JSES: Journal of Sport and Exercise Science
Volume 9, Number 2, September 2026
ORIGINAL ARTICLE

The Effectiveness of Weight Vest Training on Lower-Limb Strength and Power Performance in Amateur Soccer Players

Rafi Satyaputra[1ABCD], Imam Syafii[1ABCD], David Agus Prianto[1ABCD], Yanyong Phanpheng[2ACD]

[1] Universitas Negeri Surabaya, Indonesia
[2] Loei Rajabhat University, Thailand

Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection.

Corresponding Author: Rafi Satyaputra, rafi.22140@mhs.unesa.ac.id

Received	30 April 2026
Accepted	28 September 2026
DOI	https://doi.org/10.26740/jses.v9n2.p109-199

ABSTRACTS

Purpose	Lower muscle strength plays a crucial role in enhancing performance and preventing injuries among football players. One effective method to improve it is through weight vest training as an additional external load. This study aimed to analyze the effect of weight vest training on improving lower limb muscle strength in amateur football players.
Materials and Methods	A quasi-experimental method with a pretest–posttest control group design was employed, involving 27 players divided into three groups: Group A as the control without load (0.0 ± 0.0 kg), Group B using a weight vest of 5.02 ± 0.51 kg, and Group C using a weight vest of 7.16 ± 0.74 kg. The training program lasted three weeks with four sessions per week, consisting of 30-meter sprints and technical drills performed at 80–90% HRmax intensity. Muscle strength was measured through Leg Curl tests for both legs and Muscular Power Vertical Jump (Jump MD) tests during the pretest and posttest phases. Data were analyzed using the Shapiro–Wilk normality test, one-way ANOVA, Kruskal–Wallis, and Tukey's post-hoc test with a significance level of $\alpha = 0.05$.
Result	The results showed a significant improvement in lower limb strength and power across all groups ($p < 0.05$), with the highest increase observed in Group C.
Conclusion	It can be concluded that weight vest training with a quasi-experimental design is practical in safely and efficiently improving lower limb strength and explosive power among amateur football players.
Keywords	Weight vest; Muscle strength; Resistance training.

INTRODUCTION

In recent years, injuries have become an inseparable risk in the world of football, especially for athletes involved in intense matches and heavy training sessions. Common injuries among football players include hamstring strains, ankle sprains, knee ligament injuries (such as ACL tears), and contusions or muscle and bone bruises (Ekstrand et al., 2011; Walden et al., 2015). The causes vary from physical collisions with other players and poor field conditions to muscle fatigue due to dense training schedules. Hamstring injuries are increasingly reported, particularly during the acceleration–deceleration phase of sprinting when players abruptly change speed (Hadi & Faridah, 2024). Such injuries not only disrupt on-field performance but also delay recovery and extend

players' absence periods (Malliou et al., 2025). This phenomenon indicates that the physical demands of modern football are becoming increasingly complex, requiring optimal physical preparedness to minimize injury risk and maintain performance. One key aspect of such preparedness is muscle strength, particularly in the lower limbs, which supports dynamic movements such as sprinting, jumping, and rapid directional changes.

Approaches to improving physical strength in football have evolved significantly. Coaches and sports scientists have begun exploring various training methods to optimize players' functional strength, one of which is weight vest training (Aldiansyah et al., 2025). This vest is designed to proportionally increase body load without interfering with an athlete's technique or mobility, making it suitable for use in various dynamic exercises. Limmer (2020) demonstrated that weight vest training significantly improves strength, speed, and agility compared to conventional methods. Similarly, Apriantono et al. (2013) found that specific resistance training enhances leg muscle strength and kicking ability in football players. Further, Burgess & Naughton (2010) emphasized the importance of designing targeted training to suit the growth phases of adolescent players.

Although the importance of muscle strength has been widely discussed, specific studies on the most effective methods for developing such strength in amateur football contexts remain limited. Most previous studies have not systematically examined the effects of controlled external load interventions, such as weight vest training, on specific muscle strength, nor have they detailed variables such as intensity, program duration, and baseline fitness levels. This creates a significant research gap that requires a structured experimental approach. Therefore, this experimental study specifically aims to examine the effect of a structured weight vest training program on lower-body muscle strength in amateur football players using a controlled load and measurable performance evaluation. The central hypothesis proposes that a systematically applied weight vest training program over a defined period will result in a significant increase in lower-limb strength compared to conventional training without additional loads.

