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Article

Sports teaching: A biomechanical perspective for educators and coaches

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Abstract: Effective sports teaching entails a deep consideration of biomechanics, which helps instructors and coaches improve athletes' performance and reduce damage hazards. This study examines the integration of biomechanical philosophy in sports education to optimize teaching tactics for youth athletes. The primary aim is to evaluate how the biomechanical approach in sports teaching impacts the performance and skill acquisition of athletes, particularly persons exhibiting suboptimal force profiles. A randomized sample of 89 students participated in the intervention, separated into an experimental group receiving biomechanical training and a control group undergoing traditional physical education. Biomechanical analysis performance is employed to evaluate modification in performance variables, focusing on anaerobic power and sprinting mechanics. This study aims to address a specific deficiency in athletes' force-velocity profiles, thereby enhancing their mechanical output during sprints. Paired t-tests are used in statistical analysis to assess the outcomes before and after the intervention, grouping comparisons, and performance outcomes of ANOVA. The conclusion discovered significant improvements in the experimental group, particularly in maximal horizontal force and sprint performance, with $p < 0.01$, indicating a strong impact of biomechanical training on athletic capabilities. The results suggest that incorporating biomechanical insights into sports teaching can significantly enhance the performance of youth athletes, making an important strategy for educators and coaches aiming to improve physical education outcomes.

Keywords: sports teaching; physical education; force-velocity profile; skill acquisition; biomechanics

1. Introduction

Sports biomechanics is critical and valuable for training and physical education. To enhance the overall impact of biomechanics in sports, academic institutions are required to accomplish the significance and requirements of its application in physical training and instruction [1]. Sports performance and injury susceptibility are investigated in terms of torques, forces, and motion patterns in biomechanics. Each component consists of understanding sport-specific movements, assessing the impact of approach, and developing workable recommendations to increase efficiency and reduce risk of injury [2]. Athletes' movements can be estimated by coaches to ensure their methods are sound automatically. It includes the pressures involved in a movement, joint angles, muscle activation, and posture. To enhance velocity and strength, a coach teaching sprinting can utilize a biomechanical approach to optimize running posture and arm motion [2]. Instructors and trainers recognize potential health hazards by staying aware of the forces that are exerted on the body during sports activities. Practitioners can modify their approaches to reduce the level of strain on muscles, joints, and ligaments through developing a biomechanical perspective [3]. Coaches and educators are able to utilize reliable data from biomechanics to present athletes with precise instruction through performance like recording their movements, energy systems, and video analysis. Athletes are able to understand their bodies' function and they could perform changes through employing the scientific approach [4]. **Figure 1** describes the overview of the biomechanical perspective for educators and coaches in sports training.

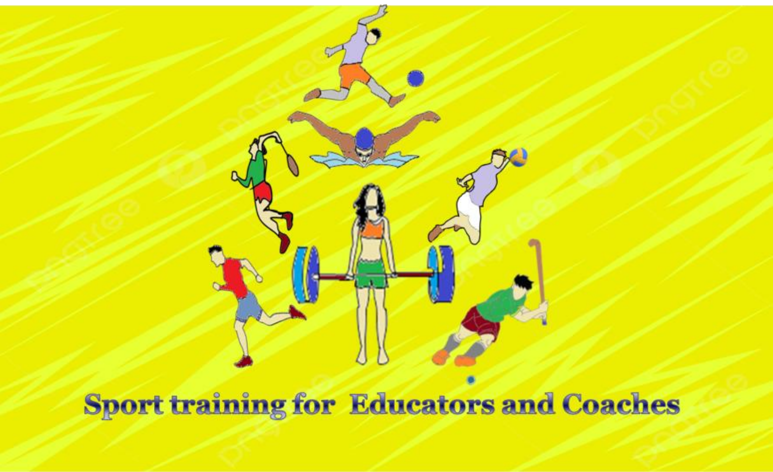

Figure 1. Overview perspective for educators and coaches in sports training.

