“Evaluating the Popular Soft Tissue Therapies: Choosing Which is Best for Your Athletes”

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Teaneck High School, NJ
EATA Clinical Meeting- January 11, 2009
Introduction

• Statistics/Incidence.
• Historical Overview.
• Review Myo-Fascial Anatomy.
• Pathomechanics.
• Proposed Mechanisms of Myo-Fascial Therapies.
• Overview of Techniques.
• Concluding Thoughts.
Incidence of Soft Tissue Injuries:

- Overuse injuries: account for greater than 7% of all injury-related physician office visits in the US. (Woodwell, et al, 2004)


- In 1997, 192 million visits to DC’s, & 114 million visits to MT’s. (Eisenberg, et al, 1998)
Soft Tissue Injuries in Sport:

- In the US, overuse injuries are est. to be 30%-50% of all sport related injuries. *(Maffuli, etal 2005)*
- Increases in young athletes thought to be due to limited recovery times, longer competitive seasons, and year round training. *(Emery CA 2003)*
- Majority of tendon injuries occur in men, but rate among women rising faster *(Maffuli, etal 2005)*
Types of Soft Tissue Injuries:

- **Sprains/Strains.**
- **Contusions.**
- **Tendinopathies.**
  - Tendinitis.
  - Tendinosis.
Historical Perspectives:

• **15,000BC** - European cave paintings depict what appears to be use of therapeutic touch.

• **3,000BC** - Chinese records reveal use of massage.

• **1569AD** - Girolamo Mercuriale writes “De Arte Gymnastica”.

• **1784** - Dr. Edward Harrison-highly regarded for manual medicine procedures in London.

• **Late 1800’s** - Andrew Still & Daniel D. Palmer reinforce manipulative therapies.
Historical Perspectives:

• 1917 - James B. Mennell, wrote text “Physical Tx by Movement, Manipulation, and Massage.

• 1949 - Janet Travell- coins the term “Myofascial Pain”.

• 1904-1985 - James Cyriax, MD: British physician considered “father of orthopedic medicine”.

• www.myofascialtherapy.org
  • www.webmanmd.com
Contemporary Leaders:

- John F. Barnes, PT
- P. Michael Leahy, DC, CCSP, ART
- Tom Sevier, MD/ David Graston
- Leon Chaitow, DO
- Warren Hammer, DC, DABCO
Myo-Fascial Anatomy:

• Muscle is surrounded by several layers of fascia.

• Fascia acts to bind and separate.

• Tendons also covered by fascial sheaths (epi/paratenon).

Figure 1: Muscle belly split into various component parts (from Essentials of Strength Training & Conditioning, National Strength & Conditioning Association)
Normal Tendon Anatomy:

- Muscle-bone interface.
- Composed of collagen bundles, cells, and ECM.
- Also has fascial sheaths that envelop and separate bundles.
- Composed of Type I, II, & III collagen, with Type I most dominant.
- Designed for tensile strength, but poor elasticity.
Factors in Tendon/Fascia Injury:
(adapted from: Khan, 1999)

• **Acute**
  – Sudden overstretch/ rupture.

**Chronic (overuse)**

**Intrinsic**
1. Malalignments
2. Fem Anteversion
3. LLI
4. Muscle Imbalances
5. Weakness
6. Hypermobility

**Extrinsic**
1. Training Errors
2. Surface
3. Environ conditions
4. Footwear & Equip
Normal Tendon Healing:

**Stage 1: Inflammatory**
- platelets & fibrin fill wound. Fibroblasts & phagocytic cells migrate to injured area.

**Stage 2: Proliferative**
- fibroblasts continue to increase in size & number, and synthesize collagen.

**Stage 3: ReModeling (Maturation)**
- realignment of collagen fibers and shift from Type III to Type I predominance.

Maffuli, et al 2005
Issues in Tendinopathies:

- Cycle begins when breakdown exceeds repair.
- Physical/Chemical alterations include:
  - Total collagen decreases (esp. Type I)
  - Increased levels of Proteoglycans/GAGs.
  - Improper ratio Type I to Type III.
  - Normal parallel bundle fiber structure disturbed.
  - Increased #s of fibroblasts- irregular.
  - Increased neovascularity.
  - Alteration in size/shape of mitochondria.
  - Little or no inflammatory cells present.

  – Leadbetter, 1992/Maffuli, 2000
Tendinopathy Pathomechanics:

Normal Tendon:
- Tightly arranged bundles.
- White/ Glistening.
- Firm.

Tendinopathy:
- Loss of normal alignment of bundles.
- Uneven mix thick/thin fibrils.
- Meshes poorly w/ surrounding tendon tissue.
- Dull/ Soft.
- Greyish.

