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Identifying the Acute Effects of Plyometric and Contrast Training on Acceleration and Agility in Young Rugby Players: A Randomized Controlled Trial

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Abstract

Objectives. The present study examined the impact of a single session of plyometric training (PT) and contrast training (CT) on speed, agility, and power in young rugby players. The objective of this study was to ascertain which method produced better immediate improvements.

Materials and methods. Thirty male rugby players at the national level (average age 14.3 years, height 1.51 meters, weight 48.63 kg) took part in the study. The participants were randomly divided into two groups: 15 individuals were assigned to a plyometric training plan, while the remaining 15 followed a contrast training routine. Before and after the training session, each athlete was subjected to testing for sprint speed (5 m, 10 m, and 20 m), agility (assessed using the Illinois Agility Test), jump height (measured via the countermovement jump, CMJ), and explosive leg power (evaluated with reactive strength index, RSI). The plyometric protocol consisted of depth jumps, bounding, hurdle hops, lateral bounds, and spring-loaded drop jumps, while the contrast protocol paired heavy resistance exercises (85% 1RM) with biomechanically similar plyometric movements.

Results. Both interventions produced significant acute improvements across all performance metrics ($p < 0.05$). The CTG demonstrated superior enhancements compared to the PTG in 5m sprint time (-6.14 % vs. -3.53 %, $p < 0.001$, $\eta^2p = 0.79$), 10m sprint time (-5.37 % vs. -3.76 %, $p < 0.048$, $\eta^2p = 0.68$), 20 m sprint time (-3.90 % vs. -2.60 %, $p < 0.019$, $\eta^2p = 0.18$), agility time (-4.95 % vs. -3.09 %, $p < 0.001$, $\eta^2p = 0.94$), RSI (+8.60 % vs. +5.91 %, $p < 0.001$, $\eta^2p = 0.82$), and CMJ height (+7.40 % vs. +5.79 %, $p < 0.001$, $\eta^2p = 0.36$).

Conclusions. The study concludes that both training modalities acutely enhanced acceleration, agility, and power performance in young rugby players. However, contrast training produced significantly greater improvements across all metrics. The findings indicate that contrast training could be more useful than plyometric training for boosting explosive strength in young rugby players following a single session. This may be associated with triggering stronger short-term improvements in muscle performance.

Keywords: post-activation performance enhancement, youth athletes, sprint performance, change of direction, explosive power, warm-up strategy.

Introduction

Rugby is a demanding, high-intensity sport that involves repeated bouts of sprinting, stopping, changing direction, and explosive efforts. Players are required to perform with high levels of speed, strength, and agility to succeed on the field (Smart et al., 2014). Quick acceleration over short distances, typically 5 to 20 meters, is especially important during game play. It enables athletes to break through defenses, avoid tackles, or chase down opponents (Barr et al., 2014; Cross et al., 2015a). Agility, which refers to the swift ability to change direction while staying balanced and

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in control, is also a critical aspect of rugby performance (Sheppard & Young, 2006). Because of these physical demands, coaches and trainers have placed increased emphasis on specific training methods that target these abilities (Beaven et al., 2011). To improve such qualities, strength and conditioning professionals have adopted strategies like plyometric and contrast training. (Baker, 2001; Markovic & Mikulic, 2010). Plyometric exercises rely on the stretch-shortening cycle (SSC) to improve explosive strength and the rate at which force is developed, called rate of force development (RFD) (Markovic & Mikulic, 2010). These drills often involve jumping, hopping, and bounding exercises that make use of the SSC. These movements take advantage of the elastic energy stored during the muscle's eccentric phase to boost force production in the following concentric phase (Cormie et al., 2011). Studies have shown that incorporating plyometrics into training programs can lead to gains in vertical jump height, sprint acceleration, and directional agility, especially in athletes involved in team sports (Asadi et al., 2016; Ramírez-Campillo et al., 2015). Contrast training, alternatively, blends heavy resistance lifts with plyometric actions that mimic the same movement patterns. This approach is thought to trigger post-activation performance enhancement (PAPE), thereby improving the body's ability to generate power more effectively within the same session (Docherty & Hodgson, 2007; Tillin & Bishop, 2009). This method aims to exploit the acute neuromuscular potentiation following near-maximal muscle contractions, potentially leading to enhanced performance in subsequent explosive activities (Robbins, 2005; Seitz & Haff, 2016a). While both training methodologies have shown promise for improving athletic performance, there remains uncertainty regarding their comparative acute effects (Hammami et al., 2019a) which is also true in the case of young rugby players. The reactive strength index (RSI) and countermovement jump (CMJ) have been established as valid measures of lower limb explosive power (Flanagan & Comyns, 2008), while sprint times over various distances (5m, 10m, 20m) represent key performance indicators in rugby (West et al., 2013). However, the immediate responses to these training stimuli and their potential to acutely enhance these performance metrics warrant further investigation.

