



Analysis of the Development of Physical Capacities, Strength and Endurance through the Practice of Field Tennis: Benefits for Health and Integral Well-being

Análisis del desarrollo de capacidades físicas, fuerza y resistencia a través de la práctica del tenis de campo: Beneficios para la salud y el bienestar integral

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Resumen

Introducción: El tenis de campo es un deporte de alta intensidad, intermitente, que requiere el desarrollo de capacidades físicas como la fuerza y la resistencia, que tienen implicaciones directas en la salud y el bienestar de los practicantes. **Objetivo:** Analizar el desarrollo de las capacidades físicas de fuerza y resistencia a través de la práctica del tenis de campo, evidenciando sus beneficios para la salud cardiovascular, Musculo esquelética y mental. **Metodología:** Se efectuó una revisión sistemática de la literatura científica en bases de datos Dialnet, SciELO, Redalyc y Latindex, revisando 15 artículos publicados entre 2019 y 2023 que cumplieron con los criterios de inclusión establecidos según el protocolo PRISMA. **Resultados:** La evidencia indica que la práctica del tenis contribuye significativamente al fortalecimiento de la fuerza muscular, la resistencia cardiovascular y las capacidades

coordinativas. Los ejercicios pliométricos, el entrenamiento neuromuscular integrativo (INT) y el entrenamiento interválico de alta intensidad (HIIT) son metodologías efectivas para mejorar el rendimiento físico. **Discusión:** Los resultados muestran que el tenis induce adaptaciones fisiológicas positivas en el sistema cardiovascular y musculoesquelético, disminuyendo el riesgo de enfermedades crónicas, mejorando la composición corporal y el bienestar psicosocial. La tecnología GPS y la evaluación de cargas nos permiten optimizar los programas de entrenamiento para maximizar beneficios para la salud.

Conclusiones: El tenis de campo, cuando se practica de forma regular y adecuada, es una actividad lúdica y saludable que puede ser prescrita como estrategia de promoción de la salud en diferentes grupos etarios y condiciones físicas, contribuyendo al bienestar integral de las personas.



Palabras claves: Fuerza muscular, Resistencia cardiovascular, Capacidades físicas, Tenis de campo, Salud, Bienestar integral, Actividad física.

Summary

Introduction: Field tennis is a high-intensity intermittent sport that requires the development of physical abilities such as strength and endurance, which have direct implications for the health and well-being of practitioners. **Objective:** To analyze the development of physical abilities of strength and endurance through the practice of field tennis, evidencing its benefits for cardiovascular, musculoskeletal and mental health. **Methodology:** A systematic review of the scientific literature was carried out in Dialnet, SciELO, Redalyc and Latindex databases, reviewing 15 articles published between 2019 and 2023 that met the established inclusion criteria according to the PRISMA protocol. **Results:** The evidence indicates that the practice of tennis significantly contributes to the strengthening of muscle strength, cardiovascular endurance and coordinative abilities. **Plyometric exercises, integrative neuromuscular training (INT) and high-intensity interval training (HIIT) are effective methodologies to improve physical performance.** **Discussion:** The results show that tennis induces positive physiological adaptations in the cardiovascular and musculoskeletal systems, decreasing the risk of chronic diseases, improving body composition and psychosocial well-being. **GPS technology and load evaluation allow us to optimize training programs to maximize health benefits.** **Conclusions:** Field tennis, when practiced regularly and appropriately, is a playful and healthy activity that can be prescribed as a health promotion strategy in different age groups and physical conditions, contributing to the integral well-being of people.

Keywords: Muscle strength, Cardiovascular endurance, Physical

abilities, Field tennis, Health, Integral well-being, Physical activity.

Introduction

The purpose of this study is to examine the physical abilities of strength and endurance involved in playing tennis and to demonstrate how these abilities can be developed through training in this sport, which may serve as another option for individuals who wish to enhance these physical abilities Kramer et al. (2021). It aims to show how physical abilities can improve while engaging in an entertaining, fun, and recreational activity. Tennis is a technical sport that involves repeated high-intensity movements, making it an excellent option for developing and improving abilities such as cardiovascular fitness Fernandez-Fernandez et al. (2018).

This research aims to introduce tennis as another theoretical and methodological approach to physical development. It demonstrates the significant positive impact on physical fitness, improving strength and endurance in those who play tennis, and highlights the development of these abilities through various movements and exercises specific to the sport. It also shows that maintaining adequate physical fitness does not require engaging in unplayful training routines; rather, physical fitness can be developed while having fun Luna-Villouta et al. (2022).



This research will provide the country's tennis clubs and coaches with tools, ideas, and knowledge to help players develop adequate physical conditioning through training sessions, thereby enriching their professional practice, expanding their offerings, and making their classes more entertaining and popular among players. By innovating their training methodologies, they will grow professionally and help improve the fitness of many who choose to play tennis to enhance their performance Mainer-Pardos et al. (2024).

“It is important to note that playing tennis can improve and strengthen various physical abilities such as speed, strength, endurance, and flexibility Rivera-Anchundia & Perez-Ramirez (2019). Additionally, it fosters coordination skills such as spatial awareness, balance, rhythm, synchronization, and relaxation. These improvements are achieved through specific exercises and stroke sequences designed to enhance these abilities. In summary, playing tennis offers an opportunity to develop both physical and coordination skills through training and activities focused on strengthening and improving these abilities.

According to the research by Morais et al. (2024) y Liu et al. (2024) conditional abilities are determined by energy-related

factors and are based on the process of energy generation and transmission. These abilities are speed, strength, endurance, and flexibility Sánchez-Pay & Sanz-Rivas (2019). This means that physical conditional abilities are related to the ability to perform movements in the shortest possible time, overcome resistance through tension, maintain effort over time, or achieve the maximum range of motion in a joint Fan et al. (2025).

According to Suárez Guzmán (2021) there is an interrelationship among the different physical abilities, which gives rise to new physical skills. These include the ability to react quickly, movement speed, speed endurance, maximum strength, explosive strength, and strength endurance. Of particular note are short-, medium-, and long-duration endurance capacities. On the other hand, coordinative physical abilities are distinguished by their role in regulating and directing body movements.

