The Leading Edge

Using stainless steel instruments and a simple set of longitudinal movements, Graston Technique offers athletic trainers a new way to diagnose and treat soft tissue injuries.

By Dr. Stephen Perle

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Soft tissue injuries are some of the most irritating injuries to deal with—for athletes and athletic trainers alike. The source of the pain produced by these injuries can be difficult to accurately locate and effectively treat, leaving athletes hobbled and athletic trainers frustrated. And some of the standard techniques used to treat these injuries, including transverse friction massage (TFM) and myofascial release, can cause a lot of discomfort—for the provider. A possible solution for both the athletic trainer and the athlete may be Graston Technique.

The centerpiece of Graston Instrument-Assisted Soft Tissue Mobilization (GISTM)—the key protocol in Graston Technique—is six specially designed stainless steel instruments that function as focused extensions of the clinician's hands. These instruments allow for better diagnosis and more effective treatment of soft tissue injuries by accurately locating, and allowing better access to, the trouble spots. Rather than interfering with palpation, the instruments, according to most clinicians who have used them, actually enhance their sensory perception.

Most clinicians also report that GISTM is much easier on their own hands than the manual soft tissue treatments. Thus, a day of treating patients with GISTM does not leave them with sore hands or thumbs like a day of TFM or myofascial release.

The Instruments
First developed in the early 1990s by competitive water skier David Graston, who sustained a serious knee injury that failed to respond to surgery and typical therapies, Graston Technique has quickly evolved for both the diagnosis and treatment of soft tissue pathology. Each instrument is shaped and sized to work on a specific body part. Thus, there is an instrument that is small enough to be used on the Achilles tendon, fingers, and carpal tunnel, and there are instruments specifically designed to treat larger body regions such as the back, upper shoulder and neck, hamstrings, quadriceps, and iliotibial band.

The appropriate instrument is moved—generally in a longitudinal direction, either proximally or distally—over the patient's lubricated skin with enough force to mobilize the soft tissues (muscle, tendon, ligament, and fascia) below. The instrument provides tactile diagnostic feedback to both the clinician and the patient. Both can feel when the instrument glides over a problem area in the soft tissue.

Normal tissue produces a smooth feel through the instruments. However, when the instrument glides over a problem area, it feels like it has become stuck in a divot in the soft tissue or is running over speed bumps. These divots or speed bumps are often referred to as "adhesions." While there is no pathological evidence that these are actually adhesions, this is a reasonable description for the soft tissue disorders the instruments find.

As a chiropractor with 20 years of experience, 12 of them teaching soft tissue treatment methods, I initially did not believe that the instruments could be a benefit from a diagnostic standpoint. I was certain that they would interfere with my palpatory skills. At my first Graston Technique seminar, my lab partner took the role of clinician first, with me as the patient. As he glided the instrument over my thigh and encountered a “divot,” both of us looked at each other in total astonishment and simultaneously asked each other if we had felt that. Generally, with the Graston tools, everything the clinician feels, the patient feels too, and often, both can identify the area of the clinical complaint.

The instruments are reasonably easy to learn to use and many clinicians say that they have saved their hands from the wear and tear that TFM or myofascial release imposed on them. GISTM treatments generally take less than 10 minutes and are usually spaced with at least one day between treatments. Thus, Graston Technique fits easily into any athletic trainer’s current treatment plans.

How It Works

According to the developer of TFM, James Cyriax, MD, TFM works by breaking up abnormal cross-linkages between collagen fibers in tendons and between ligaments and bones, thus allowing muscles to broaden during contraction. He theorized that the massage must be transverse to the fibers because any longitudinal movement would further separate torn collagen bundles. Cyriax called the technique transverse friction massage because he thought the skin caused friction with the subcutaneous fascia.

But recent research from the University of Waterloo has found that the skin and fascia have a frictionless interface. This means that the only forces transmitted through the skin are those that are normal (90 degrees) to it. This casts doubt upon whether transverse friction massage actually has anything to do with friction. In addition, it makes it unlikely that longitudinal movement could actually exacerbate the soft tissue disruption as Cyriax theorized.

We also know from the work of Albert Banes, PhD, at the University of North Carolina, that intermittent loading of fibroblasts stimulates them to both synthesize collagen and to replicate. One might hypothesize that repeatedly gliding a Graston Technique instrument over a tendon or ligament is a form of intermittent loading. Whether true or not, research from Ball State University on a rat-tendon injury model has shown that GISTM, which is performed in a predominantly longitudinal direction, does activate fibroblasts to synthesize and replicate. It is reasonable to assume that more fibroblasts depositing more collagen would accelerate healing for both tendon and ligament injuries.

