CE16317
New Advances and Techniques in Therapeutic Modalities and Rehabilitation Protocols


Andy Grubbs M.Ed., ATC
The Hughston Foundation
Columbus, GA

Disclosure

- Non-Financial
  - DJO
  - Breg
  - Gatorade
  - Mueller
  - Medco
  - Dragonfly Athletics
- Financial – Slack Publication

Goals

- Describe new and old types of modalities and show their effectiveness.
- Look at some new trends in ACL rehab and discuss personal preferences.

Therapeutic Modalities

Objectives

- Review the rationale and recommended parameters for low level laser therapy.
- Review the rationale and recommended parameters for cupping therapy.
- Review the rationale and recommended parameters for dry needling therapy.
- Review the rationale and recommended parameters for ultrasound therapy.

Objectives

- Review the rationale and recommended parameters for phonophoresis.
- Review the rationale and recommended parameters for iontophoresis.
- Review the rationale and recommended parameters for electrical muscle stimulation.
- Review the rationale and recommended parameters for cryotherapy.

Objectives

- Review the rationale and recommended parameters for thermotherapy.
- Review the rationale and recommended parameters for instrument assisted soft tissue mobilization.

Low Level Laser

Terms

- Laser – Light Amplification by Stimulated Emission of Radiation

Laser Components

- Amplifying Chamber
- Lasing Medium – GaAlAs
  - Gallium Aluminum - Arsenide
- Power Source
- Laser Applicator

- Cluster Applicator – captures LLLT, LED, and SLD

Classification

- Based on power output. Measured in mW
- I = <0.5
- II = <1
- IIIa = <5 Super.
- IIIb = <500 Deep.
- IV = >500

Low Level Laser Therapy

- Also known as cold lasers or soft lasers
- Athermic – doesn't directly heat tissue but does increase blood flow
- Less than 500mW
- Typically used for superficial wounds or areas of pain

Treatment Parameters

Wavelength

- Measured in nm
- Determines depth of penetration
- Typically between 600nm and 1000nm
- Both of our cited articles used 810nm

Power

- Power is rate at which energy is produced
- 1 Watt = 1 Joule/Second
- LLLT devices are measured in mw

Energy Density

- Power output Divided by Size of treatment area
- Measured in Joules/cm2

Parameters

- Continuous vs Pulsed
- Overall treatment time
- Scanning vs Stationary

Contraindications

- Cancer (tumors or cancerous areas)
- Direct irradiation of the eyes
- Photophobia or abnormally high sensitivity to light
- Direct irradiation over the fetus or the uterus during pregnancy
- Direct irradiation over the thyroid gland
- Symptoms of unknown cause
- Over hemorrhaging lesions

Clinical Question

- Can utilization of low level laser therapy (I) help decrease pain (O) for patients or athletes who have musculoskeletal disorders or conditions (P)?
- P: Patients or athletes who have musculoskeletal disorders or conditions
- I: Low Level Laser Therapy
- O: Decrease pain

Literature Review

- Immediate pain relief effect of low level laser therapy for sports injuries: randomized, double-blind placebo clinical trial. 2016
- 32 college athletes
- 75% of laser group saw immediate reduction in pain
- That reduction was measured at 28.74%

Literature Review

- Effects of low-level laser therapy on performance, inflammatory markers, and muscle damage in young water polo athletes: a double-blind, randomized, placebo-controlled study. 2016
- 20 male water polo players
- Did LLLT have effect on performance?
- Not stat significant…

Research

- For individuals experiencing some type of pain or irritation, LLLT can be effective in reducing their pain
- Research has not shown that it is an effective training tool
- Your experience?

Cupping

History

- References to cupping can be found in Egyptian history
- First documented medical use was in 300AD by Ge Hong

Methods

- Dry – 10 minute tx
- Wet – 3 minute tx, removal, small cuts, then reapply
- Massaging – until desired results are achieved

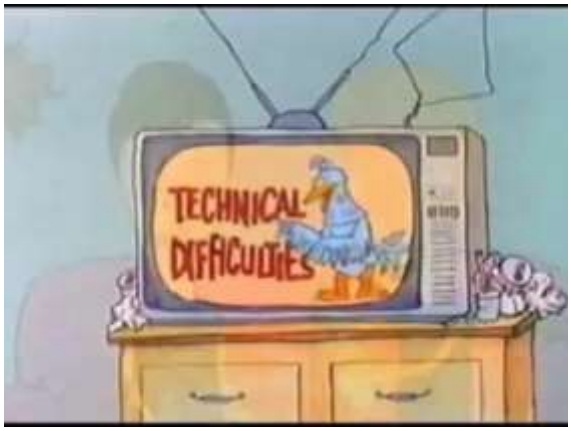
- Suction can be achieved thru many methods. Fire and Vacuum Pump