The majority of existing research has focused on chronic adaptations to these training modalities, with comparatively less attention given to their acute effects (Lockie et al., 2012; Tobin & Delahunt, 2014). Understanding the immediate performance changes following plyometric and contrast training sessions could provide valuable insights for coaches when designing pre competition warm up protocols or implementing in-season training strategies that aim to maximize performance without inducing excessive fatigue (McGowan et al., 2015). The developmental stage of young athletes presents another important consideration, as responses to training stimuli may differ significantly from those observed in adult populations (Lloyd et al., 2016). Adolescent rugby players are still developing physiologically, potentially influencing their neuromuscular responses to different training modalities (Moran et al., 2017). However, not much research has looked at how these training methods affect young rugby players in the short term. There's clearly a lack of studies in this area (Noon et al., 2015). This study aimed to fill that gap by conducting a randomized controlled trial comparing the immediate impact of plyometric and contrast training on several performance metrics. Specifically, we examined how these interventions influenced sprint acceleration over 5, 10, and 20 meters, agility, RSI, and CMJ height in adolescent rugby players. The goal was to provide insights into how different explosive training techniques can acutely affect physical performance in this age group. Such findings could help coaches and practitioners refine their training programs and warm-up routines to better prepare young athletes for match demands.

Materials and Methods

Study Participants

The study included 30 adolescent male rugby players, all of whom competed at the national level. Participants were randomly divided into two groups of equal size: a Plyometric Training Group (PTG; n = 15) and a Contrast Training Group (CTG; n = 15). An a priori power analysis was carried out using G*Power software (version 3.1.9.7; Universität Kiel, Germany), as recommended by Kang, (2021) The analysis determined that a minimum of 20 participants would be sufficient to detect a moderate effect size (f = 0.25) with 80% statistical power and an alpha level of 0.05, using a repeated measures ANOVA for within-between interactions. All athletes had at least three years of competitive rugby experience. Since participants were minors and the intervention took place in Gwalior, Madhya Pradesh, parental consent was obtained remotely. The team coach and manager, acting as local guardians, gave their consent and were present during the sessions. Before the study began, both the players and their guardians were clearly told what the study involved, its purpose, steps, risks, and possible benefits. Participation was voluntary, and subjects could opt out at any point without any negative repercussions. Strict confidentiality was maintained throughout the research. To keep the players safe, qualified strength and conditioning coaches oversaw all sessions. Warm-ups were required, and medical help was available on-site. The research followed the ethical standards of the Declaration of Helsinki (World Medical Association, 2013). The data collection for all athletes was conducted in the month of February 2025.

Table 1. General details of the participants (average ± standard deviation), total number = 30

Age (Y)	Height (mt)	Weight (kg)	BMI
14.30 ± 0.98	1.51 ± 0.02	48.63 ± 2.55	21.20 ± 0.91

Study Organization

A randomized controlled trial design was employed to investigate the acute effects of plyometric and contrast training on acceleration and agility. Pre- and post-test measurements were conducted within a single training session to assess immediate neuromuscular adaptations. Participants attended two preliminary sessions: the first for familiarization with testing procedures and training exercises, and the second (72 hours later) for determining one-repetition maximum (1RM) values for resistance exercises used in the contrast training protocol. The experimental session was conducted after a 72-hour recovery period following 1RM testing.

Familiarization Session

In the familiarization session, the athletes were shown how all the tests and exercises would be done. This helped minimize any learning effects. They performed submaximal efforts of all tests (sprints, Illinois Agility Test, drop jumps, and CMJ) and practiced the execution of all training exercises with proper technique under supervision.

