**EFFECTIVE SELF-MANAGEMENT OF MYOFASCIAL DYSFUNCTION**

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**Myofascial Pain Syndrome**

- Sensory, motor and autonomic symptoms caused by myofascial trigger points de Baillou (1538-1616)
- Nodular tumors and thickenings which were painful to the touch and from which pain shot to neighboring parts. Balzur 1816
- Small, tender and apple-sized nodules and painful pencil-sized to little finger-sized palpable bands Strauss 1898
- Hyperirritable spot in skeletal muscle…taut band…which is tender when pressed Travell and Simons, 1983

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**Motor Effect**

Motor inhibition is often identified clinically as muscle weakness, but treatment often focuses on strengthening exercises that only augment abnormal muscle substitution until the inhibiting TPs are inactivated — McPartland and Simons in Myofascial Trigger Points by Dommerholt and Huibregts

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**Myofascial Pain Syndrome**

- Most missed diagnosis:
  - 95.5% of 110 people with lower back pain had MPS in paraspinal, piriformis or tensor fascia latae — Wiener et al, 2006.
  - 94% of headache symptoms reproduced with manual stimulation of cervical and temporal MTPs compared to 29% of controls — Calandre et al., 2006.
  - 30% of migraine sufferers had MTPs that triggered full-blown migraine when MTPs were manipulated — Calandre et al, 2006.
  - MTPs found with:
    - Radiculopathies
    - Tendinitis
    - Disk pathology
    - Computer-related disorders
    - Carpal tunnel syndrome
    - Whiplash
    - Pelvic pain, etc.

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**Myofascial Trigger Point – Causes**

- Low level contractions
- Uneven intramuscular pressure distribution
- Direct trauma
- Unaccustomed eccentric contractions
- Eccentric contractions in unconditioned muscle
- Maximal or submaximal concentric contractions

Dommerholt, Brin, Frensen: Myofascial Trigger Points: An Evidence-Informed Review in Myofascial Trigger Points by Dommerholt and Huibregts
Myofascial Trigger Point – Contributors

- Overuse
- Chill
- Muscular strain
- Fatigue
- Improper nutrition
- Ergonomic stress
- Caffeine intake
- Nicotine use

Travell and Simons, 1999

Myofascial Trigger Point Etiology

- Motor End Plate (MEP) Hypothesis – (Simons)
  - Ca$^{2+}$ influx into MEP bouton → excessive ACh release
- Spontaneous Electrical Activity (SEA)
- “End plate noise” on EMG
  - 1% increase in muscle stretch → 10% increase in Ach
  (Chen and Grinnell, 1997)

Endplate Hypothesis – Motor Component

- Contraction knots
- Sensory nerve compression → Increased ACh release
- Blood vessel compression → Oxygen depletion + Increased metabolic demand → ATP depletion (ATP crisis)
- ATP crisis:
  - Pre-synapse → ↑ ACh
  - Post synapse ↓ Ca$^{2+}$ re-uptake → ↑ contractile activity (spasm)
- MTPs can excite or inhibit motor activity (local or functionally related muscle).
  - Strengthening effects:
    - Muscle substitution
    - Poor coordination
    - Muscle imbalance

McPartland and Simons, 2005

Endplate Hypothesis – Sensory Component

- ATP energy crisis → K$, proton, free O$_2$ radical release
- Histamine released from mast cells migrate to damage
- Serotonin released from platelets
- Bradykinin released from serum protein
- Sensitizer (prostaglandin, leukotriene, substance-P) release → ↓ neuron activation threshold → peripheral sensitization
- Central sensitization →
  - allodynia (pain in normally non-painful areas) and
  - hyperalgesia (↑ sensitivity to pain).

Endplate Hypothesis – Autonomic Component

- Sweating
- Vasoconstriction
- Vasodilation
- Pilomotor activity (goose bumps)
- Head and neck:
  - Lacrimation
  - Coryza
  - Salivation
  - Vessel sympathetic neurons can terminated on muscle spindle → disruption of muscle length feedback control → ATP crisis.

