

A Comparative Study to Find Out the Effectiveness of Neuromuscular Training Versus Progressive Resistance Training with Kinesiotaping for Ankle Instability in Kabaddi Players

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DOI: <https://doi.org/10.52403/gijhsr.20260407>

ABSTRACT

Background: Chronic ankle instability (CAI) is a common consequence of recurrent ankle sprains, particularly among Kabaddi players due to the sport's frequent jumping, rapid directional changes, and physical contact. Persistent ankle instability can result in pain, impaired proprioception, reduced functional performance, and increased risk of recurrent injuries. Neuromuscular Training (NMT) and Progressive Resistance Training (PRT), when combined with Kinesiotaping (KT), are commonly used rehabilitation approaches to improve ankle stability.

Methodology: A quasi-experimental study with 30 participants having chronic ankle instability divided into two groups of 15 each was conducted. Group A underwent Neuromuscular Training with Kinesiotaping, and Group B received Progressive Resistance Training with Kinesiotaping for one hour, three times a week, over six weeks. Functional performance and pain were assessed using the FAAM-Sports scale and VPIS. Data were analyzed with paired and unpaired t-tests to compare within- and between-group differences.

Results: Both treatment groups demonstrated significant improvements in pain reduction and functional ability following the intervention. However, Group A showed greater improvement than Group B. The post-test mean VPIS score was 3.2 in Group A and 4.7 in Group B, while the post-test FAAM-Sports score was 84.8 in Group A and 77.1 in Group B, indicating superior outcomes with Neuromuscular Training combined with Kinesiotaping.

Conclusion: The study concludes that Neuromuscular Training with Kinesiotaping is more effective than Progressive Resistance Training with Kinesiotaping in reducing pain and improving ankle stability in Kabaddi players with chronic ankle instability. These results support using neuromuscular rehabilitation in physiotherapy for athletes.

Keywords: Chronic Ankle Instability, Neuromuscular Training, Progressive Resistance Training, Kinesiotaping, Kabaddi Players, FAAM-Sports, Verbal Pain Intensity Scale.

INTRODUCTION

Ankle instability (AI) is a major concern in high-demand, multidirectional sports such as

Kabaddi, where athletes perform rapid raiding, dodging, sudden stops, directional changes, and ankle-hold tackles.¹ The prevalence of sports-related injuries among Indian Kabaddi players is high, with current injury rates estimated at 42.5% and major injuries affecting 62.5% of players over two years. Knee (23%) and ankle (21%) injuries are the most common musculoskeletal problems, while ACL tears are the most frequent specific injury.² Lateral ankle sprains, particularly involving the anterior talofibular ligament (ATFL), are the predominant ankle injuries and often result from excessive inversion of the foot. Poor healing may lead to chronic ankle instability (CAI), characterised by ligament laxity, proprioceptive deficits, impaired balance, and weakness of the peroneal muscles.³ Rehabilitation of CAI should address both mechanical and functional impairments. Neuromuscular Training (NMT) improves functional ankle stability by enhancing proprioceptive awareness, postural control, coordination, and neuromuscular responses. It also facilitates timely activation of key stabilizing muscles, including the peroneus and tibialis anterior, thereby reducing the risk of recurrent ankle instability.⁴ Progressive Resistance Training (PRT), on the other hand, focuses on increasing the strength and endurance of the ankle musculature through graded resistance exercises, leading to improved joint support, functional performance, and overall ankle stability. Ankle evertors and dorsiflexors through gradually increasing resistance, restoring muscle strength and endurance essential for ankle stability.⁵ Kinesio Taping (KT), developed by Kenzo Kase, complements rehabilitation by providing elastic support while enhancing proprioceptive feedback through stimulation of cutaneous mechanoreceptors. Common KT techniques include mechanical, functional, fascia, space, lymphatic, and hole-and-web corrections.⁶ In athletes with ATFL injury and peroneal tendon dysfunction, mechanical correction assists in limiting peroneal tendon subluxation by

supporting the peroneal retinaculum, while functional and lymphatic correction techniques improve sensorimotor control, reduce swelling, and promote functional recovery.⁷ Functional performance and pain were assessed using the FAAM-Sports scale and VPIS.^{8,9} Data were analyzed with paired and unpaired t-tests to compare within- and between-group differences.

MATERIALS & METHODS

This quasi-experimental study was conducted in the Outpatient Department (OPD) at JKKMMRF College of Physiotherapy over a total duration of 8 months, with each participant undergoing a 6-week intervention period. Using convenient sampling, a sample size of 30 Kabaddi players with chronic ankle instability was selected and equally divided into two groups of 15: Group A received Neuromuscular Training (NMT) combined with Kinesiotaping (KT), while Group B received Progressive Resistance Training (PRT) combined with Kinesiotaping (KT).

Inclusion Criteria

- Athletes with Age group of 20-45 years.
- Patient with good attention
- Male Kabaddi players with ankle instability.

