ADVANCED MANUAL THERAPY SPECIALTIES & INTERVENTIONS I

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Learning Objectives

At the conclusion of the mini-course, the participant should be able to:

- Identify foundational and advanced manual therapy specialties within the scope of athletic training clinical practice.
- Critically analyze current athletic training clinical practice and examine gaps in professional development
- Develop strategies to implement advanced manual therapy specialties into athletic training clinical practice that directly improve patient outcomes.

Focused Topics & Skills for Session I

foundational & advanced manual therapy specialties within the scope of athletic training clinical practice.

- Instrument Assisted Soft Tissue Mobilization (IASTM)
- Trigger Point Release (TPR) therapy
- High-Velocity, Low-Amplitude (HVLA) Spinal Manipulation

Critically analyze current athletic training clinical practice and examine gaps in professional development

Instrument Assisted Soft Tissue Mobilization (IASTM)

Lead Facilitator - Adam Thompson, PhD, LAT, ATC

- A Bit of Background and Timeline:

Davidson, C. J., Ganion, L. R., Gehlsen, G. M., Verhoestra, B. E. T. H., Roepke, J. E., & Sevier, T. L. (1997). Rat tendon morphologic and functional changes resulting from soft tissue mobilization. *Medicine and Science in Sports and Exercise*, 29(3), 313-319.

Sevier TL, Gehlsen GM, Wilson JK, Stover SA, and Helfst, RH (1995). Traditional physical therapy vs. Graston augmented soft tissue mobilization in treatment of lateral epicondylitis. *Journal of the American College of Sports Medicine, 27*(5), S52.

Gehlsen, G., Ganion, L., & Helfst, R. (1999). Fibroblast responses to variation in soft tissue mobilization pressure. Medicine and Science in Sport and Exercise, 31(4), 531-535

1988 Dave Graston

1990 Collaboration w/ Tom Sevier

Ball Hospital, research, protocols, training

1995 Mutual termination

1996 Performance Dynamics, ASTYM

1999 PD, Pressure study, continued research

Melham, T.J., Sevier, T.L., Malnofski, M.J., Wilson, J.K., Helfst, R.H. (1998). Chronic ankle pain and fibrosis successfully treated with a new noninvasive augmented soft tissue mobilization technique (ASTM): a case report. *Medicine and Science in Sports & Exercise, 30* (6), 801-804.

Instrument Assisted Interventions

- Definition:
  - IASTM is a form of manual therapy that enables clinicians to detect adhesions and mobilize scar tissue and fascial restrictions through the use of ergonomically designed instruments.

  - Many instruments allow trained clinicians to effectively address these pathologies, which are often the cause of pain and dysfunction, resulting in improved patient outcomes.

Instrument Assisted Interventions

- Definition:
  - Trained clinicians utilize these specially designed instruments to facilitate the introduction of controlled micro-trauma to the affected superficial soft tissue causing the stimulation of a local inflammatory response.

  - Adhesions within the soft tissue, which may have developed as a result of surgery, immobilization, repeated trauma or other multiple other mechanisms, are identified and targeted for treatment.

Instrument Assisted Interventions

- Definition:
  - This incurred microtrauma initiates the healing process through the re-absorption of inappropriate fibrosis and/or excessive scar tissue.

  - This results in remodeling of the affected soft tissue structures and promotes restoration of function & ROM.

Instrument Assisted Interventions

- Definition:
  - When using IASTM for soft tissue mobilization there will always be a constant variance on pressure based off whether the clinician is using an evaluation technique as compared to a treatment technique
  - The pressure utilized for evaluation and scanning is less than the pressure used for therapeutic treatment

Instrument Assisted Interventions

- Definition:
    - Developing a clear understanding of the difference between evaluation pressure and treatment pressure is a critical part of clinician training for instrument therapies.
        - Training is imperative
        - There are protocols to follow with some instruments
        - Staying current on the ever-developing literature on these therapies is imperative

Instrument Assisted Interventions

- Why:
  - Reduce Pain
  - Reduce Restriction/Stiffness
  - Improve ROM
  - Improve Function
  - Can facilitate the healing process (Davie's Law)

Instrument Assisted Interventions

- What:
  - Excessive adhesions/ scar tissue
  - Forms of tendinitis or tendinopathy
  - Muscle Strains
  - Ligament Sprains

- Focus Today:
  - Instrumentation
  - Protocols
  - Training

Instrument Assisted Interventions

- Contraindications:
  - Open wound (unhealed suture/staple site)
  - Unhealed fracture
  - Thrombophlebitis
  - Uncontrolled hypertension
  - Patient intolerance/hypersensitivity
  - Hematoma
  - Osteomyelitis
  - Myositis ossificans

Instrument Assisted Interventions

- How:
  - Comfortable patient positioning
  - Identify and treat adhesions
  - Utilize ROM (depending on training and protocol)

- Equipment:
  - Instrumentation
  - Emollient
  - Hands
  - Table, bolster, towels

Instrument Assisted Interventions

- Considerations of IASTM techniques:
  - Be careful of extrapolation
  - Some MAY NOT Break down the tissue (or be a treatment goal)
  - Others MAY treat healthy tissue in addition to dysfunctional
  - Some MAY NOT use cross friction in the treatment
  - Others MAY be considered a protocol
  - Some MAY NOT be predictable

Instrument Assisted Interventions

- Considerations of IASTM techniques:
  - Evidence level - always changing
  - Cost & levels of Clinician Training
  - Cost of Instrumentation (Buy or Lease?)
  - Clinical Expertise
  - Patent, Registered Trademark® , Trademark™, FDA approval

IASTM Education, Training, & Instruments

- ASTYM™ (Isolator, Evaluator, Localizer) – (FDA approved)
- Fibroblaster™ (Jack, Lil' Alice, Deuce, Deuce XL)
- FMT (functional movement technique) Blades and Tape
  - RockBlades® (Mallet, Mullet, Mohawk)
- Graston Technique® (GT #1-6)
- Hawk Grips® (patented) (HG #1-9)
- SASTM Method (Sound Assisted - #1-8)
- Dynamic Release '21(was Técnica Gavilán PTB® '03-'20) (patented) Non-Porous
  - (DRT#1(Garra-Talon), DRT#2 (Ala-Wing), DRT#3 (Pico-Beak)

IASTM Education, Training, & Instruments

- The Edge
- IAM® (Instrument Assisted Massage)
- FAKTR-PM (Functional and Kinetic Treatment with Rehab, Provocation and Motion)
- KIHealthConcepts – KTools – KIASTM
- Myo-Bar (Faculty Demo)
- SMART tools
- Taktonexx® tools

IASTM Education, Training, & Instruments

- BioEdge™
- Ellipse Myofascial Releaser (patented)
- Ergon® Tools
- ST3 Fuzion (soft tissue therapy tools) (patented)
- FMST – Fluid Motion Soft Tissue (patented)
- Fascial Abrasion Technique Tool™ (FAT-Tool)
- Healers' Friend
- I-Assist Tools
- M2T-Blade
- Miyodac Therapy
- Narson Body Mechanics
- Scimitar Tools (patent pending)
- Flowstick Muscle Scraper
- Adhesion Breakers
- ZUKA
- Buffalo Horn
- Jade
- Bian Stone

