

Management of Pediatric Femur Fracture with use of 90-90 Traction and Delayed Spica Casting: Case Report

Kim V¹, Mashru R², Graf K²

¹Cooper Medical School of Rowan University, Camden, NJ; ²Cooper University Healthcare, Camden, NJ

INTRODUCTION

Pediatric femur fractures are a common orthopedic injury leading to hospitalization. Although pediatric femur fractures in toddlers are commonly treated non-operatively with the use of acute hip spica casting, there are situations when it is not the optimal treatment of choice. Commonly when there is associated thoracic/abdominal trauma or open injury causing soft tissue compromise in the surrounding area, other methods of management in toddlers should be utilized. These include the use of external fixator, submuscular plating, titanium elastic nails, and 90-90 traction followed by spica casting. Titanium elastic nails and submuscular plating are more commonly used in older, school-age pediatric patients. In our case report, we visit a two year old patient who sustained a proximal 1/3 femur fracture and approximately 4cm shortening with extreme varus and rotational malalignment. She was treated with 90-90 traction followed by delayed spica casting.



Fig 1. AP and lateral views of the closed transverse fracture of the right subtrochanteric femur. Unstable fracture pattern with significant shortening was seen.



Fig 1b. Lat

CASE REPORT

A two year old female toddler with no significant past medical history presented as a transfer to our Level 1 Trauma Center following a fall of three feet in height. She was noted to have gross deformity and swelling in the right femur. The patient was noted to be neurovascularly intact. No other injury was identified. Imaging was ordered which showed a closed right subtrochanteric transverse femur fracture with 4cm shortening and significant malalignment. Although immediate spica casting was considered, it was not performed as the fracture pattern was high risk for unacceptable shortening and malalignment. This unstable fracture pattern warranted management with the use of 90-90 traction followed by delayed spica casting after formation of sufficient callus. Allowing the iliopsoas muscle to relax using 90-90 traction would allow for the fracture to align in the coronal and sagittal planes, while also allowing limb length stability. The family was consented and the patient was brought to the operating room as first case the next morning. Under MAC anesthesia, the 2.0 threaded K-wire was drilled medial to lateral. The patient was then arranged into 90-90 traction. Two pounds of weight was used to pull the fractured femur out to length while keeping it 1cm short to account for boney overgrowth. Tylenol and valium PRN was prescribed to treat pain and muscle spasms. Imaging was collected every four days. Significant callus formation was noted within the next two weeks. The patient was then brought to the operating room to be placed into a hip spica cast on day 16.

