

EVALUATING PASSIVE MAITLAND AND MANUAL THERAPY EFFECTS ON ANKLE RANGE OF MOTION AND EXPLOSIVE POWER

01. INTRODUCTION

- Human movement relies on biomechanics, neuromuscular control, and physiological adaptation.
- The ankle joint plays a vital role in daily and athletic activities like walking, running, and jumping.
- Dorsiflexion (foot moving toward the shin) is key for balance, mobility, and explosive actions.
- Passive Manual Therapy (PMT) is widely used to improve joint mobility without active effort from the patient.
- Research shows PMT improves ankle range of motion (ROM), but its impact on explosive power is underexplored.
- The Maitland mobilisation system (specifically Grade IV) targets ROM improvements through precise joint movement techniques.
- Limited ankle ROM is linked to poor movement efficiency and higher injury risk.
- This study aims to fill the gap by examining how DPMT affects ROM and explosive power, and its effects over a short period.

02. OBJECTIVE

To evaluate the effects of dorsiflexion passive manual therapy (DPMT) on ankle range of motion, explosive power, and to assess any lasting changes over a three-day period.

Related Literature

- Pluegler et al. (2020): Found passive joint mobilisation has short-term benefits on muscle function, but study quality was inconsistent.
- Taylor et al. (2023): Reported significant improvement in ankle dorsiflexion ROM using Maitland mobilisation.
- Ravichandran and Janakiraman (2021): Found Maitland techniques improved gait function and dorsiflexion in stroke patients.
- Pozgai et al. (2021): Showed MMT improved mobility and reduced pain in knee osteoarthritis patients.
- Hall (2016): Found osteopathic manual therapy improved upper body ROM and power output.
- Miles (2016): Reported improved clubhead speed and movement efficiency following osteopathic treatment.
- Mosler et al. (2006): Noted increased hip mobility and potential improvements in jump height after manual therapy in athletes.

03. METHODOLOGY

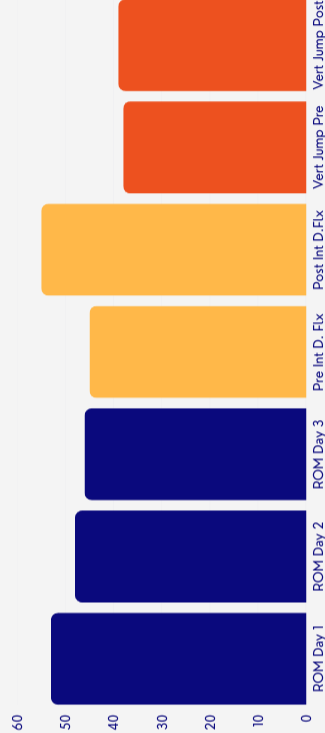
- Participants: 10 physically active university students (6M, 4F), aged 21–50, with no ankle or musculoskeletal issues.
- Design: Repeated-measures study measuring ankle dorsiflexion ROM and vertical jump before, immediately after, and three days post-DPMT.
- Intervention: Grade IV Maitland mobilisations applied for 3 x 60 seconds on both ankles with 1-minute rest intervals.
- Measurement Tools: Goniometer for dorsiflexion ROM; Takie Jump meter for vertical jump performance, using consistent positioning and testing protocols.

05. ANALYSIS

Data analysis involved paired sample t-tests to compare pre- and post-intervention scores for dorsiflexion and vertical jump height, along with Cohen's d to assess effect size. Descriptive statistics were used for mean and standard deviation calculations.

Cohen's D was calculated to measure effect size showing that

- Left ankle: D = 5.87 (very large)
- Right ankle: D = 5.22 (very large)
- Day 1 post-DPMT: D = 2.16 (very large)
- Day 3 post-DPMT: D = 0.25 (small)



04. RESULTS/FINDINGS

- Significant Improvement in Ankle Dorsiflexion ROM: Both left and right ankles showed statistically significant improvements post-DPMT (Left: $M = -10.39$, $p < 0.001$; Right: $M = -9.40$, $p < 0.001$), with very large effect sizes (Cohen's D = 5.87 and 5.22, respectively).
- No Significant Change in Vertical Jump: Vertical jump performance showed a negligible increase of 0.3 cm post-intervention, which was not statistically significant ($p = 0.121$).
- ROM Gains Sustained Short-Term: Dorsiflexion ROM remained significantly improved at Day 1 ($M = -6.19$, $p < 0.001$) and Day 2 ($M = -2.76$, $p < 0.001$) post-DPMT, with large effect sizes.
- ROM Gains Declined by Day 3: By Day 3, dorsiflexion ROM was no longer significantly different from pre-test scores ($p = 0.443$), suggesting the effects of DPMT diminished over time.

06. CONCLUSION

Conclusion of Findings:

- Grade IV dorsiflexion DPMT effectively improves short-term dorsiflexion ROM.
- No positive correlation was found between DPMT and improvement in explosive power.

Limitations:

- Small sample size limited the generalizability of the results.
- Lack of a control group reduced the ability to compare the effectiveness of DPMT against other treatments or no treatment.

Observations:

- The greatest ROM gains occurred within the first two days post-intervention.
- By Day 3, the improvements in dorsiflexion ROM began to fade, indicating a need for continued treatment.

Suggestions for Future Research:

- Increase the number of treatment sessions to assess longer-term benefits.
- Include a control group to better compare DPMT against other interventions.
- Examine the physiological mechanisms behind DPMT to understand its effects more deeply.
- Investigate the impact of DPMT on various populations, such as different age groups or individuals with different musculoskeletal conditions.

Next Steps for Future Studies:

- Use multiple sessions over an extended period to see if continued DPMT maintains ROM gains.
- Combine DPMT with other training techniques to assess effects on explosive power and overall performance.

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