CLINICAL FOUNDATIONS FOR GRASTON TECHNIQUE®

Adapted from: **Graston Technique®**
M1 Instruction Manual

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CLINICAL FOUNDATIONS FOR GRASTON TECHNIQUE®

Theory / Scientific Basis

Connective Tissue - Five Basic Types (11, 24, 27, 44)

1. Ordinary connective tissue:
    - Superficial and deep fascial sheaths
    - Nerve and muscle sheaths
    - Supporting framework of internal organs
    - Aponeuroses
    - Ligaments
    - Joint capsules
    - Periosteum
    - Tendons
2. Blood
3. Cartilage
4. Adipose
5. Bone

Connective Tissue Type Classifications: (11, 24, 27, 44)

Dense, regular: Ligament and tendon. Parallel, dense arrangement of collagen fibers.

Dense, irregular: Aponeuroses, joint capsules, periosteum, dermis of skin and fascial sheaths. Dense, multi-directional fiber arrangement. Resists high mechanical stress in a three-directional manner.

Loose, irregular: Superficial fascial, nerve and muscle sheaths, internal organ support sheaths. Thin, sparse, multi-directional meshwork of collagen. Greatest amount of ground substance per unit area.

At the 2009 Second International Fascia Research Conference, the concept supported was that fascia is a continuum:

"Fascia extends to all fibrous connective tissues, including aponeuroses, ligaments, tendons, retinacula, joint capsules, organ and vessel tunics, the epineurium, the meninges, the periostea and all the endomysial and intermuscular fibers of the myofascia."

Connective Tissue Composition: (11, 24, 27, 44)

Cells

- Primarily fibroblasts, which produce the extra-cellular matrix.
- Macrophages and histiocytes are present primarily in the inflammatory process. These cells are phagocytes, debriding foreign matter and bacteria from the affected area.
- Mast cells primarily found in loose connective tissue secrete histamine, a vasodilator.
- Plasma cells synthesize antibodies.

Extra-Cellular Matrix:

Fibers:

Collagen:	Four principle forms
Elastin:	Less tensile than collagen and more elastic. Lines arteries.
Reticulin:	Supports gland and lymph nodes.

Ground Substance:

Water	
Glycosaminoglycans (GAG's):	Sulfated (hyaluronic acid) tissue cohesiveness Non-sulfated (chondroitin 4 and 6) sulfate water retention.

Connective Tissue Purpose: (11, 24, 27, 44)

- Maintains critical inter-fiber distance, minimizing cross-fiber linking
- Mechanical barrier against bacteria
- Effects histological characteristic of the tissue
- Nutrient and waste product diffusion
- Lubrication

Muscle Tissue (11, 27)

The muscle's structure and its muscle fiber orientation affect the speed, amount and direction of forces generated within the muscle. The ability to visualize a muscle's anatomy, including its structure, attachments and fiber orientation, is essential for effective soft-tissue mobilization.

Arthrology (27, 32, 38, 44)

Definition: A joint is the connection between bone surfaces. Joints are either immovable or movable.

Components:

- Bone
- Cartilage
- Fibro-Cartilage
- Ligament
- Synovial Membrane (if a synovial joint)

Stages of Tissue Healing

The stage of tissue healing influences treatment. Consider the following factors throughout the clinical decision making process:

Inflammatory Stage

Usually lasts 24–48 hours. Exudates move into the area along with macrophages and histiocytes for debridement. (It is important to recognize that not all patients treated will have a treatment objective of creating an inflammatory response.)

Graston Technique® Implication: The Graston Technique® with a pro-inflammatory objective (higher pressure/more aggressive treatment) may actually re-initiate the inflammatory process, allowing for healing and the tissue remodeling process to begin again. Use of Graston Technique® at this early stage is not generally recommended except for the purposes of edema reduction in a purely non-inflammatory (low pressure/double bevel) approach.

Granulation Stage

Increased vascularity and capillary budding. Fibroblasts first begin to appear.

Graston Technique® Implication: It is recommended to reduce the emphasis on GT during this phase and to focus more on gentle exercise and the use of cryotherapy. Additional inflammation is not desired during this phase.