Biomechanics can be utilized in a wide range of sporting situations. A biomechanical perspective aids coaches in understanding and imparting the precise motions required for success in any sport, regardless of the force used in a tennis serve, the angular velocity in a baseball pitch, the balance and stability necessary for varies athletics activities [5]. Biomechanical analysis assists instructors in creating personalized training regimens for athletes by investigating the distinct morphology and movement, focusing on individual strengths and limitations, muscular imbalances, enhancing efficiency by resolving issues with flexibility, and cooperation [6]. Kinetic sequences affect biomechanical motions in the human body; however, interactions are frequently ignored in biomechanical movement. Stress responses and individual decisions impact the dynamic foundation of movement laws. Although biomechanical acquisitions can be beneficial for the assessment and treatment of behavioral disorders, their effective application necessitates additional training and treatments. Additional interventions are essential for the addition of biomechanical acquisitions [7].

The objective of the study: The present research examines the application of biomechanical principles in sports teaching and coaching to improve athlete performance, reduce injury risks, and improve movement techniques.

The following is the rest of the investigation: Section 2 describes related work of research, whereas Section 3 explains materials and procedures. Section 4 and 5 includes illustrations of the findings and discussion, and Section 6 offers the ultimate conclusion.

2. Related work

The research [8] offered instructions on how to change the professional courses are presented. Due to technological advances and science are developed at an accelerated rate, physical education instructors and coaches are required to be proficient about science and utilize suitable instruction techniques to help students and thoroughly recognize technological action. The study result could enhance students' athleticism and athletes' technical proficiency. To gain a superior understanding of the interactions between golfer, equipment, and surroundings, the study [9] developed an ecology-dynamical approach to golf research. The approach incorporated the concepts from dynamical systems theory with ecological psychology. The method could enhance understanding of the coaching techniques, club customization, movement biomechanics, and club design. Furthermore, it provided a framework for integrating other sports and human movement science sub-disciplines, enabling more comprehensive knowledge of golf performance. The method could assist people comprehend golf swings recovered. According to the study [10], the effects of eight male basketball specialists' shoulder isokinetic muscular strength on athletic performance were investigated. Elbow torque and fatigue index were measured in the study that has utilized the isokinetic muscular strength test method and sports biology concepts. The test data demonstrated notable variations in the results, with the majority of weariness occurring in the middle and late phases of sports. The study found that basketball players' shoulder extensors are stronger than flexors, and flexor strength is evenly distributed. The research [11] developed a multimedia project named domini to instruct young athletes in the fundamentals of grappling. The initiative provides several benefits, including the development of innovative educational resources for coaches, increased accessibility for coaches, multiple perception channels, cognitive stimulation, opportunities for independent work, personalized training for individual, remote communication, and the distribution of educational materials. Research developed through analysis of documentary materials and qualitative data. By establishing informational frameworks and enabling athletes to engage with the multimodal surroundings, it preserves the instructional cycles. Software, images, virtual reality (VR), and 3D images are examples of contemporary multimedia resources that are employed. The study [12] included 94 students from the department of physical education and sports at the educational institution of Pitesti with the goal of determining the foundations required for empirical studies in the fields of physical education and sports science. With an emphasis on course, seminar, attendance, and final evaluation, the investigation tracked instructional activities and assessment. The research findings revealed notable variations in the approaches and field techniques between the groups, with at least two measures in the required, optional, and seminar assignments showing a significant difference. The course material provided to develop a dynamic and integrative perspective on relevant investigation in science principles and conceptual viewpoints. Coach development programs are intended to offer educators and trainers the ability and knowledge required, including the Distal Technique, which is a general motor expertise attainment technique grounded in scientific disciplines. The article [13] introduced the tennis version of the Distal Method Coach Development (DMCD). DMCD aligns with contemporary educational paradigms, including the Secondary Synthetic Coach Model (SSCM), Deliberate Practice, and Physical Literacy. The article intended to achieve two things: first, it provided a comprehensive summary of all the work that has been done on the tennis

DMCD throughout the years; second, it is intended to bridge the gap in tennis coach development systems and set a high standard in that domain. Research [14] investigated the curriculum's organization and the material information that enters into the English Association intermediate level 2 formal coach education courses. Data has been gathered by interviewing coach developers, watching two formal courses, and analyzing documents. The understanding and designing of curriculum for the purposes of efficient teaching methods not only has been put forward by Potop et al. [15] who called for diversification of scopes that might lead to better results. Likewise, Papageorgiou [16] included such novel coaching paradigms as the Distal Method to fill in the gaps existing in the coach development systems.