In line with Alfonso-Asencio et al (2020), tennis is a sport in which various performance-related variables influence the final outcome of a match. Among the most decisive factors are the speed and accuracy of shots. In sports training methodology, certain physical abilities are predominant in specific disciplines and must be emphasized more; in other cases, such as in



tennis, physical abilities are interrelated, as explained in relation to the speed and accuracy of shots, since without accuracy—no matter how much speed there is—a proper game cannot be played.

Domínguez et al. (2021) notes that strength is defined as the ability to overcome or maintain resistance through muscle contraction. This ability is classified according to the type of action, such as maximum strength, speed strength, and endurance strength. Furthermore, it is also classified based on the type of contraction, which includes concentric isotonic contraction, eccentric isotonic contraction, isometric contraction, isokinetic contraction, and auxotonic contraction. It is important to note that several factors influence strength, such as muscle fiber type, muscle length, gender, etc.

Like other sports, tennis enhances various physical abilities. Playing tennis helps strengthen physical abilities such as speed, strength, endurance, and flexibility. In terms of coordination, it develops spatial awareness, balance, rhythm, synchronization, and relaxation through drills and stroke sequences, which enable students to master the technical fundamentals of tennis in physical education class.

Valle García (2020) Circuit training is a highly recommended technique for simultaneously working on different physical qualities with a group of tennis players. It allows you to easily and effectively control the content, volume, and intensity of the workout. By designing a varied and multifunctional exercise program, we can focus on developing various physical abilities without losing sight of our primary goal: to build physical conditioning that meets all the demands of the sport.

Regarding the use of INT (integrative neuromuscular training) to improve specific physical abilities in sports, Wang et al. (2022) found that abilities such as repeated sprints and changes of direction, which are of utmost importance in tennis, improved significantly in 7- to 8-year-old children after 8 weeks of training; To this end, they incorporated INT with a focus on speed, coordination, plyometrics, and speed endurance, using a limited number of exercises, with each INT session lasting between 15 and 20 minutes—a duration that did not significantly impact the total length of the regular training sessions, which lasted 90 minutes.

The objective of this study is to provide a theoretical analysis of the physiological changes that playing tennis produces in

strength and endurance. This is based on a systematic review of reliable scientific articles from high-impact regional databases, such as Dialnet, Latindex, Lilacs, Redalyc, and Scielo.

Furthermore, we aim to provide an alternative for improving physical abilities in strength and endurance through the mechanics, gameplay, and movements of tennis, making it a fun and recreational activity. We hope that more people will learn about the sport, enjoy it, practice it, and benefit from the development of the aforementioned physical abilities. Tennis has come to be regarded as a fun and beneficial activity.

Methodology

A literature review was conducted of scientific articles from databases and renowned journals such as Dialnet and the ITF, gathering the information most relevant to the structure of the research. To meet the requirements of the article, an advanced search was performed using criteria such as: a time limit based on the article's publication date, including articles from 2019 through the current year. Two high-impact articles from 2019 and 2021, recognized in the field of strength and endurance training, were included in this review to enhance the article's validity.

A total of 120 articles were initially identified; 80 were excluded due to duplication, leaving 40 to be examined. Subsequently, 5 were excluded based on publication year criteria. This left 35 articles that met the inclusion criteria; 20 were eliminated for reasons not aligned with the criteria, leaving 15 articles in the review that met the requirements, those most closely related to the research title, which were of great importance to the research process.

The following search terms were used: "Strength and endurance in tennis"; "Physical training in tennis"; "Physical conditioning, physiology, and metabolic requirements of tennis."

Selection of Articles

After the search, articles were selected using a flowchart, based on the following selection criteria:

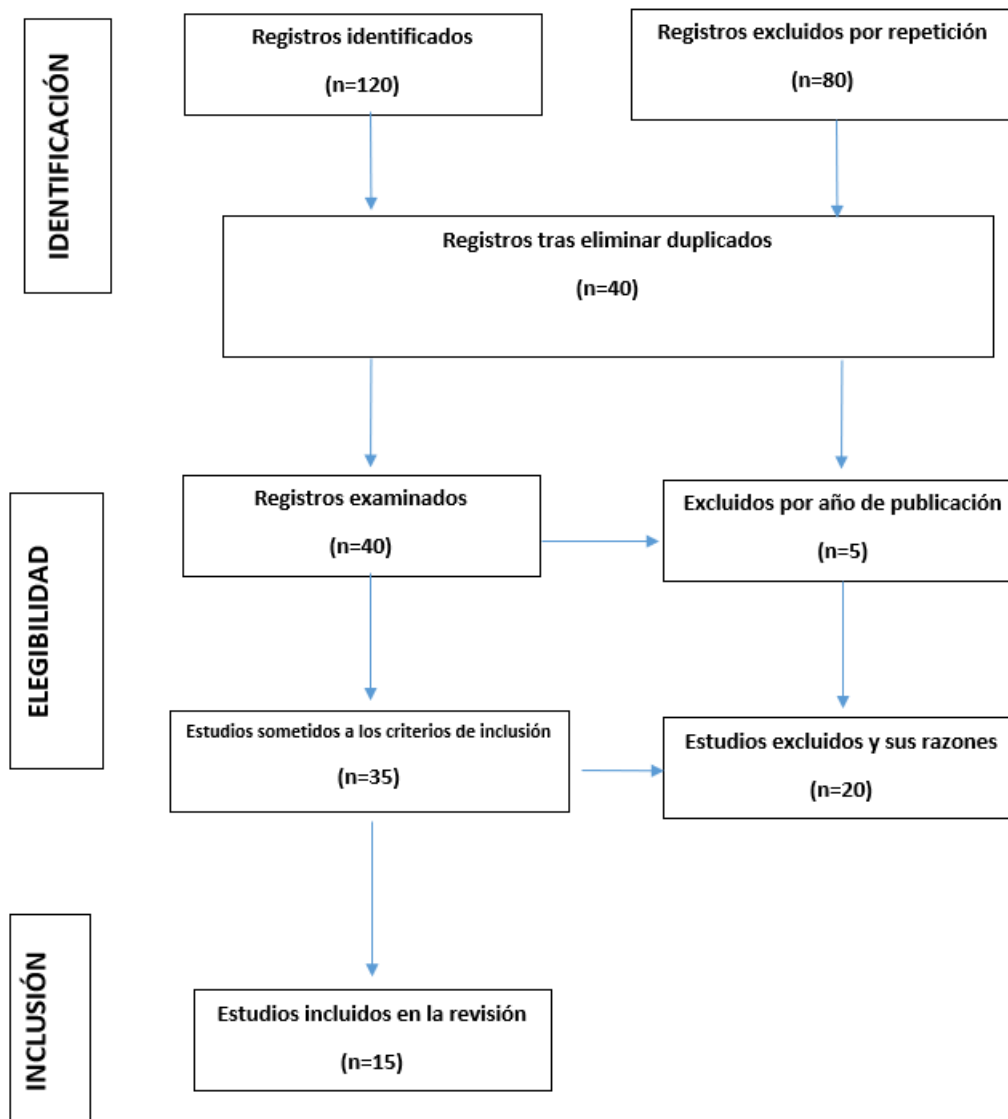
- Set the time period to 2019–2023.
- Articles published in Spanish.
- Articles that include research on:
Analysis of the development of
physical abilities, strength, and

