

ORTHO NEWSCAST



○ Volume 2 | Issue 19 | 2021

Dear Doctor,
Greetings from Micro Labs. We are happy to bring you "Ortho Newscast" which contains latest and interesting news in the field of Orthopaedics.

This issue contains

- **Midshaft clavicle fractures: Anatomical plating versus titanium elastic nailing**
- **Surgical management of distal tibia fracture: minimally invasive percutaneous plate osteosynthesis using LCP**
- **Case study: Bone graft in scaphoid fracture**

Should you require any specific article or medical information, please feel free to contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

Best Regards,

Medical Team,

Micro Labs Limited



1. Midshaft clavicle fractures: Anatomical plating versus titanium elastic nailing

Background: With the expectation that little functional loss will result despite substantial residual radiographic malalignment in displaced midshaft fractures of the clavicle have traditionally been treated non-operatively. Displaced midshaft fractures of the clavicle typically heal in approximately the same position as that seen on initial radiographs, i.e. with a characteristic inferior, medially translated and anteriorly rotated deformity of the lateral fragment. The standard operative method for fixing displaced midshaft clavicle fracture is Plate fixation. Over the years, titanium elastic nailing system (TENS) has also gained lot of attention due to its minimal invasive nature, smaller scar and reduced operative time.



Objective: This study compares the functional outcome of middle third displaced clavicle fractures treated either by plate or intra medullary TENS fixation using Constant Murley score and disability of the arm, shoulder and hand score.

Methods: A total of 56 patients (TENS; n=25, plating; n=31), classified according to orthopaedic trauma association classification underwent midshaft clavicle fixation. Clavicle middle third fractures were classified as B1-type fractures (simple fractures, two fragments), B2-type fractures (fractures with bending wedge) and B3-type fracture (complex fractures) according to the classification of the orthopaedic trauma association (OTA). They were followed up for a minimum period of 1 year.

TENS fixation should be reserved for simple fractures or with minimal comminution with good cortical apposition



Results: Out of the 56 patients, 31 of them underwent nailing and 25 underwent plating. Road traffic accident was the most common aetiology in both the groups. Out of the 31 patients who underwent nailing, 15 (4-B1, 2- B2 and 9-B3) of them needed open reduction in the form of 2 cm incision at the fracture site to aid in passage of the TENS, suggesting that comminution was the deciding factor for open reduction. In such cases the length of the scar was calculated by adding the nail entry site and the fracture site scar. Length of the scar in the TENS group was significantly smaller when compared to the incision in the plating group (1.86 ± 1.23 and 11.01 ± 3.29 cms respectively, $p < 0.001$). The mean clavicle shortening after union was significant in the TENS group as compared to the plating group (0.76 ± 0.93 and 0.09 ± 0.29 cms respectively; $p = 0.044$). The Constant shoulder score measured at the end of 1 year was 90.77 ± 9.01 for the TENS group and 92.63 ± 6.04 for the plating group, not significant statistically ($p = 0.269$). The mean disability of the arm, shoulder and hand (DASH) score was also not significantly different ($p = 0.552$) between the TENS group and the plating group, at 6.01 ± 11.09 and 6.32 ± 10.33 respectively.

Parameters	TENS (n=31)	Plating (n=25)	P value
Duration of hospital stay (days)	4.13 ± 2.38	7.24 ± 4.10	0.001
Clavicle shortening (cm)	0.76 ± 0.93	0.09 ± 0.29	0.044
Scar length (cms)	1.86 ± 1.23	11.01 ± 3.29	<0.001
Average union time (weeks)	10.17 ± 1.84	10.88 ± 2.44	0.430
Constant score	90.77 ± 9.01	92.63 ± 6.04	0.269
DASH score	6.01 ± 11.09	6.32 ± 10.33	0.552

Conclusions: The nailing procedure is less invasive, in comparison with plate fixation, , requires smaller incisions and has a shorter duration of hospital stay with no statistically significant difference in terms of functional outcome. Hence, TENS technique is recommended for the fixation of displaced mid-shaft non-/minimal comminuted clavicular fractures, especially for young individuals and can be used as an alternative to plate fixation.

