Objectives

- Understand the properties of fascia and its interface with the musculoskeletal and neurologic systems.
- Describe the subunits of the connective tissue system and anatomic significance of their structures.
- List MFD precautions and contraindications, documentation needs, and billing practices.
- Describe how MFD can be used as a multimodal instrument in conjunction with neuromuscular re-education principles to restore optimal movement.
- List current CT research and future research opportunities in the areas of MSK and radiology.

What we are NOT doing…

Why all the attention?

What we don’t know yet…
Cupping: Many Cultures

- **Chinese:** Taoist alchemist Ge Hong in 281 A.D.
- **Egyptians**
  - Used as a traditional healing method in many Arab cultures where it is called Al-hijamah
- **Native Americans**
- **Mexican-American healer**
  - Curandera
  - Sobadera
- **South Americans**

Cupping vs MFD: Apples to Oranges

- Technical types
- The power of suction-related types
- Method of suction-related types
- Added therapy-related types
- Condition and area treated-related types

2018 Aboushanab
TCM Conditions treated with “cupping”

- Infertility
- Abscesses
- Intestinal disorders
- Rheumatism
- Bronchial asthma & congestion
- Gynecological disorders
- Kidney disorders
- Dispers colds and respiratory infections
- Constipation and diarrhea

Terminology change for MSK movement impairments and ROM changes needed = Myofascial Decompression in 2009 at University of California, Berkeley

TCM Conditions treated with “cupping”

- Liver disorders
- Gallbladder disorders
- Dermatologica
- Depression
- Anxiety & insomnia
- Cellulite
- Vertigo
- Menopause
- GI symptoms

Cupping: Apples to Oranges

Cupping sets related to the types of cups
- Facial cupping sets
- Stomach cupping sets
- Bladder cupping sets
- Vertebrae cupping sets
- Ceramic cupping sets
- Etcher cupping sets

Cupping sets related to the methods of suction
- Manual suction sets
- Autocatch suction sets
- Male suction sets
- Female suction sets
- Special suction sets
- Message suction sets

Cupping sets related to the uses
- Facial Cupping Sets
- Stomach Cupping Sets
- Bladder Cupping Sets
- Vertebrae Cupping Sets
- Ceramic Cupping Sets
- Etcher Cupping Sets

Size and Pressure Matters

- Location and depth
- Flat based cups
- Concave based cups
- Not all decompressors are created equal

IASTM

- ASTYM
- Graston
- SASTM
- FAKTR
- Iamtools
- GuaSha Orthopedic
- Target Point
- Edge
- Fuzion Tool
- BioEdge
- Hawkgrips

= GuaSha?
Cost 8$- 3K
Cupping: Apples to Oranges = Color and Porosity differences

Skin Reaction after Cupping

- Healthy Blood Circulation
- Moderate Stagnation
- Severe Stagnation
- Congestion and Toxins
- Purpura
- Blisters
- Black Patches
- Blood and Qi Deficiency

www.cuppingtherapy.org/pages/discholorations

Color vs Porosity vs thickening

Cupping: Apples to Oranges

- PubMed search term “cupping”
  - = 1,650 results
- PubMed search term “cupping therapy”
  - = 767 results
- PubMed search adding “pain”
  - = 151 results
- PubMed search adding “range of motion”
  - = 7 results
  - All in last 5 yrs

(As of August 2018)

Negative pressure with movement research: MFD

- 2018 Cupping with neural glides for the management of peripheral neuropathic plantar foot pain
- 2018 The Effects of Cupping on Hamstring Flexibility in Collegiate Soccer Players
- 2017 Effect of Cupping Therapy on Range of Motion, Pain Threshold, and Muscle Activity of the Hamstring Muscle Compared to Passive Stretching
- 2016 Comparison of the effects of muscle stretching exercises and cupping therapy on pain thresholds, cervical range of motion and angle: a cross-over study
- 2014 Treatment Outcomes of Myofascial Decompression on Hamstring Pathology

