Counterstrain for Acute Injuries

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Objectives

- Review the history, mechanism and application of CS techniques.
- Appreciate the usefulness of CS in acute and chronic injuries.
- Find and treat appendicular CS points.
- Learn how extremity CS points can be related to the axial spine.
- Develop new technique approaches to effectively and gently treat injured patients.
Definition: Counterstrain

1. An osteopathic system of diagnosis and indirect treatment in which the patient’s somatic dysfunction, diagnosed by an associated myofascial tender-point, is treated by using a position of spontaneous tissue release while simultaneously monitoring the tender point.

2. Developed by Lawrence Jones, DO in 1955 (originally “Spontaneous Release by Positioning,” it was later termed “strain-counterstrain”), considered to be related to a continuing inappropriate strain reflex.

Counterstrain tender points are discrete, non-radiating, hyperalgesic areas in the myofascial tissues used in Counterstrain. The named points are found at consistent anatomical locations.

Whole body positioning for comfort evolved into identification of discrete areas of tenderness (tender points) associated with specific dysfunctions. Initially only posterior tender points were identified.

Dr. Jones found anterior tender points that increased the efficacy of his treatment approach. Dr. Jones mapped the location of tender points associated with specific somatic dysfunctions of the spine, pelvis, lower extremities, upper extremities, and the cranium.

He published the first paper on the model in 1964. His FAAO thesis evolved into a textbook which was published by the American Academy of Osteopathy in 1980.

Since that time, research has been conducted both in in vitro and in vivo models on the neuro-physiological and biomechanical mechanisms that are central to the treatment principles.
Mechanisms

Three proposed mechanisms are:

- **Proprioceptive Imbalance** - neuromuscular imbalance due to abnormal neurophysiologic activity occurring between agonist and antagonist muscles. This includes *abnormal muscle spindle activity* and H-reflex responses.

- **Sustained Abnormal Metabolism** - vascularity is position-dependent and impaired circulation results in a loss of nutrient supply and metabolic waste removal at affected structures.

- **Impaired ligamento-muscular reflex** - localized strain in ligaments either inhibits or stimulates muscular contraction that may increase strain in affected structures as a protective reflex.
One muscle is shortened, it's antagonist is stretched. An injury / movement occurs over stretching the shortened muscle. The muscle contracts /spasms to protect itself. A tender point develops in the contracted muscle.
Safety and Efficacy

- Post-treatment reactions may include myalgia’s, arthralgia’s, and/or fatigue, and are usually self-limited and well-tolerated by patients.
- Reactions associated with patient position.
- Avoid positions that do not relieve pain.
- Avoid positions that cause discomfort, dizziness, panic or exacerbate neurogenic pain.
- Avoid extreme positioning of the thoracolumbar spine in osteoporotic patients.
- Use caution when treating the cervical spine in a patient with rheumatoid arthritis or any other rheumatologic conditions, segmental or ligamentous instability.
Diagnosis

- Patient history and observation of body habitus are evaluated. Once an area of potential dysfunction is determined, then specific tissue locations are evaluated for the presence of tender points (focal areas of discrete tenderness and tissue texture abnormalities).
- The amount of pressure used to elicit a tender point is approximately that which is needed to blanch the nail bed of the diagnosing finger. This pressure will not produce tenderness in healthy tissue and does not radiate. Typically this pressure is ~ 4 kg/cm².
Mechanism of Action of Treatment

- Shortening myofascial tissues associated with the tender point reduces the somatic dysfunction’s Nociceptive input to the central nervous system, thereby normalizing neurophysiologic activity, myofascial tone and length, and local circulation.

