Berger's Capsulodesis with Dorsal Intercarpal Ligament in Chronic Scapholunate Instability

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When a completely torn scapholunate ligament is associated with a deficiency of the distal joints of the scaphoid base, there is a scapholunate instability. A scapholunate diastasis, a lunate extension (DISI) and a rotary subluxation of the scaphoid appear. When this pathologic flexion of the scaphoid (radio-scaphoidal angle >45°) is still reducible, and before arthrosis appears, preserving treatments aiming at reconstructing good scapholunate congruence are indicated [1]. Among the different capsular techniques, tendinous or ligamentous as proposed in literature, one of them, as described by R. Berger [2] particularly called our attention and is to be explained.

1 Wrist Arthroscopy

Before ligamentoplasty as such is made, arthroscopy is systematically made on an unstable and painful wrist. It aims at seeing the stump of the scapholunate ligament and making sure it cannot heal anymore. Arthroscopy is useful to test the good reducibility of flexion of the scaphoid, which must be easy, as it slightly presses on the capital facet of the scaphoid thanks to the hook palpator which is introduced in midcarpal. Finally, it enables to examine all the cartilages, especially the proximal pole of the scaphoid, the scaphoidal facet of the radius and the radial styloid, since they are the first to be affected by arthrosis [3]. If arthroscopic data confirm the resort to a scapholunate ligamentoplasty, the technique consisting in using the intercarpal ligament is thus proposed.

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E. Camus, L. Van Overstraeten (eds.), *Carpal Ligament Surgery*,
DOI 10.1007/978-2-8178-0379-1_21,

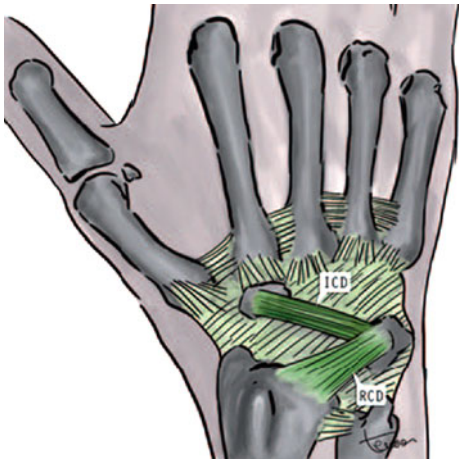

Fig. 1 The dorsal radio-carpal (DRC) and dorsal inter-carpal (DIC) ligaments

2 Surgical Technique

Under locoregional anaesthesia and tourniquet placed at the base of the arm, the portal is dorsal and transversal as it joins the radiocarpal entry points of the arthroscopy (3–4 and 4–5 portals). This is a variant of the original technique which sole interest is to be more aesthetic since it is in the bend of extension of the wrist, especially when the patient is a young woman. The retinaculum of the extensors is split lengthwise in its distal half, between the third and fourth compartment. There is a systematic avulsion of the posterior interosseous nerve.

R. Berger [4] insisted on the importance of the osseous landmarks before beginning the capsulotomy, and we follow these indications. The idea is to make a portal respecting the dorsal radiocarpal (DRC) and dorsal intercarpal (DIC) ligaments (Fig. 1).

These landmarks are (Fig. 2):

1. The middle of the section between Lister's tubercle and the radioulnar joint, which gives the centre of the radial joint of the DRC ligament
2. The top of the dorsal tubercle of the triquetrum, towards which the DRC and the DIC ligaments converge
3. The scapho-trapezial joint, which gives the distal insertion zone of the DIC ligament

Thus, the capsule is lifted as if it were a flange with a distal joint. The proximal half of the DIC ligament is also lifted on its scaphoidal joint (Fig. 3).

Two 1.2 mm diameter Joystick pins are placed in the scaphoid and the lunate (Fig. 4) and used to reduce the scapholunate diastasis, the flexion of the scaphoid and the extension of the lunate (Fig. 5). Two parallel pins maintain the reducing of the scapholunate couple, and a scaphocapitate pin cancels out the strengths which create the flexion of the scaphoid (Fig. 6). The DIC ligament is thus introduced on the posterior horn of the lunate thanks to an intraosseous anchor (Fig. 7).