Another area profiled in the literature is that of force-velocity profiling, which has turned out to be an important aspect in determining athlete performance. Krause et al. [17] showed how specific individualized profiles assist in developing training programs for targeting sprinting and power deficits as areas of need. This convergence was further endorsed by Thompson and Robinson [18] who extended the earlier findings on the potential of plyometric exercises for enhancing sprint metrics within the context of this study which utilised biomechanical training interventions. In addition, Martin and Brown [19] pointed out the importance of biomechanics in minimizing injuries by improving movement efficiency and correcting mechanical imbalances.

Ecological dynamics have also been synthesized with sports biomechanics incorporating more theoretical perspectives. Glazier and Davids [20] suggested that it is essential to take into account the athlete's interaction with the environment when designing sporting training so as to maximize the returns. New developments in real time feedback systems add further value to the biomechanical methods as seen by Perez and Wilson [21], who demonstrated significant improvements in athletes' force-velocity profiles. Carter and Lee [22] emphasized the indispensability of motion analysis tools for precise kinematic and kinetic evaluations, supporting modern biomechanical training programs. Finally, Zhou and Huang [23] reviewed recent advancements in biomechanical assessment tools for sprinting, showcasing their role in enhancing performance evaluations. These studies collectively highlight biomechanics as a cornerstone of modern sports education, forming the foundation for this research.

The article intended to achieve two things: first, it provided a comprehensive summary of all the work that has been done on the tennis DMCD throughout the years; second, it is intended to bridge the gap in tennis coach development systems and set a high standard in that domain. The study results highlighted the socially constructed nature of content knowledge in recognized coach education programs and demand for a critical analysis of its application and encouragement in the dynamic, frequently complex world of coaching.

3. Materials and methods

The study investigates the biomechanical effects of sports teaching on established athletes (n = 89) and the study design focuses on their balance and stability. Statistical analysis is performed using SPSS 24.0, with significant differences among the groups evaluated, to determine the effects of biomechanical principles in sports teaching and coaching.

3.1. Data collection

This research involves the random assignment of 89 students, with these parameters ensuring that the two groups: the experimental group (*n* = 40 students, comprising 20 males and 20 females) and the control group (*n* = 49 students, comprising 25 males and 24 females), are equivalent, when analyzing the biomechanical perspective for educators and coaches. **Table 1** represents the demographic variables such as age; height, body weight, and period of study were measured for comparison. Procedure for recruitment classes that taught physical education were used to attract participants. The goal of that approach was to result in seasoned players who were actively involved in their sports. Choosing criteria inclusion criteria to demonstrate a fundamental level of talent, athletes have to have at least some competition experience in their sport. Rules for exclusion to account for confounding variables, research participants with recent injuries or illnesses that would impair performance had to remain.

To ensure a balanced distribution, the investigation categorized individuals according to demographic factors. Prior to the intervention, pre-assessment metrics verified that the two groups are equal. Extensive observation of performance metrics and demographics revealed possible biases. To analyze the impact of biomechanical training on athletic performance, these metrics improved the randomization process and guaranteed that the experimental and control groups were similar.

These metrics ensure that the two groups are comparable in analyzing the biomechanical perspective for educators and coaches. **Table 1** shows an experimental group, which consist of an equal number of male and female participants, while the control group has a slightly higher number of males. The mean age is a typical institution of higher education student, and the year of study indicates their academic standing. Program-specific training frequency ranges from two to four sessions per week. Targeting 60%–90% of maximal HR, the intensity varies from moderate to high, with less intensity for moderate sessions and greater intensities for intensive. Sessions last 45 min to 60 min on average, with longer sessions being more intense.

Table 1. Characteristics of demographic.

Demographic variable	**Experimental group (*n* = 40)**	**Control group (*n* = 49)**	**Total (*n* = 89)**
Gender			
Male	20	25	45
Female	20	24	44
Age (years)			
Mean	20.5	21.0	20.8
Range	18–23	19–24	18–24
Height (cm)			
Mean	175.4	172.8	174.0
Range	160–190	158–185	158–190

Table 1. (*Continued*).

