CASE REPORT

Dynamic claw toes deformity after lower leg fractures: A three case study

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Introduction

Acquired dynamic claw toes deformity after tibia fracture was first reported by Clawson. The deformity may be due to either flexion contracture of the muscles of the deep posterior compartment or foot compartment after overt or subclinical compartment syndrome. Another possibility is the muscle bellies of the flexor tendon could have been injured or trapped at the site of the fracture or scarred after a local haematoma. The “fixed length phenomenon” of the long toe flexors, is also described as ‘checkrein’ deformity. Triggering of the big toe secondary to tethering of the flexor hallucis longus tendon (FHL) in the proximal sheath and entrapment in calcaneus, tibia and fibular fracture fragments has been reported.

We present three cases of dynamic claw toes deformity after fractures of the lower leg, and discuss the aetiology, clinical findings, anatomical characteristics, possible operative procedure and methods to prevent such a deformity.

Case reports

Case 1

A 29-year-old female involved in a traffic accident sustained an open fracture of the left distal fibula, Gustilo type II. An open reduction and internal fixation with an eight-hole reconstruction plate was performed. The patient visited our OPD and complained of increasing pain on the tip of the left big toe and second toe whilst walking 10 months after the operation. The physical examination demonstrated a prominent rigid clawing deformity at the interphalangeal joint (IPJ) and metatarso-phalangeal joint (MPJ) of the left big and second toes when the ankle was dorsiflexed. The toes became fully flexible and corrected themselves when the ankle was plantar-flexed (Fig. 1a and b). Motion was normal on the other toes of the left foot.

A longitudinal incision over the medial retromalleolar space was made and the flexor hallucis longus tendon (FHL) and flexor digitorium longus tendon (FDL) were identified. Traction of the FHL tendon at this site resulted in dynamic claw toes deformity of the left big toe and second toe when the ankle was dorsiflexed. We traced the FHL to its musclotendinous junction and found it was trapped to the united fibular fracture site. After the FHL was released, the IPJ of the left big toe and second toe were easily...
moved to full extension even when the ankle joint was dorsiflexed to 90° (Fig. 2).

Case 2

A 22-year-old man suffered a motorcycle accident, which resulted in the open fracture of the left femur and a closed tibial fracture. An open reduction with plating for the left femoral fracture and an interlocking nail for the left tibial fracture were performed simultaneously. A follow up physical examination demonstrated a prominent rigid clawing deformity on the second—fifth toes. A medial retromalleolar approach was made and a Z-plasty lengthening of the FDL was performed.

Case 3

A 25-year-old male, sustained a right distal tibia and fibular open fracture two years previously. The follow up physical examination showed dynamic claw toes in all five toes.

Discussion

The clawed deformity of the toes may be a complication of deep compartment syndrome in either the posterior compartment or foot compartment of the lower leg, usually seen in association with other deformities of the foot. A possible alternative explanation could be that the deformity was caused by either tethering or scarring of the muscle at the site of the fracture. Jahss noted that clawed deformity of the hallux can be seen after ankle and distal tibia fractures, due to tethering of the FHL tendon under or just proximal to the flexor retinaculum (checkrein deformity). Dynamic claw toes deformity after open reduction for lower leg fracture has been documented infrequently in medical literature.

When considering dynamic claw toes deformity with the importance of movement and the need for shoes, surgical treatment was considered the treatment of choice. All of our patients showed improvement after operation. Releasing adhesion of the FHL or FDL in the fracture site can improve the deformity but needs a large exposure site. Z-plasty lengthening of the FHL or FDL through the medial retromalleolar approach is the simplest route to correcting the deformity. According to the variant anatomy of the long flexors to the toes that has been documented by Jahss, there is a tendinous interconnection between the FHL and FDL. The FHL...
seems constant in providing extension to the second
toe, while interdigital extension to the third, fourth
and fifth toes vary in frequency. These connections
therefore determine which tendon should be length-
ened first. Feeney et al. suggests that the FHL must
be released first when the claw deformity is present
in the first and second toe. Conversely, when the
clawing predominantly involves the smaller toes,
the FDL should be released first. The surgeon should
then reassess the deformity and concomitant
lengthening of both tendons should be considered
if the dynamic claw toes can not be fully corrected.

To avoid the tethering and flexion contracture of
the flexor tendons, the surgeon must ensure that the
muscle bellies of the tendons are not trapped within
the fracture site during operation. Early passive
stretching exercises of the toes to full extension
with the ankle joint in a dorsiflexion position is
crucial to preventing these deformities in addition
to passive dorsiflexion of the ankle joint after opera-
tion.

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