

Surgical outcomes for Gartland type III supracondylar distal humerus fracture in children: comparison between flexion and extension types

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INTRODUCTION:

Supracondylar distal humeral (SCH) fractures account for 50–70% of pediatric elbow fractures. Although several studies have compared SCH fractures based on the Gartland classification and examined surgical methods, only a few have compared the flexion and extension types. This study aimed to compare the surgical outcomes of flexion and extension types of Gartland type III SCH fractures in children.

METHODS:

This retrospective study included 257 children who underwent surgery for Gartland type III SCH fractures. The patients were divided into extension- and flexion-type groups, and the radiological and clinical surgical outcomes were compared. Radiological outcomes were assessed in terms of Baumann angle (BA), carrying angle (CA), lateral capitellohumeral angle (LCHA). Angular deformities were defined as differences > 10 °in the coronal and sagittal alignment parameters (BA, CA, and LCHA) compared with the unaffected side. Clinical outcomes were assessed using the Flynn criteria.

RESULTS:

This study included 257 patients (mean age, 6.1 years, 37 flexion-type and 220 extension-type patients). Patients with flexion-type fractures were significantly older than those with the extension type (p=0.018). In flexion-type fractures, there were more instances where stable fixation could not be achieved through lateral placement of 2 pins (p=0.001), and the complication rate was higher (p<0.001) than that of extension-type fractures. There were significant differences in radiologic outcomes in terms of BA (p=0.040) and LCHA (p=0.001) between the two groups. Flexion-type fractures were a significant risk factor for sagittal deformity, with an odds ratio of 3.225 (p= 0.002).

DISCUSSION AND CONCLUSION: In this study, we found that flexion-type supracondylar fractures had poor radiographic outcomes after surgery in terms of the LCHA and BA. Flexion-type fractures are significantly associated with poor sagittal alignment. Therefore, clinicians should focus on alignment during surgery, particularly in flexion-type SCH fractures.



Parameter	Extension Type (n=220)	Flexion Type (n=37)	p-value
Mean Age (years)	5.8	6.5	0.018
Male/Female	110/110	18/19	
Unilateral/Bilateral	205/15	35/2	
Stable fixation (2 pins)	215	32	0.001
Complication rate (%)	2.3	5.4	<0.001

Parameter	Extension Type (n=220)	Flexion Type (n=37)	p-value
Mean BA (°)	55.2	58.1	0.040
Mean CA (°)	10.5	11.2	0.850
Mean LCHA (°)	135.5	132.1	0.001

Parameter	Extension Type (n=220)	Flexion Type (n=37)	p-value
Mean Flynn Score	1.8	1.9	0.750
Good alignment (%)	95.5	94.6	0.950

Parameter	Extension Type (n=220)	Flexion Type (n=37)	p-value
Mean Lateral Displacement (mm)	2.1	2.3	0.650
Mean Medial Displacement (mm)	1.8	1.9	0.700