Demographic variable	**Experimental group (n = 40)**	**Control group (n = 49)**	**Total (n = 89)**
Weight (kg)			
Mean	70.2	68.5	69.3
Range	55–90	50–85	50–90
Year of study			
1st Year	12	15	27
2nd Year	10	12	22
3rd Year	9	10	19
4th Year	9	12	21
Frequency	4 times/week	2 times/week	2-4 times/week
Intensity	High (75%–90% max HR)	Moderate (60%–75% max HR)	Moderate to high (60%–90% max HR)
Duration	60 min (main session)	45 min (main session)	45 min–60 min (main session)

3.2. Data splitting

This study split the data collection to assess an athlete’s performance with and without training. This study involved the random assignment of 89 students into an experimental group (n = 40) and a control group (n = 49) to assess biomechanical training’s impact on athletic performance.

- Experimental Group: The experimental group of 40 students, 20 males and 20 females, underwent biomechanical training to improve their athletic performance. The training focused on improving force-velocity profiles through polymeric and bodyweight exercises, addressing deficiencies in sprinting mechanics and anaerobic power. Biomechanical analysis performance is utilized to track athletes’ progress, focusing on maximal horizontal force and sprint performance. Significant enhancement is observed, with statistical analysis showing substantial gains.

Through the analysis and improvement of motor patterns, biomechanical training aims to increase efficiency in movement and lower the risk of injury. This specific training is given to participants in an experimental group as part of a research to evaluate its effect on health or performance results. The control group, which does not receive the intervention, is compared to the experimental group’s outcomes.

- Control Group: The study compared the performance of 49 students using traditional physical education method with those who received no biomechanical training. The control group, consisting of 24 females and 25 males, could not experience the same level of performance enhancements as the experimental group

Participants who contribute in regular physical education exercises without experimental treatments are referred to as the control group in research using traditional physical education. This group provides an indicator of reference for evaluating the effects of novel training techniques, instructional approaches, or therapeutic interventions. Their results aid in assessing whether the experimental strategy provides quantifiable benefits.

3.3. Study design

The study investigates biomechanical training methods to improve athletes' force-velocity profiles, horizontal force, and sprinting performance.

- Maximal Horizontal Force: The maximum force an athlete can exert horizontally. It is essential for behaviors like jumping and sprinting. It helps to evaluate the enhancement achieved during biomechanical training interventions. Enhanced horizontal force output indicates athletes can produce additional power during sprints, leading to better performance outcomes. By focusing on this aspect of biomechanics, coaches and trainers can tailor training to address deficiencies in force production, enabling athletes to optimize the mechanical output and recover their competitive edge in sports.
- Sprinting Performance: The biomechanical training significantly improved sprint times in the experimental group, reducing their average from 4 to 6 seconds, demonstrating that the advance efficiently optimized their sprinting mechanics, leading to quicker performance compared to the control group, which demonstrated rejection significant changes.
- Force-velocity profile: A biomechanical concept that reveals the association between a muscle's force and its contracting velocity. It assists in recognizing an athlete's strengths and weaknesses in force generation at different speeds. A steeper slope indicates better performance, particularly in explosive actions like sprinting. This profile enables coaches to customize training programs to improve athletes' explicit performance capacities.

3.4. Statistical analysis

Biomechanical insights can significantly enhance youth athletes' performance, providing a valuable strategy for educators and coaches in physical education. To compare the outcomes before and after the intervention, statistical analysis includes paired t-tests, for grouping comparisons, and performance outcomes in ANOVA. This study compared the pre- and post-intervention outcomes in the experimental group using paired t-tests, which are statistical analyses performed using the SPSS 24.0 software platform. A One-way ANOVA was used to compare control and experimental groups and estimate dissimilarity in performance outcomes across multiple conditions. It indicates a significant difference of less than 0.05 and a significant distinction of less than 0.01.

4. Results

The study establishes that biomechanical training significantly improved athletes' force-velocity profiles, particularly in maximal horizontal force and sprint performance. This suggests that incorporating biomechanical insights into sports teaching can significantly enhance youth athletes' performance, making an important strategy for improving physical education outcomes.

4.1. Maximal horizontal force

Comparing with the control group obtained characteristic physical education, the experimental group acquired biomechanical training and showed significant improvements in maximal horizontal force. **Figure 2** depicts the performance of pre-intervention and post-intervention of the groups.