(As of August 2018)

Myofascial Decompression in Ortho and Sports Medicine

- 2007 Denver: 27 y/o male volleyball player, left shoulder pain
- Dx by ortho as Left SLAP
- PT rehab 6 months, no Sx unless blocking in volleyball, and occasional sleeping on it; frustrated
- Tried acupuncture x 4 visits with needle techniques, without much change in Sx of function
- Acupuncturist then tried 1 Tx of cupping, similar to picture

...No Sx and pain free for 2 months

Evolution of MFD
Reverse of the “Norm”

- Most manual therapy we utilize is very compressive in nature: STM, MFR, joint mobs.
- MFD works in the decompression of adhesions; better physiologic sense for flow, reducing inhibition of fluids and nutrient exchange
- Take the “sore thumb” out of integrating a strong manual based approach to musculoskeletal disorders

Myofascial Decompression

Integrate Eastern medicine tools with Western evidence based physiologic principles and movement pattern re-

MFD effect on sub-systems of Musculoskeletal Dysfunction

- Myogenic
  - Efficient motion and improved performance
- Neurogenic
- Arthrogenic

Decompression: Western Perspective

Treatment Targets:
1. Mechanical connective tissue change
2. Trigger Points
3. Myofascial Lines
4. Scar adhesions, scar tissue
5. Upper crossed/Lower crossed syndromes: hypertonic groups

Integument

Skin layers
Epidermis: thin skin

Fascial Layers
- Superficial
- Deep = Aponerotic & Epimysial
- TLF, TFL, rectus sheath...
- Intermuscular
- Visceral

Skin: more complex than we learned

Fascia is analogous to...

Functions of muscles
- We learn action, but as we move in real world multiple functional pulls for each muscle
- ERs become IRs past 90 degrees

Fascia is analogous to...
Fascial Components

- **Fibroblasts**
  - Make and secrete all fibers of areolar connective tissue

- **Collagen fibers**
  - Strongest and most abundant; cross linking leads to immense tensile strength

- **Elastic fibers**
  - Rubber-like proteins which allow tissue to return to original shape

- **Reticular fibers**
  - Connect vessels and nerves; have more give than collagen

- **Ground substance**
  - Extracellular matrix that holds interstitial fluid via sugar-protein molecules that soak fluid like a sponge; with increased inflammatory response it becomes more viscous

The Colloidal Matrix

Living tissue is hydrated and dynamic

REMEMBER: THIS IS FASCIA

Viscoelastic properties of skin

Strolling Under the Skin
Fascial Contributions
- Support structure, tension, and suspension for tissues; “scaffolding”
- Fluid mobility; high amount of plasticity
- Connecting multiple muscles = functional kinetic chain

Viscoelastic properties: Ground substance – with GAGs
- Glycosaminoglycans
  - Proteoglycans and repeating disaccharide units
  - Commonly hyaluronan and chontratin sulfate; including dermatan sulfate
  - Bind water in normal healthy tissue
  - In aged skin, less binding to water and bind more to elastic material = thickened

Viscoelastic properties: Thixotropic Effect
- Thixotropy is the property of certain gels or fluids that are thick (viscous) under normal conditions, but flow (become thin, less viscous) over time when shaken, agitated, or otherwise stressed.

Padua University, Italy
- Stecco Group

What really happens when we stretch?
- Sensory endpoint theory (Weppler & Magnusson 2010)
  - Very little evidence that Torque/angle curves shift; even w/ 8 weeks
  - More likely that the perception of the stretch sensation occurs later in the application of similar force
  - PF stretch doesn’t change reflex pathway (Hayes 2012)
Stretching

- CT ability to compress upon itself
- Shoulder Elevation= inferior capsule and axillary fold stretched, but also superior and anterior structures need to fold
- Parallel fiber arrangement demonstrates more elastic qualities, improved mobility

Soft tissue mobility: Folding

Tensegrity

The body can have different restrictions of the musculoskeletal system in different positions.

