Strain & Counterstrain

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Concepts of Strain/Counterstrain

Rooted in antiquity:

- Body positioning
- Use of tender points
- Indirect techniques
Origin of Strain/Counterstrain

First Observation - The Discovery

Second Observation:

> Missing tender points - anterior producing pain posterior

> Tender points in extremities were not found in the muscle strained but in the antagonist

> Treating extremities involves greater amplitude of movement
A passive positional procedure that places the body in a position of greatest comfort, thereby relieving pain by reduction and arrest of inappropriate proprioceptor activity that maintains somatic dysfunction.
Definition - 2

A mild over-stretching applied in a direction opposite to the false and continuing message of strain which the body is suffering.

- This is accomplished by shortening the muscle containing the false strain message so much that it stops reporting the strain (indirect technique).
Musculoskeletal Dysfunction

**Structural Model**
- Associated with anatomic and postural deformation of tissue

**Functional Model**
- Biomechanical, non-linear somatic disturbance creating tissue that results in pain, loss of motion/tissue extensibility, movement imbalances, leading to decreased function
Rationale for Strain/Counterstrain

Based on the work of Irvin Korr, Ph.D

“Proprioceptors and Somatic Dysfunction”

Proposed a neural basis for joint dysfunction incriminating the muscle spindle
Musculoskeletal System and Proprioceptive Reflexes

**Ruffini Receptors**
- Found in joint capsule
- Report position, velocity, direction of movement

**Golgi Tendon Organs (GTO)**
- Musculotendinous junction
- Monitors excessive tension
Muscle Spindle

- Located between muscle fibers
- Very sensitive to position, load, and velocity
Korr’s Revelations

- Dysfunction that characterizes the osteopathic lesion does not arise in the joint, but are imposed by muscles that traverse the joint.

- Blames the primary or annulospiral proprioceptor reflexes in the muscle spindle.

- Increased gamma discharge exaggerates afferent discharge from spindle causing reflex spasm which fixates joint in certain position.
Jones Neuromuscular Model

1. Neutral
2. Strain
3. Dysfunction

EMG
Jones’s Postulates

- Not a lesion but an on-going neuromuscular noxious stimulus
- For success hyper-stimulated muscle must return to neutral length slowly
- In spite of subjective pain and weakness in strained muscle, objective evidence in antagonist of painful muscle
Jones’s Postulates

- POC and lasting relief – maximum shortening of antagonist and repeated stretch of painful muscle
- Treatment does not cure, it decreases or eliminates irritation and allows body to heal itself
The Facilitated Segment

A lesion represents a facilitated segment of the spinal cord, maintained in that state by impulses of endogenous origin entering the corresponding dorsal root.

All structures receiving efferent nerve fibers from that segment are potentially exposed to excessive stimulation or inhibition.
The Facilitated Segment

When these impulses extend beyond their normal sensory-motor pathways, the CNS begins to misinterpret the information due to an overflow of neurotransmitter substance within the involved segment.
The Facilitated Segment

Fig. 2-3  Facilitated segment components (C5-7).
Characteristics of a Facilitated Segment

- **Hyper-excitability** –
  - A minimal impulse produces excessive responses

- **Overflow** –
  - Impulse may “spill over” to adjacent pathways

- **Autonomic dystrophy** –
  - Sympathetic ganglia become over-stimulated which decreases healing potential
Somatic Dysfunctions - “ART”

- Somatic dysfunction detectable by physiological manifestations in:
  - Asymmetry
  - Restricted motion
  - Texture abnormalities and tender points
Summary - L.H. Jones, 1995

Initial Disturbance

Nociceptive Input

- III and IV Afferents

Gamma Motor Neurons

- Muscle Spindle Apparatus

- Ia, II Afferents

- Alpha Motor Neuron

Propioceptive Input

Chronic Irritation

- Compensatory Structural Changes

- Increased Muscle Tension

- Alpha Motor Neuron Axon
Somatic Dysfunction

- Extra-articular
- Manifestation of abnormal proprioceptive activity (muscle spindle)
- Inability of muscle spindle to reset is what maintains joint dysfunction
What is a Tender Point?