This study specifically aims to examine the effect of a structured weight vest training program on lower-body muscle strength in amateur football players. The intervention was designed with tightly controlled external load and training duration and evaluated through valid and reliable pre- and post-test strength measurements. The central hypothesis proposes that a systematically applied weight vest training program over a defined period will result in a significant increase in lower limb strength compared to conventional training without additional loads. The findings are expected to strengthen the scientific foundation for resistance-based training methods in football and provide practical insights for coaches in designing strength programs that are more effective, efficient, and evidence-based, particularly in the context of amateur athlete development.

METHODS

Study Participants

The participants in this study were selected using a purposive sampling technique based on specific inclusion and exclusion criteria. The subjects were 27 amateur football players who were active students at State University of Surabaya and had experience competing in amateur-level tournaments. The sample characteristics included an average height of 165.7 ± 5.8 cm, body weight of 62.9 ± 6.1 kg, and a body mass index (BMI) of 22.7 ± 1.9 kg/m². The explicit inclusion criteria required participants to be actively engaged in regular football training, have no current or past history of acute musculoskeletal injuries or limiting illnesses, and willingly commit to all training sessions. The participants were divided into three groups: Group A as the control group (0.0 ± 0.0

ISSN 2615-8744

kg), Group B with a weight vest load of 5.02 ± 0.51 kg, and Group C with a weight vest load of 7.16 ± 0.74 kg. Attendance during the intervention was very high (95%), with all participants completing the 12 sessions over three weeks.

Study Organization

This study employed a quasi-experimental design using a pretest–posttest control group model involving 27 subjects randomly assigned to three groups of varying sizes: Group A (n = 8), Group B (n = 9), and Group C (n = 10). Over three weeks, each group underwent a specific weight vest training intervention with a frequency of four sessions per week. Measurements were conducted at both the pretest and posttest stages, focusing on strength assessments including right Leg Curl (right lower limb strength), left Leg Curl (left lower limb strength), and Jump MD (Muscular Power Vertical Jump) to evaluate explosive leg power based on jump height. The difference between pretest and posttest scores for each variable served as the basis for assessing strength improvement. At the same time, anaerobic power was estimated using the Sayers Equation (Estimation of Peak Anaerobic Power).

Statistical Analysis

All pretest and posttest data from the Leg Curl (right and left) and Jump MD variables were analyzed using the Shapiro–Wilk test for normality and Levene's test for homogeneity to confirm data distribution and variance equality. Non-normally distributed data from the right Leg Curl were analyzed using the Kruskal–Wallis test followed by Dunn's multiple comparisons test, while usually distributed data from the left Leg Curl and Jump MD were analyzed using one-way ANOVA followed by Tukey's post-hoc test. Within-group comparisons between pretest and posttest were conducted to assess performance improvements. The significance level was set at $\alpha = 0.05$. To strengthen interpretation, the effect size was calculated using Cohen's d, allowing the intervention's impact to be evaluated both statistically and practically.

Training program

This research utilized a repeated-measures design with counterbalancing in subject allocation. The 27 subjects were randomly assigned to two treatment conditions: weight vest training and training without a weight vest. The order of the treatments was balanced—some subjects began with weight vest training, while others started without it. Each session consisted of two groups, each forming two facing lines of five players, spaced 30 meters apart with an additional 3-meter area for technical drills. The training involved 30-meter shuttle sprints performed four times at an intensity of 80–90% HRmax, interspersed with 20 seconds of active recovery involving short passes, ball control, and basic movement drills. The sessions alternated between groups with a work-to-rest ratio of 1:1, repeated for eight sets per session.