One-Repetition Maximum (1RM) Testing

The 1RM values for back squat, trap bar deadlift, and lateral step-ups were determined following the protocol described by Haff and Triplett (2021) (Haff & Triplett, 2021). After a standardized warm-up, participants performed progressively heavier loads until they reached their 1RM within 3-5 attempts, with 3-5 minutes of rest between attempts. For safety considerations with adolescent participants, a conservative approach was taken where technical failure was used as the endpoint rather than absolute muscular failure.

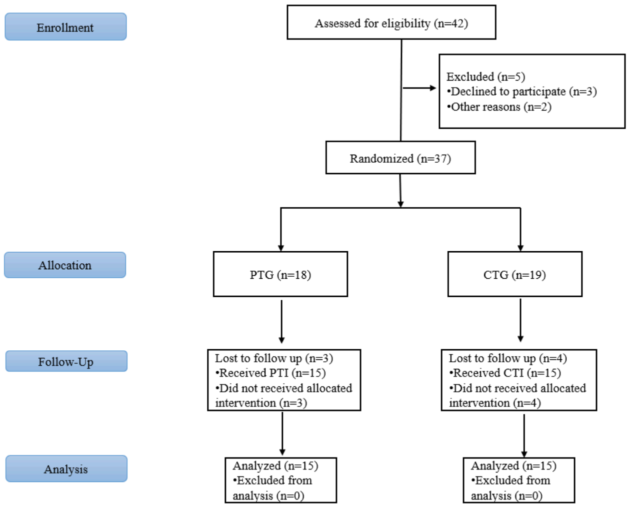

Fig. 1. Inclusion and Exclusion Criteria

Training Intervention

Each group underwent a structured warm-up followed by their respective training protocols:

Plyometric Training Group

This group performed a series of explosive bodyweight exercises designed to enhance SSC efficiency and reactive strength. The session included:

The acute plyometric training program presented in Table 2 was specifically designed for adolescent rugby players, aiming to improve explosive strength, reactive capability, and the efficiency of the SSC. These physical attributes are essential for key actions in rugby such as sprinting, tackling, and quick directional shifts.

Table 2. Plyometric Training Plan for Young Rugby Players

Exercise	Sets	Reps/Distance
Depth Jumps	3	5 reps
Bounding	3	20m
Hurdle Hops	3	5 reps
Lateral Bounds	3	10 reps per leg
Sprint Loaded Drop Jumps	3	4 reps
Rest Period	90 sec between sets, 3 min between exercises	

The session consisted of five targeted exercises. Depth Jumps (3 sets of 5 repetitions) were included to enhance vertical power and optimize SSC utilization. Bounding drills (3 sets covering 20 meters) focused on improving horizontal force production and increasing stride length.

Hurdle Hops (3 sets of 5 reps) were incorporated to build rhythm, coordination, and vertical explosiveness. Lateral Bounds (3 sets of 10 reps for each leg) aimed at reinforcing lateral stability and agility. In addition, Sprint Loaded Drop Jumps (3 sets of 4 repetitions) were used to replicate sport-specific explosive movements and transitions on the field.

To promote recovery and maintain high-quality performance, 90 seconds of rest was provided between sets and 3 minutes between each exercise. This structure also serves to minimize the risk of injury during the session.

Contrast Training Group

The contrast training protocol for this group was based on the principle of post-activation potentiation (PAP), involving the pairing of high-load resistance exercises with explosive plyometric movements. The session included:

Table 3. Contrast Training Plan for Young Rugby Players

Exercise	Sets	Reps/Distance
Back Squat (85% 1RM) + Box Jumps	3	3 reps + 5 reps
Trap Bar Deadlift (85% 1RM) + Hurdle Hops	3	3 reps + 5 reps
Sled Push + Sprint	3	20m + 20m
Lateral Step-Ups (80% 1RM) + Lateral Bounds	3	3 reps per leg + 8 reps per leg
Rest Period	90 sec between sets, 3 min between exercises	

As outlined in the session included four key contrast pairings. The first pair involved the Back Squat performed at 85% of one-repetition maximum (1RM), immediately followed by Box Jumps. Each pairing was completed for 3 sets, with 3 reps of squats and 5 reps of jumps. This combination was selected to boost lower limb strength and vertical explosive power.