The Oxford Center for Evidence-Based Medicine Hierarchy

	Level of Evidence	
Randomized controlled trials	1.	a. Systematic review of RCTs b. Individual RCTs c. All-or-none studies
Cohort studies	2.	a. Systematic review of RCTs b. Individual cohort studies c. Outcomes research
Case-Control studies	3.	a. Systematic reviews of case-control studies b. Individual case-control studies
Case series / Case study	4.	a. Includes poorly designed cohort & case-control studies
Anecdotal evidence	5.	a. Animal research b. Bench research c. Unpublished clinical observations

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Oxford Center for Evidence-Based Medicine--Levels of Evidence

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Application & Developing Strategies for Implementation of Instrument Assisted Soft Tissue Mobilization (IASTM)

Lead Facilitator - Adam Thompson, PhD, LAT, ATC

Myofascial Trigger Point Release (MfTPR)

Lead Facilitator - Anna Foster, MS, LAT, ATC

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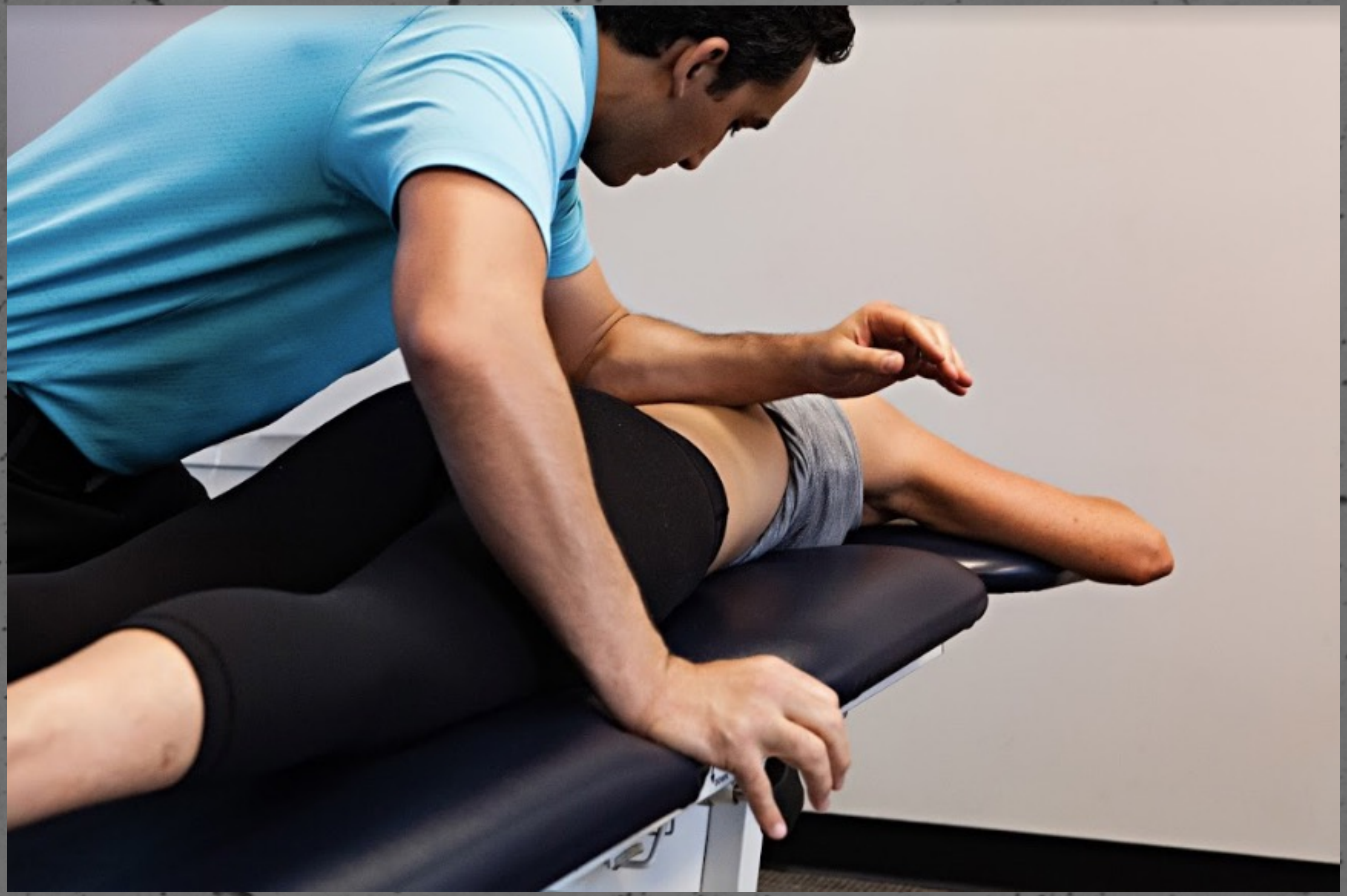
Myofascial Trigger Point Release

- Definition:
  - Myofascial trigger points: a taut band of muscle, exhibiting a twitch response.
    - Follow an unofficial map along predetermined parts of the body and manifest on a skeletal muscle.
    - Can cause specific referred pain
  - MfTPR: Constant deep manual pressure to release a hyperirritable taut band in skeletal muscle

Myofascial Trigger Point Release

- Why?
  - Relax tissue
  - Relieve/Reduce pain
  - Improve Function
  - Improve movement



Myofascial Trigger Point Release

- What:
  - Treat all major muscles that can get trigger points
  - Typically occur in the large muscles
- Focus Today:
  - Upper Trap
  - Lat/Pec
  - Glute Complex/QL
  - Quad
  - Hamstring

Myofascial Trigger Point Release

Contraindications:

- Infection
- Skin disorders
- Lymph disorders
- Bleeding disorders

Myofascial Trigger Point Release

- How:
    - Strong pressure against a taut band in the muscle
        - Hold
        - Hold & Oscillate
        - Strokes
        - Add movement of the muscle (ART)
- Equipment:
    - Hands
    - Emollient

Myofascial Trigger Point Release

- Considerations
  - Continual irritation of the tissue
  - Requires follow up with movement
    - Motion is lotion
  - Vast amount of conflicting data regarding type of techniques
  - Evidence is level is always changing

Application & Implementing Strategies for Myofascial Trigger Point Release (MfTPR)

Lead Facilitator - Anna Foster, MS, LAT, ATC

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PROTEAM TACTICAL PERFORMANCE®

High-Velocity, Low-Amplitude (HVLA) Spinal Manipulations

Lead Facilitator - Beth Walters, EdD, LAT, ATC

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Critically analyze current athletic training clinical practice and examine gaps in professional development

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HVLA Overview

- Definition
  - High velocity-low amplitude, or HVLA for short, is a type of manipulation in which the provider provides a rapid (high velocity) therapeutic force of brief duration that travels a short distance (low amplitude) within the anatomic range of motion of a joint and engages a restrictive barrier in one or more planes of motion to elicit the release of restriction.

