**The Stiff Hand: Boutonniere & Swan Neck**

Sylvia Dávila, PT, CHT
San Antonio, Texas

---

**Boutonniere Deformity**

- Disruption or lengthening of central slip
- Lateral bands slip volar to PIP axis of motion & act as flexors

**Extensor Mechanism**

- Central slip inserts into base of the middle phalanx
- Lateral bands lie dorsal to the PIP joint center of rotation
- Lateral bands secured palmarly by the transverse retinacular ligaments & dorsally by the triangular ligament

---

This presentation is the intellectual property of the author. Contact them for permission to reprint and/or distribute.
Pathomechanics of Boutonniere Deformity

- Disruption of central slip
- Lateral bands migrate palmar to axis of rotation of PIP due to attenuation of triangular ligament
- Overpull through the lateral bands due to volar position
- Exaggerated extension pull of DIP & flexion of PIP

Elson’s Test

- Flex PIP to 90 degrees over edge of table
- Patient attempts to extend PIP
- (A) With an intact central slip there is good extensor tone at the PIP & little extensor force at DIP

Elson’s Test

- (B) With central slip disruption there is decreased extensor force at PIP & prominent extensor tone at DIP
- Lateral bands are palmar to axis of rotation
Pseudo-Boutonniere

- Caused by a hyperextension injury of the PIP resulting in a flexion contracture without injury to the central slip
- Lateral band migrate & tighten & stretch central slip
- Over time decreased PIP extension

Boutonniere Injury Management

- Acute or chronic with a full passive flexible PIP
- Splint PIP joint in full extension full time 6-8 weeks
- Nighttime splinting for another 6 weeks

Pseudo-Boutonniere

- No disruption of extensor mechanism
- Elson's Test: good extension force at PIP & little force at DIP
- PIP flexion contracture with flexible DIP
- No contracture of ORL

Boutonniere Injury Management

- Acute or chronic with a full passive flexible PIP
- Splint PIP joint in full extension full time 6-8 weeks
- Nighttime splinting for another 6 weeks
**Boutonniere Injury Management**

**Modified Stack Splint**
- Tight enough to limit PIP flexion & not constrict
- Cut splint at the distal end & trim sharp edge
- Pass splint over DIP on to the PIP
- Secure splint with tape

**Boutonniere Deformity**

**PIP Flexion Contracture**
- Correct PIP contracture before initiating full time PIP extension splinting
- Dynamic orthosis
- Static progressive orthosis

**Boutonniere Injury Management**

**PIP Flexion Contracture**
- Correct PIP contracture before initiating full time PIP extension splinting
- Serial casting

**Active DIP flexion exercise during full-time extension of PIP**
- Pulls lateral bands dorsal to PIP
- Promoting gliding of lateral bands
- Stretches transverse retinacular ligaments
- Stretches oblique retinacular ligaments preventing hyperextension of DIP

This presentation is the intellectual property of the author. Contact them for permission to reprint and/or distribute.
Boutonniere Deformity PIP Corrective Orthoses

- Dynamic PIP extension
- Static progressive extension

Boutonniere Deformity PIP Corrective Orthoses

- Wirefoam orthosis
- Best for more supple contractures < 35°

Boutonniere Deformity PIP Corrective Orthoses

- Joint Jack
- Best for more unyielding contractures < 35°

Boutonniere Deformity PIP Corrective Orthoses

- Contractures ≥ 35° best treated with custom fabricated orthosis
- Amount of force & angle more precise

This presentation is the intellectual property of the author. Contact them for permission to reprint and/or distribute.
Boutonniere Deformity
PIP Corrective Orthoses
- Serial casting
- Static progressive orthosis

Boutonniere Deformity
AROM

PIP Injury
Rehabilitation
- Active & passive DIP flexion with PIP extended to stretch ORL
- Blocking exercise to maximize DIP capsular motion & glide of extensor & flexor tendons

Boutonniere Deformity
AROM
- Adduction with IP extension
- Intrinsic muscle recruitment to direct extension force at PIP
Boutonniere Deformity
AROM & PIP Corrective Orthoses
- Active motion to redirect extension force at PIP
- Blocking exercise
- Relative motion orthosis

Swan Neck
Pathomechanics of Deformity
- Metacarpal flexion
- Hyperextension of the PIP joint
- Flexion of the DIP joint

Boutonniere Deformity
PIP Corrective Orthoses
- Relative motion orthosis to redirect extension force at PIP

Swan Neck
Pathomechanics of Deformity
- Inability to overcome hyperextension of the PIP joint
- Unable to initiate finger flexion
Swan Neck Pathomechanics of Deformity

- RA
- Untreated mallet deformity
- Volar plate laxity
- Spasticity
- Ligamentous laxity
- Malunion middle phalanx fracture

Swan Neck Pathomechanics of Deformity

- Deformity may be caused by injury at DIP, PIP or MCP
- DIP: mallet injury can lead to swan neck
- Terminal extensor tendon is over stretched or ruptures
- Strong extensor force at PIP causing hyperextension

Swan Neck Pathomechanics of Deformity

- Volar subluxation of proximal phalanx - central slip tightens causing PIP hyperextension
- Rupture of terminal extensor tendon
- Rupture FDS tendon creating flexor/extensor balance disruption

Swan Neck Pathomechanics of Deformity

- PIP: Volar plate injury
- Hyperextension of PIP due to lateral band displacement
- Minimal pull on terminal extensor tendon
- DIP flexes
Swan Neck Pathomechanics of Deformity

- FDS rupture or lengthened allowing PIP hyperextension
- Intrinsic muscle tightness develops
- Lateral bands snap over condyles of proximal phalanx with active flexion

Swan Neck Deformity Therapy Guidelines

- Address the mechanism of deformity
- Corrective orthosis
  - to shorten elongated structures
  - or stretch shortened structures and prevent deformity

Swan Neck Pathomechanics of Deformity

- MCP volar subluxation & UD seen in RA
- Intrinsic muscle tightness
- PIP hyperextension

Swan Neck Deformity Therapy Guidelines

- Address the mechanism of deformity
- Corrective orthosis
  - to shorten elongated structures
  - or stretch shortened structures and prevent deformity

This presentation is the intellectual property of the author. Contact them for permission to reprint and/or distribute.
Swan Neck Deformity Therapy Guidelines

- Address the mechanism of deformity
- Corrective orthosis
  - to shorten elongated structures
  - or stretch shortened structures and prevent deformity

Swan Neck Deformity Therapy Guidelines

- Stretch contractured ligament, tendon, or muscle
- Interosseous muscle passive stretch
- Lumbrical muscle active stretch

The Stiff Hand: Boutonniere & Swan Neck

Sylvia Dávila, PT, CHT
San Antonio, Texas