Therapeutic ultrasound has been used in sports medicine practice for over 50 years, and it remains one of the most commonly administered physical agents.1 Therapeutic ultrasound is theorized to promote tissue repair by enhancing cell proliferation and protein synthesis during the healing of skin wounds, tendon injuries, and fractures.2 Proposed therapeutic effects include the following: reduced swelling and improved joint immobility,3 increased tissue temperature,3,4 tissue repair, improved soft tissue extensibility, promotion of muscle relaxation, increased blood flow, and reduced inflammation.3 Ultrasound also is believed to relax muscle spasms and to provide a local analgesic effect.4 The purpose of this report is to provide a review of the current literature pertaining to the safety and effectiveness of therapeutic ultrasound.

We searched all available literature pertaining to therapeutic ultrasound and phonophoresis, specifically as they relate to the following clinical outcomes: tissue temperature, time to heal, perception of pain, perceived soreness, cortisol level, and dexamethasone level. We searched CINAHL, Academic Search Premiere, Medline, SportDiscus, and PubMed Central. We limited the search to peer-reviewed reports of research involving human subjects that were published in the English language since 1990. We excluded studies that included combination treatments and those that failed to report treatment parameters.

Sixteen reports were located, which provided level 1 and level 2 evidence (Oxford Centre for Evidence-Based Medicine): 3 addressed tissue temperature;4-6 5 addressed pain;3,10-12 4 addressed delayed onset muscle soreness (DOMS);13-17 and 4 addressed phonophoresis.18-21 Table 1 presents a summary of the search results.

The available evidence suggests that therapeutic ultrasound is not effective for pain reduction,5,10-12 DOMS resolution,13-17 or delivery of medication below the epidermis,18-21 but it does appear to facilitate fracture healing.7,9 Therapeutic ultrasound appears to effectively heat tissues, but research has not established the temperature...
thresholds for therapeutic benefits or tissue damage.4-6 Continued widespread administration of therapeutic ultrasound is most likely attributable to tradition and beliefs that lack empirical evidence (Table 2).

**Implications for Clinical Practice and Future Research**

Therapeutic ultrasound does elevate tissue temperature, but it cannot be monitored during treatment to ensure tissue damage does not occur. Future research should document specific treatment parameters that appear to provide beneficial effects for a given type of injury.

**References**