- Small zones of tense, tender, edematous muscle and fascial tissue about 1 cm in diameter
- Sensory manifestations of a neuromuscular or musculoskeletal dysfunction
- Manifestation of facilitated segment
- Diagnostic indicator
Tender Points

- **Jump Sign**: patient / athlete will respond to pressure by moving away
- **Grimace Sign**: visual representation of tenderpoint
Goals of Strain/Counterstrain

- An indirect technique to restore tissue to normal physiological function
- Uses 2→3 planes of movement to place tissue in position of comfort (POC)
- POC is reached when palpable tenderness of TP softens and or decreases (comfort zone)
Finding the Position of Comfort

- Patient feedback
- Palpating the mobile point which is the point of maximum ease or relaxation. It is the ideal position for a release
Fig. 2. Modus operandi for ideal positioning for comfort.
Effects of Strain/Counterstrain

- Normalization of muscle hypertonicity
- Normalization of fascial tension
- Reduction of joint hypomobility
- Increased circulation
- Decreased swelling
- Decreased pain
- Increased strength, movement, function
Treatment Techniques

- Locate the tender point (TP)
- Apply sub-threshold pressure on tender point while finding POC or mobile point
- Monitor point response but take pressure off
- Hold for 90 seconds
- Return to neutral slowly
- Recheck tender point
General Treatment Principles

- Hold POC for no less than 90 seconds
- Return to neutral slowly
- Anterior tender points are usually treated in flexion
- Posterior tender points are usually treated in extension
- Tender points on or near the midline are treated with more flexion and extension
- Tender points lateral from the midline are treated with more rotation and side-bending
General Treatment Principles

- With multiple tender points, treat the most severe first.
- If the tender points are in rows, try treating the one in the middle first.
- Treat area with greatest number of TPs first.
- Tender points in the extremities are usually found on the opposite side of pain.
- May get sore following treatment.
General Treatment Principles

Associated Postural deviations:

- **Major Posterior TP**
  - Flattened forward curves or accentuated backward curves
- **Major Anterior TP**
  - Accentuated forward curves and flattened backward curves
- **Posterior TP**
  - Pain specific in posterior region
- **Anterior TP**
  - Diffuse or large areas of pain
Scanning Evaluation

- Evaluate for multiple tender points
- Record the severity of the tender points
  - + jump sign (extremely severe)
  - + grimace (very tender)
  - moderate
Contraindications /Precautions

- Open wounds
- Recent sutures
- Healing fractures
- Hematoma
- Hypersensitivity of the skin
- Systemic / localized infection
- Acute MI - Precaution
- THP - Precaution
Indications

- Acute injuries *(Sports!)*
- Fragile (osteoporosis)
- Pregnant
- Pediatrics
- Chronic pain
- Post-op (e.g. lumbar, knee, shoulder)
- Neurologic
Indications

Used in conjunction with
- Articular techniques
- Muscle energy
- Myofascial release
- Exercise
- Modalities
Post-Treatment

- Always return slowly to neutral
- Recheck TP after you return to neutral
- Warn patient they may experience increased soreness 24-48 hours post
Case Study #1

Patient: 30 y/o male recreational rugby player

Injury: 2nd degree MCL strain to right knee

Weight-bearing status: WBAT with crutches and immobilizer

ROM: (-)10° extension; 30° flexion

Pain: constant 5/10; this would increase to 8/10 with increased weight-bearing and movement
Case Study #1 (continued)

- Palpation: Tender over medial aspect of the knee
- Most dominant tender point - right paraspinal muscles at L3, followed by right gluteus minimus
- Treatment: TP’s treated and ROM increased to (-4) extension and 125° flexion
Case Study #1 (continued)