The level of fibroblast activation is proportional to the amount of force applied by the instruments. Obviously, there must be a limit to how much force can be applied. Too much force would be too painful and there must be a point when excessive force, instead of stimulating healing, would actually cause tissue damage.

Over the past decade, the understanding of tendon injuries has greatly expanded. We now know that, due to the lack of circulation in tendons and thus the lack of inflammation (i.e., the acute vascular phase of the wound healing cycle), tendons degenerate from overuse. Treatment, in part, requires stimulating the wound-healing cycle, which starts with inflammation. GISTM, like TFM, causes what Cyriax called traumatic hyperemia. This produces a local inflammatory response in the degenerated tissue, which stimulates healing.

The mechanism of action of GISTM in muscle disorders still isn’t clearly understood. It is theorized that

GISTM breaks up adhesions within muscle and between muscle and its fascia. With more superficial problems, one might think of the instruments moving the fascia much like one can move an air bubble from under a sticker. As the “bubble” moves, the fascia detaches from the muscle beneath. For deeper problems, the instruments allow for deeper penetration in the tissue and appear to separate fascial planes.

There are two interesting findings when using the Graston Technique instruments for diagnosis. One often hears that specificity of treatment is paramount in the success of treatment. It appears that Graston Technique instruments are very helpful in achieving that specificity.

The exact direction of movement of the instruments that produce the abnormal divot or speed bump feeling seems to be specific to the individual adhesion. Thus, when one glides the instruments distally, one may encounter an adhesion that may not be felt when gliding proximally. Also, if moving distally at, for example, 15 degrees to the long axis of the tissue, one may find the adhesion, but not feel it when moving at –15 degrees. Furthermore, an adhesion that is easily identified while using the instruments often cannot be palpated without the instruments. And in many cases, the clinician may not feel the lesion, but the patient can.

Treatment, like diagnosis, appears to be direction-specific. When using the instruments to perform GISTM, one moves them in the same vector that the adhesion was found in. Different methods of moving the instruments have been developed. One can move them over the skin in a way that reminds me of using a wood plane to “cut” away the problem area in the soft tissue. This is a basic stroke that often removes adhesions in muscle and fascia, as well as stimulating healing in tendons and ligaments. The instruments often are also used in a light brushing technique to desensitize the skin, and then like the end of a pencil to “erase” the soft tissue lesion.

GISTM can be expected to be uncomfortable. However, just like when one does TFM, the clinician can control how painful the treatment is by modulating the force and thus the depth of the treatment. Although non-athletes sometimes complain of the pain during treatment, athletes often say it finally feels like someone is getting to the root of their problem.

It is common for patients to experience some bruising after GISTM. The appearance of bruising might affect a patient’s future tolerance for the procedure if they are not forewarned. Over the 10 years of use of GISTM, clinicians have also seen a phenomenon they have termed “break out,” which is a more profound bruising. The theory is that the hematoma results from the shearing of hardened scar tissue from viable soft tissue. While this might scare patients and initially result in a decrease in flexibility, along with swelling and discomfort, experience has shown that this is actually a harbinger of accelerated positive clinical response.

While GISTM is the foundation of Graston Technique, the Technique incorporates other appropriate treatment methods that athletic trainers and others are already using for these conditions. A typical treatment session will start with the patient doing a cardiovascular warmup, then GISTM will be done for of three to five minutes in a localized area. GISTM treatment is followed by high-repetition, low-weight exercise, stretches, low-repetition, high-weight exercise, and, finally, cryotherapy.

When to Use

This year, my colleagues and I presented a poster at the World Federation of Chiropractic’s 7th Biennial Congress of a prospective series of 1,000 cases treated with Graston Technique. We found that the technique was effective in treating a broad range of soft tissue disorders including carpal tunnel syndrome, cervical pain, de Quervain's syndrome, epicondylitis, fibromyalgia, iliotibial band syndrome, joint sprain, lower back pain, post-fracture pain, muscle strain, painful scarring, plantar fasciitis, and tendinopathy. Treatment was effective in reducing pain and numbness and increasing patient functional capabilities.

