

## **Instrument-Assisted Soft-Tissue Mobilization: A Scientific and Clinical Perspective**

By Warren Hammer, MS, DC, DABCO

Human touch possesses sensory characteristics that are unique. Touch provides the feedback of temperature, moisture, contours and communication that cannot be duplicated by instrumentation. The question then arises as to why we would ever want to substitute our hands. The answer is that we do not want to replace our hands, but if we can improve our skills by magnifying our sensation of touch, detect involved areas of the kinetic chain more efficiently, reach areas of increased depth, conserve our joints, and finally - dramatically improve our results - then it is clinically prudent to become aware of the benefits of instrument-assisted soft-tissue mobilization.

T-bars made of wood and with rubber tips have been used for years to penetrate deep areas that are difficult to reach with the hands. Ancient East Asian methods, like gua sha, make use of any smooth edge, such as buffalo horn or even the metal lid from a jar.<sup>1</sup> Lucite, acrylic, ceramics and stainless steel instruments are in use today. Gua sha explains its effect by scraping the skin and attracting blood from the tissue, causing small petechiae or ecchymotic patches. The theory is based on promoting blood production and improving the dissemination of fluids.<sup>1</sup> Graston Technique (GT) makes use of six specially designed stainless steel instruments with beveled edges<sup>2</sup> for the purpose of diagnosis and treatment.

GT, however, has based its methods and outcomes on the scientific literature describing the effects of manual loading on soft tissue. One of the most important findings regarding the effect of instrumentation on soft tissue is the stimulation of fibroblasts and their synthesis of proteoglycan and collagen. In discussing the healing of tendinosis, Nirschl<sup>3</sup> states that the goal of healing is to enhance the proliferative invasion of vascular elements and fibroblasts, followed by collagen deposition and ultimate maturation. The reality is that mechanical load literally creates new tissue and helps it mature, when followed by specific stretching and strengthening. "Dynamic strain is integral to fibroblast stimulation and in the organization of the overall extracellular matrix of connective tissues."<sup>4,5</sup>

Davidson, et al.,<sup>6</sup> used augmented soft-tissue mobilization (ASTM-instrument-assisted) and demonstrated tendon healing by activating fibroblasts. Gehlsen, et al.,<sup>7</sup> found that the use of instruments increased the number and size of fibroblasts, as assessed by light microscopy and the electron microscope. They found that heavy pressure promoted the healing process to a greater degree than light or moderate pressure. Surely, friction massage by hand increases circulation and fibroblastic proliferation, and clinically, it is recommended that friction be applied for 20 minutes or more.<sup>8</sup> With instrumentation, the friction time is reduced to one minute and is obviously more penetrating and specific.

It is thought that the controlled microtrauma caused by instrumentation causes microvascular trauma and capillary hemorrhage, creating a localized inflammatory response that stimulates the body's healing cascade and immune/reparative system.<sup>9-11</sup> Prentice<sup>12</sup> states that tendon healing is facilitated by accelerating the inflammatory process. In addition to the benefits of enhanced mechanical load, the GT instruments have shown promise in their capacity to magnify the sensation resulting from palpation of soft-tissue adhesions. Clinicians report that they feel blockages more precisely, both in terms of location and barrier direction.

A major reason why instrumentation is important is preservation of the joints of the practitioner. Snodgrass<sup>13</sup> surveyed physical therapists and found that after spinal pain, the second most common cause for absenteeism from work was overuse of the thumb. Ninety-one percent of physiotherapists using some sort of massage had to modify their treatment techniques because of thumb pain. This fact is obvious to many DCs.

There are, at present, numerous case studies and outcome studies demonstrating the benefits of instrument-assisted soft-tissue methods. (See references for a partial list.)<sup>14-18</sup> Graston has led the way in the chiropractic profession regarding the use of instrument-assisted soft-tissue mobilization. It is already part of the core curriculum at Bridgeport, NUHS, and Northwestern; is being taught at CMCC; and is in varying stages of inclusion at other chiropractic colleges. It is also taught in the graduate kinesiology program for athletic trainers at Indiana University of Health Sciences. The owners of the technique are funding a study at NYCC on carpal tunnel syndrome (*DC*, April 4 issue, News in Brief) and a study at the Texas Back Institute on post-fusion lumbar spine range of motion. A very important aspect of the technique is its training program, emphasizing the use of instruments based on a functional evaluation of the involved soft tissues.

In summary, instrumentation is increasingly proving valuable to chiropractors in its capacity to heighten the effectiveness of human touch in diagnosing and treating soft-tissue lesions.

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