endurance through the practice of tennis.

- Publications in regional and high-impact scientific journals.

- A total of 15 articles were identified for the systematic review.

Flowchart (PRISMA)



In the context of this thesis, the topic of “ANALYSIS of the development of physical abilities, strength, and endurance through the practice of tennis” is addressed in depth.

The main objective of this study is to explore in depth how the continuous practice of this sport can influence players’ physical strength and endurance, as well as their overall health. To achieve this



objective, a matrix will be used as an essential tool to organize, compare, and synthesize the data collected during the research process. The use of the matrix will allow for the visualization of patterns and trends, lending robustness and rigor to the analysis of the results obtained.

Analysis of the Matrix

The use of the matrix in this study has proven to be an invaluable tool for systematically structuring and examining the collected data. By organizing the information into columns and rows, we have gained a comprehensive and coherent overview of the physical abilities, strength, and endurance of tennis players, based on the various factors considered in the study. The matrix has proven to be an effective tool for identifying emerging patterns, highlighting areas for improvement, and revealing connections that might otherwise have gone unnoticed. Thanks to its use, we have achieved a more in-depth and well-founded analysis, which has strengthened the credibility of the results obtained and enriched the discussion surrounding the

findings of this research. Undoubtedly, the matrix has been an essential aid in our effort to make a significant contribution to the knowledge and understanding of how tennis impacts the physical development of athletes.



Table 1: Analysis matrix of the studies included in the systematic review on the development of physical abilities, strength, and endurance in tennis

No	Title	Author(es)	Year	Objective	Methodology	Results	Conclusions	Analysis and Reflections
1	Exercises for Speed Endurance in the Specialized Training of Junior Tennis Players	Domingo-Anchundia et al.	(2019)	To design a methodological proposal for exercises aimed at contributing to the development and proper specialized training of speed endurance in young tennis players.	This research project was conducted using a qualitative approach, analyzing the physical condition of young tennis players through tests, surveys, and assessment tests. It examined	It was determined that the main shortcoming observed during training sessions is a lack of athletic fitness. Without a doubt, optimal physical condition is vital for better performance in competition, and	The proposal for selecting appropriate and optional exercises to promote an effective training process for speed endurance among junior tennis players at the Tenn Surf Club in Manta was	It is essential to constantly evaluate the progress of training programs designed to develop specific physical abilities in order to correct mistakes.



variables such as	it was evident that	supplemented by	Mistakes can
appropriate	they were not in	a pedagogical	occur not only
exercises, training	adequate shape;	training plan and	among those
plans, and	therefore,	a set of	who perform the
scheduling to		methodological	training but also
develop a suitable		recommendations	among those
methodological		that enable	who plan it,
proposal.		coaches to	such as coaches,
		improve the	instructors, etc.
		athletes'	For these
		performance and	reasons, it is all
		prepare them to	the more
		put these	important for
		recommendations	methodologists
		into practice.	to engage in
			constant
			evaluation and



							professional development.
2	Assessment of Movement Patterns in Competition to Optimize the Training Process for Elite Youth Tennis Players Using GPS Technology	Carlos Galé (2019)	The objective of this research project was to describe the profile of the physical demands and movement patterns required of youth tennis players in competition using GPS technology. To this end, the study involved young tennis players from the Aragonese	A total of 217 data sets were monitored, including competitive matches played on fast courts and clay courts, as well as training sessions. The data collection was carried out using MinimaxX Team Sports 4.0 GPS devices (Catapult	It was evident that the data related to acceleration were more significant due to the nature of the sport, in which the dimensions of the court prevent tennis players from reaching high speeds and the intermittent nature of tennis is better suited to the accelerations	The application of GPS technology to tennis provides a more detailed and accurate understanding of the demands and characteristics of youth tennis, thereby enhancing knowledge in the field of sports training appropriate for these age groups.	Assessing certain physical conditions and abilities will always be crucial to achieving positive results, and even more so when combined with technology. This research study demonstrates that the use of



