Osteotomy of the Tibial Tuberosity To Facilitate Removal of an Incarcerated Tibial Nail

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Abstract

Removal of orthopedic hardware is mostly easier said than done. Bony overgrowth, worn out screw threads and heads, stuck nails, broken implants and ingress of bone into all possible crevices of the implants make extrication difficult and exasperating for the surgeon. Of these, intramedullary nail removal is considered a routine procedure but may prove to be challenging. We present a case of a 32-year-old patient with an incarcerated tibial V-nail and describe a salvage procedure for tibia nail. It is imperative to discuss all the possible options with the patient prior to surgery. The patient usually considers the removal to be easier than the initial surgery and is usually unaware of the difficulties that can be encountered during removal and the fact that it may need a major procedure followed by a prolonged recovery time.

Introduction

Removal of intramedullary nails is considered a routine procedure but may prove to be challenging. Bone ingrowth or overgrowth, damage to the proximal threads of the nail, and broken nails or locking screws may complicate the removal of intramedullary nails. It is important to assess the main reason for nail removal and the extent to which the surgeon and the patient are willing to go to do so. Infection, nonunion, migration of the implant, unremitting pain, deformity or refracture requiring fixation are indications for nail removal. Multiple techniques including universal extraction sets, guide wires with hooks, and multiple guide wires have been described.1-6 We present a case of an incarcerated tibial V-nail and a salvage procedure for nail extraction after other methods failed.

Case Report

A 32-year-old man presented with chronic leg and ankle pain 7 years after a tibial intramedullary V nail was put in for an open tibial fracture. The patient sustained a left open tibia fracture in an accident 7 years earlier and was operated in a district hospital with debridement and fixation with a tibial V nail. The patient was relatively pain free for 5 years but subsequently he had started having ankle and knee pain which he did not pay much attention to; however, 6 months prior to evaluation the patient had increasing severe pain with physical activity limiting the activities of daily living. He was seen by some local doctors who prescribed routine medication but without any substantial relief. The patient reported to our institution where routine radiographs revealed a V nail that had migrated towards the ankle and was limiting the ankle motion in addition to giving the patient ankle and knee pain. C-reactive protein (CRP), erythrocyte sedimentation rate (ESR) and routine counts were normal suggesting an absence of infection.

On physical examination, the patient had a well-healed surgical incision in the left leg in the region of the proximal tibia and another well healed scar over the shin which was the remnant of the initial injury. The fracture was well healed. The left knee was stable in varus and valgus with full range of motion. The ipsilateral ankle had no range of motion and was stiff. Neurovascular examination was normal. Overall alignment of the extremity was anatomic.

Preoperative radiographs showed a healed tibia and fibula fractures in all 4 cortices, an intramedullary V-nail with protrusion into the ankle and cortical thickening at the fracture site.

The possible association of leg pain and retained hardware were discussed with the patient. The surgical risks were discussed extensively with the patient, as well as other risks, including continued pain after hardware removal and failure to remove the nail. The patient opted for nail removal and he was taken for surgery under regional anesthesia.

On re-exploring the initial portal of entry of the nail at the proximal tibia, the nail could not be located and the proximal portion of the nail could be visualized deep in the metaphyseal area of the tibia. Attempts to extricate the nail through the window were futile and it was then decided to do a proximal tibial osteotomy of the tuberosity to approach the nail. Accordingly, a V-shaped osteotomy of the tuberosity was done and the bone along with the patellar tendon lifted up to reveal the proximal part of the V-nail which was then easily removed. The osteotomized tibial tuberosity was then reattached to the proximal tibia employing a tension band technique. The patient was discharged after two...
days and advised early physiotherapy. He is presently pain free and has full movement at the knee but the ankle continues to be stiff.

Discussion

Incarcerated intramedullary nails have been described since Kuntscher’s time. Various reasons were listed for incarceration including ingrowth of bone into the inside of a clover leaf nail, bent nails, excessive callus formation closing the medullary canal, and bone ingrowth through the locking screw holes.

The material of the nail or the bone-metal-interface has not been mentioned as a factor in previous reports.

In our case, the V- nail had been driven too far inside into the proximal tibia and after bony union of the fracture, excessive bone growth around the nail head coupled with the tapering design of the nail apex contributed to the migration of the nail into the ankle.

We recommend that to extract an incarcerated nail, an early decision should be made to do a surgical osteotomy to approach the implant which can be easily repaired later with minimal morbidity instead of digging deeper and deeper to try and remove the nail with significant peri- and post operative morbidity including fractures or neurovascular compromise.

Ensure that all bone and soft tissue is properly protected in the proximal pathway of extraction.

References

Illustrations

Illustration 1

Radiograph showing V nail inside the tibial metaphysis

Illustration 2

V-osteotomy of the tibial tuberosity showing the incarcerated V nail within the bone
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