HVLA Overview

- How differs from common/traditional DC approach
- Getting over the "fear" of this manual technique

HVLA Scope & Safety

- AT Scope & understanding
- Indications
  - Palpable somatic dysfunction of a joint in the thoracic spine
  - Firm distinct restrictive barrier
  - Pain
  - Loss of range of motion

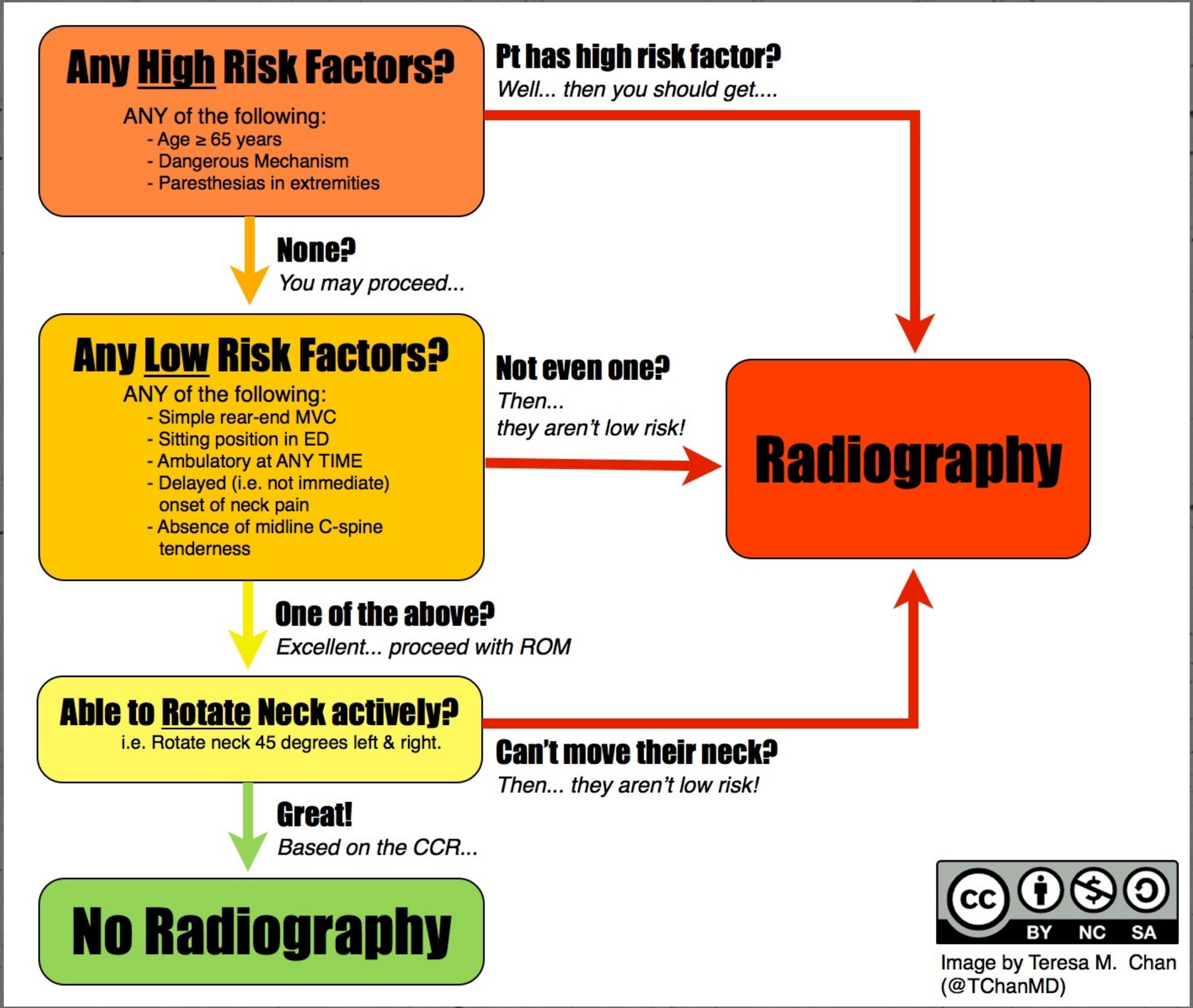
HVLA Safety

- Relative precautions
  - Hypermobility
  - Serious kyphosis or scoliosis
  - Disc herniation or disc protrusion
  - Systemic infection
  - Serious degenerative joint disease
  - Adverse reaction to previous HVLA manipulation
  - The clinician should perform a thorough history and physical examination before any osteopathic manipulative treatment.

HVLA Safety

- Contraindications
  - Increased risk of harm to the patient (lack of diagnosis, lack of skill/expertise by the clinician, lack of consent from the patient)
  - Bony compromise (tumor, infection, trauma, inflammation)
  - Neurological issues (acute myelopathy, spinal cord compression, cauda equina syndrome, nerve root compression)
  - Vascular compromise (vertebrobasilar insufficiency or cervical artery abnormalities, aortic aneurysm, angina pectoris, acute abdominal pain with guarding)

Canadian C-Spine Rules



HVLA Research & Evidence

HVLA Documentation

Documentation & objective and/or assessment documented measures at a min. should include:

- Dx and/or DDx
  - PRO
- Measures ROM & limitations
- Objective restrictions & level
- HVLA technique & outcome
  - Pre & post apt objectives
- Consent form*
- Patient edu.*

HVLA Application

- Focus of these techniques
  - Candidate selection
    - Cervical & CTJ
    - Thoracic & rib
    - Lumbar
    - SIJ
  - Apply, demonstrate & experience

Develop Strategies to Implement High-Velocity, Low-Amplitude (HVLA) Spinal Manipulations

Lead Facilitator - Beth Walters, EdD, LAT, ATC

Thank you!

Thank You to the Eli Lilly Foundation for providing research grant funding towards the purchase of various instruments, equipment, and visual adjuncts used in today's presentations.

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Thank you!

Thank You to Paul Calloway with the Mio-Guard, LLC for assisting with the purchase of various instruments, equipment, and visual adjuncts used in today's presentations.

Advanced Manual Therapy Specialties & Interventions II

Adam J. Thompson, PhD, LAT, ATC
Anna Foster, MS, LAT, ATC
Beth Walters, EdD, LAT, ATC

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Focused Topics & Skills for Session II

foundational & advanced manual therapy specialties within the scope of athletic training clinical practice.

- Positional Release Technique/ Strain Counterstrain (SCS)
- Mobilization with Movement (MWM)
- Blood-Flow Restriction (BFR) therapy

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No Conflict of Interest

- The views expressed in these slides and the today's discussion are our ownne
- Our views may not be the same as the views of our company's clients or our colleagues
- Participants must use discretion when using the information contained in this presentation

Learning Objectives

At the conclusion of the mini-course, the participant should be able to:

- Identify foundational and advanced manual therapy specialties within the scope of athletic training clinical practice.
- Critically analyze current athletic training clinical practice and examine gaps in professional development
- Develop strategies to implement advanced manual therapy specialties into athletic training clinical practice that directly improve patient outcomes.