Fibroblastic Stage

It is marked by increased proliferation of fibroblasts and accelerated collagen matrix production. This phase begins after 5–8 days in metabolic tissues such as skin and muscle; 3–5 weeks in tissues with low metabolic rates such as tendon and ligament.

Graston Technique® Implication: Since collagen is highly pliable during this stage, the Graston Technique® objective would be to assist with tissue healing/remodeling by facilitating the normalization of damaged tissues to the extent possible.

Maturation Stage

Weak hydrostatic bonds are being converted to stronger covalent bonds that are still capable of change, although more treatment may be required. The appearance of myofibroblasts is responsible for scar shrinkage and contracture. Patient may demonstrate behavioral and adaptive changes. This may last up to a year, depending on the tissue type.

Soft Tissue Histopathology **(1, 2, 3, 6, 11, 39, 44, 59)**

The Effects of Immobilization on Connective Tissue:

- Permanent loss of GAGs and water.
- No net collagen loss unless immobilized longer than 9 weeks, then collagen breakdown exceeds synthesis with a net loss of collagen.

- Loss of "critical inter-fiber distance," since GAGs serve to maintain inter-fiber distance.
- Macroscopic and microscopic formation of collagen, inter-fiber cross-links.
- Irregular lying down of collagen.
- Macroscopic fibro-fatty infiltrates serve as cross-links.
- Ligaments eventually weaken (9 weeks).
- Insertion sites of ligaments, tendons and joint capsules to bone demonstrate declining soft tissue and bone junctional strength.
- With time the tissue essentially down regulates (Davis' Law), weakens, and loses elasticity which translates to loss of motion.

Effects of Immobilization on Muscle Tissue (6, 11, 20, 24, 50, 51, 56)

If immobilized in a shortened position, there is a loss in the number of sarcomeres although sarcomere length remains the same. Thus, there is a decrease in muscle strength and the muscle adaptively shortens. If immobilized in a lengthened position, sarcomeres have less overlap:

- Decreased protein, mitochondria and enzymes.
- 50% loss of muscle weight.
- Musculotendinous junction is a transitional zone and is the most susceptible link during muscle strain. There is an increased fibrosis at this site during healing.
- Lacerated muscles heal with dense connective tissue.
- Muscle contusions result in a hematoma and heal with scar tissue of dense irregular connective tissue.
- Decreased muscle extensibility.
- Muscle atrophy.
- The associated fascial "envelope" surrounding the muscle undergoes physiologic changes described above.

Clinical Concepts – Soft Tissue Mobilization

Definition of Soft Tissue Mobilization (STM):

"The forceful passive movement of the musculofascial elements through its restrictive directions(s) beginning with its most superficial layers and progressing into depth while taking into account its relationship to the joints concerned." *Grodin & Cantu*

Effects of STM (4, 6, 11, 12, 13, 14, 17, 22, 24, 31, 36, 39, 53, 55, 58)

- Release of fascial restrictions and adhesions.
- Separates and breaks down collagen cross-links.
- Splays and stretches connective tissue and muscle fibers.
- Increases skin temperature.
- Facilitates reflex changes in chronic muscle holding patterns.
- Alters spinal reflex activity (facilitated segment).
- Increases rate and amount of blood flow to and from area.

- Increases cellular activity including fibroblasts and mast cells in the region.
- Increases histamine response secondary to mast cell activity.

Deep Friction Massage (12, 15)

Special consideration is given to deep friction massage (CFM), also referred to as a cross fiber massage (CFM) in the literature. From the spectrum of (STM) approaches, the method and rationale from CFM relates closely to GT.

Definition of Cross Friction Massage (CFM)

CFM is a therapeutic modality used to "break up" or "soften" scar tissue, thus allowing for normalization of stress within the soft tissue during movement.

Effects of CFM

Cyriax (15) postulated the effects of CFM on the following tissues:

Tendon (Without Synovial Sheath)

Tendons in the state of inflammation or degeneration may be strained at the tenoperiosteal junction or within the tendon itself. Scar tissue may develop at the site of strain. Body movement can cause pulling action to the strain and create a sustained inflammatory reaction. CFM must be administered directly to the affected site. CFM stimulates blood flow and helps to "break up" scar tissue.

