

Boutonniere Deformity Depicted in a Koguryo Tomb Mural of the Anak Area of North Korea

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Some finger deformities have been observed and discussed in Renaissance paintings. “Praying Hands” by Albrecht Durer is regarded as a good example of medical and artistic interpretation. In portraits from Asian countries, hands are rarely a topic of detailed focus. They are often hidden under the clothes, and are sometimes artistically inferior to other features of the paintings.

In a mural from ancient Korea, I observed a finger deformity in a hand holding a fan. The owner of the tomb is holding a fan with his right hand. The metacarpophalangeal joint and proximal interphalangeal (PIP) joint of his little finger are fully flexed, but the distal interphalangeal (DIP) joint is hyperextended (Fig. 1). Normally, holding a fan handle induces flexion in the DIP joint of the little finger. A feature of boutonniere deformity is that the finger is flexed at the PIP joint, with hyperextension at the DIP joint.

Injury to the extensor tendon is the chief etiology for this flexion deformity of the PIP joint. The extensor tendon is disrupted, and the lateral aspects of the tendon separate. The head of the proximal phalanx subsequently projects through the disrupted tendon elements. This deformity presumably obtained its name due to the similarity of its appearance to a buttonhole in surgical exploration.¹ The goal of treatment is to regain the full range of motion of the affected finger. Treatment options include both surgical and nonsurgical modalities.

Classically, splinting is a nonsurgical treatment and involves immobilizing the affected joint to allow for PIP flexion (straightening) to occur. This also allows the tendon to heal and not continue to separate in the volar direction. Splints are usually maintained for 3–6 weeks, depending on the patient’s age and the severity of the injury.²

Recently, boutonniere deformity has been able to be well corrected with relative motion flexion splint/orthosis. The splint keeps the metacarpophalangeal joint flexed,

and the flexion loosens the intrinsic lateral band tightness and allows the bands to migrate dorsally. The lateral slips of the long extensors get tight with metacarpophalangeal flexion. They pull the lateral bands dorsally in metacarpophalangeal flexion.³

If nonsurgical measures are unsuccessful, surgical joint replacement has been used. Joint fusion is another surgical procedure that involves fusing the two joint surfaces of the affected digit.² Recently, central slip has been reconstructed with a modified Snow technique under wide-awake local anesthesia no tourniquet. This technique is encouraged for neglected central slip injuries in which primary repair is impossible. Surgery under wide-awake local anesthesia no tourniquet enables the hand surgeon to check the stability of the repair, and early active motion with relative motion flexion splint/orthosis can be started.⁴

In Japan, which is adjacent to Korea, the prevalence of boutonniere deformity without rheumatoid arthritis or trauma was 13%, and the deformity was associated with advanced age and a narrow EPB tendon.⁵ Anak No. 3 is a Koguryo tomb located in Anak County, Hwanghae Province, North Korea. It is part of the Koguryo tombs and is estimated to have been produced in AD 357. It was first discovered in 1949, after valuable treasures had been stolen. The murals remained in good condition, and the men and women in the murals were depicted in antique clothes. At the entrance of the burial mound, there is a text about the general Dong Shou, comprising seven lines and 68 characters. It is a national treasure of North Korea (no. 67).

It is not certain whether this deformity is a true deformity from injury or a representation of a stylistic approach from that era (fourth century AD). However, it is interesting that the mural portrait depicted the finger deformity.

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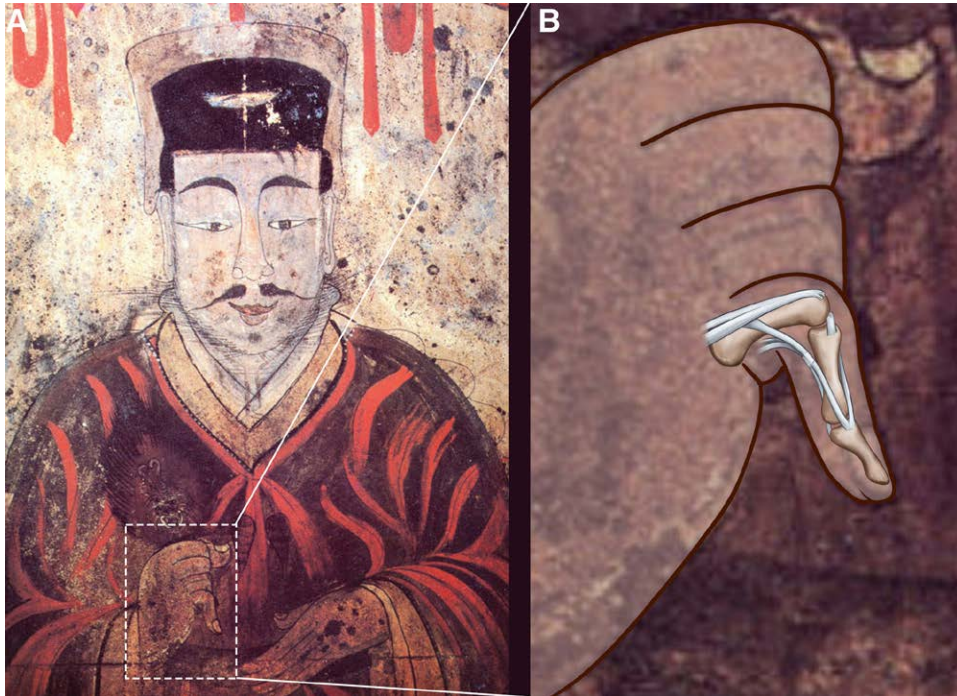


Fig. 1. A portrait of the owner of Anak Tomb No. 3, the 67th national treasure of North Korea. A, Portrait. B, Enlargement of the right hand with schema of the boutonniere deformity. Illustration by Hye Won Hu, MA.

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REFERENCES

1. Grau L, Baydoun H, Chen K, et al. Biomechanics of the acute boutonniere deformity. *J Hand Surg Am.* 2018;43:80.e1–80.e6.
2. McCue FC, Honner R, Johnson MC, et al. Athletic injuries of the proximal interphalangeal joint requiring surgical treatment. *J Bone Joint Surg Am.* 1970;52:937–956.
3. Merritt WH, Wong AL, Lalonde DH. Recent developments are changing extensor tendon management. *Plast Reconstr Surg.* 2020;145:617e–628e.
4. Bas CE, Ayhan E, Kunu O, et al. Successful boutonniere reconstruction with wide-awake local anesthesia no tourniquet. *J Hand Surg Glob Online.* 2022;4:421–425.
5. Hara T, Yoneda H, Kurimoto S, et al. Thumb boutonniere deformity without rheumatoid arthritis or trauma. *J Hand Surg Eur Vol.* 2018;43:324–330.