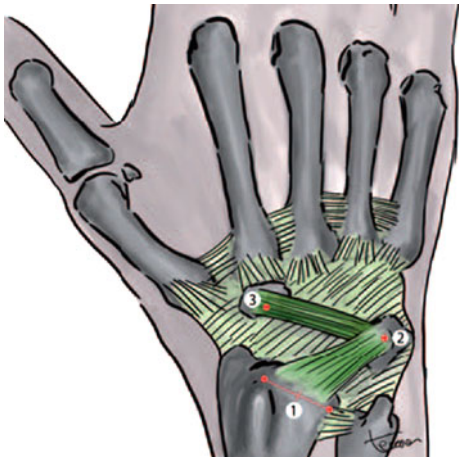

Fig. 2 The landmarks of the capsulotomy

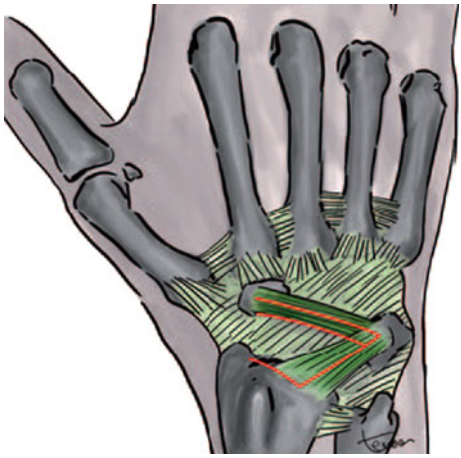

Fig. 3 The drawing of the capsular flaps

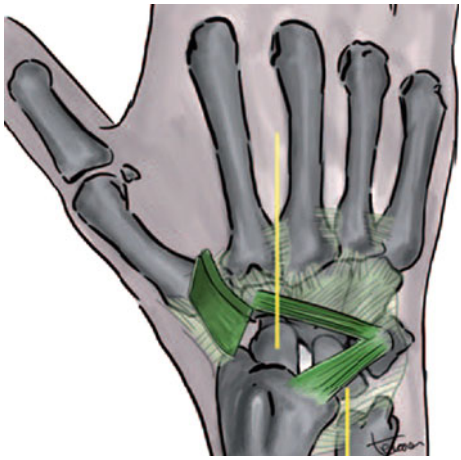

Fig. 4 The two joystick pins placed in the scaphoid and the lunat

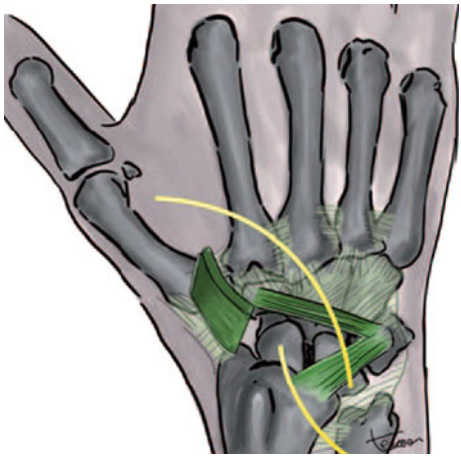

Fig. 5 The reduction maneuver

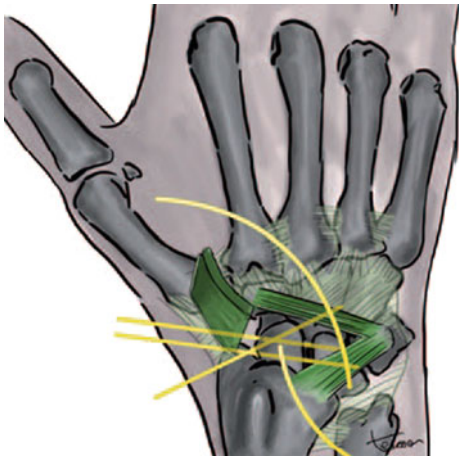

Fig. 6 The scapholunate and scaphocapitate pinning

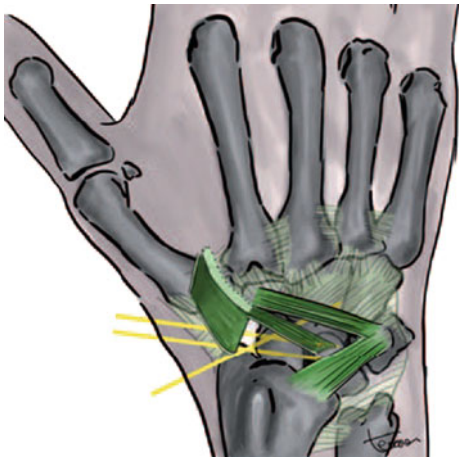

Fig. 7 The anchoring of the DIC ligament

Fig. 8 The pins are cut under the skin

The triquetral's tip of the capsular flap is sutured thanks to a resorbing thread. It seems to us that this anatomic capsular suture *a minima* minimizes the loss of flexion of the wrist.

The retinaculum of the extensors is closed in the proximal half of its open section. The pins are cut under the skin so that they hamper the patient as less as possible (Fig. 8) and are removed 6 weeks later. An antebrachia-palmar splint in neutral position of the wrist which completely frees the metacarpophalangeal joints of the long fingers and the thumb is carried during 6 weeks.

When the pins are removed, a soft and progressive physiotherapy of the wrist begins.

