

Correction of Cubitus Varus Deformity in an Adolescent Using Lateral Closing Wedge Osteotomy with Reconstruction Plate Fixation: A Case Report

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Abstract

Cubitus varus deformity, commonly referred to as gun-stock deformity, is a frequent late complication following malunited supracondylar fractures of the humerus in children. The deformity is triplanar, involving medial angulation in the coronal plane, hyperextension in the sagittal plane, and internal rotation in the axial plane. We report a case of a 14-year-old adolescent male presenting with progressive cubitus varus deformity of the right elbow following a supracondylar fracture treated conservatively seven years earlier. Radiographs demonstrated a 20° varus deformity compared with 8° valgus in the contralateral elbow. The patient underwent lateral closing wedge osteotomy of the distal humerus with fixation using a 6-hole reconstruction plate. Postoperatively, the elbow was immobilized for four weeks followed by physiotherapy. Radiological union was achieved at eight weeks with restoration of a carrying angle of 7° and elbow range of motion from 0° to 130°. Lateral closing wedge osteotomy with rigid plate fixation provided stable correction, early union and satisfactory functional outcome.

Introduction

Cubitus varus deformity is a well-known complication of supracondylar fractures of the humerus in children. It results primarily from malunion due to inadequate reduction or loss of reduction during conservative treatment. The reported incidence ranges from 3% to 57%. Although the deformity rarely produces major functional impairment, it often causes cosmetic dissatisfaction and may alter elbow biomechanics. The deformity is triplanar, involving medial tilting in the coronal plane, internal rotation in the axial plane, and hyperextension in the sagittal plane. Among these components, the coronal plane deformity is the most clinically significant because it does not remodel with growth. Various osteotomy techniques have been described to correct cubitus varus deformity, including dome osteotomy, step-cut osteotomy, and lateral closing wedge osteotomy. Lateral closing wedge osteotomy is widely used due to its simplicity, predictable correction, and inherent stability when combined with rigid fixation.

Case Presentation

A 14-year-old male presented to the outpatient department with deformity and mild pain in the right elbow. The patient had sustained trauma to the right elbow seven years earlier and was treated with

closed reduction and posterior splinting. The splint was removed after four weeks and physiotherapy was initiated. Over time the patient developed progressive deformity of the elbow. Although the elbow maintained near normal range of motion, the patient complained of cosmetic concern and discomfort while lifting heavy objects.



Clinical examination revealed visible varus deformity of the right elbow with near normal range of motion. Radiographic evaluation using anteroposterior and lateral radiographs demonstrated approximately 20° varus deformity of the affected elbow, while the contralateral elbow showed a normal carrying angle of approximately 8° valgus.

Surgical Technique

The patient was planned for correction of the deformity using lateral closing wedge osteotomy. Under fluoroscopic guidance, the desired osteotomy wedge was marked using K-wires. The wedge of bone was carefully removed without breaching the medial cortex. The osteotomy was then closed and stabilized using a 6-hole reconstruction plate with screws placed in the proximal and distal fragments. Postoperatively, the elbow was immobilized using a posterior splint for four weeks.



Results

Postoperative rehabilitation was initiated after four weeks following removal of the splint. The patient gradually regained elbow mobility and achieved full functional range of motion within seven weeks after surgery. At final follow-up, the carrying angle was corrected to 7° valgus and elbow range of motion was 0° – 130° . Radiological union of the osteotomy site was achieved at eight weeks. No complications such as loss of correction, implant failure, or neurovascular deficit were observed.



Discussion

Cubitus varus deformity primarily results from malunion of supracondylar fractures of the humerus. Although often considered a cosmetic deformity, persistent varus alignment may predispose patients to complications such as lateral condyle fractures and posterolateral rotatory instability. Surgical correction through osteotomy remains the definitive treatment. Lateral closing wedge osteotomy is one of the most commonly performed techniques because it provides reliable correction of the coronal deformity and is technically straightforward. Rigid fixation is essential to maintain the correction and prevent displacement of fragments. In our case, fixation using a reconstruction plate provided adequate stability and control of both proximal and distal fragments. Preservation of the medial cortex and minimal periosteal stripping also contributed to faster biological healing.

Conclusion

Lateral closing wedge osteotomy with reconstruction plate fixation is an effective and reliable technique for correction of cubitus varus deformity in adolescents. The procedure provides accurate deformity correction, stable fixation, early union, and satisfactory functional outcome.

References

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