JSES: Journal of Sport and Exercise Science
ISSN 2615-8744

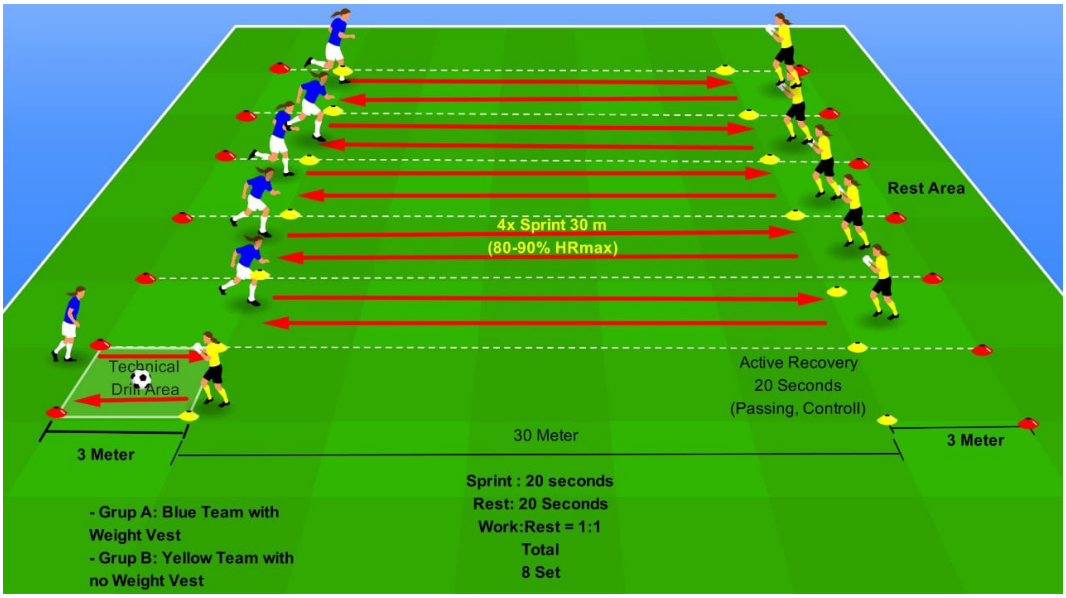


Figure 1. Illustration of Aerobic Training Design Using a Weight Vest with Integrated Technical Drills

RESULT

Table 1. Descriptive Statistics of Strength and Power Test Results (Mean ± SD).

Group	PRE	POST	PRE	POST	PRE	POST	AnST 30m
	Right Leg Curl	Right Leg Curl	Left Leg Curl	Left Leg Curl	Jump MD	Jump MD	
Group A	54.7 ± 7.6	66.9 ± 5.5	54.6 ± 6.7	64.6 ± 6.1	54.1 ± 8.5	61.3 ± 7.2	Moderate
Group B	47.8 ± 3.9	65.1 ± 9.6	48.1 ± 5.5	63.7 ± 9.5	52.0 ± 5.4	60.8 ± 7.6	High
Group C	51.6 ± 9.2	64.3 ± 6.7	50.8 ± 8.3	63.3 ± 7.4	52.9 ± 6.8	63.8 ± 6.9	Highest

Table 1 presents the descriptive statistical data of strength and power test results among three groups of football players who underwent different weight vest interventions. In the right and left Leg Curl tests, all groups showed improvements from pretest to posttest. The control group, which did not use a weight vest (0.0 ± 0.0 kg), recorded moderate increases, while Group B (weight vest 5.02 ± 0.51 kg) and Group C (weight vest 7.16 ± 0.74 kg) demonstrated greater gains. The highest scores were consistently achieved by Group C, indicating that higher external loads provided a more substantial neuromuscular adaptation stimulus.

The power test results showed a similar pattern, with all groups improving, but Group C (weight vest 7.16 ± 0.74 kg) achieved the highest increase, followed by Group B (weight vest 5.02 ± 0.51 kg) and the control group. This finding indicates that weight vest use contributes to maximizing lower limb explosive power.

In the 30m AnST test, all groups also showed improved technical performance, with the most significant progress observed in Group C (weight vest 7.16 ± 0.74 kg), followed by Group B (weight vest 5.02 ± 0.51 kg), and lastly the control group. These improvements confirm that weight vest training not only enhances physiological aspects (strength and power) but also helps players maintain fundamental technical performance under fatigue conditions. Overall, Table 1 demonstrates that the weight vest intervention of 7.16 ± 0.74 kg yielded the most optimal outcomes. In contrast, the 5.02 ± 0.51 kg load still provided significant adaptations with nearly comparable effectiveness to the heavier group.

Table 2. Shapiro–Wilk Normality Test for Right Leg Curl.

Shapiro-Wilk test	Group A	Group B	Group C
P value	0.7358	0.0213	0.1392
Passed normality test (alpha=0.05)	Yes	No	Yes
Number of values	8	9	10

Table 2 presents the results of the Shapiro–Wilk normality test, showing that most data were normally distributed except for one group in the right Leg Curl variable; therefore, the non-parametric Kruskal–Wallis test was applied.

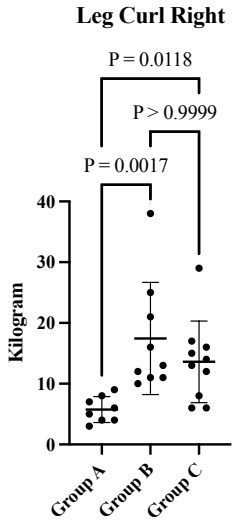


Figure 2. Comparison of right leg curl performance among groups.

