Update in Charcot Arthropathy Reconstruction Utilizing the Ilizarov Method with Combined Internal Fixation

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Case Study

A retrospective chart and radiographic review of 109 cases was performed. Each case had an Ilizarov circular external fixator applied. Circular external fixation with or without internal fixation were used in each case depending on the severity and location of the Charcot joint collapse.

Results

In our combined results we had a total of 109 cases. Of that 109, eighty-six were male and thirty-three were female. 51 patients have type 1 Diabetes mellitus and 78 of the patients have type 2 Diabetes mellitus. The average follow-up was 47.9 months (range: 12 month - 60 months). Thirty-seven had ulceration at the time of surgery with surgical primary closure of the wound. Eighteen required a below the knee amputation. Fifty-six required an additional visit at the operating room for frame adjustments. Nine had recurrence with additional fracture and dislocation. Eleven had Charcot only at the ankle joint. Eighty had Charcot at the ankle, subtalar and midtarsal joints. Eighteen had Charcot only at the ankle joint.

Analysis & Discussion

The goal for reconstructive Charcot surgery is to achieve and maintain a plantigrade orientation foot to avoid development of ulceration, infection, and amputation. Many options are available for the surgical treatment of Charcot fracture dislocation including circular external fixation with or without internal fixation. Reconstruction utilizing external fixation and in combination with internal fixation based on Charcot level of joint involvement represents a promising alternative to amputation, allowing for decreased patient morbidity.

Literature Review

Controversy exists in the literature regarding surgical intervention on Charcot arthropathy foot and ankle deformities. Most authors advocate intervention in the coalescent or consolidative stages, but early arthrodesis and open reduction and internal/external fixation during the developmental stage have been reported. In order to restore a stable plantigrade foot that is amenable to functional ambulation and not prone to future skin breakdown reconstructive surgery of the Charcot foot will need to be undertaken. This typically entails stabilization and/or arthrodesis of multiple collapsed joints. This can be performed in a number of ways: intramedullary rod fixation, locking plate fixation, and external fixation or a combination approach. Recently, the literature on the reconstruction of unstable Charcot arthropathy of the midfoot has focused on the so-called superconstructs. The application of an external fixation device in the superconstruct allows for stress shielding of the affected arthrodesis sites and augmentation of the bending stiffness superconstruct allows for stress shielding of the affected arthrodesis sites and augmentation of the bending stiffness and torsional resistance of the overall plate and screw construct. More over, the presence of the external fixator may also act as an additional deterrent for inappropriate weight bearing on the operative limb. The choice of fixation is often dependent on cortical integrity, presence of bone defects and disruptions, health of the soft tissue envelope, history of deep infection, blood glucose control, and body mass index of the patient. More often than not the bone is predictably osteopenic, comminuted, and because the occurrence of dysregulated hyperemia, construct stiffness for Charcot reconstruction is key no matter which fixation construct one chooses. Moreover, the absence of a normal pain feedback loop in neuropathic patients frequently results in premature and inappropriate weight-bearing post-operatively, which must be anticipated when choosing operative fixation approaches.

We present a case series where external fixation alone and in conjunction with internal fixation consisting of distal femoral locking plates, medial column locking plate, fusion bolts and intramedullary nails were used for correction of Charcot joints.

References: