INTERDISCIPLINARY APPROACHES IN SPORT SCIENCES -II

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CALISTHENICS: A COMPREHENSIVE APPROACH TO FITNESS

Abdulaziz Abdulrahman Noman Abdullah[1]

INTRODUCTION

Calisthenics, derived from the Greek words "Kallos" which means (Beauty) and "Sthenos" which means (Strength), is one of the oldest and most fundamental kinds of physical training (Srivastava, 2016). This method primarily utilizes the body's own weight as a source of resistance to improve strength, mobility, flexibility, endurance, and coordination (Campney et al., 1965). Calisthenics, which originated in ancient military training traditions, has evolved into a refined and contemporary approach to fitness, emphasizing bodyweight resistance as a fundamental component for encouraging balanced and full physical development (Beecher, 1856). The Persian Empire was the first institution to adopt physical conditioning for warriors training in offensive tactics, beginning at the age of six. Since then, military armies have used calisthenics to control their enemies (Srivastava, 2016).

Calisthenics is a form of physical training that emphasizes bodyweight movements, has a long history extending back to ancient civilizations. The Greek and Roman forces, for example, incorporated calisthenics into their training routines, using activities like marching, climbing, and bodyweight squats to improve troop strength and endurance for war readiness. This historical context emphasizes the long-standing acceptance of bodyweight exercises as an effective form of physical conditioning. The term "Calisthenics" comes from Greek and means "Beautiful Strength" emphasizing the aesthetic and functional benefits of this type of training (Basso-Vanelli et al., 2016; Gist et al., 2015; Kotarsky et al, 2018; Otzen, 1988; Ölmez and Akcan, 2021).

In light of the aforementioned information, a concise definition of "Calisthenics", as formulated, is a type of physical activity that utilizes bodyweight movements to improve body functionality, strength, mobility, flexibility, endurance, agility, performance and cardiovascular fitness. It consists of a number of functional exercises, including all push-ups variations, pull-ups variations, dips variations, squats variations, lunges variations, planks variations, and different core exercises, which are usually performed in a circuit, repetitions and sets or interval training format.

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Calisthenics exercises generally focus on increasing upper and lower body strength and its functionalities while also improving coordination and balance. This type of physical activity is highly adaptable, allowing individuals with varying fitness levels to participate. Furthermore, calisthenics training offers diversity, which is appropriate for people of all ages, including children, teenagers, adults and the elderly. Additionally, calisthenics exercises typically involve using basic equipment, such as pullup bars or rings, and can potentially be done anywhere, regardless of time or place, eliminating the need for specific gym facilities.

CALISTHENICS: A MODERN APPROACH

Modern calisthenics, known for its adaptability and accessibility, provides a diverse approach to strength training and gymnastic methodologies that can be used almost anywhere. This discipline is a return to fundamental human movement patterns, emphasizing the body's natural capacity for physical resilience and adaptation. Individuals can overcome the limitations of traditional gym-based training, which frequently relies on external weights and specialized equipment, by focusing on bodyweight exercises that create functional strength relevant to daily life (Thomas et al., 2017). Hence, in contrast to typical gym workouts, calisthenics emphasizes functional movements including pushing, pulling, squatting, and maintaining static body positions. These workouts are usually done in cyclical routines or circuits, which allow for easy adaptation to match different fitness levels.

Calisthenics is becoming increasingly popular around the world, particularly in cities where space and access to traditional gyms are restricted. The popularity of calisthenics stems from its simplicity and versatility. It has almost no equipment, can be performed anywhere, and is suitable for people of all ages and fitness levels. Furthermore, as more individuals focus on their health and fitness, calisthenics has emerged as an excellent option for those looking for useful and effective training methods (Low, 2016).

FUNDAMENTAL MOVEMENTS PATTERNS IN CALISTHENICS

Push Patterns

Upper body pushing movements are a crucial component of all calisthenics training methods. The ability to produce power in a pushing action is essential for independent living, which includes daily tasks, occupational responsibilities, and the control of heavy objects. This underlines the essential need to establish strong pushing abilities. Thus, this section divides upper body pushing exercises into three categories; horizontal pushing movements, vertical pushing movements, and dips movement, based on the primary plane of motion and the muscle groups most commonly recruited. Horizontal pushing exercises involve

the extension of the arms in a plane parallel to the ground, away from the body. Vertical pushing activities include raising the hands above the shoulders, which usually requires body inversion while performing calisthenics methods. Dips movement, characterized by a downward pushing motion of the hands towards the hips while maintaining a straight torso position. It is worth noting that there is significant muscular overlap between these exercises' types. All efficiently work the key muscles of the pectoralis, deltoids, arms (particularly the triceps brachii), and core.

- **Horizontal Pushing Movements**

Push-up is an essential form of calisthenics exercise, distinguished by its variety, accessibility, and remarkable adaptability. The push-up, which requires no specialized equipment and is easily adaptable to accommodate a wide range of fitness levels, may be customized in hundreds of ways to meet a variety of training objectives. The push-up's intrinsic simplicity contributes to its attraction. There are numerous push-up adjustments and progressions available, allowing people of all skill levels to properly incorporate appropriate variants into their training routines. Regardless of the precise goals, whether they are joint health, increased mobility, or the development of outstanding strength, the push-up movement is a highly efficient tool for improvement. While the push-up engages multiple muscle groups throughout the body, the primary emphasis falls upon the chest musculature, primarily acting at the shoulder joint, and the triceps, responsible for elbow extension.

Plank

The plank is an isometric exercise in which the body is held horizontally and supported only by the forearms and toes. Maintaining good form requires constant muscular tension throughout the body, especially the abdominals, glutes, and legs. Scapular retraction is required, with the shoulder blades brought together and compressed while applying downward pressure through the elbows. The classic plank (Straight Arm Plank), supported by the palms as shown in figure 1, mirrors the exact position of a push-up. Individuals with limited strength of their shoulders and arms are more to find this variation more difficult, whereas those with weaker core muscles are more to explore the challenging of the elbow plank (shown in figure 2). Hence, as the body approaches a perfectly horizontal position, the trunk muscles requires working harder to preserve stability and form. Yet, the elbow plank may be less stressful on the shoulders and arms than the palm-supported form. Modifications can be made to accommodate people with different fitness levels. Lowering the body to rest on the knees while ensuring a straight line is maintained from the shoulders to the knees minimizes the lever arm, thus reducing the difficulty of the exercise as illustrated in figure 3. On the other hand, raising feet makes

the exercise more difficult as presented in figure 4. Proper plank movement requires proper hip position. Leaning or high hip elevation should be avoided. The ideal form consists of a straight, stiff line running throughout the entire body from heels to the back of the head.

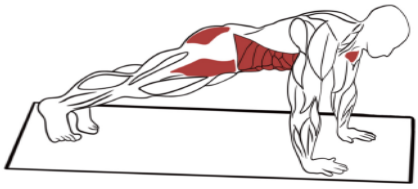

Figure 1: Straight Arm Plank

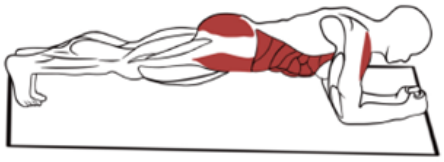

Figure 2: Elbow Plank

Figure 3: Modified Plank Type 1

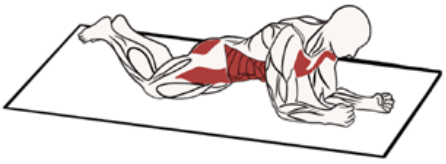

Figure 4: Modified Plank Type 2

Hollow Body

The hollow body drill is an effective tool for increasing core engagement. This skill is highly adaptable to exercises like planks and push-ups, among others. The exercise begins by resting supine with the legs flexed toward the chest and the hands alongside the body. Abdominal bracing is engaged, and the lumbar spine (lower back) remains in contact with the supporting surface. The legs are then slowly extended, with the heels at a slight distance from the ground, while maintaining lumbar spine contact (shown in figure 5). To increase the difficulty of the exercise, the chin is tucked towards the chest and the arms are raised overhead after successful leg extension without sacrificing lumbar spine contact. Furthermore, as body length increases, exercise difficulty also increases. As a result, the trunk muscles are under more strain to maintain the ideal form, which promotes strength increases.

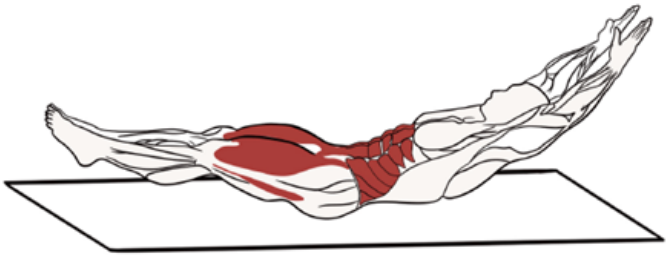

Figure 5: Hollow Body

Push-up

A prone position is assumed with the hands slightly wider than shoulder width, supported by the palms of the hands. The thumbs are placed directly under the axillae (armpits). Maintaining a solid and straight line from the heels to the head, the body is lowered until the chest touches the floor, followed by a short isometric hold in this position. The body is then pressed back to the starting position as illustrated in figure 6. The elbows are kept close to the body throughout the movement and excessive lateral abduction is avoided. Scapular retraction is emphasized in the lower part of the movement, while scapular protraction occurs in the upper part of the movement to maximize muscle engagement as shown in figure 7.

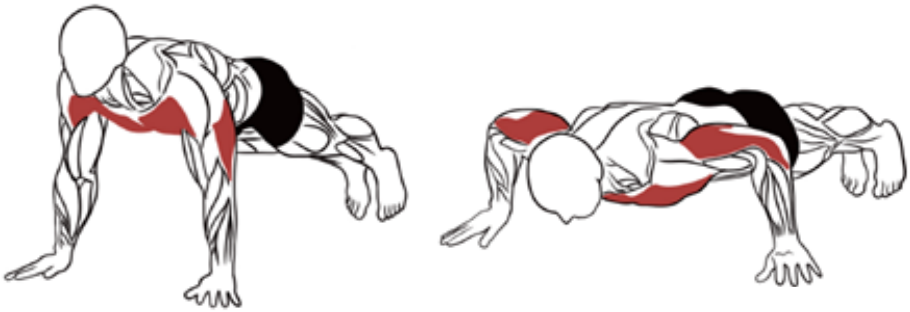

Figure 6: Push-Up

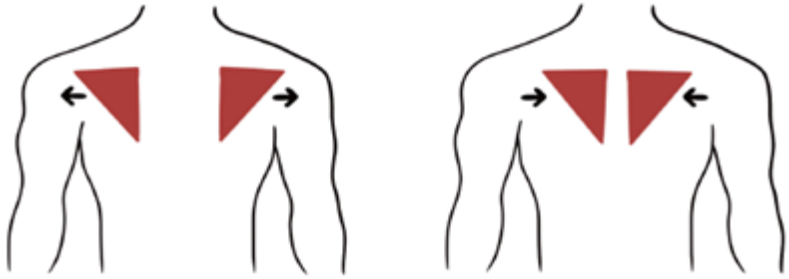

Figure 7: Scapula Protraction and Retraction

Kneeling Push-up

As presented in figure 8, kneeling push-ups are done with the knees touching the supporting surface rather than the toes. Similar to the kneeling plank, this technique minimizes the lever arm, making the exercise easier.

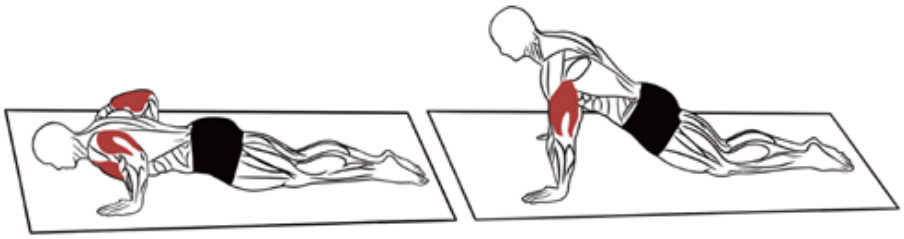

Figure 8: Kneeling Push-Up

Hands Elevated Push-Up (Incline Push-Up)

Elevating the hands over an object as shown in figure 9, provides an effective method for reducing the difficulty of standard push-ups. By inclining the body, a greater proportion of body weight is distributed towards the feet, thereby decreasing the load on the upper extremities.

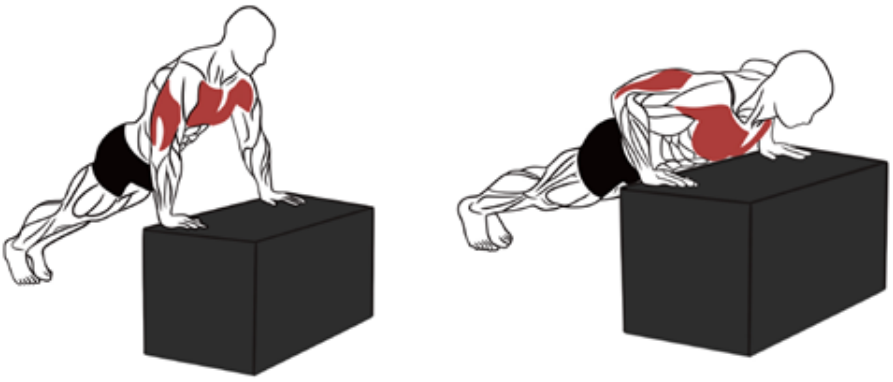

Figure 9: Incline Push-Up

- **Vertical Pushing Movements**

All upper body calisthenics training activities put plenty of pressure on the shoulders. A change in primary plane of action from horizontal (pushing) to vertical (pressing) causes a shift in emphasis from the chest to the shoulders. These exercises activate the chest, arms, abdominal muscles, glutes, and back, however the shoulders are considered the key movers in these vertical exercises.

Pike Press

The pike press begins with the hips elevated and the shoulders in line with the hands and hips. In this position, the head goes downwards towards the ground while the hips remain elevated. The body is then pushed back to its original position (shown in figure 10). Throughout the exercise, the elbows are pointed posteriorly to minimize lateral abduction.

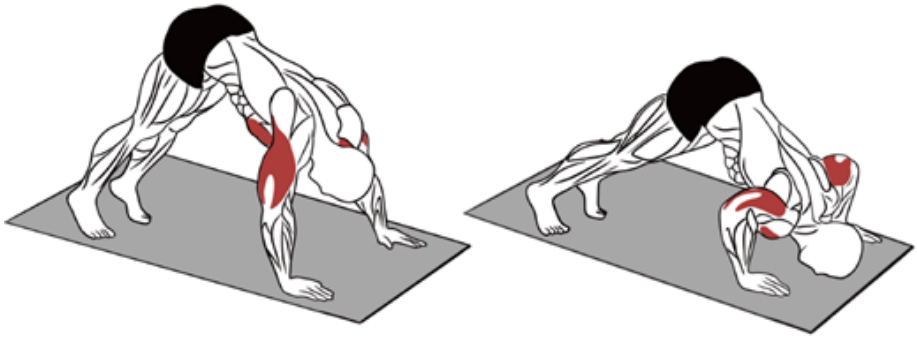

Figure 10: Pike Press

Feet Elevated Pike Press

Elevating feet increases the difficulty of the pike press movement by shifting the weight distribution to the hands. Maintaining hips positioning above the shoulder line is essential for all pike press variations to ensure the pressing movement occurs along a vertical plane as illustrated in figure 11.

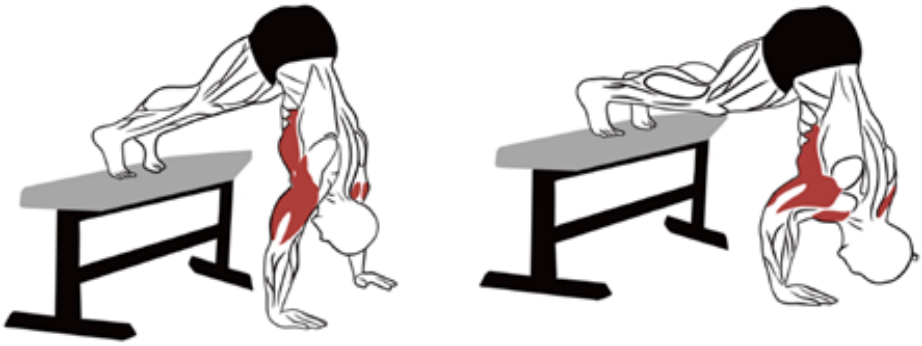

Figure 11: Feet Elevated Pike Press

Wall Handstand Press

The wall handstand press is considered as a highly challenging calisthenics exercise. The exercise is initiated by performing a handstand against a wall, followed by lowering the head towards the ground and subsequently pressing the body back to the starting position. Hand location can vary, much like in traditional push-ups. Gluteal and abdominal engagement is essential for maintaining proper posture and avoiding anterior pelvic tilt to happen (shown in figure 12). Once proficient in the wall handstand press with the back facing the wall (Back to Wall-Handstand), the exercise can be advanced to the face facing the wall (Belly to Wall-Handstand) as illustrated in figure 13. Similar to other pushing variations, narrowing the hand location can make the exercise more challenging.

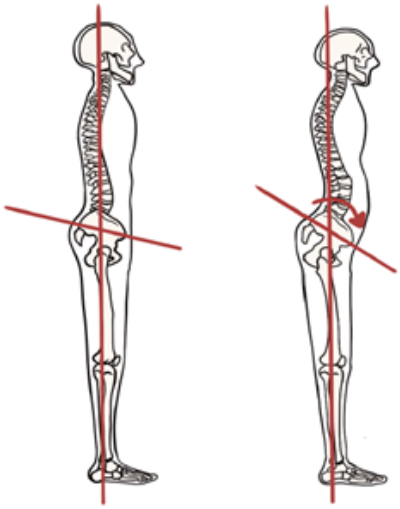

Figure 12: Pelvic Tilt

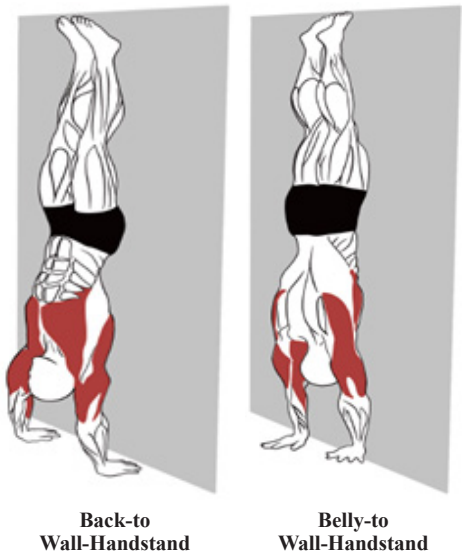

Figure 13: Wall Handstand Press

- **Dips Movements**

The dip is a key component in the development of overall pushing strength during calisthenics training. Dips are defined by the use of body weight while maintaining an upright body posture. This unique action plane generally targets pectoralis muscles (chest), deltoid muscles (shoulders) and the whole arms muscles. Notably, the triceps brachii receive greater focus in this plane compared to horizontal pushing or overhead pressing movement exercises.

Bench Dip

The bench dip variation is an excellent starting point for beginners. The exercise begins with placing the hands behind the back, palms facing downward, on a supportive surface such as a bench. Maintaining an upright torso, lower the body by flexing the elbows and shoulders, followed by an upward pressing motion (shown in figure 14). Beginners are advised to begin by flexing their knees and placing their feet on the ground. This provides for slight support from the lower extremities as needed. As skills improve, the exercise can be advanced by extending the legs and pointing the toes upwards. The legs are then allowed to relax, with the hips positioned below the shoulder line.

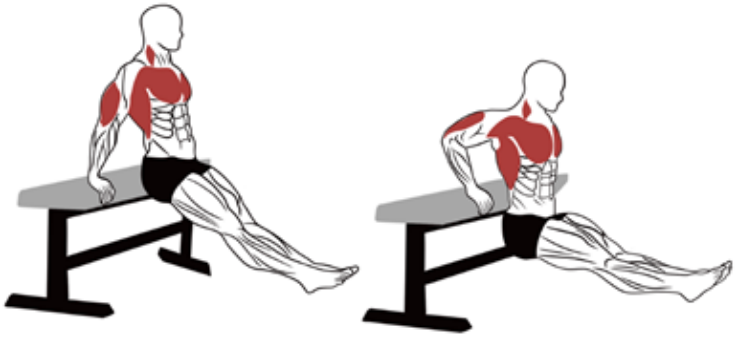

Figure 14: Bench Dip

Parallel Bar Dip

Parallel bar dips are performed by hanging the body between two parallel bars and keeping a straight position with the feet elevated from the ground. The body is lowered by flexing at the elbows and shoulders, ensuring the elbows remain directed posteriorly to optimize triceps engagement and minimize stress on the shoulder joint (shown in figure 15). To maximize training effectiveness, an upright chest position has to be maintained, and the core muscles also has to be engaged. Leg position affects exercise difficulty. Fully extended legs with a slight forward positioning improve core activation by expanding the lever arm. Inversely, flexed knees with the feet positioned posteriorly make the exercise easier. Individual preferences influence leg position and ankle crossing to improve exercise performance. Changes in elbow and shoulder flexion can modify the primary muscle groups involved. Forward leaning emphasizes chest involvement, while maintaining an upright posture prioritizes triceps and core muscles engagement.

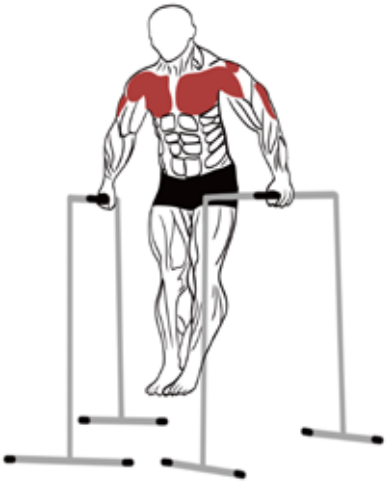

Figure 15: Parallel Bar Dip

Straight Bar Dip

A single bar, positioned anteriorly, is utilized for the performance of straight bar dips, with both hands gripping it. Straight bar dips need a circumferential movement around the bar, as opposed to parallel bar dips, which include moving between the bars. Consequently, forward leg extension is required during the descent phase to keep balance as illustrated in figure 16.

Figure 16: Straight Bar Dip

Pull Patterns

In today's society, people spend a significant amount of time engaged in activities that promote forward-leaning positions, such as desk work, mobile device usage, and driving. These activities can cause a forward-sinking chest and a curved spine, disturbing the essential concept of balance in the human body. Given such conditions, training and fitness programs should prioritize exercises that address postural imbalances. Pull exercises, in particular, serve as an important function in restoring and maintaining upper-body balance since they emphasize pulling movements. While incorporating both horizontal and vertical planes of motion, all pulling exercises stimulate the biceps during elbow flexion and the upper back musculature (latissimus dorsi, trapezius, and rhomboids) as the elbows are retracted posteriorly or towards the sides. Horizontal pulling trainings involve moving the hands towards the chest rather than extending the arms above the head. Vertical pulling trainings, on the other hand, begin with a hanging position on an overhead structure.

- **Horizontal Pulling Movements**

Horizontal pulls are widely used as preparatory exercises for vertical pulls. Nevertheless, they also have essential need as standalone movements. Since it engages a different plane of motion, this movement pattern stimulates the muscles from a unique and complementary aspect.

Australian Pull-Up

The Australian pull-up is performed by placing the body beneath a bar at around waist height and extending the legs to make a straight line from the head to the heels. Maintain a firm grip while bracing the entire body as the chest is brought towards the bar. A controlled descent occurs, returning the body to its original position (shown in figure 17). Extreme hip flexion and shoulder shrugging, like push-ups, should be avoided. To enhance traction and prevent sliding, keep the heels firmly planted on the ground. To improve accessibility for beginners, the bar height could be changed to chest level, offering more advantageous leverage. In addition, as presented in figure 18, by bending knees, the exercise becomes less difficult.

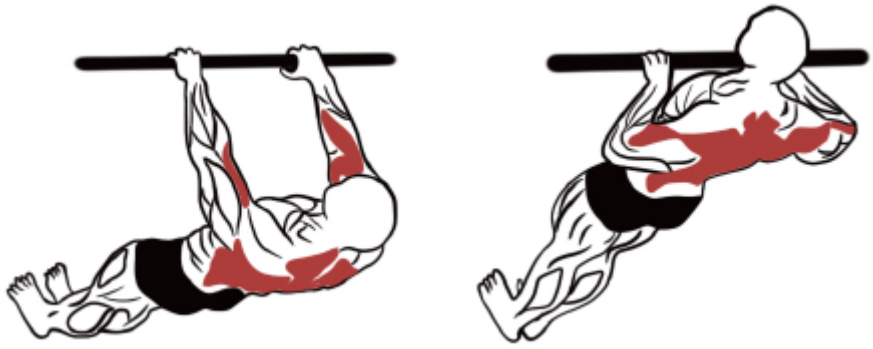

Figure 17: Australian Pull-Up

Figure 18: Australian Pull-Up Bending Knees

- **Vertical Pulling Movements**

Vertical pulling exercises are recognized as the most globally applicable calisthenics movements. The pull-up, in all of its variations, represents calisthenics' basic approach by exercising the entire body, including the cardiovascular, emotional, and spiritual domains. A pull-up is any movement that uses the arms to elevate the body while hanging from an overhead equipment. It is the foundational exercise for all advanced bar movements and is widely regarded as one of the most significant exercises in the history of the human movement.

The two arm bar hang is considered as the foundational movement in calisthenics. This involves holding an overhead bar with an overhand grip while retracting and depressing the shoulder blades. Core engagement is essential, with an intentional attempt to tuck the pelvis anteriorly, simulating the plank or hollow body position. The two-arm hang, like the plank in push-up development, is an effective beginning place for beginners looking to achieve their first pull-up.

Negative Pull-Up

The lowering part of the pull-up, referred to as a negative pull-up, is considered a beneficial preparation exercise for performing full pull-ups. The technique begins with a flexed hanging position, followed by a controlled descent to full extension before releasing the bar as shown in figure 19. Initially, maintaining control throughout the negative phase could become difficult. However, with repeated practice, descending time can be increased to ten seconds or more while maintaining a steady pace. Once this amount of control is established, doing a full pull-up becomes an achievable goal.

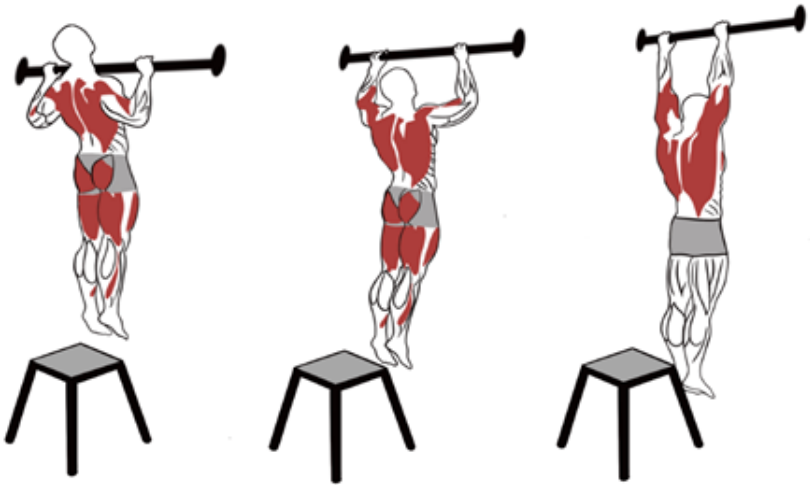

Figure 19: Negative Pull-Up

Pull-Up and Chin-Up

Pull-ups are performed by grabbing an overhead bar with hands facing away from the body. Trunk stabilization is accomplished by retracting and depressing the scapulae while equally flexing the arms, drawing the chest towards the bar. A controlled descent follows, keeping the core engaged to avoid swinging. Throughout the whole range of motion, the legs remain straight and together. While the underhand grip (chin-up) as shown in figure 20, is commonly considered as less difficult for most people. On the other hand, the overhand hold (Pull-up) as illustrated in figure 21, requires more upper back muscle activation. This variation results from the different muscle recruitment patterns associated with each grip type. The underhand grip allows for more arms participation, whereas the overhand grip emphasizes upper back muscle engagement, yet both exercises engage both muscle groups. Finally, It is important to note that chin-ups are often performed with a narrower grip than pull-ups. A recommended hand placement for chin-ups is slightly narrower than shoulder width, but a slightly wider than shoulder width grip is considered conventional for overhand pull-ups.

Figure 20: Chin-Up

Figure 21: Pull-Up

Squat Patterns (Lower Body)

Lower body strength is commonly recognized as essential for overall strength. Without strong lower-limb muscles, The capacity for efficient and independent movement in daily life may be restricted, and people may be more subject to instability. While the squat is an essential lower-body exercise, it is not the only one for leg development. Thus, this section will cover a variety of leg exercises, including the squat, which effectively activates both the anterior and posterior leg muscles. The hip, knee, and ankle are the three principal joints involved, each with its own set of muscle activations. The hamstrings and glutes help

with hip mobility, while the quadriceps help with knee extension and the calves help with ankle movement. Furthermore, the tibialis, hip flexors, lower back, and abdominals are activated. In addition, the squat targets the entire lower body and engages many muscle groups. Furthermore, its versatility enables countless modifications to accommodate a variety of fitness levels. Within this framework, I divided squat movements into two types of exercises: bilateral (Two Legs Squat Movements) and unilateral (Single Leg Squat Movements). Proficiency in bilateral movements is recommended before progressing to unilateral variations. It is worth mentioning that the squat can be modified to suit both elite practitioners and beginners.

- **Two legs Squat Movements (Bilateral)**

Bilateral squats are considered fundamental exercises. Squatting is a natural movement seen across our primate lineage, including in human infants who display this motor skill before developing independent walking. Most squat versions primarily require heels contact with the ground. This technique is proposed to improve gluteal and hamstring muscle activation. However, it is important to take into account that there are many variations of this fundamental calisthenics exercise, and exceptions to this principle may occur.

Overcoming Limitations in Squat Depth

For many individuals, achieving a full range of motion during squat performance presents the greatest challenge. If difficulty in attempting a deep squat position is encountered, it is recommended to spend extended periods in the lowest achievable position. Applying gentle pressure from the elbows against the inner thighs can be beneficial in facilitating deeper hip flexion as shown in figure 22. With consistent practice, increased hip mobility can be achieved, enabling the performance of a full-depth squat.

Figure 22: Deep Squat Technique

Bench Assisted Squat

Individuals new to the squat are recommended to use a supporting equipment such as a step, bench, or other stable object. As shown in figure 23, they should position themselves with their backs to the object and descend onto it while maintaining both feet on the floor. Extending the arms forward will assist with balance. In the event of a loss of control, the object acts as a safety precaution, preventing the fall. With regular practice, improved control during the descent phase can be achieved. Subsequently, the height of the assistive object can be gradually reduced. Over time, the ability to perform a full-depth squat without the need for external support can be developed.