The Kruskal–Wallis test results revealed significant differences among groups (p = 0.0013). Further analysis using Dunn's multiple comparison test indicated that the control group differed significantly from Group B (p = 0.0017) and Group C (p = 0.0118). In contrast, Groups B and C did not differ significantly (p > 0.05). These findings suggest that although the highest improvement was observed in Group C, the stimulus in Group B was already sufficient to produce a similar response.

Table 3. Shapiro Wilk Normality Test for Left Leg Curl.

Shapiro-Wilk test	Group A	Group B	Group C
P value	0.5611	0.5728	0.3444
Number of values	8	9	10

Table 3 shows that the left Leg Curl data were normally distributed; therefore, ANOVA was used for analysis.

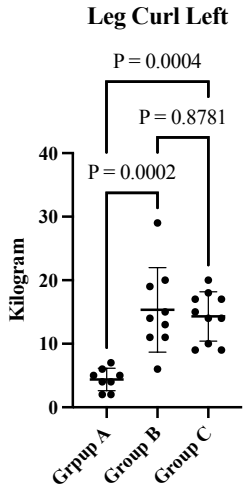


Figure 3. Comparison of left leg curl performance among groups

ISSN 2615-8744

The results revealed significant differences among groups ($F(2,24) = 14.43$; $p < 0.0001$). Tukey's post-hoc test showed that the control group differed significantly from Group B ($p = 0.0002$) and Group C ($p = 0.0004$), while Groups B and C did not differ significantly ($p = 0.8781$). The most significant improvement was again observed in Group C (weight vest 7.16 ± 0.74 kg). In general, all groups exhibited considerable pre–post improvements, but those using weight vests showed greater adaptations.

Table 4. Shapiro Wilk Normality Test for Jump MD.

P value	**0.2796**	**0.7732**	**0.5531**
Passed normality test (alpha=0.05)?	Yes	Yes	Yes
P value summary	ns	Ns	Ns
Number of values	8	9	10

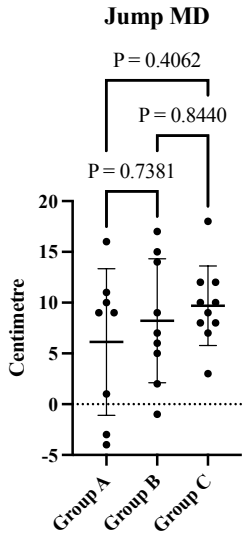


Figure 4. Comparison of Muscular Power (MD Jump) among groups.

Table 4 describes the results of the Jump MD analysis, which showed significant pre–post improvements in all groups. However, ANOVA revealed no significant differences among groups ($F(2,24) = 0.8526$; $p = 0.4388$). Tukey's post-hoc test showed no significant differences between Groups A and B, while Group C displayed a trend toward improvement compared to both. However, it did not reach full statistical significance. Descriptively, the most significant increase was recorded in Group C (weight vest 7.16 ± 0.74 kg), indicating a positive effect of weight vest training on explosive power, despite individual variations in response.

Additionally, the 30m AnST technical test results demonstrated that all groups improved in basic running technique performance. Group C (weight vest 7.16 ± 0.74 kg) showed the most consistent and prominent improvement, followed by Group B (weight vest 5.02 ± 0.51 kg), while the control group achieved only moderate progress. These findings suggest that weight vest training impacts not only strength and power but also enhances players' ability to maintain basic technical quality under fatigue conditions.

DISCUSSION

This study aimed to analyze the effect of a structured weight vest training program on improving lower-limb muscle strength and power performance in amateur football players. The findings of this study indicate that training with a weight vest significantly improves both strength and power in football players. All groups (A, B, and C) showed significant improvements between pre-test and post-test results, indicating that the structured training program implemented was effective in enhancing players' physical capabilities. However, the groups using weight vests, particularly

Group C, demonstrated more optimal improvements, suggesting that the additional load provided a greater adaptive stimulus for strength development and overall performance on the field. One potential mechanism is that the use of a weight vest not only serves to enhance muscle strength but also helps maintain natural and functional movement patterns during play (Ltifi et al., 2023).

