MICRO LABS LIMITED

ORTHO NEWSCAST

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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

- **Extra-articular open fractures of distal tibia and fibula**
- **Axial spondyloarthritis diagnosis and sacroiliitis staging using the lymphocyte-monocyte ratio**
- **Treatment of an isolated femoral shaft fracture: Retrograde Humeral Nail**

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

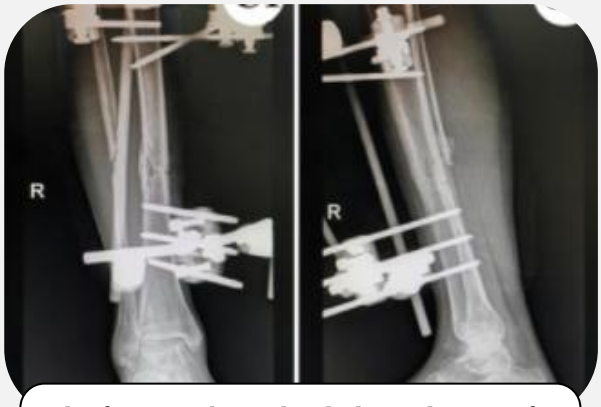
1. Extra-articular open fractures of distal tibia and fibula

Introduction: High-energy traumas such as traffic accidents or falling from high places are a cause of Open fractures of distal tibia associated with fibula. It is a big challenge to treat it because of the wound contamination, limited soft tissue envelope and poor vascularity. The role of fibular fixation in the treatment of distal tibiofibular syndesmosis injury and pilon fractures has been well defined; however, it is still controversial whether the fracture of fibula needs fixation and which method is selected in extra-articular fractures of the lower leg.

Anteroposterior and lateral radiograph of distal tibiofibular fractures before operation

Aim: To compare the efficacy of three different fixation methods of fibula combined with external fixation of tibia for the treatment of extra-articular open fractures of distal tibia and fibula.

Materials and Methods: 91 cases of open fractures of distal tibia and fibula treated with external fixator, and the fibula was fixed with non-fixation (group A, $n = 35$), plate-screw (group B, $n = 30$) and Kirschner wire (group C, $n = 26$). The operation time, intraoperative blood loss, surgical and implants costs, fracture healing time, postoperative complications, and American Orthopaedic Foot and Ankle surgery (AOFAS) scores were compared among the groups.



The fracture showed radiological signs of healing 7 months after operation (anteroposterior and lateral views)

The external fixator was removed completely 10 months after operation

Results: 87 patients were followed up for 5–35 months (average, 14.2 months). The operation time of group C (114.92 ± 36.09 min) was shorter than that of group A (142.27 ± 47.05 min) and group B (184.00 ± 48.56 min). The fracture healing time of group C (5.67 ± 1.42 months) was significantly less than that of group A (6.90 ± 1.33 months) and group B (6.70 ± 1.12 months). The postoperative complications such as fractures delayed union and nonunion in group C (2 cases, 8.00%) is less than that in group A (13 cases, 39.39%) and group B (11cases, 37.93%). The wound infection and needle-tract infection did not differ among the three groups ($P > 0.05$). The excellent or good rate of ankle function was 69.70% in group A, 72.41% in group B and 84.00% in group C, with no statistical difference among the three groups.

Conclusion: Compared with simple external fixator fixation and external fixator combined with plate-screw osteosynthesis, external fixator combined with K-wire intramedullary fixation shortens the operative time and fracture healing time, reduced costs and complications of fracture healing, while the blood loss, infection complications and ankle function recovery showed no difference with the other two groups. External fixator combined with plate-screw osteosynthesis had no advantage in treating extra-articular open fractures of distal tibia and fibula when compared with simple external fixation.

External fixator combined with K-wire intramedullary fixation shortens the operative time and fracture healing time, reduced costs and complications of fracture healing

Reference: Sun DD, Lv D, Zhou K, Chen J, Gao LL, Sun ML. External fixator combined with three different fixation methods of fibula for treatment of extra-articular open fractures of distal tibia and fibula: a retrospective study. *BMC Musculoskelet Disord*. 2021;22(1):1.