Next athletes performed Trap Bar Deadlifts (85% 1RM) paired with Hurdle Hops, again using the 3x3 and 3x5 set-rep structure. This sequence was designed to strengthen the posterior chain and improve reactive force output.

The third pairing included Sled Pushes and short-distance Sprints, each performed over 20 meters for 3 sets, targeting acceleration and horizontal power production. The final contrast set combined Lateral Step-Ups at 80% 1RM with Lateral Bounds, 3 reps per leg for the resistance work and 8 reps per leg for the plyometric drill. This pairing aimed to build unilateral leg strength and support agile lateral movements.

Rest periods were built into the session to optimize training quality: 90 seconds between sets and 3 minutes between each contrast pairing. The entire session lasted around 38 minutes, matching the duration of the plyometric training protocol to ensure both groups could train concurrently with equal workload distribution.

Measurements and Data Collection

To evaluate the immediate impact of the training protocols, performance tests were carried out both before and right after the intervention. These tests focused on key physical attributes: acceleration, agility, reactive strength, and lower body power. Acceleration was measured using sprint tests over 5, 10, and 20 meters. Electronic timing gates were employed to capture precise and consistent timing data, ensuring measurement accuracy (Cross et al., 2015b). Agility was assessed using the Illinois Agility Test, a widely recognized tool for assessing multidirectional movement and rapid changes in direction (Lockie et al., 2013). This test is commonly used in sport performance settings due to its reliability. Reactive strength was examined using the RSI, calculated from drop jump performance. This metric reflects the efficiency of the SSC (Byrne et al., 2017), offering insight into an athlete's ability to switch quickly from eccentric to concentric muscle action. Lower limb power was assessed using the CMJ, providing insight into explosive strength and neuromuscular performance (McMahon et al., 2018). To maintain consistency and data integrity, all assessments were conducted under standardized conditions by trained professionals, ensuring high reliability and validity in measurement outcomes.

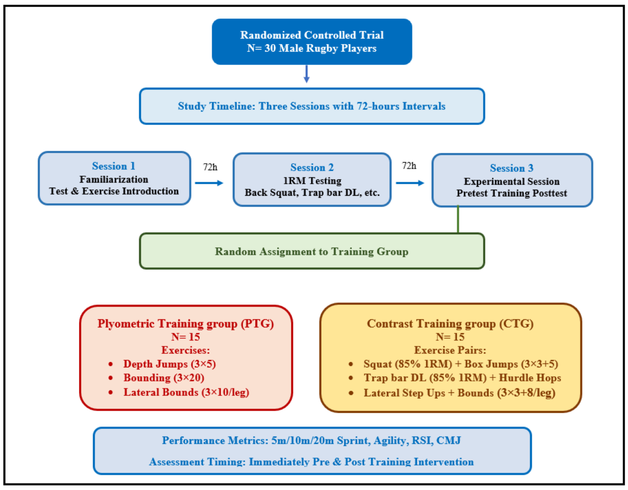

Fig. 2. Study Methodology and Design Flowchart

Statistical Analysis

The statistical evaluation was performed using IBM SPSS (Version 29.0.0, IBM Corp., New York, USA). To check for normal distribution in the dataset, the Shapiro-Wilk test was employed. Descriptive statistics, such as mean, median, and standard deviation, were calculated to provide an overview of the data. These measures helped in identifying central trends and variability in performance metrics. A repeated measures ANOVA was applied to examine both within-group and between-group differences across time points. This allowed for detection of any interaction effects between the training method and performance outcomes. Effect sizes for the main and interaction effects were reported using partial eta squared (η^2). These were interpreted as small (<0.06), moderate (0.06 to 0.13), or large (≥0.14), in line with the guidelines from (Saha et al., 2025). All statistical analyses were conducted using a predetermined alpha level of 0.05 to determine significance.

Results

The study protocol was completed by all the 30 participants with no adverse events reported. Descriptive statistics and results from the repeated measures ANOVA are presented in Table 4 and Figure 1.