Reference: Philip A, Suranigi SM, Lingaraj ,et al. Anatomical plating versus titanium elastic nailing for displaced midshaft clavicle fractures: a prospective comparative study. Int J Res Orthop. 2021 Mar;7(2):278-284



2. Surgical management of distal tibia fracture: minimally invasive percutaneous plate osteosynthesis using LCP

Background: wound infections and poor wound healing due to precarious blood supply is a challenge in the management of distal tibia fracture. Various methods of surgical treatment had been tried, such as closed intramedullary nailing, open reduction and internal fixation with conventional plate osteosynthesis and external fixation however most of them have a high complication rate than a good functional outcome. The newer technique of distal tibia fractures fixation using minimally invasive percutaneous plate osteosynthesis (MIPPO) involves less soft tissue handling and minimal periosteal stripping resulting in a lower infection rate and faster healing.



Objective: To study functional outcome in patients with distal tibia fractures treated by MIPPO technique using medial LCP.

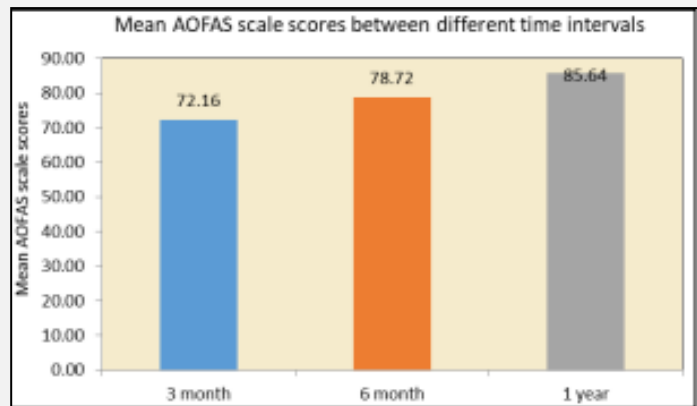
Materials and Methods: In this study, 25 patients with distal tibia extra articular fractures and intra articular fractures with or without associated fibula fractures were treated with MIPPO using medial LCP. Results were analyzed in terms of functional outcome of postoperative range of movement after union, time for fracture union, early and post-operative complications. Final outcome was assessed according to American orthopedic foot and ankle society score (AOFAS).

Results: The mean follow up period ranged from 6 weeks to 2 years. Most of the cases were closed fractures 19 (76%) whereas 6 (24%) were open type 1

MIPPO technique for the distal tibia fractures offers a biological advantage by preserving the blood supply and decreases chances of delayed or non-union.



fractures. The average time for radiological fracture union in our study was 14-18 weeks with a mean 16 weeks. Mean AOFAS score improved from 72.16 (at 3 month) to 78.72 (at 6 month and mean AOFAS score at the end of 1 year was 85.64. There were two superficial wound infections which were treated with oral antibiotics and there was one deep infection and another with persistent ankle pain.



Conclusion: In extra articular and also intra articular fractures of distal tibia, minimally invasive percutaneous plate osteosynthesis is a reliable method of fixation. MIPPO technique for the distal tibia fractures offers a biological advantage by preserving the blood supply and decreases chances of delayed or non-union. Patients treated by MIPPO technique have a much lesser rate of deep infection and excellent radiological union. MIPPO technique helps in initiating early mobilization and reduces the risk of ankle stiffness.

Reference: Parthasarathy A, Murugunde AP, Prakashappa TH, et al. A prospective study of minimally invasive percutaneous plate osteosynthesis using LCP for surgical management of distal tibia fracture. International Journal of Orthopaedics Sciences 2021; 7(1): 899-905

