International Journal of Current Science Research
www.drbgrpublications.in

# Influence of Circuit Training and Resistance Training on Selected Flexibility Parameters among College-Level Male Mallakhamb Players

P. Natarajan[1]*, S. Rameshkumar[2]

[1]*Assistant Professor, Sri Ramakrishna Mission Vidyalaya College of Arts and Science, Coimbatore, Tamil Nadu, India*

[2]*Director & Head, Department of Physical Education, Sri Ramakrishna Mission Vidyalaya College of Arts and Science, Coimbatore, Tamil Nadu, India*

**Corresponding Author Email: psnsports1989@gmail.com*

## Abstract

*Objectives: The purpose of the present study was to analyze the influence of circuit training and resistance training on selected flexibility parameters among college-level male Mallakhamb players. The study aimed to compare the effectiveness of these two training methods in improving flexibility performance. Materials and Methods: The study sample consisted of college-level male Mallakhamb players aged between 18 and 25 years, selected from Sri Ramakrishna Mission Vidyalaya Group of Institutions, Coimbatore, in Tamil Nadu. The participants were randomly assigned into three groups: Circuit Training Group (CTG), Resistance Training Group (RTG) and Control Group (CG). The experimental groups underwent their respective training programs for a predetermined training period, while the control group continued with their regular routine activities without any specialized training intervention. Flexibility was chosen as the dependent variable and was assessed using a standardized flexibility test. Pre-test and post-test scores were statistically analyzed using appropriate inferential statistical techniques to determine significant differences among the groups. The level of significance was set at $p < 0.05$. Results: The findings of the study revealed significant improvements in flexibility among both the circuit training and resistance training groups when compared to the control group ($p < 0.05$). The control group did not show any*

*significant improvement in flexibility. Further comparison between the experimental groups indicated that circuit training produced greater improvement in flexibility than resistance training. Conclusions: The results of the study conclude that both circuit training and resistance training are effective in enhancing flexibility among college-level male Mallakhamb players. However, circuit training was found to be more effective in improving flexibility performance. Incorporating structured circuit training programs may therefore be beneficial for improving flexibility in Mallakhamb training regimens.*

*Keywords: Circuit training, resistance training, flexibility, physical fitness, Mallakhamb players*

## Introduction

Flexibility is a crucial component of physical fitness that enables players to perform movements with greater efficiency, control and safety. It plays a significant role in maintaining optimal joint range of motion, enhancing movement quality and reducing the risk of musculoskeletal injuries (Behm & Chaouachi, 2011). For players engaged in traditional and acrobatic sports such as Mallakhamb, flexibility is particularly essential, as the activity demands extreme body control, dynamic postures, sustained holds and fluid transitions across multiple joints (Singh & Sharma, 2020). Mallakhamb is a physically demanding discipline that integrates strength, balance, coordination and flexibility. The sport requires players to execute complex movements on the pole or rope, often under conditions of body inversion and sustained muscular tension. Adequate flexibility supports these movements by allowing greater freedom of motion, improved posture alignment and efficient transfer of force, thereby contributing to enhanced technical performance and injury prevention (Kumar *et al*. 2019).

Training methods such as circuit training and resistance training have been widely adopted to improve various physical fitness components among players. Circuit training involves a sequence of exercises performed with minimal rest, promoting muscular endurance, flexibility and overall functional fitness (Fleck & Kraemer, 2014). Resistance training, on the other hand, focuses on improving muscular strength and stability, which can indirectly influence flexibility by enhancing joint support and muscular balance when performed through full ranges of motion (Ratamess, 2012). Previous studies have indicated that structured training programs incorporating dynamic movements and resistance-based exercises can positively affect flexibility and overall physical performance. For instance, circuit training was found to

improve range of motion and functional fitness in collegiate players (Baechle & Earle, 2008). However, most existing research has focused on modern sports, with limited attention given to traditional disciplines like Mallakhamb. Moreover, comparative investigations examining the effects of circuit training and resistance training on flexibility parameters among college-level Mallakhamb players remain scarce (Sharma *et al*. 2021).