Figure 23: Bench Assisted Squat

Squat

The squat is performed through assuming a shoulder-width stance. The trunk is braced, while the hips, knees, and ankles are contracted to lower the gluteal region toward the heels as illustrated in figure 24. To maintain balance, the arms could be extended forward during the descent, while keeping the chin raised and the chest upright. The objective is to bring the hip below the knee level before returning to the starting position. Ideally, the calves should make contact with the hamstrings at the bottom of the squat. Excessive spinal rounding is to be avoided, and heel contact with the floor must be maintained. Individual preferences for foot positioning may vary, with some preferring a near to parallel stance and others preferring a slight external rotation of the toes. Regardless of foot orientation, the knees should track in alignment with the toes, preventing both inward and outward bowing. Regardless of foot position, the knees should track in line with the toes to avoid both inward and outward bowing.

Figure 24: Squat

Narrow Squat

A narrow stance squat is assumed with the feet approximately hip-width apart. The hands may be placed behind the head or extended forward. Knee and hip flexion is performed until the thighs are parallel to the floor (as shown in figure 25). A return to the original upright position follows. Throughout the movement's ascent and descent phases, the tempo remains continuous. Knee alignment with the feet and heel contact with the floor are maintained. Additionally, core tightness and spinal alignment are maintained throughout the exercise. It is also noteworthy that decreased foot spacing necessitates increased hip, hamstring, and ankle flexibility to achieve full depth. Consequently, performing a full range of motion may present a mobility difficulty for some individuals.

Figure 25: Narrow Squat

Wide Squat

Adjusting the width of feet placement during a squat as illustrated in figure 26, alters muscle activation patterns. A wide squat position typically emphasizes gluteal and adductor muscles involvement. Therefore, performing a wider squat stance may facilitate greater flexibility in the hip joints. Thus, experimenting with different foot widths is suggested for determining personal needs and preferences.

Figure 26: Wide Squat

Split Squat

This version begins with a split squat stance, where one foot is positioned behind the body and the other is in front. The rear foot turns into a plantar flexed position, while the anterior foot remains in contact with the ground. While maintaining an upright body position, a descent is initiated until both knees achieve a 90-degree flexion (as shown in figure 27). Subsequently, a return to the starting position occurs. To prevent excessive forward lean, emphasis should be placed on initiating the movement from the posterior leg. And also, the center of gravity should be distributed evenly between both feet, with an approximate 50/50 weight distribution.

Figure 27: Split Squat

Bulgarian Split Squat

A split squat position is taken with the back foot elevated on a platform, such as a step or bench. The anterior foot is positioned flat on the ground, several inches in front of the hips. Both legs should be flexed, lowering the posterior knee to the ground before returning to the initial position as presented in figure 28. Elevating the rear foot during a split squat alters the weight distribution between the limbs, thereby increasing the strength demands on the front leg. This variant also stretches the hip flexor of the posterior leg. Additionally, this exercise intensity is proportional to the height of the elevated object.

Figure 28: Bulgarian Split Squat

- **Single Leg Squat Movements (Unilateral)**

A common myth about calisthenics training is that there are limits to the intensity of lower body exercise. However, this assumption is clearly incorrect. To maintain balanced leg development, it is critical to train both limbs equally. One approach involves alternating repetitions of the right and left legs. Alternatively, a whole set can be performed on the weaker limb first. This technique prioritizes the weaker limb while it is at its peak performance potential, allowing for subsequent matching of the stronger limb.

Step-Up

An elevated surface, such as a step or bench, is positioned in front of the individual. One knee is flexed, and the entire foot is placed firmly on the surface. The body is elevated by extending the leg through plantar flexion as presented in figure 29. A subsequent descent follows, and the movement is repeated.

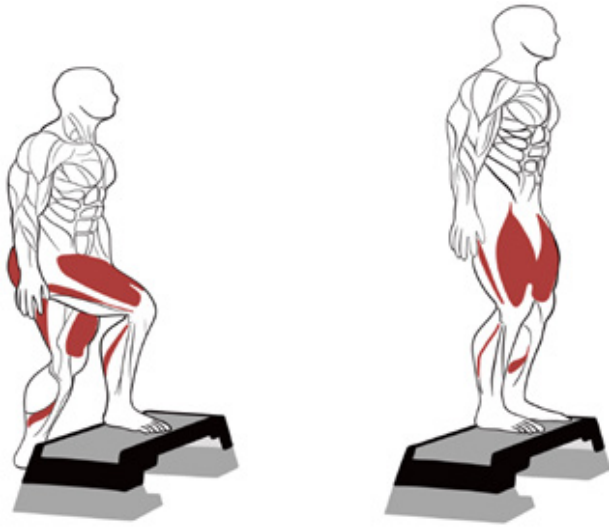

Figure 29: Step-Up

Assisted Pistol Squat

A box, bench or other sturdy object of approximately knee height is placed behind the individual. One leg is raised while the arms are extended anteriorly. A controlled descent onto the object is then performed, with a brief pause at the bottom as illustrated in figure 30. The body is then returned to an upright position by pressing the heel into the ground and engaging core muscles through abdominal contraction. The assisted-pistol squat serves as a preparatory exercise for the full movement of a pistol squat.

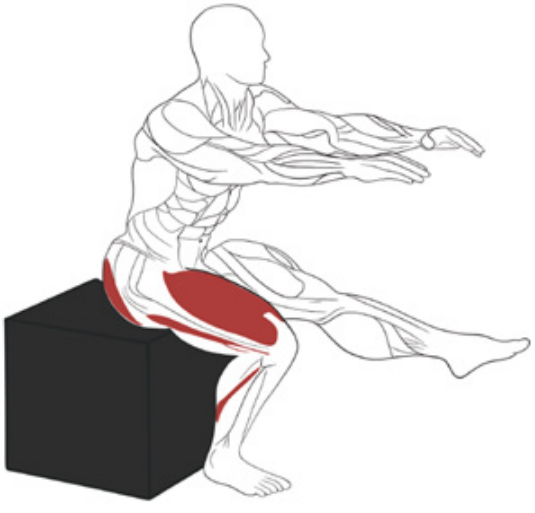

Figure 30: Assisted Pistol Squat

Pistol Squat

The pistol squat is frequently considered as the most difficult one-legged squat, requiring a harmonious combination of strength, balance, flexibility, and control. From a standing position, one leg is extended anteriorly while the knee remains extended. A deep squat is then performed on the weight-bearing leg, following a brief pause at the bottom while maintaining abdominal tension as shown in figure 31. In order to maintain the non-weight-bearing leg up, the hip flexors and quadriceps must be engaged. Keeping in mind that the weaker leg is prioritized in the first set of repetitions, followed by an equal number of repetitions on the stronger leg.

Figure 31: Pistol Squat

THE COMPREHENSIVE NATURE OF CALISTHENICS AND THE LIMITATIONS OF ISOLATED TRAINING METHOD

Calisthenics training indicates the use of the complete musculoskeletal system, proposing for a more comprehensive approach that overcomes the limitations of isolation exercises typically used in classical weightlifting. While some exercises may preferentially target specific muscle groups, total isolation of any one muscle is physiologically unachievable. The human body acts as an integrated unit, with movement patterns requiring the coordinated action of various muscle groups. This multi-joint, complex nature of calisthenics exercises, demonstrated by movements like the pull-up, which involve the biceps, latissimus dorsi, core musculature, and shoulder girdle, promotes overall strength and functional fitness. Machine-based exercises, on the other hand, often limit range of motion and stabilizing muscle recruitment, resulting in a

less comprehensive and effective stimulus for strength growth. The ability to do bodyweight exercises, such as pull-ups, which require overcoming one's own bodyweight against gravity, indicates a higher level of functional strength and athleticism than the solitary movement of a weight stack along a predetermined path.

UNLEASHING THE POWER OF A HUMAN BODY: THE FASCINATING ADVANTAGES OF CALISTHENICS

After establishing a fundamental understanding of calisthenics movement patterns, the following point discusses why it is considered a recommended kind of exercise. Calisthenics has become recognized as a new and sustainable fitness approach with numerous appealing advantages. The following is a list of the non-exclusive benefits of using calisthenics as an exercise strategy:

- **Calisthenics is For Everyone**

Calisthenics is accessible to people of all fitness levels, including beginners and professional athletes. Its progressive structure allows for adjustment and modifications, with beginners starting with basic exercises to establish a solid foundation. Adding to that, advanced practitioners can be exploring harder or more advanced options to stay motivated and progress in their fitness journeys.

- **Freedom to Train Anytime, Anywhere**

The essence of calisthenics is to use one's own body weight, making it a highly adaptable exercise routine. The choices for push-ups variations, pull-ups variations, and squat movement variations are almost unlimited. This adaptability makes it a suitable alternative for people who have busy schedules or demanding routines.

- **A Cost-Affordability Fitness Solution**

By eliminating the need for costly gym subscriptions, calisthenics provides an affordable and sustainable fitness option. Because these exercises can be performed in a variety of locations, they are accessible to a wide range of people, regardless of their financial situation. A study in 2017 shows that calisthenics is being noticed to be effective for aesthetic physical development and has gained increasing popularity over the years due to its low cost of practice, being primarily practiced in public parks, and its ease, requiring no or minimal equipment such as a high bar or parallel bars (Thomas et al., 2017).

- **Equipment-Free Fitness Approach**

Unlike traditional weightlifting, calisthenics does not require any external weights or specialized equipment. Benches or boxes from around the house can be used as tools, horizontal and vertical bars can be found in public parks. All these tools are easy to find and reach. Additionally, a weighted backpack, for example, is a low-cost solution for enhancing resistance.

- **Keeping Exercises Engaging and Dynamic**

With a wide range of exercises and unlimited progression or regression alternatives, calisthenics provides a refreshing alternative to repetitive routines. This variety ensures a consistently engaging exercises experience. The flexibility to modify training settings adds to variety, keeping physical activity exciting and distinctive.

- **Enhanced Recovery Time**

Compared to weightlifting, which can require longer recovery times, calisthenics puts relatively little stress on the body, allowing for faster recovery. This efficiency not only increases fat-burning capacity, but also makes calisthenics a desirable and practical form of exercise.

- **Strengthening the Brain-Body Connection**

In contrast to machine-based training, calisthenics requires both mental and physical abilities, including focus and precision. The combined effort improves reaction times and coordination, leading to increased overall awareness and improved mental and physical integration.

- **Core Strengthening and Spinal Protection**

The core is one of the primary parts to focus on in calisthenics as it is the center of the human body on which the upper and lower parts of the human body depend. Thus, by emphasizing core activation, calisthenics strengthens the spine while minimizing strain that can be caused by excess weight. Exercises such as planks or leg raises on pullup bar can improve spinal stability, which reduces the risk of back problems and promotes general spinal health. According to Kalym and frosin (2014), they mentioned that the spine does not have a great range of motion, yet it is critical to preserve mobility in this area. Thus, the core muscles help to stabilize the spine. Besides that, Kalym (2019) reported that a strong core provides an ideal foundation for motions while also protecting the spine from injuries. He also added, calisthenics combines spine-specific mobility exercises such as "foam rolling". These exercises can assist with reducing stiffness and tightness in the back muscles while also improving spinal extension. "*Side Leans*" are also utilized to increase flexibility in the obliques and lower back. Lastly, he noted that using various calisthenics movements, the core muscles are gradually challenged, which benefits spinal health.

- **Enhancing Weightlifting Capabilities**

Since calisthenics exercises strengthens the core and increases body control, it is an excellent complement to weightlifting. Mastering appropriate form with bodyweight exercises reduces the risk of injury while improving overall performance, making future weight training sessions safer and more effective.

- **Boosting Confidence Through Calisthenics**

The practice of calisthenics promotes both a physical transformation and improved self-esteem. Observable physique changes and successful mastery of several exercises all lead to enhanced self-confidence and a general sense of well-being. These positive results could well contribute to improved psychological well-being and a higher sense of personal accomplishment. Based on the findings of *"Complete Calisthenics"* books by Kalym and Frosin (2014); Kalym (2019), they stated that calisthenics has an additional advantage in that resistance is naturally personalized utilizing the trainees' own bodyweight. This customized technique frequently results in a smoother learning curve for beginners as compared to traditional dumbbell and barbell weightlifting. This natural adaptability can boost confidence and motivation, resulting in a more positive and lasting training experience.

- **Progressive Overload in Calisthenics**

Progressive overload is a fundamental principle in calisthenics and strength training. Calisthenics provides a various method of achieving this. Individuals can continually challenge their neuromuscular systems and stimulate adaptation by adjusting exercise variables such as range of motion, tempo, and the addition of external resistance. This adaptability makes calisthenics an affordable and effective method for people of all fitness levels, from beginners to professional athletes.

- **A Joint-Friendly Approach**

The exercises of calisthenics, which rely purely on bodyweight, reduces stress on joints and connective tissues. This makes it a safer option to weightlifting, which can occasionally cause joint strain or damage due to the excessive load. In Kalym and Frosin's (2014) perspective, calisthenics provide a lower chance of injury. This is due to the basic nature of calisthenics, which involves increasing resistance primarily through adjustments in leverage and range of motion. In contrast, weight training with dumbbells and barbells allows for rapid increases in resistance by simply adding more weight, even for unskilled individuals, considerably increasing the risk of injury. Furthermore, the improvement in calisthenics is naturally slow. More difficult exercises usually necessitate months or years of concentrated practice before they can be properly performed and integrated into a regular training plan. This is in stark contrast to weightlifting, where even beginners can undertake exercises with heavy loads, such as a 100kg or 200lb barbell squat, from the beginning.

- **Involving the Entire Body**

By addressing many muscles groups at once, calisthenics increases overall muscular development. This balanced technique promotes overall strength and functionality while avoiding the isolation of specific muscles. For example, movements like the "*Planche*" requires all of the muscles in the body to work

together, with complete tension needed to make the movement. Even exercises such as push-ups target the triceps, forearms, chest, shoulders, and core. This differs from several standard weight training approaches that isolate specific muscles.

- **Perfect Exercise Form**

Calisthenics makes it simpler to maintain proper form throughout exercises by reducing physical strain and focusing on technique. Progressions are designed to help practitioners optimize their movements, assuring efficiency and injury prevention. (Quality over quantity)

- **Enhancing Functionality for Everyday Movement**

The implementation of calisthenics improves balance, coordination, and core strength, allowing people to execute daily activities more efficiently and with fewer injuries. Additionally, Improved posture and faster reaction times are additional benefits, making it a comprehensive fitness strategy.

- **Effective Fat Burning Method with Calisthenics**

The ability of calisthenics to activate many muscle groups at once, combined with shorter rest intervals, promotes efficient fat burning. This metabolic resistance training method maximizes energy expenditure and accelerates fat loss. A study by Poti and Upadhye in (2019) indicates that calisthenic exercises and strength training programs have proven to be essential elements in weight loss treatment. Specific care has to be taken when establishing volume-intensity training for treatment adaptation and an appropriate customized exercise program should be recommended. Another study shows that regular calisthenics exercises can contribute to positive changes in overall body composition, particularly by decreasing body fat percentage in both the whole body and regional extremities, while simultaneously increasing free fat mass (Ciğerci and Genç, 2020).

- **Achieving a Balanced Physique**

With the impact of working multiple muscle groups at the same time, calisthenics naturally builds a symmetrical and proportionate body. Moreover, its integrative approach results in an aesthetically appealing and balanced physique, making it unique among exercise approaches.

- **A Time Saving Approach**

Eliminating the need for a facility or equipment, calisthenics allows people to focus completely on their training. By stimulating multiple muscles in each session, this method maximizes benefits in less time, making workouts both efficient and effective.

CONCLUSION

Calisthenics provides a comprehensive and adaptable approach to fitness, offering numerous advantages for individuals of all fitness levels. By utilizing bodyweight movements and emphasizing functional movements, calisthenics enhances strength, mobility, flexibility, endurance, coordination, and overall well-being. In addition, calisthenics is a sustainable and adaptable training method that it offers individuals with varying fitness levels and goals. Beginners can start with simpler variations and progressively challenge themselves as they gain strength and proficiency. Experienced athletes can explore advanced movements and techniques to further enhance their performance. The holistic nature of calisthenics extends beyond physical benefits, encompassing mental, emotional, and even spiritual aspects. The focus, control, and body awareness required in calisthenics training improve a deeper connection between the mind and body. Moreover, calisthenics is not only a form of exercise; it is a lifestyle choice that promotes self-sufficiency, resilience, and a deep appreciation for the capabilities of the human body. It empowers individuals to take control of their fitness journey, fostering a sense of accomplishment and self-reliance. As calisthenics continues to gain popularity, it is likely to inspire more people to embrace a fitness approach that is accessible, effective, and truly sufficient. Lastly, the principles and practices of calisthenics encourage individuals to explore their physical potential and achieve a level of fitness that go beyond the limitations of classical training methods.

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SUSTAINABILITY IN RECREATION: AN ACADEMIC PERSPECTIVE

Ferhat Kılıçarslan[1]

To my beloved Sena...

INTRODUCTION

Sustainability is an approach that aims to use existing resources without jeopardizing the needs of future generations. This concept, which includes environmental, economic and social dimensions, requires the protection of ecosystems, sustaining economic prosperity and ensuring social equality (Sen, 2018; Riccioli & Cozzi, 2021). Today, the need to strike a balance between natural resource management, economic growth and social justice within the framework of sustainable development principles is becoming increasingly important.

However, global economic systems fall short of protecting natural capital. Often, economic growth targets lead to overuse of resources, ignoring environmental externalities (Gonzalez-Redin, 2024). This situation necessitates the integration of nature conservation policies with economic systems to ensure sustainability. Global policies such as the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs) aim to promote sustainable development and support the green economy (Merino-Saum et al., 2018).

Figure 1. Global Goals for Sustainable Development (kureselamaclar.org, 2025)

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The visual in Figure 1 shows the United Nations' 2030 Sustainable Development Goals. 1) End Poverty: It is aimed to end all forms of poverty. 2) End Hunger: It aims to end hunger and ensure food security. 3) Healthy Individuals: It aims to ensure a healthy life and well-being at all ages. 4) Quality Education: It is aimed to ensure inclusive and equitable education opportunities. 5) Gender Equality: It aims to empower women and girls and ensure equality. 6) Clean Water and Sanitation: It aims to ensure access to clean water and sanitation for all. 7) Accessible and Clean Energy: Ensuring access to affordable, reliable and sustainable energy is targeted. 8) Decent Work and Economic Growth: The objective is to ensure sustainable economic growth and increase decent work opportunities. 9) Industry, Innovation and Infrastructure: Building resilient infrastructures and supporting sustainable industrialization are targeted. 10) Reducing Inequalities: It aims to reduce inequalities within and between countries. 11) Sustainable Cities and Living Spaces: It is aimed to make cities safe, resilient and sustainable. 12) Responsible Consumption and Production: It aims to promote sustainable production and consumption patterns. 13) Climate Action: It is aimed to combat climate change and take urgent measures against its impacts. 14) Life in Water: Protection and sustainable use of oceans, seas and water resources are aimed. 15) Terrestrial Life: Protection of terrestrial ecosystems and sustainable use of biodiversity are targeted. 16) Peace, Justice and Strong Institutions: Building peaceful and inclusive societies and ensuring justice for all. 17) Partnerships for the Goals: Strengthening global partnerships for sustainable development.

Since recreation activities are directly related to natural resources, sustainability principles should also be adopted in this field. However, unplanned recreation practices lead to environmental degradation, threaten economic sustainability and increase social inequalities. Therefore, planning recreation activities in line with sustainability principles is critical to ensure long-term environmental, economic and social benefits.

Sustainability refers to the balanced management of natural, economic and social resources to meet human needs. Global problems such as environmental degradation, rapid resource depletion and climate change have made it imperative to adopt sustainable approaches. In this context, sustainability is a multidimensional approach that aims not only to preserve ecological balance but also to ensure sustainable economic growth and social welfare.

Sustainability in recreation involves protecting ecosystems, supporting economic systems in the long term and increasing social benefits. Sustainability in recreation involves protecting ecosystems, supporting long-term economic systems and enhancing social benefits. This requires a multifaceted approach that integrates ecological, economic and social dimensions. According to

Venohr et al. (2018), water-based recreational activities are the most damaging to ecosystems and the most difficult to achieve sustainability. When nature-based recreational activities are not planned in an environmentally sensitive manner, they can disrupt the ecological balance, threaten biodiversity and cause overuse of natural areas. On the contrary, sustainability principles to be applied in recreational activities in these areas can help increase biodiversity by protecting ecology (Giertliova et al., 2023). Climate change poses a risk to recreational opportunities by affecting ecosystem services. Adaptation strategies and management plans that include climate impacts are crucial for sustainable recreation (Winter et al., 2019; Manley and Egoh, 2022).

Similarly, the economic sustainability of the tourism and recreation sector may be at risk due to unplanned investments or unbalanced growth. On the social dimension, there may be inequalities in access to recreation services and cultural values may be ignored. Therefore, sustainable recreation requires activities to be shaped by the principles of environmental sensitivity, economic balance and social inclusiveness. Recreational activities such as forests and fisheries can provide significant economic benefits. These include income from tourism and local economic support through job creation (Brownscombe et al., 2019; Tavárez and Barriga, 2023). Tools such as social media data can help map and assess recreational ecosystem services, provide insights into economic benefits, and support decision-making in resource-limited regions (Hermes et al., 2018; Sinclair et al., 2018). Recreational fishing and forest activities can support community engagement and social change by promoting conservation-oriented practices and citizen science (Brownscombe et al., 2019). Understanding cultural differences and social dynamics is essential for equitable service delivery in outdoor recreation and tourism, ensuring diverse community needs are met (Chakraborty et al., 2020).

The implementation of sustainability principles in the field of recreation should be supported both by conscious consumption and behavioural changes at the individual level and by policy and management strategies at the macro scale. Nature-friendly practices, accessible and inclusive activities, models that support the local economy and long-term planning processes are among the key components of sustainable recreation. In light of this information, the present book chapter will share the views on sustainability in recreation from the perspectives of experts working as academicians in the recreation departments of different universities in Turkey.

Environmental Sustainability in Recreation

Intertwining recreational activities with nature requires an important responsibility in terms of environmental sustainability. Protection of natural areas, sustainability of ecosystems and continuity of biodiversity are among

the basic elements of environmental sustainability. However, unplanned and excessive recreational use can lead to the destruction of natural areas, pollution of water resources, habitat loss and an increase in carbon footprint. Therefore, addressing recreation within the framework of environmental sustainability necessitates the development of a structure that is compatible with natural areas.

The first step to ensure environmental sustainability is to minimize the ecological footprint. Because with the spread of outdoor recreation and nature-based tourism, pressure on wildlife increases, ecosystems deteriorate and environmental sustainability is threatened (Monz & et al., 2010). Strategies such as waste management, energy saving, reduction of carbon emissions and protection of water resources should be implemented in recreation areas. Especially in nature-dependent recreational activities such as nature sports, ecotourism and outdoor activities, conscious consumption and environmentally friendly practices for the protection of the natural environment should be encouraged. In this context, the concept of "Low-Impact Recreation" emerges first. This concept is becoming increasingly important as participation in outdoor recreation increases. Low-impact recreation (LIR) is an approach that encourages recreational activities to be carried out without harming nature. This concept is based on a set of principles that aim to minimize the negative impacts of human activities on the natural environment (Sriskin and McCool, 2006).

One of the most well-known applications of low-impact recreation is the Leave No Trace (LNT) approach. LNT principles are a guide that enables individuals to minimize their footprint on the natural environment during outdoor sports and recreational activities (Backman et al., 2018). These principles include strategies such as not going off the beaten path, not disturbing wildlife, not leaving waste in nature, using sustainable fuel, and protecting water resources (Marion, 2014).

Research shows that low-impact recreation practices have a positive conservation impact on ecosystems and that awareness-raising training can increase environmentally friendly behaviours (Wu et al., 2021). However, more field studies are needed to disseminate this education and measure its effectiveness. Especially in recreation areas with high visitor numbers, LNT training integrated with sustainable tourism policies can play an important role in protecting natural areas (Sytsma et al., 2022).

However, low-impact recreation should not be limited to individual awareness but should be supported by policies and practices at the managerial level. Research shows that recreation areas can be sustainably protected through measures such as controlled visitor management, creating designated trails and campsites, and improving waste management systems (Bötsch et al., 2018; Marion et al., 2016).

Low-impact recreation stands out as an approach that should be integrated with sustainable ecotourism and nature conservation strategies by enabling individuals to engage in recreational activities in harmony with nature. In this context, education programs and management strategies supported by scientific research have an important place in shaping sustainable recreation policies (Monz & et al., 2020; Kılıçarslan & Ayyıldız Durhan, 2024).

Training on Leave No Trace (LNT) principles can significantly increase hikers' awareness and reduce their negative impacts on the environment, such as air quality and wildlife disturbances (Wu et al., 2021). However, more field studies are needed to disseminate this education and measure its effectiveness. Even low levels of outdoor recreation can change wildlife behaviour. Studies show that human presence can influence spatial and temporal patterns of wildlife activity, even in lightly visited areas, indicating that human-wildlife interactions need to be carefully managed (Marion et al., 2016; Sytsma et al., 2022). Recreational trails can disturb wildlife, especially forest birds, by altering habitat structure and increasing human presence. This disturbance can reduce bird density and species richness near trails (Bötsch et al., 2018). Implementing educational programs to increase awareness of low-impact practices among recreationists can reduce negative environmental impacts (Wu et al., 2021).

Effective visitor management, such as keeping visitors away from sensitive areas and preventing new trail construction, can help reduce human disturbance in natural habitats (Bötsch et al., 2018). However, research on the implementation processes and effectiveness of these strategies needs to be increased. Continuous research and monitoring of the impacts of recreation on wildlife and ecosystems is crucial for the development of effective conservation strategies (Marion et al., 2020; Monz et al., 2020).

Recreational activities such as camping, hiking, trail and road use can significantly alter plant communities. These activities often increase the frequency of certain plant species while reducing overall species and phylogenetic diversity, leading to vegetation degradation and soil compaction (Erfanian et al., 2021; Monz, 2021). However, more data should be provided on which plant species are more resilient and which habitats are most vulnerable. Water-based recreational activities such as boating, swimming and angling can stress freshwater ecosystems. These activities affect the integrity of aquatic ecosystems, affecting individual species, populations and communities, particularly invertebrates and plants (Schafft et al., 2018; Venohr et al., 2018).

In the process of management and planning of recreation areas, policies in line with sustainable development principles should be developed. Green infrastructure practices, nature-friendly park designs, and landscape arrangements compatible with local flora and fauna can ensure the use of

recreation areas without disturbing the ecological balance. In addition, educational programs and awareness-raising activities aimed at increasing the environmental awareness of individuals can contribute to the dissemination of nature-sensitive recreation habits. Implementation of visitor restrictions and better monitoring can help manage the load on natural areas, reducing ecological impacts (Erfanian et al., 2021; Monz et al., 2013). However, more work needs to be done on the economic and social impacts of these management strategies.

To promote environmental sustainability, nature conservation policies and recreation planning need to be integrated. Controlled tourism practices, determining carrying capacity and adopting ecosystem-based management models in protected areas can help minimize the environmental impacts of recreational activities. Furthermore, innovative sustainability solutions such as the use of renewable energy sources in recreational facilities and carbon offset projects are important steps to support ecological sustainability.

The environmental sustainability of recreation areas is not only the responsibility of managers and policymakers but is also directly related to the nature-sensitive behaviour of individuals. Increasing the ecological awareness of participants, popularizing nature-friendly recreational habits and adopting a responsible tourism approach are among the key elements that will strengthen environmental sustainability. Accordingly, addressing recreation in the context of environmental sustainability will ensure the creation of a recreation understanding that is compatible with nature and transferable to future generations.

Economic Sustainability in Recreation

In addition to being an important area that supports the physical, mental and social well-being of individuals, recreational activities also contribute directly to economic development. This impact is observed through various channels such as tourism, job creation and infrastructure development. However, economic sustainability is not limited to generating income but involves a multidimensional process of ensuring long-term financial stability, sustaining economic returns by protecting natural and cultural resources, and strengthening local economies. Since factors such as unplanned investments, excessive commercialization and unconscious use of natural resources can threaten economic sustainability, the economic dimension of recreation should be considered together with the principles of environmental and social sustainability.

Recreation areas can stimulate economic growth by attracting tourists whose spending supports local economies. However, the economic impact per dollar spent by tourists can often be lower than in other sectors. Therefore, when the volume of tourist spending is sufficient to offset this lower impact, the overall

contribution can be significant (Beardsley, 2008). Recreational activities can directly support job creation and community development. For example, the Northern Forest Canoe Trail generated an economic impact of $12 million and supported around 280 jobs. However, this impact varies across communities due to differences in visitor numbers and spending patterns (Pollock et al., 2012). Investments in recreational infrastructure such as trails can contribute to economic development by increasing visitor spending. Such investments also include the development of tourist services and infrastructure that stimulate entrepreneurial activities and job creation (Lukoseviciute et al., 2022; Musostov et al., 2023).

Various economic analysis methods are used to measure the economic value of recreation. Methods such as Cost-Benefit Analysis, Input-Output Tables and Social Return on Investment Modeling are important tools for assessing the economic impact of recreation activities (Keane et al., 2019). However, the magnitude of this economic impact can vary depending on factors such as location, type of activity and community characteristics. Strategic management and sustainable planning are necessary to maximize economic benefits (Pollock et al., 2012).

Recreational activities play a vital role in economic growth by stimulating tourism, creating jobs and promoting community development. At the same time, given that these activities can damage the ecological balance, effective management is required to balance economic sustainability with environmental sustainability. On a global scale, recreational activities, together with tourism, contribute significantly to GDP and create millions of jobs worldwide (Ragoonaden, 2016). For example, recreational trails such as hiking and cycling boost local economies by increasing visitor spending (Lukoseviciute et al., 2022). However, it should be noted that while these activities provide economic contributions, they involve many dynamics that need to be managed in terms of ecological sustainability.

Recreation activities can diversify rural economies and promote community development (Pollock et al., 2012). However, while promoting economic growth, they can also have negative impacts, such as depletion of natural resources and environmental pollution. Sustainable management and strategic planning are necessary to balance economic benefits and environmental protection (Popadynets et al., 2023). In this context, the adoption of sustainable tourism and recreation practices is critical to ensure long-term economic and social benefits.

Developing recreation models that contribute to local economies is a cornerstone of economic sustainability. Activities such as ecotourism, extreme sports and cultural events can promote regional development and support the

strengthening of small and medium-sized enterprises. Involving local people and distributing economic benefits fairly can increase regional prosperity, while public and private partnerships can contribute to maintaining a sustainable financial structure. Channelling tourism revenues to directly benefit local communities is an important strategy to enhance economic sustainability. Activities such as forest recreation and outdoor recreation can have broad economic impacts by directly contributing to related industries such as tourism, hospitality, catering and retail (Qiu et al., 2023).

The multiplier effect of recreation investments should not be underestimated. For example, forest recreation in China has created more than 18 million jobs, largely in low-skilled sectors (Qiu et al., 2023). Similarly, paddler recreation along the North Forest Canoe Trail has supported around 280 jobs (Pollock et al., 2012). Recreation investments strengthen the economic cycle by increasing sales, income and employment in local economies (Perna et al., 2019).

The economic impact of recreation can vary greatly between communities due to differences in visitor numbers, trip lengths and local infrastructure (Pollock et al., 2012). Moreover, the sustainability of the economic contribution of recreational facilities is directly related to infrastructure investments and environmental management policies (Kulczyk et al., 2018). However, economic leakages, such as the sourcing of materials and services from non-local sources, can reduce the local economic benefits of recreational activities. Therefore, increasing local capacity and community engagement can be effective in reducing leakage (Butler et al., 2020).