2. Axial spondyloarthritis diagnosis and sacroiliitis staging using the lymphocyte-monocyte ratio

Background: Axial spondyloarthritis (axial SpA) is a chronic inflammatory disorder. This could lead to disability due to the failure of timely treatment. The prevalence of axial SpA is approximately 0.2–0.3%, and this condition primarily occurs in males aged 20–30 years. The Assessment in Spondyloarthritis International Society (ASAS) provides recommendations for the management of axial SpA, including classification criteria, magnetic resonance imaging (MRI), X-rays and laboratory indicators for sacroiliac joints and the spine.

Some new inflammatory markers in recent years, such as the neutrophil to lymphocyte ratio (NLR) and red blood cell distribution width (RDW), have also been found to be associated with axial SpA disease activity. In axial SpA patients, NLR exhibits a good correlation with ESR and CRP, and increased NLR was found in patients with high disease activity. Lymphocyte to monocyte ratio (LMR), is also a common blood routine indicator. LMR has been a subject of great interest in a wide range of fields such as inflammation, immunology and carcinoma for a long period of time. The role of lymphocyte-to-monocyte ratio (LMR) in axial SpA remains unclear.

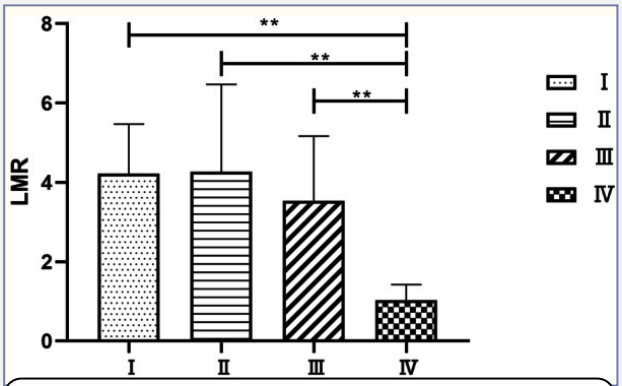
Aim: The aim of this study was to investigate the role of LMR in axial SpA diagnosis, disease activity classification and sacroiliitis staging.

Methods: 78 axial SpA patients [51males and 27 females; mean age 41.0 (29–52) years] and 78 healthy controls (HCs) [55males and 23 females; mean age 40 (30–53) years] were enrolled in this study. The diagnosis of axial SpA was performed according to the New York criteria or the Assessment of Spondyloarthritis international Society (ASAS) classification criteria, whereas the staging of sacroiliitis in axial SpA patients was determined by X-ray examination. Comparisons of LMR levels between groups were performed using t test. Pearson or Spearman correlation analysis were used to assess correlations between LMR and other indicators. Receiver operating characteristic (ROC) curves were used to determine the role of LMR in the diagnosis of axial SpA.

Results: Higher neutrophil-to-lymphocyte ratio(NLR), red blood cell distribution width(RDW), platelet-to-lymphocyte ratio(PLR), mean platelet volume(MPV), erythrocyte sedimentation rate (ESR), and C-reactive protein(CRP) levels and lower red blood cell (RBC), hemoglobin (Hb), Hematocrit (Hct), LMR, alanine aminotransferase (ALT), aspartate aminotransferase (AST), total bilirubin (TBIL) and albumin/globulin (A/G) levels were noted in axial SpA patients compared to HCs. Positive correlations were observed between LMR and RBC, Hb, Hct and A/G, whereas negative correlations were found between LMR and NLR, PLR, AST, and TBIL (*P < 0.05*). ROC curves showed that the area under the curve (AUC) for LMR in the diagnosis of ankylosing spondylitis was 0.803 *(95% CI = 0.734–0.872)* with a sensitivity and specificity of 62.8 and 87.2%, respectively, and the AUC (95% CI) for the combination of ESR, CRP and LMR was 0.975 (0.948–1.000) with a sensitivity and specificity of 94.9 and 97.4%, respectively. LMR levels were lower (*P < 0.05*) and significant differences in LMR values were observed among different stages (P < 0.05).