Fire

Vacuum

Dry

- Suction is created via fire or pump
- Cups are placed around affected area
- Left in place for approx 10 minutes
- Over 50 known uses including toothache and infertility
- Focus on pain for purposes of our discussion



Wet

- Suction is created via fire or pump
- Cups left in place for 3 minutes
- Cups removed and small cuts are made.
- Cups replaced and “toxic” blood is removed

Massage

- Lotion is applied to the affected area
- Suction is created via fire or pump
- Cup is moved in a pattern to massage the area
- Also can be used to help break up scar tissue

Contraindications

- Depends on who you ask?
- Skin disorders
- Severe swelling
- Post surgical areas
- Hernia

Clinical Question

- **Can utilization of cupping therapy (I) help decrease pain (O) for patients or athletes who have musculoskeletal disorders or conditions (P)?**
- P: Patients or athletes who have musculoskeletal disorders or conditions
- I: Cupping Therapy
- O: Decrease pain

Literature Review

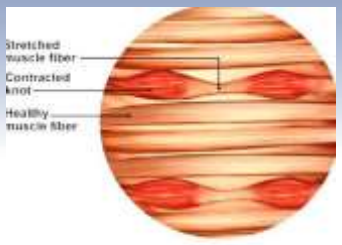
- The influence of a series of five dry cupping treatments on pain and mechanical thresholds in patients with chronic non-specific neck pain – a randomized controlled pilot study. 2011
- 50 patients = 25 Trad Tx, 25 Cupping
- 5 TX over 2 weeks
- Pain scale measures did show red. in pain

Research

- Our literature review did find studies that showed a decrease in pain scale scores with individuals receiving dry cupping methods

Dry Needling

Trigger Point



The continuously contracted knot in the muscle fiber stops blood flow at the trigger point starving tissue of oxygen and nutrients. Metabolic waste and toxins build in the area causing pain, tension, and spasm in the muscle.

Superficial

Superficial

- Needles are inserted into only the surface layer of skin
- Thought to activate mechanoreceptors

Deep

Deep

- Needle is inserted into trigger point to release tension thru activation of local twitch response

Electrical Stimulation

Clinical Indications

- Trigger Points
- Pain
- Loss of Motion

General Parameters

- Superficial – needle left in place for 30 seconds. Can be reinserted for 2 min if desired reaction is not present
- Deep – Needle is inserted into TP and probed until no more twitches, decreased tightness, or patient intolerance
- Electrical – 2 needles per channel
  - Nerve Pain = 80 to 100 Hz
  - Tissue Damage = 2 to 4 Hz

Contraindications

- Needle phobia
- Unwilling to consent
- Blood Thinning Medication
- Compromised Immune System
- Diabetic

Adverse Reactions

- Pneumothorax
- Organs
- Blood Vessels
- Nerves
- Stuck Needle

Clinical Question

- **Can utilization of dry needling (I) help decrease pain (O) for patients or athletes who have musculoskeletal disorders or conditions (P)?**
- P: Patients or athletes who have musculoskeletal disorders or conditions
- I: Dry Needling Therapy
- O: Decrease pain

Literature Review

- APTA Public Policy Practice, and Professional Affairs Unit. Description of dry needling in clinical practice: an educational resource paper. 2013
- Outlined indications for usage
- Precautions for use in practice

Literature Review

- Effectiveness of trigger point dry needling for plantar heel pain: a randomized controlled trial. 2014
- 84 subjects w/ plantar heel pain
- Broken into real or sham DN
- 1 tx a week for 6 weeks
- Real DN group showed stat sig red in heel pain

Literature Review

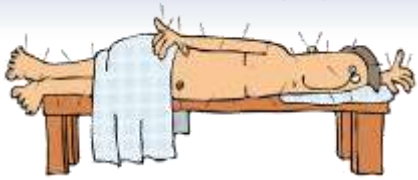
- Dry needling alters trigger points in the upper trapezius muscle and reduces pain in subjects with chronic myofascial pain. 2015
- 46 subjects. 23m / 33f Ave age 35.8
- 3x a week for 3 weeks
- 41 decrease in pain. 1 no change
- 4 dropped from study

Literature Review

- Dry needling in the management of musculoskeletal pain. 2010
- Lit Rev
- Deep Method is superior in treating myofascial trigger points
- But recommend superficial over sensitive areas. Lungs and large vessels

Research

- Research reviewed shows there is a statistical significant reduction in pain scale scores when utilizing dry needling.