One of the most important factors supporting economic sustainability is the balanced orientation of public policies and private sector investments. Collaboration between public institutions, the private sector and civil society organizations can facilitate the implementation of sustainable recreation policies, while incentive mechanisms can ensure the economic stability of sustainable tourism and recreation activities. In this process, sustainable recreation strategies integrated with regional development policies can help strike a strong balance between long-term economic growth and social welfare.

Social Sustainability in Recreation

Social sustainability aims to ensure that individuals benefit fairly from recreational opportunities, preserve cultural diversity and strengthen community ties (Eizenberg & Jabareen, 2017). In this context, social sustainability in recreation can be explained as the planning and implementation of recreational activities that provide equal access to all members of society, increase social integration and quality of life, and provide social benefits in the long term. In this framework, recreational activities that support social cohesion between individuals, increase the participation of disadvantaged groups and

provide long-term social contributions are among the key elements of social sustainability (Lehew et al., 2015). Different researchers offer various views on the key components of social sustainability. According to Nilson et al. (2023), social sustainability aims to achieve social justice, well-being and solidarity based on four key elements: equity, well-being, participation and social capital. On the other hand, Ly and Cope (2023) consider social sustainability through five key dimensions such as security, equality, social inclusion, quality of life and social cohesion, and base it on risk management and the effective use of social capital. These perspectives show that achieving social sustainability in recreation policies requires a multidimensional approach.

Recreation areas are part of larger socioecological systems in which social, economic and ecological factors interact. Social sustainability requires understanding these interactions and adapting to climate change, demographic shifts and urbanization to balance human use and ecological health (Winter et al., 2013). Therefore, an accessible, inclusive and participatory structure should be developed to create a socially sustainable recreation system (Winter et al., 2019; Ristevski et al., 2024). In particular, the participation of individuals of different ages, genders, socio-economic levels and physical abilities in recreational activities should be encouraged (Litwiller et al., 2017; Hajjar et al., 2019). Practices such as creating suitable areas for people with disabilities (Shannon et al., 2021; Ayyıldız Durhan et al., 2024), developing support mechanisms for low-income individuals to access recreation opportunities, and expanding community-based recreation projects (Tongpong, 2015) play a critical role in ensuring social sustainability. Moreover, designing recreational spaces in a way that is safe, and accessible and encourages social interaction creates an environment that supports the active participation of individuals (Zwart and Hines, 2022; Kılıçarslan & Özant, 2024).

Recreational activities that support social sustainability are community-based, inclusive and promote cultural integration. Spaces such as parks, playgrounds and community centers are important hubs for social interaction and cultural exchange, contributing to community cohesion and individual well-being (Souza, 2024). Programs for disadvantaged groups such as immigrants or people with disabilities increase social inclusion by reducing barriers to participation (Forde et al., 2015; Litwiller et al., 2017, Ristevski et al., 2024). Recreational activities that promote cultural integration help preserve ethnic cultures, support socio-economic progress and strengthen social bonds between individuals (Stodolska, 2015). Moreover, access to recreational activities improves individuals' physical and mental health, reduces stress levels and contributes to community development (Baydar Arıcan, 2020; Souza, 2024). In particular, it functions to support social participation and recovery

processes of individuals with mental health problems (Litwiller et al., 2017). In addition, recreation activities support economic sustainability by increasing property values, attracting businesses and contributing to economic vitality (Bright, 2000; Vaugeois et al., 2017; Souza, 2024). However, factors such as socio-economic constraints, lack of access and cultural differences can limit individuals' participation in these activities (Forde et al., 2015; Stodolska, 2015). To overcome these barriers, culturally sensitive marketing strategies, community partnerships and inclusive governance approaches should be adopted (Ristevski et al., 2024).

There are various barriers to social sustainability in recreation. These barriers include social, economic, cultural and psychological elements and can negatively impact sustainability efforts by limiting equal access and participation in recreational activities. Cultural and ideological barriers include participation limitations resulting from societal norms and individual beliefs. These barriers, which can vary greatly between different communities and countries, can make it difficult for individuals to participate in recreational activities (Kunicki, 1985; Milbrath, 1995). Economic and practical barriers include financial limitations such as transportation costs, entrance fees and accommodation costs. Especially for disadvantaged groups, these economic factors can prevent equal access to recreational spaces (Robinson et al., 2022; Aguilar-Carrasco et al., 2023). Psychological barriers are related to factors such as perceptions of safety and personal comfort and can discourage individuals from participating in recreational activities. These barriers are linked to broader societal issues such as crime rates and discrimination (Robinson et al., 2022).

To promote social sustainability, an inclusive approach should be adopted, ensuring equal access, adaptation to socio-ecological changes and inclusive governance. Recreation programs can overcome barriers and increase sustainability by fostering community partnerships and implementing culturally sensitive practices. Addressing challenges such as funding and intercultural integration are essential for long-term success (Forde et al., 2015; Winter et al., 2019). In this context, building inclusive infrastructures, providing economic support mechanisms for low-income individuals, and mainstreaming community-based recreation strategies should be among the key strategies to ensure social sustainability.

Barriers and Challenges to Sustainability in Recreation

While ensuring sustainable recreation requires balanced management of environmental, social and economic factors, there are structural, managerial and individual barriers to this process. These barriers make it difficult to implement sustainability principles effectively and threaten the implementation of recreational activities in an environmentally compatible, economically

sustainable and socially inclusive framework. Policy gaps, lack of awareness, financial constraints and overuse of natural resources are among the main challenges facing sustainable recreation.

Problems related to policy and management are one of the biggest factors preventing the spread of sustainable recreation practices. The lack of adequate policies and regulations on the protection and management of recreational areas and the ineffective implementation of existing ones lead to the destruction of natural areas and unbalanced growth. In addition, the lack of legal frameworks supporting sustainability principles and the lack of administrative coordination makes it difficult to implement sustainable recreation policies. In Turkey, there are significant gaps in the development and implementation of sustainable recreation policies. When Turkey's development plans are examined, it is seen that recreation is not directly addressed or evaluated in a limited scope. Especially in the Sixth Five-Year Development Plan (1990-1994), although it was proposed to open recreation departments in the physical education and sports departments of universities, limited progress was made in the implementation of this proposal (Yetim, 1999). This situation points to the lack of long-term strategic goals in the planning and management of recreation in Turkey. Furthermore, when the role of local governments in the provision of recreation services is examined, it is seen that central government policies are at the forefront and there is not enough policy development at the local level. In Turkey, the influence of local governments in the formulation of sports and recreation policies remains limited and planning is generally done at the central level (Akandere and Özyurt, 2005). This situation creates deficiencies in protecting recreation areas and managing them in a sustainable framework. In particular, the lack of legal frameworks supporting sustainability principles and the lack of administrative coordination make it difficult to protect and sustainably manage recreational areas (Karaküçük, 2017). To promote sustainable recreation in Turkey, recreation policies should be addressed more comprehensively in development plans, local governments should play a more active role in this process and governance mechanisms should be strengthened. In particular, it is important to improve legal regulations and increase coordination between local governments and central government to protect natural areas, provide sustainable recreation services and implement planning that considers ecological balance.

Lack of awareness and education stands out as one of the important barriers to sustainable recreation. Inadequate awareness of individuals participating in recreational activities about environmental impacts may prevent the spread of nature-friendly behaviours. Especially in intensive tourism regions and nature-based recreation areas, participants' failure to exhibit behaviours under sustainability principles may lead to the rapid depletion of natural

resources (Zhang et al., 2022). In this context, unless educational programs, awareness-raising campaigns and incentive policies are developed to increase environmental awareness, the effectiveness of sustainable recreation practices remains limited. Increasing environmental awareness and promoting sustainable behaviours among recreationists can reduce negative impacts (Sharmin et al., 2020; Babatunde, 2024). Many outdoor recreation programs and small tourism businesses lack adequate sustainability education, which is crucial for promoting sustainable practices. This knowledge gap affects the ability to effectively implement sustainable living philosophies and techniques (O'Connell et al., 2005; Midgett et al., 2020). For people with disabilities, physical barriers such as inadequate trails and signage in natural parks limit participation in sustainable recreation (Aguilar-Carrasco et al., 2023). Participation in nature-based tourism can strengthen tourists' commitment to environmental stewardship, which is vital for sustainable tourism (Monz et al., 2013; Lee et al., 2015).

Financial constraints and lack of resources is another important problem that directly affects the viability of sustainable recreation. Inadequate financial support for the creation of environmentally friendly recreation infrastructures, the protection of natural areas and the implementation of sustainable management models put long-term sustainability goals at risk. In particular, the inability of public institutions and local governments to allocate sufficient budget for sustainable recreation projects leads to infrastructure deficiencies and disruption of maintenance and repair processes (Sisto et al., 2020). Effective management of recreational resources is crucial for sustainable development. This includes legislative support, regional planning and measures for the protection and restoration of resources. The economic assessment of recreational resources should consider both profitability and maintenance costs (Martyn et al., 2021).

Environmental constraints and excessive tourism pressure are among the ecological threats facing sustainable recreation. The use of natural areas beyond their carrying capacity leads to the degradation of ecosystems and a decrease in biodiversity (Albert et al., 2020). Especially in popular tourism and recreation destinations, unplanned construction and excessive visitor density stand out among the factors that threaten ecological sustainability. This requires a balanced approach to tourism development that integrates ecological, economic and social components (Mikhaylyuk, 2022). Increasing visitor numbers in protected areas can lead to overuse and degradation of natural areas, threatening both conservation objectives and the long-term sustainability of tourism benefits (Hadwen et al., 2007; Zhong et al., 2020).

To overcome these obstacles to sustainable recreation, holistic and interdisciplinary approaches need to be adopted. Strengthening administrative regulations, developing strategies to raise environmental awareness, creating

models that support financial sustainability and promoting nature-sensitive recreation policies will play a critical role in overcoming these challenges.

METHOD

Research Model

This study was conducted to address the concept of sustainability in recreation from an academic perspective and to analyze the views of field experts in depth. The study was conducted using semi-structured interviews within the scope of qualitative research design. In-depth information on the environmental, social and economic dimensions of sustainable recreation and the challenges encountered were obtained by consulting the opinions of experts who conduct academic studies on recreation and sustainability. The study was conducted based on a phenomenological approach. Phenomenology is a qualitative research method that focuses on understanding individuals' experiences and perceptions of a particular phenomenon (Williams, 2021). Accordingly, the study examined how the concept of sustainable recreation is perceived and evaluated in the academic context.

Study Group

The research group consists of academicians specialized in the field of recreation and sustainability. Participants were determined by the purposive sampling method. Participation criteria included having academic studies in recreation, sustainability, tourism or related fields and having at least a PhD degree. Interviews were conducted with experts working in different universities and having academic production in this field. Accordingly, 11 academics, 6 male and 5 female, participated in the study. The ages of the participants ranged between 31 and 69. According to the answers given by the participants, the duration of working in the field of recreation varies between 9 and 40 years.

Data Collection Process

The data were collected via e-mail by asking semi-structured open-ended questions. Participants were sent questions that would allow them to express their views on the environmental, social and economic dimensions of sustainable recreation and were asked to respond in writing. The questions were structured in a way to allowed academics to make detailed analyses of their areas of expertise. Participants were informed about data confidentiality and participated in the study voluntarily.

Data Analysis

The collected data were analyzed using the content analysis method. Content analysis aims to draw meaningful conclusions from the data by identifying common themes and sub-categories in participant responses. In this process, the data were analyzed using open coding technique, and the basic concepts

and trends related to the environmental, social and economic dimensions of sustainable recreation were revealed.

FINDINGS

In this section, the results of the findings obtained through the data collected in the research are presented.

Table 1. Findings on the Relationship between Experts' Views on the Defining Characteristics of Sustainability in Recreation and Sustainable Development Goals

The Defining Characteristic of Sustainability in Recreation	Related to SDG*
Resource Management	12. Responsible Consumption and Production
Equal Opportunity	10. Reduced Inequalities
Regular Participation	16. Peace, Justice and Strong Institutions
Maintaining the Carrying Capacity of the Recreational Area	15. Life on Land
Providing Ecological Balance	13. Climate Action, 15. Life on Land
Being universal	10. Reduced Inequalities
Improving quality of life	3. Good Health and Well-being
Increasing the quality of the recreation participant	4. Quality Education
Raising environmental awareness	13. Climate Action
Developing nature awareness	15. Life on Land
Creating recreational awareness	4. Quality Education
Developing eco-recreational behavior	12. Responsible Consumption and Production
Cultural adaptability	11. Sustainable Cities and Communities
Play a role in reducing negative human impacts	13. Climate Action, 15. Life on Land

***SDG: Sustainable Development Goals**

Table 1 shows the descriptive characteristics obtained from the experts' views on the descriptive characteristics of sustainability in recreation and the SDGs that these characteristics are related to. In line with the expert opinions, descriptive characteristics of sustainable recreation were determined and these characteristics were associated with Sustainable Development Goals (SDGs). Resource management overlaps with Goal 12, Responsible Consumption and Production, in terms of effective and efficient use of natural resources. Equal opportunity is linked to Goal 10, Reducing Inequalities, as it aims to ensure fair access to recreation services for all. Regular participation is linked to goal 16, Peace, Justice and Strong Institutions, which promotes social justice and inclusion, as it emphasizes individuals' continued and safe access to recreational activities. Features that emphasize environmental sustainability, such as maintaining the carrying capacity of recreational areas and ecological balance, are directly linked to Goal 15, Life on Land, and Goal 13, Climate Action. It

overlaps with Goal 10, Reducing Inequalities, as it is universal, inclusive and non-discriminatory. Improving quality of life is associated with Goal 3, Healthy Individuals, as it aims to improve the physical and mental health of individuals. Increasing the quality of recreation participants is evaluated within the scope of the 4th objective, Qualified Education, as it aims to improve the knowledge and skills of individuals. Aspects for raising environmental awareness, such as raising environmental awareness and developing nature consciousness, align with Goal 13, Climate Action, and Goal 15, Terrestrial Life, as they focus on raising awareness of environmental protection. Recreational awareness raising is also linked to Goal 4, Quality Education, as it focuses on enabling individuals to use recreation areas consciously and responsibly. Developing eco-recreational behaviour is associated with Goal 12, Responsible Consumption and Production, as it supports the protection of natural areas and the promotion of nature-friendly behaviours. Cultural compatibility refers to recreational arrangements in urban and rural areas that are appropriate to the cultural make-up of communities and is therefore considered within the scope of Goal 11, Sustainable Cities and Communities. Finally, playing a role in reducing negative human impacts is directly related to Goal 13, Climate Action, and Goal 15, Life on Land, as it aims to minimize the negative impacts of recreation activities on the ecosystem. Accordingly, it can be said that sustainability in recreation is related to many of the goals in the SDGs. It can be said that this situation is related to the fact that recreation science is a multifaceted and multidisciplinary science, as well as the fact that human beings are at its centre. In this context, the concept of sustainable recreation should be handled with a multidimensional understanding in line with the Sustainable Development Goals with its environmental, social and economic dimensions.

Table 2. Experts' Views on the Defining Characteristics of Environmental, Social and Economic Sustainability in Recreation

Characteristics of Environmental Sustainability in Recreation	**Characteristics of Social Sustainability in Recreation**	**Characteristics of Economic Sustainability in Recreation**
Providing nature with opportunities to repair itself	Satisfaction with socialization needs	Gaining the habits of planned behaviour
Contribution to the conservation of ecosystems and biodiversity	Eliminating socialization difficulties	Simple and unpretentious use
Demonstrate recycling behaviors	Providing new experience opportunities	Budget friendliness
Preventing resource abuse	Appealing to a diverse audience	Encourage partner participation

Planned use of resources	Increasing motivation for recreational participation	Creating a chance for participants to share
Enabling tracking of carbon footprint	Cultural compatibility	Creating employment opportunities for recreation professionals
Not exceeding the carrying capacity	Consciousness-raising	Gaining the characteristics of economically conscious behavior
Planning with an environment-centered approach	Inclusion of disadvantaged groups	Effective use of raw materials
		Development of service and product delivery
		Contributing to the identification of the problems in the recreational area

Table 2 shows the experts' views on the characteristics of recreation that are necessary for it to be environmentally, socially and economically sustainable. Within the scope of environmental sustainability, nature-oriented approaches such as protecting natural resources, encouraging recycling behaviours, protecting ecosystems and biodiversity, and monitoring carbon footprint come to the fore. These features are supported by principles such as not exceeding the carrying capacity of natural areas and planned use of resources. In the social sustainability dimension, approaches that increase social inclusion such as satisfying the social needs of individuals, including disadvantaged groups, eliminating socialization difficulties, and cultural compatibility are emphasized. Factors such as creating new experience opportunities to increase the motivation of participants and appealing to a diverse participant profile also contribute to strengthening social sustainability. In terms of economic sustainability, practices such as conscious consumption habits, budget-friendliness, encouraging joint participation, and creating employment opportunities for recreation specialists stand out. In addition, cost-reducing approaches such as simple use without ostentation and efficient use of raw materials serve long-term economic sustainability. In general, the table reveals the multidimensional nature of the concept of sustainable recreation and reveals that environmental, social and economic factors are not independent of each other, but interact with each other. In this context, it is understood that these three dimensions should be considered in a balanced manner in the planning and management of recreation areas.

Table 3. Barriers to Sustainability in Recreation According to the Opinions of Experts and Sustainability Dimensions Affected by them

Barriers to Sustainability in Recreation	Environmental	Social	Economic
Unconscious resource consumption	X		
Failure to manage financially			X
Decrease in active participation due to digitalization		X	
Lack of recreational awareness	X	X	
Lack of policy	X	X	X
Destruction of areas through human-first development	X		
Infrastructure problems	X	X	X
Gaps in legal protection	X	X	X
Deficiencies in recreation and time management		X	
Lack of authenticity		X	
Failure to adapt to culture		X	

Table 3 shows the opinions of experts on the obstacles to the sustainability of recreation and the matching of the sustainability dimension affected by these obstacles. According to expert opinions, social sustainability is under threat the most. Factors such as decreased active participation due to digitalization, lack of awareness, policy inadequacies, infrastructure problems, lack of originality and cultural adaptation pose a risk to social sustainability by negatively affecting social participation and equal access. In the context of environmental sustainability, factors such as unconscious resource consumption, human-oriented construction and land destruction jeopardize the protection of natural resources and the continuity of ecological balance. In the economic sustainability dimension, lack of financial management, infrastructure deficiencies and time management problems make it difficult for recreation areas to be economically sustainable in the long term. Overall, the table shows that all dimensions of sustainability face a variety of structural, managerial and individual problems, with barriers in the social dimension in particular threatening fundamental principles such as participation and inclusion. This suggests that sustainable recreation requires holistic approaches that consider environmental protection, economic balance and social inclusion.

CONCLUSION

The current book chapter, in which the opinions of experts working as academicians in the recreation departments of different universities in Turkey are taken, reveals the defining characteristics of sustainable recreation, the elements for ensuring sustainable recreation and the obstacles encountered. The findings obtained show that all dimensions of sustainability should be addressed with an interconnected and holistic approach. Especially in the field of social sustainability, issues such as participation, equal access and cultural

harmony come to the forefront, emphasizing the importance of planning recreation activities not only on an ecological or economic level, but also within the framework of social inclusion. In the environmental dimension, protecting natural resources and adapting to carrying capacity; in the economic dimension, adopting budget-friendly practices and policies that support local development are seen as critical for the spread of sustainable recreation practices. In conclusion, sustainable recreation should be supported by long-term planning and cooperation to encourage individuals to participate in activities that are in harmony with nature, economically accessible and socially inclusive.

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THE EFFECT Of DIGITAL LEISURE FLOW EXPERIENCE Of RECREATION ON PERCEIVED HEALTH OUTCOMES LEVEL

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INTRODUCTION

The rapid advancement of information and communication technologies (ICTs), as well as the internet, social media and digitalization, reveals that global developments have recently radically transformed the forms of leisure experiences. The advent of technological advancements has significantly altered the ways in which individuals engage with and derive enjoyment from various leisure activities. While this transformation has provided new opportunities for participation, it has also fostered the development of a novel form of leisure, particularly among those with ready access to digital tools and technologies (Blanco, 2015).

Within this evolving landscape, the influence of technology on leisure practices has given rise to the concept of "digital leisure." This term encapsulates the growing trend of digitalization within leisure experiences, whereby traditional forms of recreation are increasingly mediated, enhanced, or even replaced by digital technologies, leading to new modes of interaction and consumption. As a result, individuals now partake in leisure activities that are deeply integrated with digital environments, altering not only the nature of these activities but also the social dynamics and cultural norms surrounding them. Historically, the relationship between technology and leisure has always been present; however, the increasing use of digital technologies has transformed modern leisure activities and has played a role in creating a sense of virtual satisfaction (Bryce, 2001; Juniu, 2009).

Leisure activities are activities that individuals choose to engage in purely for enjoyment, independent of obligations, and are usually hedonistically based and entertainment-oriented. In the theoretical framework, according to the serious leisure approach, digital leisure can similarly exemplify this purpose of participation, as the type of unregistered leisure basically involves pure pleasure and hedonic participation (Stebbins, 2007; 2016). In this context, it can be

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argued that digital leisure activities are similarly valid. In addition to offering entertainment as another purpose of engagement, digital leisure activities can have positive effects on participants and enable them to interact in different ways on various digital platforms (Nesteriuk, 2018; Tiilikainen, 2013).

The conceptualization of leisure has evolved significantly over time, and it is evident that digital technologies have increasingly become an integral component of individuals' daily lives (Aydoğan, 2017; Sintas et al., 2017). This pervasive digital transformation has provided individuals with a wide array of new opportunities to engage in diverse leisure activities, encompassing areas such as digital gaming, online entertainment, social interaction, and virtual communication (Carnicelli et al., 2017). Through the pervasive integration of technology, individuals now have greater access to and participation in a variety of recreational experiences that were once limited by geographical, social, or material constraints. These technological innovations have redefined traditional boundaries of leisure, enabling individuals to partake in activities that blend entertainment, socialization, and personal fulfillment, all within digital realms. Consequently, this shift has not only expanded the scope of leisure but also transformed the nature and structure of social connections and individual experiences in modern society.

Csikszentmihalyi (2020), who developed the flow theory, one of the leading theories of positive psychology, states that the potential of an event does not mean that it will happen. In other words, he argues that quantity does not turn into quality. For example, although watching television is the most common leisure activity in the United States, this activity does not provide flow experience. Flow experience is a psychological state in which individuals focus completely on an activity and feel a deep sense of satisfaction without realizing the time (Csikszentmihalyi, 1990). In contrast, deep concentration and skill-balanced activities in working life lead to four times more flow experiences. Furthermore, it is an ironic paradox that although entertainment is accessible in different formats today, it does not translate into pleasure. In the literature, there are studies examining the relationship between flow experience and leisure activities (Özdemir, Ayyıldız Durhan and Akgül, 2020; Chang, 2017a, 2017b; Cheng et al., 2016; Tao et al., 2022).

Under the right conditions, digital leisure activities can also support individuals' mental well-being by providing a streaming experience. However, the effects of digital media and technologies on leisure are still not fully understood. Therefore, the aim of this study is to examine the impact of digital leisure on individuals' perceived health outcomes through the flow experience. In particular, understanding how the flow experienced during digital leisure activities affects individuals' perceived health level and its relationship with

psychological satisfaction in recreational activities will contribute to future research in this field.

In this context, understanding the effects of digital leisure on flow experience and health outcomes can provide an important source of information to guide individuals for a healthy use of digital leisure. In a digitalized world, these effects need to be addressed in detail in order to enable healthier, more productive and satisfying use of digital leisure activities.

MATERIALS AND METHODS

The research model is a relational survey model that aims to determine the relationship between two or more variables. The study group of the research consists of 361 participants, 110 (30.5%) female and 251 (69.5%) male, who are studying in the field of sports sciences at a public university in Ankara in the 2024-2025 academic year. The average age of the participants was determined as 21.69. The Perceived Health Outcomes of Recreation Scale consisting of 16 items and 3 sub-dimensions developed by Lapa et al. (2020) and the Digital Leisure Flow Experience Scales consisting of 17 items and 3 sub-dimensions developed by Er and Cengiz (2023) were used as data collection tools in the study. In the analysis of the data, normality distribution parameters were first tested and it was concluded that the data set had normal distribution characteristics. Based on this point, T-Test, Pearson Correlation and Multiple Regression Analyses were utilized in addition to descriptive statistics.

FINDINGS

Table 1. Mean Scores from The Perceived Health Outcomes of Recreation Scales and Digital Leisure Flow Experience Scales

Scales	N	Min	Max	$\bar{x}$	S
The Perceived Health Outcomes of Rec.	361	1.00	7.00	5.33	1.19
Experience	361	2.00	7.00	5.13	1.05
Event	361	2.00	7.00	5.12	1.16
Time	361	2.00	7.00	5.11	1.14

The mean score of the participants from the Perceived Health Outcomes of Recreation Scale was ($\bar{x}$=5.33), the mean score for experience from the sub-dimensions of the Digital Leisure Flow Experience Scale was ($\bar{x}$=5.13), the mean score for experience from the activity sub-dimensions was ($\bar{x}$=5.12), and the mean score for time was ($\bar{x}$=5.11).

Table 2. T-Test Results of Mean Scores of the Perceived Health Outcomes of Recreation Scale and Digital Leisure Flow Experience Scales According to Gender Variable

Scales	Gender	N	$\bar{x}$	S	sd	t	p
The Perceived Health Outcomes of Recreation	Female	110	5.23	1.17	359	-1.05	.29
	Male	251	5.38	1.19			
Experience	Female	110	5.09	1.01	359	-.43	.66
	Male	251	5.14	1.07			
Event	Female	110	5.12	1.10	359	-.03	.97
	Male	251	5.13	1.18			
Time	Female	110	4.94	1.15	359	-1.92	.05
	Male	251	5.19	1.13			
	Total	361					

p<.05

When the participants' levels of the perceived health outcomes of recreation and their total mean scores obtained from experience, activity and time sub-dimensions were compared with the gender variable, it was determined that there was no statistically significant difference, t1(359) =-1.05, p>.05; t2(359)=-.43, p>.05; t3(359)=-.03, p>.05; t4(359)=-.1.92, p>.05.

Table 3. Mean Scores from The Perceived Health Outcomes of Recreation Scales and Digital Leisure Flow Experience Scales

		Experience	Event	Time
The Perceived Health Outcomes of Recreation	**r**	.41	.35	.28
	p	**	**	**

*p<.001

According to the results of the analysis in Table 3, it was determined that there was a positive, medium level relationship between the participants' perceived health outcomes in recreation and experience (r1=.41; p=.001), activity (r2=.35; p=.001), and time (r3=.28; p=.001).

Table 4. Regression Analysis Results for the Prediction of Digital Leisure Flow Experience

Model	B	Std. Error	β	t	p
Constant	.58	.29	---	10.29	.000
Experience	.47	.093	.42	5.04	.000
Event	.17	.091	.17	1.91	.057
Time	-.18	.089	-.18	-2.11	.035
R= .43		R^2_{adj}= .18			
$F_{(1.266)}$ = 26.66		p= .000			

Table 4 shows that the regression model is statistically significant as a result of the multiple linear regression analysis for the prediction of digital leisure flow experience. When the results regarding the significance of the regression coefficients are examined (β1,2,3=.42, .17, .-18; t1,2,3=5.04, 1.91, -2.11; p=.001), it is determined that perceived health outcomes of recreation have a positive and significant predictive power on digital leisure flow experience. It can be stated that 18% of the total variance of digital leisure flow experience is explained by the feature of perceived health outcomes of recreation.

DISCUSSION AND CONCLUSION

In this study, 361 participants were included in this research, which aims to examine the effect of individuals' digital leisure flow experiences on the level of perceived health outcomes of recreation and to describe the findings according to independent variables, and in this part of the research, the findings obtained from the research are discussed in depth within the framework of various academic studies and research in the existing literature on the subject. The results obtained were compared with the studies in the literature and the extent to which the findings overlap or differ from the results of the studies in the literature was evaluated. This process was done in line with the literature in order to increase the reliability of the research and to develop a broader understanding of the subject.

The findings of the study suggest that digital leisure flow experiences may have a determining role on the levels of perceived health outcomes of recreation. When the mean scores of the participants from the digital leisure flow experience and perceived health outcomes of recreation scales are analyzed, according to the data presented in Table 1, the mean score obtained from the perceived health outcomes of recreation scale ($\bar{x}$ = 5.33) shows that the participants perceive the positive effects of digital leisure activities on health at a moderate level. Among the sub-dimensions of the digital leisure flow experience, the mean scores related to experience ($\bar{x}$ = 5.13), event ($\bar{x}$ = 5.12) and time ($\bar{x}$ = 5.11) reveal that the participants had a similar moderate level of satisfaction and interaction in these dimensions. These findings suggest that digital leisure has a significant impact on individuals' physical and psychological health, but the level of impact varies in different sub-dimensions. In particular, the experience and activity dimensions have a higher impact on the perception of health outcomes, whereas the time dimension has a lower impact.

The analysis of data pertaining to the perceived health outcomes of recreation and the digital leisure flow experience, with respect to the gender variable, revealed that there were no significant differences between male and female participants. Specifically, the perceived health benefits of recreational activities and the flow experience during digital leisure pursuits did not vary based on

gender. These findings stand in contrast to the prevailing literature on this topic, where results have often been inconsistent and, in some cases, contradictory. For instance, Tuncer (2023) conducted a study in which a t-test was employed to examine the sub-dimensions of participants' perceived outcomes of leisure time engagement in recreation, alongside their gender-based perceptions. The results of this analysis similarly indicated that no statistically significant differences were present across any of the sub-dimensions when gender was considered. This aligns with the findings of the current study, suggesting that gender may not play a substantial role in influencing perceived health outcomes or the experience of flow in digital leisure activities. However, it is important to note that while this research supports the notion of gender neutrality in these contexts, the overall body of literature remains diverse and occasionally contradictory on this matter, warranting further investigation.

Several prior studies have explored the relationship between digital leisure flow experience and various factors, including gender. Heo et al. (2010), in their research on older adults' engagement in serious leisure activities, reported that gender did not exert a significant influence on the flow experience or subjective well-being outcomes. This finding, however, contrasts with the results of other studies that suggest gender may have a notable impact on flow experiences. For example, Plummer et al. (2017), in their examination of gender, flow, and video gaming, found that gender significantly affected the flow experience, with male participants demonstrating stronger flow states than their female counterparts. Similarly, Lu et al. (2010), in a study focused on information-sharing behaviors and interaction within digital environments, observed that gender influenced the streaming experience, with men exhibiting more favorable outcomes in certain parameters. This was also supported by Stavropoulos (2013), whose study on internet use and flow experience revealed that male participants experienced higher levels of flow compared to female participants. Furthermore, Serdar (2020) explored the relationship between physical activity and the Perceived Health Outcomes of Recreation Scale, finding that increased frequency of participation in physical activities led to higher scores across all sub-dimensions of the scale, reflecting improved health perceptions and well-being.