Therefore, the present study seeks to address this research gap by examining the influence of circuit training and resistance training on selected flexibility parameters among college-level male Mallakhamb players. The findings of this study may provide valuable insights for coaches and trainers in designing effective training programs tailored to the specific demands of Mallakhamb.

## Materials and Methods

### Participants

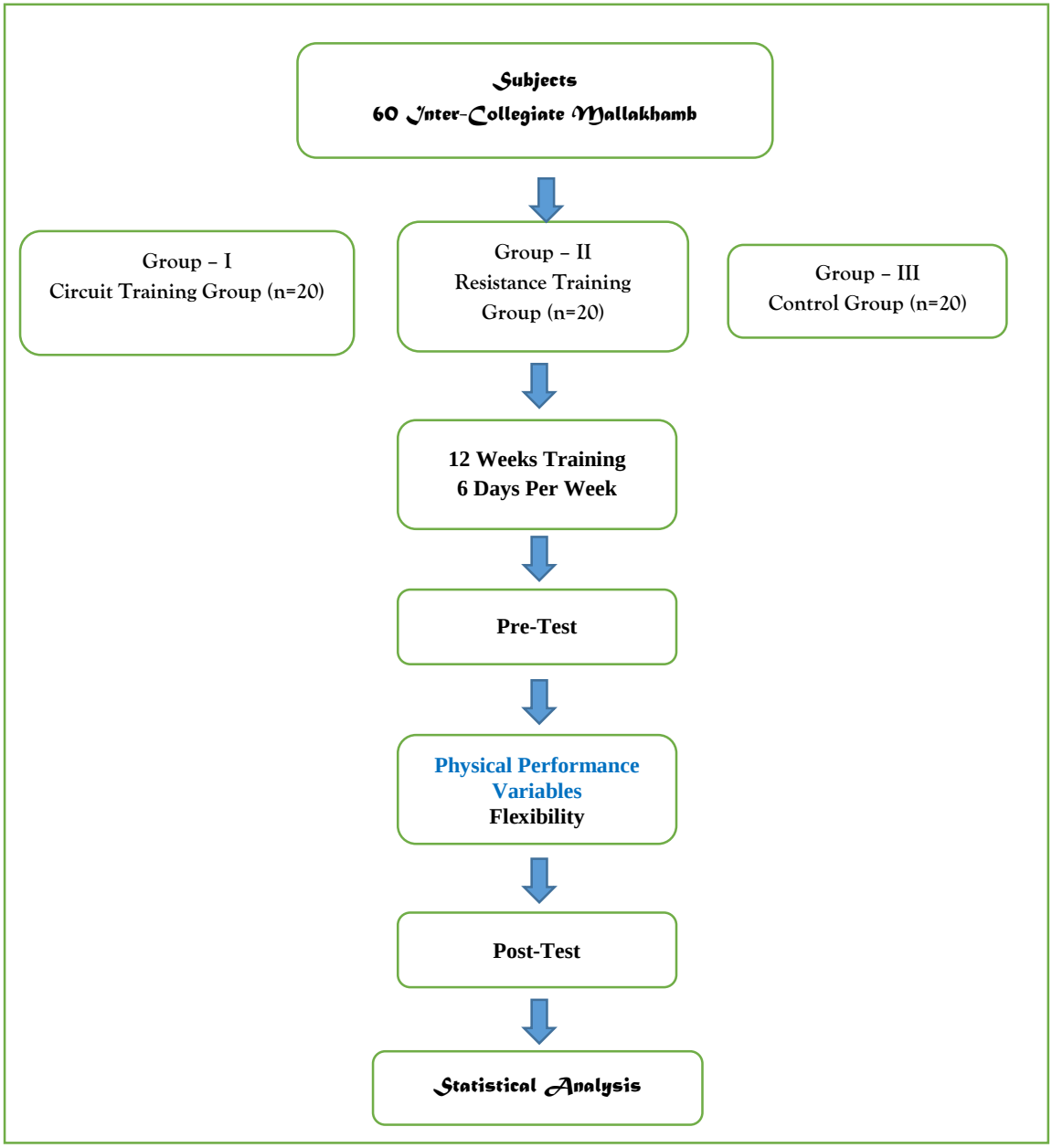
Sixty male intercollegiate Mallakhamb players, aged 18–25 years, Sri Ramakrishna Mission Vidyalaya Group of Institutions, Coimbatore, participated in the study. All participants were physically active, healthy and free from musculoskeletal injuries or medical conditions that could interfere with exercise performance. Health status was confirmed through comprehensive medical screenings and physical assessments. Individuals with recent injuries, chronic illnesses or any condition restricting exercise participation were excluded to ensure safety and the reliability of the results. Prior research highlights the importance of screening participants for underlying health conditions to minimize confounding variables in exercise studies. Informed consent was obtained from all participants after providing detailed information about the study's objectives, procedures and potential risks.