Positional Release Technique Strain/ Counterstrain (PRT)

Lead Facilitator - Adam Thompson, PhD, LAT, ATC

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Critically analyze current athletic training clinical practice and examine gaps in professional development

Positional Release Technique Strain/ Counterstrain

- A Bit of Background:
  - 1950 - Lawrence “Larry” Jones, DO
  - 1955 - Posterior and Anterior tender points
  - 1964 Spontaneous Release by Positioning
  - 1980 Strain and Counterstain

Positional Release Technique Strain/ Counterstrain

- Definition:
  - Positional Release Technique (PRT) Strain Counterstrain (SCS) is a manual therapy technique utilized to place the body in positions of comfort (think shortening) to alleviate pain and somatic dysfunction. Somatic dysfunction is defined as a disturbance in the sensory/ proprioceptive system that results in spinal segmental tissue facilitation and inhibition (Korr, 1975). Jones (1973) theorized that this somatic dysfunction led to painful, reflexively protected and contracted tissues.
  - .

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Positional Release Technique Strain/ Counterstrain

- Definition:
- Reflex tissue contractions occur in the body's deep fascia layers, skeletal muscle tissues, and/or smooth muscle structures in response to a variety of mechanical or chemical insults.
    - Examples include trauma, surgery, postural strain, repetitive motion, infectious or viral conditions, and even inflammatory diets.
- Once present, this form of reflex muscular dysfunction can contribute to a multitude of symptoms. A clinician can utilize PRT/ SCS to alleviate and/or release tension in areas of the body, reduce pain, improve limitations in strength, and restricted range of motion which in turn re-established joint movement, and reduce neuralgic pain.

Positional Release Technique Strain/ Counterstrain

- Definition:
- PRT/ SCS was originally defined as a positional release technique. Other terms commonly used to describe the technique include the Jones technique, positional release therapy (PRT) and spontaneous release by positioning. These terms are all associated within the strain counterstrain approach. The technique is based on the theory that the body, in response to pathologies, develops tissue restrictions or tender points (TPs) in tissues not directly insulted. These TP's are discrete areas of myofascial dysfunction and different from myofascial trigger points (MfTRPs).

Positional Release Technique Strain/ Counterstrain

- Definition:
- For example, a patient might strain their hamstring while the quadriceps opposing the hamstrings would be counterstrained. The indirectly involved tissue emerges as the primary complaint of the patient's pain, needing release before the hamstring pain would resolve.
- One advantage to this technique is that it should be relatively pain-free for the patient. This technique works well when done before exercise secondary to the specific body structure being worked on having less protective guarding and pain.

Positional Release Technique Strain/ Counterstrain

- Definition:
- To understand the probable mechanism of TP generation, one can use an agonist/antagonist model of muscle action. Both muscles maintain a baseline firing rate when at rest in a neutral position. Activity can then induce lengthening in muscle A and contraction in muscle B. This increases the proprioceptive activity in muscle A, while a decrease occurs in muscle B's activity. When these muscles are called on to return from this position of moderate strain, if the motion occurs too forcefully or rapidly, muscle B is stretched against this increased firing rate. This can induce a reactive hypertonicity in muscle B with sustained increased firing, and a TP develops. This theory of proprioceptor activity in somatic dysfunction was first delineated by Korr (1975).

Positional Release Technique Strain/ Counterstrain

- PRT/ SCS is an effective technique due to its gentle application for treatment that moves the patient's body away from the painful, restricted directions of motion

- It is important that clinicians remember to keep their hands/fingers lightly on a tender point once they have found the patient's position of comfort (shorten the structure; multiple planes) to monitor the treatment response.

- The initial reduction in discomfort may be explained by a change in the neural component, whereas the myofascial and circulatory changes would occur slowly and over the remainder of the treatment.

Tender Points (TPs) vs. Myofascial Trigger Points (MfTRPs)

- Tender points, “Jones” points, or counterstrain points, are qualitatively different from myofacial trigger points (MfTRPs). Travell trigger points (Simons, Travell, Simons, 1999, 2018)) will tend to refer to another location, to which counterstrain points do not refer. Travell trigger points may feel like a band or a fibrotic mass. Tender points, “Jones” points, and/or counterstrain points are small and discreet which could feel thick and dense.

Acupuncture and Dry Needling

- The acupuncture points are mapped to 14 main meridian channels. In Eastern medicine, a meridian channel is also known as a Jing lou through which Qi (vital life energy) Xue (blood), Jinye (body fluids), Jing (essence) and Shen (spirit) flow. One meridian channel relates to each of the 12 inner organs. The two additional channels relate to "extraordinary vessels" – the interior of the spine (governing vessel) and another along the midline of the abdomen (conception vessel).