Tendon (With Synovial Sheath)

In the case of peritendinitis, scar tissue roughens the gliding surface between the tendon and the sheath. This irritates the inner lining of the sheath. Crepitus may be noted. Tenosynovitis is commonly caused by overuse. It is hypothesized that CFM moves the inner aspect of the sheath repeatedly back and forth across the external aspects of the tendon, which loosens or smooths the scar tissue.

Muscle

A muscle broadens as it contracts. After a muscle is strained, intramuscular scarring limits full broadening of the muscle. The goal of CFM is to minimize the perpendicular scarring between actin and myosin filaments and to facilitate fibroblast proliferation. This helps to develop a strong, but mobile scar. Stretching exercises provide intermittent tension to stimulate collagen production and to assure orderly arrangement.

Ligaments (Joints Moved by Muscle)

Ligaments serve to hold bones together and to reinforce the joint capsule. A sprain may result in adhesions by the indiscriminate collagen deposition which typically occurs after injury. CFM can be used to move the ligament back and forth passively while preventing adherence to underlying structures. Effleurage (non-inflammatory GT, if affected structure is located at an appropriate site) can be used in the acute stage to help decrease edema.

Chronic ligament sprains can form adhesions, which, in some cases, limit ligament action over the bone. This affects normal arthrokinematics. This abnormal joint play can cause irregular joint motion resulting in chronic, repeated ligament sprains. These ligament adhesions require aggressive mobilization through CFM and movement.

CFM Guidelines
Cyriax (15) set forth the following guidelines for CFM:

- Locate the exact level of the lesion in the tissue through palpation and tissue tension testing.
- The clinician's fingers and the patient's skin move in unison to avoid injury to the skin.
- Treat the entire scar tissue with a sufficient sweep of motion during CFM.
- CFM is performed perpendicular to tissue's fiber direction.
- CFM is performed deeply, within the patient's tolerance. The pain gradually diminishes during CFM.
- The patient must be positioned to adequately expose or access the tendon lesion.
- Muscles are placed on slack to aide muscle fiber separation.
- Tendons with sheath are placed on stretch to allow the sheath to glide over the taut tendon.

Sequence of Treatment

Please consider the following sequence of treatment. The sequence may be progressed during one treatment session or over the duration of care. Rigid adherence to this sequence is not required. Consider the rationale for the intervention to determine the most appropriate sequence.

Soft Tissue Mobilization

- Treat local and regional areas.
- Release of soft tissue effects spinal and extremity joint mobility.

Joint Mobilization

- Joint mobilization and soft tissue mobility affect each other.
- Constantly reassess during treatment.
- Using GT to the periarticular structures first, significantly improves the ease of joint mobilization.

Structure Elongation

- Follow GT and joint mobilization (JM) with stretching exercises.
- May apply over pressure and/or home exercise program.
- Stretching exercises are imperative to promote tissue lengthening and proper alignment.

Neuromuscular Re-Education

- Facilitates normal movement patterns.
- Corrects aberrant motion.
- Includes strengthening, proprioceptive and functional progression exercises. Strengthening exercises provide an internal, cross-sectional stretch to soft tissue structures.
- Visualize when a muscle contracts, how it bulks, providing an internal, broadening stretch.
- Consider using movement approaches.

Strengthening

- A progressive strengthening program is a vital component of the Graston Technique®. Patient participation is required.
- A high-rep, low-weight program is used for short, tightened muscles.
- Fatiguing a muscle before a stretch, provides a more effective stretch.
- Fatigue is defined as, when a person cannot perform one more repetition with correct form.
- The initial objective of a strengthening exercise of this nature is not large strength gains, but establishing the appropriate movement (and electrical) environment in the tissues to facilitate proper healing (Davis' Law).
- The later objective of a strengthening exercise is to build strength once symptoms have abated.
- Once symptoms have abated, a transition to higher weight and fewer repetitions should be introduced.