- Recent research also describes mechano-transduction associated with precise positioning resulting in down-regulation of pro-inflammatory mediator production as a potential mechanism of action.
## Contraindications

<table>
<thead>
<tr>
<th>Absolute</th>
<th>Relative</th>
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<td>Lack of patient consent and/or cooperation</td>
<td>Patient who cannot voluntarily relax</td>
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<td>Inability to tolerate the classic treatment position, meaning that the treatment position must be modified</td>
<td>Severely ill patient</td>
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<td>Manifestation of neurological symptoms brought on by the treatment position</td>
<td>Upper cervical hyper-rotation and hyperextension in patients with known vertebral artery disease, or upper cervical ligamentous instability, or dens malformation</td>
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<td>Exacerbation of potentially life-threatening symptoms by treatment position (EKG changes, drop in O2 saturation, etc in a monitored patient)</td>
<td>Severe osteoporosis</td>
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<td>Inability to tolerate the classic treatment position, meaning that the treatment position must be modified</td>
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<td>Inability to effectively communicate</td>
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<td>Patient with severe acute rheumatologic flare</td>
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<td>Signs of apprehension while approaching the treatment position</td>
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Treatment: Special Considerations

- Scan for both anterior and posterior tender points within a region to determine the most significant point.
- If there are multiple tender points in an area, usually the most tender is the most significant and should be treated first.
- If there is a row of equally tender points within a region, treat the one in the middle.
- Anterior points typically require flexion.
- Posterior points typically require extension.
- Midline points typically require primarily flexion or extension.
- The more lateral the point, the more sidebending and rotation is typically required.
- The goal is for complete reduction of tenderness or as close to 100% as possible, but at least 70% reduction.
Treatment: Special Considerations

- Use both tenderness and tissue texture changes to find the best treatment position.
- The presence of a therapeutic pulse indicates good myofascial relaxation and improved local circulation.
- The indirect positioning used to alleviate the tender point, may also treat the associated segmental dysfunction.
- The tissues being treated may or may not be located directly beneath the tender point being treated.
- The exact position of ease will vary depending on the response of tissue during positioning.
- CS techniques can lead into combined MFR techniques.
- Applied force vectors can speed CS techniques.
- Breathing can assist as well.
Jones Tender Points Are Related to Vertebral Dysfunction and Muscle Dysfunction.

- Jones, LH; Strain-Counterstrain, Published by Jones Strain-Counterstrain, 1995.
- Rennie, PR; Counterstrain and Exercise: An Integrated Approach, RennieMatrix, Williamston, Michigan, 2004
E.C. is a 53 year old female. She has had left foot pain for 6 days after stepping off a curb walking her dog. The pain is worst with prolonged walking or standing. The left foot pain radiates to the left lateral calf at its most intense times. She was told that day in the ER that her x-rays showed “decreased bone density and arthritis of her foot, but no fractures.” Prior to this injury she had no history of problems with her low back, leg or foot.

**PAST MEDICAL HISTORY:** Diverticulosis, Hypertension  
**PAST SURGICAL HISTORY:** none  
**ALLERGIES:** None  
**MEDICATIONS:** Lisinopril, Hydrochlorothiazide  
**HABITS:** she denies alcohol or tobacco use  
**REPRODUCTIVE:** Pap smears and mammogram up to date and normal, married, monogamous, postmenopausal x 18 months  

**REVIEW OF SYSTEMS:**  
**Positives:** her blood pressure has been well controlled for years, her weight is stable, ankle is swollen and has bruising  
**Negatives:** remaining HEENT, heart, lungs, GI, GU, neurologic, extremities.
PHYSICAL EXAMINATION (INCLUDING STRUCTURAL):

Vital signs: Height 5’ 9”, Weight 206, Temperature 97.7, Respirations 16, Pulse 84, Blood Pressure 136/84

General: Alert, argumentative, stoic, appropriate speech, affect and attire, overweight

HEENT: Normal ear canals, tympanic membranes, nares and pharynx

Heart: Regular rate and rhythm, no murmurs

Lungs: Clear to auscultation, without rales, rhonchi or wheezes

Abdomen: nontender, no guarding, no rigidity, no rebound, bowel sounds intact X 4 quadrants

Neurologic: Cranial nerves I – XII were intact, Achilles and patellar reflexes were 2/4 symmetrically. Motor testing was 5/5 bilateral extensor hallucis, quadriceps femoris and hamstrings. There was no lower extremity sensory deficit. Babinski was down going bilateral. Gait was essentially normal.

Extremity: Positive swelling left lateral ankle with a bruise along the lateral foot. No limp. Full pain free knee ROM. No fibular pain to an applied squeeze. Positive +1 ankle drawer test.