Personally, I have found that Graston Technique has been invaluable in dealing with previously unresponsive patients with many types of soft tissue complaints. As an example, one of my recent patients complained of lateral epicondyle pain of nine months' duration. This condition was unresponsive to any previous conservative treatment as well as to three corticosteroid injections. The patient had constant pain and was unable to use the arm for activities of daily living. While our series of prospective case studies found that the average patient was treated with Graston Technique for eight visits, in the patient with the lateral epicondylosis, her symptoms were reduced by 90 percent after only two Graston Technique treatments.

I have also found that Graston Technique works very well for Achilles and patellar tendinosis, significant problems for runners (see "GT for the Knee" below). Colleagues have reported extensive use in the treatment of neck and lower back pain. Current studies testing the effectiveness of Graston Technique are looking at post-surgical lower back pain, lateral epicondylosis, and carpal tunnel syndrome.

There are a few absolute contraindications to the use of GISTM: open wounds (unhealed suture sites); unhealed fractures; thrombophlebitis; uncontrolled hypertension; kidney dysfunction; hematoma; osteomyelitis; myositis ossificans; and patient intolerance, non-compliance, or hypersensitivity. Likewise, there are some relative contraindications: anti-coagulant medications; cancer, depending on the type and location; varicose veins; burn scars; acute inflammatory condition (e.g., synovitis); inflammatory condition secondary to infection; pregnancy, because of the associated inherent ligament laxity; and osteoporosis.

With a little training, athletic trainers and others working with athletic soft tissue injuries can master Graston Technique. Both you and your athletes will appreciate the benefits a few simple instruments can bring.

Sidebar:

Case Study: GT for the Knee

An athlete comes to me with a diagnosis of patellar tendinosis. How might Graston Technique work into my treatment? Here's how I would proceed:

As with any complaint, the initial clinical evaluation of a patient with knee pain begins with a thorough history and a physical, orthopedic, and neurological examination. Obviously, special attention must be given to the knee, but the entire lower-extremity kinetic chain should also be evaluated for any etiological factors not local to the knee. Assuming the examination confirmed the diagnosis of patellar tendinosis and ruled out any contraindications to treatment, I would use Graston Technique, which incorporates an advanced method of instrument-assisted soft tissue mobilization, along with more traditional treatment methods.

After an initial cardiovascular warmup, I cover the area around the anterior knee with a lubricant cream. This is used to allow the instruments to slide over the skin easily and prevent pulling hair. First, I scan the area with GT3, an instrument that looks like a tongue depressor. The GT3 is used almost like a chisel, in short, repeated, rhythmic strokes along the patellar tendon. I use strokes of approximately one to two inches, at about one to two cycles per second, at various angles (generally plus or minus 30 degrees from the long axis of the tendon). The goal is to find an “adhesion,” which feels like a divot the instrument almost gets stuck in or like a speed bump the instrument has to pass over.

Once an adhesion is found, it is treated with a technique called Graston Instrument-Assisted Soft Tissue Mobilization (GISTM). This involves going over the adhesion repeatedly with the instrument in very short strokes (less than an inch), with greater load than when evaluating, for about a minute, until the adhesion is less apparent.

This whole process of evaluation and GISTM is repeated along the whole tendon in both an inferior-to-superior and superior-to-inferior direction. Treating the affected areas typically takes a total of three to five minutes.

Next, I use GT5, an instrument that has two treating surfaces, concave and semicircular in design. With this instrument I do what is referred to as “framing” the patella, using very small movements (less than an inch) to evaluate and then mobilize the tissues surrounding the patella.

Finally, I use GT4, an instrument with a convex semicircular treating surface for evaluating and then treating the soft tissues just above and below the knee. Framing the patella and treating the area around the knee also typically lasts three to five minutes each. The treatment session finishes with the patient doing high-repetition, low-weight knee flexion and extension exercises; quadriceps and hamstring stretches; low-repetition, high-weight exercises; and finally, cryotherapy.

This treatment could be repeated on alternate days, or with greater separation if the patient experiences too much tenderness. Treatments continue in essentially the same way for as long as the patient is showing a positive response. The specifics of where and how treatment is performed depends on what adhesions are found at the time of the treatment. The use of objective outcome measures is important to be able to determine if the treatment is effective. Treatment is curtailed if the patient has excessive tenderness, and it ends when the patient’s and clinician’s pain and ROM objectives have been obtained. —S.P.