Knee Pain in the Cyclist
See also Knee Injuries

Background
1. General info
   o Overuse injuries occur in cyclists who regularly ride, especially those involved in competition
   o Ensuring that bike fit is correct is major factor in preventing overuse syndromes
   o Approach to mgmt of non-traumatic overuse-related knee pain in cyclists

Pathophysiology
1. Cycling is a repetitive activity of lower extremity
   o Often requires 5000 or more revolutions per hr
2. Incidence/ prevalence
   o Incidence of non-traumatic knee injuries in cyclists range from 22-65%
   o 50% of these cases involved pain located around patella
   o Incidence of non-traumatic knee pain greater in women than men, 37% and 12% respectively
3. Risk factors
   o Poorly fitting bicycle
   o Rapid incr in miles
   o Saddle is too high or too low
   o Saddle is too far forward or back
   o Foot location is:
     ▪ Too far forward or back
     ▪ Too close or too far apart
     ▪ Too toed in or out
   o Cranks are too long or short
   o Cycling in big gears excessively
   o Excess climbing-low pedal cadence places excess torque and strain on knees
   o Fixed or excessively floating pedals
   o High release tension on pedals
4. Morbidity
   o Half of occurrences of cycling related knee pain are classified as "mild"

Diagnostics
1. History
   o Duration
   o Past episodes
   o Aggravating or alleviating factors
   o Location of pain
   o Recent changes in:
     ▪ Training freq
     ▪ Duration
     ▪ Speed or terrain
     ▪ Bicycle fit
     ▪ Saddle position
     ▪ Shoe position
- Cleat position
- Bicycle components

2. Physical exam
   - Comprehensive knee exam
   - Check for leg length discrepancy
   - Evaluate bike fit in riding position

Therapeutics

1. General
   - Relative rest
   - Anti-inflammatory meds
   - Ice
   - Stretches
   - Physical therapy

2. Anterior knee pain-patellar tendinosis, quadriceps tendinosis, patellofemoral syndrome
   - Saddle too low
     - Raise saddle height
     - Multiply pts inseam length in centimeters by 0.883
       - This number represents distance from center of bottom bracket to top of saddle
     - Use a goniometer to create a knee flexion angle of 25-30° when pts foot is at 6 o'clock pedal position
     - Have pt position saddle such that shoed heel just touches pedal when foot is at 6 o'clock pedal position
     - Do not change saddle ht by more than a few millimeters every 5-7 days to allow pts body to adjust
     - Suggest changes or refer to bike fit specialist
   - Saddle too far forward
     - Move saddle back
     - Do not change by more than a few millimeters every 5-7 days to allow pts body to adjust
     - Starting position for saddle fore-aft
       - W/cyclist in saddle and pedal at 3 o'clock position
       - Plumb line dropped from inferior pole of patella intersects pedal axle
     - Sprinters, time trialists, and those riding aerobars (tri athletes) may move saddle forward slightly
     - Many road cyclists and climbing specialists will move saddle slightly behind pedal axle
   - Climbing too much (rpm too low, force per stroke too high)
     - Decr until symptoms improve
     - Use lower gear/higher pedal cadence
   - Excessive use of big gears (rpm too low, force per stroke too high)
     - Use lower gears w/higher pedal cadence
   - Cranks too long
     - Guidelines based on cyclists height
     - Shorter cranks used by sprinters and criterium racers
     - Longer cranks are favored by time-trialists and climbers
• General recommendations, cyclist height (inches): crank arm length (mm)
  • <60 : 160
  • 60-64 : 165-167.5
  • 65-72 : 170
  • 72-74 : 172.5
  • 74-76 : 175
  • >76 : 180-185

3. Medial knee pain
   o Pes anserine tendinosis, pes anserine bursitis, and plica syndrome
   o Cleats positioned to toe out position
     ▪ Modify cleat position to move toe in
     ▪ Consider floating pedals if cyclist using fixed/ no cleats
   o Floating pedals
     ▪ Limit float to 5°
   o Exiting clipless pedals
     ▪ Lower cleat tension

4. Lateral knee pain
   o Most commonly due to Iliotibial Band Syndrome

5. Posterior knee pain
   o Most common hamstring musculature and tendons
   o Saddle too high
     ▪ Lower saddle height
       • Multiply rider's inseam length in centimeters by 0.883
       • This number represents distance from center of bottom bracket to top of saddle
       • Use a goniometer to create a knee flexion angle of 25-30° when cyclist's foot is at 6 o'clock pedal position
       • Have cyclist position saddle such that shoed heel just touches pedal when foot is at 6 o'clock pedal position
       • Do not change saddle ht by more than a few millimeters every 5-7 days to allow rider's body to adjust
       • Suggest changes or refer to bike fit specialist
   o Saddle too far back
     ▪ Move saddle forward
     ▪ Do not change by more than a few millimeters every 5-7 days to allow rider's body to adjust
     ▪ Starting position for saddle fore-aft
       • W/cyclist in saddle and pedal at 3 o'clock position
       • Plumb line dropped from inferior pole of patella intersects pedal axle
       ▪ Sprinters, time trialists, and those riding aerobars (tri athletes) may move saddle forward slightly
       ▪ Many road cyclists and climbing specialists will move saddle slightly behind pedal axle
   o Floating pedals
     ▪ Limit pedal float to 5°
References

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