Tennis Federation	Innovation,	performed by tennis	As a result, this	technology
in the alevín,	Australia) with a	players.	information can	plays a huge
infantil, cadet, and	sampling rate of		be used to design	role in athletic
junior categories,	10 Hz. A		specific training	performance.
with an average age	descriptive		exercises that	
of 14.1 ± 2.2 years.	statistical analysis		mimic	
	was performed on		competition	
	the following		conditions,	
	independent		leading to	
	variables: surface,		improved	
	competition type,		performance	
	category, ranking,		among young	
	and gender. The		tennis players.	
	dependent			
	variables analyzed			
	were grouped into			
	two dimensions:			



				speed and			
				acceleration.			
3	Relationships Between Body Size and Physical Abilities in Elite Tennis Players	Skorodumova- Ibanov et al. (2021)	To study anthropometric and physical fitness indicators to determine whether or not there is a relationship with the development of physical abilities .	Anthropometric measurements and physical tests were conducted to determine how factors such as weight, height, and body volume related to physical abilities	The study found that body mass and height have no significant influence on the development of physical abilities, much less in a competitive setting. .	This project highlights the importance of maintaining a healthy weight-to- height ratio to avoid problems related to being overweight. While this ratio plays a fundamental role in athletic performance in several ways, it is	It is essential to maintain a healthy balance between weight and height, especially in sports. Evidence shows that being taller or larger in build is not a significant advantage for developing physical abilities, but it is



						often not a	important for
						determining	avoiding being
						factor.	heavier than
							recommended.
4	Internal and External Load in Competitive Tennis: A Comparison of Three Types of Training	Rodríguez- Cayetano et al(2022)	To measure external and internal load during three types of drills (hand-fed balls, racket-fed balls, and rallying), which are the most commonly used in competitive tennis, and to compare the results with one another.	To quantify the external and internal loads in three types of training (hand-held ball drills, racket-held ball drills, and rallying) most commonly used in competitive tennis and compare them with one another.	The results show that hand-held cube training has a greater effect on internal load compared to the number of racket strokes. This reflects the fact that rallies exert a greater external load in relation to speed.	It can be concluded that hand-held cube training involves a higher internal load in terms of the number of hits and average racket speed, while rally training reflects a higher external load in terms of	The stimulus and result— whether positive or negative. depend on the load applied to the body; that is why we must always measure workloads so that we can apply the



						speeds and	appropriate
						distances covered.	intensity.
5	Coordinated Training and Physiological Indices in Young Tennis Players.	Yubing Liao.(2023)	To analyze the physiological aspects of coordination training for young tennis players using a prescribed training program. To better analyze training variables and outcomes based on physiology and the internal and external loads placed on the body.	A sample of 12 young tennis players was selected and divided into two groups: an experimental group and a control group. Technical, speed, endurance, and exercise physiology characteristics were recorded.	After 6 weeks of analysis, study, data collection, and organization, it was evident that the experimental group showed an exceptional improvement in the 30-meter sprint time, by approximately 0.5 seconds; the forehand and backhand swing	Coordination training can effectively improve physical fitness, athletic performance, and various physiological aspects of exercise in young tennis players; it is clear that coordination training has a positive effect on	Training and improving coordination is essential in all sports, but it is of vital importance because it has been shown that training not only improves coordination itself but also overall athletic performance;



scores before the	athletic	therefore, it is
experiment,	performance	recommended to
according to the	without affecting	train
records, were 75.01,	the athlete's other	coordination as
and after the test	physical	an additional
they were 89.79—	characteristics or	factor to
an increase of 14.78	their sport.	maximize
points, indicating a		performance.
significant		
improvement. The		
second group, the		
experimental group,		
also stood out in		
terms of		
physiological		
indicators of		
exercise.		



6	Anthropometric and Physical Fitness Study in Young Tennis Players: A Systematic Review	Villouta-Flores et al(2022)	The objective of the study was to conduct a systematic review of original scientific articles available in high-impact databases from 2000 to 2021 on the study of anthropometry and components of physical fitness in youth tennis players.	A systematic review was conducted in three electronic scientific databases: PubMed, LILACS, and Web of Science, covering the period from January 2000 to May 2021; Initially, 73 original articles were identified;	The results show that there are no studies that address all the questions—particularly at the South American level and regarding women—related to anthropometric measurements and physical condition. This lack of precise data on such relevant information may even be a	Studies conducted over the past twenty-one years on the monitoring of anthropometry and physical fitness in young tennis players show that there has been greater research into the relationship between anthropometric measurements and physical abilities. Therefore, it is	Collecting specific research data is essential for gaining a deeper understanding of certain topics and issues, such as the relationship between anthropometric measurements and physical abilities.
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				after applying the eligibility and exclusion criteria, along with the procedure outlined in the PRISMA flowchart, 14 articles were selected for analysis and inclusion in the project.	limitation of the study.	fitness, especially in South America. On the other hand, research has focused more on men, so there should be data available on women as well.	recommended to conduct further exploratory, qualitative, and quantitative research to gather more information and apply it where necessary.
7	Assessment of the Physical Condition of	Sánchez Alejandro- Sanz David(2019)	The objective of this research study was to assess the physical condition	The participants in this study were 9 players who underwent a	The experiment showed that higher- level players have better levels of	In conclusion, this study showed that athletes with a higher incidence	Adapted sports have seen significant growth,



Elite	of wheelchair tennis	battery of physical	physical fitness in	of injuries had	particularly due
Wheelchair	players based on	tests that	all tests, with	deficiencies in	to the
Tennis	their ranking and	measured forearm	significant	certain abilities	importance
Players by	the type of injury	strength, serve	differences found in	compared to those	placed on high
Competitive	they have sustained.	speed, running	almost all of them.	with a lower	performance.
Level and		speed over 5, 10,	Players with greater	incidence of	Athletes with
Type of		and 20 meters	functional	injuries.	disabilities must
Injury		(with and without	limitations showed		also be
		a racket), agility	lower scores,		evaluated and
		tests (with and	although few		have their
		without a racket),	statistically		physical abilities
		medicine ball	significant		assessed, as we
		throwing tests	differences were		demonstrate in
		(serve, forehand,	found. The tests		this essay. Since
		and backhand	used can be		they are high-
		strokes), and an	employed to assess		performance
		incremental	fitness levels in		athletes, various



endurance test

TSR players, as they

factors can

specific to TSR.

differentiate based

influence their

on the athlete's level

condition—such

and do not exclude

as the type of

players with

injury—and it is

functional

important to

limitations.

seek ways to

improve these

aspects.