When considering the broader literature and these findings collectively, it becomes evident that engaging in physical activities can have substantial positive effects on individuals' health perceptions, stress management, and emotional well-being. Participation in such activities is linked to the development of more favorable self-assessments and a more positive evaluation of one's environment. Research further supports the notion that physical activity contributes to the cultivation of positive emotions, better stress coping strategies, and an overall enhanced sense of well-being (Güzel et al., 2020;

Killgore, Taylor, & Cloonan, 2020; Serdar, 2020; Tural, 2020). These benefits highlight the importance of physical engagement in fostering not only physical health but also psychological and emotional resilience. Consequently, while gender may play a role in shaping specific leisure experiences, the broader positive impacts of physical activity remain consistent across various studies.

In the studies in the literature on perceived health outcomes of recreation, there are studies that are similar to the results of the study. In their study conducted by Elçi et al. (2019) in a sample of individuals participating in different recreational activities, they observed that they did not find a significant difference according to the gender variable of the participants. Similarly, Bekar (2019) stated in his study that he did not find a significant difference when looking at the sub-dimensions and total of the sub-dimensions of RASÇÖ (the perceived health outcomes scale of recreation scale) according to the gender variable. Again, in the study of Beşikçi et al. (2021), in which they examined the perceived health outcomes of individuals and recreation during the covid-19 pandemic process, it was concluded that there was no statistically significant difference according to the gender variable of the participants.

The fact that no difference was observed between genders may be due to the fact that physical activities performed within the scope of leisure time activities are inclusive for both women and men. In addition, the fact that there is no clear gender-based distinction in recreational participation ensures that these activities are equally adopted by both genders. In addition, the fact that both gender groups develop similar perceptions in areas such as general health status, fitness, self-confidence and physical development after participating in recreational activities reveals that such activities can have similar effects regardless of gender.

There are also some studies that are not similar to the current study results. For example, in a study conducted by Serdar and Demirel (2019) with university students, it was found that female participants had higher scores on three sub-dimensions than male participants in terms of perceived health outcomes. In addition, in Serdar's doctoral thesis, a significant difference was found only in the "Improved Condition" sub-dimension in terms of gender variable and sub-dimension levels, and this difference was in favor of women. Similarly, in the study conducted by Kayapınar (2021), the relationship between gender variable and sub-dimensions was examined, and a significant difference was found only in the "realization of psychological experience" sub-dimension; this difference was also in favor of women.

Considering the findings obtained from the research, it was determined that the correlation coefficients were positively significant in the analysis conducted to determine the relationship between perceived health outcomes of recreation

and digital leisure flow experience. Based on this finding, it can be stated that as the level of health outcomes perceived by the participants in recreation increases, their digital leisure flow experiences increase. When examined in the literature, it is observed that some studies are in parallel with these findings, but some studies have obtained different results. In their study, Elçi et al. (2019) found a significant relationship between the health outcomes perceived by the participants of recreation and their life satisfaction. From this point of view, they stated that they concluded that as the level of health outcomes perceived by the participants from recreation increases, their life satisfaction also increases.

Similarly, Serdar (2020) concluded in his study that there is a high level and positive relationship between "leisure attitudes" and all sub-dimensions of "perceived health outcomes of recreation". Again, Lee et al. (2014) stated that individuals generally aim to meet their psychological needs and feel good and happy while participating in leisure activities. In this context, the more effectively leisure activities meet the basic needs of individuals, the more satisfaction they will achieve. In other words, the satisfaction obtained as a result of leisure activities not only increases individuals' satisfaction and motivation towards these activities, but also contributes to the development of a more positive attitude towards these activities (Chang, 2002).

Boyar (2024) observed that perceived health outcomes of recreation have a positive and significant effect on recreational flow experience. Looking at the literature, Boateng et al. (2023) stated in their study that being active improves the positive perception of health status depending on the age, location, environmental and ecological characteristics in the aging process. In another study, Fernandez-Jimenez et al. (2024) investigated the perceived health status of individuals and their attitudes towards aging and stated that physical activity can provide a positive and optimistic perspective on aging. From this point of view, the fact that perceived health outcomes in recreation have an effect on successful aging can be interpreted as an expected situation due to the benefits it provides. Tuncer (2023) observed that there was a positive relationship, albeit at a low level, between the participants' leisure time satisfaction and their perceived health outcomes in a sample of academic staff.

According to the results of the research, it is seen that the regression model is statistically significant as a result of the multiple linear regression analysis for the prediction of digital leisure flow experience. When the results regarding the significance of the regression coefficients were examined, it was determined that perceived health outcomes of recreation had a positive and significant predictive power on digital leisure flow experience. It can be stated that 18% of the total variance of the digital leisure flow experience is explained by the feature of perceived health outcomes in recreation. Kayapınar (2021)

observed that the level of life satisfaction predicting individuals' perceived health outcome scores was significant.

As a result, the research findings reveal that there is no significant difference between the participants' perceived health outcomes of recreation and the digital leisure flow experience sub-dimensions (experience, activity and time) according to the gender variable. This result shows that participation in recreation creates similar health perceptions in both genders regardless of gender. According to statistical analyses, moderate positive significant relationships were found between the participants' perceived health outcomes of recreation and the experience and activity sub-dimensions of the digital leisure flow experience, and low positive significant relationships were found with the time sub-dimension. In addition, multiple linear regression analysis conducted for the prediction of digital leisure flow experience revealed that perceived health outcomes of recreation have a positive significant predictive effect on the digital leisure flow experience. According to the regression coefficients obtained, 18% of the variance of digital leisure flow experience can be explained by perceived health outcomes of recreation. These findings significantly reflect the effect of digital leisure activities on individuals' general health perceptions and flow experiences. Future studies can evaluate the health benefits of digital leisure activities more comprehensively by examining the effects of different demographic factors (such as age, education level) on these relationships in more detail.

Suggestions

1-) Ignoring Gender Differences: The results of this study show that perceived health outcomes of recreation and digital leisure experience levels do not differ according to gender. Future research can examine the effect of gender in more detail and explore how different demographic groups benefit from these experiences differently.

2-) Development of Recreation-Oriented Programs: It has been observed that there are significant relationships between the health outcomes perceived by the participants of recreation and their digital leisure flow experience. This finding suggests that recreational activities can have positive effects on the health status and psychological well-being of individuals. Therefore, it may be recommended to develop health and wellness-oriented programs.

3-) Education and Guidance on Digital Flow Experience: Digital leisure flow experience has a significant impact on participants. In this context, correctly directing digital leisure activities and teaching participants ways to increase the flow experience can be beneficial for a healthy leisure management.

4-) Using Health Outcomes as Predictors: The study revealed that perceived health outcomes of recreation significantly predict digital leisure flow

experience. Examining this relationship in more depth may provide valuable information for health services and therapeutic approaches. It may be suggested to develop new treatment methods that emphasize the impact of recreational activities on health.

5-) Investigation of Social and Psychological Benefits: Regression analysis on digital leisure flow experience reveals that individuals' psychological experiences and general health perceptions have a significant impact. Therefore, it is important to conduct more comprehensive studies on the social and psychological benefits of digital and physical recreational activities.

6-) Comparing Different Types of Activities: Comparing the health effects of digital and traditional leisure activities can be useful to understand how these types of activities have different effects on individuals' flow experience and overall health. Thus, the potential benefits between the two types of activities can be determined more clearly.

7-) Recommendations for Policy and Practice: Research findings reveal the potential benefits of digital leisure activities on health. Therefore, further encouraging digital leisure activities in health policies and public health programs may be a strategic step towards increasing the physical and psychological well-being of individuals.

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DIGITAL EXERCISE EXPERIENCES

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INTRODUCTION

Digital exercise experience stands out as a modern approach that includes technology-supported sport and physical activity processes. This experience is shaped by digital tools and platforms that allow individuals to plan, guide and track their physical activity. Mobile applications, wearable devices, virtual and augmented reality-based workouts, online classes, gamified exercise programs and artificial intelligence-supported analysis systems are among the key elements of this process (Akgül & Türkmen, 2023). Thanks to advanced data analytics and health tracking, users can examine their performance in detail and make progress in line with personalized recommendations. Especially in recent years, the increase in the tendency to exercise individually and at home has increased the interest in digital exercise solutions and led to the adoption of this field by a wider audience. In this context, the digital exercise experience adapts to today's lifestyle by offering a transformation that makes physical activity more accessible, flexible and effective.

With the proliferation of digital exercise, how leisure time is utilized has become an increasingly important issue. The positive health effects of leisure-based physical activity have been clearly demonstrated, and aerobically stimulating leisure-time activities performed regularly and for sufficient duration have been shown to improve physical health and reduce health risks such as coronary diseases and some types of cancer. A large proportion of leisure time activities involve mental processes, either directly (such as art, games, music, hobbies) or indirectly (such as sports, outdoor activities, social interactions). Such mental activities include perception, recall, problem solving and creativity and support healthy cognitive functioning. Moreover, since many leisure activities involve social interaction, they are thought to strengthen individuals' mental and social skills and contribute to the maintenance of a healthy mental structure (Lenkins & John, 2003:221). In addition, virtual reality or augmented reality applications that enable movement and mutual communication in virtual environments and games played with game consoles such as Nintendo Wii are seen as active participation recreational activities carried out in a digital environment (Türkmen et al., 2024).

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Sport, physical activity and exercise are intertwined concepts, and while physical activity covers all movements in daily life, exercise is defined as an activity that is more personalized, regular and performed within the framework of certain programs (Mirzeoğlu, 2011: 32). The utilization of leisure time has a universal value as well as being of vital importance for the individual and society. In every society, there are institutions and value systems for spending leisure time efficiently. In this process, social relations, values, norms and institutional structures take shape and form certain patterns. The social relationship networks and institutional structures shaped in this period play an important role in how non-working life is organized, how daily life is organized and in ensuring the continuity of the social structure (Aytaç, 2017:88). The main purpose of the leisure time evaluation process is to contribute to the self-realization of the individual through the activity experience and to achieve the highest satisfaction. In this direction, sports stand out as one of the most preferred leisure time activities. As an independent and unique leisure time activity, sport is an important field of activity that supports individuals' physical and mental well-being (Özdemir, 2017: 409). However, in order for physical activity and exercise programs to be successful, it is very difficult to make a programming without considering the needs of individuals. A need is an element that directs individuals to take action in a certain direction and arises from a deficiency felt in physical, psychological, emotional, spiritual or social areas (Hurd & Anderson, 2011:19). While it is known that participation in exercise has always been important, the importance of physical activity is even greater today as the effects of the COVID-19 pandemic continue (Mehrsafar et al., 2020:87; Paoli and Musumeci, 2020:5). During the pandemic, the increase in the time spent at home, especially due to restrictions, triggered weight gain and brought with it various health problems. One of the most important negativities caused by this period was the negative effects on mental health (Pinto et al., 2020:16; Slimani et al., 2020:11).

Promoting sport participation and physical activity is of great importance to improve the physical and mental health of individuals as well as to increase well-being in society. According to changing life circumstances, more research is needed on sport participation and possible public policies to increase well-being and health in society (Vela and Toscano, 2018:347). In order to ensure prevalence and sustainability, the needs of individuals and societies should be investigated in order to create and develop policies and programs in the right way, and the factors that motivate individuals in line with these needs and the factors that will enable individuals to maintain these motivations should be determined (Karaman, 2022: 7).

In this context, digital exercise experiences stand out as a tool that facilitates individuals' access to physical activity. Thanks to developing technology,

digital applications and platforms that allow individuals to maintain their exercise habits encourage physical activity with personalized programs. Designing sports policies to support such digital solutions will contribute to the popularization of physical activity. In conclusion, in order to promote physical activity at both individual and societal levels, it is necessary to take advantage of the opportunities offered by technology, strengthen public policies and make exercise programs sustainable. In recent years, digital exercise experiences have become an important tool that facilitates individuals' access to physical activity. Especially with the pandemic process, exercise programs offered through online platforms have gained great importance for individuals to maintain their physical activity levels. In this context, several studies have examined the effects of online exercises on individuals of different ages and health conditions.

In a study conducted to determine the effect of online home exercises on body perception and depression levels in individuals diagnosed with obesity, a home-based exercise program with a remote access program and a personal trainer shows that the home-based exercise program is suitable for improving depression and body perception in individuals diagnosed with obesity with a BMI of 30.0 and above. In order to prevent obesity, it is necessary to increase the daily physical activity of individuals and to raise awareness that it is not necessary to go to the gym to increase physical activity and that regular home-based exercises will be sufficient. These findings suggest that home-based exercise may be an important element of future physical activity guidelines, although we should be prepared for any future epidemic (Tuğrul & Harmancı, 2023).

Exercises such as yoga and pilates, which do not require much space and equipment and can be practiced in any area and at any time, are examples of exercises that can be practiced at home and in conditions of social isolation. There is no requirement to be present in a gym or to have a variety of equipment to do physical activity and exercise. In a study examining the effect of online and face-to-face mat pilates exercises on objective and subjective sleep quality in individuals aged 20-40 years, mat pilates exercises applied for 8 weeks had no effect on subjective sleep quality. Objective sleep quality was positively affected when mat Pilates exercises were applied online. Pilates exercises practiced online improve objective sleep quality. Although it is generally thought that there is more infrastructure and alternatives in gyms and outdoor activities, contrary to popular belief, using an online environment to exercise while staying at home is an exercise approach that can be included among the exercises that can be done at home to maintain or increase the level of physical activity (Erkek & Şahin, 2023).

The health effects of digital exercises have been observed not only on physical but also on mental well-being. In a study examining the effects of an online yoga-based exercise program on pain, menstrual attitude, body awareness and quality of life in dysmenorrhea, no significant change in menstrual attitude was observed in the first measurement after starting the exercise treatment, while significant improvements were recorded at the end of the 8th week. This finding suggests that a 4-week exercise program may not be effective enough on menstrual attitude and behavior, and that a program of at least 8 weeks would be more beneficial. On the other hand, there was an increase in body awareness from the 4th week, and considering that the level of pain in dysmenorrhea directly affects the quality of life, the online exercise program showed significant improvements in physical function, physical role difficulty, energy and mental health, which are components of quality of life, from the 4th week and this improvement continued until the 8th week. However, positive improvements in emotional role difficulties, social functioning, pain and general health, which were observed from the beginning, gradually increased until the end of the 8th week. While a high satisfaction rate was found among the individuals who participated in the program, it was observed that online treatment options were preferred at a similar rate to face-to-face options. In conclusion, the creation of exercise programs that support both physical and mental health in the treatment of dysmenorrhea and the delivery of these programs to large masses through technological means offer an effective and sustainable solution in the long term. In this direction, it has been revealed that the routine implementation of online exercise programs in the management of dysmenorrhea and other gynecological problems should be expanded (Şaşmaz & Bayram, 2024).

In line with the need for studies that support elderly individuals to do physical activity and exercise in the home environment, in a study in which an online exercise program consisting of stretching, strength, flexibility and balance exercises was applied during the quarantine process, it was determined that one of the most important benefits of this program was to prevent elderly individuals from being inactive and to make them more active. In addition, technology-based online exercises were also found to have positive effects on the psychological well-being of the elderly. In the digitalizing world, elderly individuals may experience various difficulties in accessing and using technological devices to benefit from telehealth systems, and in this study, platforms that are easily accessible to the elderly were preferred. Despite facing some technical difficulties in following the online exercises, such as internet connection problems and the use of small screens, the majority of the elderly individuals were able to comply with the program and exercise regularly. Moreover, it is noteworthy that most of the elderly found their technological devices sufficient to benefit from online services (Gencer et al., 2021). It is

said that it is important to solve the technical problems caused by the system and to solve the connection problems caused by the internet network, not only for older individuals but also for younger individuals in some studies (Baydar, 2021). For children, it is stated that the activities they participate in on digital platforms should be controlled and that their parents are largely responsible for the situation (Tingaz et al., 2016).

The effects of online exercises in the field of education have also been investigated. According to the findings of a study investigating the effects of two different 6-week physical activity and ergonomics training programs for physiotherapy and rehabilitation students receiving distance education, significant improvements were observed in pain, ergonomic risk, exercise benefit/obstacle perception and self- efficacy levels for physical activity in both groups, but it was determined that the video-based interactive training group provided more improvement compared to the e-brochure training group. Before the training, an increase in back, waist and neck pain was detected in the majority of students due to low physical activity level, not applying ergonomic solutions and long-term use of technological devices. After the training, the use of ergonomic solutions, exercise motivation and knowledge level were found to be higher in the group receiving video-based training, and a significant decrease in pain and ergonomic risks was recorded. However, no statistically significant change was found in the general physical activity level in both groups. It is thought that this may be related to the restrictions during the pandemic and students' preference to exercise outdoors or in gyms. In conclusion, although both training programs provided ergonomic awareness, video-based interactive training was found to be more effective and technology-based training supported by motivational interviews was found to contribute more to students (Biçici ve Arman, 2022).

There are many studies on women's experiences in participating in digital exercise. The experiences of women who participated in online exercise training during the pandemic period were examined and it was found that these tools played an important role in ensuring the continuity of physical activity during the pandemic. Participants, who were active internet users before the pandemic, started to use the internet more intensively for education, personal development and communication purposes in this process and preferred Web 2.0 tools for distance physical education and sports lessons. Participants, who stated that online sessions saved time, thought that they would not get enough efficiency from online education at the beginning, but they were able to continue their physical activities by learning to use the internet more effectively in the process. Individuals who participated in online exercise training in order to maintain the continuity of physical activity during the pandemic process stated that they both protected their own health and set an example for their children about an

active lifestyle. It was determined that Web 2.0 tools facilitated participation in exercise training, allowing individuals to both improve their technological skills and maintain their physical activity through distance education. However, it was seen that physical activity can be sustained not only with technical access but also with motivation, interaction and pedagogical support; therefore, it was emphasized that it is important to provide technical support in the educational environment and to make the necessary preparations for the participants to adapt to the online education process. As a result, while Web 2.0 tools offer an effective alternative to ensure the continuity of physical activity in extraordinary situations such as epidemics, it has been determined that individuals should be able to use these tools effectively, their motivation should be supported and training processes should be better structured (Uzunçayır et al., 2022).

In a study examining the effect of online exercises on mindfulness, mental well-being and body image of adult women, it was found that online exercises were as effective as face-to-face exercises. While the research shows that online exercises positively affect women's psychological, cognitive and physical aspects, it reveals that individuals who do not want to go to the gym or have difficulty in participating in physical activity can lead an active life with online exercises in their environment. Regular exercise is of great importance to prevent inactivity and to maintain and improve psychological and physical health; therefore, it is recommended that everyone, regardless of age and gender, should make exercise a part of their life routine. While online exercises offer an important alternative for individuals who cannot go to gyms, it is emphasized that these exercises should be performed under the guidance of an expert to prevent injuries and get maximum efficiency. Today, thanks to developing technology and internet-based solutions, online exercises can be easily integrated into daily life, and this method provides a great opportunity especially for individuals who cannot exercise due to transportation, time and access restrictions (Özyıldırım, 2021:55-73).

Online platforms such as YouTube have become a major source of health information. A study on the source and content of digital exercises aims to analyze YouTube videos on lumbar disc herniation exercises, determine the quality of information in the videos, and identify the sources of high-quality health information. Lumbar disc herniation is a common disease that causes pain and disability, and the application of prescribed exercises is an important non-surgical treatment option. Nowadays, the use of the internet for health-related information has increased significantly, and YouTube has become an important source of health content worldwide. Research results show that more than one-third of YouTube videos on lumbar disc herniation exercises are of good or excellent quality, and this high-quality content is mostly provided by academics, non-physician healthcare professionals and physicians. On the other

hand, content shared by independent users and health-related websites was found to be of lower quality. Although there was no significant difference between the video quality groups in terms of the number of daily views, daily comments and likes, patients are increasingly using the internet to better understand their medical conditions and treatment options. While it is clear that YouTube offers a wide opportunity to learn about healthcare, it is emphasized that caution should be exercised regarding the accuracy and reliability of content. Physicians should direct patients to high quality and reliable information and explain that not all sources on the internet may provide accurate information. Therefore, the importance of evaluating online health information sources should be explained to patients and awareness-raising activities should be carried out in this regard. Academics, professional organizations, universities and health professionals should take an active role on YouTube to ensure that internet users have access to more reliable, high-quality and accurate information and contribute to raising public awareness by sharing content with high scientific accuracy on this platform (Koçyiğit, Okyay, & Akaltun, 2020).

In a study examining the impact of workplace health, traditional and virtual physical exercise programs, both programs were found to have positive effects on health indicators. Significant improvements were observed in diastolic and systolic blood pressure, waist circumference and Body Mass Index (BMI) in the intervention groups compared to the control group. In particular, the virtual exercise group showed a decrease of 17.1-1.3 mmHg in diastolic blood pressure and 16.6-0.5 mmHg in systolic blood pressure, as well as a decrease in BMI. The research reveals that workplace wellness programs ranked second among the top 20 most popular fitness trends by 2024, reflecting a significant increase in the trend to improve the health of corporate employees and increase workplace productivity. Furthermore, such health-promoting practices are projected to offer a variety of benefits, such as reducing insurance costs, increasing workplace productivity and promoting mental well-being. The research findings suggest that virtual physical exercise programs can be as effective as traditional exercise programs and offer a more flexible solution, especially for employees facing time constraints. This flexibility supports work-life balance by making it easier for employees to adopt healthy lifestyle habits and encourages regular participation in physical activity. With hybrid working models becoming more prevalent in today's business world, the accessibility and flexibility offered by virtual exercise programs have been shown to provide a significant advantage for employees to maintain active lifestyles. As a result, virtual exercise programs have been found to not only have positive effects on health indicators such as blood pressure, waist circumference and BMI, but also to be an effective tool to support healthy lifestyles in the workforce environment (Oginni, Otinwa, & Gao, 2024).

This study, part of a large-scale funded project, aimed to examine the attitudes of individuals with chronic cardiovascular diseases towards online exercise. The ultimate goal of the project was to increase chronic cardiovascular disease patients' participation in online exercise programs and to develop a mobile application to track their health-related vital signs. The research findings revealed that 54.5% of patients showed a positive intention to participate in online exercise, but 54% saw safety concerns as the biggest barrier. On the other hand, 63% of the patients stated that online exercise can be safe when appropriate conditions are provided. Furthermore, 54% of the participants expressed that they would like to be able to track their health indicators such as heart rate, blood pressure, electrocardiogram (ECG), oxygen saturation and respiratory rate online. Accordingly, it was concluded that the main features of the proposed mobile application should include functions such as heart rate monitoring, blood pressure measurement, ECG monitoring, oxygen saturation and respiratory rate. Within the scope of the study, patients' attitudes towards online exercise were evaluated in terms of emotional and cognitive components and it was determined that the cognitive attitude component was 4.6 and the emotional attitude component was 3.5 on average. In terms of cognitive attitude, patients rated online exercise as "useful" (4.40), "helpful" (4.30) and "convenient" (4.28), whereas in terms of emotional attitude, the highest rated adjectives were "disappointing" (4.64), "stimulating/encouraging" (4.00) and "attractive" (3.88). These findings suggest that online exercise is generally perceived as beneficial and helpful, but may also have elements that may be frustrating for some patients. Participants highlighted improving physical fitness (4.72), promoting physical health (4.62), improving mood (4.62) and supporting psychological health (4.60) as the most important benefits of online exercise. Overall, the research findings suggest that chronic cardiovascular disease patients' attitudes towards online exercise are largely positive, but issues such as safety and ease of use may directly affect patients' participation. Furthermore, these findings shed light on the development of strategies to promote safe and effective participation of chronic cardiovascular disease patients in online exercise programs, contributing to guide collaborations between health and exercise professionals (Ntovoli et al., 2024).

In general, digital exercise experiences are considered as an important tool to support individuals' physical and mental health. As technological developments and online platforms become more accessible, it is expected that such exercises will become widespread and reach wider audiences. From the participants' perspective, the reasons and motivations for choosing to participate in digital exercises vary. For example, although the user-friendliness of online platforms, instructors' skills and presentation methods, and the reliability of the programs are among the key factors affecting the quality of the online exercise

experience, a study, based on the need to understand how enjoyable such classes are perceived by participants and what the impact of service quality is on the participant experience, examined various factors determining the quality of online workouts and their impact on participants, and evaluated the quality of service, enjoyment level and intentions to continue in comparison with traditional workouts. The study findings suggest that the enjoyment level of traditional fitness classes is higher than that of online workouts, but that online programs also offer a certain level of satisfaction. As a result of the analysis according to the enjoyment level, participants were classified into high, medium and low enjoyment groups, and it was found that the average enjoyment score of traditional classes was significantly higher than online classes. In terms of exercise behavior, 47.9% of the participants stated that they planned to continue online exercises, 40.8% planned to stop, and 11.4% were undecided. Of those who intend to continue, 25.7% want to combine traditional and online classes, while 22.2% prefer to exercise online only. These findings suggest that online fitness services offer certain advantages for participants, but may be less enjoyable compared to traditional classes. The research points to the importance of using technologies such as virtual reality, artificial intelligence and advanced audio-visual effects to improve the online fitness experience. It also highlights that exercise providers should consider investment and pricing strategies to integrate digital fitness services into existing membership packages or offer them as a standalone service model. It is also recommended to analyze the impact of psychographic and behavioral factors on exercise preferences and to compare the impact of online and traditional fitness programs on different user segments (Ntovoli, Zourladani, & Alexandris, 2024).

Considering that digital-physical activities reshape the perception of exercise, a study conducted in the United Kingdom aimed to investigate the benefits of these exercises by examining the perceptions of individuals participating in online exercises. While the decrease in social interaction during the pandemic led to a feeling of loneliness and isolation problems in individuals, while the blurring of the boundaries between gyms and home significantly changed exercise habits, individuals tried to increase their motivation to continue exercising by moving their training areas to their homes, but it was seen that solo workouts were quite different from the traditional gym experience. The study revealed that the sense of psychological autonomy provided by online workouts was an important motivator, with participants reporting that workouts helped them establish a daily routine, improved their mental health and made them feel more positive, confident and productive. Digital-physical activities also supported individuals' physical well-being, providing a flexible and accessible option for those who do not have access to a gym or prefer to exercise with minimal equipment.

Participants stated that they benefited greatly from the online classes in terms of keeping fit, improving their health and continuing to exercise, and that the exercises increased their physical endurance and helped them feel more energized. In addition, the positive effects of digital-physical activities on social ties were also observed, with participants stating that participating in online training communities strengthened their sense of belonging, reduced isolation and provided opportunities for socialization. Exercises were found to support individuals not only physically but also socially, providing an opportunity to connect with like- minded individuals through online communities and increasing a sense of solidarity. Participants stated that these exercise platforms made them feel part of a community and increased their motivation, and that training in a group made them feel more responsible compared to individual exercises. Digital- physical activities have been shown to support individuals' well-being and are an important tool to maintain physical activity in extraordinary situations such as quarantine. Research findings show that these platforms offer a realistic and sincere environment to their users, and that individuals move away from traditional social media filters and express themselves with sincere expressions. By transforming individuals' fitness consumption habits, digital-physical activity offers a new perspective in health policies and is considered as a sustainable solution for individuals who do not have access to gyms. The results of the study show that digital-physical activities reduce anxiety by increasing individuals' psychological well-being, provide opportunities to exercise by supporting their physical well-being, and reinforce a sense of community by strengthening their social well-being. As a result, digital-physical activities stand out as an effective method not only to maintain physical fitness and reduce anxiety, but also to strengthen individuals' social connections and increase their sense of being in a community (Cronshaw, 2022).

It is obvious that participation in exercises performed on digital platforms will increase day by day. Scientific research is an important source of information for participants, trainers and platform founders. From this point of view, in this section, we aimed to share the pilot study of the scientific research we conducted to determine the effects, advantages and disadvantages of digital exercise experiences on individuals and to examine the motivation sources of participants.

The opinions of individuals who regularly exercise through digital platforms about exercise controls on these platforms were examined using qualitative research method. Qualitative research methods are a field study that allows for in-depth and detailed study of issues, where analysis can be carried out without adhering to predetermined categories. In this respect, qualitative

research offers a powerful approach in terms of depth, clarity and detail. Qualitative findings are generally longer and more detailed and more varied in content. However, they are more difficult to analyze because the answers are not systematic or standardized. Responses to open-ended questions allow us to understand the world from individuals' perspectives. The main purpose of such questions is to provide the researcher with the opportunity to capture and understand participants' perspectives without being bound by the limitations and presuppositions of predetermined question categories (Patton, 2014:16-21).

The study group consisted of 25 volunteer adult participants who were identified using purposive sampling method and exercised through digital platforms at least two days a week. The research data were collected through an interview form consisting of semi-structured questions prepared in accordance with the purpose of the study. Content analysis method was used to analyze the qualitative data. The main purpose of content analysis is to reach concepts that can explain the collected data and themes to establish relationships. In this direction, the collected data were first conceptualized, then the emerging concepts were organized in a logical integrity and themes explaining the data were determined based on them (Yıldırım & Şimşek, 2008: 227-228). In the process of analyzing the qualitative data, the interviews with the participants were first transcribed and transferred to electronic media. Then, a separate file was created for each participant and the data were named as P1, P2, ..., P25.

This research analyzed the effects, advantages and disadvantages of digital exercise experiences on individuals. In the qualitative research conducted with 25 participants, the experiences of the participants were analyzed under four main themes: Exercise Habits and Preferences, Motivation and Challenges, Effects of Online Exercise and Comparisons, Future Plans and Recommendations. Each theme addresses different aspects of digital exercise on individuals and was evaluated in line with the findings from the participants' experiences. The categories and findings under these themes are presented below (Figure 1).

Main Theme	Subcategories	Summary Findings
Exercise Habits and Preferences	- Exercise types such as Yoga, Pilates, Fitness, CrossFit - Preferences between individual and group lessons - Usage rates of online platforms - Duration and frequency of weekly exercise	Participants mostly prefer exercise types such as **yoga, pilates and fitness**. Some find individual classes more efficient, while others find group classes more efficient. Weekly exercise duration varies, but most participants **exercise regularly.**
Motivation and Challenges	- Trainer influence and the importance of giving feedback - Motivational factors such as music, sense of achievement, physical development - Impact of connectivity and technical issues on motivation - Distraction and focus problems in the home environment	The motivation of the participants is largely driven by **the instructor's energy, narrative style and feedback**. Factors such as **music and a sense of achievement** also increase motivation, while **technical problems and distractions** can negatively affect motivation.
Effects of Online Exercise and Comparisons	- Physical development (flexibility, strengthening, weight loss) - Mental development (more calm, disciplined, increased awareness) - Online and face-to-face exercise comparison - Social interaction and the advantages of face-to-face classes	**Those who exercised online** reported that they gained physical strength and flexibility and **relaxed** mentally. Although online classes are considered **advantageous in terms of time and cost**, **face-to-face classes** are more effective in terms of **social interaction and instructor support.**
Future Plans and Recommendations	- Tendency to continue online courses - Preference rate of hybrid model (both online and face- to-face) - Suggestions for making online courses more efficient - Ways to increase instructor-student interaction	The majority of participants **plan to continue exercising online.** However, the **hybrid model** seems to be **becoming increasingly popular**. For more effective online classes, it is recommended **that instructors provide more feedback** and **minimize technical problems**.

Figure 1. Themes, Categories and Summary Findings

Theme 1. Exercise Habits and Preferences

Yoga, pilates and fitness stand out among the types of exercise that participants prefer when using digital exercise platforms. These types of exercises are preferred because they provide physical flexibility, strengthen muscles, provide mental relaxation and help with weight control. However, CrossFit and cardio-oriented exercises are also preferred by some participants, although these are less common due to their higher intensity.

