

Extracutaneous Locking Plate As An External Fixation Device In Juxta Articular Compound Fractures- Review

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Abstract

Compound fracture management is still a difficulty for orthopaedic surgeons. Early fracture stabilisation and sequential debridement are two treatment options for complex fractures. External preoccupation continues to be the norm. When treating compound fractures, external fixation, particularly the Ilizarov technique, is frequently utilised as a temporary or permanent adjunct for restoring bone stability. Traditional external fixations, on the other hand, are frequently cumbersome, uncomfortable, and difficult for the patient, usually causing issues with clothing and sleeping, as well as impeding daily activities. Locking compression plates have been promoted as a helpful adjunct in the treatment of challenging reconstructive situations since they have shown to be adaptable, low profile, and well tolerated by patients

Keywords: Locking plate, Extracutaneous, Compound, Fractures

INTRODUCTION

Compound fracture management is still a difficulty for orthopaedic surgeons. Early fracture stabilisation and sequential debridement are two treatments for compound fractures [1]. The norm continues to be external fixation [1]. Most distal femoral fractures in younger people and osteoporotic fractures in the elderly are the result of high energy trauma. In the past, conservative therapy to achieve adequate alignment has failed [2]. Operative techniques include intramedullary nailing, bridge plating, and open reduction and internal fixation [2]. Serious injuries like proximal tibia fractures might be difficult for a surgeon to repair. Since the anteromedial surface of the tibia is only covered with skin and subcutaneous tissues, the therapy of proximal tibia fractures necessitates careful attention to the soft tissue envelope [3]. It is challenging to achieve a stable fixation because of the comminuted fracture pattern and poor bone quality. External fixation, intramedullary devices, and traditional plate osteosynthesis are examples of current treatment techniques [3].

The surgeon must restore the tibial architecture, correct and prevent complications when treating distal tibial fractures with or without articular involvement [4]. Open reduction and internal fixation, external fixation with or without restricted internal fixation, and intramedullary nailing are among the operative modalities [4]. In order to restore bone stability, external fixation, particularly the Ilizarov technique, is frequently employed as a temporary or permanent adjunct. This method has been successfully utilised to treat compound fractures. Traditional external fixations, on the other hand, are frequently cumbersome, painful, and difficult for the patient, frequently causing issues with clothing and sleeping as well as causing obstructions during daily activities [5,6]. The use of a locking compression plate as an external fixation device has been promoted as a helpful adjunct in the treatment of challenging reconstructive cases since it has shown to be flexible, low profile, and well tolerated by patients [5,7]. The plate-type external fixator is substantially stiffer and stronger than the conventional external fixator, and its stiffness is nearly ideal [8].

METHOD

Data was collected from electronic databases such as Google Scholar, Pubmed and Springer publications. A total of 4 studies have been included in which locking compression plate has been used as an external fixator for management of compound fractures.

Study	No. of cases	Follow up	Outcome criteria
Dr Sandeep Kalia et al (2019)	23	9 months	Knee society score, complications
Dr Shrinivas Prabhu et al (2019)	35	1 year	Knee society score, time to union and infection
Panda Shakti S et al (2016)	8	1 year	Knee society score, time to union and infection
Kloen P (2009)	4	9 months	Union, complications

In a 2019 study, Dr Sandeep Kalia, Dr Shalini Sharma, Dr Manik Sehgal, and Dr Sachin Kanwar used locking compression plates as an external fixator to treat 23 patients with compound metadiaphyseal fractures. They then followed up with them for nine months to assess their reduction maintenance, union, complications, and knee society score. They discovered that there were only 3 incidences of pin site infection, and that the average knee society score ranged from 74 to 78.6. They came to the conclusion that this procedure was simpler to use, more patient-friendly, and effectively sustained reduction until union.

In a study conducted in 2019, Dr Shrinivas Prabhu and Dr Binayak Ray used locking compression plates as an external fixation method on 35 patients who had complex diaphyseal fractures of the tibia (Type 1 to type 3A). After a year of follow-up, all patients were assessed for union, infection, knee society score, and additional problems such as delayed union and non-union. With an average time to union of 18.42 weeks, all the fractures healed. There were two delayed union cases and no nonunion cases. They came to the conclusion that locking compression plates are well accepted by patients when used as external fixators, have a high incidence of union, and have few problems.

A study named "Supracutaneous plating: Use of locking compression plate as external fixator for intra-articular compound fractures" was carried out by Panda Shakti S. Panda Damodar and Suri Nikhil. In this study, supracutaneous locking plates were used as an external fixator to treat 8 patients who had distal femur and proximal tibia complex fractures. For a year, all patients were monitored and evaluated for time to fracture union, pin site infection, non-union, and knee society score. Seven out of the eight fractures healed, with a 14.2 week average duration to union. There was just one instance of pin site infection; there were no instances of pin loosening or reduction loss, and no case of loosening of pin or reduction loss. 7 out of the 8 cases had full range of movements. Based on the knee society score, 4 patients had an excellent outcome, 3 patients good and 1 patient fair. They concluded that utility of locking compression plate as an external fixator has a high rate of union, low rate of complications and better patient acceptability and compliance.

Supercutaneous Plating: Use of a Locking Compression Plate as an External Fixator is the title of a 2009 study by Kloen P. In this work, he used locking compression plates as an external fixation device to treat 4 patients with complicated fractures. The plate was used in 3 of the patients as a temporary fixing tool until the infection cleared up. After the infection was treated, the plate was subsequently replaced with definitive fixation. LCP was utilised as an external fixator and a permanent fixation in 1 patient. For an average of four months, the plate was in place. No pin site infections occurred, and the plate was removed in the outpatient department in 3 individuals.

DISCUSSION

Compound intra-articular or juxta-articular fracture cases are now something orthopaedic surgeons see frequently. Intramedullary nailing and open reduction with plate osteosynthesis are not suitable options because compound intra articular or juxta articular fractures typically appear with considerable comminution and small proximal and distal fragments [1]. Additionally, there are more opportunities for infection, which can result in soft tissue issues including nonunion. External fixation utilising an ilizarov ring fixator or a hybrid fixator to produce temporary stabilisation is a frequent practise [1,2] to get around these issues. Application of an external fixator aids in managing wounds and maintaining vascularity over the fracture site in addition to temporarily stabilising the fracture. However, using common external fixation devices has been shown to have a number of drawbacks. Its large look causes it to be frequently rejected by patients, which leads to low compliance. Mobility is also made more challenging because there is a higher probability of hitting the fixator with the opposite limb [3]. To overcome these drawbacks of conventional external fixators, the use of locking compression plates as an external fixator has been recommended. Juxta articular fractures require application of

spanning external fixators which cause joint immobilization and hence produces stiffness. However, application of LCP as an external fixator overcomes this problem and allows for early joint mobilization thus avoids stiffness. The LCP can easily be hidden within the cloth and thus is more patient friendly. Due to its less bulky nature, it does not hit the opposite limb while walking. Removal of plate can be done under local anaesthesia in the out patient department. Due to the availability of multiple screw holes, it has a more stable construct as compared to the standard external fixator.

CONCLUSION

It can be concluded that utility of locking compression plate as an external fixation device is a good method for management of compound juxta articular fractures. It not only allows early mobilization of the joint and helps prevention of joint stiffness, but has also a good rate of union, less chances of skin tract infection and other complications. Due to its less cumbersome nature it is more patient friendly and has a high acceptance rate.

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