CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

EVIDENCE SUMMARY

Boutonnière Deformity

Overview

- Differentiating a true boutonniere deformity from a pseudoboutonniere injury is critical in determining clinical management [2].
- An understanding of the anatomy, clinical presentation, treatment options, and expected outcomes is crucial for optimal treatment of posttraumatic boutonniere and swan neck deformities [4].
- The natural history of the boutonnière deformity in rheumatoid arthritis is outlined, and a simple method of repair is described [3].
- The prevalence of boutonnière deformity without rheumatoid arthritis or trauma is approximately 13% [5].
- One to two grades of ROM improvement can be achieved with nonoperative treatment, although deformity can persist even after dedicated conservative management [8].
- Similar results occurred for chronic boutonniere deformity using serial casting for adequate extension followed by 3 months of RMF orthotic use, which should be attempted prior to surgical intervention [1].
- Long-term results following soft tissue reconstruction for boutonniere deformity in rheumatoid arthritis are unreliable, and recurrent or persistent deformity is best treated with a salvage procedure [9].
- A successful operative result for swan-neck and boutonniere deformities in the rheumatoid hand depends on complete preoperative examination, correct staging of the deformity, and proper timing of treatment [10].
- The Y-shaped tendon graft can be a useful procedure for the correction of chronic boutonniere deformity, providing good or excellent results in 16 of 18 patients in one series [6].
- Detachment of up to two-thirds of the phalangeal length was effective in reducing extensor lag of the DIP joint and did not cause any boutonniere deformity in a cadaveric model of fractional Fowler tenotomy for chronic mallet finger [7].

Anatomy & Pathophysiology

- Boutonnière deformity can persist even after dedicated conservative management [8].

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- One to two grades of range of motion improvement can be achieved with nonoperative treatment of Boutonnière deformity [8].
- Accurate diagnosis and treatment of finger metacarpophalangeal joint injuries begins with an understanding of all potential diagnoses [15].
- Hand surgery and hand therapy practice interventions, including use of relative motion flexion orthoses for management of non-surgical and surgical extensor mechanism injuries, may benefit from an in-depth look at extensor mechanism zone III and IV anatomy and biomechanics [19].
- The most important factor in the development of finger deformities is the changes occurring in the tendons and related structures, especially in early stages [21].
- Reconstruction of the extensor central slip using a distally based flexor digitorum superficialis slip provides a robust repair that anatomically mimics the extensor central slip while maintaining the function of the donor FDS tendon [24].
- The main goals of any treatment of a proximal interphalangeal joint complication are maintaining concentric reduction of the joint, restoring joint stability, and facilitating early range-of-motion exercises [33].

Classification

- Differentiating a true boutonniere deformity from a pseudoboutonniere injury is critical in determining clinical management [2].
- The natural history of the boutonnière deformity in rheumatoid arthritis is outlined [3].
- The prevalence of boutonnière deformity without rheumatoid arthritis or trauma is approximately 13% [5].
- A modified Terrono classification for Type 1 thumb deformity in rheumatoid arthritis could detect advanced deformity earlier and was more strongly correlated with hand function [17].

Clinical Presentation

- Differentiating a true boutonniere deformity from a pseudoboutonniere injury is critical in determining clinical management [2].
- An understanding of the clinical presentation is crucial for optimal treatment of posttraumatic boutonnière and swan neck deformities [4].
- Accurate diagnosis of finger metacarpophalangeal joint injuries begins with an understanding of all potential diagnoses [15].
- The natural history of the boutonnière deformity in rheumatoid arthritis is outlined in historical literature [3].
- The prevalence of boutonnière deformity without rheumatoid arthritis or trauma is approximately 13% [5].
- The swan neck deformity can progress significantly with time due to increasing distal interphalangeal joint flexion contracture [14].