Compensations and Adaptations
- Regional interdependence

How do you test for upstream or downstream effects?
The system broken down

3 Planes of Motion

- Figure out the imbalances based on:
  1. Movement assessment
  2. ROM imbalance
  3. Patterned weakness/inhibition
  4. Palpation for depth and direction of restriction

3 Planes of Motion; neuro re-ed

- Not just strengthening muscles, but PATTERNS
- Using MFD not just for ROM extensibility changes
- Inhibitory techniques

Effects Where? Trigger Points?

- Travel and Simons

Synergists, Agonists, and Antagonists

Balance of Pull
Trigger Points

- Lower levels of oxygen, nutrients, blood perfusion, mitochondrial count
- Increased levels of Calcium, leading to excessive chronic muscle fiber contracture, spasms
- Stress can lead to abnormal excess afferent stimulation
- Can have shortening of sarcomeres

Literature: Analysis of trigger points

Simons et al. JOSPT(2000), Sciotti et al. (2001):

- (1) presence of a palpable taut band in a skeletal muscle
- (2) presence of a hypersensitive tender spot within the taut band
- (3) local twitch response elicited by the snapping palpation of the taut band
- (4) reproduction of referred pain in response to TrP compression. A TrP was considered active if the referred pain evoked by its compression reproduced the same subject's head pain; whereas a TrP was considered latent if the evoked referred pain did not reproduce a usual or familiar pain

Pain? Not the target for MFD, but:

- Fernández-de-Las-Peñas 2014, Ge et al. 2008
  - central sensitization mechanisms in local pain syndromes; pain perception may result from a deregulation in peripheral afferent and central nervous system pathways = "chronic excitability"

Likely a central phenomenon initiated, activated, and maintained by peripheral sensitization

Proof of Concept Study

The need for decompression

The need for decompression
Proof of Concept Study

Infraspinatus and Teres Minor

Teres Major

Infraspinatus and Teres Minor

Teres Major
**Gluteus medius**

**US With Myofascial Decompression**

- Myofascial Lines
  - Work of Thomas Myers
  - Myofascial Tracks = muscles, tendons, ligaments and fascia
  - Bony Stations = joints or insertional sites at bony landmark
  - Have to be of similar depth

  - Can be static or motion driven
    - Picture: Pec minor, biceps, coracobrachialis, rectus abdominis

**Neurophysiologic responses**

- Simply mechanical decompression of a Nerve Entrapment and/or Compression

**Superficial Back Line**

- Includes:
  - Plantar fascia
  - Achilles tendon and Gastrocnemius
  - Hamstrings
  - Sacrotuberous ligament
  - Thoracolumbar fascia
  - Erector spinae
  - Scalp fascia
**Superficial Back Line**

- Often involved with leg length differences and pelvic obliquities
- Includes:
  - Peroneals
  - Anterior ligament of the head of fibula
  - ITB and TFL
  - Superior fibers of glute max, medius
  - External and internal obliques
  - Splenius capitis and SCM

**Lateral Line**

- Fascial mechanics:
  - Translating forces = "Slings"
  - Lats to TLF to contra glute max and down lateral thigh = ITB Tx

**Fascia encapsulates and supports**
Postural Syndromes

- Vladimir Janda, MD, DSc
  - Czech neurologist and physiatrist
  - Described characteristic patterns and syndromes of muscle imbalance that lead to chronic pain and disability
- The Sensorimotor system functions as one entity, integrating the central nervous system (CNS) and musculoskeletal system.
  - The muscles are often a "window" to the function of the CNS.
  - The CNS regulates two phylogenetic subsystems: the tonic muscle groups and the phasic muscles.