Neuromusculoskeletal Exam: Elevated right shoulder, no lateral curves, positive left seated flexion test, negative straight leg raising test. Somatic dysfunction was noted at L₄ FRSR, tighter left psoas and a left unilateral sacral flexion. Poor fibular movement, multiple Jones tender points throughout the lumbar spine, pelvis, and lower extremity.
CLINICAL IMPRESSION / DIAGNOSIS / ASSESSMENT:

1. Inversion / Supination ankle sprain Grade 1
2. Somatic dysfunction: lumbar, sacral, pelvic and lower extremity
3. Possible osteopenia and foot DJD
4. Hx of Diverticulosis and controlled HTN
The ankle sprain is the most poorly diagnosed, miserably treated, and yet most common of all sports medicine injuries. “There is no such thing as a simple ankle sprain.”

Phillip Greenman, D.O.
LIGAMENTS

Lateral Collateral Ligaments (85-95%)
1. Anterior talofibular
2. Calcaneofibular
3. Posterior talofibular

Medial (Deltoid) Ligament (5-10%)
1. Anterior tibio talar
2. Posterior tibio talar
3. Tibio-navicular
4. Tibio-calcanean
ANKLE TESTING

The “Big Four” Ankle Tests

1. Eversion Test: Deltoid
2. Side-to-side Test: Tibiofibular ligament, interosseous membrane, syndesmosis
3. Anterior Drawer Test: anterior talofibular
4. Inversion Test: Calcaneofibular
GRADING OF SPRAINS

GRADE I SPRAIN

GRADE II SPRAIN

GRADE III SPRAIN
Ankle drawer test
This test determines if the anterior talo-fibular ligament is intact.
With the foot slightly plantar flexed (20 degrees), apply an anterior directed force to the calcaneus and talus with a simultaneous posterior directed force to the tibia. A positive test is laxity or increased motion of the calcaneus and talus anteriorly.
Acute Injury: Learning Points

- Treat axial spinal segment(s) neurologically related to the involved extremity.
- Treat areas of myofascial restriction along the path that might cause lymphatic stasis.
- Treat areas above and below the acute injury.
- Treat the injured area in a pain free and tension free position.
Lift ilium

With added extension
Jones Tender Points

- **T10-12**
  - Supplies sympathetic / autonomic input to lower extremity
  - Posterior
    - Extension and rotation about 45 degrees
Jones Tender Points: AT 10-12

- **Anterior**
  - These tender points are often found lateral to the midline and are bilateral.
  - AT10 is located 1-2 cm below the umbilicus and 2-3 cm lateral to the midline.
  - AT11 is approximately 5-6 cm below the umbilicus and 2-3 cm lateral to the midline.
  - AT12 is on top of the iliac crest at the midaxillary line.
  - Marked flexion and rotation of the legs toward the same side, place pillow under the buttocks.
Piriformis CS Treatment

Diagnosis

Treatment
Sacral CS Treatment
With the patient prone, palpate the hamstring for overall muscle tone.

Compare to the other side.

Now check for localized areas of tenderness and tightness.
Hamstring: Kappler’s Approach

Tender Point

Treatment
Popliteus: Rennie

- Dysfunction / tightness commonly associated with lower leg pain.
- The muscle unlocks the extended knee by internally rotating the tibia on femur.
- During stance it externally rotates the femur on tibia.
- Treat by flexing the knee and medially rotating the tibia.
Jones called this extension ankle point EXA.

He called the ankle in plantar flexion to be in “hyperextension”.

This technique works for tender points in either medial or lateral head of the gastrocnemius.
Counterstrain Points on the Ankle
ANKLE DYSFUNCTION - LATERAL (LAN)

**Dysfunction:** tender point at the lateral ankle point (LAN). This is located in a depression 2 cm anterior and caudad from the lateral malleolus.

**Objective:** To restore motion of the ankle.

**Discussion:** This type of dysfunction is quite common and is the usual source of the so-called weak ankle or trick ankle.

**Patient Position:** Lying on the same side of the dysfunctional ankle with the dysfunctional ankle suspended over the side of the table with a rolled-up towel as a pad between the distal leg and the table.