In the strength test, Group A still showed improvement but differed significantly from Groups B and C. This finding suggests that weight vest use accelerates hamstring strength adaptation. This aligns with Grazioli et al. (2023), who reported that eccentric-prone leg curls significantly increased torque, and Hu et al. (2023), who found that eccentric hamstring training reduced lower-limb injury risk by up to 28%. Although Group B did not differ significantly from Group C, Group C still recorded the highest absolute gains, consistent with the principle of progressive overload (Taylor et al., 2016). Furthermore, Maeo et al. (2021) confirmed that higher resistance and technical variation tend to produce more optimal muscle hypertrophy.

The power test results revealed a similar pattern. Groups A and B showed no significant differences, indicating that lighter loads were insufficient to trigger neuromuscular adaptations distinct from conventional training. This aligns with Maciejczyk et al. (2021) and Sole et al. (2021), who found that plyometric training with light resistance often yields similar outcomes to standard training. However, Group C differed significantly from the others and achieved the highest gains, demonstrating that loads of approximately 10–15% of body weight represent the optimal range for improving explosive strength (Sáez de Villarreal & Ramírez-Campillo, 2022; Suchomel et al., 2023). Moran et al. (2021) also emphasized that adding external resistance during plyometric training can significantly enhance the stretch-shortening cycle and lower-limb power production.

These findings are consistent with Freitas-Junior et al. (2021), who demonstrated that using a weight vest equivalent to about 12% of body weight produces greater improvements in countermovement jump (CMJ) height compared to 5% or 8% of body weight. Similarly, Huang et al. (2023) and Chaalali et al. (2022) confirmed that resistance-based training can increase lower-limb explosive power, although training intensity and program design remain key factors determining success. The fact that all groups improved from pre-test to post-test also aligns with Ramirez-Campillo et al. (2020), who found that plyometric training—with or without load—consistently enhances jump performance and reactive muscle strength. Rong et al. (2025) further stated that training consistency plays a greater role than load magnitude alone.

Despite the positive outcomes, several limitations of the current research should be acknowledged. First, the intervention duration was relatively short, lasting only three weeks, which may not capture long-term neuromuscular adaptations or structural hypertrophy. Second, this study only involved amateur-level male football players from a single university, limiting the generalizability of the findings to professional athletes or female players. Based on these limitations, future research should extend the program duration to 6–8 weeks to observe more definitive changes in power performance. Additionally, subsequent studies are recommended to include professional athletes, incorporate a wider demographic, and utilize advanced biomechanical analysis to evaluate the direct transfer of weight vest training to match-specific actions such as actual kicking velocity and multidirectional agility.

From a practical standpoint, these findings reinforce the evidence that weight vests are useful and versatile tools for enhancing athletes' physical qualities (Bertochi et al., 2024). Thus, the effectiveness of weight vest training is not limited to football but can also be applied across other sports that require high levels of lower-limb strength and explosive power (Lockie et al., 2014; Macadam et al., 2022). Additionally, this training method can be seamlessly integrated into specific

ISSN 2615-8744

soccer technical drills to simultaneously develop functional strength and sport-specific movement patterns, providing coaches with a highly efficient on-field conditioning strategy.

From the perspective of injury prevention, resistance-based training has received strong support from multiple meta-analyses. Wei et al. (2022) and Muniz Medeiros et al. (2021) found that eccentric hamstring training not only strengthens muscles but also lengthens muscle fascicles, thereby reducing injury risk. Furthermore, Adıgüzel et al. (2024) demonstrated that Nordic Hamstring Curl training increases knee flexion strength by up to 40%, muscle volume by 8%, and fascicle length by 33%. Delvaux et al. (2020) also reported that field-based eccentric training improves hamstring torque by 7.1% and passive knee flexibility by 12.7%. Therefore, weight vest training is practical not only for enhancing strength but also as a protective strategy against injuries (Hakestad et al., 2015; Lin et al., 2014)

Overall, this study confirms that weight vest training in Group C with a load of 7.16 ± 0.74 kg produced the most significant improvements in both hamstring muscle strength and jump explosiveness. Nevertheless, even the training program without additional load yielded substantial improvements, suggesting that a well-structured training design is the key factor. Therefore, weight vest training can be regarded as a practical, effective, and evidence-based strategy to enhance the performance of modern football players and can be integrated with other training methods to maximize outcomes.

CONCLUSION

Based on the research findings, it can be concluded that weight vest training significantly improves lower limb muscle strength in football players. The structured training program proved effective in enhancing players' physical performance, both with and without additional load. This confirms that the weight vest serves as an additional stimulus capable of accelerating muscular adaptation and increasing players' explosive capacity.