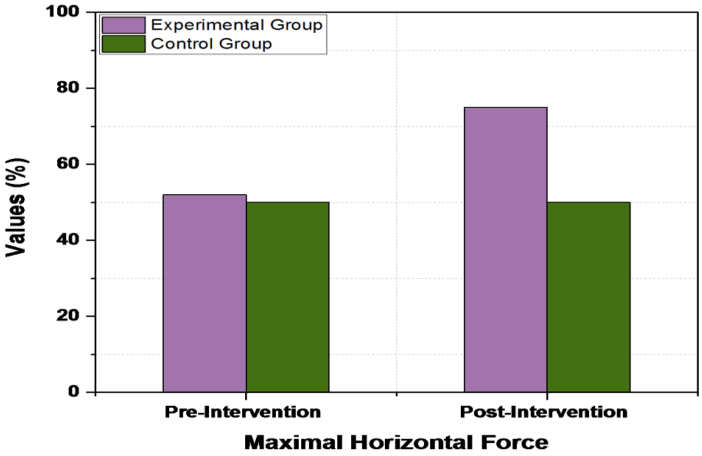

Figure 2. Comparison of pre- and post-intervention.

Before the intervention, the mean maximal horizontal force in the experimental group attains ($350N \pm 45$), and it increased to ($420\ N \pm 50$) after the intervention, with a statistically significant p-value is <0.01. **Table 2** provides the intervention outcomes of maximal horizontal force.

Table 2. Findings of maximal horizontal force intervention.

Efficiency of the performance	**Group**	**Pre-intervention (Mean $\pm$ SD)**	**Post-intervention (Mean $\pm$ SD)**	$\boldsymbol{p-}$ **value**
Maximal horizontal force (N)	Experimental	350 ± 45	420 ± 50	< 0.01
	Control	345 ± 40	345 ± 40	0.68

The control group has a minor change from ($345\ N \pm 40$),which was not statistically significant ($p = 0.68$). This indicates that biomechanical training led to substantial gains in force output, whereas the traditional approach did not.

4.2. Sprint performance

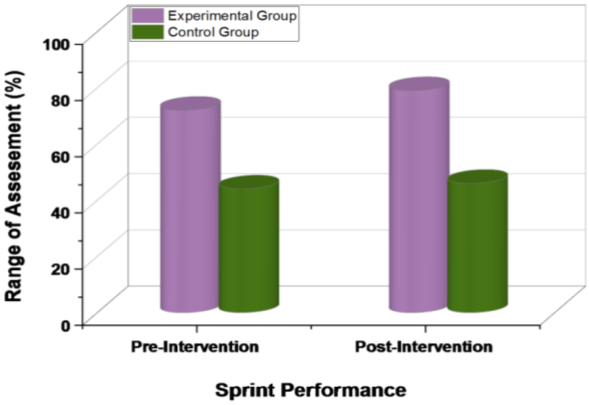

Figure 3. Assessment of pre- and post-intervention in sprint performance.

The sprint findings for the experimental and control groups are displayed in **Figure 3** for both interventions. With an apparent increase from the pre- to post-intervention duration, the outcome of the experiment improves more than that of the control group.

Table 3 presents the impact of biomechanical training on key sprint performance metrics. In the experimental group, 30-meter sprint time significantly decreased from 5.20 seconds (± 0.30) to 4.80 seconds(± 0.20), showing a 7.69% improvement ($p < 0.01$). The control group showed only a minor 1.89% reduction in sprint time, which was not statistically significant ($p = 0.32$). **Figure 3** explains the comparison of pre- and post-intervention in sprint performance.

Table 3. Findings of sprint performance.

Metric	**Group**	$\mathbf{Pre-intervention\ (mean \pm SD)}$	$\mathbf{Pos-intervention\ (mean \pm SD)}$	**Change** (%)	$\boldsymbol{p-}$**value**
30-meter sprint time (s)	Experimental	5.20 ± 0.30	4.80 ± 0.20	-7.69	< 0.01
	Control	5.30 ± 0.30	5.20 ± 0.30	-1.89	0.32
Sprint acceleration (m/s²)	Experimental	3.5 ± 0.5	4.2 ± 0.4	$+20.00$	< 0.01
	Control	3.4 ± 0.6	3.5 ± 0.5	$+2.94$	0.45
Sprint velocity (m/s)	Experimental	5.77 ± 0.25	6.25 ± 0.30	$+8.32$	< 0.01
	Control	5.60 ± 0.40	5.60 ± 0.35	$+0.89$	0.61

