

**SURGICAL TREATMENT OF POST-TRAUMATIC ARTHRITIS OF THE WRIST IN 9 CASES****Tarik El Mountassir\*, Karim El Hammiri, Yassine Moubadi, Anass Lahlou, Moncef Boufettal, Reda Allah Bassir, Mohamed Kharmaz, Moulay Omar Lamrani and Mohamed Saleh Berrada**

Department of Orthopedic Surgery, Ibn Sina Hospital, University Mohamed V, Faculty of Medicine of Rabat, Avenue Mohamed Belarbi El Alaoui B.P. 6203 10000, Rabat. Morocco.

**\*Corresponding Author: Tarik El Mountassir**

Department of Orthopedic Surgery, Ibn Sina Hospital, University Mohamed V, Faculty of Medicine of Rabat, Avenue Mohamed Belarbi El Alaoui B.P.6203 10000, Rabat. Morocco.

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**ABSTRACT**

Osteoarthritis is a chronic, non-inflammatory process due to the degenerative cartilage. On the wrist, it is most often post-traumatic and concerns usually the peri-scaphoid region; they affect young subjects, often manual workers or sportsmen. The etiologies of osteoarthritis are dominated by carpal instability scapholunar and pseudarthrosis of the scaphoid. Evolutionary schemes constants of this osteoarthritis have been identified according to the etiology: These are the SLAC (Scapho-Lunate Advanced Collapse) and SNAC (Scaphoid Non Union Advanced Collapse). The classification of Watson and Ballet is the most used First row carpal resection (RPRC) and arthrodesis of the 4 bones internal procedures with scaphoidectomy are the most widely used procedures. We present the clinical observation of 9 patients their diagnostic and therapeutic management with review of the literature.

**KEYWORDS:** SLAC and SLAC- Arthrodesis of the 4 bones Internal- RPRC.**INTRODUCTION**Wrist osteoarthritis is most often post traumatic.<sup>[1]</sup>

Scaphoid fractures and scapholunar disjunctions, untreated or poorly treated, inevitably progress to progressive degeneration, causing pain, stiffness and limitation of joint range, which compromises professional, daily and leisure activities.<sup>[2]</sup>

They affect young subjects, often manual workers or sportsmen. The SNACs and SLACs are the main etiologies.<sup>[3]</sup>

The management of these old traumatic lesions is surgical.<sup>[1]</sup> most often palliative with failure of conservative treatment. The goal of treatment is to reconstruct a simplified wrist around an intact line to maintain mobility. The decision is based on the etiology, the extent of the osteoarthritis, the presence of a misalignment, weighted by the remaining mobility, the wishes and the functional demand of the patient. The aim of this work is to show the severity of fractures and instability of the wrist that are not or poorly treated, to guide and inform on the relevance of surgical management of these lesions, and to compare our results with that of the literature.

**MATERIAL AND METHOD**

A retrospective study of a series of 9 cases of post-traumatic osteoarthritis of the wrist collected in the Traumatology - Orthopedics Department of Ibn Sina Hospital in Rabat, over a period of 5 years, between 2017 and 2021

**RESULTS**

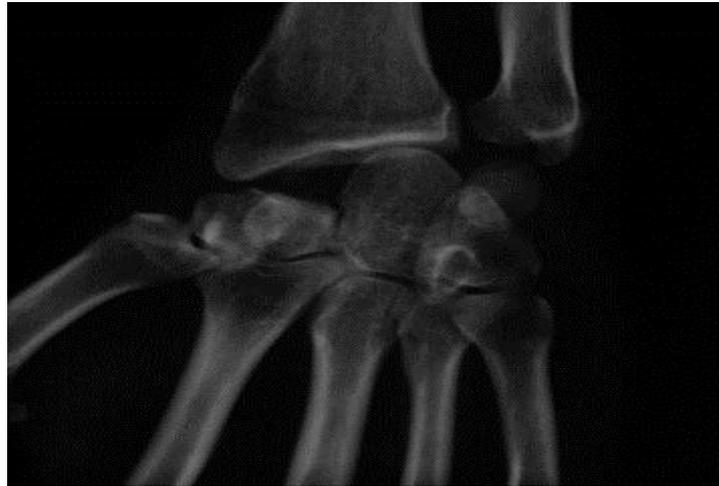
The average age of our patients is 33 years, with a clear predominance of men. Two thirds of patients are manual workers; the dominant side is affected in 77% of cases. The average trauma-treatment time is 20.7 months. All of our patients presented with pain and impotence, with a decrease in range of motion as assessed by the Mayo Wrist score.