ACKNOWLEDGMENT

The author expresses sincere gratitude to Allah Almighty for His blessings and guidance that enabled the completion of this study. Deep appreciation is extended to the author's parents for their unwavering prayers, encouragement, and support. The author also thanks Universitas Negeri Surabaya, particularly the Department of Sports Coaching Education, for providing opportunities, guidance, and facilities throughout the research process. Special thanks are given to the academic supervisors for their valuable insights, as well as to fellow students for their continuous support and collaboration during the study.

CONFLICT OF INTEREST

The author declares no conflict of interest in this study. No financial, personal, or professional relationships have influenced the research process, data analysis, or reporting of the study's findings.

REFERENCES

Adıgüzel, N. S., Koç, M., Öztürk, B., Engin, H., Karaçam, A., Canlı, U., Orhan, B. E., & Aldhahi, M. I. (2024). The Effect of the Nordic Hamstring Curl Training Program on Athletic Performance in Young Football Players. *Applied Sciences (Switzerland)*, *14*(22), 1–10. https://doi.org/10.3390/app142210249

Aldiansyah, Putra, M., Riyanto, Darwin, Y., Richo, Adrianto, Y., & Erstiawan, Martinus, S. (2025). Inovasi Rompi Medis untuk Fisioterapis Sepakbola Berbasis Tactical Vest. *CandraRupa : Journal of Art, Design, and*

Media, *4*(1), 27–35. https://doi.org/doi.org/10.37802/candrarupa.v4i1.1015

Allen, W. J. C., De Keijzer, K. L., Raya-González, J., Castillo, D., Coratella, G., & Beato, M. (2023). Chronic effects of flywheel training on physical capacities in soccer players: a systematic review. *Research in Sports Medicine*, *31*(3), 228–248. https://doi.org/10.1080/15438627.2021.1958813

Apriantono, T., Nishizono, H., & Inoue, N. (2013). Pengaruh Latihan Beban Terhadap Kekuatan Otot Kaki Dan Kemampuan Menendang Pemain Sepak Bola. *Cakrawala Pendidikan, Jurnal Ilmiah Pendidikan*, 277–284. https://doi.org/https://doi.org/10.21831/cp.v0i2.1486

Bertochi, G. F. A., Tasinafo Júnior, M. F., Santos, I. A., Sasaki, J. E., Mota, G. R., Jordão, G. G., & Puggina, E. F. (2024). The use of wearable resistance and weighted vest for sprint performance and kinematics: a systematic review and meta-analysis. *Scientific Reports*, *14*(1), 1–15. https://doi.org/10.1038/s41598-024-54282-8

Burgess, D. J., & Naughton, G. A. (2010). Talent Development in Adolescent Team Sports : A Review. *International Journal of Sports Physiology and Performance*, *5*(1). https://doi.org/https://doi.org/10.1123/ijspp.5.1.103

Chaalali, A., Bouriel, K., Rouissi, M., Chtara, M., Mkaouer, B., Cronin, J., Chaouachi, A., & Chamari, K. (2022). Resisted sprint training with partner towing improves explosive force and sprint performance in young soccer players – A pilot study. *Biology of Sport*, *39*(2). https://doi.org/10.5114/BIOLSPORT.2022.103574

Delvaux, F., Schwartz, C., Decréquy, T., Devalckeneer, T., Paulus, J., Bornheim, S., Kaux, J. F., & Croisier, J. L. (2020). Influence of a Field Hamstring Eccentric Training on Muscle Strength and Flexibility. *International Journal of Sports Medicine*, *41*(4). https://doi.org/10.1055/a-1073-7809

Freitas-Junior, C. G., Fortes, L. S., Santos, T. M., Batista, G. R., Gantois, P., & Paes, P. P. (2021). Effects of different training strategies with a weight vest on countermovement vertical jump and change-of-direction ability in male volleyball athletes. *Journal of Sports Medicine and Physical Fitness*, *61*(3), 343–349. https://doi.org/10.23736/S0022-4707.20.11171-X

Grazioli, R., Inácio, M., Lopez, P., Freitas, S. R., Cunha, G. dos S., Machado, C. L. F., Veeck, F., Baroni, B. M., Cadore, E. L., & Pinto, R. S. (2023). Effects of eccentric-emphasized leg curl intervention on muscle strength imbalance markers in professional soccer players during pre-season. *Journal of Bodywork and Movement Therapies*, *35*. https://doi.org/10.1016/j.jbmt.2023.04.012