Ultrasound

Disclaimer

- Ultrasound is one of the most widely used modalities by athletic trainers
- It is also one of the most misunderstood modalities available.

Therapeutic Uses

- Thermal – heating specific tissues to a therapeutic range w/out raising skin / fat tissue temp significantly
  - Tissues high in collagen
    - Tendons
    - Muscle
    - Ligaments
    - Joint Capsule, etc

Benefits of Thermal US

- Increases Blood Flow
- Increases Metabolism
- Diminish Pain Perception
- Reduces Muscle Spasm
- Decrease Joint Stiffness
- Reduce viscosity of fluid in tissue

Theory on Temp Change

- Option 1 = tissue temp must be raised to 104-113 F for a minimum of 5 minutes
- >113F can cause tissue damage

Theory on Temp Change

- Option 2 = tissue temp changes above baseline
  - 1.8F = increase healing and metabolism
  - 3.6-5.4F = decrease pain and muscle spasm
  - 7.2F = extensibility of collagen and joint stiffness

How to figure tx parameters

Therapeutic Uses

- Non-thermal = micromassage – cell deformation and gas bubble “cavitation”

Benefits of non-thermal

- Increased histamine release
  - Attract leukocytes, clean up debris
- Increased fibroblasts
- Wound healing
- Tissue regeneration

Contraindications

- When temp rise is not wanted
- Thermal US on acute conditions
- Decreased sensation / circulation
- Organs
- Infection

Research

- Numerous studies that show usefulness of thermal US.

Clinical Question

- **Can utilization of non-thermal ultrasound (I) help decrease pain (O) for patients or athletes who have musculoskeletal disorders or conditions (P)?**
- P: Patients or athletes who have musculoskeletal disorders or conditions
- I: Non-Thermal Ultrasound
- O: Decrease pain

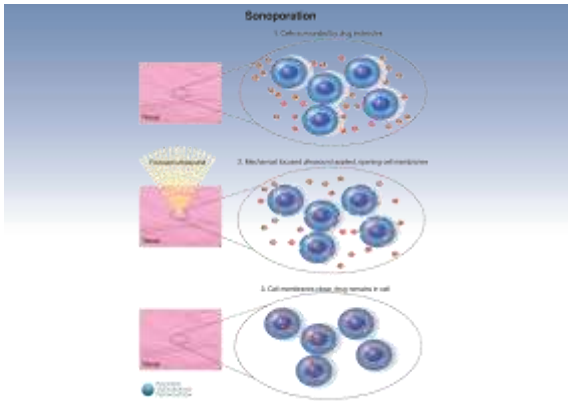
Research

- Multiple studies have shown that non thermal US can help at a cellular level
  - Especially with the inflammatory response

Phonophoresis

Phonophoresis

- The use of ultrasound to help move topical medication through the tissue
- Does not technically drive the medication in
- Sonoporation = sound waves increase permeability



Medication

- What do you like to use?

Common Compounds

- Hydrocortisone – Anti-inflammatories
- Ketoprofen
- Dexamethasone
- Fluocinonide
- Lidocaine – Analgesic

The Rub

- What is the best method for compounding?

2013 Study on Transmission

- Continuous US at 1.2w/cm2 at both 1 and 3 MHz for 30 sec
- Wanted to see which was better medium gel or cream based

Gel Based

- Arnica Gel 97% and 110%

Gel Based

- Biofreeze 60% and 79%

Gel Based

- Capzasin 70% and 93%

Gel Based

- Cobroxin 76% and 91%

Gel Based

- Solarcaine 70% and 101%

Cream Based

- Arnica Cream 67% and 74%

Cream Based

- Australian Dream 54% and 80%

Cream Based

- Bengay 37%and 55%

Cream Based

- MediPeds Footcare 126% and 101%

Cream Based

- Neuragen PN 76% and 90%

Cream Based

- Octogen 38% and 47%

Cream Based

- Thera-Gesic 52% and 73%

Results

- Topical agents in gels and more effective than creams in transmitting US energy

Tx Parameters

- Typically pulsed US is a better option
- Research shows that 20kHz was 1000% better at increasing permeability over 1MHz

Clinical Question

- **Can utilization of phonophoresis (I) help decrease pain (O) for patients or athletes who have musculoskeletal disorders or conditions (P)?**
- P: Patients or athletes who have musculoskeletal disorders or conditions
- I: Phonophoresis
- O: Decrease pain

Literature Review

- Evaluation of the effectiveness of three physiotherapeutic treatments for subacromial impingement syndrome: a randomized clinical trial. 2016
- 99 subjects w/ shld impingement
- US, Ionto, and Phono were acceptable tx for this condition

Research

- Many studies tout the effectiveness and ineffectiveness of phonophoresis
- Best options seem to lie in using pulsed US and gel based compounds.

Iontophoresis

Iontophoresis

- Utilization of a mild direct current to drive ions of medication into tissue
- Like charges repel each other
- Research shows it can penetrate 6 to 20 mm below the skin

Medications

- Lidocaine – (+ ion) – decrease pain through nerve transmission block
- Hydrocortisone – (+ ion) – reduce inflammation
- Acetate – (- ion) – dissolve calcium deposits and scar tissue
- Dexamethasone – (- ion) – reduce inflammation

Tx parameters

- Typical Total charge = 40mA
  - Current 4mA = 10 min
  - Current 3mA = 13.5 min
  - Current 2mA = 20 min

Battery Pads

Tx Parameters

- Medication can be delivered over multiple hours allowing the patient to receive the medication outside the facility
- Total charge is typically 40 to 80 mA

Benefits of Ionto

- Medication w/out needle injections
- Reduce risk of infection from needle injections
- Less GI complications when compared to pills

Negative Outcomes

- Skin irritation at electrode site

Contraindications

- Damaged Skin
- Drug Allergy
- Pacemakers
- Around eyes / chest cavity

Clinical Question

- **Can utilization of iontophoresis (I) help decrease pain (O) for patients or athletes who have musculoskeletal disorders or conditions (P)?**
- P: Patients or athletes who have musculoskeletal disorders or conditions
- I: Iontophoresis
- O: Decrease pain

Research

- Research has shown that ionto is effective in treating pain and inflammation at multiple sites on the body
  - Plantar Fasciitis
  - TMJ
  - Epicondylitis

Electrical Stimulation

3 Major Uses

- Transcutaneous electrical nerve stimulation – TENS – for pain relief

3 Major Uses

- Interferential - pain relief

Gate Control Theory

Gate Control Theory

- Small Diameter Nerve Fibers carry dull, aching pain
- Large Fibers carry sharp, stinging pain
- Converge at T Cell
- Strong sensory stimuli can close gate to pain

TENS

- 1965, 2 scientists published paper on gate control theory of pain mgmt
- Early 1970's companies started producing TENS units for sale

TENS Modes

- Sensory – 80-200pps, used to treat acute pain, intensity to tingling sensation
- Motor – 1-5pps, chronic pain, intensity to tolerance
- Brief-Intense – Varies, chronic pain

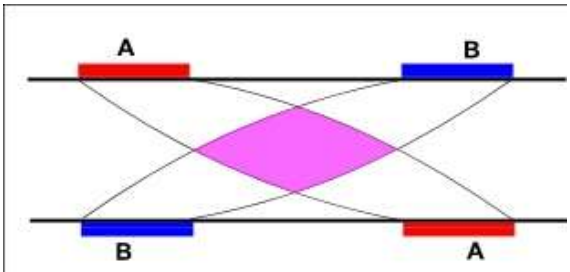
Interferential

Interferential

- Started to gain popularity in 1980's
- Main usage in pain control
- Is there a huge difference between TENS and Interferential?

Similar but not same

- Can cover a larger area
- Deeper penetration?
- Higher total current
  - 70-100mA



Current 'A' is at 4000Hz and current 'B' is at 3900Hz Interference current (beat frequency) generated in the central zone at the difference between input currents which would be 100Hz

Vector

- Static Vector – does not move
- Dynamic Vector – moves thru the field
  - Sweep or scan – will adjust the 2nd channels beat frequency

3 Major Uses

- Neuromuscular electrical stimulation – muscle reeducation

Why do we call it Russian?