- Weight-bearing: Increased with much less pain
- Results: After two treatments patient was off crutches, with full ROM and exercising without pain
Case Study #2 – Acute LBP

- Patient: 35 y/o female custodian
- Injury: Progressive increase in right sided LBP after lifting incident 2 weeks ago
- Trunk ROM: Limited and painful; flexion > extension > lateral flexion/rotation
- Neurological: Normal
Case Study #2 (continued)

- Pain: constant 5/10; increases to 8/10 when attempting to lift at work

- Gait: antalgic

- Palpation: TP’s over iliacus; right L4 and L5

- Treatment: Iliacus TP with significant increase in trunk ROM; L4 and L5 TP’s treated with full trunk ROM and no pain
Summary

- Scan body for TP, grade severity
- Follow general rules
- Monitor TP while finding POC
- Maintain contact with TP while in POC
- Hold POC until complete release
- Return to neutral slowly
- Recheck TP
- Warn patient and avoid strenuous activity
That’s All Pilgrims
Questions?
Stain/Counterstrain Lab

- Posterior Lumbars
- Anterior Lumbars
- Posterior Pelvis
- Anterior Pelvis
- Posterior Sacrals
Posterior Lumbars

D’Ambrogio and Roth 1997
Posterior Lumbar

**Patient Presentation:**
- Hyper-lordotic posture
- Increased pain with sitting
- Difficulty with flexion
Posterior Lumbar – Lateral
D’Ambrogio and Roth 1997
Posterior Lumbers 1-5

Location of Tender Points:
✓ Lateral aspect of the spinous processes
✓ Paraspinal sulcus
✓ Posterior aspect of transverse process
Posterior Lumbers
D’Ambrogio and Roth 1997
Posterior Lumbars 1-5

Position of Treatment:

✓ Patient lies prone; pillow under chest
✓ CAT stands on the side opposite the TP
✓ Grasp the anterior aspect of the pelvis on the TP side; pull posteriorly to create rotation 30 - 40°

Good for severe, acute back pain
Quadratus Lumborum

**Position of Tender Point:**
- Lateral aspects of transverse processes L1-L5
- Pressure anteriorly then medially

**Patient Presentation:**
- Limited flexion; tight hamstrings; + SLR
Quadratus Lumborum
D’Ambrogio and Roth 1997
Quadratus Lumborum

**Position of Treatment:**

- Patient prone with pillow under chest
- CAT stands on opposite side and grasps ilium on affected side
- Patient then flexes and abducts ipsilateral hip to 45°
Quadratus Lumborum

**Position of Treatment:**

- Patient prone; side-bend trunk toward tender point; abduct and extend hip and rest on operator’s thigh; gently hike hip and fine tune with rotation

- Patient lies on unaffected side; hips and knees flexed to 90°; CAT stands behind and grasps ankles and lifts them to induce side-bending; patient protracts or retracts to fine tune
PL 3 (Iliac)

**Location of Tender Point:**

- 3 cm below margin of ilium and 7 cm lateral to PSIS
- Pressure applied anteriorly and medially
PL 3 (Iliac)
D’Ambrogio and Roth 1997
PL 3 (Iliac)

Position of Treatment:

- Patient prone; operator stands on opposite side of TP
- Extend thigh of affected side and support on thigh of operator
- Operator then slightly adducts thigh and markedly externally rotates
PL 4 (Iliac)

Location of Tender Point:

- 4 cm below the crest of the ilium and just posterior to the border of the tensor fascia lata
  - Pressure anteriomedial
PL 4 (Iliac)
D’Ambrogio and Roth 1997
**Position of Treatment:**

- Patient prone and operator stands on the side of the TP
- Operator then extends thigh and supports leg on thigh
- Leg then slightly adducted and moderately externally rotated
**UPL 5**

**Location of Tender Point:**

- superior medial surface of the PSIS; pressure applied inferiorly and laterally
- KEY POINT – extended L5
  - tight hamstrings
  - + SLR
UPL 5

