Aims & Objectives

- What and how of myofascial release?
- Function and role of fascia in the human body
- The world of Myofascial Release
- Why this 3-dimensional body wide matrix is of importance to manual therapists & clinicians
- Stimulate further interest in myofascial system

1. Introduction
What is fascia?
And
So what?
The neglected tissue

- Previously fascial tissue has been ignored
- Not generally portrayed in anatomy books
- Not often a subject of study in the fields of anatomy or physiology
- And fascia has been considered an inert structure

The Cinderella of modern medicine

- A dramatic shift in the scope of medical research to focus on the study of fascia
- It now has its own identity within medical research

The scope of connective tissue

- Fascia extends to all fibrous connective tissues:
  - Ligaments
  - Tendons
  - Aponeuroses
  - Retinaculae
  - Joint capsules
  - The epineurium
  - The meninges
  - Periosteum
  - And all the endomysium and intermuscular fibres of the myofasciae

Fascia presents a new paradigm

- The traditional muscle–bone concept gives purely a mechanical model of movement
- This is a reductionist approach
- A one dimensional idea when considering human movement
- The reductionist method fails to give us a picture of the fully integrated body when it comes to movement

Fascia presents a new paradigm

- The fascial system is often described as a whole body stocking holding and supporting all the muscles and organs
- Fascia sheds new light on a more accurate representation of body mechanics
- This model looks at the synergistic relationship between structures
A myofascial approach is a more general system approach applied to posture and movement. It is used to describe and explain whole body wide connections, linkages and function. "When one part moves, the body as a whole responds." Functionally, the only tissue that can mediate such responsiveness is the connective tissue.

The word myofascia describes:
- The bundled together inseparable nature of muscle tissue (myo)
- And its accompanying web of connective tissue (fascia)

Each individual muscle is surrounded by the epimysium - a connective tissue layer that is continuous with the tendons attaching the muscle to the bones.

Muscle and fascia are biomechanically linked together:
- Endomysium → Perimysium → Epimysium

In summary:
- Muscle and fascia are biomechanically linked together
- Endomysium → Perimysium → Epimysium
- Perimysium: designed for lubrication (not for force transmission)
These connective tissue layers are composed of collagen fibres and elastin fibres.

A matrix of hydrated proteoglycans mechanically links the collagen fibre networks in these structures.

The collagen fibres are mechanically stabilized by the formation of cross-links.

The cross-links are essential for the mechanical strength and stiffness of the collagen fibres.

Without them the collagen molecules would slide past each other under load and the fibres would have no strength.

Instead muscles distribute a large portion of their contractile or tensional forces onto fascial sheets.

These sheets transmit the forces to synergistic and antagonistic muscles.

Fascia is densely innervated by myelinated nerve endings to serve a proprioceptive function.

- Pacini corpuscles, Golgi tendon organs, & Ruffini endings are all present.

In addition they are innervated by free nerve endings, containing substance P suggestive of a nociceptive function.
Patients with FM show evidence of inflammatory mediators in the intramuscular connective tissue. Inflammatory markers were primarily found in the interstitial tissue between the muscle fibres. Similar to muscles strained by eccentric muscle action.

The connective tissue surrounding the muscles, not the muscle itself, may be the source of peripheral nociceptive input. There may be a dysfunctional healing process of the fascia in fibromyalgia.

Liptan, 2010

1. Structural Integration
   - A Philosophy for Myofascial Release
   - Many of the myofascial release approaches originate from the ideas of Dr Ida Rolf.
     - Structural Integration (mid-1940’s)
   - Rather than simply working on symptoms she focused on the relationship of parts to the whole.
   - Ida Rolf gave new insight into the role of connective tissue and considered how this related to:
     - Structure and function of the human body

2. The Anatomy Trains®
   - Thomas Myers presents a model of: Functional Interconnectedness
   - The Anatomy Trains present a ‘longitudinal’ view of myofascial anatomy.
   - The Anatomy Trains maps the major structural and functional continuities in the body’s fascial net.
2. The Anatomy Trains®

- Thomas Myers describes 12 sets of distinct lines of dissectible myofascial connections
- Superficial Back Line
- Superficial Front Line
- Lateral Line
- Spiral Line
- The Arm Lines
- The Functional Lines
- The Deep Front Line