Differentiation of TPs and MfTRPs

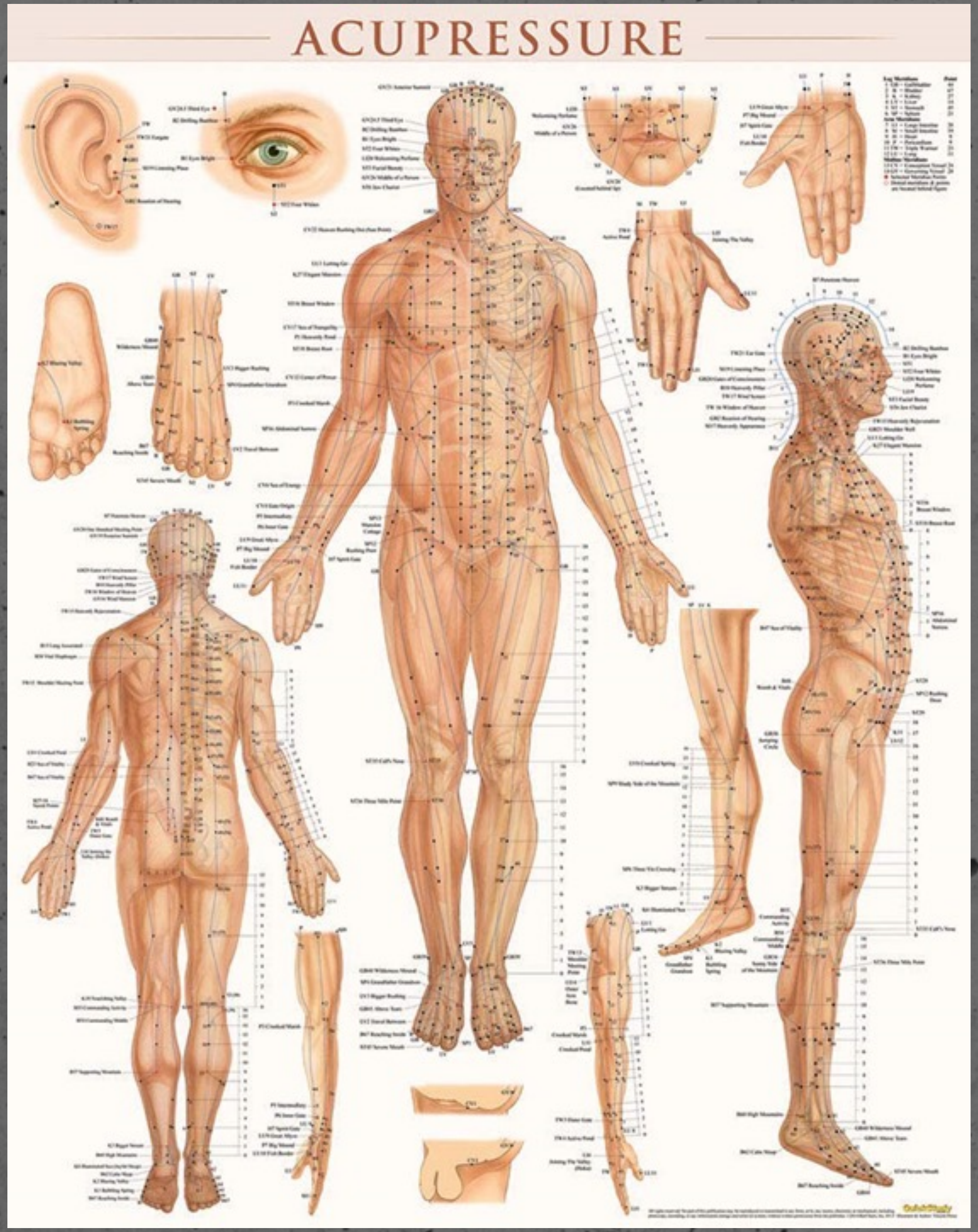
Tender Points

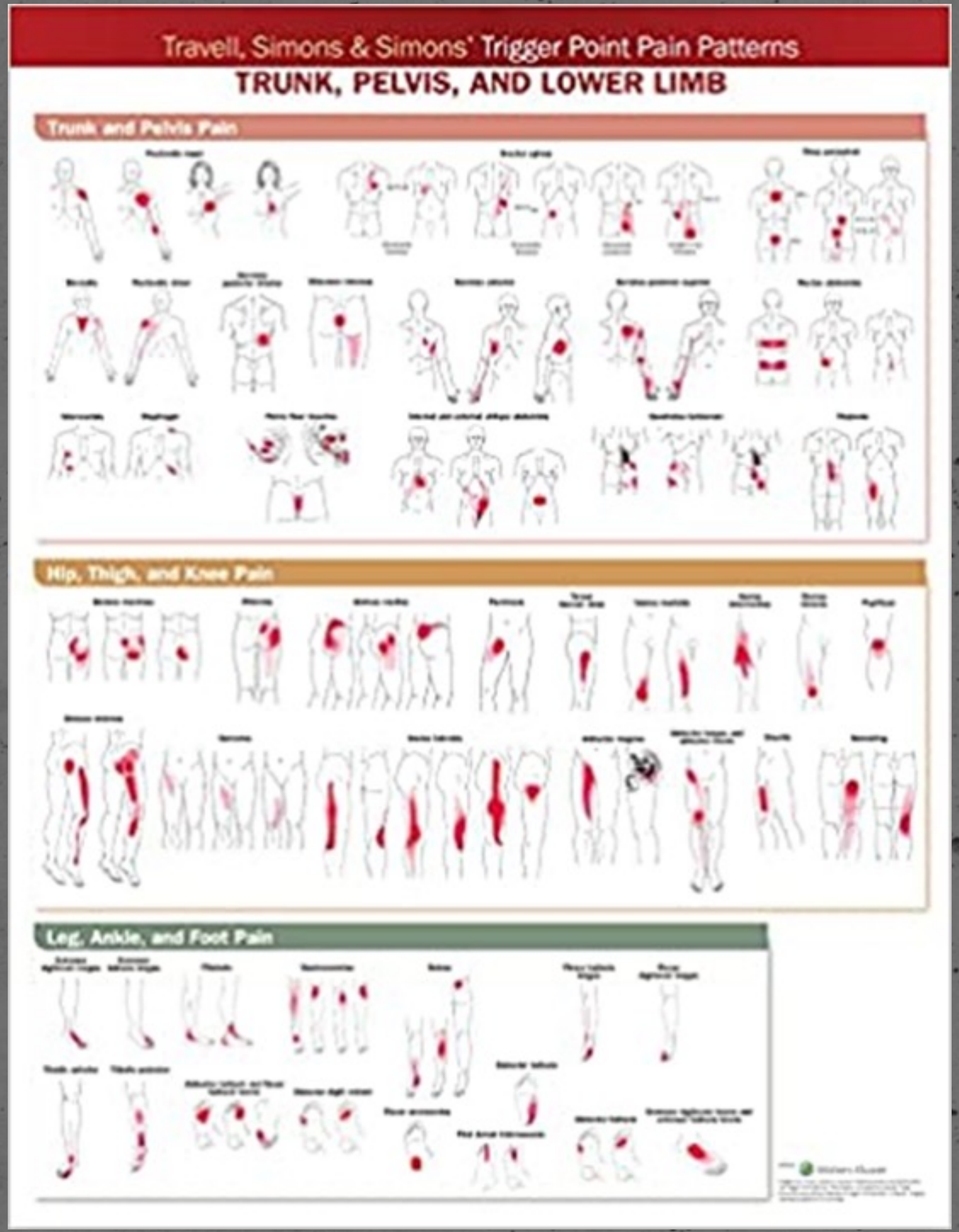
- Localized pain: Tender points cause localized pain directly on the source.
- Multiple sites: People with tender points usually don’t experience a single tender site; instead, they experience multiple points of tenderness.
- Symmetrical locations: The tender points are usually symmetrically located across the body.
- No referred pain: Pain within tender points is usually localized and typically not referred. Tender points can, however, increase sensitivity throughout the body.

