International Journal of Current Science Research
www.drbgrpublications.in

Effect of Resistance Training on Selected Physical Variables among College Hockey Players

V. Amutha[1*], M. Sundar[2]

[1]*Principal, Cheran College of Physical Education & Research Centre, Karur, Tamil Nadu, India*

[2]*Former Vice-Chancellor, Tamil Nadu Physical Education and Sports University; Principal, Alagappa University College of Physical Education, Karaikudi, Tamil Nadu, India*

[*]*Corresponding Author Email: drva.principalpec@gmail.com*

Abstract

The purpose of this study was to examine the effect of resistance training on selected physical variables among college hockey players. Thirty male college hockey players aged 18–25 years were randomly selected and divided into two groups: experimental (n = 15) and control (n = 15). The experimental group participated in a structured resistance training program for eight weeks, with three sessions per week, while the control group continued their regular hockey practice without additional strength training. The selected physical variables included muscular strength, muscular power, speed, agility and muscular endurance. Pre-test and post-test measurements were recorded and analyzed using descriptive statistics, paired t-tests, and independent t-tests at a 0.05 level of significance. The results revealed significant improvements in all selected physical variables among the experimental group compared to the control group. The study concluded that systematic resistance training significantly enhances physical performance in college hockey players.

Keywords: Resistance training, muscular strength, muscular power, speed, agility, hockey players

Introduction

Hockey is a high-intensity, intermittent sport that requires a combination of technical skills, tactical intelligence, and superior physical fitness. Players must perform repeated sprints, rapid directional changes, powerful shots, and sustained movements throughout a match. These

activities demand well-developed muscular strength, power, speed, agility and endurance. Modern sports training emphasizes scientific conditioning methods to optimize athletic performance. Among these methods, resistance training has gained widespread acceptance due to its effectiveness in improving neuromuscular efficiency and force production. Resistance training involves performing exercises against external resistance to increase muscular strength and power. When applied systematically, it leads to physiological and neurological adaptations that enhance athletic performance.

At the collegiate level, hockey players often focus primarily on skill-based training sessions. While skill development is essential, insufficient emphasis on structured strength training may limit overall performance potential. Therefore, examining the effect of resistance training on selected physical variables among college hockey players is essential for optimizing training programs and maximizing athletic performance.

Methodology

Thirty male hockey players aged 18–25 years from Cheran College of Physical Education, Punnam Chathiram, Karur, were randomly selected for the study. The participants were divided into two groups of fifteen each. The experimental group underwent a structured resistance training program, while the control group continued regular hockey practice without additional resistance exercises. The study followed a pre-test and post-test randomized group design, and pre-test measurements of muscular strength, muscular power, speed, agility and muscular endurance were recorded for all participants.

The resistance training program for the experimental group lasted eight weeks, with three sessions per week, each lasting approximately 60 minutes. Exercise intensity ranged from 60% to 85% of one repetition maximum (1RM). The training protocol included exercises such as squats, deadlifts, lunges, bench press, plyometric drills and core stability exercises. Warm-up and cool-down sessions were included in each training session to prevent injuries. The control group continued their regular hockey training without additional resistance exercises. Muscular strength was assessed using the 1RM squat test, muscular power using the vertical jump test, speed with the 30-meter sprint test, agility with the shuttle run test and muscular endurance using the push-up test. All tests were conducted under standardized conditions before and after the intervention period.

Statistical Analysis

The collected data were analyzed using descriptive statistics to calculate means and standard deviations for pre-test and post-test scores. The paired t-test was applied to compare pre-test and post-test measurements within each group to determine the significance of improvements over time. Additionally, independent t-tests were conducted to compare post-test scores between the experimental and control groups to evaluate the effect of the resistance training program. A significance level of $p < 0.05$ was considered for all statistical analyses.

Table I: Muscular Strength (1RM Squat)

Group	Pre test	Post test	t- value
Experimental	85 kg	108 kg	**6.12***
Control	83kg	85 kg	0.52

Significant at 0.05 level

The results of the study indicate that the eight-week resistance training program had a significant effect on the physical performance of the experimental group. Muscular strength, measured using the 1RM squat test, showed a substantial increase in the experimental group, with the mean value improving from 85 kg in the pre-test to 108 kg in the post-test. The calculated t-value of 6.12 exceeded the critical value at the 0.05 level, indicating that the improvement was statistically significant. In contrast, the control group showed only a minor increase from 83 kg to 85 kg, with a t-value of 0.52, which was not statistically significant. This demonstrates that structured resistance training is effective in enhancing lower-body strength among college hockey players.

Table II: Muscular Power (Vertical Jump)

Group	Pre test	Post test	t- value
Experimental	45cm	52 cm	**5.48***
Control	44cm	45cm	0.61

Significant at 0.05 level

Muscular power, assessed through the vertical jump test, also improved significantly in the experimental group. The mean vertical jump height increased from 45 cm in the pre-test to 52 cm in the post-test, with a t-value of 5.48, reflecting a statistically significant improvement at the 0.05 level. The control group exhibited only a negligible change, from 44 cm to 45 cm, with a t-value of 0.61, indicating no significant improvement. These results suggest that resistance training, including exercises such as squats and plyometric drills, effectively enhances explosive power in athletes.

