Osteopathic Sports Medicine - Knee Pain

Cheryl Hammes, DO & Rob Truax, DO

Associate Professors, OMM

Cleveland Campus

truax@ohio.edu

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**
- *Proximal and distal contributions to lower extremity injuries: a review of the literature*. Chuter V Gait and Posture 36(2012) 7-15.
- *Core Stability and its relationship to lower extremity function and injury*. Willson, J J Am Acad Ortho Surg 2005;13;316-325.
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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:

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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 asstance
- 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
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  - 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.
- **S**welling: immediate or mixed
- **T**rauma or Twisting: immediately preceding pain onset
- **O**nset – immediate pain or gradual
- **P**opping: immediate/one time vs recurrent
- If Positive for STOP: trauma and do instability tests (Lachmans, 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

x

x

x

xx

x

x

x

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

Patella ME

- 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 exercies
- 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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