The Myofascial Meridians or Anatomy Trains

2. The Anatomy Trains®

- The myofascial meridian lines are not acupuncture meridians
- They are lines of pull based on standard Western anatomy
- Each meridian describes one very precise line of pull through the body

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2. The Anatomy Trains®

- According to Myers: “muscles operate across functionally integrated body wide continuities within the fascial webbing”
- These meridians of continuous myofascial fibres provide common pathways of:

  Myofascial transmission from one segment to another

2 Therapeutic applications of Anatomy Trains idea

- As a way of understanding and mapping global postural patterns
  - Shortness in one line (or in an aspect of a line) pulls on the skeleton to create or maintain postural dysfunction
  - Causing a chain of compensations along the line or in other lines
- If not getting the results you want on a particular structure, try instead releasing structures that are hypertonic elsewhere along the line
  - provides the fascial ‘slack’
Extensive citations: A. Stecco and FM® method

- Histological study of the deep fasciae of the limbs
- Expansions of the pectoral girdle muscles onto the brachial fascia
- Application of FM® technique in chronic shoulder pain
- The ankle retinacula: morphological evidence of the proprioceptive role of the fascial system
- The anatomical & functional relation between gluteus maximus and fascia lata
- Conservative treatment of carpal tunnel syndrome: comparison between laser therapy and FM®
- Mathematical analysis of the flow of hyaluronic acid around fascia during manual therapy motions
- Fascial components of the myofascial pain syndrome

22 citations in PubMed alone

3. Fascial Manipulation©

- According to the Fascial Manipulation Method:
  - The body can be divided into 14 segments
  - Each body segment is served by six myofascial units
  - In the Functional Manipulation© the therapist identifies specific points within a fascial sequence
  - Deep massage on specific points aims at restoring tensional balance

The mainstay of this manual method lies in the identification of a specific, localised area of the fascia in connection with a specific limited movement

4. Fascial Fitness©

- Most sports-related overload injuries occur within elements of the fascia loaded beyond their prepared capacity
- If one’s fascial body is well trained optimally elastic and resilient
  1. then it may be relied on to perform effectively and
  2. to offer a high degree of injury prevention
- The intention of the fascia oriented training is to influence the matrix renewal via specific training activities which result in a more injury-resistant and resilient ‘body suit’
- Movement practices: plyometrics, gyrokinesis, chi running, yoga or martial arts contain elements congruent with Fascial Fitness©

Schleip & Muller, 2013

Upper limb fascial continuity

- A whole series of dissection studies have verified that:
  - pectoralis major
  - biceps brachii and
  - palmaris longus muscles
- Insert expansions into the brachial and antebrachial fascia
- and they follow a constant pattern


Other myofascial chains

- The idea of myofascial or muscle slings is not unique to Thomas Myers
- Other models show the locomotor system as being one unit that always functions as a whole
- Kurt Tittel uses the term ‘muscle slings’ to describe the assistance of muscle groups to exert coordinated movements

In particular the muscular chains that are active in sports activities

Schleip & Muller, 2013

Schleip & Muller, 2013

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World Health Webinars
Myofascial Release | Other STW
--- | ---
Requires understanding of body wide fascial matrix, functional anatomy | Cultural basis: TCM, Thai—massage, Swedish style, Aromatherapy
Based on fascial anatomy | Non-specific, ‘massage by numbers’ - Remedial, relaxation massage
Analysis of postural & movement patterns within a fascial web | General postural holding i.e. Upper cross syndrome (Janda)
Often treat away from pain areas Less emphasis on ‘knots’, TPs | Focuses on tender/tight area (local) Overemphasis on TPs
Lubricant: little to none | Oils, ointments
Application: Deep, firm, slow | Variable speed, depth
Direction: follows lines of fascia | Variable strokes & direction
Involves some dynamic components while applying release technique | Patient, client passive Limited patient interaction
Fully integrated with rehabilitation, functional loading & strengthening fascia | Part of rehab but primarily a passive treatment intervention

Therapeutic application

- An accurate analysis of the myofascial connections based on an understanding of fascial anatomy can provide indications as to where it is best to intervene
- The localisation of precise points or key areas can render manipulation more effective

Proposed mechanism

- A recent study looked at repetitive motion strain as a modelled injury and demonstrated:
  - enhanced apoptosis activity
  - and loss of intercellular integrity

- However during treatment with MFR following repetitive strain injury resulted in:
  1. normalization in apoptotic rate
  2. cell morphology changes
  3. and reorientation of fibroblasts

(Meltzer et al., 2010)
Under normal conditions, fascia tends to move with minimal restrictions. Injuries resulting from physical trauma, repetitive strain injury, and inflammation are thought to:

1. Decrease fascia tissue length
2. And elasticity
3. Resulting in fascial restriction

It is possible that pain relief due to myofascial release is secondary to returning the fascial tissue to its normal length.