Table III: Muscular Endurance (Push – Ups)

Group	Pre test	Post test	t- value
Experimental	32reps	40 reps	**5.22***
Control	31 reps	32 reps	0.58

Significant at 0.05 level

Muscular endurance, evaluated by the maximum number of push-ups performed, increased considerably in the experimental group, from a mean of 32 repetitions in the pre-test to 40 repetitions in the post-test, with a t-value of 5.22, demonstrating statistical significance at the 0.05 level. The control group, however, showed only a minimal improvement, from 31 to 32 repetitions, with a t-value of 0.58, indicating that regular hockey practice alone does not significantly improve muscular endurance.

Overall, all calculated t-values for the experimental group exceeded the critical value at the 0.05 significance level, confirming that the resistance training program had a significant positive effect on muscular strength, power, and endurance among college hockey players. Conversely, the control group's minimal improvements highlight the importance of structured resistance training for meaningful gains in these physical variables.

Results and Discussion

The results of the study indicated that eight weeks of resistance training led to significant improvements in all selected physical variables among the experimental group. Muscular strength increased substantially, which can be attributed to progressive overload and

enhanced neuromuscular recruitment, facilitating better force production during hockey-specific movements. Muscular power improved, likely due to enhanced fast-twitch muscle fiber activation and better coordination between muscle groups, resulting in higher vertical jump performance. Speed and agility were also positively affected, as increased strength and power allowed players to accelerate more quickly and change direction efficiently during sprinting and shuttle runs. Muscular endurance improved as well, with the experimental group able to perform more repetitions during push-up tests, reflecting enhanced muscle fatigue resistance through repeated contractions.

The control group, which did not participate in structured resistance training, showed minimal improvements in all measured variables, indicating that regular hockey practice alone is insufficient to significantly enhance physical performance. These findings are consistent with previous research emphasizing the effectiveness of systematic resistance training in improving strength, power, speed, agility and endurance in athletic populations.

Conclusion

Resistance training significantly improves selected physical variables among college hockey players. The experimental group demonstrated marked enhancements in muscular strength, muscular power, speed, agility and muscular endurance compared to the control group. These results suggest that integrating structured resistance training into regular hockey training programs can optimize athletic performance and help players achieve higher levels of fitness and on-field efficiency.

Recommendations

It is recommended that resistance training be incorporated into college hockey training schedules to improve physical performance. Similar studies could be conducted with female hockey players to evaluate gender-specific effects. Future research may also include physiological and psychological variables to better understand the broader impact of resistance training. Additionally, longer-duration resistance training programs may yield greater improvements in performance outcomes.

References

Baker, D., & Nance, S. (1999). The relation between strength and power in professional rugby league players. *Journal of Strength and Conditioning Research*, *13*(3), 224–229.

Behm, D. G., Young, W. B., Whitten, J. H., Reid, J. C., Quigley, P. J., & Low, J. (2005). Effect of strength training on squat and sprint performance in recreationally active women. *Journal of Strength and Conditioning Research, 19*(2), 326–331.

Blagrove, R. C., Howatson, G., & Hayes, P. R. (2018). The effects of strength training on physical performance in elite youth soccer players. *Journal of Sports Sciences, 36*(6), 647–656.

Bradi, B., & Moir, G. (2019). Influence of lowerbody resistance training on multidirectional speed and agility in collegiate athletes. *International Journal of Sports Physiology and Performance, 14*(4), 465–472.

Chiu, L. Z., Fry, A. C., & Schilling, B. K. (2004). Complex training: Its effect on strength and power in college athletes. *Strength and Conditioning Journal, 26*(6), 42–52.

Comfort, P., & Stone, M. H. (2014). The relationship between strength, sprint, and jump performance in junior athletes. *Journal of Strength and Conditioning Research, 28*(6), 1491–1496.

Cronin, J., & Hansen, K. (2005). Strength and power predictors of sports speed. *Journal of Strength and Conditioning Research, 19*(2), 349–357.

Delextrat, A., & Kraemer, W. J. (2002). Performance changes resulting from strength training in female basketball players. *Journal of Strength and Conditioning Research, 16*(1), 63–69.

Duthie, G. M., Young, W. B., & Aitken, D. A. (2002). The reliability of a repeated sprint test for collegiate hockey players. *Journal of Strength and Conditioning Research, 16*(2), 296–299.

Hoffman, J. R., Kraemer, W. J., & Fry, A. C. (1991). The effects of a 2year strength training program on elite college athletes. *Journal of Strength and Conditioning Research, 5*(2), 116–126.

Keogh, J. W. (1999). Physiological adaptations to resistance training in female athletes. *Sports Medicine, 27*(3), 177–188.

Kraemer, W. J., & Ratamess, N. A. (2004). Fundamentals of resistance training: Progression and exercise prescription. *Medicine & Science in Sports & Exercise, 36*(4), 674–688.

Lockie, R. G., Murphy, A. J., & Spinks, C. D. (2003). Effects of resisted sled towing on sprint performance. *Journal of Strength and Conditioning Research*, *17*(4), 760–767.

Maud, P. J., & Foster, C. (2006). Physiological assessment of elite hockey players. *International Journal of Sports Physiology and Performance*, *1*(2), 183–196.

Newton, R. U., Kraemer, W. J., & Hakkinen, K. (1999). Effects of heavy resistance training on motor performance in collegiate athletes. *Journal of Strength and Conditioning Research*, *13*(3), 208–219.

Young, W. B., Wilson, G., & Byrne, C. (1999). Relationship between strength qualities and sprint performance in elite athletes. *European Journal of Applied Physiology*, *79*(4), 334–339.