Exclusion Criteria

- Recent ankle injury
- Ankle dislocation
- Fracture of both bone
- Foot Deformities
- Generalized Joint Laxity
- Acute Inflammation
- Skin Hypersensitivity (for Kinesiotaping)
- Players currently receiving other forms of physiotherapy, corticosteroid injections (within the last 3–6 months), or using rigid ankle bracing regularly.

Procedure

The patients were informed about the entire treatment procedure with a brief

demonstration of the merits and demerits. Thirty patients with evidence of ankle instability were recruited for the study after due consideration of the inclusion and exclusion criteria.

Before the intervention, all participants in both Group A and Group B underwent baseline assessment using the Foot and Ankle Ability Measure–Sport (FAAM-Sport) Scale and the Verbal Pain Intensity Scale (VPIS).

Group A, Phase 1 (Weeks 1–2) focuses on restoring proprioception and static balance with basic exercises like single-leg balance and calf raises. Phase 2 (Weeks 3–4) introduces dynamic stabilization using unstable surfaces and active movement, including star excursion reach and foam squats. Phase 3 (Weeks 5–6) emphasizes reactive and plyometric exercises such as hop-to-stabilization, lateral skater hops, and ladder drills to build explosive power and prevent reinjury.

Group B subjects were treated with progressive resistance training combined with Kinesio taping for 1 hour, 3 sessions per week, for 6 weeks. For Group B, Phase 1 (Weeks 1–3) centers on isolated strength and isometric exercises to rebuild baseline muscle strength. Phase 2 (Weeks 4–6) develops neuromuscular control and balance with single-leg balance progressions and star excursion reaches. Finally, Phase 3 (Weeks 7+) prepares the ankle for dynamic and functional movements that simulate real-life and sports activities, enhancing stability on uneven terrain and during impact.

DATA ANALYSIS

Data analysis was conducted to compare the effectiveness of Neuromuscular Training

with Kinesiotaping (Group A) and Progressive Resistance Training with Kinesiotaping (Group B) in improving functional ability and reducing pain among Kabaddi players with chronic ankle instability.¹⁰ Functional ability was assessed using the Foot and Ankle Ability Measure–Sports (FAAM-Sports) Scale, and pain intensity was measured by the Verbal Pain Intensity Scale (VPIS). Statistical analysis involved paired t-tests to evaluate within-group pre- and post-intervention changes in FAAM-Sports and VPIS scores. Unpaired t-tests were used to compare the post-intervention scores between the two groups. A p-value of less than 0.05 was considered statistically significant for all analyses conducted in the study. Data were analyzed using appropriate statistical software to determine the effectiveness of each intervention approach.¹¹

RESULT

(Post-Test Comparison: Groups A and B):

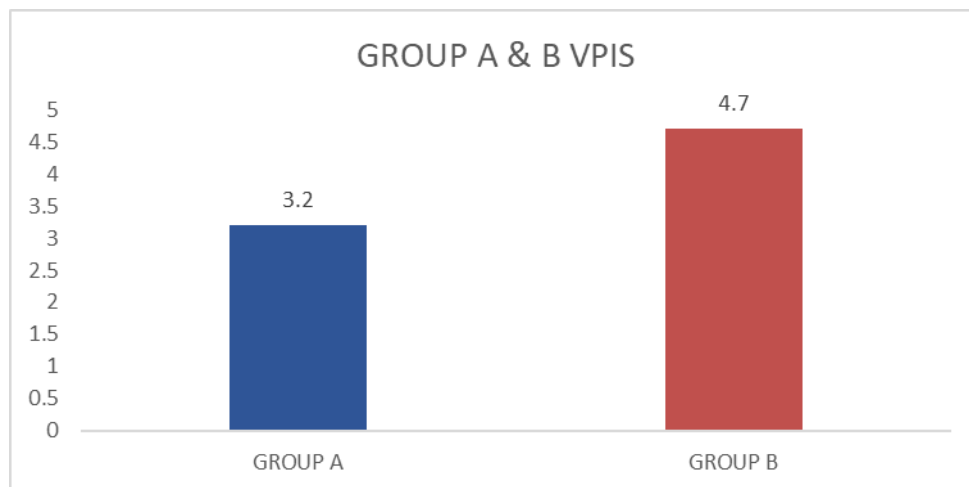
The post-test scores of Group A and Group B were compared using the Verbal Pain Intensity Scale (VPIS). The analysis included the calculation of the mean, mean difference, standard deviation, and the independent (unpaired) t-test to determine differences between the two intervention groups. Group A received neuromuscular training combined with Kinesio taping, whereas Group B underwent progressive resisted exercise combined with Kinesio taping. The findings were used to evaluate the relative effectiveness of the two treatment approaches in reducing pain following the intervention period.¹²

VPIS	Mean	Mean difference	Standard deviation	Un Paired t value
Group A	3.2	1.53	1.21	3.83
Group B	4.7		0.96	