Case study: Bone graft in scaphoid fracture

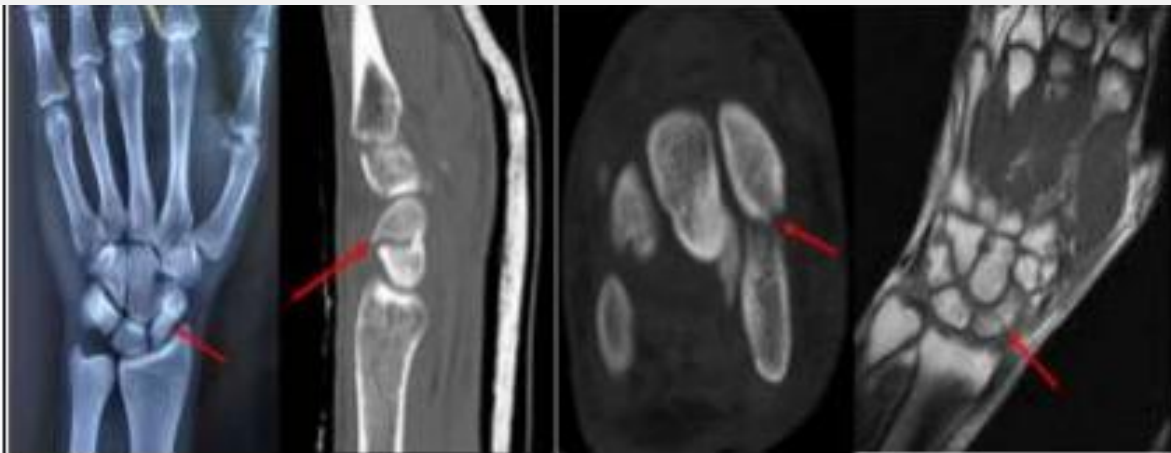
Introduction: A Scaphoid fracture with displacement has a non-union rate of more than 90%. Treatment delay is one of the most common causative factors for the non-union of Scaphoid. Avascular necrosis of Scaphoid occurs most frequently in proximal pole fractures with an incidence of more than 30%.

Case: A 45 year old male presented to emergency room with a chronic left sided wrist pain for a period of 12 weeks. He had a history fall on outstretched hand 12 weeks back and sustained injury to the left wrist, Aggravated on wrist movement during his occupation and pain relieved on rest. Pain was disturbing his activity of daily living. Clinical examinations revealed that tenderness over the anatomical snuff box, range of movements over the left wrist was painful. Radiological investigations was done and



found to have old non-healing Scaphoid fracture over the proximal pole. Magnetic Resonance Image confirmed non-union of Scaphoid.

Operative Procedure: Patient in supine position, hand in arm table under aseptic precaution Volar incision over Flexor carpi radialis tendon ending distally over the scaphoid tuberosity was made. Scaphoid bone was identified and the non-union of it was exposed by dorsiflexion and ulnar deviation of wrist. Sclerotic ends were freshened and cavity formed extending well into each adjacent fragments. Cancellous bone graft was obtained from the iliac crest and filled into the cavity. Stabilization of two fragments done with Guide wires with the help of image intensifier. Through the guide wire Herbert screw fixation done. And reduction was found satisfactory under the guidance of image intensifier.



1. X-ray AP view of right wrist showing transverse fracture through the scaphoid bone (red arrow). 2. CT Sagittal images of showing fracture through the scaphoid bone (red arrow). 3. MRI T1WI Axial and Sagittal images demonstrating breach in scaphoid bone (red arrow)

Discussion: In the fractures involving proximal 1/3rd, the incidence of Avascular necrosis is nearly 40%. Vascular supply for the Scaphoid is determined pre-operatively by Gadolinium enhanced Magnetic Resonance Imaging and by intra-operatively assessing the bleeding from the bone. If any small fragment was found to be undergoing non-union, excision of proximal pole is done.

Bone grafting is considered to be a better option than Pulse electromagnetic field for scaphoid non-unions. The goals of treatment were to relieve symptoms, correct the carpal deformity, achieve union and delay the onset of wrist arthrosis. Vascularised bone grafting is indicated in non-union and avascular necrosis and failed previous iliac grafting.



Sources of vascularized pronator quadratus pedicle graft from the distal radius, iliac crest free flap, distal dorsolateral radius and pedicle bone grafts based on the 1 to 2 intercompartmental supraretinacular artery. This technique does not have associated shortening or angulation. Screw fixation is superior than K-wire fixation after bone grafting.

Conclusion: The risk of non-union with or without avascular necrosis can be altered by early diagnosis of scaphoid fracture. For nonunion scaphoid fractures, open reduction with internal fixation with bone grafting is most productive modality compared to others. The use of vascularized bone grafting has better outcome when compared to conventional bone grafts.

Vascularized bone grafting has better functional and radiological outcome in cases of non-union of scaphoid fracture.

Reference: Mohanraj P, Khader AF, Sanjai B. A case report on non-union in scaphoid fracture using bone graft. International Journal of Orthopaedics Sciences 2021; 7(1): 815-816.



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