	AUC	*P*
ESR (mm/h)	0.937 (0.895–0.978)	*P* < 0.001
CRP (mg/L)	0.899 (0.845–0.954)	*P* < 0.001
LMR	0.803 (0.734–0.872)	*P* < 0.001
RDW (%)	0.773 (0.696–0.849)	*P* < 0.001
NLR	0.718 (0.634–0.801)	*P* < 0.001
PLR	0.687 (0.602–0.772)	*P* < 0.001
A/G	0.648 (0.548–0.747)	0.002
MPV (fl)	0.639 (0.550–0.729)	0.003
ESR + CRP + LMR	0.975 (0.948–1.000)	*P* < 0.001

Comparison of clinical indicators for diagnosis of axial SpA



LMR values in axial SpA patients with different X-ray stages

Conclusions: LMR might be an important inflammatory marker to identify axial SpA and assess disease activity and X-ray stage of sacroiliitis.

Reference: Wang J, Su J, Yuan Y, Jin X, Shen B, Lu G. The role of lymphocyte-monocyte ratio on axial spondyloarthritis diagnosis and sacroiliitis staging. *BMC Musculoskelet Disord*. 2021;22(1):86.

3. Treatment of an isolated femoral shaft fracture: Retrograde Humeral Nail

Background: In-born errors of metabolism (IEMs) comprise a large class of genetic disorders characterized by isolated gene defects that lead to breakdowns in essential metabolic pathways. In-born errors of metabolism may have a number of orthopedic manifestations including bony dysplasia, joint contractures, and scoliosis**.** Femoral shaft fractures occurring in such patients may present a unique challenge. Closed treatment may impede patient care, and may increase risk for nonunion or malunion. Similarly, abnormal bony geometry may preclude use of traditional fixation devices, and poor bone quality may increase risk for iatrogenic fracture and implant failure.

Initial injury films demonstrating femoral shaft fracture and severe coxa valga

Case summary: A 31-year-old female patient with history of Mucolipidosis type IV presented with an isolated left femoral shaft fracture. Physical examination was notable for small stature, global developmental delay, and spastic quadriplegia. She had elbow and wrist flexion contractures and her bilateral lower extremities were internally rotated with hip flexion and adduction contractures. Injury films revealed an oblique, subtrochanteric femur fracture with mild shortening and valgus angulation. The femur itself was dysplastic, with a narrow medullary canal and significant coxa valga. Pelvic radiographs revealed diffuse osteopenia, acetabular dysplasia, and mild thoracolumbar scoliosis. There was severe subluxation of the left hip and complete dislocation of the right hip.

Intraoperative fluoroscopic imaging demonstrating fracture reduction and nail passage

Several technical concerns were taken into consideration during preoperative planning. Intramedullary fixation was favored over plate osteosynthesis to minimize surgical dissection and risk

for infection. Her narrow medullary canal, however, was unlikely to accommodate a standard femoral nail. Smaller diameter humeral nails have been previously described for treatment of femoral shaft fractures in adolescents and other patients of small stature, the nails were inserted in an antegrade fashion via a trochanteric entry point. The extreme valgus of the patient's femoral neck made cephalomedullary nailing unfeasible. The decision was made to attempt intramedullary fixation via a retrograde approach.

Three month postoperative radiographs demonstrating interval fracture healing

Discussion: Successful care of her femur fracture was ultimately achieved with a retrograde humeral nail. It is important to note that the humeral nail utilized in the case is designed with a 5-degree proximal bend to permit off-axis entry in the humeral head. This bend also facilitates retrograde insertion of the nail in the distal humerus via a posterior cortical entry site proximal to the olecranon. For successful, atraumatic passage of the nail through the distal femoral cortex in the patient, it was essential to correct this bend prior to passing the nail.

Conclusion: In the care of lower extremity long bone fractures in patients with small stature or circumstances where resources are limited a retrograde humeral nail may be considered a viable treatment option.

Reference: Ibrahim IO, Rodriguez EK, et al. Retrograde Humeral Nail for treatment of an isolated femoral shaft fracture in a patient with Mucolipidosis Type IV: Surgical decision making and outcome. OJHMS. 2021;21.