Cycling Assessment: Saddle Analysis

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ENDURANCE
CYCLING STUDIO + PHYSICAL THERAPY

Disclosures
Nothing to disclose

Objectives
- Cycling as sport/hobby
- What is bike fit & why?
- Process/Flow
- Common Impairments
- Saddle Analysis
  - Pelvic anatomy
  - Pressure mapping
  - Saddle demo
  - Case Report

Cycling
- Recreating
  - 30 million US residents rode a bicycle an average of 6 days a month, for an average of >1 hour on a typical day.
- Transportation/commuting
  - 7.2% of commuters go by bike (PBOT)
  - National avg 0.5%
- Sport: amateur racing, professional racing

Why Bike Fit?
(my journey)
- My own discomfort
- Saddle sores
- Thenar atrophy
- Sold a bike 2 sizes too big
- My own inefficiencies as a rider

Goal of a Bike Fit
- Performance
- Comfort
- Aesthetic
### Type of Fit
- Static v Dynamic fit
- Direct v Indirect
- Software v Clinician decision process
- Tools
  - Gebiomized: pressure maps
  - Dartfish
  - Lazers, Levels, etc

### Process
- Schools
  - Bike fit, LLC
  - Retul/Specialized
  - Trek Precision
- Rider history
- Goals
- Physical assessment
- Bike data
- Addressing impairments
- Follow-Up

### Rider History
- Injury history
- Athletic history
- Experience with the bike
- Type of riding

### Goals
- Bike goals
  - Competition
  - Long rides
  - Commuting
  - Gravel, road, etc
- Efficiency
- Reduce pain
- Weight loss
- Rehab

### Physical Assessment
- Posture
- Muscular asymmetry
- Foot structure
- Pelvic rotation in standing, supine and long sitting
- LLD
- Hamstring flexibility
- Hip flexibility
- Muscular tension
- Motor control (glute or ham)
- Lumbar stability, thoracic mobility

### Gathering Data
- Cleat position, footbed (always check the insole!)
- Motion capture (All sides)
- Saddle pressure mapping
- Direct observation
Motion Capture

- 4 sides
- Sagittal
  - Knee, hip, shoulder, wrist angle
- Frontal
  - Front - handlebar width, LE tracking, upper trap v scapular stability
  - Back - pelvis
- Before/After
- Biofeedback for the Client
  - Angles - knee, hip, ankle, shoulder angle

Saddle Pressure Map

Direct Observation

- Pelvis - rocking, why?
- Muscle firing patterns
- Up v down stroke
- Transverse plane evaluation

Common Impairments

- Hip Pain
- Knee pain
- Low back pain
- Neck pain
- Hand & Foot numbness
- Saddle numbness

Hip Pain

- FAI
  - Rocking of the pelvis/external rotation
  - Quad dominance, plantarflexed
- Fit Modifications:
  - Taller saddle
  - Forward saddle
  - Emphasize power phase/downstroke
  - Shorter crank arms

Knee Pain

- Patellofemoral
- Plantarflexion
- Quadriceps dominant
- Too low/high saddle height
- Fit Modification:
  - Change saddle height, fore/aft
  - Teach glute engagement
### Low Back Pain
- LBP
- Posterior pelvic rotation
- Pelvic rocking
- Quad dominance
- **Fit Modification:**
  - Move saddle to neutral
  - Teach neutral pelvic posture
  - Glute activation

### Neck Pain
- Cervical extension
- Posteriorly rotated pelvis
- Upper trapezius engagement
- Thoracic hypomobility
- **Fit Modification:**
  - Neutral saddle angle
  - Teach neutral spine posture
  - Neutral bar height and reach

### Hand Numbness
- Nerve Compression
- Direct pressure
- Elbows locked
- Too much reach
- C-spine extension
- **Fit Modifications:**
  - Neutral bar height
  - Ergonomic hoods
  - Weight evenly distributed

### Foot Numbness
- Pressure and compression of nerves
- Heavily plantar flexed
- Narrow shoe
- Cleats too far forward
- **Fit Modifications:**
  - Cleats under 3rd met
  - Teach neutral heel with focus on power phase

### Perineal Numbness
- You can ride without numbness!
- Saddles have come a long way
  - Specialized
  - Ergon
  - Bontrager, etc
**Saddle Evolution**

- Convex v Concave
- Old v New
- Cutout/relief channel
- Pressure mapping

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**Pelvic Anatomy**

**THE MOST IMPORTANT CONTACT POINT***

*According to me!

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**Case Report**

- J.R. - World Tour Professional Cyclist
- 1st crash L side
  - L sided cramping, “locked up”
- 2nd crash fx’d hand
- Intense pain with anaerobic efforts, pain in quad and cramping in LE
- Intermittent pain in L LE for the next two years
- PT, massage, muscle activation
- Loss of power “cat 4 numbers on left”

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**Case Report cont’d**

**Objective**

- Standing/supine L ant rot of innominate
- SI Joint discomfort
- Weakness of L glutei in medius/maximus
- Standing L femoral IR/hypertrophied TFL
- Aggressive cycling position
  - 12cm drop hip angle of 55deg
Thoughts?

PT Treatment

- Pelvic symmetry using MET
- Glute med/max activation & strength
- Pedaling efficiency — power phase
- Quad/TFL Release
- Bike Fit Mods
  - Fwd saddle
  - Reduced drop

Outcome

PT Treatment

- Dx: Iliac Artery Endofibrosis
- Surgery: Vein Patch Angioplasty

Getting Started

- Know how to wrench
- Confidence with a patient’s bike is KEY!
- BikeFit, LLC app, Coach’s Eye, Dartfish
- Courses/Continuing Education
  - BikeFit, LLC
  - Trek, Specialized/Retul

References

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Thank you!
Questions?