Ulnar Nerve and Median Nerve Neuropathy in the Cyclist

See also Ulnar neuropathy
See also Median nerve compression
See also Peripheral neuropathy

Background
1. General info
   - Overuse injuries occur in cyclists who regularly ride, especially those involved in competition
   - Ensuring that bike fit is correct is major factor in preventing overuse syndromes
2. Definitions
   - Ulnar neuropathy
     - Compression of ulnar nerve at wrist "handlebar palsy"
   - Median neuropathy
     - Compression of median nerve in carpal tunnel

Pathophysiology
1. Pathology of dz
   - Ulnar neuropathy
     - Compression of ulnar nerve at Guyon's canal in wrist
     - Motor/sensory symptoms or both
   - Median neuropathy
     - Compression of median nerve at carpal tunnel from
       - Direct pressure on handlebars and/or stretch of median nerve d/t hand and wrist extension
       - Paresthesias and/or motor function deficit
2. Incidence/prevalence
   - Actual incidence unknown
   - Study of 25 cyclists
     - 23 cyclists reported subjective motor and/or sensory symptoms after extended cycling tour
3. Risk factors
   - Mountain bikers have more symptoms than road bikers
   - Forward position on bike causing extra wt distribution on hands
     - Predisposing fit issues
       - Handlebars too low
       - Saddle too far forward
       - Saddle tilted down
       - Handlebar stem too long
   - Extended time cycling
   - Rough terrain producing trauma and/or vibration
4. Morbidity/mortality
   - Long term morbidity can be reduced and prevented in most cases by
     - Early recognition and prevention of further compression
**Diagnostics**

1. **History**
   - Ulnar neuropathy (at hand and wrist)
     - Sensory symptoms in fifth digit and medial half of fourth digit
       - Paresthesias
       - Hypoesthesia
       - Hyperesthesia
     - Aching or lancinating pain in medial and proximal forearm
     - Clumsiness or weakness of hand
     - Motor symptoms
       - Loss of thumb adduction strength
       - Abduction/adduction of digits
   - Median neuropathy
     - Sensory symptoms of thumb, index, middle, and ring fingers
       - Paresthesias
       - Hypoesthesia
       - Hyperesthesia
     - Pain may radiate proximally into forearm, upper arm, shoulder
     - Complaints of
       - Clumsiness
       - Weakness
       - Inability to open jars or twist off lids
     - Weakness of pincer strength

2. **Physical exam**
   - Ulnar nerve
     - Motor function
       - Interosseous functional testing
         - Finger abduction and adduction strength
     - Adductor pollicis testing
       - Thumb abduction
       - Froment sign: ask pt to pinch piece of paper between thumb and index finger tips
         - Adductor pollicis weakness presents w/flexion of thumb IP joint
     - Sensory function
       - In ulnar nerve distribution (palmar and dorsal surfaces of 5th digit and medial half of fourth digit); test
         - Soft, sharp, and two-point discrimination
         - Assess distal 5th digit to minimize overlap w/median nerve
     - Hypothenar wasting-late effect
     - Palpation and compression at Guyon's canal may reproduce symptoms
     - Palpate for bony or soft tissue abnormalities
   - Median nerve
     - Motor function
       - Asses thumb opposition strength
     - Sensory function
       - In median nerve distribution (thumb, index, middle, and lateral ½ ring finger); test
         - Soft, sharp, and two-point discrimination
- Phalen test
- Tinel test
- Compression and palpation at carpal tunnel may reproduce symptoms
  - Palpate for bony or soft tissue abnormalities

3. Diagnostic testing
   - EMG/NCS studies can confirm dx
     - Helps differentiate compressive neuropathy in wrist/hand from more proximal or central process

Differential Diagnosis
1. Cervical radiculopathy
2. Acute brachial neuritis
3. Anginal pain
   - Especially if left sided or in ulnar distribution
4. Proximal nerve entrapment
   - Ulnar nerve: forearm, cubital tunnel, arcade of struthers
   - Median nerve: forearm or proximal arm
5. Ulnar artery aneurysm or thrombosis

Therapeutics
1. Must relieve pressure on nerve
   - Well-padded gloves
   - Avoid riding routes w/high vibration
   - Decr riding time
   - Extra handlebar tape to incr handlebar thickness and cushioning
   - Raise handlebar stem
   - Verify that saddle is not too far forward
   - Verify that saddle nose is not tilted down
   - Road-type handlebars
     - Use alternative hand positions
     - Change hand position freq during rides
     - Avoid hand positions that place pressure or stretch on offended nerve
   - Flat-bar handlebar (mountain bikes) must decr compression
     - Discontinue riding
     - Change handlebar type
     - Install one of the newer handlebar grips w/an "anatomic" design
   - Consider recumbent bicycle-seated or supine position decr pressure on nerve
2. Consider
   - Splinting
   - NSAIDs
   - Oral steroids
   - Steroid injections
   - Surgery in recalcitrant cases

Follow-Up
1. Return to office
   - Long-term disability can occur
   - Follow-up recommended to assure resolution of pts symptoms
     - Use self-report of symptom improvement or worsening
- Examine for evidence of muscular atrophy
- Perform sensory testing
- Assess hand motor function at each visit
  - May need more aggressive tx with:
    - Progressive symptoms
    - Progressive PE deterioration
    - Non-improvement
    - Intrinsic hand muscle atrophy

2. Refer to specialist
  - Persistent or worsening symptoms not responding to 4-6 wks of
    - Activity modification
    - Splinting
    - NSAIDs
    - Injections
  - Refer to surgeon experienced in nerve release for ulnar and median compressive neuropathies
  - Intrinsic muscle atrophy
    - Prompt referral to surgeon
    - Pts with 2° intrinsic muscle atrophy may not regain full strength and function

Prevention/Screening
1. Padded cycling gloves
2. Proper bicycle fit
3. Freq changes in hand position while riding

References

Evidence-Based Inquiry
1. Does surgery improve outcomes in patients with carpal tunnel syndrome?
2. What is the best diagnostic approach to paresthesias of the hand?

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