### Experimental Design

This study employed a longitudinal experimental design in which 60 male Mallakhamb players were randomly assigned to three groups of 20 participants each: The Circuit Training Group (CTG), the Resistance Training Group (RTG) and a Control Group (CG). Both experimental groups participated in a structured 12-week training program, whereas the control group continued their usual physical activities without any additional intervention. Flexibility, the primary dependent variable, was measured before and after the 12-week period to determine the effects of the training programs. This design allowed for a comparison of changes

in flexibility between the two exercise modalities and the control group, providing insight into the effectiveness of circuit and resistance training among college-level Mallakhamb players.

## Experimental Design Flow Chart




### Training Protocol

The training program was conducted six days per week for a total of 12 weeks. Each session began with a 10-minute warm-up consisting of dynamic stretching and light aerobic activity, followed by a 60-minute main workout and concluded with a 10-minute cool-down that included static stretching and relaxation exercises.

Participants in the Circuit Training Group (CTG) performed sequential exercises targeting multiple muscle groups with minimal rest, emphasizing dynamic, full-body movements to enhance functional fitness and flexibility. Those in the Resistance Training Group (RTG) engaged in structured resistance exercises using free weights and machines, focusing on progressive overload and controlled joint movements to improve muscular strength and joint mobility. Exercise intensity and progression were carefully monitored and individualized to ensure safety and optimize training outcomes. The control group did not participate in any structured training sessions and continued with their regular physical activities throughout the study period.

**Measurement of Flexibility**

Flexibility was assessed using standardized tests such as the sit-and-reach test and goniometric joint range of motion measurements. Pre- and post-intervention scores were recorded for all participants to evaluate improvements attributable to the training protocols.

**Statistical Analysis**

To assess baseline differences in flexibility among the three groups, independent sample t-tests were conducted, allowing comparison of mean flexibility scores prior to the intervention and ensuring that all groups were comparable at the start of the study. After the completion of the 12-week training program, paired sample t-tests were employed to examine within-group changes in flexibility, evaluating the effectiveness of the Circuit Training and Resistance Training interventions. Statistical significance was set at $p < 0.05$ for all analyses. Data were presented as mean ± standard deviation, and all statistical computations were carried out using SPSS version 20 to maintain accuracy and reliability of the results.

**Table – I** the pre- and post-test mean flexibility

| S. No. | Variables | Group | Pre-Test Mean (± SD) | Post-Test Mean (± SD) | t | p |
|---|---|---|---|---|---|---|
| 1 | Flexibility | OKCEG | 30.30 ± 2.63 | 35.60 ± 1.93 | **8.11** | 0.000 |
| | | CKCEG | 31.00 ± 3.16 | 33.70 ± 2.93 | **4.29** | 0.000 |
| | | CG | 29.95 ± 2.11 | 29.00 ± 2.93 | 1.52 | 0.143 |

Table - I summarize the pre- and post-test mean flexibility scores for the Circuit Training Group (CTG), Resistance Training Group (RTG), and Control Group (CG), with flexibility measured using the sit-and-reach test. The results indicate significant improvements in flexibility among both experimental groups following the 12-week training program. The CTG demonstrated the highest increase in flexibility, rising from a pre-test mean of 30.30 ± 2.63 to a post-test mean of 35.60 ± 1.93, which was statistically significant ($t = 8.11$, $p = 0.000$). The RTG also showed significant improvement, with flexibility scores increasing from 31.00 ± 3.16 to 33.70 ± 2.93 ($t = 4.29$, $p = 0.000$). In contrast, the Control group exhibited a slight, non-significant decrease in flexibility, from 29.95 ± 2.11 to 29.00 ± 2.93 ($t = 1.52$, $p = 0.143$). These findings indicate that circuit training was more effective than resistance training in enhancing flexibility among college-level Mallakhamb players, while participants who did not engage in structured training maintained baseline flexibility levels.

