Rates of Implant Related Fractures After Proximal Femoral Osteotomies for Neuromuscular Hip Dysplasia

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BACKGROUND

Neuromuscular hip dysplasia is frequently associated with increased femoral anteversion and coxa valga which can require corrective proximal femoral osteotomy (PFO) during surgical treatment. Locking plates and blade plates are frequently used for fixation, but it is controversial whether implants should be routinely removed. Retained implants can predispose a patient to periprosthetic femur fractures, while hardware removal can result in post-removal fractures.[1] Rates of these complications remain to be further evaluated to help guide patient families and surgeons in deciding whether to perform implant removal.

PURPOSE

- Evaluate implant related fracture rates in patients with neuromuscular hip dysplasia that have undergone proximal femoral osteotomy

METHODS

- Retrospective review of patients <18 years surgically treated with a PFO for neuromuscular hip dysplasia at a tertiary children's hospital from 2010-2020
- Patients sustaining a postoperative periprosthetic femur fracture were identified
- Patients undergoing subsequent hardware removal were evaluated and rates of post-hardware removal femur fractures were determined
- Information regarding patient demographics, fracture characteristics, and surgical procedures was collected
- Descriptive statistical analysis was performed

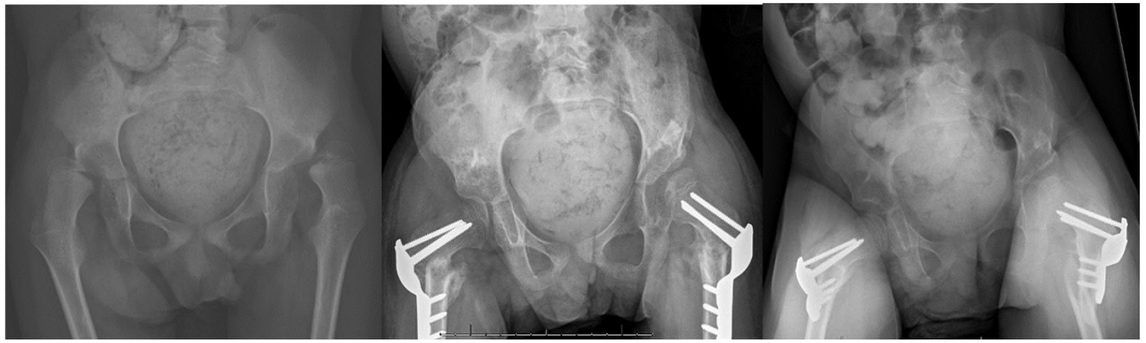

Figure 1: Pre-op AP pelvis showing bilateral neuromuscular hip dysplasia. Post-op AP pelvis after bilateral varus derotation proximal femoral osteotomies. AP pelvis 10.4 months postop showing Left periprosthetic femur fracture.

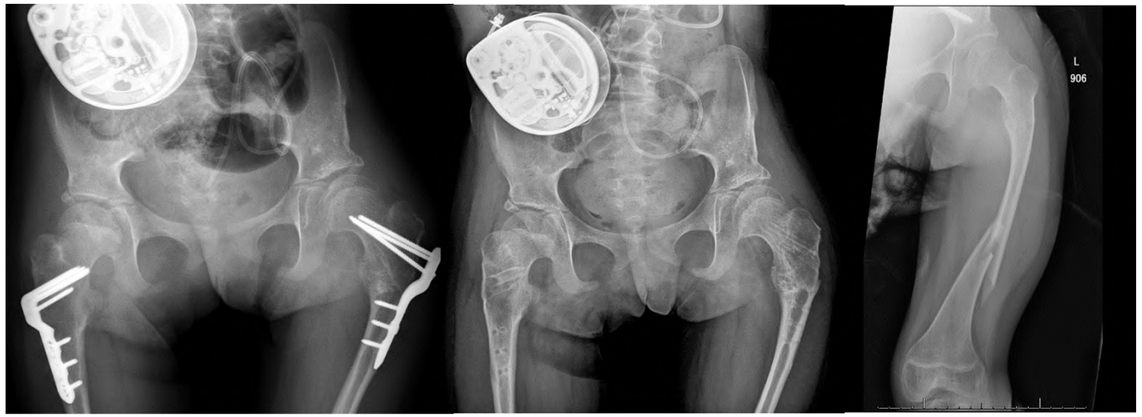

Figure 2: Post-op AP pelvis of a patient after bilateral proximal femoral osteotomies for treatment of neuromuscular hip dysplasia. AP pelvis after bilateral hip removal of hardware. AP femur xray showing a femoral shaft fracture occurring 3 years after hardware removal.

RESULTS

- 233 patients underwent PFO for treatment of neuromuscular hip dysplasia during the study period

- 8 patients (3.43%) sustained periprosthetic femur fractures
- These were usually subtrochanteric fractures (7/9, 77.8%)
- Occurred an average of 1.93 years after index surgery

- 84 patients (36.1%) underwent routine hardware removal during follow up
- 4.76% (4/84) sustained a femur fracture after implant removal
- All post-implant removal fractures occurred in the femoral shaft distant from hardware removal site
- Occurred an average of 1.18 years after hardware removal

CONCLUSION

Fracture, either periprosthetic or post-implant removal, after PFO for neuromuscular hip dysplasia is a rare complication. No patients had a fracture near the site of hardware removal – these fractures occurred distally in the femoral shaft and more than a year after implant removal. The decision for routine implant removal is influenced by many factors and the risk of implant related fractures with retention versus removal should be considered.

Our results can be used by the surgeon to counsel patient families about the rate of these complications and aid in the decision making process for pursuing implant removal after PFO.

REFERENCES

1. Ding J, Dai ZZ, Liu Z, Wu ZK, Zhang ZM, Li H. Risk factors for implant-related fractures after proximal femoral osteotomy in children with developmental dysplasia of the hip: a case-control study. Acta Orthop. 2021 Apr;92(2):228-234