Postural Instruction

- Remove or correct "perpetuating factors" (Travell, Kendall, Sharman).
- Posture is addressed in the first and second sessions and followed throughout the course of treatment.
- For successful postural correction, the tissues need adequate extensibility; otherwise, the patient fights their own restrictions.

Inflammation Control

Use modalities, rest, positioning and support as needed. Cryotherapy, when indicated, is used after treatment to control an unpredictable or excessive inflammatory response and to reduce bruising.

Modalities

- The use of modalities is based on sound, physiological principles.
- When considering a modality, ask the following questions, "Why am I using this modality?"
- How does the use of a chosen modality lead toward achieving a therapeutic goal? Is the goal to reduce pain and edema to improve motion? Or, is the goal to increase tissue extensibility and pliability to improve motion?

Palliative use of modalities, not used in the context of a goal-oriented program is an inadequate therapy.

Rationale for GT

For Different Tissue Types

The rationale for using GT is virtually the same as rationales for other soft tissue mobilization techniques. The difference is that the Graston Technique® approach allows the goals to be accomplished in less time, with less pressure and less energy on the part of the clinician. GT is an advancement in soft tissue mobilization. It assists in diagnosing the location of soft tissue dysfunction and isolating the treatment of the lesion. The Technique must be accompanied by a stretching and strengthening program of the targeted tissues to promote proper fiber alignment.

Consider the Rationale for Using GT for the Following Structures and Conditions:

Tendon

Tendinosis (15, 29, 34, 40)

Tendinosis is the term used for tendon degeneration without signs of inflammation. Tendinosis is often a more accurate description of what is occurring on a cellular level than the original term "tendonitis." On biopsies, most of the time it has been found that areas such as the Achilles and supraspinatus tendons, patellar ligament, tennis elbow, etc., did not show evidence of intratendinous inflammation. Tendinosis has also been described as an avascular degenerative process that may represent the result of failed tendon healing seen with aging or following repetitive microtrauma. An adequate generic term by Maffulli (34) covers these conditions as "tendinopathy."

GT is used for CFM to mobilize mechanically the scar tissue, increasing its pliability and loosening it from surrounding healthy tissue.

Furthermore, it is hypothesized that GT reinitiates the inflammatory process by introducing a small amount of trauma to the tendon scar. Reinflammation starts the healing process again by enhancing the proliferative invasion of blood, nutrients and fibroblasts to the region, which results in new collagen deposition and maturation.

Follow with stretching exercises to encourage proper realignment of newly forming collagen. Endurance strengthening exercises (high-repetition and low-resistance) are introduced to impart non-abusive stress to the structure to increase its strength, to promote further proper alignment (Davis' Law) and to maximize scar tissue degradation. Adaptive stress is essential to rehabilitation.

Tendinitis (15)

In the condition of actual tendon inflammation, use GT in a manner similar for tendinosis; however, reduce pressure and time parameters.

Peritendinitis

This condition has been previously classified as peritendinitis, tenosynovitis and/or tenovaginitis. Inflammation is more prevalent in the layer of a tendon sheath, or peritendinous area than the tendon itself. (Selvanetti) In this issue condition, there is an influx of inflammatory cells into the tissues surrounding the tendons. Eventually, there is exudation of fluid into the tendon sheath. (Patton) The fluid thickens and the tissue becomes more edematous, causing the tendon to lose its gliding properties which results in pain and restriction of motion.

With this condition, GT is used for CFM with a gentle, active tendon-gliding motion. However, since the tendon sheath is already inflamed, the treatment strokes and parameters must be adjusted to deliver a less intense application than would be used with the existence of tendon degeneration.

Muscle

Common muscle injuries include strains, tears and calcification. GT can be used for effleurage, pétrissage and DMF. The Graston Technique® instruments can be used to break cross-fiber links, splay fibers and increase fascial mobility in muscle. Based on the effects of STM, the technique facilitates the healing process by perfusing the area with oxygen, nutrition and

stimulating blood and lymph flow that aids in removing waste products such as lactic acid. The objective of a GT treatment for muscle can vary greatly from a non-inflammatory "massage" type approach to a therapeutic pro-inflammatory, aggressive tissue intervention.

