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Effectiveness of Myofascial Release versus Faradic Foot Bath on Foot Alignment and Foot Posture in Individuals with Flexible Pes Planus: A Comparative Study

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Abstract

Background: Flexible pes planus is characterized by collapse of the medial longitudinal arch during weight-bearing, leading to altered foot biomechanics and functional impairment.

Objective: To compare the effectiveness of myofascial release and faradic foot bath in improving foot alignment and foot posture in young adults with flexible pes planus.

Material and Methods: A comparative experimental study was conducted among 30 participants aged 18–25 years with flexible pes planus. Participants were allocated into two groups (n=15 each). Group A received myofascial release to the gastrocnemius and soleus muscles, while Group B received faradic foot bath targeting the intrinsic foot muscles. Interventions were provided for four weeks. Outcomes were assessed using the Navicular Drop Test (NDT) and Foot Posture Index-6 (FPI-6) before and after treatment.

Results: Both groups demonstrated significant improvements in NDT and FPI-6 scores following intervention. However, the faradic foot bath group showed significantly greater improvement than the myofascial release group in both outcome measures.

Conclusion: Both interventions were effective in improving foot alignment and posture; however, faradic foot bath demonstrated superior clinical effectiveness in young adults with flexible pes planus.

Keywords: Pes planus; Myofascial release; Electrical stimulation therapy; Navicular Drop Test; Foot Posture Index; Young adults

INTRODUCTION

Pes planus, commonly known as flat foot, is a postural deformity characterized by a reduction or collapse of the medial longitudinal arch during weight-bearing activities. In flexible pes planus, the arch is preserved in non-weight-bearing but collapses during standing, resulting in excessive foot pronation and altered biomechanics. These changes may impair normal foot function and contribute to discomfort and reduced physical performance.

Flexible pes planus is prevalent among young adults and may be associated with factors such as tightness of the triceps surae, ligament laxity, obesity, posterior tibial tendon dysfunction, and plantar

fascial insufficiency. Clinical assessment commonly includes the Navicular Drop Test (NDT) and the Foot Posture Index-6 (FPI-6), which provide reliable measures of foot alignment and posture.

Myofascial release aims to reduce fascial restrictions and improve flexibility of the gastrocnemius–soleus complex, whereas faradic foot bath activates the intrinsic foot muscles through electrical stimulation, potentially improving neuromuscular control and dynamic support of the medial longitudinal arch. Although both interventions have shown beneficial effects individually, evidence directly comparing their effectiveness in individuals with flexible pes planus remains limited.

Therefore, the present study was undertaken to compare the effectiveness of myofascial release and faradic foot bath on foot alignment and foot posture in young adults with flexible pes planus.

MATERIALS AND METHODS

Study Design: A comparative experimental study was conducted among 30 college students with flexible pes planus. Ethical approval was obtained from the Institutional Ethics Committee of Revathi Institute of Physiotherapy and Research (RIPR/DT/21/4530), and written informed consent was obtained from all participants before enrolment.

Participants: Thirty participants aged 18–25 years who met the eligibility criteria were recruited using convenience sampling and allocated equally into Group A (n=15) and Group B (n=15).

Inclusion and Exclusion Criteria: Participants were aged 18–25 years, had a body mass index of 18–25 kg/m², and a navicular drop greater than 10 mm. Individuals with foot pain, previous foot surgery or trauma within the last 6 months, skin infection or wounds, pregnancy, peripheral neuropathy, or peripheral vascular disease were excluded.

Interventions: Group A received myofascial release to the gastrocnemius and soleus muscles using slow sustained pressure followed by stretching. Group B received faradic foot bath targeting the intrinsic foot muscles. Both interventions were administered on alternate days, three sessions per week, for four weeks.

Outcome Measures: Foot alignment was assessed using the Navicular Drop Test (NDT), and foot posture was assessed using the Foot Posture Index-6 (FPI-6). Measurements were recorded before and after the intervention period.

