Nerve Injuries in Cyclists

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Overview

- Nerve Injury 101
  - 3 points of contacts
    - Ulnar neuropathy (handlebar)
    - Pudendal neuropathy (saddle)
      - Erectile dysfunction
    - Foot paresthesias (pedal)

Nerve Injury

- Nerve contains neurons and blood vessels
- Susceptible to compression
- Pressure level
- Duration

Nerve Injury

- Nerve intact but not functional
  - Mildest form of injury
    - Focal demyelination
    - Impaired conduction
      - Paralysis of body part
      - Sensory deficits

Nerve Injury

- Neuropathy: deranged function and structure of peripheral nerves
  - Sensory: touch, pain, temperature
  - Motor: muscle contraction

Mechanism

- Compression (ischemia)*
- Stretch

*Nerve Injury in Cyclists*
Nerve Injury

- Variable rate of recovery
- Amount and duration of compression (ischemia) determine degree of injury
- Remyelination must occur
  - Hours to weeks to months (12 weeks)
  - No ongoing compression

Ulnar Neuropathy

- “Cyclists’ or handlebar palsy”
- Prolonged grip pressure or wrist hyperextension
- *Sensory*: numbness/tingling in ring, little finger
- *Motor*: weakness in hand

Ulnar Neuropathy

- Nerve compression at wrist
- Deep and superficial branches

Ulnar Neuropathy

- Bicycle fit: wrist position
  - Avoid hyperextension
  - Less weight on handlebars
- Padded gloves and handlebar tape
- Change hand position frequently

Median Neuropathy

- Less common
- Carpal Tunnel
**Pudendal Neuropathy**

1. Neurovascular compression
2. Between saddle and pubic symphysis (3)
3. Perineal or genital numbness
4. Women also affected

**Erectile Dysfunction**

- 1997 Bicycling Magazine article
  - >100,000 permanent ED from cycling
  - Irwin Goldstein, MD:
    - "I cannot say that sitting on a bicycle seat causes impotence. I can't claim that long-term compression causes impotency."
    - "There are two kinds of cyclists: Those who are impotent and those who will be."

- Hippocrates (400 B.C.)
  - Scythians north of Black Sea
  - Nomadic horse people
  - ED in wealthy with horses
  - “the constant jolting on their horses unfits them for intercourse”

- Taylor 2004
  - Surveyed 688 cyclists, 18-77 years
  - ED in younger and older cyclists
  - ED prevalence by age group same as gen popn
  - No ↑ prevalence in cyclists
  - No association with cycling variables
  - Only risk factor was age

- Sommer 2001
  - 40 men, measured tpO₂ seated, standing
  - Seated cycling decreased tpO₂ by two-thirds
  - Interviewed 100 male cyclists
  - 61% reported genital numbness, 17% ED
  - No case of ED without genital numbness but + numbness without ED
Erectile Dysfunction

- Schwarzer 2002
  - Wider saddle and absent nose protects penile blood flow

Perineal Pressure

- Affected by width/shape of rear, nose of saddle
- Standing vs upright vs racing position
- ↑ pressure can reduce penile blood flow
- Heavier riders?
- Handlebar pressure, stability, handling?

Erectile Dysfunction

- Perineal pressure affects penile blood flow
- Hypoxemia of penis associated penile fibrosis
- Unclear relationship: numbness ~ ED
- Case reports
- No large scale trials

Link between cycling and ED controversial

Pudendal Neuropathy

- Bike fit
  - Saddle angle
  - Saddle height
- Design of saddle
  - Wider, padded, flexible nose, cutout
- Out of saddle (20-30 sec/10 min)
- Padded shorts
- Short-term cessation (3-10d)

Foot Paresthesias

- Plantar forefoot numb, “hot” or painful
- Interdigital nerves compressed by metatarsal heads
Foot Paresthesias

- Less pedal pressure
- Cleat position
- Pedal platform
- Shoe tightness
- Shoe sole
  - Firmness
  - Worn
- Arch support, metatarsal button

Summary

- Nerve injury affects sensory +/- motor
- Degree of injury: amount, duration
- Nerve must regenerate (up to 12 weeks)
- No ongoing compression
- Check bike fit first (saddle height, position)
- Equipment changes
- Controversial link between ED ~ cycling

References

- Schwarzer U et al. Cycling and Penile Oxygen Pressure: the type of Saddle Matters. Europ Urol 2002; 41:139-143

Questions?