Osteopathic Sports Medicine - Knee Pain

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Learning Objectives

• Review orthopedic concepts and their osteopathic correlations

• Understand the difference between damage and dysfunction

• Understand the Kinetic Chain model of rehabilitation

• Understand how to do OMT to both the knee and the Kinetic Chain
Osteopathic Model-
Today we will focus on Structural Component
What is an Osteopathic diagnosis?

• The osteopathic lesion is an **effect only**. We must try to figure out what influence a lesion/lesions would have on a given area and consider the anatomy and physiology it represents. Think back to what could have produced the lesion. Use the lesion itself as a ‘tool’ not as the ‘cause...’

Paraphrased from “knowing to Treating,” Rollin Becker, DO in *Stillness of Life* which was an edited transcription from a Dallas Osteopathic Study Group session in 1967.
Concepts of Osteopathic Sports Medicine

• Goal is to maintain maximal functional ability for each person

• 3 categories of function-personalities:
  • **Competition**: little league, high school, club team, college, professional, individual sports
  
  • **Performance**: those that want to maintain high abilities: runners, power lifters, adult amateur athletes
  
  • **Health**: those that want to maintain or improve daily activities: gardening, caring for grandchildren, enjoying retirement, keeping job
Damage vs Dysfunction

- **Damage**: active tissue damage that compromises essential activities
  - Characterized by ACUTE OVERLOAD of an isolated region of the body, **inflammation**:
    - Trauma: ACL tear, shoulder dislocation, sprained ankle
    - sudden high volume of regular intensity: increase mileage, weekend landscaping activities
  - Need rest and slow recovery

- **Dysfunction**: restriction in neuro-musculoskeletal systems that impair activities: **muscle fatigue**
  - Characterized by CHRONIC OVERLOAD due to inter-dependent, multi-regional restriction – this is the concept of the Kinetic Chain
  - Needs mobility for freedom of movement and quick return to activity

- **Premise of this course**:
  - Local evaluation for damage and dysfunction
  - Distal evaluation for dysfunction of kinetic chain
Damage vs Dysfunction

• Combination of both: when there is both damage and dysfunction. Tissue damage leads to a concurrent impairment in the kinetic chain

  • *Ankle Sprain*: focal rest of the ankle but also address the restriction caused by compensations that extend into the lumbo-pelvic region

  • *Degenerative Joint Disease of the Hip*: DJD limitations increase demand on the lumbo-sacral region for more stability leading to impaired core muscles

  • *Tibial stress fracture*: disease and inflammation of the periosteum needs rest; impaired kinetic chain in the lumbo-pelvic region needs addressed
Rehabilitation – distinguishing two issues

• Damage: attempt to restore pre-injury level of functional activity, if possible

• Dysfunction: attempt to raise the level of functional activity. Find “hidden health” that is not available due to restricted movements of the kinetic chain

• Premise of this talk:
  
  • Local evaluation for damage and dysfunction
  • Distal evaluation for dysfunction of kinetic chain
Keys to Rehabilitation

• Cognitive-Behavioral Components: Pain-avoidance behavior (Mind in Model)
  • Kinesiphobia: fear of moving due to the pain it causes. This creates dysfunction on top of disease

• Deconditioning Syndrome: diminished ability or perceived ability to perform tasks involved in a person’s usual activities of daily living
  • Shifting mindset from treating the pain to increasing activities that are being avoided due to pain

• Low correlation with degree of pain, pathoanatomical disease, and functional impairment → level of pain does not correlate to severity of disease
Keys to Rehabilitation

• Negative Effect of immobilization:
  • Compromises: musculo-tendonious, ligamentous-articular, osseous, cardiovascular and central nervous system
  • Atrophy and remodeling of muscles needs reversing

• Rehabilitation – combination of passive and active activities
  • Passive: OMM to begin to reverse the immobility allowing “quiescent” muscles to work
  • Active: Physical Therapy-exercises that take advantage of the improved mobility and muscle activation to improve conditioning
  • Occur concurrently
“Tissue is the issue, motion is the lotion
There are no techniques”

Anthony Chila, DO, FAAO dist., FCA
Palpate and diagnose axial spine

- Palpate for tissue texture changes

- Dr. Buckner’s lecture
- Dr. Wilson’s Lecture
- Dr. Craft’s lecture

- S = Sensitivity changes (more inclusive than tenderness)

- T = Tissue texture abnormalities

- A = Asymmetry

- R = Restriction of motion
Kinetic Chain

• **Kinetic Chain Model**: A synergistic, neurally-directed recruitment of muscles groups in a proximal-to-distal pattern to create maximally effective movement;

• **Requires proximal stability for distal mobility**


What muscle is she using to hold herself?

