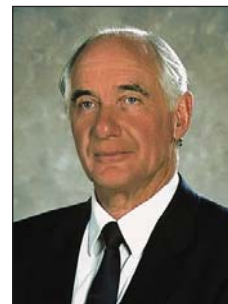


A matter of some public concern

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Robin McKenzie has practised physiotherapy since 1953. He is still involved with the McKenzie Institute International in teaching the system of mechanical diagnosis and therapy he developed for self-treatment of disorders of the musculoskeletal system. Branches of the Institute have spread to over 30 countries worldwide, the most recent addition in China where the Institute has committed to a five year education programme for Chinese physicians involved in the treatment of musculoskeletal problems. Guidelines recommending the McKenzie method for diagnosis and treatment of low back pain now apply in Denmark and are 'Recommended' in the Official Disability Guidelines in some States of America.

Ultrasound is one of the most frequently applied treatments used by physiotherapists. It is used mainly in the treatment of strains, sprains and soft tissue injuries and other musculoskeletal disorders, including arthritis. Yet in multiple scientific studies it has been found to provide no useful benefit. A few studies have even found that its use can be detrimental. Many in the physiotherapy profession are aware that this situation is unacceptable and have ceased to apply ultrasound. However there are even greater numbers of therapists who continue using ultrasound knowing full well that evidence justifying its use does not exist.

The overwhelming evidence should long ago have convinced cli-

nicians, especially physiotherapists using this outmoded device, that its continued use is akin to fraud. Health authorities responsible for controlling the dispensation of treatments have a responsibility to ensure that resources are used according to evidence-based principles. Indeed the Physiotherapy Board and Health Department have been campaigning recently to ensure that physiotherapists comply with a programme intended to ensure the maintenance of clinical competence. Clinical competence is not achieved by permitting the continued use of apparatus long ago found to be of no benefit to the patient.

The overwhelming evidence against the use of clinical ultrasound for the treatment of musculoskeletal disorders should have been sufficient to ensure the method was discontinued long ago. How many thousands of patients are receiving and paying for this useless treatment every day? How much is the Accident Compensation Corporation paying annually for what amounts to fraud?

The use of electro-physical modalities by physiotherapists raises serious issues for the profession and cannot remain unchallenged. Ultrasound is but one of the many ineffectual treatments applied by physiotherapists in practice in New Zealand.

Given that there now exist six systematic or substantial reviews of ultrasound, which are consistently negative in conclusion, it is difficult to understand why the NZ Accident

Compensation Corporation continues to fund the passive modality, and the Physiotherapy Board continues to sanction its use.

The evidence

Holmes and Rudland¹ conducted a systematic search for articles on ultrasound and found 18. Almost all contained serious methodological flaws, such as lack of a control group, failure to use a double-blind design, and lack of statistical analysis. They concluded *'The case for ultrasonic treatment of soft tissue injuries is not well founded at present.'*

In 1995 a meta-analysis of ultrasound for musculoskeletal disorders was conducted in which 22 papers fulfilled the inclusion criteria of the review.² In 16, ultrasound was compared to sham treatment, and in 13 the results were presented in a way that made data pooling possible.

Analysis of these trials showed there was no evidence that ultrasound provided pain relief, so further trials were not evaluated *'The use of ultrasound is based on empirical experience,*

but is lacking firm evidence from well-designed controlled studies.'

In a systematic review of a range of physiotherapy interventions for shoulder pain,³ ultrasound was evaluated in six studies and was found to be ineffective in all. *'There is evidence that ultrasound therapy is in-*

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effective in the treatment of soft tissue shoulder disorders.'

By 1999 a further systematic review of ultrasound⁴ located 38 studies into a variety of disorders, 18 of which were placebo-controlled. Of 13 placebo-controlled trials scoring at least 50% validity score, 11 found no evidence for clinically important or statistically significant results. For ankle and shoulder disorders, and as an adjunct to exercise therapy, they concluded that there is evidence that ultrasound is ineffective. *'There seems to be little evidence to support the use of ultrasound therapy in the treatment of musculoskeletal disorders.'*

The same group also reviewed the use of ultrasound for acute ankle sprains:⁵ *'The results do not support the use of ultrasound in the treatment of ankle sprains.'* A further placebo controlled trial published since that review came to the same conclusion.⁶

Reviews of effectiveness studies⁷ and on the biophysical effects of ultrasound⁸ found 35 English language RCTs published between 1975 and 1999. The authors applied six methodological filters so that only the 10 highest quality studies were included. In eight out of 10 studies there was no difference between groups treated with active or placebo ultrasound. *'There was little evidence that active therapeutic ultrasound is more effective than placebo ultrasound for treating people with pain or a range*

of musculoskeletal injuries or for promoting soft tissue healing.'

The only two studies that favoured ultrasound over placebo were both conducted by the same research team,^{9,10} *'However in both studies blinding was either not addressed or not properly enforced, and if the methodological filter concerning blinding had been strictly applied in the review both studies would have been excluded.'* As noted earlier, failure to enforce blinding over-inflates the reported treatment effect. Other studies evaluating the role of ultrasound for the same conditions – calcific tendonitis and carpal tunnel syndrome – have failed to show a positive effect for active ultrasound.¹¹ Other concerns about the Ebenbichler study¹⁰ have been raised. A mean reduction in pain greater than the mean initial pain score is reported, which is impossible.¹² The intervention involved almost daily interventions for three weeks and then thrice weekly for three weeks; a total of 24 treatments. The sham group had similar outcomes at nine months. The role of calcific lesions in shoulder pain is unclear, the prevalence is the same in asymptomatic populations, and so the abnormality may be an incidental finding.

Regarding the biophysical effects of the intervention, *'There is currently insufficient biophysical evidence to provide a scientific foundation for the*

*clinical use of therapeutic ultrasound for the treatment of people with pain and soft tissue injury.'*⁸

Conclusion

Evaluation of the efficacy of certain modalities can generally be done with a rigorous scientific methodology. Issues of compliance, double blinding and sham treatment are considerably easier to control when investigating ultrasound than, for instance, exercise protocols or manipulation. It is thus likely that the interpretation of these reviews is based on scientific evidence, rather than the arbitrary outcome of poorly constructed research.

Not only are these findings based on rigorous research, but also they are almost entirely consistent. A few trials suggest that ultrasound can be effective, but there are problems with their findings. The overwhelming weight of evidence demonstrates that with active or inactive ultrasound the outcome is the same. It is not a useful adjunct to other interventions.

The question to be asked at this point is how many systematic reviews and RCTs that consistently demonstrate the lack of efficacy of ultrasound does it take for physiotherapists to abandon this useless practice?

Competing interests

None declared.

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