When the exercise styles of the participants were analyzed, it was observed that there were differences in preferences between individual and group classes. Some participants preferred individual exercises because they stated that they had the opportunity to progress at their own pace and felt free. On the other hand, some participants stated that participating in group classes increased their

motivation and that instructor guidance and group dynamics made the exercise process more efficient. This situation varies according to individuals' personal preferences, understanding of discipline and social needs.

Although the duration and frequency of weekly exercise varies from person to person, it is generally observed that most of the participants exercise regularly. The flexibility offered by digital exercises allows individuals to exercise at times that suit their schedules, which increases the sustainability of exercise. At this point, most of the participants stated that they exercised at least three days a week, while some of the participants took care to exercise every day.

Theme 2. Motivation and Challenges

One of the issues that the participants emphasized the most in digital exercises was motivational factors. One of the most important factors affecting motivation is the instructor's style of expression, energy and feedback process. Trainers being interactive, guiding the participants with motivating words, evaluating the correctness of the movements and making corrective suggestions if necessary are among the most important factors that increase motivation. In addition, music, sense of achievement and physical development are also factors that increase motivation. Participants stated that choosing the right music, especially during exercise, made the training more enjoyable and that they could adjust their tempo better with the music. In addition, observing their own development and noticing the changes in their bodies stand out as one of the most important factors that increase their motivation. However, there are also various obstacles to motivation. Connection and technical problems are the main ones. Participants stated that technical problems such as lost internet connection, decreased image quality or audio synchronization negatively affected their motivation. In addition to technical problems, the high number of distractions in the home environment is another reason for loss of motivation. Reasons such as phone notifications, distractions from family members or pets, inability to fully focus due to other responsibilities at home can reduce the efficiency of digital exercises.

Theme 3. Effects of Online Exercise and Comparisons

Participants reported that online exercises had various physical and mental effects on them. Physically, it was observed that digital exercises, when done regularly, increased physical flexibility, strengthened muscles and contributed to weight control. Some of the participants stated that thanks to digital exercises, they were able to perform movements that they could not do before and increased their muscle endurance. Mentally, digital exercises contribute to individuals becoming more disciplined, mindful and calm. Participants who especially preferred yoga and meditation-based exercises stated that such activities reduced their stress, provided mental relaxation and

helped them feel more balanced in their daily lives. Despite the advantages of online exercises, they also have some shortcomings compared to face-to-face exercises. Participants emphasized that online exercises are advantageous in terms of time and cost, but face-to-face classes are more effective in terms of social interaction and instructor support. In face-to-face exercises, the presence of groupmates and direct feedback from the instructor increase motivation, whereas these dynamics are weaker in online classes.

Theme 4. Future Plans and Recommendations

One of the key findings of the research is that the vast majority of participants plan to continue exercising online. However, what is noteworthy here is that the hybrid model is becoming increasingly popular. That is, some participants prefer to combine both online and face-to-face exercises, rather than continuing with online classes only. This can be explained by the fact that online and face-to-face exercises have different advantages. Several suggestions were offered to make online courses more efficient. In particular, participants stated that more feedback from instructors would increase motivation and make the process more effective. They also emphasized that technical problems should be minimized and connection and image quality should be improved. In addition, some participants suggested creating more interactive exercise platforms and increasing the interaction between instructors and students in live classes. In this regard, instructors' one-on-one interaction with participants, answering questions and making the course content more dynamic are among the suggested areas for improvement.

Conclusion: The Future of Digital Exercise Experiences and Areas for Research

Digital exercise experiences have significant and multifaceted impacts on both the physical and mental health of individuals. With the innovations offered by modern technology, individuals' exercise habits are transforming and the accessibility of physical activity is becoming easier. However, some challenges such as loss of motivation, technical infrastructure deficiencies and lack of individual feedback also arise in this process. Therefore, some improvements are needed to make digital exercises more sustainable and effective.

Research findings show that digital exercise programs offer significant advantages in terms of flexibility, accessibility and cost. Users can exercise whenever they want, regardless of location, eliminating the need to visit traditional gyms. However, the social interaction, one-to-one feedback and coaching support provided by face-to-face workouts cannot be fully met in the digital environment. For some individuals, these deficiencies can lead to a loss of motivation and reduced commitment to exercise. Today, hybrid models where online and face-to-face exercises are conducted together stand out as a

remarkable issue in terms of user experience. By detailing users' expectations from the hybrid exercise model, its contribution to individual exercise programs and its effects on group interaction, the elements that enrich the personal training experience can be determined.

Hybrid models enable digital exercise platforms to evolve in the future to be more interactive, more technically robust and more tailored to individual needs. Combining the advantages of digital and face- to-face workouts, these systems help users make a long-term commitment to their exercise programs. Moreover, more active use of innovative technologies such as AI-supported recommendation systems, virtual trainers and interactive feedback mechanisms can significantly improve the user experience. The role of instructors and their impact on motivation is also of great importance. Examining the differences in motivation between live and pre-recorded classes may be useful to increase users' commitment to the exercise process. The impact of the level of interaction with the instructor on the exercise process should be assessed and motivational factors should be identified. In particular, trainers providing individual feedback and guidance by analyzing users' performance data is key to providing a personalized experience. In addition, platforms need to minimize technical issues, develop more user-friendly interfaces and increase interactive elements such as live lessons. Furthermore, virtual reality (VR)-based exercise experiences seem to be an effective tool to increase user motivation by providing a more realistic training environment. With the development of technology, the contributions of virtual reality (VR), augmented reality (AR) and artificial intelligence-assisted training programs to the digital exercise experience are attracting more and more attention. By evaluating the adaptation process and efficiency levels of users to these technologies, the effects of VR-based training on the physical and mental experience can be determined.

The effects of digital exercises on health should be addressed comprehensively and their contributions to chronic diseases, obesity management and rehabilitation processes should be supported by scientific studies. In particular, research conducted in collaboration with health professionals by detailing the effects of digital exercises on cardiovascular diseases, musculoskeletal disorders and metabolic diseases can contribute to the development of this field. In this context, the effectiveness of digital exercises can be more clearly demonstrated by examining the changes in individuals' physical endurance, muscle strength, flexibility and general health parameters in the long term. However, the role of digital exercises on psychological well-being should not be ignored. Its effects on stress management, depression and anxiety should be detailed and how it contributes to individuals' mental health should be investigated. Regular physical activity is known to increase the levels of endorphins and serotonin, known as happiness hormones, in the brain, but more research is needed on how

exercises performed in a digital environment affect these processes. In addition, how social support mechanisms can be developed for individuals to maintain their motivation and the potential of online exercises to strengthen social bonds should also be evaluated. Focusing on the social interaction dimension, how online exercise programs affect the connections between individuals can be investigated. Social support mechanisms can be examined by analyzing how digital exercises strengthen solidarity and sense of community among individuals.

The exercise experience is significantly influenced by individual differences and environmental factors. Among the factors that shape the user experience, the psychological effects of the music, environment and interface designs used during exercise have an important place, and determining the factors that increase motivation is critical for research in this field. In addition, how digital exercises are used in different age groups should also be considered. By comparing the effects on young people, adults and elderly individuals, age-specific exercise programs can be created. Considering the difficulties faced by elderly individuals in accessing digital exercise platforms, more appropriate programs and access mechanisms should be developed for them. In addition, personality traits, learning styles and exercise habits of individuals directly affect their adaptation to digital exercises. While significant differences can be observed in the digital exercise experiences of introverted and extraverted individuals, analyzing their sources of motivation, self-discipline levels and reactions to digital content can contribute to the development of more personalized exercise programs. Taking all these factors into account will increase user experience and adherence to exercise by making digital exercises more tailored to individual needs.

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THE EFFECT OF PILATES EXERCISES ON PHYSICAL FITNESS

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INTRODUCTION

Among the various exercise disciplines, Pilates exercises have been gaining popularity both in our country and globally. Through Pilates exercises, individuals not only maintain their physical health but also protect their mental well-being. Recreational activities play a crucial role in this regard. When individuals prefer to engage in such recreational activities with a trainer or recreation leader, the observed benefits increase significantly.

Today, many people choose Pilates exercises to make the best of their leisure time (Ayyıldız Durhan et al., 2022: 86). Participating in activities during leisure time contributes to individuals in many aspects at every stage of life (Kılıçarslan et al., 2023: 175). As mentioned earlier, Pilates exercises are more effective when performed under the guidance of recreational leaders. These leaders or trainers shape the activities according to the goals and the individual or group needs of the participants (Ayyıldız Durhan et al., 2022: 127). Therefore, the observed benefits are greater compared to exercises performed alone. Exercise is an essential tool in raising healthy generations and creating modern societies. Especially for children and young people, exercise plays a significant role in their physical and mental health, social development, and in fostering qualities such as creativity, productivity, sportsmanship, empathy, tolerance, morality, proper conduct, and self-confidence (Güngör et al., 2019: 421). One of the most popular exercise programs today is the Pilates method, developed by Joseph H. Pilates. This method has been shown to have positive effects not only on musculoskeletal health but also on mental well-being. Pilates is a combination of disciplines that integrate mind-body coordination with balance, breathing, and movement systems (Küçükkapan & Civan, 2021: 54; Ünver, 2021: 3-4).

Pilates is a type of body and mind centering technique developed by Joseph Hubertus Pilates. The founder himself named this method "Contrology" (Kloubec, 2010). The primary goal of the Pilates method is to improve and enhance circulation, physical fitness, flexibility, postural alignment, body awareness, and motor coordination (Küçükkapan & Civan, 2021: 55; Ünver, 2021: 4). In this context, Pilates exercises can be divided into two categories: Mat Pilates exercises and Reformer Pilates exercises. Mat Pilates refers to

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exercises performed on the ground using a mat. These exercises can be done with various equipment such as Pilates mats, stability balls, resistance bands, Pilates rings, dumbbells, Pilates rollers, magic circles, straps, etc. Mat exercises can be performed in different positions (supine, side-lying, prone, etc.). While numerous Mat Pilates exercises exist, one person does not have to practice all of them. Exercise programs can be tailored to specific goals. Since Mat Pilates exercises form the foundation of Pilates, they are typically the first exercises performed (Doğan, 2018: 13; Ünver, 2021: 8).

Reformer Pilates involves performing Pilates exercises using specialized equipment. Some of these include the Reformer, Cadillac, Wunda Chair, Spine Corrector, Barrel, and Ped-a-Pul. Among these, the Reformer is the most widely used. The Reformer is an apparatus that adjusts to different gravity directions, provides both fixed and movable surfaces, and can be modified to fit the physical structure and limitations of individuals. It offers support and resistance while enhancing strength, flexibility, proprioception, and balance (Karaca, 2019: 38).

Although the Reformer is the most well-known and commonly used Pilates equipment, it is not the only one. Cadillac, Wunda Chair, and other apparatus also play integral roles in Pilates training. Cadillac is a rectangular apparatus with an overhead frame connected by metal bars, designed to facilitate complex exercises with minimal movement control. The Wunda Chair is a box-like chair with springs that offer resistance. The equipment used in Reformer Pilates generally alters the support center, adjusts lever length, and either facilitates or increases exercise difficulty (Ünver, 2021: 9).

Both Mat and Reformer Pilates have their respective advantages and disadvantages. Reformer Pilates requires specialized equipment, making it more expensive of a practice. Although individuals can learn Pilates techniques, they can access Reformer Pilates exercises in fitness centers, which imposes an additional financial burden. On the other hand, individuals can perform Mat Pilates at home once they learn the fundamental principles, as it requires more affordable and accessible equipment. Today, almost every household has the necessary equipment for mat pilates.

In recent years, Reformer Pilates has been increasingly used for therapeutic purposes (Ünver, 2021: 10) Its specialized design allows for broader rehabilitation applications. Reformer pilates enables a chance to exercise on a moving surface. The equipment enables modifications that adjust support centers, lever lengths, and movement difficulty levels. With the help of the reformer, facilitating or complicating the movement can be done with greater ease and clarity. The equipment of reformer facilitates the selection of exercises according to the support or resistance requirements of people. A greater number

of different modifications of exercise techniques can be made in Pilates with equipment. Pilates with equipment can offer complex, multiple options in terms of strengthening. Pilates tools and equipment are easy and safe to use by trained people. The use of these apparatus requires trained professionals to ensure safety. Incorrect or careless use can pose risks to both practitioners and instructors (Can, 2006: 16). The equipment does not fully support the person; they need to support themselves. Therefore, although Pilates with equipment provides functional and effective exercise applications, it can also pose a risk for inexperienced users. Mat pilates can be practiced in groups of 10-15 people, allowing more individuals to participate simultaneously compared to Reformer Pilates. Since Mat Pilates exercises form the foundation of Pilates, they are typically the first exercises performed. If individuals start with basic Mat exercises, they can quickly grasp Pilates principles and movements, facilitating a safer transition to Reformer Pilates. Both Mat and Reformer Pilates offer similar benefits. As discussed, Mat and Reformer Pilates have comparable and distinct characteristics (Bulguroğlu, 2015: 27).

The Principles of Pilates

The Pilates method is based on several principles, which include concentration, breathing, centering, control, precision, and fluidity. These principles are explained individually below.

Concentration: When performing Pilates exercises, it is necessary to focus on how the body moves in a coordinated manner, the specific muscles being used, or those that are not. Full concentration on the body's movements is required during the exercises. Concentration ensures the mind-body connection. By directing attention to the active body segment, neuromuscular control is developed, and the quality of movement improves (Can, 2006: 16).

Breathing: According to Pilates, proper breathing increases the oxygen capacity carried by the blood, aiding in better activation. Breathing principles are incorporated into movement patterns. In Pilates, deep breathing that provides optimal oxygen circulation to all tissues and makes one feel alive is important, as it increases lung capacity. Pilates contributes to strengthening the respiratory center. With diaphragm activation, the m. transversus abdominis and related core muscles are synergistically activated. Breathing helps establish the connection between the mind and body. In Pilates, breathing awareness is integrated into movements to increase oxygen exchange between tissues and improve lung capacity (Çakır and Yücel, 2021: 83).

Centering: Centering is the main focus of the Pilates method. Before starting movements, the core muscles must be activated to ensure the stabilization of the core region. Stabilizing the core region controls the movement of the lower and upper extremities while allowing the spine to move within a neutral

range. To perform movements correctly, it is essential to start from the center. In Pilates, exercises should be performed outward from the center. Creating a strong, stable, and flexible core is fundamental (Karaca, 2019: 39).

Control: Pilates exercises require control. The necessity of thought to control body movements is emphasized in Pilates. A holistic approach requires the movements to be performed with the principle of full control. During Pilates exercises, the mind should have control over the body. Enabling the individual to control the exercise ensures that it is performed correctly and safely. Control means understanding and maintaining the proper alignment, effort, and form during the exercises (Can, 2006: 16).

Precision: Each movement has a specific speed and range of motion. Movements should be performed precisely, not vaguely. Precision also requires awareness of both spatial and temporal aspects of the movements. To perform the targeted movements as clearly as possible, each exercise should be carried out with focus (Karaca, 2019: 39).

Fluidity: Fluid movements are preferred in Pilates exercises. Static positions are replaced by more fluid movements. To achieve fluidity in movements, they must be performed in accordance with a specific rhythm. Movements should be performed without rushing or pausing. Smooth transitions should be used between movements. Sharp endings should be replaced by flexible transitions (Bulguroğlu, 2015: 15).

Joseph Hubertus Pilates primarily worked with dancers when creating and developing the Pilates exercise method. For this reason, it was understood that Pilates exercises require high physical skills. Over time, modified exercises based on the basic principles of this method were created, allowing Pilates to be applied not only by people with high physical skills but also by different populations (elderly, patients, pregnant women, etc.) (Bulguroğlu, 2015: 15).

Physical Fitness

Physical fitness is a concept that is becoming increasingly important for daily life and general health. Physical fitness refers to the ability to perform the activities required by daily life, recreational activities, and professional tasks successfully and correctly, without feeling fatigue (Baltacı, 2016: 161). It is well-known that regular physical activity plays a vital role in maintaining health (Baydar Arıcan, 2021: 92; Karaman et al., 2018: 99).

Physical Activity and Physical Fitness in Children

Physical activity is very important for children in the process of ensuring their normal growth and development. Physical activity in children typically occurs through games. Physical fitness is crucial in preventing obesity in children. Healthy habits and health behaviors are acquired and developed

during childhood (Zorba & Saygın, 2007: 262). Today, businesses that prepare exercise programs for children often offer various exercises under the title of "children's pilates." In the age of advancing technology, it is more beneficial to guide children toward physical activity rather than letting them spend time with phones or tablets.

Regular exercise, balanced nutrition, and adequate sleep improve flexibility, coordination, endurance, and strength (Kalish, 1998: 10). Inactive children develop health problems along with obesity and poor endurance. The most important factor in this issue is parents. Informed parents understand the importance of exercise, but children of families who are uninformed about this often grow up facing health problems related to obesity and inactivity. The general issue in today's children is poor posture, often caused by a lack of exercise and incorrect sitting positions at school desks. These postural problems can be prevented through regular pilates exercises.

Physical Activity and Physical Fitness in Women

Physical activity and physical fitness are significant issues for women. Especially during pregnancy, women can correct postural imbalances through regular pilates exercises. Not only during pregnancy but also in women experiencing health problems and chronic pain, regular pilates exercises have been shown to alleviate these issues in several studies.

During pregnancy, women often stop exercising, and there is continuous concern about whether sports activities should be suspended in the early weeks of pregnancy (Saygın & Zorba, 2017: 281). During the first trimester, doctors usually advise pregnant women with a risk of miscarriage to stop physical activities, but those with low risk can continue their exercises without stressing the core area (abdomen and surrounding muscles).

Heavy exercises done before pregnancy do not affect fertility or subsequent pregnancies. During pregnancy, pilates exercises—whether on the mat or using a reformer—can be performed without stressing the abdominal area, allowing women to actively engage in their physical fitness during this period.

Physical Activity and Physical Fitness in Older Adults

Physical activity and physical fitness in older adults contribute to extending the aging process, as supported by scientific studies. Although these studies have not definitively proven the extension of life, they have provided clear evidence of the health benefits of conscious and regular exercise (Zorba & Saygın, 2007: 277).

As people age, physiological changes occur, particularly in bone tissue, the nervous system, metabolism, aerobic capacity, respiratory systems, and body composition. Exercises can help prevent these negative changes. Older adults

are often recommended to engage in walking and low-intensity exercises. In reformer pilates exercises, individuals benefit from light resistance provided by springs, allowing them to use pilates equipment effectively.

The concept of physical fitness has become a measurable characteristic in various fields today, with numerous tests available to assess it. In addition to skill- and health-related physical fitness tests and tests that assess protective fitness against diseases, there are also tests that examine fitness through social and recreational activities (Saygın & Zorba, 2017: 85). The components of physical fitness are related to both health and skill. Physical fitness is examined in terms of health-related and skill-related physical fitness parameters (Ünver, 2021: 13).

Health-Related Parameters of Physical Fitness

Health-related physical fitness parameters include cardiovascular fitness, body composition, muscular strength, muscular endurance, and flexibility.

Cardiovascular Fitness:

Cardiovascular fitness is the ability of the circulatory and respiratory systems to efficiently supply oxygen and nutrients required by muscles. It reflects the functional capacity of the heart, lungs, and related muscles during exercise. Cardiovascular fitness indicates how well the respiratory and circulatory systems adapt to work and exercise. The assessment of this component of physical fitness involves tests of cardiorespiratory function during exercise and rest (Kahya, 2018: 10).

Body Composition:

Body mass refers to the amount of weight an individual carries. Body composition, however, shows the exact and variable amounts of bone, muscle, and fat tissue that make up body weight (Baltacı, 2016: 161).

Muscular Strength:

Muscular strength can be defined as the maximum force generated by a muscle or group of muscles. Muscular strength depends on the type of contraction (static or dynamic, concentric or eccentric), muscle type, contraction speed, and joint angle (Korkmaz, 2020: 6).

Muscular Endurance:

Muscular endurance refers to the ability of a muscle to repeat a movement or maintain tension for a desired amount of time (Kahya, 2018: 10).

Musculoskeletal Fitness:

Muscular strength, muscular endurance, and the quality of bone structure form musculoskeletal fitness. As mentioned, muscular strength is the maximal force or tension generated by a muscle group. Muscular endurance is the ability

to sustain submaximal force levels for extended periods. Bone quality involves the microarchitecture, mineral content, and density of bones. Bone structure is related to the risk of fractures (Baltacı, 2016: 162; Malmberg et al., 2002: 666).

Flexibility:

Flexibility is the functional ability of a joint to work at its optimal range of motion. Flexibility assessments can be performed through methods such as trunk flexion, hyperextension, lateral flexion, shoulder raising, hamstring stretching, or through goniometric measurements (Korkmaz, 2020: 7). The biomechanical structure of joints, their movements, and range of motion vary. Flexibility is influenced by factors such as muscle tone, muscle strength, ligaments and other connective tissues, the structure of the bones forming the joint, joint surfaces, joint space, joint capsule, and the amount of synovial fluid (Baltacı, 2016: 161; Malmberg et al., 2002: 666).

Skill-Related Parameters of Physical Fitness

Skill-related physical fitness parameters include agility, coordination, balance, power, reaction time, and speed.

Agility: Agility is the ability to suddenly move or change direction in response to any stimulus, either with the whole body or a part of it. It involves the skill to start, stop, and rapidly change the direction of movement. Agility is closely related to speed, coordination, and balance, and requires the ability to respond to environmental changes. Agility is a complex physical fitness parameter with multiple components.

Coordination: Coordination is the ability to perform movements in a regular, harmonious, and goal-directed manner, as a series of actions (Günay and Yüce, 2008: 243).

Balance: Balance is the ability to maintain the alignment of body segments, supporting surfaces, and external stimuli without losing stability. It refers to the ability to control the body's position. Balance is divided into static and dynamic balance. Static balance is the ability to maintain a fixed position of body segments, requiring isometric muscle contraction for its maintenance. Postural control is essential for static balance (Balaban et al., 2009: 134). Dynamic balance is the ability to maintain or adjust balance in activities requiring moving body segments or on unstable surfaces. Achieving dynamic balance requires not only isometric contractions (as in static balance) but also isotonic contractions (concentric and eccentric contractions). Dynamic balance is more complex than static balance, especially when considering the continuation of movement.

Power: Power is a physical fitness parameter that indicates the rate of work done per unit of time. Many sports require a high power output within a short

time to perform specific movements, in which the speed component of physical fitness also comes into play (Ergun and Baltacı, 2018: 114).

ReactionTime: Reaction time is the interval between the onset of a stimulus and the initiation of the response to that stimulus (Günay and Yüce, 2008: 244).

Speed: Speed is generally defined as the shortest time required for an object to move over a fixed distance. As a skill-related physical fitness parameter, speed refers to the ability to perform a movement in a short period, or the ability of body parts to move quickly (Ergun and Baltacı, 2018: 114; Özer, 2020: 6).

Considering all these parameters, it is evident that Pilates has a significant impact on physical fitness when related to its principles. Additionally, there are many studies in the literature regarding the effects of Pilates on physical fitness. The common goal in these studies is to examine the impact of mat and equipment-based Pilates on physical fitness. Based on the results of these studies, it is clear that regular exercise programs, when applied in alignment with their objectives, provide numerous important benefits to the human body. To achieve the desired effects of exercise, the type, duration, frequency, and intensity of the exercises must be properly planned (Can et al., 2014: 9).

Breathing is emphasized as being crucial in Pilates exercises. Among the components of physical fitness, muscle endurance and cardiovascular endurance are key. Within the principles of Pilates, breathing is highly important. The breathing technique used in Pilates supports body control, increases awareness, and enhances lung capacity. With effective breathing, an increase in muscle endurance can also be observed.

It has also been observed that Pilates exercises can enhance flexibility in individuals. Flexibility is an essential parameter for performing functional movements correctly, ensuring functionality, and preventing musculoskeletal injuries. For a muscle to provide normal mobility at joints, it must be of adequate length, but it also needs to contract for effective joint stability (Özer, 2020: 21). Given the characteristics of Pilates exercises, it can be understood that Pilates can be used to improve flexibility. Furthermore, Pilates exercises targeting the core region have been found to have a significant impact on balance. It is well known that regular physical activity and exercise improve individuals' physical fitness (aerobic fitness, muscular fitness, flexibility, and body composition) and, in turn, support a healthy lifestyle (Bozkuş et al., 2013: 62).

Scientists have observed visible muscle deformation in individuals who do not exercise. Within the first three days of inactivity, people who do not engage in physical activity lose about one-fifteenth of their maximal muscle strength. Inactive individuals also experience negative effects on their circulatory, respiratory, digestive, and nervous systems. As a result, even though changes in body stores can be observed, if the second exercise session is delayed, a regular

decline in performance is seen. After 48-72 hours, to achieve the desired level of physical fitness, muscles must be reactivated. According to research findings, while daily exercise yields the desired results, when exercises are scheduled to be no more than three days a week, physical fitness will either remain at an adequate level or improve depending on the intensity of the exercise (Zorba, 2014: 229-230).

Studies have shown that a sedentary lifestyle brings health issues along with it. For example, Baydar, who discussed sedentary living, anxiety, and exercise during the pandemic, explained the health issues associated with sedentary behavior and the impact of exercise on physical fitness and health in a book published in 2021 (Baydar, 2021: 93-102). Pilates exercises have been the subject of limited research in relation to chronic back pain, scoliosis treatment, osteoarthritis treatment, mobility in hospitalized patients, activity development in gymnasts, flexibility, and body composition (Yakut et al., 2006: 52).

In conclusion, Pilates exercises aim to teach patients how to actively engage the muscle corset formed by structures such as the multifidus, transversus abdominis, thoracolumbar fascia, and other muscles that make up the central column. This helps maintain daily functional skills such as walking, climbing stairs, and carrying weights. The corset effect created by this muscle connection, as shown in EMG studies, helps protect the patient from positions that may cause trauma and pain throughout the day (Yakut et al., 2006: 56). Additionally, while Pilates exercises have an impact on physical fitness, they also enhance quality of life and motivation. They reduce persistent muscle pain and discomfort. Pilates exercises are also widely used to address posture disorders such as scoliosis, kyphosis, and lordosis. Thus, it is evident that Pilates not only influences physical fitness but also positively affects joint and muscle pain, and overall health, as demonstrated in research. Pilates exercises are generally preferred by women; however, they are not exclusive to women and can be applied to all individuals, including children and the elderly.

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CAMPUS RECREATION: ACTIVE CAMPUS, ACTIVE MINDS

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INTRODUCTION

University education is not only a period in which an individual deepens his/her academic knowledge; it is also an important period in which he/she becomes psychologically, physically and socially competent, shapes his/her future and specialises. How students utilise the time they have outside their classes has a great importance on their development. Campus recreation comes into play at this critical point.

Campus recreation helps students to balance their academic responsibilities and includes a wide range of leisure activities from physical activities to social organisations, from artistic activities to nature sports. The recreational opportunities offered on a university campus support students' physical health, provide psychological relaxation and strengthen social bonds through a variety of activities that students can participate in both individually and as a group. Today, campus recreation is becoming increasingly important as educational institutions aim to support not only the academic success of their students but also their social and emotional development.

University students need to feel physically and mentally well while trying to overcome the intensity of their course programmes, exam stress and future anxiety. Recreational activities allow them to release their energy by doing sports, spend time in nature, express themselves by participating in artistic or cultural activities. In addition, such activities facilitate the formation of social bonds among students, enabling the establishment of strong friendships and increasing the sense of belonging. Especially when students from different cultures come together within the framework of common interests, university life becomes more meaningful and enjoyable.

However, it should be emphasised that recreation is not only a means of entertainment. Research shows that regular physical activity and social interaction positively affect students' academic success. Students who play sports, are interested in music or participate in community activities have higher time management skills and increase their motivation. This helps them to focus more on their studies, use their creativity and improve their problem solving

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skills. In this chapter, we discuss the definition and importance of campus recreation and aim to examine its role in the physical, psychological and social development of university students in depth.

The Concept of Campus Recreation

Recreation refers to the activities that individuals spend their free time for physical, mental and social renewal. These activities enable individuals to get away from the stress of daily life, acquire new skills and strengthen their social relationships (Karaküçük, 2014). Participation in recreational activities, not only for recreational purposes, promotes social relationships, positive emotions and skill acquisition, increases subjective well-being and improves the quality of life in general (Brajša-Žganec, Merkaš & Šverko, 2011).

In the 20th century, the effectiveness and impact of recreation, especially in educational institutions, has gradually expanded. Universities have developed campus recreation programmes to support students' academic achievement and encourage their social development. While these programmes help students maintain their physical, mental and emotional health, they have also become a part of campus life (Hurd & Anderson, 2011).

Campus areas of universities are important areas that support cultural, physical, intellectual, social, environmental and economic development for students, academic and administrative staff, student families and the community they live in (Gül et al., 2016). Recreation activities planned by recreation experts or managers on university campuses and carried out within the framework of a specific programme are generally referred to as campus recreation (Beşikçi, 2022). According to Bosna, Bayazıt, and Yılmaz (2018), campus recreation can vary according to the characteristics of the campus in terms of places and activities in each institution. However, the most important feature of campus recreation is that it offers versatile programmes and services for all university members, students and their families, staff and staff families. Many sportive and cultural activities, conferences and symposiums, artistic activities, youth festivals, spring festivals, concerts, etc. organised on campuses are activities created for students to increase their personal development and become competent (Günaydın, 2011).

Campus recreation is a broad term that encompasses a variety of recreational activities for students, faculty, staff and their spouses or relatives at educational institutions. These activities include swimming, group fitness, on-campus sports, informal sports, and fitness. These recreational activities provide students with many benefits such as academic success, better transition to university life, improved mental and physical health, and stronger social bonds (Andre et al., 2017; Kılıçarslan et al., 2023; Karaman Çam et al., 2024).

It is stated that the main objectives of campus recreation are to meet the physical, social and mental needs of students, academic/ administrative staff and even local people, to enable participants to develop a positive self-image and build strong social relationships, to support their physical and mental health, to enrich university experiences outside academic programmes by encouraging participation in activities and to gain leadership skills (Sanderson et al., 2018; Arslan et al. 2024). These activities enable students to gain new experiences, support their individual development and make new friends throughout their university life. At the same time, it is also organised to help individuals with special needs to enjoy school life by considering their needs, social development, health and safety (Mclean, Hurd, & Rogers, 2008).

According to Komives (2019), recreation programmes developed in accordance with professional standards on university campuses offer students various opportunities to contribute to their academic and personal development. These programmes allow students to actively participate in joint educational activities and have a voice in campus management and administrative processes. In addition, it helps to develop the awareness of democratic participation by providing the opportunity to defend their ideas and protect their interests through student organisations.

In addition, activities carried out to reinforce leadership skills support students to increase their managerial and organisational competencies by taking responsibility (Külekçi, 2015; Ayyıldız et al., 2022). Encouraging healthy social relations within campus life strengthens interpersonal communication and improves students' sense of belonging. These activities, which allow them to utilise their leisure time effectively, play a supportive role in coping with academic pressures and contribute to the development of ethical decision-making skills. In many studies, the effect of campus recreational experience on

students' university education is important at the point of continuation (Çevik et al., 2019).

