3D FOREARM OSTEOTOMY ASSISTED WITH PREOPERATIVE CUSTOMIZED TEMPLATE

Marta de Prado, María de los Ángeles de la Red, Carlos Garcés, Gonzalo García, José Couceiro, Higinio Ayala, Olga María Velez, Manuel Rubén Sánchez
Hospital Universitario Marqués de Valdecilla, Santander, España

INTRODUCTION:
Physeal fractures represent 15% of all pediatric fractures. Injury to the physeal region at the distal ulna is even more uncommon. The surgical indications in forearm deformities includes: carpal subluxation, decreased range of motion and cosmetic problems.

CASE REPORT:
A 16 year old girl with distal radio-ulnar fracture at 5 years old, treated at surgically in another center.

Physical examination:
Pain over the dorsum of the ulna, increased when she grasped objects and in pronation
Pain over the radial head at the elbow joint.
Supination was limited to 40º.
A stable distal radio-ulnar joint.
Forearm deformity was evident and presented a cubitusvarus of 15º.

Image test:
X-Ray: distal ulna shortening and radius bowing. The ulna has a dorsal angulation at its distal third of 20º.
CT: dorsal incurvation of the radius, volar incurvation of the ulnar bone.
Left ulnar length: 21.5 cm ,right ulnar length: 24.8 cm.
Left radius length:22.6 cm, right radius length: 23.4 cm.
The left radial head was slightly dysplastic but it was not dislocated.
The radial torsional angle was of 6,5º on the left side and 10,8º on the right forearm.

Treatment:
A corrective radio-ulnar osteotomy was proposed and planned in a 3D bone model.

Radial surgery:
1.-Using the real size bones the position of the radius template was estimated.
2.-A closing wedge osteotomy of 15º correcting the bone in the 3 planes.
3.-The osteotomy was stabilized with a plate.

Ulnar surgery:
1.-A closing wedge osteotomy of 20º and resection of a dorsal spur.
2.-To avoid excessive shortening: triangular osteotomy in a reversed way.
3.-An ulnar plate was inserted and filled with screws.

RESULTS:
Osteotomy union was complete at 8 weeks.
At 6 month:
-Forearm pronation: 60º.
-Forearm supination: 50º.
-No pain at the DRUJ and in the elbow joint.

CONCLUSION:
1.-Symptoms after malunion of a diaphyseal forearm bone include restriction of forearm rotation, pain and instability of the radioulnar joint during pronation and supination.
2.-In this complex forearm deformities quantification of correction of a multiplane malunión remains challenging.
3.-Technology advances with three dimensional planning and printing technique aids the surgeon to achieve an accurate preoperative planningification and is a promising technique.

REFERENCES:

Contact: marta.dpt@gmail.com