INTRODUCTION

Interferential current (IFC) is widely used in conjunction with other therapies to manage musculoskeletal pain. IFC uses two medium frequency carrier currents which interfere deeper in tissues, producing an amplitude modulated frequency (AMF). The interference creates the effect of low frequency stimulation with less discomfort for patients compared to direct low frequency stimulation. The predominant proposed mechanisms of analgesia include the gate control theory of pain and endogenous opioid production. Several systematic reviews have found a lack of studies examining the independent treatment effects of IFC, this study reviewed the isolated effects of IFC compared to control groups.

RESULTS

The initial search yielded 285 results with 10 eligible studies adhering to inclusion and exclusion criteria, published from 2011-2016. Participants across studies included healthy individuals with experimentally induced pain and patients with the following diagnoses: chronic low back pain, carpel tunnel syndrome, shoulder hemiopigia, and knee osteoarthritis. Outcome measures included subjective pain reports such as the visual analog scale (VAS) or the numeric pain rating scale, objective physiologic measurements such as pain-free ROM or a 15 meter walk test, pain behavior assessments such as medication use, and functional outcome measures such as the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). These 10 studies were analyzed with a PEDro scale: scores ranged from five through nine, with a mean value of seven. All nine RCTs that used a carrier frequency of 4,000 Hz reported a positive effect of IFC: seven reported a reduction in a measure of pain and two reported a decrease in use of pain medication. One RCT reported no significant effect of IFC when using a carrier frequency of 2,000 Hz. Four of the 10 RCTs evaluated long-term effects: three RCTs found significant lasting benefits, while one RCT found no significant long term improvements.

DISCUSSION

In this systematic review, including 10 randomized controlled trials, totaling 898 participants, IFC was found to be effective in the immediate management of musculoskeletal pain. Carrier frequency, as opposed to AMF, may be the more dominant analgesic parameter. Four thousand Hz is the most commonly used carrier frequency. All studies included that used a carrier frequency of 4,000 Hz reported an immediate reduction in pain or a decrease in use of pain medication. Pereira et al.1 when using a carrier frequency of 2,000 Hz, found that IFC did not significantly alter pain pressure threshold, and in fact, reduced pain threshold to cold. Correa et al.2 reported that both the 1,000 and 4,000 Hz groups had no significant alterations in pain intensity, but did have significantly lower rates of pain medication usage. In addition, the 1,000 Hz group had significant improvement on the physiological pain parameters of temporal summation and pain pressure threshold (PPT).

Despite a lack of evidence, many authors regard AMF as the most relevant IFC parameter. Gundog et al.3 compared the effectiveness of different AMFs and found no significantly different analgesic effects. Further research addressing the potential physiologic effects of varying the AMF and the associated clinical implications is needed.

Long term follow-ups had mixed results. Three studies4-6 found significant improvements at three weeks, one month, and six months, respectively. One study7 found no significant difference at four months. Further research regarding both the long term effectiveness and the immediate duration of pain relief based on various IFC parameters is needed.

CONCLUSIONS

The reviewed studies support use of IFC in the treatment of musculoskeletal pain. More research is needed to determine the optimal parameters and evaluate long-term effectiveness.

CLINICAL RELEVANCE

Current evidence supports utilization of IFC as an effective adjunctive intervention in the short-term management of musculoskeletal pain, which may help improve functional outcomes and reduce patient use of pain medications.