SESSION 4

Finger

Moderators : Kapandji A.I., Barbier O.

Some Factors Influencing 3-D Modeling of the Human Finger
van Zwieten K.J., Lippens P.L.

Percutaneous Osteotomy of Phalanges and Metacarpals Mal-Union
Gonzalez-Hernandez E., Osorio L., Indriago I., Rojas S.L., Badia A., Khouri R.

SOME FACTORS INFLUENCING 3-D MODELING OF THE HUMAN FINGER

van Zwieten K.J., Lippens P.L.

Departement Medische Basiswetenschappen, Limburgs Universitair Centrum,
Diepenbeek, Belgium

Modeling of the human finger requires reliable data sampling, both numeric and anatomical. Most data are obtained from anatomical specimens in different stages of flexion and extension, and presented as 2-D models in lateral or dorsal views of the finger. These models are inadequate, however, since they merely represent projections of the model in sagittal, *resp*. frontal planes. 3-D data derived from serial cross sections should be corrected for differences in slice thickness and for specimen distortion. In our studies, high resolution MRI is used to reconstruct the 3-D structure from three scans in perpendicular planes, and to determine the exact position of the anatomical elements in the human finger.

At the level of the proximal interphalangeal (PIP) joint of an extended finger, the position of the extensor assembly coincides approximately with the frontal plane. The extensor assembly is maintained in this position by strong collateral ligaments. During flexion of the finger, however, the ligaments shift alongside the trochlea to more palmar positions, thus enabling the lateral bundles of the extensor complex also to move to more palmar positions. In a flexed finger the positions of the lateral bundles of the extensor assembly coincide more or less with sagittal planes at the level of the PIP joint. These positional changes of tendons and ligaments should be taken into account in 3-D modeling of finger kinematics.

PERCUTANEOUS OSTEOTOMY OF PHALANGES AND METACARPALS MAL-UNION

Gonzalez-Hernandez E., Osorio L.,Indriago I., Rojas S.L., Badia A., Khouri R.

Miami Hand Center, Miami (Florida), USA

Introduction

Metacarpal fractures mal-unions are usually well tolerated. Phalanges malunions are usually more noticeable and frequently interfere with the proper function of the hand. These deformities are accentuated as the patients attempt to make a fist. We reviewed our experience with patients who underwent percutaneous corrective osteotomies for complaints which ranged from unacceptable cosmetic deformity to significant functional impairment.

Methods

This is a retrospective study of twenty one patients who underwent percutaneous corrective osteotomies about the long bones in the hand. The duration of the deformity ranged from 2 years to 1 month. Fourteen patients underwent corrective osteotomy in the metacarpal ; nine of them for severe flexion deformity, two for shortening up to 1 cm, and three for malrotation. Seven patients underwent osteotomy of the proximal phalanx for malrotation. The osteotomy was performed percutaneously at the site of the deformity, with a small osteotome under fluoroscopic guidance.

All the osteotomies were stabilized with intramedullary flexible nails and no power tools were used in any of the cases. No bone grafting was performed in any of the cases, including those with significant shortening. MP blocking casts were used during a 4 weeks period in the metacarpal osteotomies and we supplemented the cast with a buddy tape in the proximal phalanx osteotomy cases. All the intramedullary nails were removed at 4 to 6 weeks under local anesthesia. The minimum follow up was 12 months.

Results

The Total Range of Motion of the MCP and PIP joints were preserved as we compared the preoperative evaluation with the final results. There was no loss of correction in any of the cases. One patient had an overcorrection of 3 mm beyond the contralateral fourth metacarpal, for a preoperative shortening of 5 mm. All the osteotomies were sufficiently stable at 6 weeks, no cases required reoperation beyond the routine pin removal. All patients were highly satisfied with the result and all returned to preoperative work status.

Conclusion

The minimally invasive approach for correction of deformities of the long bones of the hand is safe and reliable, producing no significant scars and maintaining ROM while correcting the deformity, with a high patient satisfaction.