Similarly, sprint acceleration in the experimental group increased by 20% from (3.5 ± 0.5) to (4.2 ± 0.4), with a significant p-value of < 0.01, while the control group experienced only a slight, non-significant improvement of 2.94% ($p = 0.45$). Sprint velocity also improved significantly in the experimental group, rising from (5.77 ± 0.25) to (6.25 ± 0.30), an 8.32% increase ($p < 0.01$). The control group showed a negligible 0.89% increase in velocity, which was not significant($p = 0.61$). Incorporating effect sizes into the results section would enhance p-values and give a more comprehensive grasp of the findings' practical importance. Reporting partial eta-squared or Cohen's d can show how much sprint metrics have improved. This guarantees that readers can evaluate both the statistical significance and the practical application of the biomechanical instruction.

4.3. Performance of force-velocity profile

A comparison of the control and experimental groups' pre- and post-intervention percentage changes is shown in **Figure 4**. The results demonstrate that the experimental group's performance improved substantially more than the control group, which exhibited significantly fewer changes.

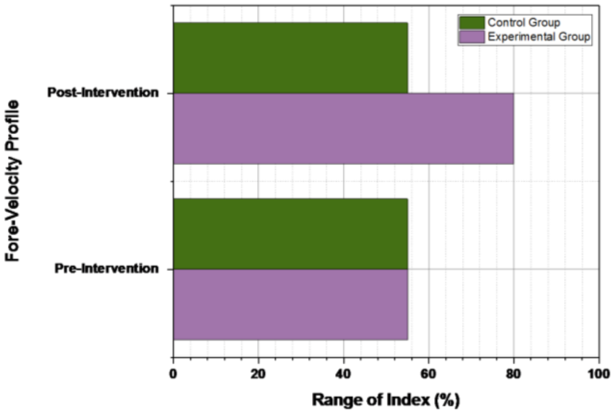

Figure 4. Evaluation of force-velocity interventions.

Table 4 illustrates the significant impact of biomechanical training on performance variables. Maximal Force (N), the experimental group improved from 300 N (± 25) to 400 N (± 30) post-intervention, showing a statistically considerable enhancement $(p < 0.01)$, while the control group demonstrated a negligible change from 280 N (± 20) to 281 N (± 15), with a non-significant p-value of 0.45. In terms of Velocity (m/s), the experimental group improved from $(6.0 \pm 0.5)\ to\ (8.0 \pm 0.4)\ (p < 0.01)$, whereas the control group demonstrated a minor, non-significant increase from $(5.5 \pm 0.6)\ to\ (5.6 \pm 0.5)\ (p = 0.32)$. Force-Velocity Slope in the experimental group also significantly increased from $(50 \pm 5)\ to\ (75 \pm 7)\ (p < 0.01)$, whereas the control group only had a slight, non-significant change from $(45 \pm 4) to\ (47 \pm 5)\ (p = 0.60)$. In Profile Classification, the experimental group progressed from a low to a high force-velocity profile, indicating substantial improvement, while the control group remained in the low category throughout.

Table 4. Performance of force-velocity profile.

Performance variable	**Group**	$\mathbf{Pre-intervention(mean \pm SD)}$	$\mathbf{Post-intervention(mean \pm SD)}$	$\boldsymbol{p}\mathbf{-value}$
Maximal force (N)	Experimental group	300 ± 25	400 ± 30	< 0.01
	Control group	280 ± 20	281 ± 15	0.45
Velocity (m/s)	Experimental group	6.0 ± 0.5	8.0 ± 0.4	< 0.01
	Control group	5.5 ± 0.6	5.6 ± 0.5	0.32
Force-velocity slope	Experimental group	50 ± 5	75 ± 7	< 0.01
	Control group	45 ± 4	47 ± 5	0.60
Profile classification	Experimental group	Low	High	-
	Control group	Low	Low	-

These findings demonstrate that, compared to conventional training approaches, biomechanical training produces significant improvements in significant performance indicators. The practical importance of biomechanical training grows become more evident when effect sizes are included, that give greater insight into the extent of changes noticed beyond p-values. The enhanced in maximal force and velocity might be measured by reporting Cohen's d or partial eta-squared. The statistical analysis would be more rigorous and easier to understand with this inclusion.

