Hannemann PFW, Mommers EHH, Schots JPM, and et al. The effects of low‐intensity pulsed ultrasound and pulsed electromagnetic fields bone growth stimulation in acute fractures: a systematic review and meta‐analysis of randomized controlled Trials. Arch Orthop Trauma Surg 2014; 134:1093–1106.

Reviewer: Linda Metzger 6-10-15

Design: Systematic Review and Meta-Analyses of RCTs

Objective: To assess the effects of low-intensity pulsed ultrasound (LIPUS) on bone growth stimulation compared with placebo for acute fractures in adults.

Summary of Results:

- The literature search covered the period from 1980 through 2013.
- Primary outcome was time to radiological union.
- Includes 5 small sized trials with a total of 181 patients.
- Pooled data from 5 studies compared LIPUS and placebo in fractures of the lower limb with regard to time to radiological union. The heterogeneous result (I^2 = 99 %) did not significantly differ between LIPUS or placebo. (MD = −14.49, 95 % CI −55.96 to 26.97, p = 0.49).

Reasons not to Cite as Evidence:

- Sample sizes of the included trials were small. All studies had less than 70 total participants with all studies ranging from 22 to 67 total subjects.
- Four trials had methodological limitations. The risk of bias in the included studies was assessed according to the methods in the Cochrane Handbook. Risk of bias' assessment of the included studies was high or unclear for 4 RCTs. These four studies were at high or unclear risk of selection bias due to insufficient random sequence generation and allocation concealment.
- Only one study had a low risk of bias, but was published in 1994, and so does not really reflect the current literature on this topic.
- Highly significant statistical heterogeneity (I^2 = 99%) was present in the pooled analyses for time to radiological union. The trials were very different from each other. This variation may be due to differences in characteristics of the intervention, differences in patient characteristics, or bias. The variability in criteria for radiological union is most likely the main factor for variation in the outcome generating substantial heterogeneity. The trials should probably not have been pooled, since pooled data with high heterogeneity may not have a clinically useful interpretation and must be interpreted with caution.
- While a potential benefit of ultrasound for the treatment of acute fractures in adults cannot be ruled out, the currently available evidence from 5 clinically heterogeneous trials is insufficient to support the routine use of this intervention in clinical practice.

Assessment: Inadequate for evidence of the effect of low-intensity pulsed ultrasound (LIPUS) as part of the treatment to reduce time to radiological union for acute lower limb fractures in adults.