Special Note (15, 23)
In the case of muscle calcification, use caution. According to some references, soft tissue mobilization may actually promote additional calcification in the presence of myositis ossificans.

Muscle is highly vascularized, thus, bruising may occur when using GT, more than other tissue types. Greater pressure may be required with the instruments to reach deeper muscle fibers. Try having the patient repetitively contract and relax the muscle to increase comfort and increase tissue heating/pliability.

Treat the muscle in its lengthened and shortened position to access the area of adhesions.

Ligament
Reduce GT application time due to the focused pressure from the instrument with the increased mechanical advantage and proximity to the bone.

Special Note: **Position the joint in a position to allow access to the affected ligament. Superficial tissue will need to be on enough slack to allow the instruments to reach the level of the lesion. (15) Additionally, positioning should never place additional tensile stress on an already compromised structure.**

Fascia
Based on the general principles of soft tissue mobilization, the Graston Technique® promotes fascial mobility. The instruments increase the mechanical advantage of the clinician and are excellent in mobilizing the superficial fascial layer in preparation of deeper work.

Bone
The periosteum is highly innervated with pain receptors (27, 44). Continually assess the comfort level of the patient when applying a rigid, steel Graston Technique® instrument around rigid, bony structures. Direct pressure on bony structures should be avoided. Instead, consider "framing" around bony prominences.

Contraindicated for GT:
- GT may interrupt the callous formation.
- GT increases tissue mobility. A non-union fracture requires stability.
- Consider other types of Soft Tissue Mobilization (STM) or massage peripheral to the fracture site, which might stimulate circulation and healing. To enhance healing, consider other modalities, e.g., electrical stimulation.

Neurovascular
Use caution in the presence of peripheral vascular disease and peripheral neuropathies. GT stimulates the neurovascular system, promoting tissue healing. DO NOT use GT if there is vascular insufficiency or sensory loss. In these cases, GT may compromise tissue healing or actually promote tissue destruction.

Do not strum over nerve tissue. Moving the instruments from proximal to distal in the area of nerve tissue increases comfort.

Special Note: Consider the following peripheral nerves during treatment. (9) Do not strum over the nerves. Moving the instruments from proximal to distal in the area of nerves increases comfort.

Upper Extremity:

- Ulnar N (Guyon's tunnel cubital sulcus)
- Radial N (radial head, spiral groove below lateral head of triceps, radial sensory N at distal radius)
- Median N (carpal tunnel, medial to biceps tendon insertion and muscle belly)

Lower Extremity:

- Superficial Peroneal N (dorsum of foot)
- Deep Peroneal N (lateral to 1st ray)
- Common Peroneal N (behind fibular head)
- Tibial N (posterior tarsal tunnel, popliteal fossa)
- Sural N (lateral to Achilles tendon)
- Sciatic N
- Saphenous N (proximal to pes anserine)

Lymphatics

Due to the intermittent compression of the sweeping strokes, it is rationalized that GT enhances the flow of lymph (4). This reduces edema and exports toxins from a region. Encourage the patient to drink plenty of water (8–12 8-oz. glasses of water per day) to foster the removal of toxins via good circulation.

Special Note: The technique has not been clinically validated as an appropriate augmentation lymphedema massage. This possible application requires research by experts in lymphedema massage.

Scar (35)

Scar tissue gradually becomes infiltrated with nociceptors and a minimal vascular supply. These factors have clinical implications. Since scars have nociceptors, they can become a source of chronic pain, especially as the scar contracts and hinders normal motion. As the contracted scar is pulled on during motion, it elicits a painful response which inhibits muscle activity causing progressive atrophy. This leads to additional contracture, fascial restrictions and scar tissue that cause the vicious cycle to continue.

The membranes of capillaries that infiltrate scar tissue are fragile compared to capillaries present in healthy tissue, especially in the presence of low grade, chronic inflammation. When scar tissue is released, its capillary supply may easily rupture causing interstitial bleeding; hence, bruising.

Traumatic Scars vs. Surgical Scars:

There is a greater degree of irregular soft tissue damage and neurovascular compromise compared to a post-surgical scar.