Russian

- Yakov Kots 1977
- Up to 30% more force than voluntary cont
- Up to 40% strength gain
- No discomfort

- Never verified by any other research

Indications

- For patients that can't perform a voluntary contraction
  - Post surgical
  - Pain
  - Muscle Atrophy
  - Prolonged immobilization

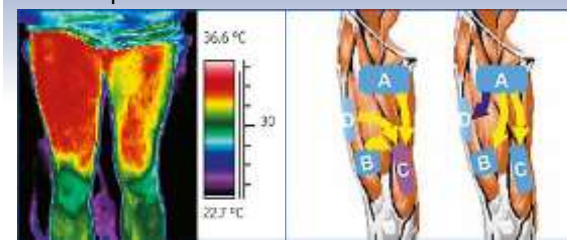
Tx Parameters

- 2500-5000 Hz
- 50-70 pps
- Duty Cycle
  - 10 on, 50 off
  - 10 on, 30 off
- Ramp 2 to 3 sec
- 20 minutes

Kneehab

Kneehab

- Multipath muscle activation



Clinical Question

- Can utilization of a superimposed neuromuscular electrical stimulation (I) help increase postoperative outcomes (O) for patients or athletes who have sustained an isolated ACL injury (P)?
- P: Patients or athletes who have sustained an isolated ACL injury
- I: Superimposed neuromuscular electrical stimulation
- O: Increase postoperative outcomes

Literature Review

- The effectiveness of supplementing a standards rehabilitation program with superimposed neuromuscular electrical stimulation after anterior cruciate ligament reconstruction. 2011
- 96 subjects – 3 groups
- Kneehab group showed significant gains

Research

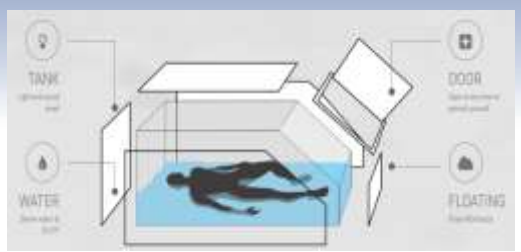
- 96 patients – isolated ACL tear, semitendinosus or gracilis graft
  - Assigned to one of three groups
    - Standard Rehab Prot.
    - SRP w/ NMES
    - SRP w/ Kneehab
  - 20 min, 3x a day, 5x a week for 12 weeks

Research

- Compliance – total of 60 available hours
  - SRP – 48 hours, 48 minutes
  - SRP w/ NMES – 39 hours, 18 minutes
  - SRP w/ Kneehab – 45 hours, 20 minutes
- Results – Showed less deficit at 6 wk check and made strides roughly 25% faster

Epsom Salt Bath

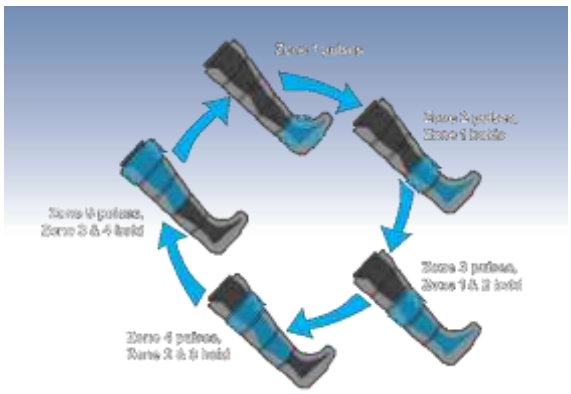
Isolation Tank



Treatments

- 800 to 1,000 lb of epsom salt
- 60 to 90 minutes sessions
- Small benefits for pain reduction have been noted in smaller studies
- Overall benefit seems to be stress reduction and relaxation

Compression Therapy



Literature Review

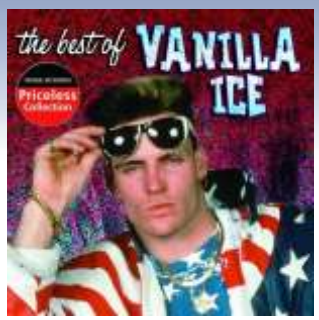
- Using recovery modalities between training sessions in elite athletes. Does it help? 2006
- Literature Review
- Looked at massage, cryo, O2 therapy, NSAIDs, compression garments, muscle stim
- Only cryo and compression

Cryotherapy

Methods

- Ice Bags
- Ice Massage
- Cold Whirlpool
- Gel Packs

Methods



Cryotherapy Tanks

Common Indications

- Acute Injuries
- Chronic Injuries
- Post Surgical Pain

RICE or METH

- Rest, Ice, Compression, and Elevation
- Movement , Elevation, Traction, and Heat

To Ice or Not to Ice?

