

Arthrodesis by Dorsal Circular Plate in Slac Wrist Grade 3: A Case and Literature Review

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Abstract

Case Report

Osteoarthritis of the wrist is most often secondary to a traumatic sequel or a metabolic disease and usually concerns the periscaphoid region. We report the case of a 58-year-old woman with SLAC wrist grade 3 (scapho-lunate advanced collapse) who underwent a dorsal circular plate medio-carpal arthrodesis associated with a scaphoidectomy. The following up was 28 months. Subjective clinical criteria such as: pain, satisfaction and objectives: articulation's amplitudes were analyzed. The evaluation was completed by the questionnaire (QUICK DASH). Radiologically, consolidation and fusion of the triquetro-hamatal arthrodesis was observed. The use of a complementary transplant was not necessary. Arthrodesis with the dorsal circular plate seems to allow a faster clinical and functional recovery, in addition it confers a primary stability and a reliability allowing an early mobilization while maintaining a good consolidation rate with a learning curve that remains fast.

Keywords: Arthrodesis, Wrist, scaphoid, hand.

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INTRODUCTION

Osteoarthritis is a chronic, non-inflammatory process due to degenerative cartilage involvement. On the wrist, it is most often secondary to a traumatic sequel or a metabolic disease and usually concerns the periscaphoid region [1].

Surgical treatment of scaphoid osteoarthritis with mediocarpal osteoarthritis (grade 3) secondary to pseudarthrosis of the scaphoid "SNAC" (non-union scaphoid advanced collapse) or a scapholunar sprain "SLAC" (scapho-lunate advanced collapse) most often involves scaphoidectomy associated with mediocarpal arthrodesis [2, 3].

The objective of the arthrodesis of the 4 bones is to transmit the charges on the radiolunate articulation preserved and to remove the charges at the level of the articulation radio-scaphoid osteoarthritis. In a normal wrist, the charges in the radiocarpal's articulation are transmitted 60% on the scaphoid and 40% on the lunate according to the Skie *et al.*, works [4].

After arthrodesis of the 4 bones, the charge decreases significantly at the level of the scaphoid fossa without increasing at the level of the lunate fossa as one

might think; there is no increase in ulno-carpal loads either [4].

Arthrodesis of the four bones will also limit the radiolunate inclination by blocking the mid-carpal joint, which according to Kauffmann [5] is used for 60% of the radial inclination and 86% of the ulnar inclination. In fact, excision of the scaphoid makes it possible to compensate for the blockage of the medio-carpal articulation.

CASE REPORT

We report the case of a 58-year-old patient, who consults for chronic left wrist pain, mechanical appearance, with a marked decrease in mobility and progressive loss of strength. Clinical examination revealed dorso-radial swelling associated with synovitis and decreased articulation's amplitudes.

On radiography: the patient had a diffuse radio - scaphoid articular narrowing and capito - lunate and marked chondral osteocondensation and radial styloid osteophytosis with an aspect of pseudarthrosis of the scaphoid (Figure-1).

The patient benefited from an infiltration + arthro-scan: which showed a rhizarthrosis and SLAC type III with a partial lesion of the scapholunate

ligament and integrity of the TFCC (triangular fibrocartilaginous complex) (Figure-1).

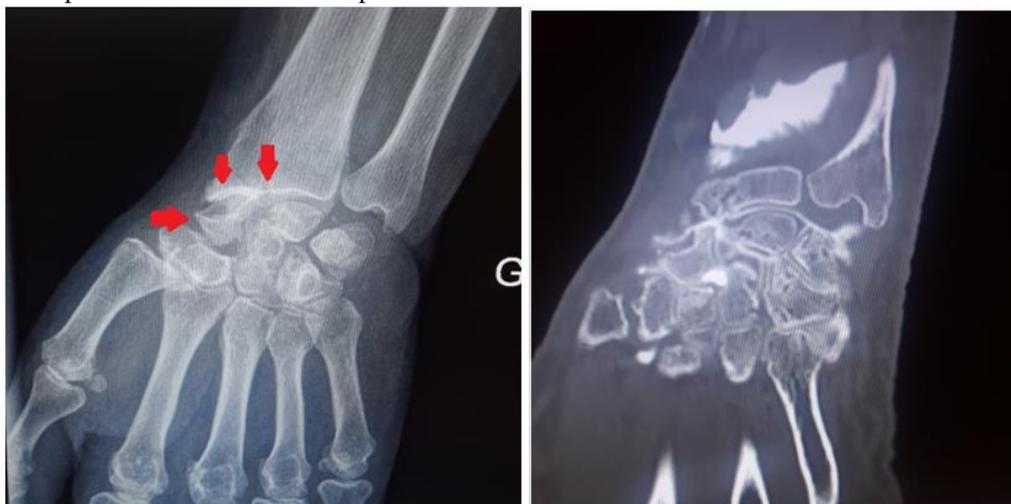


Fig-1: SLAC type 3 osteoarthritis secondary to scaphoid pseudarthrosis

Under the plexus block of the upper limb and pneumatic tourniquet, the cutaneous approach was dorsal in the axis of the 3rd metacarpal. The dorsal sensory branches were preserved, careful hemostasis was practiced. The retinaculum of the extensors was exposed and incised, resection of the posterior interosseous nerve (Figure-2). Les temps suivants ont comporté une scaphoïdectomie totale afin d'éviter tout conflit radio-scaphoïdien dans les suites. During scaphoid exertion, the capsulo-ligamentous attachments were preserved in order to prevent destabilization and ulnar and dorsal translation of the carpus by reaching

the radial, radial-scapho-capital and long-lunar collateral ligaments, but also any destabilization of the carpus. The spine of the thumb by injury of the scapho-trapezium ligaments, a revival of the capito-lunar and hamato-trichostral articular surfaces. The luno-trichostral and capato-hamatal articulations were not stimulated, and the luno-trichostral ligament was preserved. No bone graft was used. The arthrodesis was entrusted to a dorsal circular plate (Figure 3 & 4). Immobilization by a 30° extension of the wrist palmar splint was put in place for six weeks, which rehabilitation began.