On-campus recreation is an option that can help reduce the stress of students on university campuses (Baydar, 2016). According to Selvaratnam (2020), activities on campuses have an important place as an option that can help reduce the stress of university students. At the same time, according to Mclean and Hurd (2012), campuses are not only a place where students come to study but also a social living space where they can get away from the exhausting stress of daily life.

According to definitions and research, campus recreation refers to the programmes, facilities and services offered by universities to promote health, physical activity and social interaction among students, faculty and staff. In this context, considering the multidimensional structure of campus recreation, it is necessary to emphasise which areas of activity it covers and the role of these areas in university life. Examining these areas of scope will provide a more systematic presentation of the contributions offered by campus recreation.

Scope of Campus Recreation

Recreation activities on university campuses are structured in various areas in order to respond to different interests and needs. These activities are shaped with a broad perspective from supporting students' physical health to encouraging their artistic and cultural development, from increasing their social sensitivity to integrating with nature. These activities within the scope of campus recreation can be analysed under the main headings of physical, artistic and cultural activities, social and volunteering-based activities, and nature and sustainability-oriented activities. These titles contribute to both the personal

development processes of individuals and social cohesion within the community, enriching campus life.

Physical

One of the most common types of campus recreation is those based on physical activities. Such activities help students adopt a healthy lifestyle and cope with stress (Baydar Arıcan, 2021). Universities encourage students to engage in regular physical activity by providing infrastructures such as sports facilities, outdoor sports areas and indoor physical activity areas.

Students who actively participate in sport tend to have higher academic performance than those who do not participate in sport activities. This positive correlation is supported by numerous studies conducted in different educational levels and contexts. A study conducted by the National Collegiate Athletic Association (NCAA) showed that students who regularly participate in sports have higher academic performance (NCAA, 2020). It shows that students participating in sports activities experience optimal performance moods more frequently in line with factors such as task difficulty and skill adaptation. This situation indicates that students' motivation, self-discipline and goal-oriented study skills are reinforced and positively reflected on their academic achievement (Taşkuyu, 2018; Karaman, 2028). However, according to Yavuz and İlhan (2023), positive effects were observed in all sub-dimensions of psychological well-being levels of university students who regularly participate in sports. In this direction, it can be stated that students who participate in sports experience more positive emotions, connect to life more strongly, establish more qualified and supportive relationships with their social environment, develop a higher awareness of the meaning and purpose of their lives, and experience an increase in their perception of personal success. These findings reveal that regular sport contributes to the multidimensional psychological well-being of university students.

However, another important dimension of the issue is that everyone can benefit equally from campus recreation services, especially the level of participation of disabled students in these activities and the difficulties they face. Participation in recreational activities on campus can provide social health benefits for university students with intellectual or developmental disabilities. The importance of campus recreational activities is increasing for students with disabilities to become a regular part of campus life and to include them in campus life in general (Arıcı, 2023).

Artistic and Cultural Activities

Artistic and cultural activities are an important part of campus recreation. Theatre performances, concerts, exhibitions and workshops allow students to develop their creativity and gain cultural awareness. Such activities provide

a platform for students to express themselves and enrich campus life. For example, one study found that students who participated in artistic activities had better empathy and communication skills (Stuckey & Nobel, 2010).

Studies on the effects of participation in artistic activities on university students‘ psychological well-being and life satisfaction show that such activities can increase students’ overall life satisfaction. In Kömürcü’s (2023) study, it was determined that university students’ level of participation in artistic activities significantly predicted psychological well-being and life satisfaction. Similarly, in Duran and Tezer’s (2016) study, it was found that the group psychological counselling programme enriched with art activities had positive effects on the well-being of university students. This finding reveals that artistic activities can be an effective tool in supporting students’ mental health.

In addition, in different studies, it was found that the psycho-education programme based on art practices was effective in increasing the psychological resilience levels of university students and this effect continued throughout the three-month follow-up period (Çınar, 2018). This shows that artistic activities can play an important role in improving students’ stress coping and resilience skills.

In addition, in Bal and Tuna’s (2021) study, the quality of life, hopelessness and self-esteem levels of adults engaged in artistic activities were examined and it was determined that participation in artistic activities increased the quality of life, decreased the level of hopelessness and increased self-esteem. These findings support that artistic activities contribute to the psychological and emotional health of individuals. The predictive power of university students‘level of participation in artistic activities on psychological well-being and life satisfaction was examined and it was concluded that participation in artistic activities significantly increased students’ psychological well-being and life satisfaction. This finding shows that artistic activities can increase students’ overall life satisfaction (Kömürcü, 2023).

In a study conducted by Andrews and Slater (2023), it was found that fine arts students experienced higher levels of mental distress due to academic load and creative pressures. However, it was revealed that regular participation in artistic activities supported the psychological well-being of these students by increasing their ability to cope with stress. In the study, it was stated that the artistic production process functions as a means of self-expression and relaxation.

Similarly, in a study conducted by Li et al. (2024), it was concluded that public art education for university students in China improved students’ mental health literacy and increased their emotional awareness. It was stated that students who participated in the art education programme had higher

psychological resilience and were able to cope with stress more effectively. This finding shows that art is a supportive element in individuals' psychological resilience development processes.

Social and Volunteering Activities

Social activities and volunteering programmes help students gain a sense of community and develop their leadership skills. Club activities, community projects and volunteering programmes enable students to come together and cooperate towards common goals. Such activities facilitate the establishment of social bonds among students and strengthen the sense of belonging (Astin & Sax, 1998). In addition, volunteering activities make important contributions to students' awareness of social responsibility.

In a study examining the relationship between leadership traits and social-emotional competencies of university students, it was determined that youth leadership traits explained 61% of students' social-emotional competence levels. This finding reveals how intertwined leadership skills are with social and emotional competences (Yıldırım & İlhan, 2022). Similarly, in a study on volunteer youth leaders, it was found that these individuals received high scores in leadership dimensions such as challenge and goal orientation, communication, group skills, trust and reliability. This shows that volunteering experiences reinforce leadership skills (Özçetin & Duman, 2022).

Another study evaluating student leadership practices showed that leadership skills developed in dimensions such as modelling, inspiring a shared vision, challenging the process, mobilising and encouraging people. These findings suggest that students' leadership capacities can be strengthened in various ways (Kouzes & Posner, 2013). In higher education, students' active participation in academic, social and cultural activities also increases their leadership and social skills. Universities' providing students with opportunities to participate in such activities makes significant contributions to their personal and professional development (Kara, 2018).

A study examining the effects of international volunteer service experiences on young people revealed that such experiences increase cultural awareness and leadership skills. Volunteering activities enable young people to recognise different cultures and develop their leadership skills (Yılmaz, 2011). Similarly, in a study conducted by Smith, Holmes, Haski-Leventhal, and Brudney (2010) in five different countries, it was determined that university students who regularly participate in volunteering activities have significant gains in areas such as personal development and social responsibility awareness. This study shows that volunteering activities are an effective tool in the social and individual development of students at the international level.

In an evaluation study on volunteering activities in Turkey, it was concluded that participation in voluntary activities has positive effects on students' social responsibility and solidarity awareness. However, it is noteworthy that the overall participation rates are low (Kesgin, 2019). In a study conducted by Harrington (2016), it was revealed that volunteering activities are effective in reducing students' stress levels and strengthening their mental health. Volunteering activities not only enable students to establish more ties with the society, but also contribute to their individual psychological well-being.

Beydoğan (2012), who examined the effect of social and cultural activities implemented in schools on students' value acquisition, found that such activities help students internalise values such as social responsibility, cooperation and respect. In this context, it can be said that both volunteering activities and social activities contribute significantly to students' social and individual gains beyond academic achievement.

In conclusion, social activities and volunteering activities play a critical role in developing students' leadership skills, social-emotional competencies, social responsibility awareness and psychological well-being. Universities' support for such activities offers multidimensional contributions to students' personal and professional lives.

Nature and Sustainability Orientated Activities

Nature-based activities make significant contributions to university students' environmental awareness and learning sustainable living practices. Such activities increase students' environmental awareness by encouraging them to interact directly with nature. With the understanding of environmental ethics, every individual should adopt the responsibility of protecting nature; therefore, it is of great importance to provide students with nature awareness during university education (Karaküçük & Akgül, 2017). For example, activities such as camping, nature walks and permaculture gardens help students develop sensitivity towards the environment. Furthermore, such activities reduce students' stress levels and improve their mental health (Bowler, Buyung-Ali, Knight, & Pullin, 2010).

Sustainability-oriented projects help students adopt environmentally friendly practices and take responsibility for the future. University students, as important actors of social change, constitute a critical group in terms of developing sensitivity and awareness towards environmental problems. In this direction, environmental awareness and green culture gains in the context of sustainability strengthen students' relations with nature and encourage environmentally friendly behaviours (Kılıçarslan & Özant, 2024).

In Turkey, various practices aimed at increasing the environmental awareness of university students attract attention. The Green Student Project, which was

carried out in this context, aimed to provide positive contributions in areas such as environmental literacy, environmental awareness, environmental ethics awareness and attitudes towards the environment by providing students with ecorecreation activities intertwined with nature. As a result of the activities carried out within the scope of the project, positive changes were observed in the environmental awareness and attitudes towards the environment of the participating students (Akgul et al., 2022). Such projects not only provide students with theoretical knowledge, but also enable them to develop permanent behavioural changes through direct contact with nature.

In addition, activities such as outdoor sports and nature walks enable students to connect with nature and positively affect their mental health. A study by Pretty, Peacock, Sellens, and Griffin (2005) found that nature-based physical activities improve mood and reduce symptoms of depression.

In a study aiming to determine the awareness, consciousness and sensitivity levels of university students on environmental issues, it was found that environmental education played an important role in increasing students' environmental awareness. This study shows that the compulsory teaching of environmental courses in educational institutions contributes to the development of positive attitudes and behaviours towards the environment (Karataş, 2014). Environmental education aims to develop environmental awareness in individuals and to gain environmentally sensitive, positive and permanent behavioural changes. In this context, it is stated that students who receive environmental education increase their sensitivity about protecting and using the natural environment and take a more active role in solving environmental problems (Kalkan et al., 2011; Akgül & Karaküçük, 2024).

In another study examining the environmental awareness of university students, it was found that students who received environmental education were more sensitive to environmental problems and adopted sustainable lifestyles. This shows that environmental education positively affects students' attitudes and behaviours towards the environment (Gül et al., 2018). In a study examining the relationship between university students' attitudes towards sustainable environmental education and environmental problems, it was found that students' positive attitudes towards sustainable environmental education increased their sensitivity towards environmental problems. This shows that environmental education plays an important role in developing students' environmental awareness and sense of responsibility (Yıldız et al., 2021).

In another study investigating the benefits of ecology-based nature education programmes, it was found that such programmes increased students' environmental knowledge levels and contributed to the development of more positive attitudes towards the environment. In particular, it was emphasised that

activities that provide direct nature experience encourage students' ecological awareness and sustainable behaviours (Erdoğan, 2011).

In conclusion, nature-based activities and environmental education play a critical role in helping university students gain environmental awareness and learn sustainable living practices. Such activities contribute to students' becoming more environmentally sensitive and responsible individuals by strengthening their ties with nature.

CONCLUSION

Campus recreation is not only an area that encourages physical activity, but also a social and cultural environment that contributes to the multidimensional development of university students. Physical, artistic and cultural activities, volunteering-based activities, and nature and sustainability-oriented activities offered on campuses support students' physical and mental health, as well as enabling them to gain important gains such as social skills, leadership qualities, social responsibility awareness and environmental awareness. In this context, campus recreation, as an indispensable part of university life, makes significant contributions to students' personal and academic development processes.

However, in order for campus recreation activities to reach all students equally and appeal to different interests, these areas need to be addressed with more inclusive and innovative approaches. In particular, making arrangements that facilitate the physical and social participation of disabled students, increasing activities that embrace social diversity and integrating the digitalisation process into recreation activities are considered as steps that will strengthen the quality of campus recreation in the future. In addition, expanding sustainability-oriented projects and adopting more nature-based practices will both increase students' environmental awareness and contribute to their acquisition of a healthy and balanced lifestyle.

In conclusion, campus recreation is not only an area where individuals engage in physical activities, but also a multifaceted development area where students strengthen their social ties, develop their creativity, contribute to society and establish stronger relationships with nature. Universities should consider this multidimensional function and provide campus recreation with a more inclusive, accessible and innovative structure, which will pave the way for students to grow up as individuals who are better equipped both individually and socially.

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FUNDAMENTAL SPORTS EDUCATION FOR CHILDREN

Ceren Suveren[1]

INTRODUCTION

Fundamental sports education in children has become one of the most critical issues. With the advancement of technological developments, movement, which is the natural need of children, has been replaced by screens, and children's movement development processes have been directly affected. Living conditions cause children to constantly run around in the triangle of school, courses, and home, but they move away from healthy living patterns (Blair, 2009). The use of technology and unhealthy nutrition make this process worse. Most families encourage their children to focus on academic education instead of physical activities due to concerns about academic success. This may reduce the presence of exercise and physical activity in children's lives and prevent the acquisition of movement habits. However, many studies are proving that physical activity has a positive effect on academic achievement, cognitive functions, and focus (Assessment, 2012; Donnelly et al., 2016; Donnelly & Lambourne, 2011; Hillman et al., 2008) Movement, one of the most natural and basic needs of human beings, starts with the reflexes of the newborn baby and transforms into voluntary movements over time. Fundamental movement training processes prepare the ground for fundamental sports training. Individuals with insufficiently developed fundamental movement skills are less likely to succeed in sportive activities (Ng & Button, 2019). For this reason, motor development and fundamental movement training processes in children should be handled very carefully, and these steps should never be skipped.

MOTOR DEVELOPMENT IN CHILDREN

Motor Development in Children

Motor development refers to the process of acquiring skills related to behaviors related to movement. A sense of curiosity pushes children to move to explore; thus, the need to move becomes a mental and physical need. As children move, nerve conduction is strengthened, and the mind creates shortcuts related to movement skills. As the human brain develops, the nerves of the central nervous system become more and more like a network of tissues, and the speed of nerve conduction increases. This increase is significant, especially in conscious

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movement (Shumway-Cook, 2007). The motoric development process also shows changes depending on the development of this nerve conduction process (Payne & Isaacs, 2017).Neuroplasticity refers to the brain's flexibility and adaptability, and the neuroplasticity process that occurs during exercise plays a critical role in developing learning, memory, and other cognitive functions. The brain changes structurally and functionally in this process, and with exercise, the volume of brain regions associated with learning and memory, such as the hippocampus, may increase, and the connections between nerve cells are strengthened (Kolb & Whishaw, 2009; Özocak et al., 2019).

The factors affecting this process should be examined to understand how the development process works and to interpret the differences in development between individuals. Developmental processes, which vary from person to person, follow certain principles and require considering individual differences. The motor development process directly affects the interaction of individuals with their environment and forms a structure linked to physical and cognitive development. Cognitive, affective, and psychomotor development constitute the three basic dimensions of human development. Changes in these areas directly affect the individual's behaviors and shape their learning and movement competencies. Training in these areas of development, especially in childhood, contributes to individuals using their motor skills more effectively at later ages(Berk, 2013; Gallahue & Ozmun, 2006; Lerner, 2018; Papalia et al., 2007; Vygotsky, 1978).

Motor Development Periods in Children

Motor development processes in children progress in certain stages. Although the developmental processes of all children follow the same sequence, the boundaries are not very sharp due to individual differences (Tunçeli & Zembat, 2017). For this reason, although it is accepted as a criterion that the child's development is not precisely within the limits, it does not always mean that there is an abnormal situation (Soylu & Altunbay, 2023). Growth, development, learning, and readiness are the cornerstones of individuals' motor skills and physical movements. Human development is shaped within the framework of these concepts, and it is necessary to know the principles of development and the factors affecting it better to understand movement development (Karaca et al., 2020). Motor development periods in children are examined under four main headings.

Reflexive Movements Period (0-1 years):

Movements during this period are considered the newborn baby's first motor responses. The spinal cord and the lower brain govern movement behaviors during this period. These reflexes indicate that the baby's development is on a regular course and that the nervous system is functioning healthily. Over time,

these reflexive movements (such as the sucking reflex) turn into voluntary movements, and more complex motor skills emerge with the development of the cerebral cortex (Gallahue & Ozmun, 2006).

Primitive Movements Period (0-2 Years)

During this period, in parallel with the development of the central nervous system, the head and trunk are first controlled by the legs. They become ready to acquire gross motor skills. The maturation of the nerves and muscles is essential for the child to reach the movement pattern of the following developmental period. In parallel with the development of the nervous system, coordination increases, and the rough forms of fundamental movements become apparent during this period. In the first months, the child's aimless arm and leg movements gradually develop into voluntary and specific movements and skills. This way, basic motor skills such as walking, running, and jumping gradually develop (Payne & Isaacs, 2017).

Fundamental Movements Period (2-7 years)

This is the period when basic skills are acquired. These basic skills include running, jumping, leaping, hopping, catching, throwing, and kicking the ball with the foot. At this stage, children try to understand and try out the movement abilities of their bodies. The movements then become more controlled and harmonious. As a result of this development, children exhibit mechanically compelling, harmonious, and controlled movement patterns. Children develop their movement skills in play and develop new skills by combining them in various ways. It is crucial to support and develop the skills that emerge in this period at the maximum level to move on to specialized movement skills (Haywood & Getchell, 2024).

Sport-Related Movements Period (7-14 years)

During this period, fundamental movements develop into more complex and sporty skills. The increased nerve conduction speed allows these skills to be learned more quickly and effectively. Balancing is when locomotor and manipulative skills are increasingly perfected, combined, and used in various activities. Increased nerve conduction velocity allows these skills to be learned more quickly and effectively. The extent to which skills develop during sport-related movements depends on various mental, emotional, and motor factors. In this period, the effect of gender differences on motor skills and performance increases (Malina, 2004).

FUNDAMENTAL MOVEMENT TRAINING

Fundamental movement training is a structured educational process to develop individuals' motor skills. This process supports physical, cognitive, and psychomotor development, especially in childhood (Gallahue & Donnelly,

2003). The acquisition of movement skills from an early age contributes to children's development of skills for sports at a later age (Haywood & Getchell, 2024).

Studies show that as a result of children not learning fundamental movement skills in a timely and correct manner, inadequate movement skills are encountered at later ages, and therefore, children avoid participating in activities throughout their lives (Bayazıt, 2023; Canlı et al.; Orhan, 2019). Movement is a vital learning tool for all children. People perceive their environment through movement and discover the outside world through movement. Movement is a means of social communication. It should not be forgotten that human movement is at the center of sports and games (Küçük & Koç, 2004).

Regarding movement development, the process is dependent on biological maturation. External factors are unlikely to accelerate this maturation process. However, appropriate environmental conditions enable children to use the movement skills they have acquired much more effectively, and the child who acquires movement skills has the opportunity to develop new skills by interacting more with the environment. Developing fundamental movement skills does not only make a physical difference in children. The self-confidence they gain from their abilities strengthens their communication with the environment. Many studies have shown that the gains acquired through physical activity can be transferred to other areas of daily life (Adolph & Berger, 2015; Berk, 2013; Gallahue & Ozmun, 2006; Haywood & Getchell, 2024; Payne & Isaacs, 2017; Piek et al., 2008). In other words, children's daily life skills increase as the range of motion available to them expands. The ability of children to be physically active throughout their lives, to easily apply and develop simple and complex skills, to pass the competence barrier, and to maintain the perceived level of competence as they get older will be possible with the movement skills developed through fundamental movement education regularly received at an early age and their transferability to daily life (Barnett et al., 2009; Gallahue & Ozmun, 2006; Haywood & Getchell, 2024; Lubans et al., 2010; Stodden et al., 2008; Telama et al., 2005).

Fundamental movements are analyzed in 3 main groups;

Displacement Movements: These are movements in which a whole or a part of the body is moved between two different points. Skills such as walking, running, jumping, and leaping can be given as examples of these movements.

Balancing Movements: These are movements in which the body maintains its current position or adapts to a new position. Skills such as standing on one leg, turning, swinging, and bending can be given as examples of these movements.

Object Control Movements (Manipulative Movements): These skills require controlling an object simultaneously with performing movement skills. Excellent hand-eye coordination and movement mastery are required to perform these skills. Skills such as dribbling, hitting the ball with a racket, throwing and throwing can be given as examples of object control movements.

The Importance of Fundamental Movement Training

Fundamental movement training is not a concept that can be handled in a single dimension. The basis of the child's entire sports life is based on the fundamental movement training process. Because creating the necessary ground for specialized movement skills is only possible by supporting motor developmental processes with fundamental movement education. Although movement training is perceived as a purely physical process, it refers to a multifaceted development process (Gallahue & Ozmun, 2006; Haywood & Getchell, 2024).

The importance of fundamental movement education in terms of motor development: By supporting muscle control and coordination, it enables the learning of new skills and the realization of combined movement skills (Durukan et al., 2016; Erol, 2022; Şahin & Şentürk, 2015).

The importance of fundamental movement education in physical health: An active life is the basis of good health. The inclusion of physical activity in children's lives at an early age allows for the reduction of increasingly common health problems such as obesity and cardiovascular diseases. It provides for reduction. It also supports muscle and bone development and impacts growth and development (Baydar et al., 2017; Bull et al., 2020; Janssen & LeBlanc, 2010; Strong et al., 2005).

The importance of fundamental movement education in social development: It enables children to move away from individualism and develop social skills through group games and teamwork. Since physical activity and play provide an environment for children to express themselves in the best way possible, it enables the development of feelings such as self-esteem and self-confidence, as well as the correct learning of concepts such as belonging, friendship, and justice (Bailey, 2006; Barnett et al., 2009; Gagen & Getchell, 2006).

The importance of fundamental movement education in terms of cognitive development: When cognitive development, which is briefly defined as the harmony between body and intelligence, is supported by movement education, learning becomes faster and more permanent due to increased brain activation. The processes of assimilation, adaptation, and adaptation related to the schemas children initially acquire are supported by new schemas, and the scope of learning expands. Strengthening the relationship between movement

and brain functions and short pathways in nerve transmission greatly supports learning. It facilitates learning new and complex skills and improves the quality of old skills (Best, 2010; Diamond, 2000; Piaget, 1952; Ratey & Loehr, 2011).

SKILL DEVELOPMENT AND SPORTS EDUCATION BY AGE GROUPS

Skill is the ability of the central nervous system to work in harmony with the muscles to produce purposeful movement. The entire development of skill is possible only when many systems in the bodywork coordinate (Šimonek, 2014). The skills that children will exhibit differ according to age groups. Children's skill-learning processes follow each other, but from time to time, different features come to the fore and become more open to development.

Skill and Characteristics of Skill

The skill has five main characteristics (Göktaş, 2025);

Kinesthetic discrimination is the perception of precise differentiations and gradations in movements through kinesthetic information from the muscles and tendons (crunches), which allows us to know what and how much we should do (how much should I turn?, how much should I bend? etc.).

Spatial Orientation is briefly defined as the ability to determine direction. It means the three-dimensional comprehension of the environment and its features (height) and being aware of the positions of everything in the area (height, width, distance, flexibility, etc. of the net - net - goal - goal - obstacle - obstacle, etc.). At the same time, being aware of the position of teammates, opponents, or the referee in the field while performing the activity is an indispensable criterion for the purposeful realization of the movement.

Balance It is the ability to provide and maintain the desired position of the body during movement. It solves motor problems when the balance may be impaired or impaired due to the change of the body's center of gravity or the narrowness of the bearing areas.

Rhythm: the ability to recognize extraordinary dynamic changes in movements and to act according to these dynamic changes. Even when walking, humans move according to a rhythm. Rhythm is the perception, memorization, and application of time and dynamic structures already known or existing in the movement.

The reaction is a voluntary response to a stimulus and is also defined as the ability to move rapidly and in the right direction depending on a stimulus.

According to Hirtz (1985), these five essential elements form the movement that emerges for skill. Realizing the skill is of better quality and exactly as desired depends on the adequate and timely development of these features. This is only

possible through movement education. When the skill development process is examined according to age periods, it is seen that there are differences between age periods and genders. These differences are given in the table below (Hirtz, 1985).

Table 1: Development of skill characteristics

Age (Girls) / Characteristics	8	9	10	Age (Boys) / Characteristics	8	9	10
Kinesthetic discrimination				Kinesthetic discrimination			
Spatial Orientation				Spatial Orientation			
Balance				Balance			
Rhythm				Rhythm			
Reaction				Reaction			

Low Middle High

Fundamental Motoric Characteristics

Skill development is also directly related to motoric characteristics and the level of motoric characteristics. The psychomotor development process starts in children from the prenatal period and progresses with maturation. Maturation is defined as the physical readiness of a person to do a job. Maturation level is one of the main factors affecting motoric ability development. Another factor affecting the level of motoric ability is age. Factors such as genetic, environmental and psychological factors, physical activity level, gender, nutrition, and physical characteristics are also important factors affecting the level and development of motor skills (Bompa & Buzzichelli, 2019; Harre, 1982; Malina, 2004; Schimdt & Lee, 2019; Zatsiorsky et al., 2020). Fundamental motoric characteristics;

Strength: Muscles can resist external resistance. There are different types of maximal strength, quick strength, and endurance strength.

Endurance is the capacity to sustain physical activities for a long time. It is divided into aerobic and anaerobic endurance.

Speed: It is the ability to perform movements in the shortest time. It includes components such as reaction, movement, and sprint speeds.

Flexibility: It refers to the joint's range of motion and depends on the extensibility of the muscles.

Coordination is performing accurate, fluid, and efficient movements in harmony using different body muscle groups.

These fundamental motoric characteristics are the most important factors affecting an individual's physical performance and are considered determinants

of success in different sports (Alter, 2004; Åstrand, 2003; Bompa & Buzzichelli, 2019; Harre, 1982; Magnusson & Renström, 2006; McArdle et al., 2010; Schimdt & Lee, 2019; Zatsiorsky et al., 2020).The developmental table of motoric characteristics according to age is given below.

Table 2. Development of motoric characteristics

Age (Girls) / Characteristics	8	9	10	Age (Boys) / Characteristics	8	9	10
Strenght				Strenght			
Endurance				Endurance			
Speed				Speed			
Flexibility				Flexibility			
Coordination				Coordination			

Low Middle High

Sports Education by Age Groups

Sports are activities based on physical activity, are carried out individually or as a team within the framework of specific rules, and involve absolute competition. Sport improves physical health and improves mental, social, and emotional development. It is a process that psychologically prepares constructs for life. Sports help individuals to improve their social, individual, and psychosocial balance (A. Ö. Pekel et al., 2019; Sevim, 2007). Sports education, according to age groups, should be planned according to the developmental periods of children. Sports education, which is structured by paying attention to physical, motor, cognitive, and psychosocial developmental processes, supports performance development and, at the same time, enables individuals to grow up healthy and self-confident.

Preschool Period (2-6 Years)

Sports education in the preschool period is the period that should be planned and implemented with the most attention given to children. Children's cognitive, affective, and physical development processes in this period are rapid. Children's education in this age group lays the foundation for the physical awareness they will maintain throughout their lives. Regarding developmental principles, 0-6 years is called the critical and sensitive period (Piaget, 1952). In this period, children are like a blank sheet of paper and are highly influenced by environmental interactions, and these experiences directly shape their learning processes. It is inevitable for the trainers working in this age group to have knowledge about child development and physical development and

to be able to analyze and direct children's behaviors regarding the quality of sports education. (Haywood & Getchell, 2024). At this stage, children master fundamental movement skills, acquire new movement skills, and can produce new skills by performing combinations of existing movement skills. Training can be started at a young age in some early specialized sports branches (gymnastics, swimming, ice skating, etc.). However, this process should be proportional to the child's intelligence and physical ability and should be planned by the child's biological development level and motor competencies (Bompa & Buzzichelli, 2019). Because the body is very advanced, it does not mean that the mind will adapt to this situation, and when this situation is not considered, the pressure on children may increase. (Bailey, 2006; Pekel et al., 2025).

Overloading at an early age is a form of training that negatively affects the child's entire life. For this reason, the content of the training is of great importance. In this age group, children need to learn about sports through play-based activities (Gallahue & Ozmun, 2006; Hazar et al., 2015). Children recognize and learn about the outside world through play. Competition and play are at the heart of sports. Therefore, gamified activities enable children to develop control over their bodies while at the same time supporting their social and emotional integration into sports. The most recommended activities in this age group are free play, fundamental movement training (running, jumping, catching, throwing, climbing), swimming, horseback riding, gymnastics, and dancing.

First School Age Period (7-10 years)

This is a period in which children cognitively transition from the pre-operational period to the concrete operations period, and the impact of their cognitive skills on their bodies increases significantly. When they transition from the motor development period to the motor learning period, children progress in motor performance by learning movements through environmental experiences (Schimdt & Lee, 2019). Motor performance is a phenomenon in which the qualities of movements also come into play. Unlike the preschool period, the vital thing in this period is not only to perform the movements but also to interpret the movements as good or bad and to improve the performance in line with the feedback given. This phase is also called the transition phase to sports or the beginning phase of specialized movements (Bompa & Buzzichelli, 2019; Gagen & Getchell, 2006; Gallahue & Ozmun, 2006; Schimdt & Lee, 2019).

Until the age of 7, the kinesthetic discrimination ability, which does not develop much, develops very rapidly until the age of 10, and this has a very positive effect on the success of children who train in their branches. There are no significant gender differences in performance tests conducted during this

period. Due to the increase in the maturation of body awareness and physical competencies, spatial orientation and balance skills improve, and reaction skills develop rapidly. Rhythm ability shows significant growth, especially in girls compared to boys. Therefore, primary school is a critical age period for training rhythm ability. At the end of this period, due to the high learning speed in sports branches consisting of technical compositions (such as gymnastics)," In the "Fundamental Education" stage, intensive educational activities can be carried out. However, it should be kept in mind that there may be differences in the developmental processes of children and that the transition periods of educational periods may vary (Payne & Isaacs, 2017; Schimdt & Lee, 2019; Suveren Erdoğan & Cengizel, 2020). Starting sports training for branches is essential in this period, as it adds new ones to the developed movement skills. It is a period that should be evaluated correctly regarding children's meeting with branches, setting sportive goals, and planning their work towards these goals. It is crucial in terms of being a period in which concepts such as teamwork, cooperation, and fair play enter their lives, and they tend towards more regular and planned training processes in terms of sports life (Kırıkoğlu & Balçıkanlı, 2024; Pekel et al., 2023; Pekel, Kirikoglu, et al., 2023; Pekel, Kırıkoğlu, et al., 2023; Sezen-Balcikanli, 2009; Sezen-Balçikanli, 2014).

The loading principles of the training in this period should be planned in a personalized manner that is parallel to children's physical development levels. Not only should the ability or performance level not be considered a criterion for training planning, but the child's cognitive and affective developmental status and psychological competence in sports should also be evaluated. In children, sports and competition may cause an increase in fear and anxiety. For this reason, it is a period when participation in sports should be at the forefront rather than competition. These situations should be considered when planning training (Côté & Hancock, 2016; Malina, 2004; Scanlan et al., 2005; Schimdt & Lee, 2019; Zatsiorsky et al., 2020).

