

Extracorporeal Shock Wave Therapy versus Other Modalities for Treatment of Plantar Fasciitis: A Network Meta-Analysis

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INTRODUCTION:

The purpose of this network meta-analysis (NMA) was to compare the effectiveness of extracorporeal shock wave therapy (ESWT) to other conservative treatment options for the management of plantar fasciitis (PF).

METHODS: A systematic search of PubMed and Google Scholar was conducted for randomized control trials published after 2013 comparing ESWT to other treatment modalities. Studies met inclusion criteria if mean and standard deviations for visual analog scale (VAS) pain scores, plantar fascia thickness (PFT), and total Foot Function Index (FFI) were reported at a follow-up duration of at least 12 weeks after treatment. ESWT was compared against seven other treatment modalities: minimal dose ESWT, topical corticosteroids with ESWT, dextrose prolotherapy, platelet-rich plasma (PRP) injection, corticosteroid injections (CSI), custom orthotics (CO), and placebo. Standardized mean differences (SMD) between groups were calculated and pooled using a random effects model to assess effect size and account for heterogeneity (τ^2, I^2) between studies. P-scores were used to assess the relative effectiveness of different treatments with higher scores indicative of a higher probability of being the most favorable treatment.

RESULTS:

Sixteen studies incorporating 1,247 patients were included in the NMA. VAS scores were compared between 7 treatments with only PRP demonstrating a significantly greater treatment effect (TE) compared to ESWT (TE = -1.05, p=0.009). PFT was compared between 6 treatments with only PRP demonstrating a significantly greater treatment effect compared to ESWT (TE = -0.709, p=0.038). Total FFI score was compared between 6 treatments with ESWT demonstrating a significantly greater treatment effect compared to CSI (TE = 1.07, p= 0.034). ESWT demonstrated an effective P-score for reduction of VAS pain (0.593), PFT (0.451), and FFI (0.483), although inferior to PRP and CO. Substantial heterogeneity was observed between studies for VAS ($\tau^2=0.742, I^2=92\%$), PFT ($\tau^2=0.458, I^2=89.1\%$), and FFI ($\tau^2=0.167, I^2=76.4\%$).

DISCUSSION AND CONCLUSION:

The results of this NMA suggest that ESWT is an effective treatment of PF for the reduction of PFT and improvement of self-reported foot function and pain when evaluated at least 12 weeks after treatment. PRP consistently demonstrated the highest probability of being the most effective treatment. ESWT is likely more effective than CSI for the improvement of functional outcome measures. We conclude that ESWT has equivalent effectiveness compared to the other treatments modalities, although substantial heterogeneity was present in our study.

Outcome	All studies included	Studies included
VAS	<ul style="list-style-type: none"> Abdelhameed et al., 2020 Goel et al., 2021 Haidich et al., 2021 Brennum et al., 2017 Kaikkangas et al., 2021 Lai et al., 2018 Martinez-Koca et al., 2015 Okur et al., 2019 Parsley et al., 2023 Soliman et al., 2018 Xu et al., 2020 Yalcin et al., 2020 Wheeler et al., 2020 Itano et al., 2022 Abdelhameed et al., 2017 Valderrama et al., 2017 	<ul style="list-style-type: none"> ESWT ESWT (minimal dose) ESWT + topical corticosteroid Dextrose prolotherapy PRP Placebo Corticosteroid injections Custom orthotics
	<ul style="list-style-type: none"> Abdelhameed et al., 2020 Goel et al., 2021 Haidich et al., 2021 Brennum et al., 2017 Kaikkangas et al., 2021 Lai et al., 2018 Martinez-Koca et al., 2015 Okur et al., 2019 Parsley et al., 2023 Soliman et al., 2018 Xu et al., 2020 Yalcin et al., 2020 Wheeler et al., 2020 Itano et al., 2022 Abdelhameed et al., 2017 Valderrama et al., 2017 	<ul style="list-style-type: none"> ESWT Dextrose prolotherapy PRP Placebo Corticosteroid injections Custom orthotics
FFI	<ul style="list-style-type: none"> Wheeler et al., 2020 Itano et al., 2022 Kaikkangas et al., 2021 Okur et al., 2019 Xu et al., 2020 Itano et al., 2022 Yalcin et al., 2017 Yalcin et al., 2020 	<ul style="list-style-type: none"> ESWT ESWT (minimal dose) Dextrose prolotherapy Custom orthotics Corticosteroid injections PRP
PFT	<ul style="list-style-type: none"> Lai et al., 2018 Valderrama et al., 2017 Xu et al., 2020 Soliman et al., 2018 Parsley et al., 2023 Abdelhameed et al., 2020 	<ul style="list-style-type: none"> ESWT ESWT + topical corticosteroid Corticosteroid injections PRP Dextrose prolotherapy

Figure 1 Forest plot comparing treatment effect (TE) of various treatment modalities for the reduction of plantar fascia thickness (PFT) in patients with plantar fasciitis at ≥ 12 weeks after treatment.

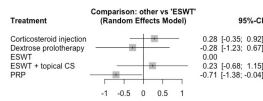


Figure 2 Forest plot comparing treatment effect (TE) of various treatment modalities for the reduction of Visual Analog Scale (VAS) pain score in patients with plantar fasciitis at ≥ 12 weeks after treatment.

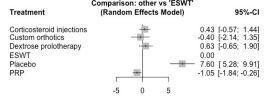


Figure 3 Forest plot comparing treatment effect (TE) of various treatment modalities for the reduction of Foot Function Index (FFI) score in patients with plantar fasciitis at ≥ 12 weeks after treatment.

