



Wide-Focus Extracorporeal Shock Wave Therapy Targeting Plantarflexor Spasticity After Stroke: Clinical Insights into Muscle Quality and Walking Performance

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BACKGROUND

Plantarflexor spasticity remains a major contributor to gait impairment in chronic stroke, often leading to restricted ankle dorsiflexion, inefficient push-off, and reduced walking speed. However, functional gait improvement does not always occur with spasticity reduction, indicating that other factors, including changes in muscle quality, may influence walking performance.



Outcome assessed before and after intervention included Modified Tardieu Scale (R1, R2), 10-Meter Walk Test, Goal Attainment Scaling (GAS), and Modified Heckmatt Scale (MHS).

OBJECTIVES

To explore the effects of wide-focus extracorporeal shock wave therapy (ESWT) combined with stretching on plantarflexor spasticity, muscle quality, and walking performance in chronic stroke.

AIM

This study aimed to examine the impact of wide-focus ESWT on spasticity modulation, muscle echogenicity, and gait-related functional in chronic stroke.

METHODS



- 5 individual with chronic stroke (Brunnstrom stage 4-5)
- Underwent wide-focus ESWT (Likawave®) once weekly for four weeks
- Intensity level 4, frequency 4 Hz, 1000 pulses per muscle
- Targeting the gastrocnemius medialis, gastrocnemius lateralis, and soleus muscles, combined with standardized plantarflexor stretching



RESULT

All participants completed the intervention without adverse events. Improvements in velocity-dependent plantarflexor spasticity were observed. Changes in R1 and R2 values of the gastrocnemius muscles were not statistical significance, whereas the soleus muscle showed significant improvements (R2: $p = 0.004$; R1: $p = 0.025$). Walking speed increased in all participants and approached statistical significance ($p = 0.056$), accompanied by meaningful gains in walking-related goals (mean GAS score = 1.2). Muscle echogenicity responses varied between individuals; however, a significant overall reduction was observed across the plantarflexor muscles ($p < 0.05$).

CONCLUSION

Wide-focus ESWT combined with stretching was feasible and clinically applicable for managing plantarflexor spasticity in chronic stroke. Improved walking performance may reflect enhanced muscle quality, despite modest spasticity changes. Further controlled studies are warranted.

REFERENCE

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