NATA Position Statement 2013

- Cryotherapy should be applied to acute ankle sprains to reduce pain, minimize swelling formation, and decrease secondary injury.Evidence Category: C

If No, then what?




Clinical Question

- **Can utilization of cryotherapy (I) help decrease pain (O) for patients or athletes who have musculoskeletal disorders or conditions (P)?**
- P: Patients or athletes who have musculoskeletal disorders or conditions
- I: Cryotherapy
- O: Decrease pain

Literature Review

- Mechanisms and efficacy of heat and cold therapies for musculoskeletal injury. 2015
- Literature Review
- Cold has benefit for pain reduction
- Heat has benefit for pain and metabolism

Research

- Multiple studies have shown cryotherapy as an effective method of reducing pain
- Opinions are mixed about its effectiveness in reducing inflammation

Thermotherapy

Transfer of Heat

- Conduction – through contact
- Most common for orthopedics

Transfer of Heat

- Convection – through air or liquid

Transfer of Heat

- Radiation – rays, waves, or particles

Types

- Hot Packs
- Can hold temp for 30 min
- Approx 115F to skin

Types

- Hot Whirlpool
- Body = 100-108F
- Ext = 105-112F
- 10 to 20 minutes

Types

- Paraffin Bath
- Dip and Wrap
- Immersion

Types

- Shortwave Diathermy
- Deep heat through high frequency electromagnetic waves
- Generator and Drum
- Ave 20 min tx

Types

- Infrared Lamp
- Superficial Heat
- Very easy to burn patient

Indications

- Increase Circulation
- Increased Metabolism
- Decrease Pain
- Decrease Muscle Spasm
- Decrease Tissue Stiffness

Contraindications

- Acute Injuries
- Circulation Issues
- Sensation Issues

Clinical Question

- **Can utilization of thermotherapy (I) help decrease pain (O) for patients or athletes who have musculoskeletal disorders or conditions (P)?**
- P: Patients or athletes who have musculoskeletal disorders or conditions
- I: Thermotherapy
- O: Decrease pain

Literature Review

- Mechanisms and efficacy of heat and cold therapies for musculoskeletal injury. 2015
- Literature Review
- Cold has benefit for pain reduction
- Heat has benefit for pain and metabolism

Research

- Majority of studies show benefits of thermotherapy are valid.

What is IASTM

Inst. Asst. Soft Tissue Mobs.

Definition

- Utilization of some type of tool or instrument for the manipulation or massage of soft tissues

Methods

- Graston Technique = most recognized provider – 2 level certification course
- SMART Tools
- Rock Blades
- IASTM
- Hawk Grips
- KIASTM

History

- Where did graston technique come from?

Patterns

- J Stroke
- Scoop
- Strum
- Sweep
- Swivel
- Brush
- Fan
- Framing

Indications

- In theory can be used for any soft tissue injury

Contraindications

- Anti-coagulant medications
- Open wound
- Unhealed fractures
- Varicose veins
- Burn scars
- Uncontrolled hypertension
- Pregnancy
- Infections

Literature Review

- The effect of Graston technique on the pain and range of motion in patients with chronic low back pain. 2016
- 30 subjects w/ CLBP
- Treated for 4 weeks – Exe or Exe w/graston
- Graston group has better ROM and Pain score

Literature Review

- Spinal manipulative therapy, Graston technique and placebo for non-specific thoracic spine pain: a randomized controlled trial. 2016
- 143 subjects – 3 groups
  - Graston, Spinal Manipulations, Placebo US
- No difference at any point in the process
  - Pain or Disability

Gua Sha

- ***Gua sha* -"scraping *sha*-bruises"**
- Practitioners believe *gua sha* releases unhealthy elements from injured areas and stimulates blood flow and healing.


Clinical Question

- **Clinical Question #5: Can utilization of instrument assisted soft tissue mobilization (I) help decrease pain (O) for patients or athletes who have musculoskeletal disorders or conditions (P)?**
- P: Patients or athletes who have musculoskeletal disorders or conditions
- I: Instrument Assisted Soft Tissue Mobilization
- O: Decrease pain

Research

- Once again research is varied about the true effectiveness of IASTM
- But if using general safety parameters there have been few adverse reactions

ACL Rehab

Pre Surgical Rehab

Pre Surgical Rehab

- Multiple studies have shown the effectiveness on a goal oriented pre surgical rehab series.
- Let's look at the milestones…

Milestone 1

- Full knee active extension.