FIGURE 1. Histopathologic comparison of normal tendon and abnormal tendon as seen under a polarized light microscope (x 100). Normal patellar tendon (A) consists of tightly bundled collagen fibers with a characteristic golden reflectivity. In an abnormal patellar tendon from a postsurgical patient with chronic tendinopathy (B), loss of collagen continuity, loss of reflectivity, and a frank collagen defect (arrows), are easily seen.
Fascial Restrictions:

- Can occur in either muscle or tendon structures.
- Post-inflammatory changes may lead to adhesions between layers/structures.
- Chronic tendinopathies often result in thickening of tendons, resulting in a tighter tendon/fascia interface.
Challenges to Successful Treatment:

- Reverse the degenerative processes occurring within the connective tissues.
- Increase fibroblast proliferation in a positive manner (Controlled Inflammatory Response).
- Stimulate Type I Collagen production.
- Breakup adhesions that are creating restrictions or inhibiting a productive healing response.
Proposed Mechanisms Behind Most Soft Tissue Therapies:

1. Break up adhesions.
2. Stimulate a controlled inflammatory response to activate a renewed healing cascade in the tissues.
3. Fibroblast activation.
4. Promote a free flow of “Qi” in the body, thereby allowing healing to occur.
5. “Unwind” facial web to release restrictions brought on by both physical and emotional stresses.
• **Davidson, et al (1997):**
  - IASTM may promote CT healing via increased fibroblast recruitment and activation.
  - Study involved induced tendinitis in rats (20).

**Gehlsen, et al. (1998):**
- IASTM treatment using heavier pressure created fibroblast recruitment to a greater degree than medium or light pressure.
- 30 S-D rats.
- 20 patients with hx patella tendinitis received either traditional PT or IASTM based therapy.  
- Traditional PT group also received CFM- total 12 sessions  
- IASTM + exercise group- 8 total sessions.  
- At end of 8 weeks: 100% of IASTM group resolved vs 60% of traditional PT group.
Evaluating the Popular Soft Tissue Therapies/Systems...
Barnes- MyoFascial Release:

• One of the original techniques.
• John F. Barnes, PT- developer.
  • “Fascia is a tough connective tissue that spreads throughout the body in 3-D web”.
• Fascial strain can slowly tighten this web, causing body to lose its physiological adaptive capacity.
• Tightening can be caused by trauma, inflammation, poor posture, and emotional stresses.
Barnes- MyoFascial Release:

• “Ordinary stretching & manipulation affect the elastic-muscular barrier, and NOT the collagenous barrier…”

• Improvements probably due to challenging of elastic barrier, shearing of cross-links in fascia, and changes in ECM.
Application:

- A gentle, consistent pressure is applied until firm, collagenous barrier is reached.

- Position is held 90+ sec., until a “release” is felt.
Barnes MFR- Training/Cont. Ed:

- Seminars taught throughout US.
- Personal instruction by Barnes.
- Fees range: $695. - $1800.
- Courses: MFR I, II, III; Myofascial Unwinding; Women’s Health; Pediatric; Myofascial Rebounding; Subtle Energy I, II.
- NATA BOC # P463.
- **Not much direct research into technique found during literature search.**
“ART is a patented, state-of-the-art soft tissue system that treats problems with the muscles, tendons, ligaments, fascia, & nerves…”

It is a non-invasive treatment that both locates and breaks down scar tissue & adhesions using 500+ specific treatment protocols…
Active Release Techniques:

• Developed in mid 80’s by P. Michael Leahy, DC, CCSP.

• Graduate of USAFA & LACC.

• Utilized engineering background to develop technique to locate and remove MF restrictions utilizing precise contacts and specific movement patterns.
Active Release Techniques:

• **ART does not utilize instruments** because “tactile sensitivity is needed to feel restrictions” (esp w/ entrapped nerves).

• **Purports to identify restrictions at** “different depths & levels of tissue”.

• **Practitioner must be** “able to feel soft tissue structures glide over and thru each other”.

• **“ART practitioners trained to locate adhesions, identify direction adhesions are aligned, and remove them.”**

  • Abelson, 2004
Active Release Techniques:

Abelson, 2004: “ART is built upon a strong scientific foundation…”

- Most of the research in the form of:
  - Case Studies.
  - Case Reports.
Active Release Techniques:

Schiottz-Christensen, et al, 1999 (JOccRehab):  
ART protocol taught to ATC- tx 28 patients, all who failed in prior care plans for RSIs.  
- 71% success rate at one & three months.

Wong, 2004 (JCanChirAssoc):  
case report of tx of pt. w/ multilevel spondylolisthesis with ART as well as other techniques- positive outcome.
Active Release Techniques:

**George, et al, 2006 (JMPT):**

Pilot study- effects of ART on hamstring flexibility.
- all 20 males ↑ sit & reach scores following ART tx.

