Rutjes AWS, Nüesch E, Sterchi R, Jüni P. Therapeutic ultrasound for osteoarthritis of the knee or hip. *Cochrane Database of Systematic Reviews* 2010; Issue 1.

Reviewer: Linda Metzger 1-28-15

Design: Cochrane Systematic Review and Meta-Analyses

Objective: To compare therapeutic ultrasound with sham or no specific intervention in terms of effects on pain and function outcomes in patients with knee or hip OA.

Summary of Results:

- Includes 5 small sized trials with a total of 341 patients with knee OA.
- For pain, 5 studies (320 subjects, 464 knees) contributed to the overall meta-analysis. There was an effect in favor of ultrasound therapy after using it for 2 to 8 weeks, which corresponded to a difference in pain scores between ultrasound and control of -1.2 cm on a 10-cm VAS (95% CI -1.9 to -0.6 cm). A pooled effect size of -0.49, (95% CI -0.76 to -0.23) showed a significant moderate effect vs. control on pain reduction, with a heterogeneity of 26%. This does not demonstrate a clinically relevant difference. The quality of the evidence was low.
- For function, 4 studies (251 subjects) contributed to the overall meta-analysis. There was a trend in favor of ultrasound after using it for 2 to 8 weeks, which corresponded to a difference in function scores of -1.3 units on a standardized WOMAC disability scale ranging from 0 to 10 (95% CI -3.0 to 0.3). A pooled effect size of -0.64, (95% CI -1.42 to 0.14) showed a nonsignificant effect vs. placebo on functional improvement, with a heterogeneity of 88%. This does not demonstrate a clinically relevant difference. The quality of the evidence was low.

Reasons not to Cite as Evidence:

- Sample sizes of the included trials were small ranging from 40 to 82 total subjects, and not adequately sized or powered.
- This systematic review is limited by the quality of the included trials.
- The methodological quality and the quality and adequacy of reporting was poor among all 5 included trials. All trials were at high risk of bias.
    - None of the trials described generation of allocation sequences or concealment of allocation
    - None of the trials reported whether primary outcomes were specified a priori
    - None of the trials were analyzed according to the intention-to-treat principle
    - Only one trial described the occurrence of adverse events or withdrawals and dropouts because of adverse events
    - None of the trials had adequate blinding of physicians or therapists; only 2 blinded patients; and only 2 blinded outcome assessors.
- A high degree of heterogeneity among the trials was revealed for function (88%). The trials should probably not have been pooled, since pooled data with high heterogeneity may not have a clinically useful interpretation. This variation may be due to differences in characteristics of the intervention, differences in patient characteristics, or bias.

- The small VAS difference observed (1.2 points) between the groups was statistically significant, but was not clinically significant. Results for the pooled effect of function were not statistically significant or clinically important.
- The authors' reported conclusions were confusing and conflicting and were also too weak for evidence.
    - Despite the widespread use of therapeutic ultrasound in physical therapy, evidence of its clinical effectiveness in people with hip or knee OA is of poor quality and therefore inconclusive.
    - In contrast to the previous version of this review, The effects of ultrasound therapy on both, knee pain and function, may be beneficial for patients are potentially clinically relevant and deserve further clinical evaluation.
    - Because of the low quality of the evidence, we are uncertain about the magnitude of the effects on pain relief and function.

Assessment:

Inadequate for evidence of the effect of ultrasound on knee OA.