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Lower Crossed Syndrome

**Tonic/Short**
- Gastroc-Soleus
- Hip Adductors
- Hamstrings
- Rectus Femoris
- Iliopsoas
- Tensor Fascia Lata
- Piriiformis
- Thoraco-lumbar extensors
- Quadratus Lumborum

**Phasic/Lengthened**
- Peroneus Longus, Brevis
- Vastus Medialis, Lateralis
- Gluteus Maximus, Medius, Minimus
- Rectus Abdominus

Upper Crossed Syndrome

**Tonic/Short**
- Pectoralis Major
- Upper Trapezius
- Levator Scapulae
- Scalenes
- Sternocleidomastoid

**Phasic/Lengthened**
- Serratus Anterior
- Rhomboids
- Lower Trapezius, Middle Trap
- Deep neck flexors

Postural Distortions

- Therefore patterns of muscle imbalance may be due to CNS influence, rather than structural changes within the muscle itself.
- The coordinated firing patterns of muscle are more important than the absolute strength of muscles; i.e.: HAMSTRINGS; function with ECC
- Sensorimotor Training - increasing proprioceptive input into the CNS with a specific exercise program using proper firing patterns and ROM recruitment = neuro re-ed

Why does decompression work?

- Decrease tonic, tight, facilitated muscles
- Decrease densification in specific myofascial layers
- Reduce thickening trigger points, improve blood flow and metabolic exchange
- Traction out deep connective tissue elements that are in dysfunction; most importantly collagen cross bonding and mobilizing viscous ground substance
Why does decompression work?

The site of pain is often not the cause of the pain.

MFD: What are trying to accomplish?
- Sensory changes
- Structural changes
- Influence muscle firing patterns
- Recovery?
- Performance?

MFD Techniques: single Static
- Decompressor is stationary
- Point release

MFD Techniques: single Glide
- Similar to static, but is slid along restriction to further promote elongation
- Can be toward or away from restricted segment

MFD Techniques: High-Velocity pop

Take the tissue to end range, then “pop” off into the direction of most restriction.
MFD Techniques:
Linear and Diagonal lines

- Similar to static, but along fascial restriction line to promote elongation

Myofascial Decompression:
Inhibition techniques

- Active or Passive insufficiency = LT ratios

Contraindications
- Eyes and genitalia …but?
- Unhealed wounds
- Hemophilia, leukemia, active TB
- Thrombocytopenia
- Influenza or fever
- Moderate/severe anemia
- Moderate/severe cardiac conditions, high BP
- Vasculitis
- Active cancer
  - Post treatment 2-3 months
- Skin elasticity disorders-EDS…?

MFD Techniques:
w/ROM

- PROM is the workforce
- AROM is the workforce

Deltopectoral fascia

Precautions
- Those that are over eager
- Blood thinners
- Healing or thin skin
  - Elderly, Psoriasis, eczema
- Pregnancy; early stage, high risk
- Areas of ecchymosis
  - Previous cupped, Graston, STM
- Venous stasis and varicose veins
- DM; tissue healing and neuropathy
- Keloid Scars
- Swollen tissue; especially pitting edema
Precautions

**Vasovagal Response**

Vasovagal syncope is a temporary failure of the brain to maintain blood pressure and heart rate that causes the individual to possibly lose consciousness. Causes of vasovagal syncope include fear, pain, anxiety, trauma, blood loss, extreme exertion, prolonged static standing, physical or emotional stress, or an unpleasant sight, sound, or smell.

**Post-Surgical:**
- Can treat distal and proximal lesions early
  - Early fibroblastic activity and collagen proliferation at 4-7 days
- Typical wait time 1-2 weeks near surgical site, 3-4 weeks directly over portals, 5-6 over open

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**Warning the patient**

- Significant other, weddings, vacations
- Domestic abuse; pediatrics
- Hydration

**Warning the MD**

- Call your MDs/ referral (Che-Wei Lin, 2009)
- Instruct patient to explain or "scar mobilization"

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**Current and Future Research**

- 25% distortion of the tissue

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**Precautions**

**Neuromuscular re-education is always needed to follow up with STM techniques.**

*Bobble head effect*

...Techniques take years to master, just like all other STM techniques. Multi-Modal. Be smart about application and start simple.
References

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Thank You!!

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