Milestone 2

- Absent or Minimal Swelling

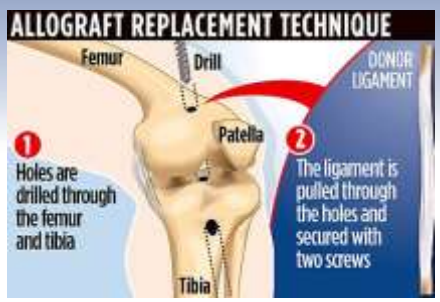
Milestone 3

- No lag on SLR

Milestone 4

- 90% quad strength when compared to uninvolved

Graft Selection



Autograft

- "Gold Standard" BPTB
  - Hamstring, IT Band, Gracillis
- 85 to 95% success rate
- 6 month recovery time

Pros

- Decreased cost
- Disease transmission
- Quicker graft incorporation

Cons

- Early degenerative changes
- No resisted knee flexion 12wks – Hamstring
- Quad weakness
- PF pain
- Motion loss

Allograft

- Common options
  - Achilles tendon, patella tendon, and tibialis tendon

Pros

- No donor-site complications
- Larger predictable graft sizes
- Lower chance of degenerative changes
- Shorter operative time

Cons

- Higher cost
- Slower incorporation/recovery
- Disease transmission
- Decreased stability
- Increased failure rate for young / active population

Surgeon

Literature Review

- Current concepts for anterior cruciate ligament reconstructions: a criterion-based rehabilitation progression. 2012
- Evidence based approach to ACL rehab

Post Operative Rehab

- Week One
  - MOTION – Act and Pass 0 to 90
  - Quad Firing

Post Operative Rehab

- Week 2
  - Knee Flex > 110
  - Discontinue crutches
  - Bike
  - SLR w/ no lag

Post Operative Rehab

- Week 3 to 8
  - Knee flex to w/in 10 degrees
  - Quad at > 80%
    - Can remove NMES
  - No effusion
  - Normal Gait

Post Operative Rehab

- Weeks 9 to 12
  - Quad > 80%
  - Hop Test (12 wks) >85%

Hop Test

Functional Progression

- After 12 weeks
- Running Progression
- Build up to normal function

TABLE 4 RUNNING PROGRESSION*

Level	Treadmill	Track
Level 1	0.1-mi walk/0.1-mi jog, repeat 10 times	Jog straights/walk curves (2 mi)
Level 2	Alternate 0.1 mi walk/0.2 mi jog (2 mi)	Jog straights/jog 1 curve every other lap (2 mi)
Level 3	Alternate 0.1 mi walk/0.3 mi jog (2 mi)	Jog straights/jog 1 curve every lap (2 mi)
Level 4	Alternate 0.1 mi walk/0.4 mi jog (2 mi)	Jog 1.75 laps/walk curve (2 mi)
Level 5	Jog full 2 mi	Jog all laps (2 mi)
Level 6	Increase workout to 2.5 mi	Increase workout to 2.5 mi
Level 7	Increase workout to 3 mi	Increase workout to 3 mi
Level 8	Alternate between running/jogging every 0.25 mi	Increase speed on straights/jog curves

*Progress to next level when patient is able to perform activity for 2 mi without increased effusion or pain. Perform no more than 4 times in 1 week and no more frequently than every other day. Do not progress more than 2 levels in a 7-day period. Conversion: 1 mi = 1.6 km. Reprinted with permission from Tom Manal, University of Delaware Physical Therapy Clinic.

journal of orthopaedic & sports physical therapy | volume 42 | number 7 | july 2012 |

Clinical Question

- Clinical Question #11: Can utilization of a preoperative quadriceps strengthening program (I) help increase postoperative outcomes (O) for patients or athletes who have sustained an isolated ACL injury (P)?
- P: Patients or athletes who have sustained an isolated ACL injury
- I: Preoperative quadriceps strengthening program
- O: Increase postoperative outcomes

Research

- 2009 study from BJSM
- Quad deficits of >20 % were significantly correlated to problems after surgery

How often to rehab?