8	Longitudinal Development of 5-Meter Sprint Performance in Young Tennis Players	Kramer-Valente et al(2020)	The studies identified provided data on anthropometry, somatotype, and body composition; and it is important to note that this information is valuable and should be considered a reference for other studies, talent identification, and training planning	The articles are based on studies conducted in Europe that examined various anthropometric and physical fitness parameters (muscle strength and power, speed, agility, and cardiovascular endurance) in both men and women; some of these studies included	It was found that, as they age, female tennis players increase in weight, height, speed, and jump height. • Sprint performance (5 m) is determined by chronological age, foot size, and lower-body strength. • Sprint performance (5 m) is not determined by maturity or body weight.	Studies analyzed over the past twenty-one years (2000–2021) on the monitoring of anthropometry and physical fitness in young tennis players indicate a need for further research, particularly in South America; current studies provide valuable	When comparing by gender, differences are evident between men and women in anthropometry and physical fitness, and for both sexes, advanced maturation is associated with better performance on
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for adolescent	developmental	information	tests of running
tennis players.	factors in their	primarily on	speed, strength,
	analyses,	anthropometric	and muscle
	reflecting greater	parameters for	power. Given
	progress in this	men and women,	the above, there
	field and a more	and these values	is a need to
	in-depth approach	are similar to	gather more
	to research on the	those found in	evidence
	continent,	European studies.	regarding
	particularly with		physical fitness
	regard to young		and
	athletes.		anthropometry
			in young tennis
			players, as these
			are essential
			factors for
			optimizing



							athletic performance, identifying talent, and preventing injuries in junior tennis players.
9	Measuring and Monitoring Tennis Training Load: A Case Study	Genevois- Rogowski et al(2020)	Twenty-two tennis players (M = 16.9 years) who trained at the HDN Academy in Nîmes voluntarily participated in this study. The players were divided into two groups: a	This experiment was conducted to evaluate the effects of a service preparation routine—repeated and standardized during training under match conditions, that	The statistical analysis of ball speed showed no significant differences between the serves of the control group (mean = 149 km/h) and those of the visualization	The purpose of this study was to present a simple method for quantifying training load in tennis and its indicators, in order to analyze variations over	The positive effects of visualization, using an external focus— that is, asking the player to visualize the trajectory of the ball they want to



			control group and a visualization routine group.	combined breathing, individualized ball bouncing, and visualization focused on the ball's trajectory and the target area to be hit.	routines group (mean = 155 km/h) in the post-test.	time. However, further research is still needed on different skill levels and age groups to establish benchmarks and to improve and develop methods for planning training load in our sport.	serve and the goal they wish to achieve. We recommend that coaches ask players to focus on the effects and consequences of their serve, rather than on the technical aspect of the stroke.
10	Training for Lateral Acceleration	Enga- Bharathan(2021)	Analyze research on lateral acceleration,	Tests were conducted to evaluate various	This study found that changes in direction are related	Physical training in tennis should include specific	It is well known that strength plays a role in



reactive force, and	jumping exercises,	to unilateral	lateral movement	tennis in various
unilateral force;	including single-	strength—that is,	exercises that	ways; one of
gather data and	leg jumps,	the strength of the	focus not only on	these is lateral
information on	bilateral jumps,	leg on the outside of	reactive strength	strength. Its
changes in	and plyometric	the plane in which	but also on	importance lies
performance	exercises. The	the movement is to	coordination,	in the fact that it
resulting from the	goal was to	be performed. A	since many tennis	manifests itself
proposed exercises.	identify	high incidence of	players lack	explosively over
Highlight the	weaknesses in	superior	adequate lateral	short periods of
importance of	strength and	performance was	strength due to	time, and
lateral strength	ultimately track	observed among	deficiencies in	without proper
training and design	improvements	athletes who have a	motor skills.	lateral strength,
a program with a	following the	stronger, faster, and		performance can
series of exercises	prescribed	more explosive leg.		be
that enhance its	program.			compromised.
development.				We must
				emphasize



							training this ability in order to improve performance and benefit the athlete.
11	Assessment of the Athletic Fitness of Tennis Players at the Ucundinamar ca Sports Club	Suárez Pedro (2021)	To provide an overview of the available scientific knowledge regarding what type of strength should be trained and the methods for training strength in tennis players.	A strategic plan was developed to assess the physical condition of the club's athletes, using various physical fitness tests that would allow for a comparison of individual	Considering that periodization and strength training planning are fundamental, and that the variables of volume and intensity—which determine performance and recovery—will	This information is supplemented by citing some suggested texts on assessing strength from a practical perspective, using technical methods	The strength that is trained and developed is directly related to the increase in speed required for a given movement. In tennis, a forehand or a



				performance	always be taken into	and backed by	serve can reach
				across the	account.	science, in	speeds of 150
				corresponding		preparation	km/h or more,
				categories and		for a future	which requires
				disciplines, with		review on how to	that they be
				the goal of		assess	accompanied by
				improving		strength in tennis.	effective
				performance and			strength-speed
				establishing			training.
				standardized			
				guidelines for that			
				purpose.			
12	Multilateral	Macías-	The objective of	This research is	The observation	El diagnóstico y	The
	Coordination	Meza(2020)	this study is to	explanatory in	provided	las evaluaciones	development of
	Exercise		improve	nature, as it seeks	information on the	realizadas en los	coordination
	Programs in		multilateral	to improve	children's deficits in	niños, permitió	plays a
	Tennis for		coordination by	coordination	motor coordination;	visualizar el	fundamental



Children	providing a	exercises using a	most of them have	estado físico que	role in all sports,
Aged 8 to 12	program of	mixed-methods	difficulty running	poseían, lo que	which is why it
	multilateral	research design. It	backward, adjusting	permitió	is important to
	exercises that	employs a mixed-	their stride, lateral	estructurar una	train it in order
	simulate tennis	methods, cross-	movements, the	propuesta de	to achieve
	gameplay in	sectional approach	ability to	sistema de	positive
	children.	incorporating	synchronize their	ejercicios de	results—results
		qualitative,	feet, proper running	coordinación	that can be
		quantitative,	form, and proper	multilateral	sustained if
		bibliographic,	running posture	enfocados en el	training begins
		descriptive, and	with the racket. All	tenis de campo.	at an early age.
		analytical	of these points are		
		methods, as the	evident in the		
		aim is to	children's mistakes,		
		demonstrate a	which we can		
		methodology for	correct at this age;		
		multilateral	therefore, a series of		



