

A Case of Paediatric Non-union of Tibia Treated With Tibialization of Fibula

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Abstract:

Management of non-union with bone gap in tibia is difficult, especially if superimposed by infection of bone. Various modalities have been described for the treatment of gap non-union, with their own advantages and disadvantages. A case of a paediatric patient with traumatic left tibia fracture which was complicated by subsequent osteomyelitis and non-union presented to tertiary care hospital. After failure of different modalities of treatment, to provide union, the patient was managed with tibialization of fibula with fibula strut graft supported by a rush nail.

Keywords : Fibula, Huntington, Non-union, Osteomyelitis, Strut graft, Tibialization

Introduction:

We present a case of a pediatric patient with infected gap nonunion of the lower 1/3 of the tibia. Though many modalities of treatment such as use of antibiotic beads, external fixator, limb reconstruction system, were used for treatment of the nonunion, none of them gave satisfactory result and recurrence of discharging sinus was seen. The case was finally treated with tibialization of fibula with successful union and no post-operative complications. Here, as the fibula was unable to be medialized, a fibula strut graft was taken and placed at tibia nonunion site.

Case Description:

This is a case of 6 year old male child who suffered injury to left leg due to fall from vehicle. Patient had pain in left leg and was taken to bone settler where he was managed with plaster slab. After few days, the pain was increased with discharge from injury site. Patient then went to a private hospital where drainage of pus was done. Patient then came to Orthopaedic OPD for further management.

On examination, patient was not able to bear weight on left lower limb. A discharging sinus was present over anterior aspect of left leg along with swelling and tenderness. Movements at left ankle joint were painful. Distal neurovascularity was normal and Dorsalis Pedis artery was palpable.

On initial stage, thorough debridement of the wound was done and local antibiotic impregnated rod placed in the wound to control infection. After 1 month, as the discharge was continuous, the rod was removed and external fixator of fracture was done along with regular dressing of the sinus. Fixation with external fixator led to pin site infection. External fixator was then removed and debridement of pin site was done until subsidence of infection. The non-united tibia was fixed with limb reconstruction system along with fibular graft.

Limb Reconstruction System (LRS) was removed after no improvement at non-union site. Final fixation was done by tibialization of fibula. Patient was operated under general anaesthesia in supine position. Incision was made over old scar on anterior aspect of lower 1/3rd of left leg. The bone at the non-union site was removed and the margins of the remaining bone were refreshed. Another incision over the lateral aspect of left leg was placed and fibula of the size similar to that of the bone gap was cut and removed. A rush nail was inserted in the fibula and passed through distal tibial

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end, talus and calcaneum. The nail was then passed through the proximal tibia. Thorough wash was given and closure of the wound was done.

In the post-operative period, patient was managed with below knee slab for 4 weeks. Left knee range of motion was initiated soon after operation. After 4 weeks, slab was removed. Patient was kept non-weight bearing for 10 weeks. Weight bearing with support of brace was started after 10 weeks with nail in situ. Nail was removed after 6 months and full weight bearing was allowed.

Result:

Good callus formation was observed at 2 months and complete tibialization of fibula observed at 6 months. Due to bone loss, there is 2.5 cm shortening which is being managed by shoe support. The patient was followed up for a period of 1.5 years. There was occasional pain which was managed by medications.

Fig. 1: X-ray of patient on admission



Fig. 2: X-ray showing immediate post-operative tibialization of fibula

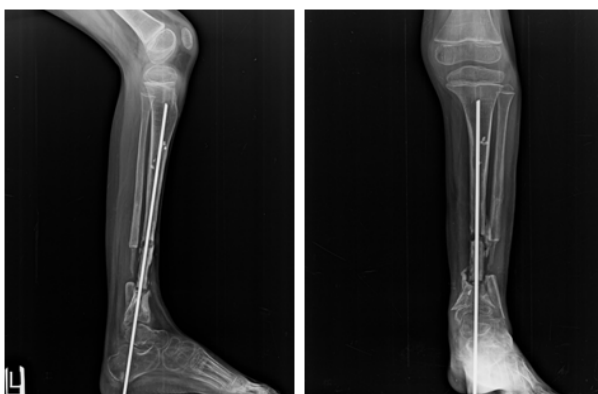


Fig. 3: X-ray showing presentation at follow up after 2 months



Fig. 4: X-ray showing presentation at follow up after 8 months



Fig. 5: Cross legged sitting, standing, length discrepancy of two legs



Discussion:

The management of tibia non-union with bone loss is difficult for the surgeon. In developing countries, it is most commonly the result of chronic osteomyelitis, followed by accidents and after resection of neoplasms. Large bone defects caused by infections can become a major problem. Various procedures are described to treat such cases, such as allograft reconstruction, distraction osteogenesis, Huntington's procedure, etc. Among these, Huntington's procedure is now accepted widely as a simple, relatively easy and feasible procedure. It has the advantage that it does not require any special implants and can be done in a basic orthopaedic operative setup.

Lambert⁽¹⁾ showed that 1/6th of the static load of the particular leg was taken up by fibula. When fibula is put under stresses higher than usual, it undergoes hypertrophy and plays a major role in the supporting structure of the leg. In 1905, Huntington⁽²⁾ first described the technique of fibular transposition to tibia. The original technique was described as a two staged procedure in which, during the first stage, only the proximal part of fibula was medialized and later at the second stage, the distal part was medialized. Medialization of fibula causes reduction in volume of leg which makes skin closer easier even in scarred and fibrous tissue.⁽³⁾

Huntington's procedure has an advantage that the fibula is attached to its muscle mass and the blood supply is not hampered. However, in this case, due to extensive fibrosis at the non-union site, the

centralization of fibula was not possible. Hence, the fibula was removed completely from its attachment and then was fixed as a bone graft to cover the bone loss of tibia and to aid union. Bones in children have good remodelling potential even in osteomyelitic bones. A staged procedure yields good outcome as long as principle of stable fixation is applied. Krieg et al⁽⁴⁾ showed that in younger age group, fibula hypertrophy is common and chances of stress fracture are less.

Conclusion:

Huntington's procedure is an easy, cost effective and simple procedure for managing nonunion cases of tibia with bone loss. In required circumstances, if vascularised fibula graft cannot be transferred to tibia, a fibula strut graft can be taken and placed at tibia nonunion site, which shows similar outcome as the vascularised graft.

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