

Ultrasound and Shockwave Therapy for Acute Fractures in Adults

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REVIEW QUESTION: What are the effects of low-intensity ultrasound and extracorporeal shockwave therapies in the treatment of acute fractures in adults?

Nursing Implications

Fractures are associated with considerable morbidity and socioeconomic cost at the societal level, as well as loss of independence and productivity at the level of the individual. The length of time it takes for a fracture to heal is vital to the recovery process, but in 5%–10% of long bone fractures, healing is delayed and in some cases, union or complete healing of the bones was never achieved. This places additional strain on the health-care system, in terms of both physical constraints such as the number of staff and beds required and financial constraints. Ultrasound has been suggested as being useful in the treatment of fractures by enhancing and accelerating bone healing. It is, therefore, important for nurses to understand the impact and efficacy of ultrasound technology in the treatment of fractures.

Study Characteristics

This summary is based on an update of a 2012 Cochrane systematic review published in 2014 that investigated the impact of ultrasound and extracorporeal shockwave therapies in the treatment of acute fractures in adults. The review included 12 studies, with 622 participants aged between 15 and 81 years, with 648 fractures (Griffin, X. L., et al., 2014). The majority of the included studies (10) were randomized controlled trials (RCTs) (eight with and two without placebo controls), with the remaining two studies being quasi-RCTs (one with and one without a placebo control). Eleven RCTs investigated the impact of low-intensity pulsed ultrasound (LIPUS) and one extracorporeal shockwave therapy. The nine placebo-controlled studies investigating the impact of LIPUS used a deactivated ultrasound machine for their control group. The outcomes of interest included function, time to union, nonunion, and pain. The risk of bias across the studies included in the review varied, ranging from a low risk to a high risk.

Summary of Key Evidence

Functional outcome, specifically time to return to work among regular citizens and time to return to training or

duty in soldiers and midshipmen, was investigated by three studies. Analyses revealed no impact of LIPUS on time to return to work in 101 participants with complete fractures (mean difference [MD] = 1.95 days favoring control; 95% confidence interval [CI] = -2.18 to 6.08; one study), or time to return to training or duty in 93 soldiers or midshipmen with stress fractures (MD = -8.55 days; 95% CI = -22.71 to 5.61; two studies). Similarly, LIPUS was not found to significantly reduce the healing time (time to union) of complete fractures (standardized MD = -0.47; 95% CI = -1.14 to 0.20; eight studies; 446 fractures). In addition, analyses revealed no significant difference between the LIPUS and control groups in terms of delayed- or nonunion of complete fractures (10/168 vs. 13/165; risk ratio = 0.75; 95% CI = 0.24–2.28; five studies; 333 fractures).

Extracorporeal shockwave therapy had no significant effect on nonunion at 12 months; however, this was based only on a single quasi-randomized study (3/27 vs. 6/30; risk ratio = 0.56; 95% CI = 0.15–2.01). Conversely, extracorporeal shockwave therapy was significantly associated with better visual analogue scale scores for pain at 3 months follow-up (MD = -0.80; 95% CI = -1.23 to -0.37).

Best Practice Recommendations

As a consequence of the heterogeneity present between the included studies, it is not appropriate to generate recommendations for practice on the basis of the review. However, the potential benefit of ultrasound in treating acute fractures in adults should not be ruled out and further research into its utility in this area should be conducted.

REFERENCE

Griffin, X. L., Parsons, N., Costa, M. L., & Metcalfe, D. (2014). Ultrasound and shockwave therapy for acute fractures in adults. *Cochrane Database of Systematic Reviews* 6. Art. No.: CD008579. DOI: 10.1002/14651858.CD008579.pub3. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008579.pub3/pdf>

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