Oblique plane deformity correction with Ilizarov technique in case of malunited tibia - Case report

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ABSTRACT

Multiplanar or oblique plane deformity (deformity present in more than one plane), poses challenge to every orthopedic surgeon. Abnormal loading of joints secondary to deformity can lead to premature degeneration. Outcome depends on accurate correction of deformity. We present a case of malunited tibia with oblique plane deformity with knee pain who underwent deformity correction using Ilizarov technique. At four years follow up patient had significant reduction in knee pain with improvement in gait.

Key words: oblique plane deformity, deformity correction, Ilizarov technique

INTRODUCTION

Deformities of long tubular bones are often associated with limb shortening and soft tissue contractures. Traditional methods of management of such deformities are more traumatic and involve resection of wedge of bone. As these methods do not include gradual stretching of contracted soft tissues, it results in further shortening of limb.[1]

Ilizarov technique addresses complex angular and rotational deformities, bone loss and limb length discrepancy.[2,3] Moreover, the surgical intervention is usually performed in a percutaneous manner, lessening trauma to soft tissues and bone.[1] The apparatus used in this technique permits full weight-bearing or partial weight-bearing with crutches, which creates optimal mechanical and biological environment for osteogenesis and prompt functional recovery.[4]

CASE REPORT

A 40 years old woman presented with history of deformity of right leg as a sequel of open type II fracture of tibia and fibula at lower 1/3rd following a road traffic accident two years back. It was initially treated with debridement and unilateral external fixator. After 8 weeks, the fixator was removed and patient was mobilised with partial weight bearing on patellar tendon weight bearing cast. She later noticed deformity of her right leg which has progressively increased over a period of one and half year, with associated pain at right knee and difficulty in walking.

Examination revealed short limb gait, procurvatum and valgus deformity at lower 1/3rd of leg. Skin was adherent to bone at apex of deformity. Normal range of movements was present at knee, but restricted movement was observed at ankle due to tight posterolateral structures. (Fig 1a, Fig 1b)

Fig 1a: Procurvatum deformity

Fig 1b: Valgus deformity

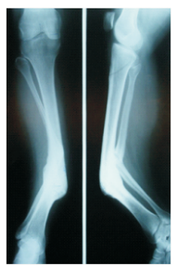

Fig 2: Pre operative radiograph

Anteroposterior and lateral radiographs and scannogram revealed valgus deformity of 40^{0} at lower 1/3rd of right tibia associated with procurvatum deformity of 60^{0} and shortening of limb by 5 cm. Translation of 1 cm laterally and posteriorly (Fig 2) and mean axis deviation of 25mm was noted.

Graphical method was used for evaluating the true plane and magnitude of the deformity and further treatment was planned accordingly. Osteotomy was performed just distal to the apex of deformity

as skin condition was poor and bone was sclerotic at that region. Hinges were placed at the apex and gradual distraction was started at 1mm/day. Initially knee and ankle were spanned to prevent any secondary deformities due to stretching of tight posterolateral soft tissue structures. After 8 weeks, deformity was corrected and spanning fixator at knee and ankle was removed (Fig 3a, Fig 3b). Knee, ankle mobilisation as well as full weight bearing mobilisation was started. Full length radiograph confirmed a near deformity correction with a minimal residual procurvatum of 8^0, residual translation of 0.5 cm, with sound union of osteotomy (Fig 4). There was clinical improvement in the gait and ankle movements, with significant reduction of pain. The patient had good functional recovery at four years follow up. (Fig 5)


Fig 3a & 3b. Corrected valgus & procurvatum deformities

Fig 4. Post op scannogram


Fig 5. Follow up radiographs

DISCUSSION

Deformities in the lower limbs can be symptomatic or asymptomatic. All symptomatic patients should be considered for deformity correction. Asymptomatic deformities with mechanical axis deviation of more than 15mm, procurvatum deformity of distal tibia greater than 15^0, recurvatum deformity of distal tibia more than 10^0, and varus or valgus deformity of distal tibia of more than 10^0 should also be included for correction.[5] Altered load transmission across joints can lead to premature degenerative changes secondary to deformity.[6,7] Goals in deformity correction surgery are to relieve symptoms if present and to protect adjacent joints from development of osteoarthrosis.[5]

Accuracy of correction is frequently compromised with open methods. The greatest limitation with acute correction and internal fixation methods in managing complex deformities is the inability to modify the correction postoperatively. Some intrinsic factors like radiographic magnification, rotation, measurement error, width of blade may contribute to inaccuracy.

Unilateral dynamic external fixation has been used to correct angular, rotational deformities and restore length concurrently. Advantage of this approach is the ability to modify postoperatively.[8] Circular dynamic external fixators with multiplanar fixation are best suited for simultaneous correction of complex deformities.[9] Gradual correction of the deformity diminishes the nerve traction injuries and reduces the complication rate.[8]

To conclude, multiplanar deformities can be treated effectively with Ilizarov technique and it offers an advantage of correcting complex deformities accurately with minimal surgical trauma. Gradual distraction allows for lengthening of soft tissues and reduces traction injuries of the nerves. Accurate correction of deformities reduces joint pains secondary to eccentric loading of the joints and protects the joints from premature degeneration.

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