THIS IS EVIDENCE FOR THE KINETIC CHAIN MODEL
Health?

• What does it mean to have a HEALTHY Kinetic Chain?

• What does SPINAL or KNEE Health look like?

• Does a person who has no symptoms AND has a normal x-ray and MRI define what is “HEALTHY”?

• Before we discuss “disease,” let’s discuss HEALTH
Lumbo-Sacral-Pelvic, Knee and Ankle Health Test:
Squats – so easy, an infant can do it!
Types of Squats
(Can you do the Duck Walk?)

• Pistol Squat/Single-leg Squat
• Bulgarian Squat/Single-leg, rear-foot elevated squat
• Goblet Squat
• Body weight squat with or without assistance
• Split squat/Lunge Squat
• Chair Squat

• Good Squat: Feet wider than shoulder, toes forward or slightly outward, knees move forward over toes, back stays straight, achieve 90 degrees
• Can you walk 5 feet in a deep squat?
Types of Squats
Types of Squats
TYPES OF SQUATS – from more difficult to least

• Single-Leg Squat: hardest
  • Balance
  • Hip control
  • Knee control

• Double-leg Squat
  • Lumbo-Pelvic strength and mobility
  • Latissimus dorsi tightness
  • Ankle mobility

• Split-Squat:
  • Balance
  • Mobility

• Chair-Squat: Easiest
Why is a squat so amazingly important?

• It reveals all the muscles, ligaments, joints, and neuro-motor control available to the person

• The more that is available, the less each areas has to work in order to carry out daily function

• Alternatively, as some areas become limited in use, other links in the kinetic chain become overloaded.
Knee and Ankle

• Lumbo-sacral-pelvis (LSP) complex is a strong influencer of Lower Extremity injury risk
• The knee is the joint that connects the ankle-foot (AF) complex with the lumbo-sacral-pelvic complex
• So, most knee pains are either:
  • Traumatic that directly impact the knee - Damage
  • Secondary to LSP or A-F complex dysfunction

• Local evaluation for damage and dysfunction
• Distal evaluation for dysfunction of kinetic chain
Question

• What do you call it when someone engages in regular, acute overuse activities??

  • EXERCISE!!!!

• What do you call it when some steadily increases their regular, acute overuse activities?

  • FITNESS!!!!
Osteopathic Paradigm

Disease

• Trauma or acute overload → tears, inflammation.
  • RICE, bracing, surgery, etc
• Joint instability – often the result of trauma – surgery?
• Repetitive overload (not “overuse”) – stress fractures, inflammation, micro-tears – PRP?

Lack of Health

• Neuromuscular imbalance (with or without compensation)
• Muscle Fatigue: often due to muscle imbalance
• Accumulative – layers of compensation
• Look for both concurrently
• Somatic dysfunction can exist in both columns
Knee

- **Knee pain Damage:**
- **S.T.O.P.**
- **Swelling:** immediate or mixed
- **Trauma or Twisting:** immediately preceding pain onset
- **Onset** – immediate pain or gradual
- **Popping:** immediate/one time vs recurrent
- If Positive for STOP: trauma and do instability tests (Lachman’s, Anterior/Posterior drawer; Valgus/Varus for medial/lateral collateral ligaments’ McMurray’s for Meniscus)
Knee

• **Trauma** – Orthopedic referral or close follow-up and bracing

• **Non-traumatic:** tendonitis/osis; bursitis (iliotibial band or pes anserinum); DJD (sub-patella, intra-articular); anterior knee pain – patella-femoral syndrome

• **Chronic Overload:** anterior knee pain, patella-femoral syndrome, patella tracking dysfunction; sub-patella osteochondral dissecans
Knee - Pediatric