Conventional radiography was performed in all our patients, according to the Watson and Ballet classification, there are 3 SNAC I, 3 SNAC II, 2 SLAC II and 1 SLAC III.

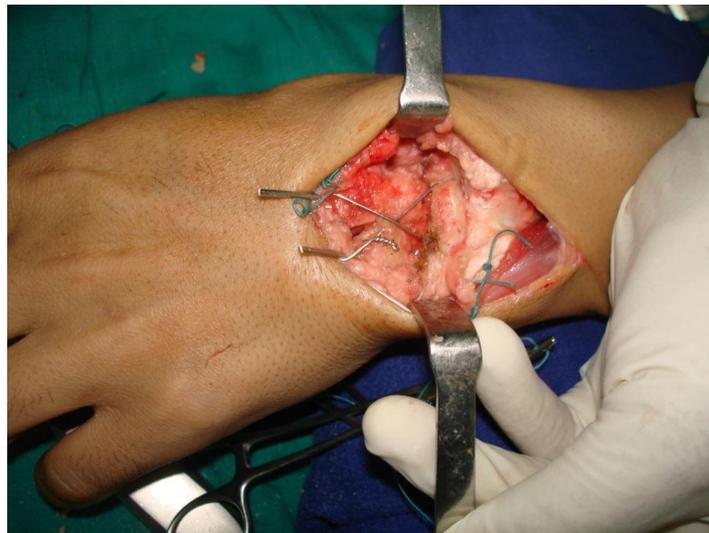
RPRC (figure 1) was performed in 3 cases, arthrodesis of the four internal bones + scaphoidectomy (figure 2) in 3 cases, scapho-capital arthrodesis in one case and radial styloidectomy + bone graft in 2 cases.

A section of the posterior interosseous nerve for analgesia was performed systematically during the dorsal approach.

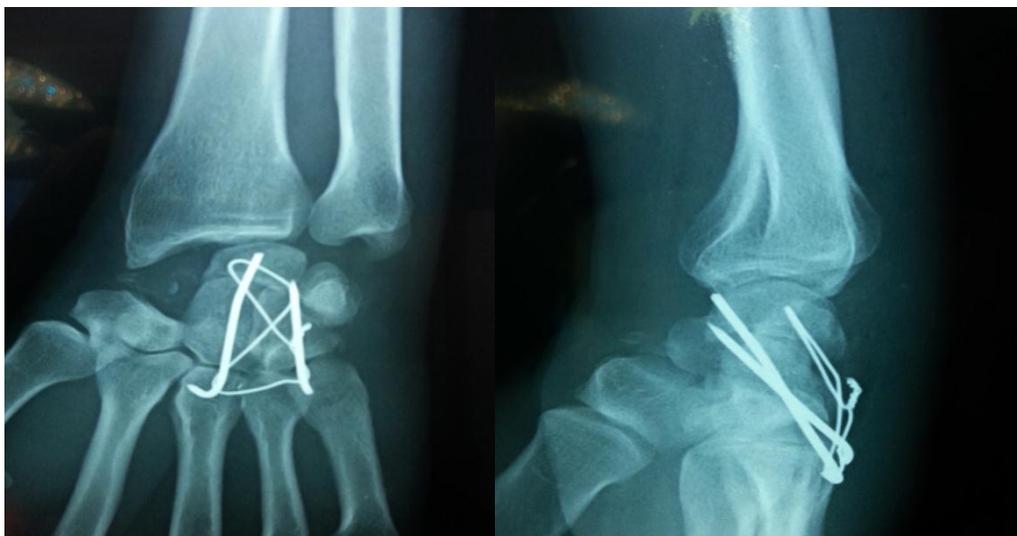
Finger mobilization was encouraged from day 1, rehabilitation by a physiotherapist started on the 15th day with passive and active mobilization fingers and wrist according to an infra painful threshold.