Investigations

- Differentiating a true boutonniere deformity from a pseudoboutonniere injury is critical in determining clinical management [2].
- An understanding of the anatomy, clinical presentation, treatment options, and expected outcomes is crucial for optimal treatment of posttraumatic boutonnière and swan neck deformities [4].
- Accurate diagnosis and treatment of finger metacarpophalangeal joint injuries begins with an understanding of all potential diagnoses [15].
- It is necessary to determine the true etiology before surgical intervention [12].
- A successful operative result depends on complete preoperative examination, correct staging of the deformity, and proper timing of treatment [10].
- Cortical breaks were commonly visualized in MCP and PIP joints with HR-pQCT and microCT [37].

Treatment

- Serial casting for adequate extension followed by 3 months of relative motion flexion (RMF) orthotic use should be attempted prior to surgical intervention for chronic boutonniere deformity [1].
- Differentiating a true boutonniere deformity from a pseudoboutonniere injury is critical in determining clinical management [2].
- A simple method of repair is described for the boutonnière deformity in rheumatoid arthritis [3].
- Understanding the anatomy, clinical presentation, treatment options, and expected outcomes is crucial for optimal treatment of posttraumatic boutonnière and swan neck deformities [4].
- The prevalence of boutonnière deformity without rheumatoid arthritis or trauma is approximately 13% [5].
- The Y-shaped tendon graft is a useful procedure for the correction of chronic boutonniere deformity, providing good or excellent results in 16 of 18 patients in a reported series [6].
- Detachment of up to two-thirds of the phalangeal length is effective in reducing extensor lag of the DIP joint and does not cause any boutonniere deformity in a cadaveric model [7].
- One to two grades of ROM improvement can be achieved with nonoperative treatment, although deformity can persist even after dedicated conservative management [8].
- Long-term results following soft tissue reconstruction for boutonniere deformity in rheumatoid arthritis are unreliable, and recurrent or persistent deformity is best treated with a salvage procedure [9].
- A successful operative result for swan-neck and boutonniere deformities in the rheumatoid hand depends on complete preoperative examination, correct staging of the deformity, and proper timing of treatment [10].
- Metacarpophalangeal joint arthroplasty improves function and deformity and achieves nearly uniform patient satisfaction in rheumatoid arthritis [11].

- One technique does not treat all finger deformities uniformly, highlighting the need to determine the true etiology before surgical intervention [12].
- The use of relative motion flexion orthoses (RMFO) is effective in increasing active distal interphalangeal joint flexion and improving PIP extension in patients with Burton stage 1 chronic boutonniere deformity [13].

Complications

- Differentiating a true boutonniere deformity from a pseudoboutonniere injury is critical in determining clinical management [2].
- The prevalence of boutonniere deformity without rheumatoid arthritis or trauma is approximately 13% [5].
- Detachment of up to two-thirds of the phalangeal length was effective in reducing extensor lag of the DIP joint and did not cause any boutonniere deformity in a cadaveric model [7].
- Long-term results following soft tissue reconstruction for boutonniere finger deformity in rheumatoid arthritis are unreliable [9].
- Recurrent or persistent deformity is best treated with a salvage procedure [9].
- A successful operative result depends on complete preoperative examination, correct staging of the deformity, and proper timing of treatment [10].
- One technique does not treat all deformities uniformly, highlighting the need to determine the true etiology before surgical intervention [12].
- Swan neck deformity can progress significantly with time due to increasing DIPJ flexion contracture [14].

Recovery

- Serial casting for adequate extension followed by 3 months of relative motion flexion (RMF) orthotic use yields similar results for chronic boutonniere deformity and should be attempted prior to surgical intervention [1].
- One to two grades of range of motion (ROM) improvement can be achieved with nonoperative treatment, although deformity can persist even after dedicated conservative management [8].
- The Y-shaped tendon graft is a useful procedure for the correction of chronic boutonniere deformity, providing good or excellent results in 16 of 18 patients in a reported series [6].
- The use of relative motion flexion orthoses (RMFO) is effective in increasing active distal interphalangeal joint flexion and improving proximal interphalangeal (PIP) extension in patients with Burton stage 1 chronic boutonniere deformity [13].
- Long-term results following soft tissue reconstruction for boutonniere deformity in rheumatoid arthritis are unreliable, and recurrent or persistent deformity is best treated with a salvage procedure [9].
- A successful operative result for boutonniere deformity depends on complete preoperative examination, correct staging of the deformity, and proper timing of treatment [10].