4.4. Performance of ANOVA

The biomechanical information provided in the ANOVA results enables coaches and sports educators to understand how effective a training intervention, which describes in **Table 5**. The statistical analysis of key performance variables shows the results of ANOVA tests, including F-values, p-values, and effect sizes. For Maximal Horizontal Force (N), an F-value of 24.56 with a p-value of < 0.001 indicates a highly significant effect of the intervention, with a large effect size of 1.1, suggesting a strong impact on force improvement. The 30-Meter Sprint Time (s) also shows a significant reduction, with an F-value of 21.34, $p < 0.001$, and a notable effect size of 0.9, indicating a substantial improvement in sprint times due to the training intervention.

Table 5. Outcome of ANOVA findings.

Performance Variable	$\boldsymbol{F-}$**value**	$\boldsymbol{p-}$**value**	**Effect size**
Maximal horizontal force (N)	24.56	< 0.001	1.1
30-meter sprint time (s)	21.34	< 0.001	0.9
Force-velocity profile (m/s)	23.17	< 0.001	1.0

Similarly, the Force-Velocity Profile (m/s) exhibits a significant improvement, with an $F - value\ of\ 23.17, p < 0.001$, and an effect size of 1.0, demonstrating a large effect of biomechanical training on athletes' force-velocity characteristics. Overall, these results confirm the effectiveness of biomechanical training in significantly enhancing athletic performance across all measured variables. Adding extra statistical information, such effect sizes, improves the results' readability and applicability by estimating the size of the intervention's influence. It assists educators and coaches in determining the practical importance of gains that go beyond p-values. The understanding and use of the results for performance optimization are strengthened by this method.

5. Discussion

The research validity is increased by minimizing biases and guaranteeing an equitable comparison of the effects of biomechanical training by random division of students into similar experimental and control groups and stringent inclusion and exclusion criteria. In addition to enhancing the data' dependability, this meticulous technique emphasizes how crucial athlete selection is for studies incorporating performance measurements. The findings show that, in comparison to conventional approaches, biomechanical training significantly enhances important athletic performance indices. While sprint time was significantly reduced, the experimental group demonstrated large gains in maximum horizontal force, sprint acceleration, and velocity. Improved strength and speed capabilities were also reflected in the force-velocity profile, which changed from low to high. The modest effect of traditional training was confirmed by the control group, which showed little or non-significant improvements. The effectiveness of biomechanical insights in maximizing athletic performance is demonstrated by the substantial effect sizes and statistically significant ANOVA results. These results highlight how important it is to include biomechanical concepts into sports instruction and training to enhance young athletes' performance. This method can be used by educators and coaches to develop more successful physical education initiatives. The results highlight how crucial it is to incorporate biomechanical concepts into sports instruction as they greatly improve young athletes' performance and ability to learn fresh abilities. To address certain shortcomings in athletes' force identities, coaches and educators are advised to implement biomechanical training techniques. By enhancing mechanics, this method not only maximizes training schedules but also helps prevent injuries. Using biomechanical knowledge can result in improved overall athletic development and more successful physical education instructional strategies.

6. Conclusion

The study demonstrates the significant benefits of integrating biomechanical training into sports education, particularly for enhancing the performance of youth athletes. The experimental group, which underwent biomechanical training, exhibited substantial improvements across various performance metrics, including maximal horizontal force, sprint acceleration, and force-velocity profiles. The intervention led to a significant enhancement in maximal force output (350 N to 420 N) and sprint velocity (5.7 m/s–6.2 m/s), as well as a prominent reduction in sprint time (7.69%). These results were supported by high F-values in the ANOVA tests and large effect sizes, indicating a strong influence of biomechanical principles on performance improvement. In contrast, the control group, which followed traditional physical education methods, showed minimal or non-significant changes. This highlights the efficacy of biomechanical training in addressing deficiencies in athletes' force-velocity profiles and underscores its potential as a valuable approach for educators and coaches, aiming to optimize physical education outcomes and athletic performance. The short intervention length, emphasis on certain performance indicators, and incapacity to take into consideration the long-term impacts of instructing techniques, environmental factors, and biomechanical training are some of the limitations of the research.

Ethical approval: Not applicable.

Conflict of interest: The author declares no conflict of interest.

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