Schleip (2003)

Personal communication Robert Schleip:

1. Stimulation of mechanosensory receptors in fascia (Ruffini endings, etc.) with related physiological effects
2. A sponge-like alteration (and exchange) of the water content
3. Or increased expression of hyaluronan as outlined in the new paper by Stecco et al. 2011
4. Stimulation of the affected fibroblasts to change their cytokine production during the subsequent hours/days

Proposed mechanism

1. It has been hypothesized that:
   - Fascial restrictions in one part of the body cause undue tension in other parts of the body
2. Due to fascial continuity:
   - This may create stress on any structures that are enveloped, divided, or supported by fascia

Hyaluronan: a basis for myofascial pain

1. If the HA assumes a more packed conformation
2. Or if the loose connective tissue inside the fascia alters its density
3. Then the behaviour of the entire deep fascia and the underlying muscle would be compromised

Stecco et al. 2011

Where things can go wrong:

- Adhesion, gluing and lamination in myofascial layers limit:
  - Motion
  - Function
  - Mobility
  - Motility

- This results in adhesions and pulling on adjacent structures
A role for the TLF in stability

- The TLF has received considerable interest in a role for providing stability to the Lx-pelvic region
- The posterior layer of the TLF has an important role in transferring forces between spine, pelvis and legs
- Especially in rotation of the trunk and stabilisation of the lower lumbar spine and SIJ

Key reference: Journal of Anatomy 2012
The thoracolumbar fascia: anatomy, function and clinical considerations

The thoracolumbar fascia (TLF)

- The posterior layer of the thoracolumbar fascia covers the back muscles from the sacral region through to the thoracic region
- It consists of a superficial and deep lamina which has strong connections at the level of L4-L5

TLF: A system for tension transmission

- Anatomical studies demonstrate that the different layers of the TLF are a sophisticated integrated system for tension transmission
- The superficial lamina is tensed by contraction of latissimus dorsi, gluteus maximus and erector spinae
- The deep lamina is tensed by contraction of the biceps femoris
Functional Importance of the TLF

- Energizes the posterior oblique muscular sling
- Connects the trunk to the pelvis and to the lower limbs

Changes in fascia in chronic LBP

- Ultra-sound study: evidence of altered lumbar connective tissue structure in patients with CLBP
- Thickness and echogenicity of the combined subcutaneous and perimuscular zone were significantly greater in the LBP group
- Patients with LBP had on average 25% greater perimuscular connective tissue thickening in the lumbar region than subjects with no-LBP after adjusting for BMI

Reduced shear strain in the TLF and chronic LBP

- A further study showed that the TLF shear strain was 20% lower in subjects with CLBP
- There was no evidence that this difference was sex-specific although overall males had significantly lower shear strain than females
- Reduced shear plane motion may be due to abnormal trunk movement patterns &/or intrinsic connective tissue pathology

Sub-failure injuries of the TLF

- Studies show that the human lumbar fascia frequently shows signs of increased tissue repair
- Histological examination of the TLF in CLBP patients show higher than average density of myofibroblasts
- Cells commonly associated with tissue repair function
The TLF: Manual therapy & exercise

- Various soft-tissue treatments are directed to the muscle areas adjacent to the TLF.
- Exercise interventions for LBP rely on the functional link the TLF provides between trunk and limbs.
- Through its expansive fascial connections to deeper layers of fascia the TLF has an important role to play in providing stability:
  1. to the lumbo-pelvic region but also
  2. to integrate the pelvis & rib-cage

Myofascial Release provides a new paradigm challenging long-held beliefs about anatomy, biomechanics & human movement.

Histological studies are beginning to provide a better understanding of the physiological function of fascia.

Histological studies also show that fascia is adaptive – this has clinical implications.

Myofascial Release is having fundamental impact on manual therapy as seen by its widespread use by a wide range of professions.

Thank you

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Coming up next

Exercise in Cancer Patients

Catherine Granger
Physiotherapist