- Pediatrics: apophysitis: infrapatella and tibial tuberosity (Osgood-Schlatter disease)

- Growth plate is weaker than the soft tissue (ligaments and tendons)

- The Growth plate will inflame and be injured prior to soft tissue
  - Salter 1: x-ray shows normal knee with normal growth plate
  - Salter 2: mild disruption of the bone

- Diagnosis: above history + tender to palpation at the infrapatellar or tibial tuberosity. There may be inflammation and enlargement not
“Causes” of Knee Pain - some could actually be due to Kinetic Chain issues

- Lateral tracking
- Chondromalacia
- Tight IT band
- Plica band
- Tight hamstrings
Knee ligaments & Fascia

Thieme, Atlas of Anatomy
p395

Thieme, Atlas of Anatomy
p395

Gray’s Anatomy of the Human Body, 1918
Figure 434 and 438
Diagnose your partner
piriformis, iliacus, psoas tender points
Level iliac crest, symmetric ASIS/PSIS, symmetric leg length

Psoas & Iliacus Tenderpoints
Diagnosis & OMT for the knee

**Diagnosis**
- Tibial rotation
- Patellar tracking

**Treatments**
- Femoral/Tibial Dysfunction
  - Still technique
  - MFR
- Patella ME
- Patella BLT
Diagnose
Tibial rotation

• Internally rotated
• Externally rotated
Tibial rotation treatment
Still Technique

- Physician thumbs on lateral border of tibial tuberosity
- Physician fingers on the lateral border of the popliteal fossa
- Place tibia in maximum ease
  - Internal or external rotation
- Add traction or compression
- Rotate the tibia towards barrier
  - Either internal or external rotation
Tibial rotation treatment
MFR

- Physician hand position the same as Still Technique
- Stack the tibia in ease
  - Anterior/posterior
  - External/internal rotation
  - Valgus/varus knee
  - Traction or compression
- Have your patient take a few deep breaths and follow the tissues until release
Patella BLT

- Physician engages the lateral and medial border of the patella
- Gently lift the patella
- Balance the tension in all planes
- Wait for release
• Physician push the patellar inferior
• Have patient contract quadricep muscle 3-5 secs
• Patient relax
• Physician takes the patella more inferiorly
• Repeat 3-5 times
Knee Rehabilitation

• **Core Stability**: Pelvic Bridge and Planks
• **Hip**:
  • STRENGTH OF GLUTEUS MAXIMUS
  • Strength of internal and external rotation
  • Strength of ab/adductors
  • Mobility of hip and hamstring strength-flexibility
• **Knee**: quadriceps
• **Ankle**: calf strengthening and stretching
• **Foot Mobility**: tennis ball foot massage
• **Child’s Pose**: latissimus dorsi stretch
• Multiplanar Movement exercises
Conclusions

• Is it Damage, Dysfunction, or Both: S.T.O.P. and ask the questions

• Look for the Kinetic Chain component of the knee complaints using functional test: Squats
  • Single-Leg Squat
  • Double Leg Squat
  • Split Squat
  • Chair Squat

• The first step of rehabilitation is to improve mobility using osteopathic manipulative treatments (OMT) at the initial visit

• Kinetic Chain-based exercises

• Recheck improvement from OMT through functional tests
Fitness: Mobility  Strength  Endurance  Balance
Coding and Billing

• **Modifier 25**
  • Added to the E/M code when billing to alert the insurance company that an evaluation and a procedure were done on the same day.
  • Also, that the E/M was significant and justified
Procedure and Diagnosis Codes for OMT

**Procedure Codes**
- 98925 (1-2 regions)
- 98926 (3-4 regions)
- 98927 (5-6 regions)
- 98928 (7-8 regions)
- 98929 (9-10 regions)

**Diagnosis Codes**
- Head M99.00
- Cervical M99.01
- Thoracic M99.02
- Lumbar M99.03
- Sacrum M99.04
- Pelvis M99.05
- Lower Extremities M99.06
- Upper Extremities M99.07
- Ribs M99.08
- Abdomen/other M99.09
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Lower Extremity Reference