**Figure 1: Resection of the first row of carpal bones**



**Figure 4: Per operative image of internal four-bone arthrodesis with scaphoidectomy**



**Figure 3: Conventional x-ray showing internal four-bone arthrodesis with scaphoidectomy**

## DISCUSSION

Osteoarthritis of the wrist represents the inevitable evolutionary term in the natural history of the main traumatic carpal injuries, when these are ignored or insufficiently treated. The two post-traumatic pathologies most often found are pseudarthrosis of the scaphoid leading to SNAC (Scapho Non Union Advanced Collapse) and scapho lunar disjunctions leading to SLAC (Scapho Lunate Advanced Collapse), the evolution of which can be assessed by the classification of Watson.<sup>[4]</sup>

### SLAC

- SLAC I: stylus scaphoid osteoarthritis.
- SLAC II: radioscaphoid arthritis.
- SLAC III: radioscaphoid arthritis and capito-lunar arthritis.

### SNAC

- SNAC I: Pen-scaphoid osteoarthritis.
- SNAC II: SNAC I + Scapho-capital osteoarthritis.
- SNAC III: SNAC II + Capito-lunar osteoarthritis.

Involvement of the intra-carpal joints is sequential.<sup>[5,6]</sup> but some intra-carpal joints remain intact, allowing reconstruction of a simplified wrist around this spacing to maintain some mobility at wrist.

The resection of the first row of carpal bones is an ancient procedure, performed at least since the beginning of the nineteenth century by Moreau. It simplifies the radiocarpal joint by creating a neo-articulation between the lunar surface of the radius and the head of the capitate. The use of this procedure as an "arthroplasty" of the wrist returned to Stamm in 1944. He considered that a simple and functional new joint is better than a complex joint in poor condition.<sup>[7]</sup> It decreases the pain of the patients, preserves the mobility of the wrist and gives a useful function with reasonable force; the price to pay is the decrease in the height of the carpus.

RPRC is only feasible if the cartilages of the lunar fossa of the radius and the head of the capitate are preserved. The indications can possibly be extended to stage III SLAC and SNAC, by placing an RCPI® implant for resurfacing the head of the capitate, but this remains to be validated in the medium and long term.<sup>[8]</sup>

RPRC is simpler to perform and has fewer complications than Watson's procedure. It preserves more mobility while giving a similar result on pain and patient satisfaction. But, the risk of osteoarthritis degeneration is greater, especially in young active subjects and the strength is rather less good. It is therefore mainly indicated in rather sedentary or light manual patients, not too young and with mobility still preserved. This procedure is systematically proposed in our series for SLAC and SNAC at Watson stage II.