The post test mean of group A was 3.2 and the post test mean of group B was 4.7 and the mean difference of group A and group B was 1.53. The unpaired ‘t’ test values of 3.83

greater than tabulated value. P value is of .05, which showed that there was statistically significant reduction in pain for chronic ankle instability kabbadi players in response

treatment in group A when compared to group B



GRAPH-I

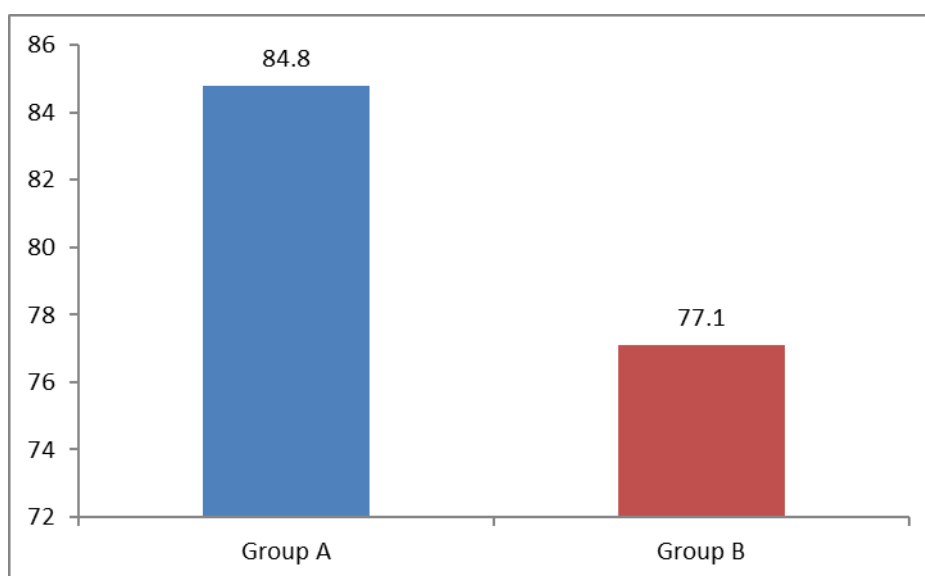
The comparative mean values, mean difference, standard deviation and unpaired 't' test value between post test versus post test values of FAAM S group A and group B patients who have been subjected to

Neuromuscular Training with Kinesiotaping vs progressive resisted training with kinesiotaping for chronic ankle instability kabbadi players.

FAAMS Scale	Mean	Mean difference	Standard deviation	Un Paired t value
Group A	84.8	7.7	7	2.7
Group B	77.1		8.1	

The post-test mean of group A was 84.8 and post-test mean of group B was 77.1 and the mean difference of group A and group B was 7.7. The unpaired 't' test values of 2.7 was greater than the tabulated P value of 0.05,

which showed that there was statistically significant increase the functional ability for chronic ankle instability kabbadi players in response treatment in Group A and Group B.



GRAPH -II

DISCUSSION

Group A (Neuromuscular Training with Kinesiotaping) showed a significant reduction in pain (VPIS pretest mean: 7.33, posttest mean: 3.20; mean difference: 4.13; $p = 0.05$) and a significant increase in functional ability (FAAM-Sports pretest mean: 67.1, posttest mean: 77.1; mean difference: 10.01; $p = 0.05$).¹³

Group B (Progressive Resistance Training with Kinesiotaping) also demonstrated significant pain reduction (VPIS pretest mean: 7.27, posttest mean: 4.73; mean difference: 2.53; $p = 0.05$) and improved function (FAAM-Sports pretest mean: 67.1, posttest mean: 77.1; mean difference: 10.01; $p = 0.05$).¹⁴

Between-group comparisons showed Group A had significantly greater pain reduction (posttest VPIS mean difference: 1.53; $p = 0.05$) and higher functional improvement (posttest FAAM-Sports mean difference: 7.7; $p = 0.05$) than Group B.

The study concluded Neuromuscular Training with Kinesiotaping is more effective than Progressive Resistance Training with Kinesiotaping in reducing pain and improving ankle stability in Kabaddi players with chronic ankle instability.¹⁵

Based on the statistical findings, the null hypothesis was rejected in favour of the alternative hypothesis.

CONCLUSION

Based on the results the study concluded that Neuro muscular Training with Kinesiotaping was effective in reduction of pain and improvement in ankle stability when compared progressive resisted training with kinesiotaping in patients with chronic Ankle Instability.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: None

Source of Funding: None

Conflict of Interest: no conflict of interest.

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- How to cite this article: Mohankumar P, Ferdinand Robert, Kannan Dhasaradharaman, Thenmozhi M P, Anantharaj K. A comparative study to find out the effectiveness of neuromuscular training versus progressive resistance training with Kinesiotaping for ankle instability in kabaddi players. *Gal Int J Health Sci Res.* 2026; 11(4): 60-65. DOI: <https://doi.org/10.52403/gijhsr.20260407>