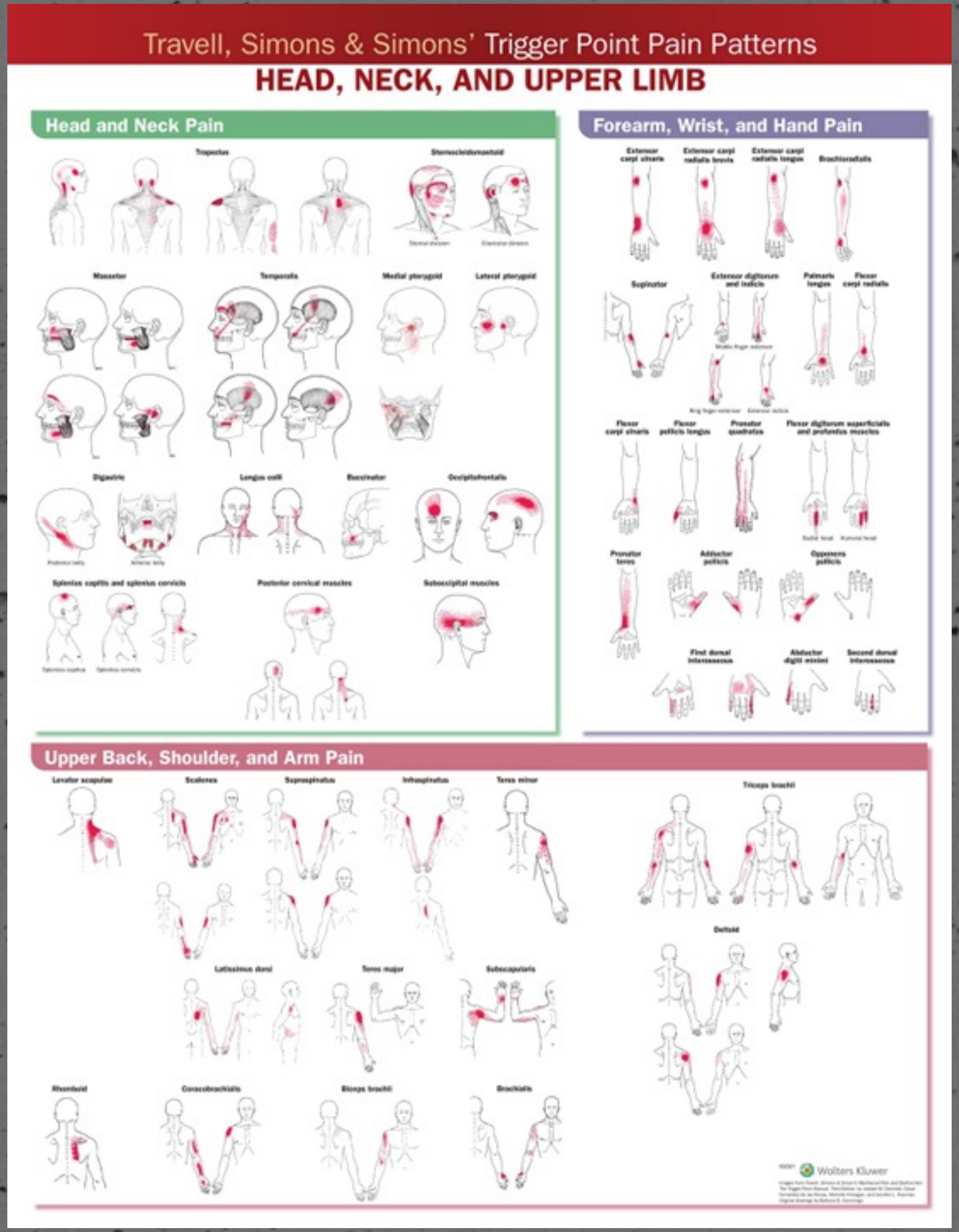
Myofascial Trigger Points

- Taut band and twitch response: Myofascial trigger points are defined by a taut band of muscle, exhibiting a twitch response.
- Single points: Unlike tender points, it’s possible for a single myofascial trigger point to manifest
- Skeletal muscles are at risk: Trigger points may follow an unofficial map along predetermined parts of the body and manifest on a skeletal muscle.
- Can cause specific referred pain: Trigger points refer pain in a specific pattern to other parts of the body, but don’t contribute to overall tenderness.

Differentiation of AcuPs and MfTRPs







Positional Release Technique Strain/ Counterstrain

- Why:
  - Reduce Pain
  - Reduce Restriction/Stiffness/Spasm
  - Improve ROM
  - Improve Function

Positional Release Technique Strain/ Counterstrain

- What:
  - Pain/ Restriction/ Spasm tissue within MSK tissue
  - Tendinitis or Tendinopathy (not all)
  - Muscle Strains
- Focus Today:
  - Education and Training

Positional Release Technique Strain/ Counterstrain

- How:
  - Comfortable patient positioning
  - Identify TPs, MfTRPs
  - Utilize ROM (based on experience, training & protocol)

- Equipment:
  - Table
  - Hands
  - Table, bolster, towels

Positional Release Technique Strain/ Counterstrain

- Contraindications:
    - Vertebral Artey Disease
    - Patient cannot voluntarily relax
    - Rheumatoid Arthritis or Down's syndrome
    - Patients who do not want counterstrain treatments
    - Malignancy Aneurysm

Positional Release Technique Strain/ Counterstrain

- Considerations of PRT/SCS:
  - Knowledge of anatomy is paramount
  - Patient Comfort and Feedback are direct guides to facilitate intervention
  - Differentiation of TPs and MfTRPs - Practice!

PRT/ SCS Education & Training

- The Jones Institute was established in 1988 by Lawrence Jones, DO, FAAO, and Randall Kusunose, PT, OCS. The Jones Institute offers post-graduate SCS seminars for healthcare professionals throughout the United States.
- The Counterstrain Academy began in 2005 as a one-on-one mentoring of new, passionate Fascial Counterstrain Practitioners. It was formalized in 2011 as the program began to attract multiple practitioners and regional recognition as an authority in Fascial Counterstrain Continuing Education. In 2012 Brian Tuckey, PT, OCS, JSCCI and Timothy Hodges, LMT, JSCCI, CACI, and they officially established the entity through the creation of the CS-Mastery Program.
- The Positional Release Therapy Institute (PRT-i) was established in 2009 by Timothy Speicher, PhD, ATC, LAT, CSCS, PRT-c® and has two distinct avenues of care and training. After recent rebranding, Elevated Performance and Rehabilitation will focus on treatment and the Positional Release Therapy Institute (PRT-i) side of the business is dedicated to both Professional and Student continuing education.

COUNTERSTRAIN The Jones Institute

COUNTERSTRAIN ACADEMY

POSITIONAL RELEASE THERAPY INSTITUTE

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The Oxford Center for Evidence-Based Medicine Hierarchy

	Level of Evidence	
Randomized controlled trials	1.	a. Systematic review of RCTs b. Individual RCTs c. All-or-none studies
Cohort studies	2.	a. Systematic review of RCTs b. Individual cohort studies c. Outcomes research
Case-Control studies	3.	a. Systematic reviews of case-control studies b. Individual case-control studies
Case series / Case study	4.	a. Includes poorly designed cohort & case-control studies
Anecdotal evidence	5.	a. Animal research b. Bench research c. Unpublished clinical observations

(Adapted with permission from http://www.cebm.net/index.aspx?o=1025.
Oxford Center for Evidence-Based Medicine--Levels of Evidence

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Develop Strategies to Implement Positional Release Technique & Strain/Counterstrain

Lead Facilitator - Adam Thompson, PhD, LAT, ATC

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Mobilizations with Movement (MWM)

Lead Facilitator - Anna Foster, MS, LAT, ATC

Critically analyze current athletic training clinical practice and examine gaps in professional development

Mobilizations with Movement

- Definition:
  - Sustained accessory mobilization applied by clinician and an active physiological movement to end rang applied by patient.
  - End range over pressure or stretching is delivered
- Why:
  - Reduce Pain
  - Relieve Restriction
  - Improve Function
  - Create a Positive Environment for Joint Healing

Mobilizations with Movement

- What:
  - Treat all major peripheral joints
- Focus Today:
  - Spine - Specifically Cervical
  - Hip
  - Shoulder
  - Knee
  - Ankle