The Table 4 outlines the immediate effects of the two training interventions, PTG and CTG on key performance indicators such as sprint times (5 m, 10 m, and 20 m), agility, RSI, and CMJ height. Both groups showed noticeable improvements in sprint performance over all measured distances. The times for 5 m, 10 m, and 20 m sprints were significantly reduced post-training in each group. However, athletes in the CTG displayed more pronounced gains. Specifically, CTG participants recorded a 6.14 % drop in 5 m sprint time, a 5.37 % decrease over 10m, and a 3.90 % improvement at the 20 m mark, indicating more effective acceleration enhancements compared to PTG. The PTG also showed notable improvements, with reductions of 3.53 % (5 m), 3.76 % (10 m), and 2.60 % (20 m). Statistical analysis confirmed significant effects, with F-values ranging from 4.25 to 107.67 and p-values below 0.05, indicating meaningful performance enhancements. Agility improvements were more pronounced in the CTG than in the PTG. The CTG showed a 4.95 % reduction in agility time, whereas the PTG recorded a 3.09 % reduction. A highly significant effect ($F = 442.86$, $p < 0.001$, $\eta^2p = 0.94$) was observed, demonstrating the substantial impact of both training modalities, with CTG yielding superior agility gains. The RSI, a key measure of explosive strength and neuromuscular efficiency, showed a greater increase in the CTG (8.60 %) compared to the PTG (5.91 %). The statistical analysis revealed a strong effect size ($F = 127.94$, $p < 0.001$, $\eta^2p = 0.82$), highlighting the effectiveness of complex training in enhancing rapid force production. CMJ performance, indicative of lower-limb power, exhibited improvements in both groups, with the CTG achieving a 7.40 % increase and the PTG a 5.79 % increase. The effect size was moderate ($\eta^2p = 0.36$, $F = 15.95$, $p < 0.001$), suggesting that complex training provides a marginal advantage in jump performance over plyometric training alone.

Discussion

The primary objective of this research was to explore how a single session of plyometric and contrast training acutely

Table 4. Pre- and Post-Test Performance Analysis of Sprint Speed, Agility, Reactive Strength, and Jump Performance in Plyometric and Complex Training Groups

Variables	Groups	Pre data	Post data	Δ (%)	SS	F	p	η^2p
5mt Sprint	PTG	1.13 ± .016	1.09 ± .018	-3.53	.002	107.67	<0.001*	.79
	CTG	1.14 ± .012	1.07 ± .014	-6.14				
10mt Sprint	PTG	1.86 ± .016	1.79 ± .018	-3.76	.002	4.25	<0.048*	.68
	CTG	1.86 ± .014	1.76 ± .015	-5.37				
20mt Sprint	PTG	3.07 ± .025	2.99 ± .037	-2.60	.007	6.25	<0.019*	.18
	CTG	3.07 ± .022	2.95 ± .023	-3.90				
Agility	PTG	17.14 ± .021	16.61 ± .025	-3.09	.339	442.86	<0.001*	.94
	CTG	17.15 ± .023	16.30 ± .035	-4.95				
RSI	PTG	1.86 ± .011	1.97 ± .013	5.91	.010	127.94	<0.001*	.82
	CTG	1.86 ± .011	2.02 ± .016	8.60				
CMJ	PTG	38.48 ± .035	40.71 ± .470	5.79	1.398	15.95	<0.001*	.36
	CTG	38.48 ± .042	41.33 ± .345	7.40				

