

2D osteotomy provides comparative results with 3D osteotomy for cubitus varus deformity

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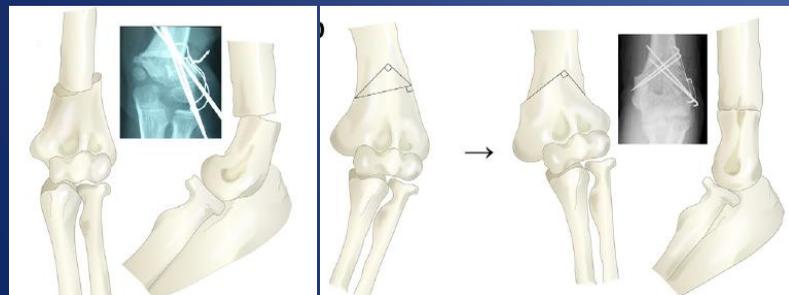
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Introduction

A variety of osteotomies have been proposed to correct posttraumatic cubitus varus deformity as well as any associated hyperextension and/or rotational deformities. However, lateral closing-wedge osteotomy and step-cut osteotomy, both of which have been used extensively with satisfactory outcomes, correct only in the coronal plane. Direct comparison has been made between three-dimensional (3D) and simple coronal two-dimensional (2D) osteotomies.

Materials & Methods

Between 1983 and 2015, we treated 102 elbows (102 patients) with a posttraumatic varus deformity. There were 72 male and 30 female patients. The average age of the patients at the time of the osteotomy was 10.8 years (range, 3 to 31 years). We classified 39 patients who underwent 3D osteotomies as 3D Group and 63 patients who underwent 2D osteotomies as 2D Group, and we compared the outcomes between the groups. Clinical evaluation included an assessment of the carrying angle and measurement of the passive range of motion before surgery and at the time of the final follow-up. To evaluate the remodeling capacity of the bone to recover elbow flexion in 2D Group, we assessed the range of motion before surgery and at the time of the final follow-up in patients who were less than ten years old and those who were more than ten years old.



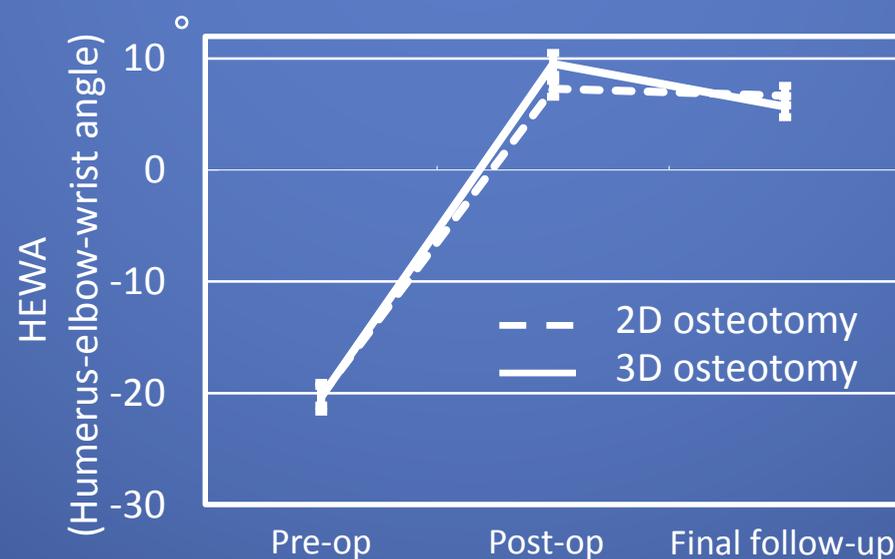
2D osteotomy

3D osteotomy

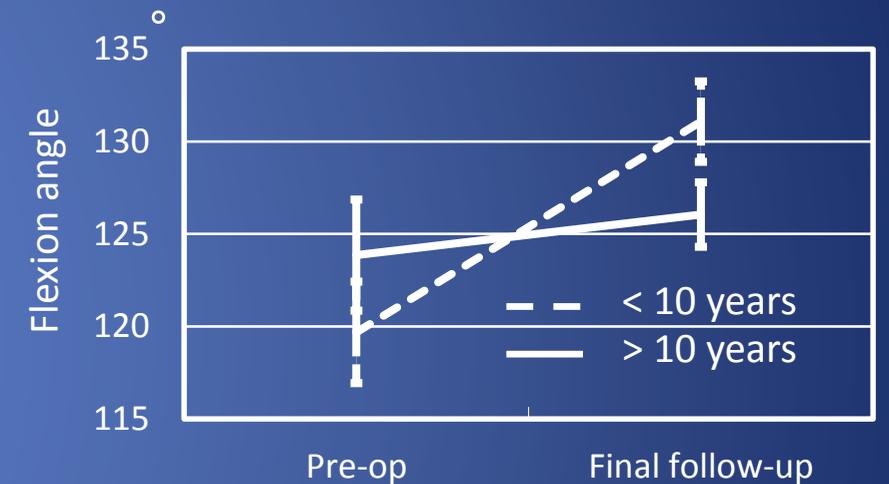
Takagi T et al. JBJS-A 2010

Results

1. There was no significant difference between the groups with regard to the carrying angle or the elbow range of motion, either before surgery or at the time of the final follow-up.
2. 3D Group had more significant loss of correction ($p < 0.05$). There was a loss of 4.4 degrees from immediately after surgery to the time of the final follow-up in 3D Group compared with a loss of 0.7 degrees in Group II.



3. In 2D Group, elbow motion reached the physiological range by the time of the final follow-up in patients who were less than ten years old.



Conclusions

2D supracondylar osteotomy of the humerus provides comparable results with 3D osteotomy for posttraumatic cubitus varus deformity. For osteotomies to correct cubitus varus deformity, correction of internal rotation is not needed. Furthermore, with a 3D osteotomy, it is difficult to maintain correction and to acquire the planned carrying angle because of the small area of bone contact from our results. It is necessary to correct hyperextension in patients older than ten years of age, as after that age bone remodeling is not expected to increase elbow flexion.

References

1. Takagi T et al. JBJS-A, 92(7):1619-26, 2010
2. Takagi T et al. JBJS-EST, 1(1):e3, 2011