**Physician Position:** Standing at the side of the table by the dysfunctional foot.

**Procedure:**

1. Using your hand closest to the table, contact the tender point with a monitoring finger.
2. Place your other hand in contact with the medial aspect of the patient’s foot and ankle.
3. A heavy force of about 25 kg on the medial surface of the foot is applied as the foot is everted slightly.
4. Wait 90 seconds.
5. Passively return the ankle to neutral.
6. Reassess.
**ANKLE DYSFUNCTION - MEDIAL (MAN) TENDER POINT**

**Dysfunction:** tender point at the medial ankle point

**Objective:** To restore motion to the ankle

**Discussion:** This tender point is fairly common and is due to a fairly common ankle problem. This is especially true in patients who wear out the lateral side of their shoes and break down their lateral longitudinal arches. This tender point is located 2 cm below the medial malleolus in an arc about 2 cm long.

**Patient Position:** Lying on opposite side of the dysfunction with the dysfunctional side knee bent 90° and the foot suspended off the table. A rolled-up towel serves as an ankle pad and is placed between the leg and the table.

**Physician Position:** Standing at the side of the table.

**Procedure:**

1. You use your hand closest to the table as your monitoring hand and place your finger on the tender point.
2. Position your other hand such that your palm contacts the lateral aspect of the foot with your thumb on the dorsal foot, your palm contacting the lateral foot just inferior to the lateral malleolus and your 5th digit in contact near the sole of the patient's foot (see illustration).
3. With your lateral hand, apply a force of approximately 20 kg to cause hyper-inversion of the ankle/foot.
4. Fine tune to the zero point.
5. Wait 90 seconds.
6. Passively return the ankle and foot to the neutral position.
7. Reassess.
Counterstrain Points on the Foot
Jones: FCA point (plantar fascitis)  
Kappler: P. Fascitis point
Case 2

- 43 year-old right hand dominant female Violinist falls while cross country skiing.
- The pole bends her right thumb backwards causing pain and swelling.
- She sees you three weeks later for stiffness, pain and swelling of the first carpometacarpal joint.
- She is a Violin player with intermittent neck pain, upper thoracic pain and upper extremity paresthesia’s.
- Playing Violin for extended periods of time, or sleeping on her right shoulder causes right hand paresthesia’s.
X-Ray Findings:

http://depts.washington.edu/uwhand/conditions/Arthritis/CMC.php
Hypertonic scalenes, and mid cervical musculature, and right levator scapulae muscle.

Somatic dysfunction is most prevalent in the high upper thoracic region (T1-4), and forearm.

Neurological exam shows a positive ulnar tap test (Tinel's sign) and a negative Spurling’s test.

Pain is located at the first metacarpal phalangeal joint and the first carpal metacarpal joint, but not in the anatomic “snuffbox”.
Differential Diagnosis Changes:

- Skier’s thumb
- Thumb Carpal-Metacarpal Arthritis
- Intersection syndrome
- de Quervain’s syndrome
- Larson's syndrome
- T4 syndrome
- Right sided sympathetic dysfunction and swelling
Chronic Overuse: Learning Points

- Look for a postural pattern that might tip you off to an area of tender point density.
- Determine if the area is compensation or primarily related to the injury.
- Treat the primary dysfunction and see what happens to the compensation.
Jones Tender Points

- C2,3,4,5,6 anterior
  - Flex, sidebend and rotate away from point
Upper Thoracic's

Diagnosis

Treatment
Prone CS: Posterior Thoracic's
Upper ribs

“The Bomb”

Treatment
Pectoralis Minor

Diagnosis

Treatment
Anterior Thoracic Tender Points
Diagnosis

Treatment

Long Head of the Biceps
Infraspinatus

**Diagnosis**

**Treatment**
Subscapularis

Diagnosis

Treatment
Elbow Points

Anterior elbow

Radial head
Pronator Teres

**Diagnosis**

**Treatment**
Pronator Teres Treatment

(You can also add mild compression)
CM1: Jones Treatment

**Diagnosis**

**Treatment**
Wrist: WRI

Diagnosis

Treatment
DWR

Diagnosis

Treatment
References

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