- Tends to be highly sensitive.
- Use GT instruments very gently over traumatic scars.
- Double-beveled edges are more comfortable.
- Tension on soft tissues adjacent to the scar are often the cause of symptoms and scar proliferation.

Special Note: Be cautious depending upon the age of the scar. **DO NOT** rub back and forth over the scar with the instruments. Initially, to help protect the integrity of the scar, mobilize the tissue towards the scar. Distraction on a freshly healing wound is contraindicated, however, as the scar matures it may be appropriate. Once the scar is mature, mobilize with the instrument away from the scar in all directions. Post-surgical scars are less sensitive than traumatic scars and can be treated more aggressively.

Potential Treatment Responses

Patients may experience pain or discomfort during treatment. In addition, bruising or a significant soft tissue release is possible subsequent to GT. These patient responses may evoke a concern/fear from the clinician.

To minimize the fear/concern **for the clinician as well as the patient**, it is essential that the clinician become confident in appropriately coaching patients through these potential side effects.

Pain

Patients may demonstrate variable degrees of discomfort as a response to GT.

- Recognize that application of the technique may cause discomfort, but causes no harm! Discomfort should be restricted as much as possible – localized to the lesion – avoiding the compromise of healthy tissue.
- Adjust the amount of pressure to patient tolerance. Determine a sign, or tap out sign, the patient can use to indicate, "Stop." Please note that some discomfort may be necessary to release the tough scar tissue and restrictions. Once the clinician isolates a specific restriction, coach the patient through the discomfort.
- Encourage the patient to breathe in a pattern that aids in minimizing stress.
- Have the patient count down, "10, 9, 8, 7," etc. Modalities, such as cryotherapy prior to treatment, may help to reduce the discomfort. Also, follow treatment with cryotherapy to reduce discomfort and bruising.

Bruising

In cases being treated for a chronic musculoskeletal condition, localized microtrauma and associated scar tissue breakdown may cause temporary bruising. Forewarn the patient of this possibility. Explain to the patient why bruising may occur. Follow GT with cryotherapy to minimize bruising.

Where the objective of GT is to reset the inflammatory cascade, bruising may appear ominous, but is often a sign that scar tissue, adhesions and restrictions have been released. Following a release, progress often escalates as tissue remodeling and strengthening can occur without the constraint of the restriction.

Scar tissue, as it separates from healthy tissue, is poorly vascularized. Capillaries that have infiltrated the scar may rupture. The epithelial walls of capillaries in traumatized areas are weakened because of acute or chronic inflammation and swelling. Traumatized soft tissue is more susceptible to bruising than healthy tissue.

Bruising should correspond to the site of the lesion. Bruising healthy tissue is not considered to be therapeutic. Random, indiscriminate bruising is not to be expected. Bruising that extends beyond the boundaries of the detected restriction should be avoided, and requires further investigation. It may be related to the patient's pathology, general health, medications, body and skin type. Greater than expected bruising may also be a factor due to the clinician's underdeveloped manual skill or treatment technique and will require modification of the treatment parameters. It is essential that any episode of significant bruising should be re-evaluated in the context of the patient's previous treatment and it's correlation to the clinician's physical findings.

What to Do If Significant Bruising Occurs:

- Pretreatment patient education is a must!
- Explain to the patient the potential for bruising to occur.
- Assure the patient that this setback is temporary and will ultimately result in functional improvement.
- Temporarily reduce the intensity of GT by decreasing treatment duration and pressure.
- Instruct the patient to continue icing and performing the home exercise program.
- Focus their program on stretching to remodel the softened tissue as well as icing to control inflammation.

Over-Treatment

Do Not Over-Treat. Excessive treatment may exacerbate a patient's condition.
It can occur when:

- Using too many treatment modalities. The goal is to change or introduce one modality at a time. Use only necessary modalities.
- Treating one specific restriction/lesion for too long. The goal is to use GT no more than 30 seconds to one minute per restriction/lesion.
- Using GT for too long during a session. The goal is to use GT a maximum of 8–10 minutes for all regions combined.
- Using excessive pressure. The goal is to be as gentle as possible while still treating effectively.

The most common mistakes when using the Graston Technique® instruments are:

- Spending too much time per treatment area.