Hadi, P., & Faridah, F. (2024). Edukasi Pencegahan dan Penanganan Cedera Hamstring pada Pemain Sepak Bola di Komunitas Jambi Fun Soccer. *Jurnal Abdimas Kesehatan (JAK)*, *6*(2), 218. https://doi.org/10.36565/jak.v6i2.680

Hakestad, K. A., Torstveit, M. K., Nordsletten, L., Axelsson, Å. C., & Risberg, M. A. (2015). Exercises including weight vests and a patient education program for women with osteopenia: A feasibility study of the osteoactive rehabilitation program. *Journal of Orthopaedic and Sports Physical Therapy*, *45*(2), 97–105. https://doi.org/10.2519/jospt.2015.4842

Hernández-Belmonte, A., Courel-Ibáñez, J., Conesa-Ros, E., Cava, A. M., & Pallarés, J. G. (2021). Level of Effort: A Reliable and Practical Alternative to the Velocity-Based Approach for Monitoring Resistance Training. *Epub*. https://doi.org/10.1519/jsc.0000000000004060

Hu, C., Du, Z., Tao, M., & Song, Y. (2023). Effects of Different Hamstring Eccentric Exercise Programs on Preventing Lower Extremity Injuries: A Systematic Review and Meta-Analysis. *International Journal of Environmental Research and Public Health*, *20*(3). https://doi.org/10.3390/ijerph20032057

Huang, R., Zhang, M., Huang, L., Chen, Z., Mo, Y., & Gao, Y. (2023). Effects of lower-extremity explosive strength on youth judo athletes adopting different types of power-based resistance training. *Frontiers in Physiology*, *14*. https://doi.org/10.3389/fphys.2023.1065036

Limmer, M., Berkholz, A., De Marees, M., & Platen, P. (2020). Reliability and Validity of a New Portable Tethered Sprint Running Test as a Measure of Maximal Anaerobic Performance. *Journal of Strength and Conditioning Research*, *34*(8), 2197–2204. https://doi.org/10.1519/JSC.0000000000003119

Lin, H. Y., Lee, P., Chang, W. D., & Hong, F. Y. (2014). Effects of weighted vests on attention, impulse control, and on-task behavior in children with attention deficit hyperactivity disorder. *American Journal of Occupational Therapy*, *68*(2), 149–158. https://doi.org/10.5014/ajot.2014.009365

Lockie, R. G., Murphy, A. J., Callaghan, S. J., & Jeffriess, M. D. (2014). Effects of sprint and plyometrics training on field sport acceleration technique. *Journal of Strength and Conditioning Research*. https://doi.org/10.1519/jsc.0000000000000297

Ltifi, M. A., Turki, O., Racil, G., Larion, A., Chelly, M. S., Ben Saad, H., Khalifa, R., Chamari, K., & Padulo, J. (2023). A 3-min weighted vests re-warmups induce sprint performance enhancements at the start of the second half of a soccer match-play. *Frontiers in Physiology*, *14*(July), 1–9. https://doi.org/10.3389/fphys.2023.1173991

Macadam, P., Cronin, J. B., & Feser, E. H. (2022). Acute and longitudinal effects of weighted vest training on

sprint-running performance: a systematic review. *Sports Biomechanics*, *21*(3), 239–254. https://doi.org/10.1080/14763141.2019.1607542

Maciejczyk, M., Błyszczuk, R., Drwal, A., Nowak, B., & Strzała, M. (2021). Effects of short-term plyometric training on agility, jump and repeated sprint performance in female soccer players. *International Journal of Environmental Research and Public Health*, *18*(5). https://doi.org/10.3390/ijerph18052274

Maeo, S., Huang, M., Wu, Y., Sakurai, H., Kusagawa, Y., Sugiyama, T., Kanehisa, H., & Isaka, T. (2021). Greater Hamstrings Muscle Hypertrophy but Similar Damage Protection after Training at Long versus Short Muscle Lengths. *Medicine and Science in Sports and Exercise*, *53*(4). https://doi.org/10.1249/MSS.0000000000002523

Malliou, V. J., Pafis, G., Ispirlides, I., Daskalaki, K., & Katsikas, C. (2025). The Impact of Injury Severity on Sleep Quality in Soccer Players. *European Journal of Sport Sciences*, *4*(3), 1–8. https://doi.org/10.24018/ejsport.2025.4.3.230

Moran, J., Ramirez-Campillo, R., Liew, B., Chaabene, H., Behm, D. G., García-Hermoso, A., Izquierdo, M., & Granacher, U. (2021). Effects of Vertically and Horizontally Orientated Plyometric Training on Physical Performance: A Meta-analytical Comparison. In *Sports Medicine* (Vol. 51, Issue 1). https://doi.org/10.1007/s40279-020-01340-6

