INTERNATIONAL GRADUATE COLLOQIUM

i-SPEAK 2025

SPORTS AND PHYSICAL EXERCISE ASSEMBLY OF KNOWLEDGE SHARING

COLLOQIUM PROCEEDINGS

EXTENDED ABSTRACT

The Acute Effect of Jump Rope and Plyometric Jump Training on Explosive Power in Swimmers

Haris Rafiuddin bin Ab Kahar[1], Adam Linoby[1], Razif Sazali[1], Yusandra Md Yusoff[1], Amrun Haziq[1], Aizzat Adnan[1], & Muhammad Zulqarnain[1*]

[1]*Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Negeri Sembilan Branch, Seremban Campus, Negeri Sembilan, MALAYSIA*

**Corresponding authors: zulqarnain9837@uitm.edu.my*

Keywords: *Plyometric training, Jump rope training, Explosive power, Swimmers, Vertical jump, Standing broad jump, Acute effect*

I. Introduction

The present study explores the acute effects of plyometric jump training and jumps rope training on the explosive power of elite swimmers. Swimming, known for its mental and physical benefits, including stress reduction and mood improvement [1]. Requires high muscle engagement and coordination. Consequently, training regimens must evolve to address these biomechanical needs [2].

II. Methods

This study investigates the acute effects of plyometric jump training and jumps rope exercises on explosive power in swimmers. A crossover research design utilizing pre- and post-test measurements was employed. Thirty swimmers from Supersharkz Club were divided into two groups: one performing plyometric jump training and the other engaging in jump rope exercises. Baseline explosive power was assessed using vertical jump tests and standing broad jumps. Post-intervention measurements were then compared to evaluate the effectiveness of both training protocols.

III. Results and Discussion

A. The Effect of Plyometric Training on Explosive Power in Vertical Jump Tests

The data indicated a significant increase in the vertical jump performance post-training, with the mean score rising from 30.43 ± 8.91 cm to 33.50 ± 8.40 cm, confirming that plyometric training enhances vertical jump explosive power. A paired-samples t-test demonstrated a statistically significant difference ($p < 0.001$), with a moderate effect size (*Cohen's d* = 0.36). This study aligns with previous research examining the impact of plyometric exercises on vertical jump performance, specifically in volleyball players.[3] identified a significant relationship between plyometric training and improved vertical jump performance,

B. The Effect of Plyometric Training on Explosive Power in Standing Broad Jump Tests

The data indicated pre-test mean score at 1.25 ± 0.13 m and the post-test mean score at 1.37 ± 0.198 m. This increase of 0.12 meters was statistically significant ($p < 0.001$) and suggests that plyometric training substantially improves explosive power in the standing broad jump. *Cohen's d* value of 0.69 indicates a medium to large effect size, demonstrating that plyometric training notably enhances standing broad jump performance. The results of this study are consistent with previous research, such as an investigation on the effects of plyometric exercise on jump performance. Basumatary's study demonstrated that plyometric training led to significant improvements in all measured variables, including the standing broad jump [4].

C. The Effect of Jump Rope Training on Explosive Power in Vertical Jump Tests

The data indicated pre-test results at 30.10 ± 8.84 cm and post-test results at 32.87 ± 8.73 cm. The increase of 2.78 cm in vertical jump height was statistically significant ($p < 0.001$). The results indicate that jump rope training positively impacts vertical jump performance, with a small to medium effect size (*Cohen's d* = 0.282). Found that jump rope and traditional protocols significantly ($p < 0.001$) boosted peak power and jump height for the Countermovement Jump and Drop Jump, demonstrating the positive influence of jump rope exercises on athletes' explosive power.[5]

D. The Effect of Jump Rope Training on Explosive Power in The Standing Broad Jump Test

The data indicated the mean score at 1.259 ± 0.131 and the post-test mean score at 1.373 ± 0.194. The change of 0.11 meters was statistically significant ($p < 0.001$), suggesting that jump rope training enhances standing broad jump explosive power. The medium effect size (*Cohen's d* = 0.68). Previous research supported our findings, revealing significant statistical differences in physical performance indicators such as power and strength following jump rope training [6].

E. To Compare the Effects of Plyometric and Jump Rope Training on Vertical Jump Performance

The results revealed that both training methods resulted in increases in vertical jump height, but the plyometric group showed a slightly greater improvement (mean change of 3.08 cm) compared to the jump rope group (mean change of 2.78 cm). The plyometric group mean score was 3.0783 ± 1.9894, while the jump rope mean score was 2.7798 ± 1.6093. However, the difference was not statistically significant ($p > 0.001$), indicating that both plyometric and jump rope training may have similar effects on vertical jump performance. The small effect size (*Cohen's d* = 0.165). These findings align

with previous studies on junior boxers, the similarity in characteristics between jump rope and plyometric training routines may explain the lack of substantial variations in performance outcomes [7].