Statistical Analysis: Data were analysed using SPSS version 24. The Shapiro–Wilk test assessed normality. Paired t-tests were used for within-group comparisons and independent t-tests for between-group comparisons. Statistical significance was set at $p \leq 0.05$.

RESULTS

Thirty participants completed the study and were equally allocated to Group A (Myofascial Release) and Group B (Faradic Foot Bath). Both groups showed significant improvements in Navicular Drop Test (NDT) and Foot Posture Index-6 (FPI-6) scores after four weeks of intervention. However, the Faradic Foot Bath group demonstrated significantly greater improvement than the Myofascial Release group.

Navicular Drop Test (NDT)

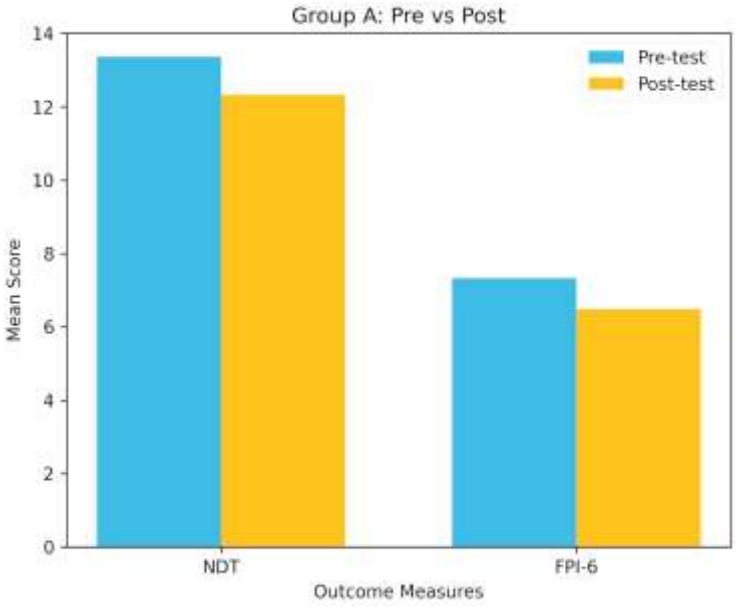
- **Between-Group Comparison:** Baseline NDT scores showed no statistically significant difference between Group A and Group B ($p = 0.941$). Post-intervention, Group B exhibited a statistically significant lower mean score (10.36 ± 2.46) compared to Group A (12.33 ± 2.42), $t = 2.20$, $p = 0.001$.
- **Within-Group Comparison:** Both groups demonstrated statistically significant reductions from pre- to post-test: Group A ($t = 7.27$, $p = 0.001$) and Group B ($t = 9.29$, $p = 0.001$).

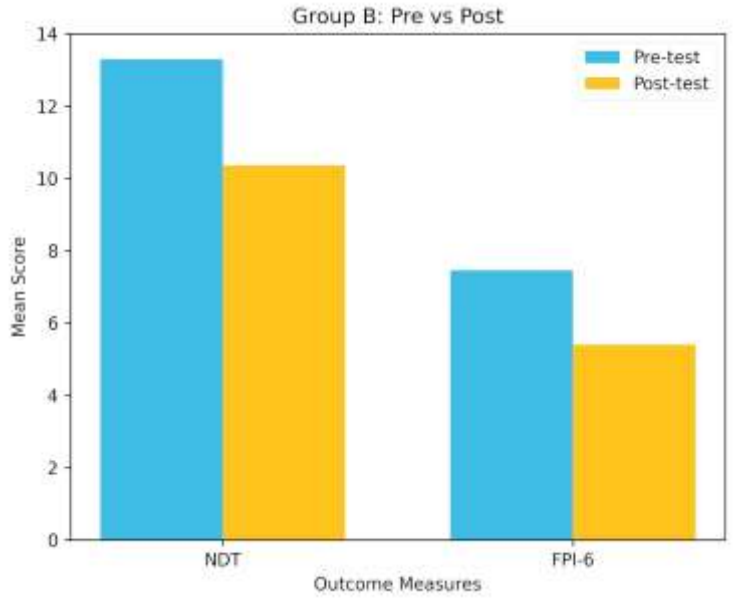
Foot Posture Index (FPI-6)