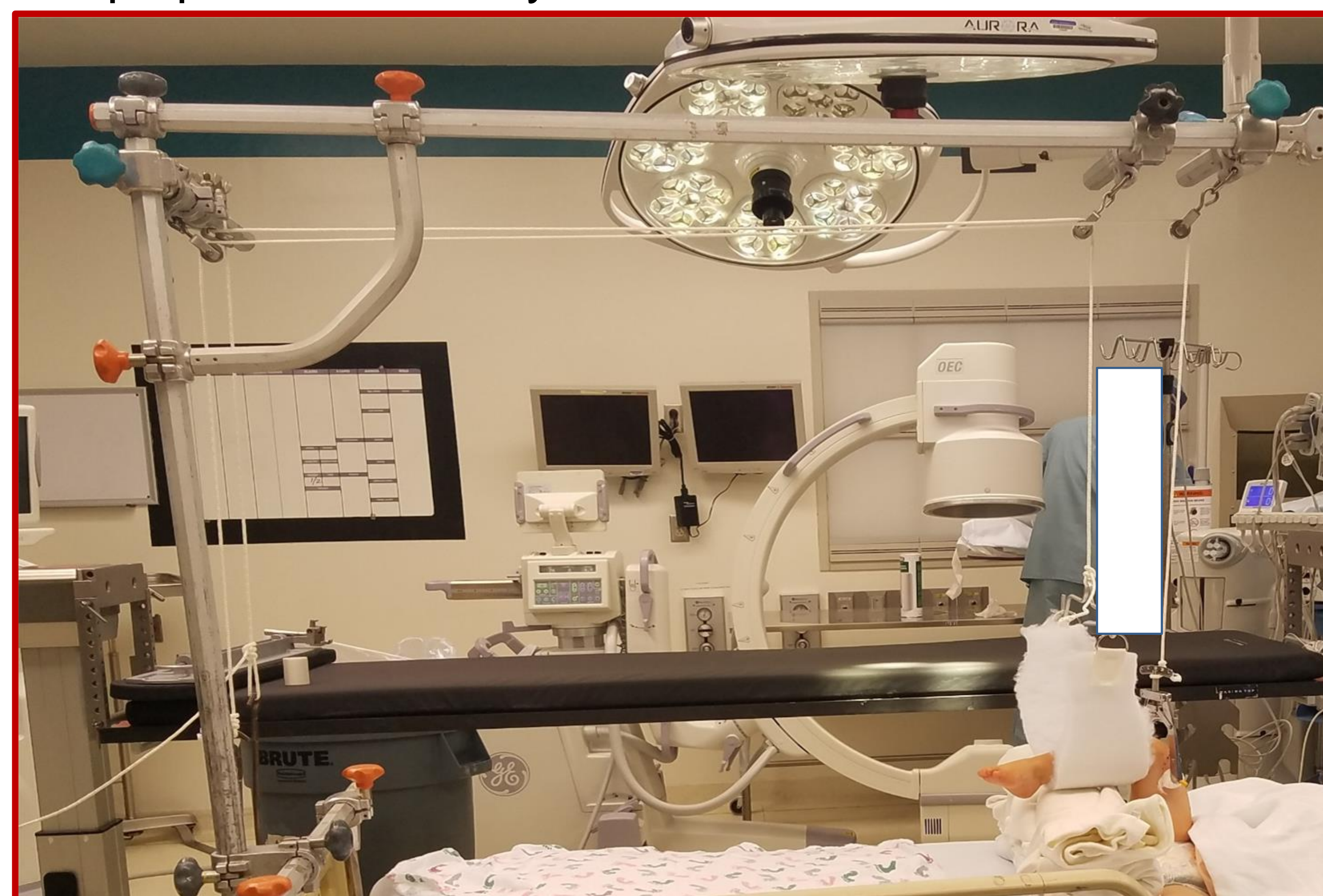


Fig 2. An image depiction of the 90-90 traction set up in the operating room. It was performed following placement of the traction pin in the distal femur while the patient was under MAC anesthesia.

FOLLOW UP AND OUTCOME

The patient followed up in the office at weeks 3 and 5. Following adequate healing and acceptable alignment, the hip spica was taken off at week 5 since injury. At the office follow up visit at week 14, the femur showed continued healing, acceptable alignment, and 1cm shortening. She was performing all activities without difficulty.