3 Clinical Series

3.1 Material and Method

Our experience of this surgery rests on 40 patients among which 25 have been examined again about 41 months later. They were operated by the same surgeon between January 2002 and January 2007. They all suffered from a chronic scapholunate instability with a traumatic origin dating back to more than 3 months. The average age was 28. The delay between the trauma and the surgery was about 10 months (3 months to 5 years). Each patient was clinically evaluated in preoperative and 3, 6, 12 and 24 months after the surgery by a same independent observer who uses the computer system EVAL.

The ranges in flexion-extension and in radial and ulnar inclination of the painful wrist and the healthy wrist were reported, as well as grip strength thanks to Jamar's dynamometer.

The comparative static and dynamic radiographic report was systematically established at the same periods. The dynamic report was composed of a view in

Fig. 9 Radiographic static instability

Fig. 10 Radiographic dynamic instability

radial inclination, a view in ulnar inclination and a view in supination with clenched fist. Twelve patients had a static instability (Fig. 9) and 13 had a dynamic instability (Fig. 10). The radio-lunate and scapholunate angles as well as the scapholunate interval were measured for each series of views at the different periods.

Each patient benefited from wrist arthroscopy to quantify the degree of instability following Dautel's classification [5] and to check the absence of arthrosis, the correct reducibility of flexion of the scaphoid and the absence of associated ligamentous injury.

Eighteen instabilities were stage 3 and 7 were stage 2. The surgical technique which was used was the one described above.

Three complications should be reported in this series: 2 superficial sepses on the pins which did not imply the early removal of the material. One patient had to be reoperated 2 years later for a curettage and to fill a cyst of the lunate which appeared around a resorbing anchor, but without consequence on the efficiency on the capsulodesis.

Table 1 Compared results with other series

	Moran (Brunelli)	Moran (Berger)	Garcia-Elias (tenodesis 3LT)	Talwalkar (tenodesis 3LT)	Chabas (modified Brunelli)	Dreant (Berger)
Moderate pain 0–3	27 %	43 %	73 %	62 %	80 %	58 %
Extension	43°	49°	52°	55°	50°	56°
Flexion	40°	44°	51°	45°	41°	48°
Radial inclination	16°	19°	16°	18°	24°	22°
Ulnar inclination	26°	26°	29°	29°	29°	30°
Grip strength	87 %	91 %	65 %	80 %	78 %	88 %
Scapholunate interval	2–6 mm	4 mm			2–4 mm	3 mm
Scapholunate angle	54°	66°			62°	64°

Fig. 11 Clinical result in palmar flexion

4 Results

The authors compared their results to the series of tenodesis to the flexor carpi radialis by Moran et al. [6], Garcia-Elias et al. [1], Talwalkar et al. [7], Chabas et al. [8] and the series of capsulodesis to the dorsal intercarpal ligament by Berger and Moran et al. [6] for the treatment of chronic scapholunate instability (Table 1).

5 Discussion

The benefit as far as strength and pain is the same as the other series. Post-operatory ranges of the wrist in flexion and in extension are less diminished with this technique. Thus, it can be considered as a therapeutic option to recover a stability of the scapholunate couple, since it is efficient and engenders little stiffening (Figs. 11 and 12). The exam

Fig. 12 Clinical result in dorsal flexion

of these patients in 10 years will be very interesting, especially as far as the maintenance of the scapholunate interval and the possible development of arthrosis are concerned.

References

1. Garcia-Elias M, Lluch A, Stanley JK (2006) Three-ligament tenodesis for the treatment of scapholunate dissociation: indications and surgical technique. J Hand Surg 31A: 125–134
2. Walsh JJ, Berger RA, Cooney WP (2002) Current status of scapholunate interosseous ligament injuries. J Am Acad Orthop Surg 10:32–42
3. Watson HK, Ballet FL (1984) The SLAC wrist: scapholunate advanced collapse pattern of degenerative arthritis. J Hand Surg 9A:358–365
4. Berger RA (2007) Palpable landmarks for dorsal wrist capsulotomy. J Hand Surg 32A: 1291–1295
5. Dreant N, Dautel G (2003) Development of an arthroscopic severity score for scapholunate instability. Chir Main 22(2):90–94
6. Moran SL, Ford KS, Wulf CA, Cooney WP (2006) Outcomes of dorsal capsulodesis and tenodesis for treatment of scapholunate instability. J Hand Surg 31A:1438–1446
7. Talwalkar SC, Edwards AT, Hayton MJ, Stilwell JH, Trail IA, Stanley JK (2006) Results of triligament tenodesis: a modified brunelli procedure in the management of scapholunate instability. J Hand Surg Br 31(1):110–117
8. Chabas JF, Gay A, Valenti D, Guinard D, Legre R (2008) Results of the modified brunelli tenodesis for treatment of scapholunate instability: a retrospective study of 19 patients. J Hand Surg Am 33(9):1469–1477