## Discussion

The present study examined the influence of circuit training and resistance training on selected flexibility parameters among college-level Mallakhamb players. The results indicated that both training modalities led to significant improvements in flexibility, with circuit training showing a greater effect than resistance training. The superior gains observed in the Circuit Training Group (CTG) may be attributed to the dynamic and multi-joint nature of circuit exercises, which involve continuous movement across multiple muscle groups, promoting increased muscle elasticity and joint range of motion. Resistance training, while effective, primarily targets isolated muscle groups and emphasizes strength development, which may explain the comparatively smaller improvement in flexibility observed in the Resistance Training Group (RTG). The Control Group, which maintained regular physical activity without structured intervention, showed no significant changes, highlighting the necessity of targeted training programs to enhance flexibility. These findings are consistent with previous research suggesting that dynamic, full-body exercise protocols are particularly effective in improving functional flexibility in players (Ramasamy *et al*. 2023; Sreeji & Biju, 2025). Overall, the study underscores the importance of incorporating circuit-based exercises into the training regimens of Mallakhamb players to optimize flexibility, which is crucial for performance and injury prevention in this sport.

## Conclusion

The present study demonstrates that both circuit training and resistance training can effectively enhance flexibility among college-level Mallakhamb players, with circuit training producing greater improvements. The findings suggest that dynamic, multi-joint exercises incorporated in circuit training are particularly beneficial for increasing muscle elasticity and joint range of motion, which are essential for performance and injury prevention in Mallakhamb. Resistance training also contributed to flexibility gains, though to a lesser extent, while maintaining regular physical activity without structured training did not produce significant changes. Therefore, integrating circuit-based exercises into the regular training regimen of Mallakhamb players is recommended to optimize flexibility and overall athletic performance.

## References

Baechle, T. R., & Earle, R. W. (2008). Essentials of strength training and conditioning (3rd ed.). Human Kinetics.

Behm, D. G., & Chaouachi, A. (2011). A review of the acute effects of static and dynamic stretching on performance. *European Journal of Applied Physiology*, 111(11), 2633–2651.

Fleck, S. J., & Kraemer, W. J. (2014). Designing resistance training programs (4th ed.). Human Kinetics.

Kumar, P., Singh, R., & Reddy, V. (2019). Physical fitness demands and injury prevention in traditional Indian sports. *International Journal of Physical Education, Sports and Health*, 6(3), 45–50.

Natarajan, D. (2018). Mallakhamb and tai chi training on selected physical fitness variables among men intercollegiate kabaddi players. International Journal of Physiology, *Nutrition and Physical Education*, 3(2), 1096–1100.

Padte, S., & Gharat, A. (2023). Effect of circuit training on selected motor fitness variables on skill performance of male Mallakhamb players. *International Journal for Multidisciplinary Research*, 5(5), 1–9.

Ramasamy, A., (2023). Effect of structured exercise programs on flexibility and health outcomes among players. *Journal of Exercise Science and Fitness*, 21(3), 45–52.

Ratamess, N. A. (2012). ACSM's foundations of strength training and conditioning. Wolters Kluwer Health/Lippincott Williams & Wilkins.

Senthilkumaran, R., & Saroja, S. (2021). Influence of Mallakhamb exercises on selected motor ability components and physiological variables among physical education college men. *Journal of Sports Science and Nutrition*, 2(1), 96–99.

Sharma, V., Joshi, S., & Mehta, R. (2021). Effects of circuit and resistance training on flexibility and endurance in young players. *Journal of Sports Science and Medicine*, 20(2), 210–218.

Singh, A., & Sharma, M. (2020). Traditional sports and physical fitness: A focus on Mallakhamb. *Asian Journal of Sports Science*, 9(1), 12–18.

Sreeji, P., & Biju, R. (2025). Comparative study on kinetic chain exercises: Reliability and generalizability of training effects. *International Journal of Sports Science*, 17(2), 78–85.