Second School Age Period (11-13 years)

This period is considered the most critical period in terms of performance sports. It is when children first meet and get acquainted with sports and start more regular and planned training to branch out and progress in sports activities (Pekel, 2023). In this period, the goal of success replaces the sweet competition in sportive activities. This period is also called the "Best Learning Period" or the "Best Skill" period, as the ability to perceive and observe is significantly developed. At this age, children perceive the execution of movements holistically rather than analyzing them as adults do.

Since the highly developed kinesthetic analyzer (muscle, tendon sense) causes the development of movement ability, the child can efficiently perform

combined movements while at the same time analyzing the presence of environmental factors. The concept of automatic movement, which means performing the skill at a maximum level while attention is at a minimum level and having a low margin of error, is highly developed in children in this period. For example, a child playing soccer can dribble the ball to the opponent's goal while simultaneously analyzing the positions of his teammates and the opposing team players and choosing the person to pass to. Motoric maturity is completed in this period, and balance ability is significantly developed. Spatial orientation ability continues its developmental process depending on experiences. In this period, technical skill development can be considered as the primary goal. The planned training has evolved from general to specific and has become specific to the desired technical skills—the characteristics of the branch structure training contents.

While the basic requirements take up less space in the training, the parameters required for the branch are given more weight. For example, flexibility in sports is a critical parameter in terms of avoiding injuries and facilitating the realization of movements. However, flexibility is not as necessary in weightlifting as in taekwondo. For this reason, while the content of taekwondo training includes flexibility and basic techniques, maximal strength may appear as a parameter that is more emphasized in the training content of weightlifting.

In this period, when training is performance-oriented, and the concepts of winning and losing are in place, the fear of losing can affect children's perspective on sports from time to time (Pekel, 2023). Losing is undoubtedly a situation that always happens in sports. However, sometimes, this can cause children to cool down or move away from sports. For this reason, coaches should not only focus on winning. At the same time, it is also possible for athletes to be injured due to physical and mental stress due to overload when they are only focused on success. It is imperative to convey to athletes that sports is a gentlemanly struggle and that winning or losing is inherent like sports.

Period of Adolescence (13-16 years)

Adolescence is when training intensity is the highest and participation in sportive activities is the most conscious (Malina et al., 2004). Adaptation to the rapid physical changes experienced during adolescence is only possible with the continuity of training processes (Pearson et al., 2006). With the onset of adolescence, there is a slowdown or pause in the development of coordinative abilities (Haff, 2013). The structural development of the central nervous system is almost complete. The natural incentives to learn and play are significantly weakened, which hinders movement activity (Donnelly et al., 2016; Zatsiorsky et al., 2020). In connection with sexual maturation and changes in bodily structure, it is necessary to restore coordination in movements

(Bailey et al., 2013). In parallel with the restoration of this harmony and the steady development in the physical structure, it is possible to reach the highest levels of the Competition period in "Sports Branches Depending on Technical Compositions" (Côté & Hancock, 2016).In addition, adolescence is a period of significant psychological changes (Patton & Viner, 2007). Physical changes such as increased desire to engage in social activities, difficulties caused by physical changes, sudden weight gain, and height growth affect children significantly in sports. (Abbott & Collins, 2004).

These changes can also cause serious injuries if training is interrupted or loading planning is incorrectly done. (Faigenbaum et al., 2009). In addition, in cases where sports are started at an early age, overloads performed beyond the age may cause boredom in athletes from time to time, cooling down from sports and even quitting sports (Fraser-Thomas et al., 2008). During this period, athletes mostly continue sports and turn sports into a career plan or move away from sporting activities. For this reason, the attitude of the coach and the family towards children during adolescence is critical. Overly oppressive or insistent attitudes may cause children to dislike sports. Maintaining motivation and increasing encouragement regarding the importance of sports (Harwood & Knight, 2015; Wylleman et al., 2004).

CONCLUSION

The need for movement, which starts in the womb, has been one of the most basic needs of human beings throughout life. Movement training is essential for a healthy life, both mentally and physically. Movement training that starts in childhood forms the basis of sports training when managed correctly. A successful sports life can only be built on the fundamental movement training received on time, and sporting success can be achieved. Apart from this, the fact that sports have become a way of life and take place in human life is also based on fundamental sports education. Today, when we combine the difficulty and confrontation of social life with technological developments, human beings are gradually turning into beings that move away from movement. This transformation threatens both mental and physical health. For all these reasons, a healthy future can only be protected by physical activity habits acquired at a young age.

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ENHANCING QUALITY OF LIFE THROUGH PHYSICAL ACTIVITY IN INDIVIDUALS WITH INTELLECTUAL DISABILITIES

Gökçe Oktay[1]

INTRODUCTION

Children with intellectual disabilities are children who cannot use their ability to perceive the stimuli in their environment, evaluate what is perceived, conceptualize, think, learn, and make connections between what is learned and experiences, and try to live in their own world (Kurt et al., 2008). Intellectual disability is also defined by an inability in the individual's ability to adapt to his or her environment and perform daily living skills. This includes social skills, communication and activities of daily living. Intellectual disability occurs during the developmental period, i.e. from birth to approximately 18 years of age (Borthwick-Duffy, 2001; Sapna, 2019). Intellectual disability can result from a variety of causes, including genetic disorders, environmental influences, lack of prenatal care and toxic exposures (Chelly et al., 2006). These individuals with learning disabilities face difficulties in areas such as adaptation to society, communication, social relations and daily living skills (Chyzhyshyn, 2022).

Trainings implemented to overcome the difficulties experienced by individuals with intellectual disabilities are of great importance in terms of improving the quality of life of these individuals and ensuring their better integration into society (Aller et al., 2023; Kelley et al., 2023). Trainings for individuals with intellectual disabilities can improve their quality of life by supporting their cognitive and behavioral development. These trainings help individuals to become more independent in daily life and improve their social skills, while also providing important benefits for families and support staff. For trainings to be effective, a personalized and continuous approach should be adopted (Danielsson et al., 2015; Roording-Ragetlie et al., 2023).

Physical activity is recognized as a beneficial intervention that improves individuals with intellectual disabilities. Participation in physical activity and sports reduces behavioral and emotional problems, improves executive functions, increases overall quality of life, improves general health, improves self-efficacy and quality of life, and improves social skills and self-perception (Su et al., 2022; Jakubowska et al., 2024).

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In this chapter, the effects of physical activity on the cognitive, social and emotional development of individuals with intellectual disabilities and its contributions to their quality of life will be discussed comprehensively. In the light of the existing literature, the effects of physical activity on the psychosocial adaptation processes, executive functions and general well-being of these individuals will be evaluated; in addition, suggestions for increasing the effectiveness of this process will be discussed.

Intellectual Disability

Intellectual disability can be defined as an individual's performance significantly below average in cognitive functions, which leads to permanent limitations in areas such as daily life skills, social interaction, adaptation, health and safety. This situation, which emerges with the interaction of environmental, genetic and social factors, can affect the individual's ability to adapt to new and complex situations, to remember what they have learned and to solve problems (Bertelli et al., 2022).

Individuals with intellectual disabilities may face various difficulties in the process of meeting the expectations of the society, as is the case with individuals belonging to other disability groups. These individuals may have difficulty in adapting to the requirements of daily life not only in the cognitive field but also physically. This situation may create various obstacles in their interactions with the social environment and their adaptation to society, making their adaptation difficult (İlhan & Esentürk, 2015).

Classification of Intellectual Disability

Classifying individuals with intellectual disabilities and identifying their differences is important for determining the support services they will receive and gaining the necessary life skills (Kurt, 2020). International classification systems such as DSM-5 and ICD-11 classify intellectual disability under different categories. These systems consider intellectual disability together with other psychiatric disorders, allowing it to be evaluated in a broader context (Ullah et al., 2020).

Scientifically, people with intellectual disabilities are categorized into 4 categories: mild, moderate, severe and profound intellectual disabilities. In this categorization, the level of disability of people with intellectual disabilities is determined according to IQ (Intelligence Quotient) test scores (Kayrak, 2014). As the intelligence scores of individuals with intellectual disabilities decrease, their level of intellectual disability increases. For this reason, it becomes difficult to integrate individuals with low intelligence scores into living conditions and integration into society. The mental disability classifications of these individuals according to their intelligence scores are given in the table below.

Table 1: Classification of intellectual disability according to intelligence level

Disability Group	Intelligence Score
Mild intellectual disabilities	69-50
Moderately intellectually disabled	49-35
Severe intellectual disability	34-20
Profound (very severe) intellectual disability	19-0

Causes of Intellectual Disability

The causes of intellectual disability are based on a variety of factors, including genetic, environmental and infectious factors. These factors can have different proportions of influence in different types and degrees of severity of intellectual disability. Most people experience mild intellectual disability and in this group a specific biological cause is less likely to be identified. However, in cases of severe and profound intellectual disability, specific biological causes such as genetic abnormalities, metabolic disorders and brain malformations are more common (Patel et al., 2020).

In the literature, the main factors that cause intellectual disability are explained as follows.

- ✓ Hereditary factors,
- ✓ Chromosomal disorders such as Down syndrome, metabolic disorders such as phenylketanuria and some genetic disorders,
- ✓ Unconscious use of drugs, drugs, alcohol and smoking by the mother during pregnancy,
- ✓ Infectious diseases such as rubella, toxoplasma and exposure to radiation during pregnancy,
- ✓ Poisoning of the mother during pregnancy, inadequate nutrition and oxygen deprivation of the baby,
- ✓ Infectious diseases that the baby has in the womb during pregnancy, blood incompatibility between the child and mother and consanguineous marriage,
- ✓ Premature or late delivery, cord entanglement, oxygen deprivation of the baby during difficult deliveries as it passes through the birth canal,
- ✓ Miscarriage of the baby, damage to the baby by birth devices, delivery in unhygienic conditions,
- ✓ Failure to provide appropriate treatment for certain diseases such as measles and whooping cough,

- ✓ Central nervous system disorders such as encephalitis, meningitis, convulsions, severe jaundice, thyroid hormone deficiency,
- ✓ Lack of adequate and balanced nutrition of the baby,
- ✓ Environmental factors such as indifference, lack of maternal love, child abuse, lack of stimuli (Şahin & Şahin, 2020).

Quality Of Life In Intellectual Disabled Individuals

Quality of life is a multidimensional concept that refers to individuals' perception of their lives in relation to their goals, expectations, standards and concerns within the framework of their cultural and value systems. This concept is influenced by various factors such as physical health, psychological state, social relationships, environmental factors and spiritual beliefs (Panzini et al., 2017; Soyuer & Varol, 2019).

The quality of life in individuals with intellectual disabilities is affected by different variables compared to the general population, and especially social support, economic status, psychological health and functional abilities come to the fore (Matsumoto et al., 2024). The fact that individuals with disabilities need some services more than healthy individuals, face various disabilities and the negative effects of environmental factors can change the priorities that determine the quality of life.

In this context, the main factors shaping the quality of life of individuals with intellectual disabilities are as follows:

- ✓ Emotional well-being (feelings of happiness and confidence),
- ✓ Level of relationship with family and close friends,
- ✓ Economic conditions of the individual or their family,
- ✓ Employment and work opportunities,
- ✓ The degree of disability and the skills the individual has,
- ✓ Access to education and health services,
- ✓ Living environment and social opportunities,
- ✓ Ability to move independently in daily life,
- ✓ Opportunities to participate in social events.

A better understanding of the effects of all these factors on the quality of life of individuals with intellectual disabilities is of great importance in terms of developing effective strategies to improve the living standards of these individuals.

The use of quality of life approach for individuals with intellectual disabilities has been increasing in recent years. In order to improve the quality of life of individuals with disabilities, they should be approached with empathy. Acting from the perspective of individuals with special needs, creating policies to meet

their needs and providing services to reduce their difficulties in social life are very important in improving their quality of life (Öztabak, 2017).

It is important to strengthen social support systems and improve income level in order to increase the quality of life in people with intellectual disabilities. While social support positively affects quality of life by increasing social integration and psychological well-being of individuals, income level is a factor that directly affects quality of life. Individuals with low income levels may experience more difficulties in accessing health services, education and rehabilitation programs and may experience a decrease in their quality of life. Therefore, social support and economic conditions need to be improved to improve the quality of life of individuals with intellectual disabilities (Defar et al., 2023; Wu et al., 2024). Another factor that negatively affects the quality of life in these individuals is psychological and cognitive health. While depression and cognitive disorders reduce quality of life, factors such as social support and physical activity can provide positive effects. These findings emphasize the importance of targeted interventions to improve the quality of life of individuals with intellectual disabilities (Sánchez-Alcalá et al., 2024; Zahra et al., 2022).

Various strategies and interventions have been proposed to improve the quality of life of individuals with intellectual disabilities and these strategies aim to meet the physical, psychological and social needs of individuals. Studies showing that psychological support, lifestyle interventions, mindfulness-based interventions, behavioral interventions to improve daily living skills, and educational content such as regular physical activity positively affect the quality of life of these individuals are included in the literature (Egger et al., 2024; Jang et al., 2023;).

Although the positive contributions of physical activity to quality of life are well documented, it is observed that it is not sufficiently prioritized in intervention programs for individuals with intellectual disabilities.

Physical Activity

Health-related quality of life is an indicator of the physical, social and mental effects of diseases on the individual, and physical activity and health are in a linear relationship. Physical activity is defined as “all body movements that occur in daily life and require energy, which occur with the contraction of skeletal muscles in the body” (Azboy, 2021).

Some sports branches that include all or part of certain body movements such as walking, running, jumping, swimming, cycling, active movements of the legs and arms, and active movements of the head and neck, dance, exercise, games and all activities in daily life are seen as part of physical activity (Azboy, 2021), and all these physical activities are a basic element that plays an important role in protecting the physical and mental health of individuals. Therefore, making

physical activity an integral part of daily life is of great importance to maintain a healthy and balanced life.

For individuals with intellectual disabilities, physical activity is an important element that supports the development of both physical and cognitive functions. In order to encourage the participation of these individuals in physical activity, programs that are structured according to their individual needs should be developed and social barriers should be eliminated. Such interventions not only contribute to the improvement of motor skills and physical health, but also positively affect psychosocial well-being and general quality of life by increasing social interactions.

Relationship Between Regular Physical Activity And Quality Of Life In Mentally Disabled Individuals

People with intellectual disabilities face various challenges in social, cognitive and physical domains. Social relationships and support have a significant impact on the mental health and overall quality of life of these individuals. Cognitive and physical disabilities can lead to loss of independence in activities of daily living (Steptoe & DiGessa, 2021; Ai et al., 2024). There is a relationship between gross motor function levels and independence levels of these individuals and quality of life. The level of motor functioning affects the quality of life not only of individuals but also of their caregivers (Barış & Bayram, 2020). Improving the quality of life of these individuals supports their better integration into society and personal development. Therefore, improving quality of life should be an important goal at both individual and societal levels.

In order to increase the quality of life, it is of great importance to include individuals in educational programs that will contribute to their multidimensional development instead of unidirectional approaches. Planning these programs in accordance with the needs of individuals and maintaining them regularly will be a supportive factor in their development processes. In this respect, physical activity programs can be considered as an effective educational model that contributes to both physical and cognitive, emotional and social development of individuals. The effects of physical activity on different areas of development are discussed in detail below.

The Effect Of Physical Activity On Cognitive Skills

Cognitive skills are mental abilities that enable individuals to be successful in problem solving, information processing and learning processes. These skills include various components such as acquiring and organizing information, representing problems, creating mental models, and developing cognitive strategies (Fe et al., 2020).

Individuals with intellectual disabilities have significant difficulties in executive functions and cognitive processes. Poor executive functions lead to

various problems in areas such as effective use of information, management of activities of daily living, social participation and behavior regulation. This situation may negatively affect the overall quality of life by making it difficult for individuals to acquire independent living skills. Therefore, interventions to support the cognitive skills of individuals with intellectual disabilities are of great importance not only for academic and social development but also for improving their quality of life by increasing their independence (Wolf et al., 2022).

Studies in the literature show that physical activity-based intervention programs can reduce behavioral problems by supporting cognitive skills in individuals with intellectual disabilities, improve working memory and visual-spatial processing, and thus positively improve daily living skills and quality of life (Pamuk et al., 2022; Koper et al., 2024).

Effects Of Physical Activity On Social Skills

Social skills are the ability of individuals to communicate and interact effectively with others. These skills enable the individual to function competently in social tasks and are often associated with communication and interaction. Social skills include various abilities such as communication, emotion regulation, cognitive skills, and social problem solving that enable individuals to be successful in social interactions (Grover et al., 2020). Social skills in individuals with intellectual disabilities are an important factor affecting their participation and adaptation to social life. Social skills deficiencies and excesses are considered to be determinants of intellectual disability, and the development of these skills can improve the quality of life of individuals.

Social skills of individuals with intellectual disabilities are more limited compared to their typically developing peers. Stereotypic and problematic behaviors negatively affect the basic components of social skills such as communication and interaction, limiting the social competence of these individuals (Matson et al., 2006). Social skills directly affect not only interpersonal relationships but also various developmental domains such as peer acceptance, academic achievement and psychological well-being (Soto Icaza et al., 2015). Another important developmental area closely related to social skills is motor skills. Motor skills play a critical role in social cognition, language development and social interaction processes and are considered as an indicator of social communication skills (Smith et al., 2018).

Programs such as physical activity and movement training have positive effects on various social skills in individuals with intellectual disabilities. These practices improve cooperation skills such as following instructions, making friends, participating in group activities and helping others. They also support self-control skills such as anger management, waiting for one’s turn and a

positive approach to criticism. In addition, it contributes to the reduction of externalized behaviors such as tantrums, hyperactivity, maladaptive behaviors and non-compliance with rules. Improvements in these skills reveal positive development in social skills (Hatipoğlu Özcan et al., 2024).

Some studies in the literature show that regular physical activity programs have positive effects on behavioral and emotional problems, mental health and psychosocial well-being (Borland et al., 2021); by increasing perceived control, competence and self-esteem, this supports psychological well-being by allowing individuals to have more control in their lives and provides positive effects on social functioning (Reinders et al., 2019).

Effects of Physical Activity On Motor Skills

Motor skills refer to a person's ability to plan and perform movements. These skills improve with practice, increasing the spatial and temporal accuracy of movements (Lukman & Neviyarni, 2021). Motor skill performance is lower in individuals with intellectual disabilities compared to their typically developing peers. They experience significant deficits in skills such as running speed, balance, strength, visual motor control (Pahlevanian et al., 2012). The fact that individuals with intellectual disabilities are physically limited and there are not enough adapted sports activities causes them to stay away from sportive activities and it is thought that their quality of life is negatively affected.

Motor skills are linked to daily living skills, which have an important place in living an independent life, and poor motor skills negatively affect individuals' lives. Improved motor skills can increase the ability to fulfill daily functions and thus affect the quality of life. Thus, with the development of motor skills in individuals with intellectual disabilities, we can increase both other areas of development and quality of life (Travers et al., 2017).

Physical activity programs are one of the intervention programs that significantly improve the development of fine and gross motor skills in individuals with intellectual disabilities. These programs contribute to the development of important skills related to daily life such as strength, balance, coordination, agility and improvement of general health (Đorđević et al., 2024). There are many studies in the literature that support this information. In general, physical activity is a valuable intervention to improve motor skills in individuals with intellectual disabilities. Therefore, it is important for the quality of life of individuals with intellectual disabilities that physical activity is an indispensable part of their lives and that it becomes a lifelong philosophy.

Effects of Physical Activity on Physical Health

Being healthy is defined as a state of complete physical, mental and social well-being and does not simply mean the absence of disease or disability. A healthy lifestyle includes habits such as a balanced diet, regular exercise,

tobacco and alcohol control and psychological balance. This lifestyle accounts for 60% of the factors that significantly influence individuals' health and life expectancy (Vercammen et al., 2021).

People with intellectual disabilities face significant health problems, including obesity, cardiovascular problems and musculoskeletal problems, in addition to mental and social problems. These health problems are exacerbated by lifestyle factors, inadequate access to health services and a focus on intellectual disabilities that overshadows physical health problems.

People with intellectual disabilities are more likely to be obese than the general population due to factors such as low levels of physical activity and poor diet. This physical inactivity and obesity contributes to musculoskeletal problems that are often not adequately addressed. In addition, the fact that all these physical health factors are overshadowed by mental problems increases the rate of cardiovascular problems in these individuals (Stanley & Laugharne, 2012).

Regular physical activity or exercise programs have an important contribution to the process of preventing or improving these physical health problems in individuals with intellectual disabilities. Physical activity can help prevent obesity by reducing metabolic risk factors. This is achieved by reducing body fat and improving overall metabolic health. Regular physical activity can also reduce the risk of cardiovascular disease. This is achieved by influencing the biological and psychosocial processes that support heart health. In addition, physical activity supports musculoskeletal health and can improve mobility in these individuals. This can reduce the risk of falls by increasing muscle strength and flexibility (Stubbs, 2021).

Therefore, it is of great importance for individuals with intellectual disabilities to regularly participate in physical activity to improve their daily living skills and increase their overall quality of life. It is recommended that individuals with intellectual disabilities should be included in physical activity and exercise programs that include movement and that these programs should be regular and tailored to the individual in order to improve physical health and increase quality of life.

CONCLUSION

This study examined the effects of physical activity on quality of life in individuals with intellectual disabilities and revealed that regular physical activity contributes significantly to the multidimensional development of individuals. According to the findings of the study, physical activity not only improves motor skills, but also supports individuals' psychological well-being, increases their social interactions and strengthens their independent living skills. In addition, physical activity programs help individuals with intellectual

disabilities to achieve emotional balance, reduce stress levels and improve their self-confidence.

Improving quality of life is not limited to physical health, but encompasses many factors such as an individual's social relationships, level of independence, emotional stability and integration into society. While physical activity enables the individual to be more active in daily life, it can contribute to economic independence by supporting participation in the workforce. At the same time, regular exercise programs can help individuals with intellectual disabilities to be more involved in social life, reducing the feeling of isolation and loneliness.

In this direction, it is seen that physical activity is an effective tool to improve the quality of life of individuals with intellectual disabilities. However, it is of great importance that these programs are planned by taking individual differences into consideration, guided by experts and implemented sustainably. The cooperation between educators, families and health professionals should be increased to make physical activity an integral part of the daily life of the individual. In conclusion, it is emphasized that physical activity should be considered as a multidimensional intervention tool to improve the quality of life of individuals with intellectual disabilities.

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CHILD AS A PART OF RECREATIONAL ACTIVITY

Hacer Özge Baydar Arıcan[1]

INTRODUCTION

The concept of recreation has been present in daily life since the beginning of human existence. Today, although recreational activities are offered for commercial purposes, the individual's desire to have a pleasant time on their own and freely participate in these activities is not one of the issues of the modern age. When considered historically, it would not be a wrong attitude to think that recreational activities have existed since the ancient stone age. This is because the lifestyle of the people of that period was hunter-gatherer and all the time left after returning from the hunt could be reserved for themselves. It is not possible to say when the existence of recreation in the past began. Turning points of great importance for humanity are also breaking moments in terms of recreation. The clearest examples of this can be shown as the transition to settled life and the industrial revolution (Çalış, 2024). Interest in sports, physical activity, exercise and recreational activities that appeal to all segments in every development period regardless of age is also an increasing value today (Kurtipek, Güngör, Ayyıldız-Durhan, 2022; Carbone, Smith, Lewis & LeBlanc, 2021; Yavuz, Baydar Arıcan & Türkmen, 2024; Yavuz & İlhan, 2023).

Recreation is defined as physical and spiritual renewal by participating in activities that keep the basic vital functions of people alive, rest them, entertain them, give them joy, pleasure and increase their well-being levels (Akesen, 1984). The general name of the activities that people participate in open spaces is called open space recreation (Kılıçarslan & Ayyıldız-Durhan, 2024). When we look at the concept of recreation as a term, the phenomenon of recreation comes from the Latin word Recreation, which is expressed as renewal or recovery. In Turkish, it is generally expressed and used as leisure time evaluation.

In addition, recreation as a concept covers a wide range of activities in terms of content and scope. The active role of individuals in recreational activities increases the quality of life, positively affects life satisfaction and provides many physical, social and psychological benefits to individuals. Recreation can vary according to people's interests, motives, goals and participation patterns and many other factors. The actions of societies in their free time according to the rituals in their culture show cultural differences and the activities they will

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do in their free time affect their participation (Kül-Avan & Karaküçük, 2019; Sevil, Şimşek, Katırcı, Çelik, Çeliksoy & Kocaekşi, 2012;).

Recreational games are activities that can be recommended for recreational activities that can be practiced at home. Recreational games are games that children, young people, the elderly and other individuals can play in their time within the concept of recreation, based on volunteerism, without any expectation of financial gain, where they can entertain and enjoy themselves, which can include physical activity, which can be played indoors or outdoors. When we look at traditional recreational games, it is assumed that it is one of the activities that can be recommended and implemented in leisure time at home, and that it will remind parents of the past, give children the opportunity to play games in their own culture, and at the same time support a healthy life with the physical activities and movements it contains (Uslu, Karavelioğlu, & Gümüşgül, 2020).

Child and Childhood

Children have been the representatives of goodness, happiness and purity in society. When the history of childhood is examined, it is seen that, in sociological terms, each society and social period has a different understanding of childhood. It has been determined that there is not a single understanding of childhood, and that there are differences in the concept of childhood in terms of gender in terms of boys and girls, in terms of social status in terms of rich and poor children, in terms of the place of life in terms of peasant and urban children, and in terms of the perspective and accepted perception of the child in laws and social situations (Güçlü, 2016). From past to present, the concepts of child and childhood have been discussed and analyzed many times, especially from biological, historical and philosophical perspectives. In fact, knowing the child, the nature of the child and its development in every aspect has been on the agenda of anthropology, philosophy, psychology, history and literature as well as education. The period from birth to adolescence is called childhood, and those who live this period are called children (Sağlam & Aral, 2016). Child and childhood has always been a concept that many branches of science have always cared about, emphasized and written about. The child has been one of the most important phenomena of all branches of science throughout history. Child refers to the period before adulthood in terms of age range. The understanding of childhood varies between societies and cultures. While childhood refers to a period of life stage, the understanding of childhood emerges as a socio-cultural concept. Therefore, the understanding of childhood is determined according to social values and codes and is relative. It is stated that the concept of child or childhood exists in every society. Although it is in every society, the understanding of childhood differs. Societies' understanding

of childhood reflects the social, economic, political and religious evidence of the period (Güçlü, 2016; Heywood, 2001).

Accepted by developmental psychologists, childhood is the changes accompanied by progress and growth in the areas of physical, mental, social, emotional development and language development. This period is generally accepted by experts as the period between the ages of 0-18. Ages 0-8 are called early childhood, 8-12 middle childhood and 12-18 adolescence. The age of 12, when there is a significant change in the way children understand and think about abstract concepts, is the age when adolescence begins, which serves as a bridge between adulthood and childhood (Santrock, 2012; Boyd & Bee, 2009; Kılbaş Köktaş, 2004). The child realizes and learns many of the states and movements, knowledge and skills necessary for his/her life, usually in a play environment. The childhood stage, which is the most innocent and special state of the human being in the developmental period, is a very special period that scientists, thinkers, clergymen, educators, in short, almost everyone who is interested in the child has tried to define by putting forward their own opinion (Sağlam & Aral, 2016).

Child and Recreation

Movement should be considered as a basic condition for healthy and positive child development. By moving, a child evolves from a needy, dependent and inactive state to a skillful, active, curious and exploratory structure, makes sense of his/her environment and the situations that develop around him/her and builds his/her own personality. Recreational-physical activities are perceived as an indispensable element of children's lives and can make positive contributions to children's development in a wide range. In addition to increasing muscle strength, bone density and cardiovascular system fitness, many experimental and scientific studies have determined that medium and high-intensity physical activity is significantly related to children's memory and emotional development. Adults, parents and school principals should accompany children's movement actions by taking certain precautions without determining the framework and limiting it. Recreational activities are needed for a child to feel sufficient in terms of physical and mental aspects, to be able to communicate easily with his/her environment, to socialize and to become aware of his/her own skills. These needs are basically provided through movement and play. Recreational games are prepared in order to instill this concept in children who are more related to concrete concepts in the preschool period, to direct their development and to protect their physical and mental health. Play emerges as a form of recreation that brings children together, develops social ties between them and shapes the body and mind. Theater, trips, in-school activities, physical activities, parent-child participation activities can be given as examples of recreational activities for children (Jing, Jia & Yang, 2024; Arslan & Halli, 2022; Şenbakar, 2021).

Child and Play

Games, which have a history as old and deep-rooted as the history of humanity, continue to be played in all corners of the world regardless of different social characteristics, forms and rules. Due to different cultural characteristics and the meanings attributed to the game, various definitions have been made regarding the concept of play (Aytaş & Uysal, 2017). Play is a very necessary tool for the child's psychomotor development and acquisition of skills, social and language development. Every activity with different games and toys in different developmental periods is an important stage in child development. Play is a tool that serves the child's health, body and mind development. Play is the child's simplest and most spiritually satisfying endeavor (Ece, Ünsal, & Çalık, 2023). Play is a very effective tool that expresses the child's desires and goals, brings him/her to his/her wishes and prepares him/her for life. The child spontaneously learns the attitudes and movements, knowledge and skills necessary for life during play. Sportive activities, educational games and activities during the day and play are as important as nutrition and sleep for the child to grow and develop in a physically and spiritually healthy way (Kaya, Filiz & Yıldırım, 2021; Kaytez & Durualp, 2014). In general, play contributes to the child's influence and development in many ways. While the effects of games vary according to their types, their general effects can be listed as follows:

- The physical impact of play.
- The impact of play in social terms.
- The effect of play in terms of mental and emotional aspects.
- Cognitive effects of play (Özer, Gürkan ve Ramazanoğlu, 2006).

On the other hand, the selection of the playground and the play area for the child is also a very important parameter. Participating in the game in the playground is very important for the development of children's self-confidence, language skills, communication with playmates and social skills. Play areas offer children the opportunity to understand, make sense of and learn the social roles and relationships in their environment.

The positive effects of playgrounds on the child's development can be expressed as follows;

- The playground helps the child's cognitive, physical and spiritual development.
- The child can get to know his/her surroundings in the playground and can control his/her existing fear.
- The playground develops the child's concentration power and skills.

- The playground supports the child's development of a sense of responsibility.
- The playground develops the child's cooperation and solidarity (Ünal, 2009).

Traditional Recreational Activities for Child

It is necessary to carry out recreational activities that support development and growth in childhood. The main purpose here is for the child to benefit physiologically, psychologically, mentally and sociologically by doing physical activity (Ece, Ünsal, & Çalık, 2023). There are many factors for participation in recreational activities. The most basic thing is to set a suitable time frame to be active in a recreational activity. Here, it is very important to consider the hours when the attention and coordination of the children participating in the activities are active. Time, social environment, material and moral conditions of the family and physical conditions are also important factors in participation in recreational activities. Children who participate in leisure time activities that provide pleasure, fun and happiness reflect the following positive emotions in their behavior;

- Cognitive activities; These are the activities that the individual creates in thought and mind.
- Physical activity, sport and exercise; Includes activities in the field of exercise and sport.
- Music; It includes activities in which the individual actively or passively participates. Examples of these activities are whistling, composing, attending concerts, etc.
- Drawing, Painting; Drawing, traveling, attending painting exhibitions, etc.
- Dance; Oriental dance, modern dance, folk dances, aerobic dance, step-aerobics, zeybek etc.
- Hobbies; Sewing clothes, cooking, gardening, reading, listening to music, painting, swimming, sports, etc.
- Games; Puzzles, electronic games, memorization games, hide and seek, körebe, hopscotch, leapfrog etc.
- Relaxation; Massage, listening to music, hot shower, watching nature, walking etc.
- Social activities: Visits to relatives, meetings with friends, certain courses, etc. The most effective method in sustaining cultural values is the use of the entertainment factor. In these environments where games and entertainment are handled as a tool, the main purpose is to revitalize

traditions and customs by the people who make up the society and to transfer them to new generations through demonstration (Esen, 2008; Yiğitbaş, 2020;).

