

A new smart dynamic external fixator in the treatment of complex fractures of the proximal interphalangeal joint of the long fingers.

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Objective: Treatment of articular fractures of the proximal interphalangeal (PIP) joint of the hand can be a hard challenge. Ideal treatment should include an anatomic reduction, stable fixation and the possibility of early finger mobilization to prevent joint stiffness. We propose for the treatment of these fractures a new smart dynamic external fixator (SDEF), derived from the device described by Suzuki and based on the concept of the capsuloligamentotaxis described by Vidal.

Methods: From 2003 to 2012 we treated with a SDEF 21 patients with a mean age of 44 years (range, 19-61 years) affected by articular fracture of PIP joint. This device has eliminated any assembling difficulty. The entire surgical procedure was performed percutaneously. The mean operative time was 11 minutes (4-21 minutes). The patients were encouraged to move the PIP and the distal interphalangeal (DIP) joints immediately after the procedure. The device was removed after a mean time of 54 days (42-64 days).

15 cases were retrospectively assessed after a mean follow-up of 15 months (11-21 months).

Radiological assessment was performed to evaluate fracture reduction and bone healing.

Clinical subjective assessment was performed with the quick DASH questionnaire. Pain was also evaluated with a visual analogical scale (VAS).

Objective assessment included range of motion (ROM), grip strength and incidence of complications.

Results: At the radiological evaluation good reduction was achieved in 13 cases; in 2 cases a residual articular step was present. Bone healing was achieved in all cases.

The average quick DASH score was 8.4 (0-18). Average VAS score was 1.5 (0-3).

The mean ROM of the PIP joint was 80° (84% of the uninjured side). The mean ROM of the DIP joint was 56°. A mean DIP extensor lag of 10° (5°-15°) was present.

The average grip strength was 94% (78-115%) of the controlateral hand.

No cases of septic arthritis and/or osteomyelitis were present. Superficial pin-track infection, treated with oral antibiotics and temporary rest, developed in 3 cases.

Conclusions: On the basis of our results we believe that SDEF is a good minimally invasive surgical option for treatment of articular fractures of the PIP joint.

The procedure is very easy and fast to realize and does not require particular skill by the surgeons.