Position of Treatment:

- Patient prone; operator stands on opposite side of tender point
- Operator extends the hip on affected side and supports leg on thigh; slightly adduct with mild external rotation
Location of Tender Point:

- 1.5 to 2 cm inferior to the PSIS in the sacral notch
- Maverick Point: flexion dysfunction with TP located posteriorly
  - If anterior lumbar “check out”, look at this point; may see with pain on backward bending
LPL 5
D’Ambrogio and Roth 1997
Position of Treatment:

- Patient prone
- Operator seated on side of tender point; patient moves toward the edge of the table so that leg can be dropped off the table and rest on the operator’s thigh;
- Flex hip to 90°, slight adduction and internal rotation; can retract opposite ilium to fine tune
Patient prone
Operator stands on opposite side of the TP and grasps the ilium at the level of the ASIS;
Patient flexes and abducts leg on affected side; ilium is retracted and rotated toward TP
Anterior Lumbars
D’Ambrogio and Roth 1997
Anterior Lumbar Bars

**Patient Presentation:**
- Decreased lordosis
- Difficulty with extension
- Pain with sidebending
- Increased pain with prolonged standing, walking
- Work on these points before doing EIL
Anterior Lumbar 1

Location of Tender Point:

- Medial surface of the ASIS;
- Press laterally, approximately ¾ inch deep
Anterior Lumbar 1

D’Ambrogio and roth 1997
**Position of Treatment:**

- Patient supine; head of table can be raised;
- Operator stands on side of TP and markedly flexes patient’s legs;
- Rotate to side of TP and laterally flex toward TP side (or away)
Anterior Lumbar 2

**Location of Tender Point:**

- Inferior-medial surface of the ASIS;
- Pressure applied superior-lateral (feels like a small gland)
Anterior Lumbar 2

**Position of Treatment:**
- Patient is supine; head of table can be raised;
- Operator stands on opposite side of the TP;
- Operator flexes patient’s legs to 90°; moves knees away from TP side 60° (rotation); slightly push feet toward floor to create side bending away from TP side.
AbL 2 (Psoas)

**Location of Tender Point:**

- On the abdomen 5 cm lateral to the umbilicus and slightly inferior;
- Pressure posteriorly
AbL 2
D’Ambrogio and Roth 1997
AbL 2

**Position of Treatment:**

- Patient is supine with the operator standing on the side of the TP;
- Hips are flexed to 90°; rotates hips 60° toward TP side and laterally flexes the hips away from the TP by elevating the feet
AL 3-4

Location of Tender Point:

- L3
  - Lateral surface of ASIS; push medially
- L4
  - Inferior surface of the ASIS; push posteriorly and then superiorly
AL 3-4
D’Ambrogio and Roth 1997
Position of Treatment:

- Patient is supine with the operator standing on side opposite the TP;
- Operator flexes patient’s hip 50-90°, laterally flexes hips away from the TP by pulling legs toward operator; fine tune by rotating hips toward or away from TP.
AL 5

Location of Tender Point:

- Anterior surface of the pubic bone
- 1.5 cm lateral to pubic symphysis
AL 5
D’Ambrogio and Roth 1997
Position of Treatment:

- Patient is supine with the operator standing on side of TP;
- Patient’s hips are flexed 60-120°; hips rotated towards the TP side and laterally flexes away from TP side (move feet away from operator)
Posterior Pelvis
D’Ambrogio and Roth 1997
Superior Sacroiliac (SSI)
D’Ambrogio and Roth

**Location of Tender Point:**
- Approximately 3 cm lateral to the PSIS; pressure medially
- SI joint pain with sitting / standing
Superior Sacroiliac (SSI)

**Position of Treatment:**
- Patient is prone with the operator standing on the side of the TP; e
- Extend patient’s hip resting leg on operator’s thigh; slightly abduct and rotate to fine tune
- If patient has limited hip extension, treat anteriors first
**Middle Sacroiliac (MSI)**