influences short-distance sprinting, agility, RSI, and CMJ height in adolescent rugby players. Both training modalities led to significant improvements across all parameters, with contrast training demonstrating consistently greater gains. To put numbers on it, the CTG group reduced their 5 m sprint times by 6.14% while PTG improved by 3.53 %. Similarly, for 10 m sprints, CTG dropped 5.37%, compared to PTG's 3.76 %. At 20 m, CTG saw a 3.90 % reduction, PTG just 2.60 %. In agility, CTG improved 4.95 %, PTG by 3.09 %. RSI and CMJ followed the same trend. The CTG had an 8.60 % increase in RSI versus 5.91 % in PTG. CMJ height rose 7.40 % in CTG, 5.79 % in PTG. These results are consistent with what earlier research has shown on PAPE, which suggest that muscle output can temporarily improve after engaging in heavy or intense conditioning exercises (Blazevich & Babault, 2019). PAPE describes a short-lived increase in muscular performance triggered by a preceding high-intensity activity. (Blazevich & Babault, 2019). In contrast training, the combination of heavy resistance followed by explosive movement appears to more effectively activate this mechanism than plyometric exercises alone. This sequence likely "primes" the neuromuscular system, enabling greater power output during subsequent high-velocity movements (Seitz & Haff, 2016b). One explanation for CTG's superior results is the more robust recruitment of high-threshold motor units, particularly Type II (fast-twitch) fibres, which are essential for producing rapid and forceful contractions (Hodgson, et al., 2005). While plyometric training alone can also activate these fibres, the inclusion of heavy resistance work may provide a more intense and effective stimulus (Barra-Moura et al., 2024). On a neural level, contrast training enhances corticospinal excitability and reduces inhibitory reflexes, improving the nervous system's efficiency in quickly activating the muscles (Lorenz, 2011). This likely played a significant role in the improved RSI and short sprint performance, especially in the 5 and 10 m tests where explosive starts are critical. Bevan et al., (2010) reported similar results, finding that heavy back squats improved sprint times in elite rugby players.

Mechanically, contrast training may increase musculotendinous stiffness, enhancing the SSC. A stiffer muscle-tendon unit facilitates quicker and more efficient force transmission, which is particularly beneficial for sprinting, jumping, and direction changes (Ramírez-delaCruz et al., 2022). While plyometric movements already utilize the SSC, the heavy pre-load in contrast training likely improves elastic energy storage and utilization during the explosive phase (Hammami et al., 2019b). There may also be a psychological component. Lifting heavy loads before performing explosive tasks can increase arousal and focus, temporarily boosting performance (Gould, 2021). Though this area is less studied, it's frequently cited by coaches and athletes as a practical advantage of contrast or complex training. Contrast training offers a more holistic and powerful stimulus, producing more noticeable short-term performance improvements. Notably, this appears to be the first study directly comparing the acute effects of plyometric and contrast training in adolescent rugby players. Although this limits direct comparison with prior work, parallels can be drawn. Jeffreys, et al., (2019) reported RSI improvements in collegiate rugby players following both high- and low-volume plyometric programs. Although their intervention lasted several weeks and involved older athletes, the 5.91 % RSI improvement observed in our PTG after just one session echoes their conclusion that even low-volume protocols can be effective. Interestingly, our CTG's RSI improvement of 8.60 % exceeded Jeffreys' long-term gains, likely due to the immediate potentiation effect of combining resistance and explosive exercises.

Vissing et al., (2008) reported that plyometric training led to greater improvements in muscle power compared to resistance training among untrained young men. This observation is consistent with the outcomes seen in our PTG. Interestingly, CTG demonstrated even greater acute performance gains. This suggests that combining resistance and plyometric exercises may provide a more effective stimulus for neuromuscular activation. It's important to mention that Vissing's study involved untrained adults, whereas our participants were trained adolescent athletes, this difference in training background may partly explain the variation in results. Additional support comes from Huang et al., (2023) and Chikhalkar, (2018), who found plyometric training improved speed, agility, and explosive strength in elite and adolescent basketball players, respectively. While the populations and sports differ, the underlying neuromuscular adaptations appear comparable. Our CMJ findings also resonate with those of Vissing et al., (2008), who demonstrated that plyometric training effectively boosts jump performance. The enhanced jump height in both PTG and CTG, particularly after a single session, underscores the responsiveness of explosive power to acute neuromuscular stimuli. These improvements likely contributed to the observed sprint gains, as increased reactive strength and vertical power are closely tied to acceleration capability. When it comes to agility, our findings may be among the first to document acute improvements following a single PT or CT session. Both CT and PT programs lasting 6-12 weeks have been shown to improve agility and change of direction ability in youth soccer and basketball players (García-Pinillos et al., 2014; Latorre Román et al., 2017). The improvements in Illinois Agility Test scores add new evidence that both training types can immediately enhance change-of-direction ability, with contrast training again proving more effective. From an applied perspective, the outcomes of this study offer valuable insights for coaching practices. When time is limited, such as before a game or during a tapering phase, contrast training could serve as a time-efficient tool to boost short-term performance. Its effects are immediate and multifaceted, making it a smart option for enhancing speed, agility, and power on short notice. This study has limitations. It focused solely on male adolescent rugby players, limiting generalizability. The intervention assessed only acute effects, without examining long-term adaptations. Additionally, muscle activity was not measured directly, which leaves gaps in our understanding of underlying physiological mechanisms. Future research should explore different age groups, sports, and genders, while incorporating electromyographic and hormonal markers for deeper insight.

