

Contribution of Matti-Russe Technique in the Management of Carpal Scaphoid Pseudarthrosis

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Abstract

Original Research Article

The scaphoid pseudarthrosis is the most common complication of fractures of the carpal bones. This is a retrospective study of 16 observations of non-union of the carpal scaphoid, collected at the Department of Traumatology and Orthopedics of Rabat, over a period of 4 years from 2018 to 2022. The average age is 29,8 years, with a male predominance (94%). Initially, it was an orthopedic treatment in 4 cases and the fracture was unknown in 12 cases. In our serie according to Schernberg classification : 1 case was stage I (6%). 8 cases were Stage II (50%). 4 cases were Stage III (25%). 3 cases were stage IV (17 %). According to the classification of Alnot : 3 cases were stage I (19%), 4 cases were stage IIA (25%), 2 cases were stage IIB (12 %), 5 cases were stage III (31%), two cases were stage IV (13%). The consolidation was achieved in 91%. The purpose of this study is to describe the epidemiological and clinical radio carpal scaphoid non-unions and show the interest of MATTI-RUSSE technique. The clinical and radiological results are reported and analyzed according to the literature.

Keywords: Matti Russe, Scaphoid, Pseudarthrosis, Reeducation, Osteosynthesis, Pain.

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INTRODUCTION

Five to ten percent of scaphoid fractures carpal don't consolidate definitively and evolve towards pseudarthrosis which is actually the most common fracture's complication of this carpal bone. The

therapeutic methods for scaphoid pseudarthrosis are numerous, but the choice still arouses debates. The treatment is based on the stage of the management of pseudarthrosis. In this framework, the Matti-Russe technique is considered as the best therapeutic method.

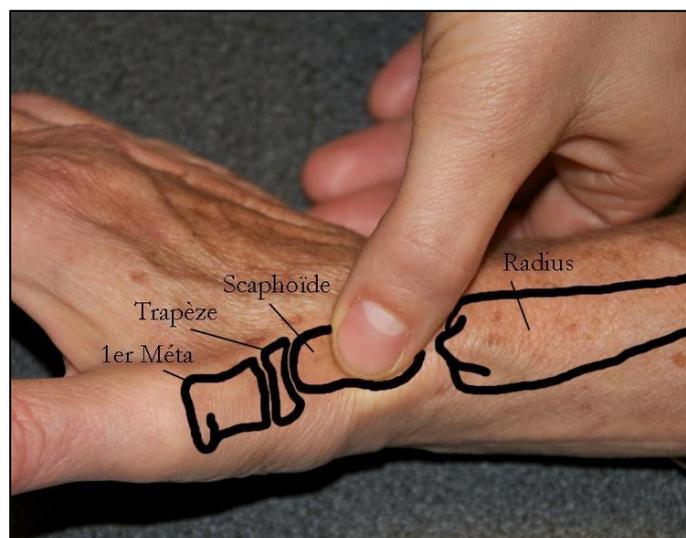


Figure 1: Localization of the pain in the case of scaphoid pseudarthrosis

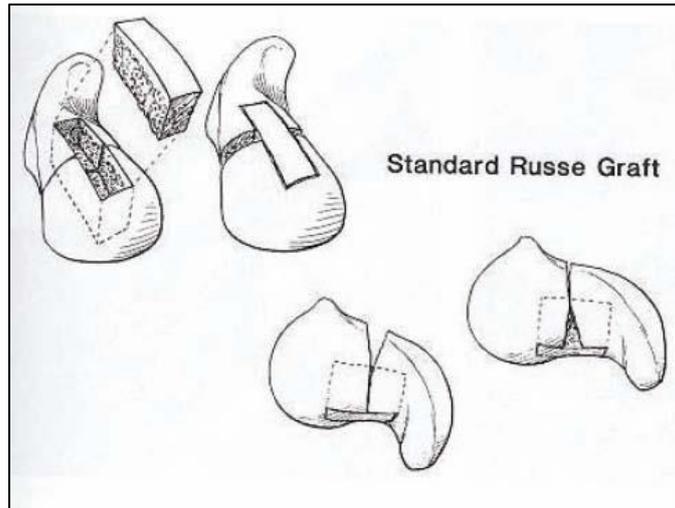


Figure 2: Principle of Matti-Russe technique

MATERIEL AND METHODS

The work consists of a retrospective study relating 16 cases of carpal scaphoid pseudarthrosis, collected in the Department of Traumatology and Orthopedics of the University Hospital Center in Rabat, over a period of 4 years from 2018 to 2022. The purpose of this study is to describe the epidemiological, radio clinical profile and the therapeutic arsenal of carpal scaphoid pseudarthrosis, and to show the interest of the Matti-Russe technique in the care therapy of this pathology.

Were included in this study, patients with post-traumatic pseudarthrosis of the scaphoid and having benefited from the Matti-Russe technique.