D’Ambrogio and Roth 1997

**Location of Tender Point:**

✔ Middle of the buttocks in a slight depression; press anteriorly and medially
Middle Sacroiliac (MSI)

**Position of Treatment:**

- Patient is prone with the operator standing on the side of the TP
- Markedly abduct leg
- Fine tune with flexion/extension or internal/external rotation
Inferior Scaroiliac (ISI)
D’Ambrogio and Roth 1997

Location of Tender Point:
- Located in a line along the sacrotuberous ligament from the ischial tuberosity to posterior aspect of the inferior lateral angle;
- Pressure anteriorly and laterally
Inferior Scaroiliac (ISI)

**Position of Treatment:**

- Patient prone with the operator on the side opposite the TP
- Operator reaches across and grasps the leg on the involved side and extends, adducts, externally rotates it across the uninvolved leg
Piriformis (PRM – PRL)

D’Ambrogio and Roth 1997

**Location of Tender Point:**

- PRM – belly of the piriformis approximately halfway between the inferior lateral angle of the sacrum and the greater trochanter

- SI torsions, sciatic irritation, + SLR
Piriformis (PRM – PRL)

Position of Treatment:

- Similar to LP5
- Patient is prone with operator seated on side of TP
- Leg on TP side suspended off table resting on operator’s thigh
- Flex hip from 60 – 120°, abducted; fine tune with internal/external rotation
Gemelli (GEM)  
D’Ambrogio and Roth 1997

**Location of Tender Point:**

- On a line from the lateral inferior surface of the ischial tuberosity to the medial aspect of the posterior surface of the greater trochanter (gluteal fold)
- High HS pull?
Gemelli (GEM)

**Position of Treatment:**
- Patient is prone, operator on opposite side
- Operator pins patient’s ankle in axilla
- Leg is moderately extended, markedly adducts and externally rotates leg
Gluteus Medius (GME)
D’Ambrogio and Roth 1997

Location of Tender Point:
- On a line 1 cm inferior to the iliac crest
- 3 – 5 cm on either side of the mid-axillary line
- Iliosacral dysfunction
Gluteus Medius (GME)

Position of Treatment:

- Patient is prone with operator standing on side of TP
- Operator extends and abducts the leg and rests the leg in operator’s thigh
- Hip positioned in marked external rotation (TPs posterior to mid-axillary line) or in internal rotation (TPs anterior to mid-axillary line)
**Iliotibial Band (ITB)**

D’Ambrogio and Roth 1997

**Location of Tender Point:**

- On the iliotibial band along the lateral aspect of the thigh on the midaxillary line
- Check with hip and knee dysfunction
Iliotibial Band (ITB)

**Position of Treatment:**

- Patient may be prone or supine
- Operator stands on the side of the TP and grasps the patient’s leg and produces marked abduction
- Internal/external rotation to fine tune
Anterior Pelvis
D’Ambrogio and Roth 1997
Patient Presentation:

- Pain with standing and walking
- Posture – anterior pelvis
- Dysfunction of hip flexors, adductors, internal rotators
- Iliosacral dysfunction
Iliacus (IL)
D’Ambrogio and Roth 1997

**Location of Tender Point:**
- 3 cm medial to ASIS and deep in the iliac fossa; pressure posteriolaterally
- Key point for chronic SI joint dysfunction
Iliacus (IL)

**Position of Treatment:**

- Patient supine with ankles supported on operator’s thigh; operator stands on side of TP
- Legs taken into extreme flexion and external rotation
- Rotation toward the TP to fine tune
Superior Pubis (SPB)
D’Ambrogio and Roth 1997

Location of Tender Point:
- Superior aspect of lateral ramus of the pubis and approximately 2 cm lateral to the pubic symphysis; push inferiorly
Superior Pubis (SPB)