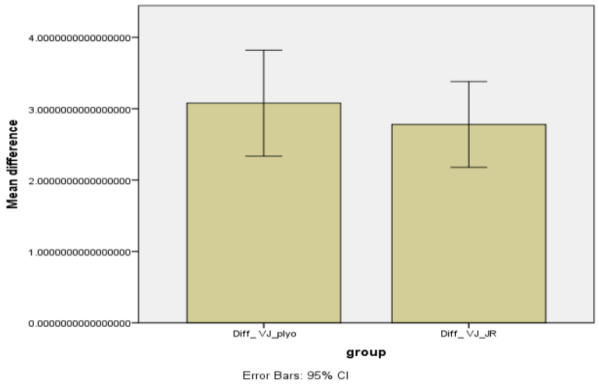

Fig. 1 Comparison of the effects of plyometric and jump rope training on vertical jump performance.

F. To Compare the Effects of Plyometric and Jump Rope Training on Standing Broad Jump Performance

The results showed that both the plyometric and jump rope groups experienced similar improvements in standing broad jump performance. The plyometric group mean score was 0.1160 ± 1.0378, while the jump rope mean score was 0.1137 ± 0.0999, with the plyometric group showing a mean change

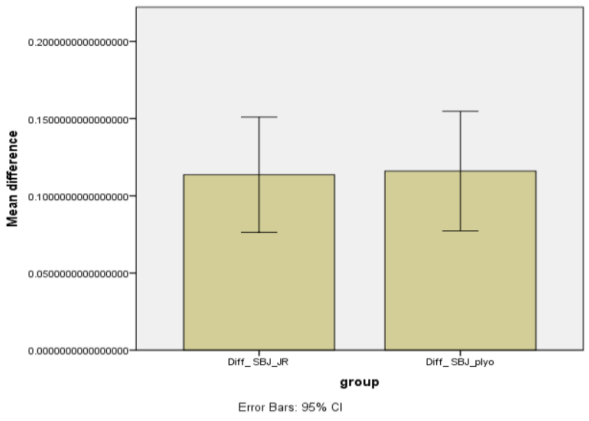

Fig. 2 Comparison of the effects of plyometric and jump rope training on standing broad jump performance.

of 0.12 m and the jump rope group showing a mean change of 0.11 m. Statistical analysis ($p > 0.001$) confirmed that there was no significant difference between the two groups. The effect size (Cohen's $d = 0.003$). These findings align with previous studies, which found that plyometric or jump rope training both training methods had comparable effects, suggesting their similar effectiveness in enhancing explosive power in swimmers.[7]

IV. Conclusions

The study concluded that both plyometric jump and jump rope training significantly improve explosive power in swimmers, particularly in vertical and standing broad jump tests. While plyometric training showed slightly larger improvements, both training methods had comparable effects, suggesting their similar effectiveness in enhancing explosive power in swimmers.

Acknowledgements

I would like to express my heartfelt gratitude to the PADE Supersharkz swim team for their participation in this research, whose commitment and effort made this study possible. Special thanks to Coach Mark for kindly allowing me to work with his team and for providing invaluable support throughout the research process. Your contributions are deeply appreciated.

References

[1] Hapidoh, S. (2021). Implementasi Kegiatan Renang Dalam Mengembangkan Motorik Kasar Anak Usia Dini Di Ar-Raudah Playgrup And Kindergarten Kota Bandar Lampung (Doctoral dissertation, UIN RADEN INTAN LAMPUNG).

[2] Suchomel, T. J., Nimphius, S., & Stone, M. H. (2016). The importance of muscular strength in athletic performance. Sports Medicine, 46(10), 1419–1449. https://doi.org/10.1007/s40279-016-0486-0.

[3] Çankaya, C., Arabacı, R., Kurt, E., Doğan, S., Erol, S., Gürak, A. N., & Korkmaz, F. (n.d.). European Journal of physical education and sport science examining the effects of the pliometric (jump squat) exercise on vertical jump in female volleyball players. https://doi.org/10.5281/zenodo.1997613.

[4] Basumatary, S. (2018.). Editorial Epicenter Voyage of a Myth Institute-Lakshmibai National Institute of Physical Education North East Regional Center Editor-in-Chief.

[5] Makaruk, H. (2013). acute effects of rope jumping warm-up on power and jumping ability in track and field athletes. *Pjst*, 20(3), 200–204. https://doi.org/10.2478/pjst-2013-0018.

[6] Ali, M., & Shamakh, M. (2012). The Effect of Jump Ropes Exercise on Some Physical and Physiological Variables in Physical Education Students (Vol. 2, Issue 1).

[7] Chottidao, M., Kuo, C. H., Tsai, S. C., Hwang, I. S., Lin, J. J., & Tsai, Y. S. (2022). A Comparison of Plyometric and Jump Rope Training Programs for Improving Punching Performance in Junior Amateur Boxers. *Frontiers in Bioengineering and Biotechnology*, 10. https://doi.org/10.3389/fbioe.2022.878527.

[8] Cengizel, C. O., Oz, E., & Cengizel, E. (2022). Short-term Plyometric and Jump Rope Training Effect on Body Profile and Athletic Performance in Adolescent Basketball Players. *International Journal of Sport Studies for Health*, 5(2). https://doi.org/10.5812/intjssh-132585.