In the short term the pain was improved in 100% of cases, which is comparable to the series by Welby and Alnot.<sup>[9]</sup> and F. Lecomte.<sup>[10]</sup> where the improvement in pain was 90% and 80% respectively. Mobility remained more or less stable with a total mean mobility arc in flexion-extension of 113 ° and radial inclination-ulnar inclination 47 ° (decrease of 7 °), which is identical to the series of Welby and Alnot.<sup>[9]</sup> on the other hand, the force of the wrist and the thumb-index clamp have decreased, which is consistent with the welby et alnot series. The Mayo wrist score was evaluated in patients: Excellent in two (66%) and good in one (33%), which is superior to the Lecomte series.<sup>[10]</sup> where it was excellent in 40% of patients, good in 50% and average in only 10% of patients. For the resumption of work, 100% of our patients have resumed their work at the same post, which is higher than the F. Lecomte series where 61% of patients were able to resume their previous activity. After resection of the first row, the capitate becomes blocked on the posterior margin of the extended radius. This explains why the extension is never greater than 60 °; likewise, the trapezium blocks against the radius in flexion from 70 °.<sup>[11]</sup>

Resection of the first row of carpal bones should theoretically decrease wrist strength through the relative lengthening of the tendons.

The occurrence of osteoarthritis of this joint is rather rare. The studies with the longest follow-ups (Wyrick et al, Tomaino et al. Rettig and Raskin) show a low percentage of osteoarthritis, especially when there was no degenerative lesion of the lunar fossa of the radius or of the head of the large bone preoperatively. Thus, the degenerative evolution of the neoarticulation is slow and very progressive, despite the constraints imposed on it. Arthrodesis of the four internal bones + scaphoidectomy

This technique was proposed by Watson in 1984 to treat post-traumatic wrists with osteoarthritis degeneration of the "SLAC and SNAC wrist" type.<sup>[12]</sup> It makes it possible to focus the constraints of the wrist on the radiolunar space. This technique makes it possible to obtain satisfactory analgesic results at the cost of a marked reduction in wrist mobility.

Compared to RPRC, Watson's intervention preserves poorer mobility with more postoperative complications, so for stages I and II, the comparative studies tend to favor RPRC. But, it tends to restore better strength with less risk of joint space degeneration and good results are maintained over the long term. It therefore to be favored among manual workers, young, with mobility partially preserved, knows that in the long term, young subjects will have a more marked pinching of the joint space.

Concerning the short-term clinical results, the pains were improved in 100% of the cases which is comparable to the series of H. Cherifi.<sup>[13]</sup> The arcs of average articular mobility have decreased in flexion-extension and in

radial inclination – ulnar inclination respectively by (30 ° -30 ° and 10 ° -20 °) but still remain in the useful mobility sector, which is also comparable and identical to the series of H. Cherifi. Wrist strength has improved on average by 15% but is still lower than the healthy contralateral side, which is close to the series by H. Cherifi.<sup>[13]</sup> which is 10%. The Mayo wrist score was evaluated in the 4 patients: Excellent in two and good in the other two, this is comparable to the series by H. Cherifi.<sup>[13]</sup> where it was excellent in 40% of patients and good in 60 % patients.

For the return to work, 100% of our patients have returned to work after 6 months (long recovery period compared to the RPRC) at the same post, which is superior to the series by H. Cherifi.<sup>[13]</sup> where only 80% of patients were able to resume their previous activity.

On the radiological plan, the intra-carpal fusion was 5 months, no complications such as protrusion of the material, conflict with the posterior surface of the radius or degeneration of a joint space were noted, on the other hand a lunotriquetral pseud arthrodesis observed in 30% of cases in the series of H. Cherifi.<sup>[13]</sup>

## CONCLUSION

Osteoarthritis of the wrist is in 90% of post-traumatic cases. All these techniques give good results with disappearance of pain and improvement of mobility, at the expense of grip strength or the opposite, hence the need to treat scaphoid fractures before the stage of pseudarthrosis, or at the latest, in the early stages of the pseudarthrosis in order to preserve the amplitudes of the wrist, as well as the instabilities scapho-lunar can be corrected by ligament repairs or by partial arthrodeses.

## Consent

The patients have given their informed consent for the case to be published.

## Competing Interests

The authors declare no competing interest.

## Authors 'Contributions

All authors have read and agreed to the final version of this manuscript and have equally contributed to its content and to the management of the manuscript.

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