Conclusions

Both PTG and CTG produced immediate performance improvements in sprint speed, agility, RSI, and CMJ height. However, contrast training consistently resulted in greater gains, likely due to its ability to stimulate both neural and muscular systems more effectively. For coaches aiming to optimize short-term athletic performance in youth rugby or similar sports, contrast training presents a potent and practical strategy.

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Conflict of interest

The authors declare no conflict of interest.

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Визначення безпосереднього впливу пліометричного та контрастного тренування на показники прискорення та спритності юних регбістів: Рандомізоване контрольоване дослідження

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Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 9 с., 4 табл., 2 рис., 46 джерел.

Мета дослідження. У представленому дослідженні вивчався вплив проведення одного заняття з пліометричного тренування (ПТ) та контрастного тренування (КТ) на показники швидкості, спритності та потужності у юних регбістів. Метою дослідження було з'ясувати, яка з зазначених методик забезпечує більшу ефективність з точки зору поліпшення безпосередніх результатів.

Матеріали та методи. У дослідженні взяли участь 30 регбістів національного рівня чоловічої статі (середній вік 14.3 роки, зріст 1.51 метра, вага 48.63 кг). Учасників було розподілено за методом рандомізації на дві групи: 15 осіб долучилися до плану пліометричних тренувань, а решта 15 — до програми контрастних тренувань. Перед початком та після завершення тренувальної сесії кожен спортсмен проходив тестування на швидкість спринту (5 м, 10 м і 20 м), спритність (вимірювалась за допомогою Іллінойського тесту на спритність), висоту стрибка (виконання стрибка з контррухом, СКР) та вибухову потужність ніг (оцінювалась із використанням індексу реактивної сили, ІРС). Пліометричний протокол складався зі стрибків у глибину, стрибків з відштовхуванням й підняттям колін, стрибків через бар'єри, бокових стрибків і стрибків з невеликої платформи із пружним відштовхуванням, тоді як контрастний протокол поєднував інтенсивні силові вправи (85% 1ПМ) з біомеханічно аналогічними пліометричними рухами.

Результати. Обидві інтервенції сприяли значному ефективному поліпшенню за всіма показниками результативності ($p<0.05$). Група, що виконувала програму контрастних тренувань продемонструвала кращі результати порівняно з групою пліометричних тренувань щодо показників часу виконання спринту на 5 метрів (-6.14 % проти -3.53 %, $p < 0.001$, $\eta^2p = 0.79$), часу виконання спринту на 10 метрів (-5.37 % проти -3.76 %, $p < 0.048$, $\eta^2p = 0.68$), часу виконання спринту на 20 метрів (-3.90 % проти -2.60 %, $p < 0.019$, $\eta^2p = 0.18$), часу реакції спритності (–4.95 % проти –3.09 %, $p < 0.001$, $\eta^2p = 0.94$), IPC (+8.60 % проти +5.91 %, $p < 0.001$, $\eta^2p = 0.82$) та висоти СКР (+7.40 % проти +5.79 %, $p < 0.001$, $\eta^2p = 0.36$).

Висновки. Проведене дослідження дозволяє зробити висновок, що обидва види тренувань значно покращили показники прискорення, спритності та потужності юних регбістів. Однак виконання контрастного тренування забезпечило значніші поліпшення результатів за всіма показниками. Результати дослідження свідчать, що контрастне тренування може бути ефективнішим за пліометричне тренування з точки зору підвищення вибухової сили у юних регбістів вже після проведення одного заняття. Це може бути пов'язано з активізацією інтенсивніших короткострокових позитивних змін показників м'язової працездатності.

Ключові слова: постактиваційне підвищення результативності, юні спортсмени, спринтерська результативність, зміна напрямку руху, вибухова потужність, стратегія розминки.

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