**Position of Treatment:**

- Patient is supine with the operator standing on side of TP
- Operator flexes the hip 90° – 120° with no abduction or rotation
Inferior Pubis (IPB)

D’Ambrogio and Roth 1997

**Location of Tender Point:**

- Medial surface of the descending ramus of the pubis (find ischial tub move medially)
Inferior Pubis (IPB)

**Position of Treatment:**

- Patient is supine
- Operator stands on the side of the TP and flexes, abducts, and externally rotates the affected hip
Lateral Pubis (LPB)

D’Ambrogio and Roth 1997

Location of Tender Point:

- Lateral surface of pubic bone just below the inguinal ligament attachment (undergarment line)
- SI joint pain, flare-ins, tension in femoral triangle, ant. thigh pain
Position of Treatment:

- Patient is supine and the operator is standing on the side of the TP
- Patient’s hips flexed to 90° and rested on operator’s thigh
- Unaffected leg is crossed over the affected leg
- Move affected leg into internal/external rotation
**Location of Tender Point:**

- 2 cm lateral to the ASIS; hips may be flexed to 45° to facilitate location.
Sartorius (SAR)

**Position of Treatment:**

- ✔ Patient is supine with the operator standing on side of TP
- ✔ Operator flexes hip to 90° and adds moderate abduction and external rotation
Adductors (ADD)

D’Ambrogio and Roth 1997

Location of Tender Point:

- Origin of adductors to pubic bone or belly of muscle
- SI joint flare-outs, trochanteric bursitis, ITB
Adductors (ADD)

**Position of Treatment:**

- Patient is supine with the operator standing on the side opposite of the TP
- Operator reaches across and grasps the patient’s distal tibia and adducts the leg (pulling medially)
Posterior Sacrals
D’Ambrogio and Roth 1997
Posterior Sacrals

- Present in sacroiliac dysfunction (torsions)
- Clear L5 before treating sacrals
Posterior First Sacral (PS 1)
D’Ambrogio and Roth 1997

Location of Tender Point:
- Sacral sulcus, medial and slightly superior to PSIS
- Backward sacral torsions
Posterior First Sacral (PS 1)

Position of Treatment:

- Patient is prone
- Operator applies a downward pressure on inferior lateral angle opposite of TP
Posterior Second Sacral (PS2)
D’Ambrogio and Roth 1997

Location of Tender Point:

✓ Midline of the sacrum between the first and second sacral spines
Posterior Second Sacral (PS2)

**Position of Treatment:**
- Patient is prone
- Operator applies a downward pressure to apex of sacrum in midline
- Produces rotation around a transverse axis
Posterior Third Sacral (PS3)

D’Ambrogio and Roth 1997

Location of Tender Point:
✓ Midline of sacrum between the second and third sacral spines
Posterior Third Sacral (PS3)

Position of Treatment:

- Patient prone
- Operator applies a downward pressure to the apex of the sacrum in midline
Posterior Fourth Sacral (PS4)

D’Ambrogio and Roth 1997

Location of Tender Point:

- Midline of the sacrum just above the sacral hiatus
Posterior Fourth Sacral (PS4)

Position of Treatment:
- Patient is prone
- Operator applies an anterior pressure on the sacral base in midline
Posterior Fifth Sacral (PS5)
D’Ambrogio and Roth 1997

Location of Tender Point:

- 1 cm medial and superior to the inferior lateral angle of the sacrum
- Forward sacral torsions
Posterior Fifth Sacral (PS5)

Position of Treatment:

- Patient is prone
- Operator applies a downward pressure on the sacral base on the side opposite the tender point
Location of Tender Point:
- Inferior or lateral edges of the coccyx
- Pressure superiorly and medially
Coccyx (COX)

**Position of Treatment:**
- Patient is prone
- Apply a downward pressure to the apex of the sacrum
- Rotate sacrum toward side of tender point
The End – Questions?