TREATMENT OF FRACTURE-DISLOCATIONS OF THE PROXIMAL INTERPHALANGEAL JOINT WITH THE "PINS & RUBBERS" TRACTION SYSTEM

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The use of a cheap, self-made external fixator for the treatment of unstable fracture dislocation of the PIP joint is described. The first experience in 5 patients is promising.

Keywords : proximal interphalangeal joint ; dislocation ; external fixator.
Mots-clés : articulation interphalangienne proximale ; luxation ; fixateur externe.

INTRODUCTION

Fracture dislocations of the PIP joint of the long fingers are often unstable, with comminution of the articular surface of the middle phalanx, and they frequently lead to (painful) joint stiffness.

Suzuki *et al.* (1994) described an elegant, simple and cheap system consisting of bent wires and rubber bands. We report our first results using this technique in five patients.

MATERIAL AND METHOD

Surgical technique (fig. 1)

A long axial K-wire (1.5 mm) is drilled into the head of the proximal phalanx, perpendicular to the axis of the bone and bent 90° on both sides of the finger in the direction of the fingertip. A hook is produced at both ends (W1).

A second K-wire (1.5 mm) is drilled into the head of the middle phalanx and 2 hooks near the skin are produced (W2).

A third K-wire (1.2 mm) is inserted in the base of the middle phalanx palmar to the bent axial wire, to prevent dorsal displacement of the middle phalanx (W3).

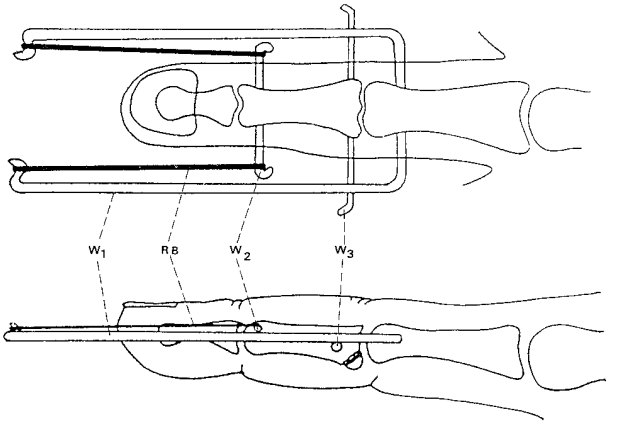

Fig. 1. — Schematic presentation of the device. (RB = rubber band, W1, W2, W3 = K-wire one, two and three (see text).

The hooks of the axial (W1) and second K-wire (W2) are connected with rubber bands, and the reduction is checked under radioscopy. The tension of the rubber bands is adapted according to the reduction status. The device is removed after 4 to 5 weeks. Active flexion and extension exercises are encouraged from the first postoperative day.

Patients

We treated 5 patients ; there were 3 acute fracture dislocations and 2 chronic cases ; there were 4 males and one female with an age between 23 and 59 years (see table I).

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In the 2 chronic cases, closed reduction was impossible and the joint was approached through a midlateral incision, the accessory collateral ligaments were resected and the palmar plate was released.

RESULTS

The results are summarized in Table I. The PIP joint remained swollen in all patients. None of them complained of pain. In one patient (case 3) a pin track infection occured and the device was removed after 12 days, with preservation of the reduction.