Child's games have an important position in terms of Turkish cultural history and are frequently mentioned in Dede Korkut stories. It is possible to follow the sociological traces of Turks in these traditional games known to be played especially in Turkestan geography (Sallabaş, 2020). When we look at the game, which has a very important place in Turkish culture, in general terms, it is the activities that people organize within certain rules to spend time individually or when they gather, to have fun, to be happy, to learn while having fun and being happy (Kayabaşı, 2019). The child's life, learning about the world, existence and everything else consists of play. Play is one of the most basic and effective tools that realize the child's spiritual, emotional and social satisfaction and adaptation to life (Özer, Gürkan ve Ramazanoğlu, 2006).

Types of Games Child Play Today

Games can be classified according to many different factors. Since children's interests differ according to their age, developmental stages can be a criterion for grouping. According to the place where the games are played; outdoor or indoor areas, table games can be mentioned. According to the number of participants; individual, two-person and team games can be mentioned (MEGEP, 2006). While children played various games for fun, adults also played traditional games specific to adults in order to be together, spend time together and have fun, and at the same time entertained the public with some of the games they played. These games have many different functions such as socializing and strengthening the bonds between people. The game, which has a recreational value, sometimes appears as a sport with all its types, sometimes as an educational game with simple applications, sometimes as a dance, folklore or theater, and sometimes as a different activity based on human creativity (Karaküçük, 2014; Serbest, 2020).

Competition Games:

These are games played by two or more parties, either individually or as a team. The main goal in these games is to win. However, players must strictly follow the rules. There may be a referee to manage the game. There are many competitions with electric and remote controlled toys, which are very common today. There are also talent competitions for children, running competitions, darts, folk dances and swimming competitions. Quiz competitions for school-age children are also a type of game. Computer games are among the most common types of competitive games. Games played in teams require unity, togetherness, sharing of work and cooperation. What is fundamentally important and necessary is to raise awareness that losing in competitions for children is

not a bad situation or an end, not an event to be treated badly or felt badly. In competitions, both the competitive aspect and the educational, instructive and entertaining aspects of games should be emphasized (MEGEP, 2006).

Water and Sand Games

It is a fun play element for children. It should not be overlooked that the sensory effect of water contributes to children's development. Sand is another universal play element. Water and sand games attract children of all age groups and help them develop their imagination and social communication skills. At the same time, the most suitable play materials and toys for children are water, sand, cotton and wooden natural materials. Water games are the most common games played in children's clubs, especially in hotels. When the games played in the pool are accompanied by an animator, there is not much risk. But children get tired very quickly in such games. These games include short-distance swimming, ball catching, slides, staying under water for the longest time, water polo, removing an object thrown into the pool and similar games. It is important to make sure that children who know how to swim are taken into the pool or that children's pools are preferred. She noted that a two-year-old child can be introduced to clay, a play material, and that the child can explore his or her emotions by crushing, compressing and molding the clay. In addition, clay games such as water and sand games can have the same effect. Children continue to spend time with these materials as they get older, but the way they use these materials and the way they play differentiates as they get older, and children can create creative art products without realizing it. (Ummanel, 2017; Yücel, 2005).

Table Games

These games include chess, table football, checkers, bingo, ping-pong ball and card games. Some of these games require experience and special skills. The above-mentioned games are played among children aged nine years and older. For children younger than nine years old, games such as coloring, cutting and gluing are appropriate. One of the most useful board games for children is chess. Among board games, there is no other game that has inspired as many different fields as chess and has been used directly or metaphorically in written and visual expressions. It has developed with every culture it has come into contact with and has become a part of that culture. It is a board game that can be the subject of research in many fields on its own. Thanks to chess, children develop skills such as risk-taking, thinking and decision-making. Board games have also found a place among the digital games that emerged with computer technology at the end of the 20th century. From ancient board games to modern board games, digital versions of many games have been produced. Systems that are too complex to be implemented in board games can be calculated and

implemented in digital games without the player feeling it. This has paved the way for advanced variants of board games, or games inspired by them. While board games are usually limited to a turn-based system, digital games offer the player a real-time gaming experience as well as turn-based systems (Aydın, 2024; Koca, 2016; Yaman, 2022;).

Games with Natural Tools

These can include games played with water, sand, soil, stones, mud, snow, plants and other natural materials. In general, these games are played in open spaces. They are types of games that can be practiced outside school rather than at school. These games are very important opportunities to develop a love of nature and at the same time an awareness of protecting and caring for nature. Children should be controlled and allowed to play freely with water and soil. Making sculptures out of mud and dough, sand castles and clay, building houses, roads, vehicles, etc. with stones, and playing with plants, animals and nature without harming them will be extremely enjoyable and instructive for children. Games played with natural materials are indispensable for children of all ages. The main difference from other types of games is that they can be practiced at any time. Rather than buying materialistic products such as electronic toys and robots, it is better to introduce children to games with natural materials. This will prevent wastefulness and allow children to be creative. Children should be given opportunities to explore, observe, problem solve, develop and learn through trial and error. Children should be able to test new skills. Winning new challenges will help children gain self-confidence and discover their own impact on the body. Children love climbing and reaching peaks. From this point on they have a new understanding of their environment. The high position brings challenges to the game. However, safety is also very important in this regard. Because 70% of children who use play equipment are at risk of falling from these climbing devices. Safety is both planning and detailed design. The surface under the climbing device should be a safe and soft material to prevent falling (Duman & Koçak, 2013; MEGEP, 2006; Tekkaya, 2001)

Symbolic - Imaginary Games

For young children aged 0-6 years, daydreaming is a very common and widespread phenomenon. Preschool children generally play games with imaginary people. For example, a 3-4 year old child struggling to put his/her doll to sleep, loving, caring for or scolding his/her mother, feeding and cleaning the diaper are the most common games we encounter. Imagination and creativity are very important in preschool children. Children sometimes play games by identifying themselves with cartoon, fairy tale and movie characters. Children who play these games can generally display their skills in drama, animation and improvisations quite well. The reenactments can be embellished with props,

face paintings, masks and costumes. The important thing here is that the child can express himself/herself freely using his/her creativity and imagination. We also witness children choosing real-life heroes when they play imaginative fiction. Doctors, soldiers, teachers, models, policemen, policemen and the like are much admired and imitated. Such professions are portrayed in games in terms of every aspect from their clothes to their attitudes and the tools they use (Barton & Wolery, 2008; Ergin, 2017; Morelock, Brown, & Morrissey, 2003;).

Benefits of Recreational Activities for Children

Recreational activities have a very important effect on the socialization of the individual due to their feature of being a social activity that provides the opportunity for the person to participate in lively social environments. Physical activity and recreational leisure activities have significant effects not only on children but also on disabled individuals (Kaya, Elitok, Yağmur, 2024). Studies show that recreational activities provide significant contributions to the development of individuals in many ways (Ayyıldız-Durhan, Türkmen, Coskun & Akgül, 2022; Kılıçarslan & Özant, 2024; Karaman-Çam, Ayyıldız-Durhan & Türkmen, 2024). All people become active and socialize with games, sports and other activities from a very young age. Every type of recreational activity creates a social experience (Yenigün & Doğduay, 2012). Whether recreational activities are carried out individually or collectively, they satisfy the socialization needs of people. On the other hand, these activities support the character of individuals from childhood to the last stage of their lives and the learning of social values. (Yağmur & İçigen, 2016). The relationship between the concepts of play and recreation that children play is quite tight. While play and its varieties can be used within the scope of recreation, play has similar characteristics to recreation. When children participate in play and recreational activities, they develop physically and mentally. In addition, these activities have revealed quite positive effects on the development of balance and coordination activities, especially in the preschool period of 4-6 years (Suveren-Erdoğan, 2014). Play is an activity in which children learn by having fun and also includes recreation. Some of the benefits of recreational activities that include play are as follows;

Children realize their talents and develop their skills.

- Children learn by transforming reality into imagination in play and apply what they learn to their daily lives. On the other hand, they learn how to cope with the difficulties they will face.
- The child learns to live in harmony with those around him/her.
- The child's ability to imagine and problem solving skills develop.
- The child's sense of helping, awareness of taking responsibility and ability to overcome his/her responsibilities develop (Aslan & Halli,

2022). Regular physical activity and exercises, which are an important need and habitualized during childhood, positively affect the future life of the individual. All games and educational activities involving physical activity provide a number of physical and mental positive effects to the individual in every developmental period, especially in childhood. Some of these effects: Some of these effects are;

- It contributes to the healthy progress of the development and growth process, the development of flexibility and basic motor skills.
- It provides a number of physical and physiological effects such as bone development, body weight control, speech disorders, obesity and prevention of cardiac problems.
- It prevents the emergence of negative emotions such as fear, anxiety and worry in children, one of whose basic needs is especially outdoor play and physical activities.
- It supports the development of perception, cause-effect relationships, inference, right decision-making skills, cooperation, working together, collaboration and self-confidence (Baydar Arıcan, 2021; Çelik & Şahin, 2013; Çingöz & Suveren-Erdoğan, 2021; Medwell, Grimshaw, Robertson & Kelso, 2012).

As a result of planning and implementing sports, games and sports recreational activity programs applied at very young ages in line with the needs of children, they contribute significantly to their physical, psychological and social development, as well as being important tools that strengthen their self-esteem and social ties. (Akarsu, Bayrakdar, Karaman, Zorba, Yaman, & Yıldırım, 2019; Arslan & Dilci; 2018; Mao, Doan, & Handford, 2024; Özant, Ayyıldız- Durhan, Demirel, & Zorba, 2024). Therefore, it is observed that children who regularly participate in sports and recreational activities from an early age maintain their individual development in a healthier manner and build their social adaptation skills on stronger foundations.

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COORDINATION AND BALANCE IN FENCING

Kemal Arda Kurt[1]

INTRODUCTION

Fencing is often called "physical chess" because strategy, tactics, and technical skills are fundamental in this sport. Fencing may look simple on the outside, but it is a challenging sport to master. It requires a sense of distance and timing, anticipatory technical skills, quick reaction, good balance, and excellent coordination. To be successful, a fencer must be able to combine physical agility with mental acuity uniquely. The fencer's physical and cognitive abilities play a decisive role in the results of the competition. Tactical decisions such as attack, defense, and counter-attack must be executed within milliseconds.

Balance and coordination are fundamental to fencing and critical to improving the athlete's performance. Balance is vital for the fencer to maintain body control while stationary or in motion in attacking and defensive positions. Coordination is necessary for different body parts to work in harmony. These two skills allow athletes to perform their movements more controlled and effectively. In this section, fencing, coordination, and balance will be discussed.

FENCING

The origin of fencing dates back to the development of martial arts and fighting techniques in ancient times. The sword and defense techniques first used in warfare were gradually taught in a more disciplined way. In the Middle Ages, the methods used in Italian, Spanish, and French duels played a significant role in the development of fencing. Fencing has a deep connection with the history of warfare and fighting techniques of different cultures. For example, in Europe, it started with the tradition of dueling and gradually became a sport. In the 19th century, modern rules were established and included in the first Olympic Games in 1896. Today, it is governed by many federations worldwide and practiced professionally (Anglo, 2000; Cohen, 2003; Dupuis, 2015).

Fencing is an offensive and defensive sport aiming to score points by touching the opponent's valid target areas. It is essential to act within the rules, protect your body, and block the opponent's strikes. Fencing is generally defined as a combat sport with features such as agility, strategy, speed, reaction, coordination, and balance at the forefront (Córdova et al., 2020; Roi & Bianchedi, 2008).

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In fencing competitions, three different weapons are used. These are the epee, the foil, and the sabre. Game rules vary according to the weapon used (Barth & Beck, 2006):

Epee: In the epee, the whole body is the target area. The type of strike is only a poke (a touch with the tip of the weapon). Strikes to the head, arms, legs, and torso are valid. This makes epee matches more based on attention and timing. There is no attack priority in epee. The side with the valid hit scores the point. In the case of a double hit (two fencers hitting simultaneously), both score points. This rule makes epee matches more prone to sudden and unexpected strikes.

Foil: In the foil, only the body is targeted. The stroke is only a poke. Hits to the arms, legs, and head are considered invalid. This makes foil matches more based on tactics and strategy. The attacking fencer has priority in scoring points. The attacking side maintains its priority until the opponent completes their hit. However, if the opponent successfully defends and stops the attack, priority goes to the defending side. This rule leads to a constant tactical struggle in the foil matches.

Sabre: The sabre targets the torso, arms, and head. Strikes to the legs are invalid. The strikes are pokes and slashes (touch with the tip or side of the sabre). This makes sabre matches faster and more lively. A rule of attack priority applies in the sabre, similar to the foil. However, because sabre matches are faster and more dynamic, applying this rule requires faster and more instantaneous decisions**.**

Fencers use special equipment as part of safety measures. These include a mask, protective fencing clothing, an electric jacket-vest, and gloves. In addition, electronic scoring systems allow for more accurate determination of hits (Alvarez et al., 2008; Barth & Beck, 2006)).

Fencing competitions are played according to a set point system, and these exciting challenges take place under the meticulous supervision of competent referees. Referees closely monitor everything on the fencing rink, evaluating strikes and checking for compliance with the rules. Their main tasks are determining valid strikes, enforcing priority rules, and punishing unsportsmanlike behavior. By their decisions, referees ensure that the competition proceeds pretty and orderly.

Fencing competitions require high performance both physically and mentally. Physically, fencers must be fast and durable. Basic posture, footwork, lunging, and practical weapon-handling skills are at the forefront. Mentally, fencers must be able to think strategically, make quick decisions, focus, and read the opponent’s movements. A high mental concentration is required to analyze the opponent’s tactics, implement one’s game plan, and react correctly

to sudden situations. Therefore, fencing is a dynamic and exciting sport in which physical and mental abilities are harmonized (Gutierrez-Davila et al., 2013; Hijazi, 2013; Tsolakis et al., 2010; Turner et al., 2013).

COORDINATION

Coordination is the ability of nerves and muscles to work in harmony to perform a specific movement or activity accurately, controlled, and efficiently. Coordination is a fundamental building block for sports performance. An athlete can perform movements more fluently and effectively through coordination, develop a sense of balance and rhythm, and quickly transition between movements. Improving coordination in athletes can improve their performance and reduce the risk of injury (Iorga et al., 2023; Schöllhorn, 2003).

Coordination involves the organization and control of movements. The working order of muscles, nervous system transmission, and brain functions are the essential elements of coordination skills. Coordination is learning complex movements and reacting quickly and correctly in different situations. This skill depends on the correct succession of movements and their realization in the desired way. In addition, coordination requires the central nervous system and the skeletal musculature to work harmoniously for the targeted movement. This interaction between the two systems ensures that movements are fluid and controlled (Houston et al., 2024; Lemke et al., 2019).

Coordination is an essential skill that develops throughout an individual's lifetime and is especially developed during childhood. Factors such as the acquisition of motor skills, balance, and development of hand-eye and hand-foot coordination form the basis of coordination in childhood. The skills acquired in this period significantly affect the individual's motor performance and success in physical activities in later life. Games, sporting events, and various physical activities support and develop children's coordination skills. In childhood, opportunities to explore the body, balance, coordinate, and develop motor skills are the most intense. Therefore, the importance given to coordination skills in childhood is of great importance for the quality of life and physical development of the individual (Satta et al., 2017; Stanković et al., 2023; Vandorpe et al., 2012).

Factors Affecting Coordination

Coordination is an essential skill that enables the human body to perform complex movements skillfully. However, this skill is shaped by many different factors. The functioning of the central nervous system, the level of attention and concentration, regular training and exercises, maturation, learning, and readiness are among the main factors that directly affect the quality and effectiveness of coordination. These factors play a critical role in developing and maximizing coordination skills.

Central Nervous System: The central nervous system consists of the brain and spinal cord and plays a key role in regulating and directing movements in the body. The brain processes information and controls movement in the body through complex neural networks. The spinal cord coordinates muscle movements by transmitting signals from the brain to various body parts. Therefore, a healthy central nervous system is vital for athletes to increase their coordination skills and optimize their performance. Furthermore, research on the development and functionality of the central nervous system provides essential clues to improving coordination in sports (Carson & Kelso, 2004; Diedrichsen et al., 2007; Lemke et al., 2019).

Attention and Concentration: Attention and concentration are important psychological factors in sports performance. Attention allows athletes to focus on a specific task or goal without being influenced by external factors. In contrast, concentration will enable athletes to concentrate on a particular task and perform this task successfully. Therefore, developing attention and concentration is vital for effectively using coordination (Vast et al., 2010; Vaz et al., 2019).

Training and Exercise: Athletes need to improve their coordination to increase their performance and make their movements more effective. This requires regular training and various exercises. Coordination exercises allow athletes to perform their movements more harmoniously and controlled. These exercises allow athletes to learn complex movements more easily and react faster to different situations. Regular coordination training and exercises positively affect the performance of athletes and reduce the risk of injury. Therefore, athletes should pay attention to training programs to improve their coordination skill (Bompa & Haff, 2009; Schmidt & Wrisberg, 2008).

Maturation: Maturation is one of the most critical factors affecting coordination and is closely related to physical and neurological development, especially during childhood and adolescence. Maturation is how an individual's physiological and neural systems develop following their genetically determined potential. This process plays a critical role in acquiring and developing coordination skills. Individuals who have not reached sufficient physical maturity cannot be expected to have a high level of coordination (Gallahue & Ozmun, 2005; Malina et al., 2003).

Learning: Learning is the reorganization or permanent change of an individual's behavior due to interaction with the environment. This concept has an essential role in developing and effectively developing coordination skills. Learning new movements, improving existing skills, and adapting to different situations is possible through learning. The learning process involves the athlete analyzing and correcting their movements using their experiences,

observations, and feedback. In this way, the athlete can more consciously control their movements, identify their mistakes, and develop more effective strategies (Guadagnoli & Lee, 2004; Magill, 2021; Schmidt & Wrisberg, 2008).

Readiness: Readiness refers to the prior knowledge, skills, and attitudes related to the work. It is a combination of maturation and learning processes. That is, a person needs to have both the physical maturity and the necessary knowledge and experience to learn a skill. It is one of the critical factors affecting coordination and refers to an individual's physical, mental, and emotional readiness to learn a particular skill or perform a task (Gallahue & Ozmun, 2005; Payne & Isaacs, 2017).

Coordinative Capabilities

Coordination ability is considered in a hierarchical system, along with motor learning, control, and adaptation to changing conditions. This system characterizes five basic coordination abilities: reaction, kinesthetic discrimination, spatial orientation, balance, and rhythm ability. These abilities are the fundamental elements that enable movements to be performed effectively and harmoniously. The coordination process results in purposeful, skilled movement when the coordinative skills come together correctly. In this context, the level of coordinative abilities is significant for coordination processes. In fencing sport, the level of these coordinative abilities can be decisive in competitions.

Reaction: Reaction is the ability to react quickly and accurately to a stimulus or a changing situation. After sensing an external stimulus, this skill involves the body responding appropriately to that stimulus as swiftly and efficiently as possible. It is closely related to the speed and functioning of the central nervous system. This skill is essential in sports such as fencing, which require quick decision-making and adaptation to sudden changes. The shorter the reaction time and the more accurate the response, the higher the performance (Bompa & Haff, 2009; Nuri et al., 2013).

Fencing is a discipline that involves a high level of reaction process. Reacting instantly to the opponent's moves requires both rapid processing of visual stimuli and the production of appropriate motor responses to these stimuli.

Kinesthetic Discrimination: Kinesthetic discrimination is the ability to perceive and discriminate the position of the body's limbs and joints in space, movement, and muscle tension. The brain, which processes sensory information from receptors in muscles, tendons, and joints, realizes this ability. Kinesthetic discrimination enables precise control and coordination of movements (Proske & Gandevia, 2018; Schmidt et al., 2018).

Kinesthetic discrimination in fencing allows the athlete to control the weapon's position and body movements. Fencers need kinesthetic discrimination to correctly adjust the muscles' tension levels and the joints' angles during the execution of techniques, to anticipate the opponent's movements, and to react accordingly.

Spatial Orientation: Spatial orientation is the ability of an individual to perceive and understand the position of objects, people, and their bodies in space and act using this information. This concept is vital in daily life, sports, art, and engineering. Spatial orientation involves understanding the body's relationship with the environment and reflecting this information in our movements (Wolbers & Hegarty, 2010).

In fencing, this skill allows the athlete to be aware of both their body and opponent's positions. It helps them to perform purposeful movement at the proper distance.

Rhythm: The athlete can perform movements at a specific tempo, timing, and fluency. This skill enables the athlete to perform their movements in an organized, harmonious, and controlled manner to improve their performance. This skill includes adapting to the movement rhythm of other players and the team, changing the game's tempo, and imposing one's rhythm on the opponent. It also refers to the ability to perform movements in the spatial dimension by adapting to fluid and dynamic changes. This requires the player to move flexibly and harmoniously within the game (Liparoti & Minino, 2021; Schmidt et al., 2018).

Rhythm in fencing is about coordinating the athlete's movements regarding timing, speed, and flow. Fencers should analyze the opponent's rhythm and plan and implement their attack and defense organizations by this rhythm.

Balance: Balance ability is the ability of an individual to maintain body position or to quickly readjust to a new position in response to sudden and unexpected changes in body position. This ability depends on the position of the body's center of gravity, the width of the support surface, the functionality of the vestibular system, and the state of the central nervous system. Information from the vestibular system, especially in the inner ear, is critical in maintaining balance. It is crucial to develop this ability to maintain balance or quickly return to normal when disturbed. This process controls the body's movements, allowing it to move in a balanced and controlled manner (Hrysomallis, 2011; Pekel et al., 2023).

Fencing is a sport where balance control is significant. Fencers must control their body's center of gravity during steps and moves in static and dynamic situations and react quickly to the opponent's moves. This is only possible with good balance skills.

BALANCE

The balance parameter is an essential ability that should be considered alone. In short, it is defined as the ability of the body to maintain the current position or adapt to the new position during the displacement of the projection of the center of gravity. This skill is related to the harmonious functioning of the muscles, the correct processing of signals from the inner ear and eyes, and the coordination of the nervous system (Peterka, 2002; Winter, 1995).

Equilibrium is a fundamental concept for both physical and biological systems, and its maintenance depends on a harmonious distribution of forces. The human body uses a complex system to stay in balance. This system is essential for walking, running, playing sports, and performing daily movements. A good understanding and development of balance improves mobility and sporting performance and reduces the risk of injury, leading to a safer sporting life (Cengiz & Coşkun, 2023; Suveren-Erdogan, 2018).

Three basic types are static, dynamic, and balanced with the object.

Static Balance: Static balance refers to the body's ability to remain balanced at rest. This skill allows the body to remain stable in a given position and is determined by muscle strength, flexibility, and proprioception (sensing the body's position in space). Static balance is especially critical for athletes' postural control and performance. Static balance refers to the state in which the internal and external forces acting on the body or any part of the body are in balance. For example, static balance in the knee joint is achieved when the agonist and antagonist muscles balance each other, and the force is directed toward the center of the joint movement. This type of balance makes it possible for the body and posture to remain stable when no external force is applied. It also describes a person's ability to remain stable in a given position. Static balance is responsible for maintaining upright posture by adjusting the position of the body against the force of gravity, allowing a person to stand in a balanced way (Hrysomallis, 2011; İpekoğlu et al., 2018; Zemková, 2014).

Dynamic Balance: Dynamic balance is defined as the body's ability to reposition itself with each change in movement. Maintaining balance during fast movements and adapting to changing conditions is vital for athletes' performance. Dynamic balance develops through coordination, muscle strength, proprioception (perception of the body's position in space), and visual perception. Training programs to improve dynamic balance skills are very effective for athletes to maintain balance during various movements. Unlike static balance, it involves maintaining balance during movement. In sporting activities, the athlete maintains the correct body position during movements such as acceleration, deceleration, or sudden changes in direction. In physical

terms, the forces acting on an object in dynamic equilibrium can cause it to be out of balance before the movement begins. Once movement begins, the body may need to translate or rotate by applying vertical or angular forces against the force of gravity. To maintain dynamic balance, the movement between the center of gravity of the organism and the base of support must be maintained continuously (Bressel et al., 2007; Proske & Gandevia, 2018; Schmidt et al., 2018).

Balance with the Object: Object balance is the ability of an individual to maintain body position and balance while carrying, using, or manipulating an object. Balance with an object depends on information processing from the proprioception, vestibular, and visual systems by the central nervous system (Paillard, 2017). Balance with the object is performed in addition to both dynamic and static balance processes (Suveren Erdoğan & Cengizel, 2020).

Factors Affecting Balance

Balance ability does not depend on a single factor, such as strength or training. The quality and maintenance of balance are closely related to using highly complex skills and the sensitivity of the senses of sight and hearing. In summary, there are multiple factors affecting balance.

Strength: Strength is an essential factor that ensures balance. Muscle groups in the body need to be strong to maintain balance. Muscle strength is crucial for the muscles of the lower extremities, such as the core, ankle, knee, and hip. The strength of these muscle groups supports balance by increasing the body's stability. Strength is an essential factor that ensures balance. Muscle groups in the body need to be strong to maintain balance. Muscle strength is significant for the muscles of the lower extremities, such as the core, ankle, knee, and hip. The strength of these muscle groups supports the ability to balance by increasing the stability of the body (Granacher et al., 2013; Hrysomallis, 2011).

Flexibility: Flexibility is the ability to make optimal use of the range of motion of joints and muscles and is one of the key factors affecting balance. It significantly affects the body's mobility and postural control. Flexible muscles increase the joint range of motion, allowing the body to move more efficiently and effectively (Behm et al., 2016; Shrier, 2004).

Proprioception: The term proprioception was first defined in the scientific world by the Scottish neurologist Sir Charles Bell as the "sixth deep sense." This concept, whose Latin origin means "the feeling of being on one's own," is associated with the individual's motor skills and control of movement(Hillier et al., 2015). Proprioception senses the angles and postures of the joints and transmits the signals necessary for the body to maintain its balance and movements, voluntary or involuntary. This system plays a vital role in determining the position and direction of movement of the limbs. Receiving

impulses from muscles, skin, tendons, and joints, receptors support the central neuromuscular system to help the body coordinate its movement (Proske & Gandevia, 2012).

Vestibular System: The vestibular system is a sensory system in the inner ear that provides balance, movement, and spatial awareness of the body. It helps to maintain body position by sensing head movements. The central nervous system combines information from the vestibular system with proprioceptive and visual data, enabling balance and postural control (Goldberg et al., 2012).

Visual Perception: Visual perception is an essential sensory component in maintaining balance. In the process of balance, the body retains postural stability by perceiving the objects and movements around it. The eyes continuously monitor environmental changes and transmit this information to the brain, contributing to maintaining balance (Mann et al., 2007; Peterka, 2002).

COORDINATION AND BALANCE RELATIONSHIP

Coordination and balance are two fundamental components of human movement and are closely interrelated. These concepts play a critical role in daily activities and sports performances. Coordination refers to the ability of different body parts to work in harmony to achieve a targeted movement. Balance is the body's ability to remain in a fixed position or to maintain stability while moving. These two elements are achieved through complex interactions between the nervous system, muscles, joints, and sensory systems (Gribble et al., 2012; Hrysomallis, 2011).

Coordination plays a vital role in maintaining balance. For example, when walking or running, the harmonious movement of the legs, arms, and torso is essential to prevent losing balance. Lack of coordination disrupts the fluidity of movements and can lead to loss of balance. This is a crucial factor that increases the risk of falls, especially in infants and older people (Payne & Isaacs, 2017).

Coordination is controlled by the central nervous system (CNS). The CNS enables the planning and execution of movement through signals sent to the muscles. In this process, sensory systems such as proprioception (sensing the body's position in space) and the vestibular system (inner ear structures that provide balance) are also involved. These systems help maintain balance by continuously monitoring the position and movement of the body (Schmidt & Wrisberg, 2008).

The relationship between coordination and balance becomes particularly evident during dynamic movements. For example, walking, running, or carrying an object requires different body parts to work in harmony (coordination) while maintaining balance. Lack of coordination can disrupt the fluidity of movements, leading to impaired balance. Similarly, balance disorders can

negatively affect coordination. Coordination and balance are two essential motor skills that support each other. Therefore, balance exercises are often used to improve coordination. The contraction of muscles at the right time and with the right intensity is necessary to maintain balance. This process takes place as a result of coordination.

COORDINATION AND BALANCE IN FENCING

Fencing is a dynamic sport that requires both physical and mental skills. In this sport, fencers compete within specific rules and try to score points. These techniques, which involve harmonious movements of the weapon hand, body, and feet, require high balance and coordination. A successful fencing technique combines balance, speed, and coordination. Since fencing is fluid and fast, it involves complex movements and sudden counter-moves. Therefore, to perform well in this sport, it is essential to maintain body control, make coordinated movements, and stay balanced in rapid direction changes.

In fencing, coordination, especially hand-foot harmony, is essential for the purposeful realization of body movements. For example, during a lunge, at the right time and distance, the fencer's leg should swing forward, and the arm should reach toward the opponent simultaneously. Such movements require a high level of motor control and neuromuscular coordination. In addition, during defensive movements, the body's ability to perform purposeful movements in harmony allows the fencer to respond effectively to the opponent's moves (Gutierrez-Davila et al., 2013; Roi & Bianchedi, 2008).

Coordinated movements require the fencer to harmonize mental decision-making processes with physical movements. Anticipating the opponent's moves, reacting with the right timing, and executing techniques flawlessly is a result of coordination. Coordination supports quick decision-making and execution, effectively establishing superiority over the opponent. The ability to follow the opponent's weapon, adjust the distance correctly and hit the target accurately, harmony of footwork and body composition, and make fast and effective moves are directly related to coordination (Lopatenko et al., 2021).

In fencing, balance is critical, especially in fast changes of direction and sudden stops, and forms the basis of both offensive and defensive movements. It plays an important role, especially in fast changes in direction and sudden stops. Correct posture and the correct distribution of body weight are critical to react quickly and effectively against the opponent. In fencing, a balanced stance makes it easier to parry the opponent's attacks, while good coordination makes it possible to quickly identify the opponent's weak points and make appropriate moves. Balanced fencing techniques allow fencers to execute the

complex movements needed to close defensive lines and perform offensive actions (Barth & Beck, 2006).

Coordination and balance in fencing positively affect quick decision-making and reaction times, especially during competition. A balanced posture and effective coordination allow the fencer to outmaneuver the opponent physically and mentally.

In conclusion, coordination and balance are fundamental skills that should not be ignored to achieve success in fencing. Continuous development of these skills will positively affect fencers' technical and tactical performances and put them one step ahead.

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