Fig-2: Opening of the retinaculum of the extensors of the wrist



Fig-3: Intraoperative photo showing arthrodesis of the 4 carpal bones per circular plate



Fig-4: Postoperative photo showing arthrodesis of the 4 bones of the carpus by dorsal circular plate associated with a scaphoidectomy

CLINICAL ANALYSIS

Articular's amplitudes

The pre and postoperative articular's amplitudes were measured using a goniometer, according to the following criteria: Flexion - Extension - Radial Tilt - Ulnar Tilt.

Pain

The pain was self-assessed by the patient on a scale of 0 to 10.

Satisfaction

Satisfaction was self-assessed by the patient herself by responding with: I am satisfied - I am not satisfied.

Functional Questionnaires

The Disability of Arm-Shoulder-Hand (DASH) is a subjective self-assessment questionnaire of the overall functional ability of both upper limbs.

Duration of the immobilization

Immobilization with a 30° wrist palmar splint was put in place for six weeks.

Radiological Analysis

Performed on the wrist radiographs of face and pre and postoperative profile at the last follow-up.

The Consolidation

The arthrodesis was considered solid in the case of fusion of capito-lunar and triquetro-hamatal interlinings. The lack of fusion of a triquetro-lunar or capito-hamatal interline was not considered a failure of consolidation in view of the absence of mobility of these articulations.

Carpal Radio Conflict

Signs of radiocarpal dorsal conflict in relation to the material or not were noted.

RESULTS

The follow-up was 28 months. The results of the clinical analysis are reported in the following table:

Table-1: Results of the clinical analysis of our case

Flexion		Extension		Radial Tilt		Ulnar Tilt		Pain 0 - 10		Satisfaction	Quick dash (0 - 100)	
Préopo	Postop	Préopo	Post op	Préopo	Post op	Préopo	Post op	Préopo	Post op	Post op	Préopo	Post op
45°	35°	55°	45°	15°	15°	40°	34°	7	1	Oui	29	8

Radiologically, there is a good end result with a consolidation aspect and a fusion of the triquetro-

hamatale arthrodesis. The carpal radio conflict was not observed in our patient.

No infectious complications were observed and the use of a complementary transplant was not necessary.

DISCUSSION

The following up in our case is 28 months, however no series of the literature shows a following up greater than five years. The biggest following up is 4.6 years [6]. The articular's amplitudes, mobility and muscle strength were decreased after surgery in our case, which is consistent with literature data. The evaluation of the pain which is a subjective parameter is poorly standardized in the literature and the series are therefore difficult to compare in view of the heterogeneity of the measuring means. We obtained an 8% Quick Dash similar to Vance *et al.*, [7] (8/100) and Ozyurekoglu *et al.*, [8] (13/100) whose following up is however higher.

In the analysis of the literature data we find that Roux *et al.*, [9] as well as Tchurukdichian *et al.*, [10] who published series using the Xpode® plate as a means of arthrodesis started mobilization respectively from the first and second week. For staple-fixed arthrodeses, even with shape memory, all studies include an immobilization variant between 6 and 10 weeks, a shortening of this duration in the absence of existing data could have been a source of complications for patients (increase in pseudarthrosis rate).

We believe that a minimum duration of 4 weeks of strict immobilization must be observed to ensure good capsulo ligament healing because it preserves the long-term radiographic articulation avoiding any ulnar translation of the carp altering the congruence of this joint as Ashmead *et al.*, [11].

The goal of early mobilization can also be part of a faster rehabilitation project without having to influence the final range of motion.

The approach could influence consolidation. Some authors recommend a previous approach [12] and we think that the posterior approach is the approach that offers a better operative view and consequently a compression of the arthrodesis focus.

Regarding complications, the risk of nonunion, linked to the use of circular plates, is very small with the last generation. Initial complications are not uncommon, the rate of nonunion is 3 to 9% and the conversion rate in total arthrodesis from 2 to 36%. It may be limited to a capito-lunar arthrodesis, scaphoidectomy being or not associated with the removal of tributhrum. It could give better functional results [13] but with a risk, perhaps, more important of pseudarthrosis [13, 14]. The radio-lunar spacing can also be touched [15] it is imperative to realize an arthroscan before any medio-carpal arthrodesis.

CONCLUSION

In case of failure of the medical treatment, the therapeutic choice is firstly based on the etiology and the extent of osteoarthritis, weighted by the remaining mobilities, the age and the functional demand of the patient. The circular plate arthrodesis seems to allow a faster clinical and functional recovery, moreover it confers a primary stability and a reliability allowing an early mobilization while maintaining a good rate of consolidation with a learning curve which remains fast. Finally, it must be emphasized that surgical treatment must give priority to the relief of pain in relation to the preservation of mobility.

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