Mobilizations with Movement

- Natural Apophyseal Glide (NAGs)
    - Useful for cervical and upper thoracic
    - Oscillatory mobilizations
    - Gross restrictions
    - Highly irritable conditions
    - Mid-range to end range facet jt mobilizations

Mobilizations with Movement

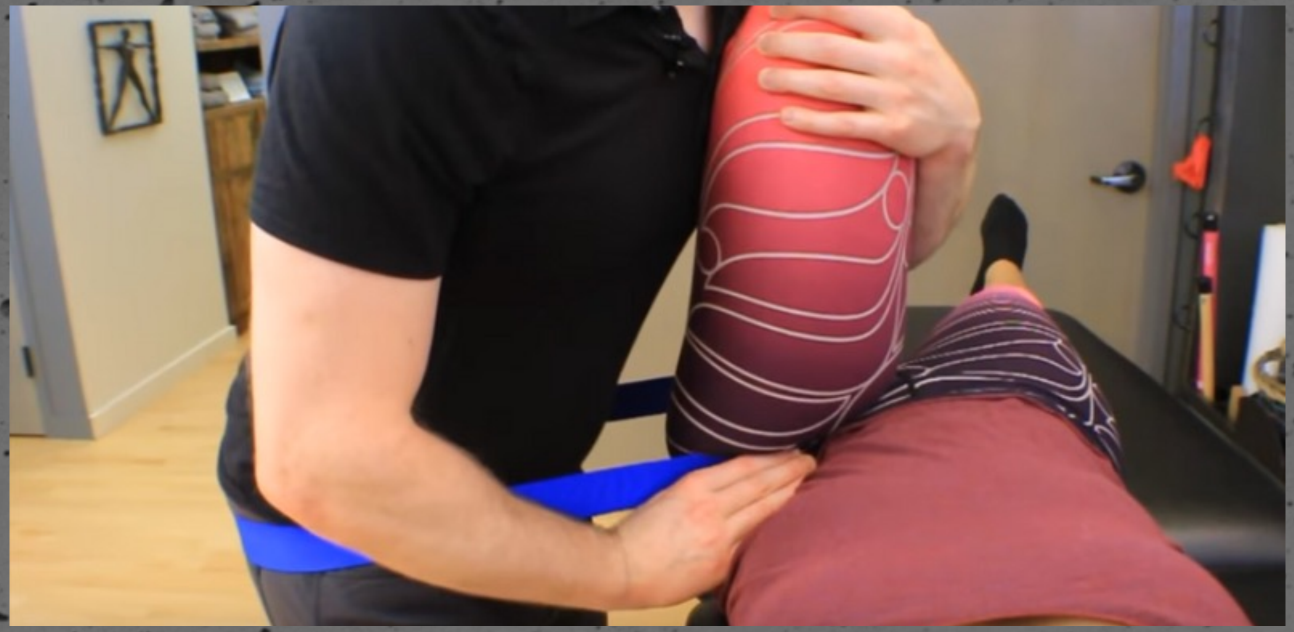
- Sustained Natural Apophyseal Glides (SNAGs)
  - Useful for all spinal joints, ribs, and SI jt
  - Accessory Zygapophyseal glide
  - Patient performs the symptomatic movement
  - SNAGs most successful when symptomatic with movement
  - Performed in weight bearing positions

Mobilizations with Movement

- Contraindications:
  - Fracture
  - Advanced Osteoporosis or Bone Disease
  - Pregnancy
  - Extensive Joint Effusion

Mobilizations with Movement

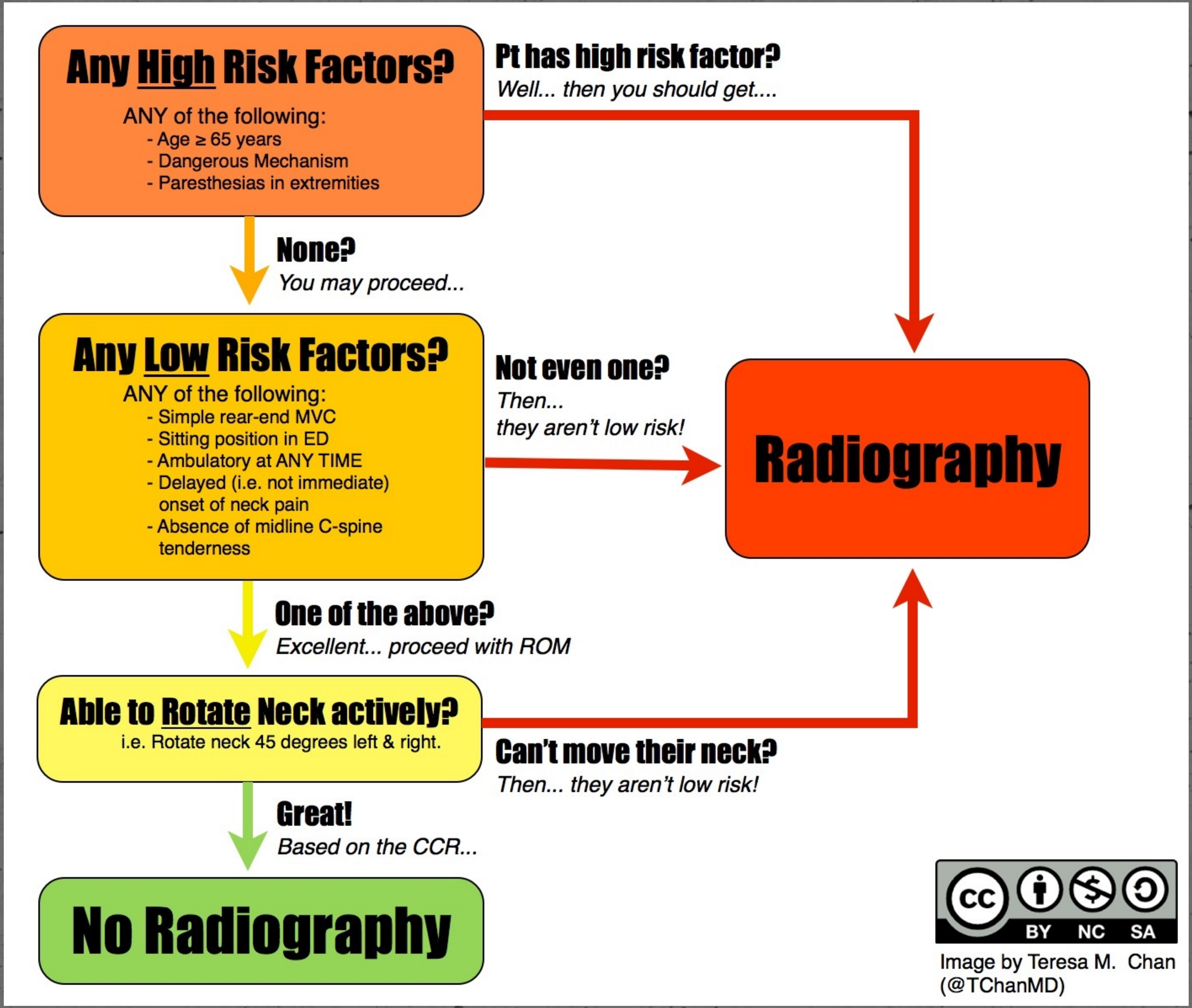
- How:
  - Place patient in position
  - Create comfort
  - Find restricted motion
- Principles:
  - Assess patient movement
    - Pain with movement
    - Loss of movement
    - Pain with functional activities
  - Investigate multiple planes
  - Sustain the glide add movement from patient