**Spina, 2007 (JCanChiroAssoc):**

Case report- tx of case of coxa saltans with ART resulted in full resolution.
Active Release Techniques:

**George, et al, 2006 (JChirMed):**

Pilot study- tx of 5 subjects w/ confirmed CTS. Tx with ART- 6 sessions.

- significant improvement in mean symptom severity and functional status but EMG unchanged.

**Howitt, et al, 2006 (JCanChiroAssoc):**

Case study- tx of patient with unresolved Trigger thumb who underwent care plan of ART & GT- lead to successful resolution. Care plan also included TEx.
Active Release Techniques:

**Treatment Principles:**

- **Soft Contact/ Specific.**
- **Work longitudinally.**
- **Active motion whenever possible.**
- **Work with venous & lymphatic flow.**
- **Avg. success after 6-8 treatments.**
- **Work tissue from shortened to lengthened position.**
Active Release Techniques:

**Training/ Education:**

- Courses taught throughout US
- Thurs- Sat. 20% lecture/ 80% hands-on.
- Sunday- testing/certification.
- Upper Extremity- 105 protocols ($2190.)
- Lower Extremity- 96 protocols ($2190.)
- Spine- 76 protocols ($1790.)
- Long Tract Nerve Entrapment ($995.)
- Masters ART
- Biomechanics (online)
Active Release Techniques:

- Certification test by Leahy or another instructor.
- Must take 2 or more courses to be ART Provider
- Elite Provider Network
- Must re-take at least one course per year to maintain certification $$$
Instrument-Assisted Soft Tissue Mobilization:

- The use of instruments in massage can be traced back several centuries.
- Allows for more precise application of pressure with less stress on practitioner’s hands/fingers.
- May assist in magnifying our tactile sensitivity.
- Use of instruments may significantly decrease treatment times, and improve outcomes.
Gua Sha

- Eastern (Asian) healing technique.
  - Gua= to scrape or rub.
  - Sha= reddish, elevated skin rash (petechiae)

Gua Sha is to be used whenever pain is associated with an acute or chronic disorder.

Use of a tool (soup spoon, round metal object, or buffalo horn) to rub along the surface of skin to…”raise stagnated blood to the body surface to relieve tissue congestion… and pain”

-Nielsen, 2001
Gua Sha

- Expose skin and apply a medium (Vicks/Peanut Oil).
- Use tool to stroke the affected area at approx 30° angle to skin with mod. pressure.
- Reddish bruising generally lasts 3-7 days & not painful.
- Keep area warmed post treatment.
• Developed in mid-90’s in collaboration with researchers at Ball Memorial Hospital, Ball State.
• Lead by Tom Sevier, MD
• Initially had assoc. with Dave Graston also.
• Has lead the field in generating both basic clinical research and outcomes data for IASTM.
• ASTYM is a “system”, and is not concerned with instrument construct.
• **System:**
  - You pay (yearly fees) to support on-going clinical research & marketing support.
  - Staffed F/T by PTs and MDs.
  - Goal of system is to assist the healing/immune response in tissue and actually “change” the dysfunctional tissue.
  - Has identified and developed specific protocols based on clinical & outcomes research.
  - Protocols identify key parameters from stroke direction, to applied pressure, to pre/post tx therapeutic protocols, as well as # of treatments, etc.
- Clear plastic instruments (3).
- Each instrument has beveled edges and concave/convex shapes.
- Instruments are leased from Performance Dynamics.
- Edges tend to be sharper than those found on the steel/aluminum instruments.
Training/ Continuing Education/ Fees:
Graston Technique:

- Founded in 1994, Therapy Care Resources, Inc.
- Originally a partnership between (David) Graston, Michael Arnolt, & Andre Hall.
- Patented first stainless steel instruments (Grastech).
- Taught in the curriculum of NUHS, Bridgeport, NWHSU, & CMCC, as well as graduate AT program @ Indiana U.
• GT is utilized by over 450 outpatient facilities, as well as 60+ professional and amateur sports teams, and numerous universities.

• Educational program involves 2 modules, delivering over 25 hours of instruction.
- Set of 6 curvilinear edge stainless steel instruments.

- Instruments have concave/convex shapes to mold to various body contours.

- Instruments purported to resonate (like a tuning fork) in clinicians hand to more precisely isolate adhesions and restrictions.

- A “stethoscope” for identifying myofascial problems.
• GT is currently involved in multiple research projects, however much of the basic science is from same studies quoted by other techniques (Davidson, 1997/ Gehlsen, 1998/ Wilson, 2000).

• Much of the current research in the form of case studies/reports:

• **Aspegren, D, Hyde, T, 2007 (JMPT):**
  – Case report- female VB player with costochondritis- tx also involved CMT & KT. Outcome was favorable.
• **Hammer, WI, Pfefer, MT, 2005 (JMPT):**
  - Case report: tx of case of subacute lumbar compartment syndrome with GT- resolution after 6 tx.