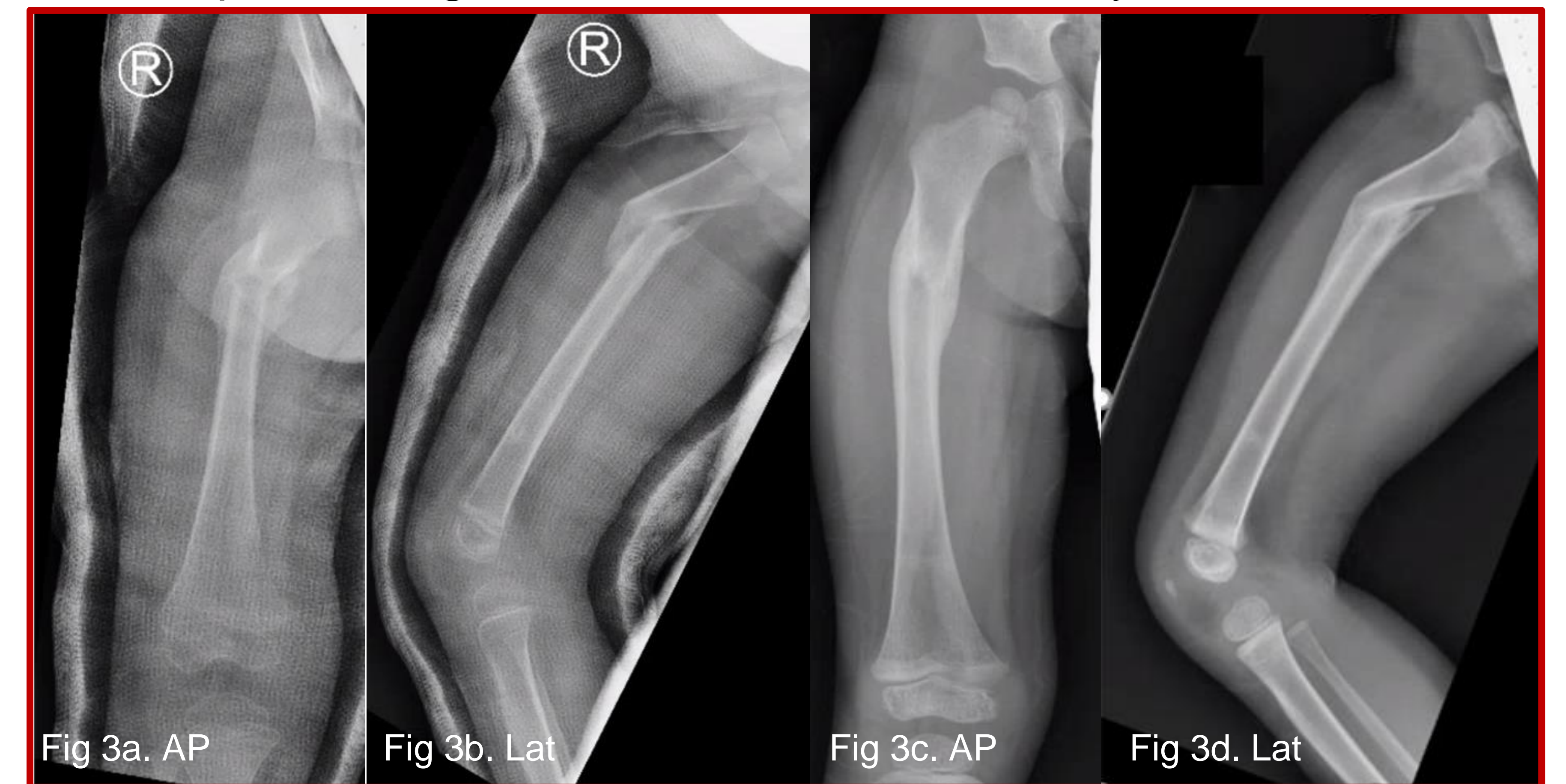


Fig 3a and b show AP and lateral views at week 5. Fig 3c and 3d show AP and lateral views at week 14

DISCUSSION

Traditional treatment methods of pediatric femur fractures with the use of 90-90 traction resulted in a high percentage rate of fracture union and overall good results in maintenance of acceptable alignment and angulation. However, associated hospital costs, psycho-social impact, and increased time to ambulation encouraged the development of alternative modalities of management in school-aged pediatric patients. Nonetheless, in pediatric patients up to the age of 2 years old, 90-90 traction followed by delayed spica casting may be a good treatment modality for some patients with proximal 1/3 femur shaft and subtrochanteric fractures.

CONCLUSION

Closed pediatric femur fractures in toddlers are often treated non-operatively with acute hip spica casting. However, unstable fracture can warrant management with the use of initial 90-90 traction followed by delayed spica casting for optimal fracture union, alignment, and angulation. Although an older technique, it is one that orthopedic surgeons treating pediatric femur fractures should keep in their armamentarium.

SELECTED REFERENCES

Jeng, C., Sponseller, P.D., Yates, A., Paletta, G. Subtrochanteric femoral fractures in children: Alignment after 90°-90°traction and cast application. *Clinical Orthopaedics and Related Research* 1997;341:170-174

Pombo, M., Shilt, J. The Definition and Treatment of Pediatric Subtrochanteric Femur Fractures With Titanium Elastic Nails. *J Pediatr Orthop* 2006;26:364-370

Kocher, M.S., Sirk, E.L., Blasler, R.D., Luhmann, S.J., Mehman, C.T., Scher, D.M., Matheny, T., Sanders, J.O., Watters, W.C., Goldberg, M.J., Keith, M.W., Haralson, R.H., Turkelson, C.M., Weis, J.L., Sluka, P., Hitchcock, K. AAOS Clinical Practice Guidelines - Treatment of pediatric diaphyseal femur fractures. *J Am Acad Orthop Surg* 2009;17(11):718-25

Nork, S.E., Hoffinger, S.A. Skeletal Traction Versus External Fixation for Pediatric Femoral Shaft Fractures: A Comparison of Hospital Costs and Charges. *Journal of Orthopaedic Trauma*. 1998;12(8):563-568.

Buechsenschuetz, K.E., Mehman, C.T., Shaw, K.J., Crawford, A.J., Immerman, E.B. Femoral shaft fractures in children: Traction and casting versus elastic stable intramedullary nailing. *Journal of Trauma*. 2002;53(5):914-921

Bornan, A., Gardell, C., Janavi, P.M. Home traction of femoral shaft fractures in younger children. *Journal of Pediatric Orthopaedics*. 1998;18(4):478-480.

Houston, M.S. Care of the school-aged child in 90/90 traction. *Orthopaedic nursing / National Association of Orthopaedic Nurses*. 1996;15(2):57-62

Ryan, J.R. 90-90 skeletal femoral traction for femoral shaft fractures in children. *Journal of Trauma - Injury, Infection and Critical Care*. 1981;21(1):46-48.