				coordination	multilateral	
				exercises in	coordination	
				tennis.	exercises for tennis	
					was proposed.	
13	The Importance of Aerobic Capacity in Tennis: Training and Assessment (Part 2)	Cyril Genevois (2019)	To provide information on the physiological demands of competitive tennis, specific protocols have been developed to combine aerobic capacity testing with technical efficiency testing	A high-intensity exercise program was implemented, followed by aerobic endurance tests to assess progress, as well as the physiological effects and adaptations produced in the	This study demonstrated that high-intensity interval training can improve aerobic endurance, preparing tennis players for similar game situations.	High-Intensity Interval Training (HIIT) is an efficient and time-effective way to improve tennis players' aerobic fitness. The 30/15 IFT test is an intermittent field test that coaches can use to assess Interval training typically involves short bursts of intense effort, as in tennis. Interval training mimics the characteristics of the sport, which is why it's a great option



			and training. This study provides a rationale for aerobic training in tennis players.	body by high-intensity interval training.		players' overall physical performance and tailor training sessions to individual needs.	for developing the components of athletic fitness.
14	Anthropometric Characterization and Body Composition of Elite Male and Female Tennis Players in Chile	Villouta-Castelli (2021)	The objective of the study was to determine the anthropometric and body composition characteristics of young elite Chilean tennis players. The study was a descriptive, cross-	The sample of 84 tennis players (58 men, 15.5 ± 0.76 years old, and 26 women, 15.3 ± 0.8 years old) was selected using non-probabilistic convenience sampling.	With regard to anthropometric variables, a significant difference was observed between men and women in the measurements of height ($M = 1.74 \pm 0.08$ m, $F = 1.65 \pm$	The female participants had a body weight of 49.8 ± 6.9 kg, a height of 1.65 ± 0.03 m, and a body fat percentage of $19.3 \pm 4.8\%$, with a balanced	Anthropometric measurements are of great importance in assessing athletic performance, as they provide insight into an athlete's body



sectional study. By	Anthropometric	0.03, $p < 0.0001$),	ectomorphic	composition and
reviewing the	variables were	body weight ($M =$	somatotype.	performance,
literature on body	assessed,	64.3 ± 7.94 kg, $D =$	Overall, both	helping to
composition and	including weight,	49.8 ± 6.9 kg, $p <$	groups exhibited	prevent
performance, we	height, seated	0.0001), waist	anthropometric	imbalances and
were able to select	height, skinfold	circumference ($V =$	and body	promote optimal
the best ideas for	thickness (biceps,	27.0 ± 1.26 cm, $D =$	composition	athletic form.
conducting the	triceps,	25.5 ± 0.4 cm, $p <$	characteristics	
study, thereby	subscapular,	0.0001), hip	similar to those of	
making a	supraspinal,	circumference ($V =$	other groups of	
significant	abdominal,	46.6 ± 4.3 cm, $D =$	junior tennis	
contribution.	anterior thigh, and	43.5 ± 4.5 cm, $p <$	players, with the	
	medial calf),	0.003), PG ($V =$	exception of	
	circumferences	34.8 ± 4.3 cm, $D =$	somatotype in the	
	(flexed arm, mid-	31.8 ± 3.2 cm, $p =$	case of the female	
	thigh, and calf),	0.0002), and PBC	participants	
	and diameters	($V = 28.7 \pm 3.0$ cm,	.	



(bicondylar $D = 25.7 \pm 4.6$ cm,
humeral and $p < 0.0007$) and
femoral). PVC ($V = 0.4 \pm$
Anthropometric 0.99 cm, $D = 4.1 \pm$
analyses and 0.9 cm, $p < 0.001$)
calculations were
performed to
determine the
body composition
and somatotype of
the participating
subjects. The
results for the
males were as
follows: body
weight 64.3 ± 7.94
kg, height $1.74 \pm$



0.08 m, body fat

percentage $16.6 \pm$

4.1%, with a

balanced

mesomorphic

somatotype.

15	Dietary and Nutritional Needs in Tennis: A Narrative Review	Domínguez- Sánchez et al(2021)	The objective of this study is to map, describe, and discuss the current state of nutritional science and dietary practices for tennis players from a theoretical and contextual	A narrative review was conducted using the Dialnet, Elsevier, Medline, PubMed, and Web of Science databases, employing a search strategy that targeted terms	Nutritional guidelines for macronutrient intake depend on many factors, such as activity level, sport, age, and sex, among others. L Macronutrient intakes, such as	It is possible to enhance a tennis player's performance and maintain their health by following a proper nutritional regimen tailored to their	The topic of diet, nutrition, and macronutrient intake is always a subject of debate, since nutritional requirements vary depending
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perspective, in	related to the	carbohydrates, vary	physiological	on certain
order to facilitate	topic. A series of	depending on	needs, taking into	factors such as
future systematic	inclusion and	training load,	account not only	sports, physical
reviews and	exclusion criteria	ranging from 5–7	their athletic	condition,
contribute to the	were also applied	g/kg/day for normal	performance but	gender, etc.
development and	to ultimately	training to 7–10	also their quality	However, there
maintenance of	select the studies	g/kg/day during	of life.	are certain
physical abilities	that met the search	competitive periods	Specific physical	dietary
such as strength,	criteria.	or periods of higher	conditioning	guidelines that
endurance,		training load. The	training was also	can be followed
coordination, and		recommended	positively	to prevent
flexibility.		protein intake is 1.8	influenced by an	declines in
		g/kg/day, and the	adequate	performance and
		recommended fat	nutritional intake.	health problems.
		intake is 1 g/kg/day.		
		Regarding		
		supplementation		



that has been
scientifically proven
to optimize
performance in
tennis, we find
caffeine, sodium
bicarbonate,
creatine, and β -
alanine; beet juice is
a potential
nutritional and
ergogenic aid to
consider when
planning the dietary
and nutritional
regimens of tennis
players.