Manual Techniques

- Massage
- Rolling
- Friction (Deep Transverse Friction – Cyriax)
- Ischemic compression (Travell and Simons, 1983)
- Press and Stretch (Travell and Simons, 1983)
- Integrated Neuromuscular Inhibition Technique (INIT)
- Muscle Energy Technique (MET)
- Spray and Stretch
Traditional Self-Care

- Ball:
  - Tennis
  - Lacrosse
  - Golf
  - Softball
- Thera Cane, Backnobber
- Knobbler
- Stretching
  - Frequency
  - Appropriate
  - Neuropathophysiology
  - “Weakness”

Massage

- Pressing, rubbing, manipulating: skin, muscles, tendons, ligaments, fascia
- Reduces
  - Stress
  - Pain
  - Muscle Tension
- Benefits
  - Headaches
  - Myofascial pain syndrome
  - Soft tissue strains or injuries
  - Sports injuries
  - Temporomandibular joint pain

Why Self-Management

- Better outcomes
  - Lower cost
  - Lower levels of pain-related disability (Blyth et al, 2005)
  - Less reliance on medication (Blyth et al, 2005)
  - Patients feel empowered (Smith and Elliot, 2005)
  - Massage* with exercise better than joint mobilization, PT, self-care education and acupuncture* (Furlan et al (Cochrane Review), 2010)
- Convenient
  - No or fewer appointments
  - Better compliance with treatment programs (Smith and Elliot, 2005)
  - Speed up recovery
  - Manual therapy familiarity
  - Unaddressed causative factors
    - Ergonomics
    - Overuse
    - Biomechanics

Pitfalls of Self-Management

- Missed diagnoses of serious illnesses
  - Cardiac disease® (Owen-Smith et al, 2005)
  - Cancer (Auren and Kajalainen, 1997)
- Sequelae of inappropriate self-medication (Ouverte et al, 2000)
- Inappropriate targeting (Smith and Elliot, 2005)
- Lack of training in the implementation (Smith and Elliot, 2005)
- Ineffective intervention® (Smith and Elliot, 2005)

Case Study

- 59 year old business executive (multi-national)
- Medical history
  - Lumbar and cervical disk injuries (lumbar fusion)
  - Rotator cuff repair
  - Achilles tendon repair
  - Upper crossed syndrome® (Janda with associated increased kyphosis
- Recreation
  - Grouse hunting
  - Sailing (44’ trimaran)
  - Intense home gym workouts (2 hours a day)
Case Study

- Self-management
  - Foam roller work
  - Rumble roller
  - TOLA system
    - Neck
    - Shoulder girdle (levator scapulae, rhomboid, upper trapezius)
    - Gluteus medius
    - Occiput
    - Thigh
  - Stretching exercises
  - Strengthening
    - Lower trapezius
    - Serratus anterior
    - Gluteus maximus

Case Study

- Physical therapy
  - Monthly
  - 6 monthly
  - Yearly
- Outcome
  - Normal kyphosis
  - No neck pain
  - Fully functional
  - pistol

Self-Management

- Traditional home exercise program
  - Strengthening
  - Stretching
  - Balance work
  - Plyometrics etc.
- Manual Therapy option
  - Release
  - Stretch
  - Strengthen

Self-Treat Tools

- Balls
  - Tennis
  - Golf
  - Lacrosse
- Rollers
  - Foam
  - Rumble
- Canes
  - TheraCane
  - Backknobber
- Others

Lower Back Pain

- Compensatory mechanics
- Trigger points
  - Gluteus medius
  - Piriformis
  - Hamstrings
  - Hip flexors
  - Paraspinals

Tola System

- Background
- About Hogsback
- Design characteristics
  - Tola Point
  - Tola Wedge
  - Tola Rocker
  - Tola Strap
- Pressure
  - Force per unit area
  - Force (body part)
  - Area (Point)
Case Study – Lower Back