- Applying too much pressure per treatment area.

Remember, be as gentle as you can, and as forceful as you need to be.

Dosage Parameter Guidelines

The intensity or "dosage" of a GT treatment intervention can be modified by manipulating the following variables:

VARIABLE	EFFECT
Size of GT Instrument	Larger instruments less intense vs. smaller
Size of Treatment Edge	Broader/longer edge is less intense vs. smaller
Shape of Instrument vs. Shape of Body Part	Concave on convex (least aggressive) Convex on concave (more aggressive) Convex on convex (most aggressive)
Speed of Stroke	Faster strokes are more intense
Length of Stroke	Longer strokes are generally less tolerable
***Stroke of Choice**	Brushing is least aggressive Sweeping & fanning are less aggressive Strumming, J-stroke, swivel & scoop are most aggressive
Target Tissue Length	Slacken target tissues to achieve deeper penetration
Angle of Instrument Edge	30 degrees is less aggressive 60-90 degrees is most aggressive (90 degree angle is suggested for Strumming and Swiveling only)
Treatment Time	Longer duration increases intensity

Evaluation

Realistic goals and effective treatment plans are established based on a thorough evaluation. Reassessment of critical signs and symptoms is necessary during each treatment session. GT administered without a thorough evaluation, along with an understanding of the anatomical relationships, biomechanics and rehabilitation principles may result in simply "chasing the pain."

The purpose of this section is to outline the evaluation process and soft tissue assessment used with the Graston Technique®. An in-depth discussion of orthopedic evaluation and testing procedures is outside the scope of this manual. We encourage you to attend other courses and to refer to other texts that focus on orthopedic evaluation and treatment of different regions to develop your diagnostic skills further.

Evaluation Process

1. Obtain a thorough medical history from the patient.
2. Have the patient rate their pain and function on a visual analog scale.
3. Collect objective data through measurement and soft tissue evaluation.
4. Set measurable functional and objective goals.

*Soft Tissue Evaluation**

*Soft tissue evaluation is a subset of the examination process.

Manually palpate the soft tissue for dysfunction/restrictions first, and then use the Graston Technique® instruments. Generally, manual evaluation provides a more global initial assessment of the soft tissue condition. The Graston Technique® instruments are used for further localization and delineation of soft tissue restrictions. Patient progress must be determined based upon functional testing and not just because an area palpated demonstrates less pain or because their symptoms have abated.

Soft Tissue Assessment

Manual Assessment

A clinician's hands identify anatomical landmarks better than the Graston Technique® instruments. Thermal sensors provide information on skin temperature. Manual assessment may prove more effective for the following information:

Skin Temperature	Contour
Moisture	Size
Anatomical Landmarks	Tissue Layers
Position	Shape

Graston Technique® Assessment

The GT instruments are particularly useful to help find and follow apparent and remote myofascial strain patterns.

The instruments magnify what the hands feel. They can detect thickening, ridges, adhesions, fibrotic nodules, crystalline deposits and scar tissue. Both the clinician and patient feel these as **vibration sensations** through the instruments.

The instruments assist the clinician to identify and localize lesions. Since the surface of the instruments do not compress, like the fat pads of the finger, deeper lesions are accessible and more treatable.

The instruments, due to the smaller surface area of the edge on some instruments, are able to separate fibers and outline the anatomy more effectively (i.e., framing the patella, scapula).

They may prove more effective in assessing texture, especially of deeper structures. However, the instruments cannot assess temperature and moisture.

The “depth” of soft tissue lesions can be grossly assessed by placing the treated tissue on tension or in slackened positions when performing assessment strokes.

Special Note: Make bilateral comparisons. Also, compare the information received from both manual and GT assessments.

Palpation with the Graston Technique® instruments adds another dimension to soft tissue evaluation.

Common Palpation Errors – Manual and Instrument

- Too much pressure diminishes the sensitivity of the clinician's proprioceptors and may increase patient discomfort.
- Lack of concentration.
- Palpating deeply, too quickly.
- Assessing a large surface area too rapidly; for example, by making your sweeping strokes too fast. In this instance, information will be missed and patient discomfort may increase.
- Failing to assess the tissues in multiple directions.
- Failing to assess reticular tissues at structural attachment sites.
- "Digging" or "grinding" with the instruments, especially in proximity to bone.