DISCUSSION

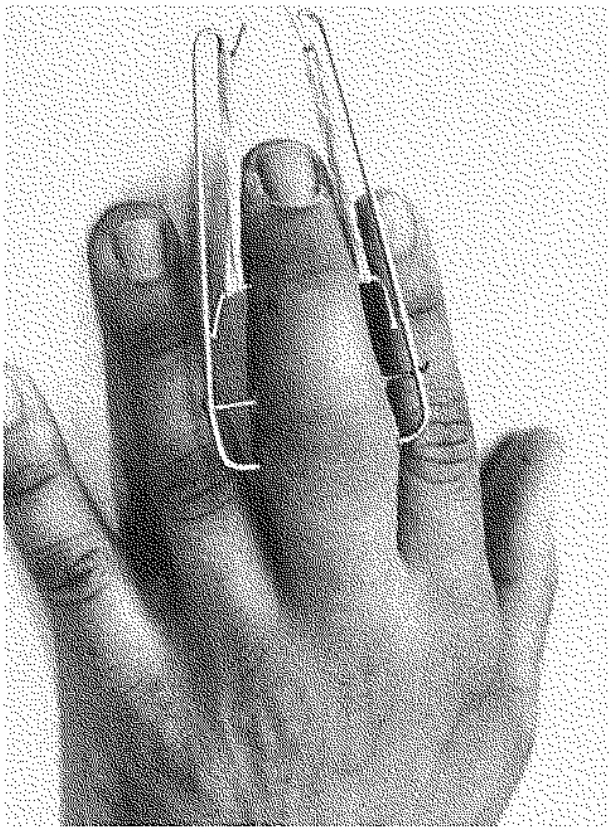
Fracture dislocations of the PIP joint are usually unstable. Reduction is easily achieved but is difficult to maintain. Immobilisation and transarticular pin fixations often lead to stiffness, swelling and pain.

Table I. – Summarized data of the patient

Mean mobility : -25° → 80°
Mean TAM : 63° (42° → 90°)
Recent cases : 75° (-15° → 93°)
Old cases : 46° (-15° → 61°)

Patient (Gender) (Age)	Lesion	Delay (Days)	Additional Procedures	Results (Mobility PIP)
M 36	L3	10	—	-10/85
M 36	R3	1	—	-15/85
F 59	L2	5	—	-20/110
M 23	L4	90	Open reduction Volar plate arthroplasty	-0/50
M 56	R4	63	Open reduction	-30/72

TAM = total active motion.



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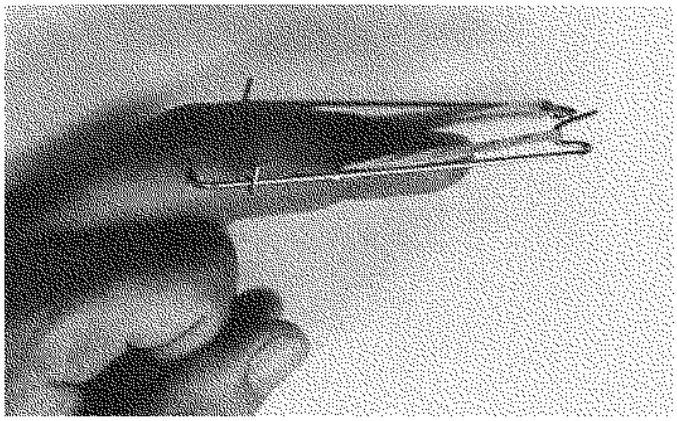

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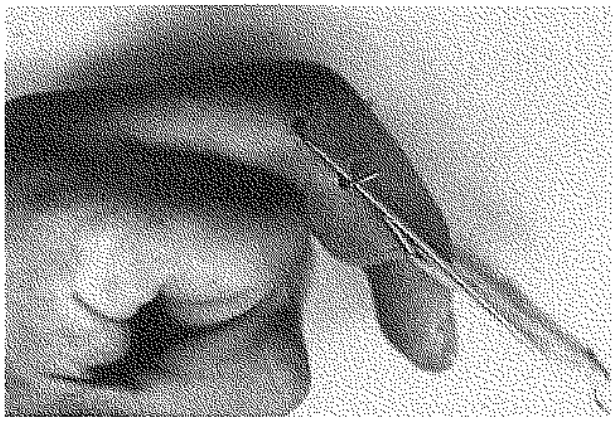

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Fig. 2. – Case 1 : (a) superior view of the device and lateral view with the finger (b) extended and (c) flexed.