An analysis of the development of physical abilities, strength, and endurance through the practice of tennis involves exploring a wide range of fundamental theoretical aspects. The importance of physical abilities, such as agility, coordination, and speed, which play a crucial role in athletic performance, is highlighted. Muscular strength is presented as a determining factor for powerful shots and precise movements on the court. On the other hand, endurance is important due to the intermittent nature of the game, which demands a high level of both aerobic and anaerobic endurance. Additionally, the paper addresses concepts related to the principle of specific training, which emphasizes the need to tailor training sessions to tennis in order to maximize results. The scientific literature highlights how tennis has positive effects on players' cardiovascular health and musculoskeletal development, fostering a positive perception of this sport in the context of physical activity and health.

Discussion of Results

Improving physical abilities is essential for any sport; tennis is no exception, and even more so because it is an intriguing sport for which relevant studies are only now being conducted, as there is currently little literature available to help us understand its various processes.

Colombian tennis has been gaining momentum, thanks to the organized approach to training planning and the emphasis placed on proper strength training as a performance capacity and mental toughness as a capacity for results. (Torres, 2018)

In recent years, tennis has gained greater prominence in the Americas, not only due to its development and practice but also because of growing scientific research on topics such as training methodology, physical conditioning, anthropometry, etc. This has fostered the technical and methodological development of the sport, enabling improvements in multiple areas.

Tennis movement is characterized by lateral shifts, primarily short ones of 3–4 m, typically initiated by a reactive decision step. Lateral acceleration depends on unilateral movement, specifically, the outer leg, to improve ground reaction force (GRF). (Eng Dou-Sundar Barathan, 2021). Since most tennis movements are lateral, they must be executed efficiently; the technique relies on unilateral strength, that is, the leg bearing the weight.

One of the key factors in tennis performance is the serve, which must be executed with great speed and the highest possible accuracy, since it is the only shot in which the player has total control over



the timing, speed, direction, and spin of the ball, without any influence from the opponent. (Mora-Castellanos 2017). The first and most important stroke is the serve; learning it is essential, as a large part of the game depends on this stroke. To execute it efficiently, one must not only focus on the technical aspects but also strengthen the abilities involved, such as strength and speed.

In addition to the benefits already mentioned, integrative neuromuscular training (INT) has proven particularly effective in preventing injuries and improving long-term musculoskeletal health. Wang et al. (2022) observed that INT, by focusing on speed, coordination, plyometrics, and speed endurance, significantly improves the ability to repeat sprints and change direction in 7- to 8-year-old children, without the need for large volumes of additional training. This type of intervention not only improves athletic performance but also helps establish safer and more efficient movement patterns. This reduces the risk of overuse injuries at an early age and lays the foundation for healthy, lifelong participation in sports. Introducing INT programs in tennis could be an effective strategy for promoting musculoskeletal health in youth and adults, especially among those who are new to sports or have muscular imbalances.

On the other hand, monitoring both internal and external training load is essential for adjusting exercise intensity and volume to individual capabilities, thereby maximizing health benefits and minimizing the risk of overtraining. Rodríguez-Cayetano et al. (2022) found that ball-passing drills generate a higher external load in terms of speed and distance covered, while bucket exercises increase the internal load. This information allows coaches and health professionals to design sessions that balance cardiovascular and muscular demands and are tailored to each person's goals. Genevois-Rogowski et al. (2020) complement this perspective by showing that load can be easily controlled by visualizing goals, suggesting that even in recreational settings, it is possible to modulate effort to achieve positive physiological adaptations without compromising health.

Conclusion

In concluding this research project, it is worth noting that the development of physical abilities in tennis is based on multiple factors, such as training methods, physical conditioning, age, gender, genetic factors, and so on. It is essential to be as specific as possible in training to achieve positive results in tennis and to understand the reasons behind certain factors, such as



body composition, and how to achieve an appropriate balance.

Furthermore, we can highlight key aspects of tennis, such as the development of strength and endurance, not only among elite athletes but also among recreational players. Tennis offers a great activity for children, teenagers, and adults alike, serving as an excellent option for improving coordination and core strength due to its varied and explosive movements. Tennis is not merely an elite sport but also a form of exercise that provides numerous benefits for our physical fitness.

The evidence gathered also underscores the importance of viewing tennis as a versatile tool for promoting health across different age groups. In children and adolescents, regular tennis play promotes motor development, coordination, and the adoption of healthy habits that last over time (Macías-Meza, 2020; Yubing Liao, 2023). In adults, tennis improves cardiovascular fitness, muscle strength, and weight control, reducing the risk of chronic diseases such as type 2 diabetes, hypertension, and dyslipidemia (Genevois, 2019; Villouta-Castelli et al., 2021). The strength training and balance inherent in tennis for older adults prevent falls and maintain functional independence, improving quality of life and psychological

well-being (Bustamante-Jarrín et al., 2020). This versatility makes tennis an inclusive activity that can be adapted to each person's needs.

Finally, it is essential that both public health policies and educational programs consider tennis a priority option within strategies to promote physical activity. People are more likely to engage in exercise when it is fun and social—as tennis is and this is a critical factor for the success of any health intervention. Collaboration among sports organizations, educational institutions, and health systems could facilitate access to tennis facilities and programs for vulnerable populations, which will help reduce health inequalities and foster a culture of holistic well-being. It is also suggested that further research be conducted on the effects of tennis on mental health and on specific populations, such as women, people with disabilities, and ethnic minority groups, in order to design more equitable and effective interventions.

B Referencias bibliográficas

Alfonso-Asencio, M., Hellín-Martínez, M., & Sánchez-Alcaraz Martínez, J. (2020). Proposal of a specific test in tennis: Test of shot speed and precision. *Coaching & Sport Science Review*, 28(82), 35-38.