- **Between-Group Comparison:** Pre-intervention FPI-6 baseline values showed no significant difference between groups ($p = 0.731$). Following intervention, Group B demonstrated significantly lower scores (5.40 ± 0.81) compared to Group A (6.49 ± 1.29), $t = 2.78$, $p = 0.001$.
- **Within-Group Comparison:** Both groups showed significant improvements post-treatment: Group A ($t = 64.57$, $p = 0.001$) and Group B ($t = 11.80$, $p = 0.001$).

Variables	Group A mean SD ± Myofascial release	Group B mean SD ± Faradic foot bath	t-value	p- value

Navicular drop test (NDT)	12.33 ± 2.42	10.36 ± 2.46	0.075	0.941
Foot Posture index (FPI-6)	6.49 ± 1.29	5.40 ± 0.81	0.347	0.731





DISCUSSION

The present study compared the effectiveness of myofascial release (MFR) and faradic foot bath (FFB) in improving foot alignment and foot posture among young adults with flexible pes planus. Both interventions produced statistically significant improvements in Navicular Drop Test (NDT) and Foot Posture Index-6 (FPI-6) scores after four weeks of treatment. However, participants who received faradic foot bath demonstrated significantly greater improvement than those who received myofascial release.

The superior outcomes observed in the faradic foot bath group may be attributed to enhanced activation of the intrinsic foot muscles, including the abductor hallucis, lumbricals, and plantar interossei. Improved neuromuscular recruitment and muscle strength provide greater dynamic support to the medial longitudinal arch, thereby reducing excessive pronation and improving foot posture. In contrast, myofascial release primarily improves soft-tissue flexibility and reduces fascial restrictions within the gastrocnemius–soleus complex, which may improve ankle mobility but has a comparatively smaller effect on intrinsic muscle strength.

The findings of the present study are consistent with previous studies cited in the manuscript, which reported beneficial effects of faradic foot bath and intrinsic foot muscle strengthening in individuals

with flexible pes planus. Overall, the results suggest that both interventions are clinically effective, although faradic foot bath may offer greater improvement in foot alignment and posture in young adults with flexible pes planus.

CONCLUSION AND DECLARATIONS

Conclusion

Both myofascial release and faradic foot bath were effective in improving foot alignment and foot posture in young adults with flexible pes planus. However, faradic foot bath demonstrated greater improvement in both Navicular Drop Test and Foot Posture Index-6 outcomes, suggesting that it may be the more effective physiotherapy intervention.

Limitations and Recommendations

The study included a relatively small sample size and a short intervention period of four weeks. No long-term follow-up was performed. Future studies should include larger samples, longer intervention durations, follow-up assessments, and additional outcome measures.

Ethics Approval: Ethical approval was obtained from the Institutional Ethics Committee of Revathi Institute of Physiotherapy and Research.

Informed Consent: Written informed consent was obtained from all participants before enrolment.

Conflict of Interest: The authors declare no conflict of interest.

Funding: No external funding was received for this study.

Author Contributions:

Dr. Safwana Puthan Peedikakkal: Conceptualization, Methodology, Participant recruitment, Data collection, Formal analysis, Manuscript drafting.

Dr. Nithya V: Supervision, Methodology validation, Critical revision of the manuscript, Final approval of the manuscript.

Dr. P. Bright Alwin Victor: Research guidance, Manuscript review, Administrative support, Final approval of the manuscript.

Data Availability: The datasets are available from the corresponding author upon reasonable request.

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