Cycling Assessment: Saddle Analysis

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OHSU Sports Symposium
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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

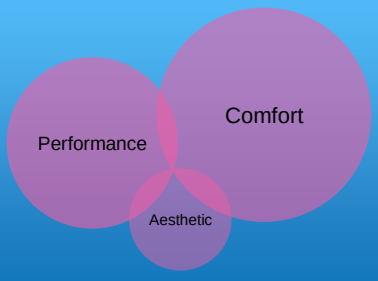
- Recreating
  - 30 million US residents rode a bicycle an average of 6 days a month, for an average of >1 hour on a typical day.
- Transportation/commuting
  - 7.2% of commuters go by bike (PBOT)
  - National avg 0.5%
- Sport: amateur racing, professional racing

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



Type of Fit

- Static v Dynamic fit
- Direct v Indirect
- Software v Clinician decision process
- Tools
  - Gebiomized: pressure maps
  - Dartfish
  - Lazers, Levels, etc
- Schools
  - Bike fit, LLC
  - Retul/Specialized
  - Trek Precision

Process

- 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

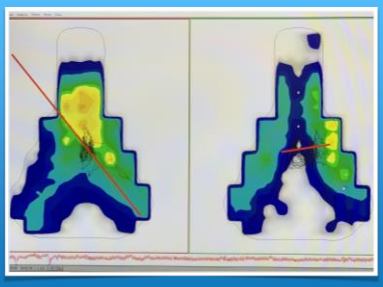
- Cleat position, footbed (always check the insole!)
- Motion capture (All sides)
- Saddle pressure mapping
- Direct observation



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

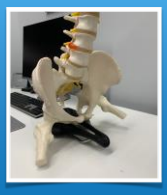
- FAI
  - Rocking of the pelvis/external rotation
  - Quad dominance, plantarflexed
- Fit Modifications:
  - Taller saddle
  - Forward saddle
  - Emphasize power phase/downstroke
  - Shorter crank arms

Knee Pain

- Patellofemoral
  - Plantarflexion
  - Quadriceps dominant
  - Too low/high saddle height
- Fit Modification:
  - Change saddle height, fore/aft
  - Teach glute engagement

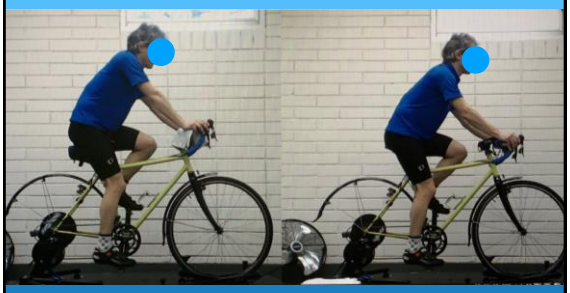
Low Back Pain

- 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

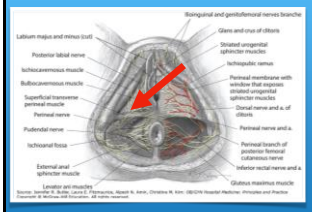


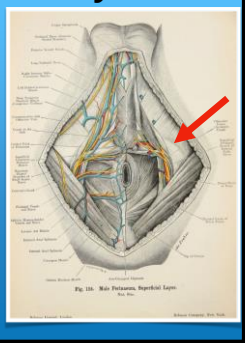
Saddle Evolution

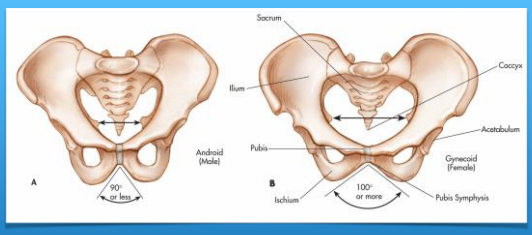
- Convex v Concave
- Old v New
- Cutout/relief channel
- Pressure mapping



Pelvic Anatomy







THE MOST IMPORTANT CONTACT POINT*

Saddle Pressure DEMO

*According to me!

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"

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





https://www.flickr.com/photos/slipstreamsports/8980758701/

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



https://www.velonews.com/2018/06/news/gallery-brown-snags-u-s-pro-mens-road-win_470476
http://www.cyclingnews.com/news/rathe-impresses-with-tour-of-utah-mountains-jersey/

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

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Thank you!
Questions?