Evaluation vs. Treatment

While using the Graston Technique® instruments for soft tissue mobilization, there is a constant interchange between evaluation and treatment. During the initial evaluation, there is a focus on tissue assessment, but this process does have an effect on the tissue and should be considered as a trial treatment. Follow with stretching, exercise and cryotherapy to minimize potential discomfort. Cryotherapy may be especially important with the initial treatment since patient reactivity will not truly be determined until a subsequent treatment.

The initial evaluation gives a general assessment of the location of soft tissue abnormalities and early reactivity of the tissues.

A typical treatment session commences with scanning the region for evaluation purposes. Once a restriction is isolated, it is treated. Then, another area is moved into for evaluation and treatment. Hence, there is a "flow" between evaluation and treatment throughout a soft tissue mobilization session. The following chart attempts to distinguish how one varies the treatment parameters to use the instruments in an evaluation versus a treatment mode. These are only guidelines:

Parameter	Evaluation	Treatment
Instrument Selection (How the instrument is used is more important than which instrument is used)	Typically, use GT4 or an instrument with a larger treatment surface.	Typically, GT3 or an instrument with a smaller treatment surface.
Clinician Position	Normally doesn't change.	Normally doesn't change.
Patient Position	Normally doesn't change.	Normally doesn't change.
Angle of Application	Doesn't change.	Increase angle more toward 60 degrees.
Rate	Slower	A little faster is tolerated.
Duration	Use caution in assessing the patient's tolerance.	See Dosage Parameter Guidelines, pg 14.
Intensity	Too much pressure decreases accuracy, increases patient guarding and decreases proprioceptive sense.	Force is directed into a specific area. Same guidelines for evaluation. See Treatment Parameter Guidelines, pg 14.
Depth of Penetration	Affects intensity, usually more superficial, just deep enough to treat the lesion.	Deep enough to reach and treat the level of the lesion within patient tolerance.
Stroke Amplitude	Covers a broader surface area.	Localized to the lesion/ restriction.
Direction	Multiple	Multiple, but only focus on one direction at a time.

Advances with Graston Technique®

The traditional “controlled microtrauma” approach has served well for many years as our instructional model; however, we are seeing a number of different therapeutic approaches that benefit patients because of the increase in clinical use.

We have discovered many patients respond to Graston Technique® treatments without observable petechia or bruising. In addition, when utilized on acute conditions, it is used for a very different mechanical intent. We essentially are using the instruments to evacuate edematous tissues mechanically and therefore not intending to create microtrauma.

Current Therapeutic Approaches for Graston Technique®

1. Pro-inflammatory – Original controlled microtrauma to reset inflammatory cascade – the traditional Graston Technique®.
2. Facilitatory – To utilize as a biofeedback approach or based on preliminary study, used to possibly reduce arthrogenic inhibition.
3. Edema reduction – Utilize instruments as a mechanical squeegee to evacuate edematous tissue.
4. Pain reduction – Brushing approach.
5. Scar mobilization – Improve scar character by releasing adherent tissues without increasing inflammation, since inflammation is what contributes to producing more scarring.
6. True Cyriatric approach (CFM) – Pressure-related, but not creating inflammation to increase fibroblastic proliferation.
7. Fascial mobilization – May or may not create inflammation based upon pressure application and vascularity of the tissues.

GT Treatment Objectives

Graston Technique® Objective:	Manual Approach of GT Used:
An intentional mode for inducing controlled microtrauma (The most common usage of Graston Technique®)	Higher pressure Pro-inflammatory (traditional use)
Facilitation of connective tissue healing, i.e. ligaments, tendons	Higher pressure, CFM-like Pro-inflammatory
Release of functional soft tissue/fascial restrictions, entrapments, facilitation of movement, etc.	+/- higher pressure +/- pro-inflammatory
Acute injury management of edematous soft tissues	Low pressure Non-inflammatory
Scar management	Low pressure Non-inflammatory

Appendix

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