Clinical Question

- Clinical Question #13: Can utilization of a home exercise program in conjunction with limited rehabilitation visits (I) provide similar outcomes when compared to regular rehabilitation visits (O) for patients or athletes who have sustained an isolated ACL injury (P)?
- P: Patients or athletes who have sustained an isolated ACL injury
- I: Utilization of a home exercise program in conjunction with limited rehabilitation visits
- O: Provide similar outcomes when compared to regular rehabilitation visits

Literature Review

- The effects of the number and frequency of physical therapy treatments on selected outcomes of treatment in patients with anterior cruciate ligament reconstruction. 1997
- 100 patients in each group / BTB Recon
- A = HEP and 20 visits in 6 months
- B = HEP and 7 visits in six months
- No significant differences

Research

- No significant difference in knee flexion, isokinetic strength, or subject rating.

Why do some still fail?

Research

- 2011 BJSM Lit Review
- 48 studies with 5770 subjects
- 82% return to some level of sports
- 63% pre-injury level
- 44% competitive sports
- But 90% had normal knee function on testing

Why not return?

- Fear of reinjures.

Manual Therapy

Breakdown

- *Manual therapy techniques* are skilled hand movements and skilled passive movements of joints and soft tissue and are intended to improve tissue extensibility; increase range of motion; induce relaxation; mobilize or manipulate soft tissue and joints; modulate pain; and reduce soft tissue swelling, inflammation, or restriction. Techniques may include manual lymphatic drainage, manual traction, massage, mobilization/manipulation, and passive range of motion.

Joint Manipulation

Manipulation

- Passive movement of a skeletal joint to achieve a desired therapeutic effect
  - Temporary relief of musculoskeletal pain
  - Shortened time to recover from back injury
  - Temporary increase in passive range of motion

Literature Review

- Cervicothoracic manual therapy plus exercise therapy versus exercise therapy alone in the management of individuals with shoulder pain: a multicenter randomized controlled trial. 2016
- 140 patients
- Focused on manipulations to c-spine
- No significant change in scores

Joint Mobilizations

Mobilizations

- Skilled passive movement of the articular surfaces performed by a therapist to decrease pain or increase joint mobility

Grades

- Grade 1 – pain, small amp
- Grade 2 – pain, large amp
- Grade 3 – stiffness, large amp
- Grade 4 – stiffness, small amp
- Grade 5 - manipulation

Literature Review

- Effects of stretching and strengthening exercises, with and without manual therapy, on scapular kinematics, function, and pain in individuals with shoulder impingement: a randomized controlled trial. 2015
- 46 patients ½ therapy ½ therapy w/ III and IV mobilizations
- No significant change in scores

Massage

Massage

- Manipulation of tissue for purpose of relieving muscle tension, spasm, and pain

Passive Range of Motion

PROM

- Moving a joint through motion by external forces
  - Therapist or machine

Manual Traction

Manual Traction

- Use of hands or harness for decompression therapy.

Lymphatic Drainage

Lymphatic Drainage

- Lymphedema = accumulation of fluid that can occur after lymph nodes are removed during surgery

Hivamat

Hivamat

- Muscle Relaxation -Deep oscillation therapy is felt as a vibration within the tissue, relaxing the underlying muscles.
- Increased Circulation - The massaging effect created by the oscillations within the patient's tissues work to open pathways and increase the flow of blood and lymph throughout the body.
- Pain Relief - Activating the lymphatic system and increasing blood flow, pressure upon the nerves is reduced; with the pain subsided, mobility can be reintroduced earlier

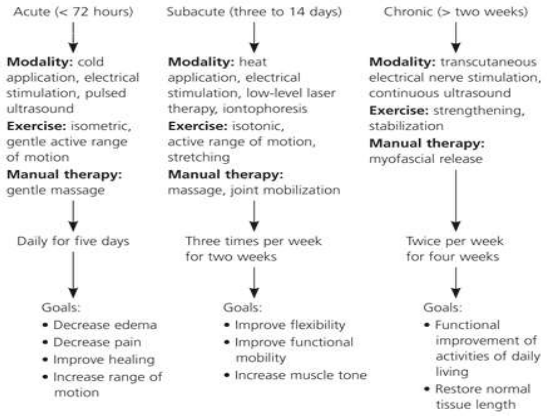
Clinical Question

- **Can utilization of manual therapy (I) help decrease pain (O) for patients or athletes who have musculoskeletal disorders or conditions (P)?**
- P: Patients or athletes who have musculoskeletal disorders or conditions
- I: Manual Therapy
- O: Decrease pain

Research

- Research is varied about the effectiveness of manual therapy

What do we do now?



Thanks

- Please turn in evaluation sheets and receive your attendance certificate.