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3YEAR OLD INFECTED NONUNION SALVAGED BY MASQUELET WITH ILIZAROV FIXATOR: A CASE REPORT

Orthopaedics

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ABSTRACT

Introduction- non-union of fracture is often complicated by other coexisting problems, such as persistent infection, loss of soft tissues and bone, limb length discrepancy and limb deformity . Infected tibial non-union has always posed a challenge for orthopedic surgeons. There are different options available for the management of chronic diaphyseal infections associated with non-union which include extensive debridement with local soft-tissue rotational flaps , packing the defect with antibiotic cement beads, Papineau-type open cancellous bone grafting, tibiofibular synostosis, free microvascular soft-tissue and bone transplants and the Ilizarov method. The use of distraction osteogenesis proves to be an excellent option in managing and restoring massive limb bone loss without the need for guides or bone grafts. Ilizarov external fixator is better suited for infected non-union of tibia because it can provide a stable mechanical environment, transport bone, correct deformities, and enable weight bearing during the course of treatment. **Case Report-** here, we present a case of 31year old male with history of an open fracture of the right tibia, following a road traffic accident ,which was managed by debridement , sequestrectomy and the autologous bone graft was placed into the gap and a corticectomy sparing the periosteum was performed in the proximal 1/3rd of tibia and an external ring fixator was placed. **Conclusion-**The use of distraction osteogenesis proves to be an excellent option in managing and restoring massive limb bone loss without the need for guides or bone grafts. Ilizarov external fixator is better suited for infected non-union of tibia because it can provide a stable mechanical environment, transport bone, correct deformities, and enable weight bearing during the course of treatment. However, patient discomfort due to long-lasting treatment duration, is one of the key disadvantages of this treatment modality. In this case , The full restoration of the tibial length was achieved, which is an excellent example for unifocal limb lengthening.

KEYWORDS

non union compound fracture, distraction osteogenesis, masquelet, Ilizarov, tibial length

INTRODUCTION

The incidence of complex and compound fractures of long bones is on an increasing trend due to increasing number of high energy trauma events in recent times . Tibia is the most common long bone fractured due its vulnerable subcutaneous location. Delayed union and non-union due to infection are some of the commonly acquired complications. Non-union is more common in tibia fractures compared to other bones of the body.

Additionally, non-union of fracture is often complicated by other coexisting problems, such as persistent infection, loss of soft tissues and bone, limb length discrepancy and limb deformity . Infected tibial non-union has always posed a challenge for orthopedic surgeons .

There are different options available for the management of chronic diaphyseal infections associated with non-union which include extensive debridement with local soft-tissue rotational flaps, packing the defect with antibiotic cement beads, Papineau-type open cancellous bone grafting , tibiofibular synostosis, free microvascular soft-tissue and bone transplants and the Ilizarov method. The Ilizarov method has certain advantages as it can overcome most of the difficulties; it can compensate for bony defects, allow for bony union through bone histogenesis as well as eliminate infection.

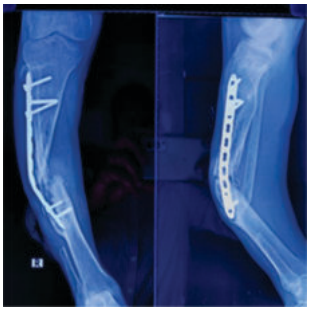
Based on reported cases, the highest bifocal tibial lengthening was 22 cm whereas the highest uni-focal tibial lengthening was 14.5 cm. This case demonstrates the management of restoring the original length of the tibia after massive bone loss using bone transport technique .

CASE REPORT

In September 2019, an 31-year-old, male was diagnosed with an open fracture of the right tibia, following a road traffic accident. Emergency debridement was performed at the local hospital following injury and an external fixator was applied which stayed on for 6 months but during follow up in the same hospital , patient was taken in for a second surgery where in bone grafting with plating was done. The fracture and wound had not healed 6 months after injury.

Patient came to our hospital after having been through multiple private and government centers after 2.5 years in march of 2022.

A physical examination of the patient's right leg revealed a soft tissue defect and deformity in right tibia with non union. A 2 × 10 cm incision was observed on the anterior lateral side of the right leg .



Pre Operative Xray On Day Of Admission

And a Discharging sinus over lower antero-medial aspect end of right leg with serous discharge.

The treatment plan consisted of a single stage surgery and local and systemic application of antibiotics. In this, the bone transport technique was used to repair the bone defect, and rehabilitation exercise was performed to restore the function of the affected limb as much as possible. The patient was informed about the treatment plan and the associated risks.

Surgery

After removing the plate , thorough debridement was done , sequestrectomy was done and the autologous bone graft was placed into the gap and a corticectomy sparing the periosteum was performed in the proximal 1/3rd of tibia and an external ring fixator was placed.
There was no neurologic deficit after the surgery. The wound had healed uneventfully.

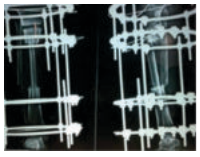
Patient was advised partial weight bearing with walker and was advised to follow up every 2 weeks.

Immediately Post op

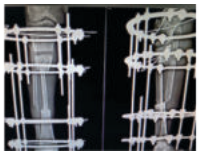
Fixator - in - situ

Follow- ups

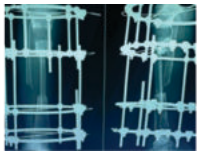
Graft consolidation was noted on the postoperative radiograph after 8 weeks. We started the patient on an active rehabilitation program.



4 week



8 week



16 week

DISCUSSION

The difficulty in the management of non-union of long bones is compounded by the presence of bone loss, shortening, infection and deformity. The bone gap may be spontaneous due to bone loss during the initial injury or iatrogenically produced after debridement for osteomyelitis occurring after the initial management.

The ring fixator with tensioned wires offers rigid fixation and the corticotomy contributes to the biological process of fracture healing. It improves the vascular supply and thus reduces infection. Shortening and deformity associated with the gap is also effectively managed with the ring fixator.

The induced membrane technique according to Masquelet offers an established solution for complex injuries of the tibia with segmental bone and soft tissue destruction.

Currently, bone transport is the safest and most effective method for the treatment of massive bone defects. However, this treatment modality requires further optimization as it associated with a number of disadvantages, including a long treatment period, the requirement for repeated surgeries and patient discomfort.

CONCLUSION

The use of distraction osteogenesis proves to be an excellent option in managing and restoring massive limb bone loss without the need for guides or bone grafts.

Ilizarov external fixator is better suited for infected non-union of tibia because it can provide a stable mechanical environment, transport bone, correct deformities, and enable weight bearing during the course of treatment. However, patient discomfort due to long-lasting treatment duration, is one of the key disadvantages of this treatment modality.

In this case , The full restoration of the tibial length was achieved, which is an excellent example for unifocal limb lengthening.

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