Muniz Medeiros, D., Marchiori, C., & Manfredini Baroni, B. (2021). Effect of Nordic Hamstring Exercise Training on Knee Flexors Eccentric Strength and Fascicle Length: A Systematic Review and Meta-Analysis. *Journal of Sport Rehabilitation*, *30*(3). https://doi.org/10.1123/JSR.2019-0388

Nurhayati, U. A., & Hasnawati, B. N. (2023). Circuit Training Is More Effect Than Interval Training on Increasing Vo2 Max in Football Players. *Annual Physiotherapy Scientific Meeting Proceeding*, *1*(1), 49–58.

Ramirez-Campillo, R., Andrade, D. C., Nikolaidis, P. T., Moran, J., Clemente, F. M., Chaabene, H., & Comfort, P. (2020). Effects of plyometric jump training on vertical jump height of volleyball players: A systematic review with meta-analysis of randomized-controlled trial. *Journal of Sports Science and Medicine*, *19*(3). https://pmc.ncbi.nlm.nih.gov/articles/PMC7429440/

Rong, W., Soh, K. G., Samsudin, S., Zhao, Y., Wang, X., Zhang, X., & Cao, L. (2025). Effect of resistance training on kinetic and kinematic indicators in jump athletes: a systematic review. *BMC Sports Science, Medicine and Rehabilitation*, *17*(1). https://doi.org/10.1186/s13102-025-01249-5

Sáez de Villarreal, E., & Ramírez-Campillo, R. (2022). Resistance Training for the Maximisation of the Vertical Force Production: Jumps. In *Lecture Notes in Bioengineering*. https://doi.org/10.1007/978-3-030-81989-7_5

Sole, S., Ramírez-Campillo, R., Andrade, D. C., & Sanchez-Sanchez, J. (2021). Plyometric jump training effects on the physical fitness of individual-sport athletes: A systematic review with meta-analysis. *PeerJ*, *9*. https://doi.org/10.7717/peerj.11004

Suchomel, T. J., McKeever, S. M., Sijuwade, O., & Carpenter, L. (2023). Propulsion Phase Characteristics of Loaded Jump Variations in Resistance-Trained Women. *Sports*, *11*(2). https://doi.org/10.3390/sports11020044

Taylor, J. L., Amann, M., Duchateau, J., Meeusen, R., & Rice, C. L. (2016). Neural contributions to muscle fatigue: From the brain to the muscle and back again. *Medicine and Science in Sports and Exercise*, *48*(11). https://doi.org/10.1249/MSS.0000000000000923

Wei, Z., Libing, S., Yingzhe, X., Yichi, Z., Jing, Y., Wenqi, H., Yanhua, G., & Hongjun, L. (2022). Effect of eccentric strengthening on hamstring strength: a Meta-analysis. *Chinese Journal of Tissue Engineering Research*, *26*(29). https://doi.org/10.12307/2022.900

INFORMATION ABOUT THE AUTHORS

Rafi Satyaputra; rafi.22140@mhs.unesa.ac.id; https://orcid.org/0000-0001-5850-3856; Department of Sports Coaching Education; Faculty of Sports and Health Sciences, Universitas Negeri Surabaya, Surabaya, Indonesia.

Imam Syafii; imamsyafii@unesa.ac.id; https://orcid.org/0000-0002-5440-5834; Department of Sports Coaching Education; Faculty of Sports and Health Sciences, Universitas Negeri Surabaya, Surabaya, Indonesia.

David Agus Prianto; davidprianto@unesa.ac.id; https://orcid.org/0000-0002-7199-5397; Department of Sports Coaching Education; Faculty of Sports and Health Sciences, Universitas Negeri Surabaya, Surabaya, Indonesia.

Yanyong Phanpheng; https://orcid.org/0000-0002-9290-2479; yanyong.pha@lru.ac.th; Sports and Exercise Science Program, Department of Applied Science, Faculty of Science and Technology, Loei Rajabhat University, Thailand.

CITE THIS ARTICLE AS
Satyaputra, R., Syafii, I., Prianto, D. A., & Phanpheng, Y. (2026). The Effectiveness of Weight Vest Training on Lower-Limb Strength and Power Performance in Amateur Soccer Players. *JSES : Journal of Sport and Exercise Science*, 9(2), 109–199. https://doi.org/10.26740/jses.v9n2.p109-199