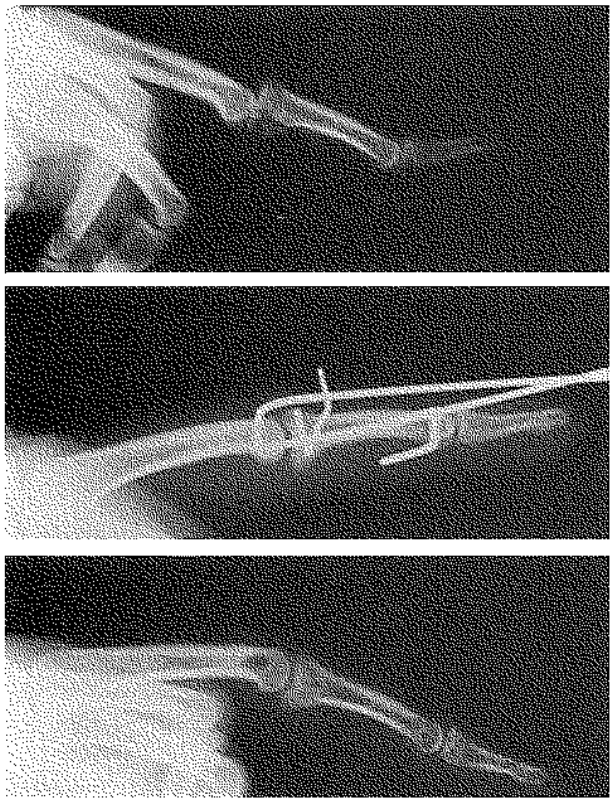

Fig. 3. — Case 1 : (a) preoperative radiographs of a fracture dislocation of the PIP joint ; (b) postoperative radiograph with the fixator, and (c) radiograph 3 months postoperatively.

Extension block splinting was already described by Mc Elfresh *et al.* in 1972 (6), and recently reviewed by the same authors (3). In 1987 Agee described a force couple splint to treat these lesions (1). The "quatro-S" of Fammy is an attractive alternative, allowing considerable motion but without traction (2).

The dynamic traction is a combination of traction and movement. The traction force provides a distal traction, with reduction of the fragments (ligamentotaxis) and prevention of periarticular soft tissue contracture. The joint movement might enhance cartilage repair (or regeneration). The devices with a banjo frame are bulky and difficult to assemble (7).

The results of dynamic traction are good and do not deteriorate with time. The 10 patients of Schenck (7) had a total active motion (TAM) of 87° (-5° in extension to 92°). Stern *et al.* (8) reported 7 cases with a TAM of 76° (-12° to 88°), and Hastings and Ernst (5) even had a better outcome (TAM : 98° ; from -2° to 100°) in acute dorsal fracture dislocations.

The results of the "pins and rubbers" traction system described by Suzuki *et al.* (9) are equally good with a mean TAM of 87° (-5° in extension to 92° in flexion) (4 cases of fracture dislocation of the PIP). The series of De Soras *et al.* (6) with 7 cases had similar results : TAM of 66° (-10° in extension, 76° in flexion). This device offers a dynamic approach of a complex problem, without the necessity for open reduction. It is easy to apply, comfortable for the patient and cheap. The results are in our hands comparable to those reported in literature.

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SAMENVATTING

L. DE SMET, G. FABRY. Behandeling van fractuurluxaties van het proximaal interphalangeaal gewricht met een dynamisch traktie systeem.

We beschrijven de behandeling van fractuurluxaties van PIP met een zelfgemaakte, goedkope externe fixator. De eerste ervaringen met dit systeem zijn veelbelovend.

RÉSUMÉ

L. DE SMET, G. FABRY. Traitement des fractures-luxations de l'articulation interphalangienne proximale par traction dynamique.

Les auteurs rapportent les résultats du traitement des fractures-luxations de l'IPP au moyen d'un fixateur externe simple et peu coûteux. Les premiers résultats sont favorables.