Mobilizations with Movement

- Considerations:
  - Full Assessment of mobility especially when working with spine
  - Utilize only 3x - more specific to cervical
  - Don't make the patient continually worse
  - Think about the joint and concave/convex and surrounding musculature

Canadian C-Spine Rules



Mobilizations with Movement

- Equipment:
  - Mobilization Belt/Gait Belt
  - Stretch Strap
  - Hands
  - Pillows
  - Towels

Application & Developing Strategies for Implementing Mobilizations with Movement (MWM)

Lead Facilitator - Anna Foster, MS, LAT, ATC

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Blood Flow Restrictions Training (BFR-T)

Lead Facilitator - Beth Walters, EdD, LAT, ATC

Critically analyze current athletic training clinical practice and examine gaps in professional development

BFR-T Introductions

Definition, Purpose & Applied Physiology

- Definition
  - Blood flow restriction (BFR) is a training method partially restricting arterial inflow and fully restricting venous outflow in working musculature during exercise (Scott et al., 2015).
- Purpose & applied physiology
  - mTOR pathway up-regulate protein synthesis
  - Recruitment of additonal motor units as initial ones drop out
  - Afferent nerve traffic to CNS to release neuro-immuno-humoral systemic response

BFR-T Physiology Overview

1. Local disturbance of homeostasis by not receiving enough blood flow to sustain contraction
2. Metabolic crisis
3. Local anabolic environments
4. Systemic anabolism
5. Systemic neuro-immuno-humoral anabolic response
6. < "damage" done. > in strength & fitness come quickly

BFR-T Evidence & Saftey

- State of the literature:
  - Reviews - 13
  - Safety Topics - 18
  - Efficacy - 146
  - Mechanism - 207
- 6 cases of DVT in 12,642 in over 32,000 KAASTU sessions

BFR-T System Overview

- Factors & considerations when selecting system or type
  - The Size and Width of the Cuffs
  - The Material of the Cuffs
  - The Durability of the Cuffs
  - The Mechanism of Applying Pressure
  - The Ability to Accurately Measure Pressure
  - The Cost of Blood Flow Restriction Cuffs

BFR-T System Overview

- Popular, reliable systems
    - Pros & cons

[The Best Blood Flow Restriction Bands in 2023 - Mike Reinold]

BFR-T System Overview

- Other systems
  - Pros & cons

BEST-PRACTICE WHEN DOCUMENTING PATIENT ENCOUNTERS

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Objectiveand/or assessment documented measures at a min. should include:

- BFR type, color, single or BL limb use
- mmHg pumped to
- set/rep/rest times
- Total time spent wearing
- Notation of activities performed with BFR application
- Patient edu. for each encounter

**Stationary bike, :15/:45: 5 min
**End range hip flex, captain morgans, 30-15-15, L only
**BL calf raises, 30-15-15
** = Bstrong BFR, yellow, BL LE, 325mmHg

**Bench supported copenhagens, 3x10, BL
**Green band lat walks, around thighs, ~40ftx2
**Green band lat walks, around ankles, ~40ftx2
**Copenhagens w/ alt leg lift, 3x10, BL
**SL BOSU RDL, 3x10, BL

** = Bstrong BFR< yellow, BL LE, 350mmHg

Patient Education: Blood flow restriction (BFR) application was discussed with the patient. Pros & cons to use were discussed. Indications, contraindications, and precautions for use were discussed. Approaches and methods for application were reviewed with the patient. Chosen technique(s) that were applied in today's sessions were discussed ahead of time with rational for use. The patient had an opportunity to ask questions, all questions were answered. The patient elected for the application of BFR understanding they may change their mind mid-treatment if any adverse effects were experienced. Verbal & written consent was provided.

Ways to make documentation less time consuming

- Pre-made consent forms
- Word doc always open on computer to copy & paste info. if electronic
- Printed scripts that have fillable sections for paper documentation
- Plan rough idea of rehab for session (s) ahead of time
- Some EMRs maintain previous encounter information & it's preloaded into the system
- Not documenting essentail information only puts you in a vulnerable position for potential litigation.
- The more objective each encounter, the better

EB BFR-T GUIDELINES

	Guidelines
Frequency	2–3 times a week (>3 weeks) or 1–2 times per day (1–3 weeks)
Load	20–40% 1RM
Restriction time	5–10 min per exercise (reperfusion between exercises)
Type	Small and large muscle groups (arms and legs/uni or bilateral)
Sets	2–4
Cuff	5 (small), 10 or 12 (medium), 17 or 18 cm (large)
Repetitions Pressure	(75 reps) – 30 × 15 × 15 × 15, or sets to failure 40–80% AOP
Rest between sets	30–60 s
Restriction form	Continuous or intermittent
Execution speed	1–2 s (concentric and eccentric)
Execution	Until concentric failure or when planned rep scheme is completed

Arthroscopic Personalized BFR Example (This will be variable based on the precautions of the surgery performed)

Phase 0 Patient Education Phase Pre-Operative Phase	*Discuss:* BFR physiology, indications, and screen patient for precautions and contraindications. *Pre-Operative:* Research has shown that as little as 6 sessions of BFR prior to surgery has improved outcomes for strength and hypertrophy compared to those who do not BFR LE exercise: quad sets, SLR, SL hip abduction, prone hip extension, step ups, step downs, leg press, hamstring curls BFR UE exercise: scaption, flexion, abduction, SL external rotation, banded internal rotation, prone row, Is, Ys, Ts, vertical/horizontal pressing, vertical/horizontal pulling
Phase I Maximum Protection Phase Weeks 0-3	*Specific Instruction:* -BFR exercise can begin as early as 1-3 days post-operative or as soon as patient can tolerate BFR cuff -BFR exercise in this phase should focus on OKC isolation exercise to improve muscle activation and at least 1 CKC exercise if WB status allows
Phase II Early Rehabilitation Phase Weeks 3-6	*Specific Instruction:* -Continue with BFR exercise that is focused on OKC isolation exercise and progress complexity of CKC exercise if WB status allows
Phase III Controlled Ambulation and Strengthening Phase Weeks 6-16	*Specific Instruction:* -BFR exercise can focus more on CKC exercise progressions and isolated OKC exercise should be focused to current deficits -Once patient is comfortable loading to an RPE intensity of 7-8/10 BFR exercise should no longer be the primary focus and traditional strength and hypertrophy training should be performed -BFR exercise can become a supplement at or around 12 weeks post surgical if traditional strength training parameters are being met.

Patient Responses

- tissue color
- Pittichae
- Fatigue
- Numbness
- Tingling
- Pain

Develop Strategies to Implement Blood Flow Restrictions Training (BFR-T)

Lead Facilitator - Beth Walters, EdD, LAT, ATC

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