- <https://doi.org/10.52383/itfcoachin g.v28i82.21>
- Domínguez, R., Sánchez Oliver, A. J., Fernandes da Silva, S., López-Samanes, Á., Martínez-Sanz, J. M., & Mata, F. (2021). Dietary-nutritional needs in tennis: A narrative review. *Revista Española de Nutrición Humana y Dietética*, 25, e1029. <https://doi.org/10.14306/renhyd.25.s1.1029>
- Eng, D., & Sundar Barathan, B. (2021). Training for lateral acceleration. *ITF Coaching & Sport Science Review*, 29(83), 21-24. <https://doi.org/10.52383/itfcoachin g.v29i83.51>
- Fan, J., et al. (2025). Effects of sprint interval training compared to high intensity interval training on repeated sprint capacity and sport-specific performance in college-aged male tennis players. *PLoS One*, 20(9), e0332705. <https://doi.org/10.1371/journal.pone.0332705>
- Fernandez-Fernandez, J., Granacher, U., Sanz-Rivas, D., Sarabia Marín, J. M., Hernandez-Davo, J. L., & Moya, M. (2018). Sequencing effects of neuromuscular training on physical fitness in youth elite tennis players. *Journal of Strength and Conditioning Research*, 32(3), 849-856. <https://doi.org/10.1519/JSC.00000000000002319>
- Genevois, C. (2019). The importance of aerobic fitness for tennis: Training and testing (Part 2). *ITF Coaching & Sport Science Review*, 27(79), 23-26.
- Genevois, C., Rogowski, I., & Le Sollicec, T. (2020). Medición y control de la carga de entrenamiento del tenis: estudio de caso [Measurement and control of tennis training load: A case study]. *ITF Coaching & Sport Science Review*, 28(81), 21-23.
- Kramer, T., Valente-Dos-Santos, J., Visscher, C., Coelho-e-Silva, M., Huijgen, B. C. H., & Elferink-Gemser, M. T. (2021). Longitudinal development of 5m sprint performance in young female tennis players. *Journal of Sports Sciences*, 39(3), 296-303. <https://doi.org/10.1080/02640414.2020.1816313>



- Liao, Y. (2022). Coordinated training and physiological indices in young tennis players [Entrenamiento coordinado e índices fisiológicos en jóvenes tenistas]. *Revista Brasileira de Medicina do Esporte*, 29, e2022_0173.
https://doi.org/10.1590/1517-8692202329012022_0173
- Liu, Y., Abdullah, B. B., & Abu Saad, H. B. (2024). Effects of high-intensity interval training on strength, speed, and endurance performance among racket sports players: A systematic review. *PLoS One*, 19(1), e0295362.
<https://doi.org/10.1371/journal.pone.0295362>
- Luna-Villouta, P. F., Flores-Rivera, C. R., Garrido-Méndez, A., & Vargas-Vitoria, C. R. (2022). Estudio antropométrico y aptitud física en jóvenes tenistas: una revisión sistemática [Anthropometric study and physical fitness in young tennis players: A systematic review]. *Pensar en Movimiento: Revista de Ciencias del Ejercicio y la Salud*, 20(1), e47773.
<https://doi.org/10.15517/pensarmov.v20i1.47773>
- Macías, R., & Meza, H. (2020). Sistemas de ejercicios de coordinación multilateral en el tenis de campo en niños de 8 a 12 años [Systems of multilateral coordination exercises in field tennis for children aged 8 to 12]. *Revista Cognosis*, 5(2), 121-134.
- Mainer-Pardos, E., Villavicencio Álvarez, V. E., Moreno-Apellaniz, N., Gutiérrez-Logroño, A., & Calero-Morales, S. (2024). Effects of a neuromuscular training program on the performance and inter-limb asymmetries in highly trained junior male tennis players. *Heliyon*, 10(5), e27081.
<https://doi.org/10.1016/j.heliyon.2024.e27081>
- Morais, J. E., et al. (2024). Effects of On-Court Tennis Training Combined with HIIT versus RST on Aerobic Capacity, Speed, Agility, Jumping Ability, and Internal Loads in Young Tennis Players. *Journal of Human Kinetics*, 95, 173-185.
<https://doi.org/10.5114/jhk/189691>
- Rivera-Anchundia, J. D., & Perez-Ramirez, R. M. (2019). Ejercicios para la resistencia a la velocidad en la preparación especial de tenistas juveniles [Exercises for speed



- endurance in the special preparation of junior tennis players]. *Revista Científica Especializada en Ciencias de la Cultura Física y del Deporte*, 16(41), 37-53.
- Rodríguez-Cayetano, A., Martín-Martín, O., & Sánchez-Miguel, P. A. (2022). Carga interna y externa en el tenis de competición: comparación de tres tipos de entrenamiento [Internal and external load in competitive tennis: Comparison of three types of training]. *Retos*, 44, 1084-1092. <https://recyt.fecyt.es/index.php/retos/article/view/90583>
- Sánchez-Pay, A., & Sanz-Rivas, D. (2019). Evaluación de la condición física del jugador de tenis en silla de ruedas de alto nivel según nivel competitivo y tipo de lesión [Assessment of the physical condition of high-level wheelchair tennis players according to competitive level and type of injury]. *Revista Internacional de Ciencias del Deporte*, 15(57), 235-248. <https://doi.org/10.5232/ricyde2019.05702>
- Suárez Guzmán, P. A. (2021). Evaluación de la condición física deportiva de los tenistas del Club Deportivo Ucundinamarca [Evaluation of the sports physical condition of tennis players from the Ucundinamarca Sports Club]. *Educación Física y Deporte*, 40(1), 140-153. <https://revistas.ut.edu.co/index.php/edufisica/article/view/2404>
- Valle García, C. (2020). Circuit training for 12 and under tennis players: An on-court exercise proposal. *ITF Coaching & Sport Science Review*, 28(80), 31-34. <https://doi.org/10.52383/itfcoaching.v28i80.67>
- Villouta, P. L., Correia-de-Campos, L. F. C., Paredes-Arias, M., Vargas-Vitoria, R., Martínez-Salazar, C., & Araneda-Garces, N. (2021). Caracterización antropométrica y composición corporal de tenistas de elite varones y damas de Chile [Anthropometric characterization and body composition of elite male and female tennis players from Chile]. *International Journal of Morphology*, 39(1), 84-89. <https://doi.org/10.4067/S0717-95022021000100084>
- Wang, Z. H., Pan, R. C., Huang, M. R., & Wang, D. (2022). Effects of integrative neuromuscular training combined with regular tennis



training program on sprint and
change of direction of children.
Frontiers in Physiology, 13, 831248.
[https://doi.org/10.3389/fphys.2022.
831248](https://doi.org/10.3389/fphys.2022.831248)