- 58 y.o. male, warehouseman (forklift operator)
- Tripped and fell: herniated L3/4, L4/5 July 2010
- Failed conservative treatment
- Laminectomy: August 2010
- No relief
- Oxycontin and Oxycodone
- Previous history of substance abuse
- Examination suggested myofascial dysfunction

<table>
<thead>
<tr>
<th>Lumbar ROM</th>
<th>Norm</th>
<th>Result</th>
<th>Difference</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumbar Flexion</td>
<td>60°</td>
<td>9°</td>
<td>51°</td>
<td>15%</td>
</tr>
<tr>
<td>Lumbar Extension</td>
<td>25°</td>
<td>7°</td>
<td>18°</td>
<td>28%</td>
</tr>
<tr>
<td>Lumbar Lateral Left</td>
<td>25°</td>
<td>7°</td>
<td>18°</td>
<td>28%</td>
</tr>
<tr>
<td>Lumbar Lateral Right</td>
<td>25°</td>
<td>4°</td>
<td>21°</td>
<td>16%</td>
</tr>
</tbody>
</table>

- Deep trigger point release, stretch to:
  - Gluteus medius
  - Piriformis
  - Hamstrings
  - Paraspinals (erector spinae, quadratus lumborum)
  - Core strengthening exercises
  - TOLA instruction on 11/10/2011

<table>
<thead>
<tr>
<th>Algometry</th>
<th>Left</th>
<th>Right</th>
<th>Bilateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gluteus medius</td>
<td>14.1 lbs</td>
<td>9.5 lbs</td>
<td>4.6 lbs</td>
</tr>
<tr>
<td>L4 Paraspinals</td>
<td>17.6 lbs</td>
<td>12.3 lbs</td>
<td>6.3 lbs</td>
</tr>
</tbody>
</table>

Degrees

- Headache
  - Upper trapezius: temporal area and eye
  - Sternocleidomastoid: top of the head, around the eye, or across the forehead.
  - Temporals: side of the head, jaw and teeth.
  - Splenius: Capitus: top of the head
  - Cervicis (suboccipital muscles): side of the head and to the outside of the eyes.
  - Semispinalis: Cervicis: occiput
  - Capitus: temporal region, side of the eyes.
  - Levator scapulae: side of the head, forehead.

- Headache
  - 48 year old woman
  - 6 year history of temporal and frontal headache
  - Treated with medication
  - Missed work
  - Trigger points in splenius capitis, upper trapezius, sternocleidomastoid
  - Responded well to manual therapy
    - Deep trigger point release
    - Occipital release
    - Transverse mobilization to C1 in rotation

<table>
<thead>
<tr>
<th>Headache</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
<td>Baseline</td>
<td>Avg</td>
</tr>
<tr>
<td>Gluteus medius</td>
<td>1.1 lbs</td>
<td>0.9 lbs</td>
</tr>
<tr>
<td>L4 Paraspinals</td>
<td>1.1 lbs</td>
<td>0.9 lbs</td>
</tr>
</tbody>
</table>

3 months:
- Mild headaches
- Less frequent
- Mostly hormone related
Frozen Shoulder
- Lateral arm fascia
- Posterior capsule
- Anterior capsule/biceps
- Infraspinatus
- Rhomboid
- Self-Treat (Release, Stretch, Strengthen)
- RRE
  - Overall average visits: 8
  - Self-treat 30% (Tola release, stretch, strengthen)
  - Average visits after Tola: 3.5

Case Study
- 64 year old man
- No thyroid disease
- No diabetes
- Insidious onset of adhesive capsulitis
- Non-dominant side
- Niel-Ascher Technique (www.frozenshoulder.com)
- Maitland mobilization
- Proprioceptive neuromuscular facilitation (PNF)
- Stretching exercises
- Strengthening exercises

Muscle Strains
- Hamstrings
- Gastrocnemius
- Soleus
- Quadriceps
- Shoulders
- Hip flexors
- Hip external rotators
- Pectoralis major/minor
- Back
- Neck
- Feet

Questions
Information on the TOLA System: www.tolapoint.com

Information on purchasing the TOLA System: www.optp.com