**Burke, J, Buchberger, D, et al, 2007 (JMPT):**
- Pilot study comparing GT to hands-on STM on pts with CTS. Both groups had similar positive outcome in pain & functional levels, but no changes in EMG activity…
Training/ Instrument Fees:

*Module I: Graston Basic (12h): $495.

*Module II: Advanced UQ/LQ (14h): $695.

**Grastech Instruments: $2,755.
(60 day trial- money back guarantee - $150. restock fee)

*Annual Fees (required): $75.

*NATA BOC-approved provider.

(prices as of June 2008)
Sound-Assisted Soft Tissue Mobilization (SASTM):

- **David Graston.**
- A machinist by trade, and professional water skier prior to serious knee injury.
- Taught by PT to use cross-friction during rehab - developed CTS in hands. Developed instruments based on “Roller concept” of varying sizes - first wooden, next aluminum.
- Developed working relationship with Tom Sevier/Ball Memorial Hospital (1993) but parted ways in 1995. Helped develop original SS instruments used in studies.
• Formed Carpal Therapy, Inc. in 2000.
• Released first instruments in 2003.
• Manufactured from ceramic polymer that allows for increased resonance.
• Instruments based upon Gua Sha.
• Utilize progressively smaller square treatment edges to localize lesions and provide less insult to surrounding tissues.
• Utilizes “Fibrotic Mapping” protocol to find areas in need of treatment.
• 8 Instruments available.
• David believes use of **progressively smaller treatment edges** allows greater focal pressure to lesions without greater discomfort of patient.
  • Heat area pre-tx.
  • Apply lubricant/cream.
  • Scan tissue in all 4 directions, then tx in direction of barrier (avg. 20 strokes or 20 sec)
  • Utilize progressively smaller tools.
  • Finish with some cross-fiber strokes.
  • Don’t overtreat!!
- **Training/ Instrument Fees:**
  - Basic certification (fee) is included in purchase cost of each set.
  - Additional certifications @ $250. per clinician or $995. per clinic (unlimited).
  - Training programs available throughout US, or on-site ($1,250.-$1500.)
  - Basic training also available online w/ instrument purchase.
• **Instrument Fees:**
  
  3 Instrument (Basic) Set: $995. + $55. ship
  
  6 Instrument (Standard) Set: $1995. + ship
  
  7 Instrument Set (Exp) Set: $2125. + ship
  
  8 Instrument (Full) Set: $2250. + ship
Other IASTM Options:

• **StarrTool:**
  - All-in-one instrument.
  - Beveled edges.
  - Aluminum ($129.)
  - Stainless Steel ($259.)
  - Basic training CD.
  - [www.starrtool.com](http://www.starrtool.com)

**Shrimp Deveiner:**
- Aluminum construct.
- CHEAP!!! ($2.99)
- [www.ebay.com](http://www.ebay.com)
Comparing the Techniques/Systems:

- **Hands-On vs. IASTM:**
  - Clinician preference.
  - **No research clearly supporting one approach over the other!**
  - ART does not need any instruments, but more stress on hands/clinician.
  - Barnes MFR tends to be time-consuming and a bit esoteric.
  - **Clinician feedback:** all compliment each other. ART beneficial for muscle-based, and IASTM better with tendinopathies.
Comparing the IASTM Systems:

- **Instrument Construct:**
  - GT- stainless steel
  - SASTM- ceramic polymer
  - ASTYM- acrylic (plastic)

Georgiou, Marcus (Durban (SA) Institute of Technology- Masters Thesis study.

“The influence of component materials on GT effectiveness during treatment of MPS”

- concluded SS more effective than Alum in tx of MPS- attributes to “cooling phenomenon” of SS vs. aluminum??? Bias?
Comparing the IASTM Systems:

• **Instruments:**

  **Clinician Feedback**—personal preferences, but more seem to prefer SS.

  **My Opinion:** Instrument weight and machining (treatment edge) are important!
Comparing IASTM Systems:

- **Training/Certifications (feedback):**
  - **ASTYM:** excellent training program and outcomes system for members. Instruments not very technical. Yearly fees are pricey$$.  
  - **Graston (GT):** highly regarded training modules. Cheap yearly fees. Instruments are very well regarded but very pricey$$$$.
  - **SASTM:** instruments well regarded. Reasonable fees. Training program needs more work. No yearly fees.
  - **Active Release Techniques:** well regarded technique. Excellent materials/DVDs. Very pricey seminars$$$$$. Yearly re-cert fee not cheap$$.  

Concluding Thoughts…

- The key to each technique is the clinician...
- Each technique has its advantages & disadvantages over each other.
- Are there cheaper options?
- Need research that attempts to compare the techniques head on!!!!!
- More research on instrument construct!!!
- FAKTR-PM…
QUESTIONS?