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Key Evidence

- [L4] Similar results occurred for chronic boutonniere deformity using serial casting for adequate extension followed by 3 months of RMF orthotic use, which should be attempted prior to surgical intervention. [1] (10.1016/j.jht.2023.02.005)
- [L5] Differentiating a true boutonniere deformity from a pseudoboutonniere injury is critical in determining clinical management. [2] (10.1016/j.jhsa.2022.10.019)
- [L4] The natural history of the boutonnière deformity in rheumatoid arthritis is outlined, and a simple method of repair is described. [3] (10.2106/00004623-196951070-00009)
- [L5] An understanding of the anatomy, clinical presentation, treatment options, and expected outcomes is crucial for optimal treatment of posttraumatic boutonnière and swan neck deformities. [4] (10.5435/jaaos-d-14-00272)
- [L3] The prevalence of boutonnière deformity without rheumatoid arthritis or trauma is approximately 13%. [5] (10.1177/1753193417704610)
- [L4] The Y-shaped tendon graft can be a useful procedure for the correction of chronic boutonniere deformity; in our patient series, this provided good or excellent results in 16 of 18 patients. [6] (10.1016/j.jhsa.2021.01.003)
- [L5] Detachment of up to two-thirds of the phalangeal length was effective in reducing extensor lag of the DIP joint and did not cause any boutonniere deformity in this cadaveric model. [7] (10.1016/j.jhsa.2012.07.039)
- [L3] One to two grades of ROM improvement can be achieved, although deformity can persist even after dedicated conservative management. [8] (10.1016/j.jht.2025.02.013)
- [L5] Long-term results following soft tissue reconstruction are unreliable, and recurrent or persistent deformity is best treated with a salvage procedure. [9] (10.1016/j.jhsa.2011.05.029)
- [L5] A successful operative result depends on complete preoperative examination, correct staging of the deformity, and proper timing of treatment. [10] (10.5435/00124635-199903000-00002)
- [L5] Follow-up studies show that this surgery improves function and deformity and achieves nearly uniform patient satisfaction. [11] (10.5435/00124635-200305000-00005)
- [L5] It emphasizes that one technique does not treat all deformities uniformly and highlights the need to determine the true etiology before surgical intervention. [12] (10.1016/j.jhsa.2022.07.008)
- [L4] The use of RMFO is effective in increasing active distal interphalangeal joint flexion and improving PIP extension in patients with Burton stage 1 chronic boutonniere deformity. [13] (10.1016/j.jhsa.2022.08.007)
- [L5] The swan neck deformity in this individual progressed significantly with time because of increasing DIPJ flexion contracture. [14] (10.1016/j.jht.2009.11.005)
- [L5] Accurate diagnosis and treatment of finger metacarpophalangeal joint injuries in athletes begins with an understanding of all potential diagnoses, allowing for safe and early return to play. [15] (10.5435/jaaos-d-21-01031)

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- [L3] The modified classification could detect advanced deformity earlier and was more strongly correlated with hand function. [17] (10.1177/1753193419886719)
- [L5] Hand surgery and hand therapy practice interventions, including use of RMF orthoses for management of non-surgical and surgical EM injuries may benefit from an in-depth look at the EM zone III and IV anatomy and biomechanics. [19] (10.1016/j.jht.2023.01.002)
- [L4] The most important factor in the development of finger deformities is the changes occurring in the tendons and related structures, especially in early stages. [21] (10.2106/00004623-195739030-00006)
- [L4] The modified technique provides a robust repair that anatomically mimics the extensor central slip yet maintains the function of the donor FDS tendon. [24] (10.1016/j.jhsa.2009.01.025)
- [L5] The main goals of any treatment of a PIP joint complication are maintaining concentric reduction of the joint, restoring joint stability, and facilitating early range-of-motion exercises. [33] (10.1016/j.hcl.2017.12.014)
- [L4] Cortical breaks were commonly visualized in MCP and PIP joints with HR-pQCT and microCT. [37] (10.1186/s12891-016-1148-y)

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