Were excluded of this study any patient with a freshness fracture or delays in the consolidation of the scaphoid, and any patient with pseudarthrosis treated according to a process other than the Matti-Russe technique.

In the operative technique: the scaphoid is exposed by an anterior approach and both edges of pseudarthrosis are sharpened, we practice a hollowing out of the two fragments, filling with spongy bone taken from the iliac crest and used as a graft recessed according to Matti-Russe technique [2-3].

In case of tipping in DISI, we associate a synthesis uniting the three fragments.



Figure 3: X-Ray showing a carpal scaphoid fracture



La technique de MATTI-RUSSE,
ou greffe osseuse antérieure encadrée

❖ Pseudarthrose de type I ou IIA

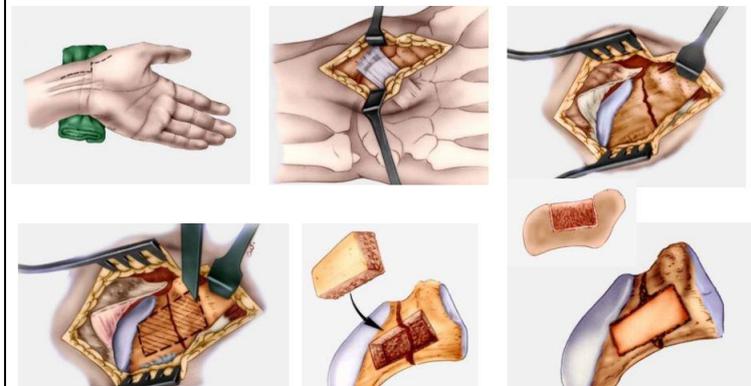


Figure 4: Steps of Matti-Russe technique

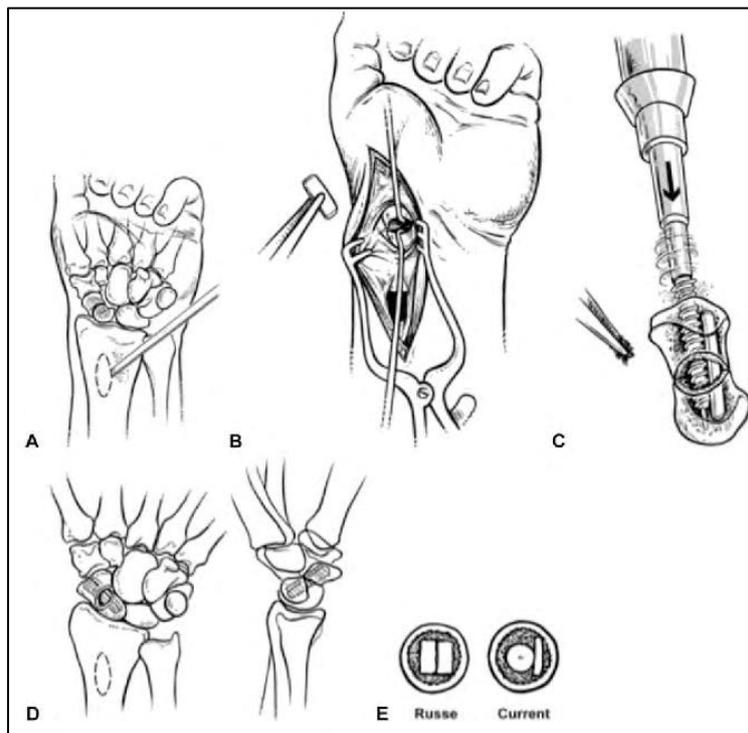


Figure 5: Anterior approach in Matti-Russe technique

RESULTS

The average age of our patients was 29.8 years, with extremes of 19 years and 46 years (15 men and only 1 woman). The dominant hand was concerned in most cases (82%). 8 cases were caused by a sport accident, 4 cases after a domestic fall and 2 cases by an accident in the public road. The initial treatment was orthopedic in four cases and the fracture was unrecognized in twelve cases. The average setting time in charge was 12.6 months (2.5 months - 9 years). A wrist pain was present in all patients. In our series according to the classification of Schernberg: 1 case was stage I (6 %), 8 cases were stage II (50%). 4 cases were Stage III (25 %) and 3 cases were stage IV (19%).

According to the evolutionary classification of ALNOT: 3 cases were at stage I (23%), 4 type IIA cases

(36%), 2 type IIB cases (9%), 5 type III cases (23%), 2 type cases IVA (9%).

A clinical and radiological control was carried out at a regular interval. Consolidation has been obtained in 91%.

The functional assessment has been made using Michon's score, based on 3 criteria: strength/pain/limitation of movement.

We find the following results according to the score of Michon: Excellent in 2 cases, Good in 11 cases, poor in 3 cases. In the postoperative complications, we didn't reveal any infection on the wrist or on the site of iliac sampling.

The evolution was favorable under medical treatment with well-conducted rehabilitation.

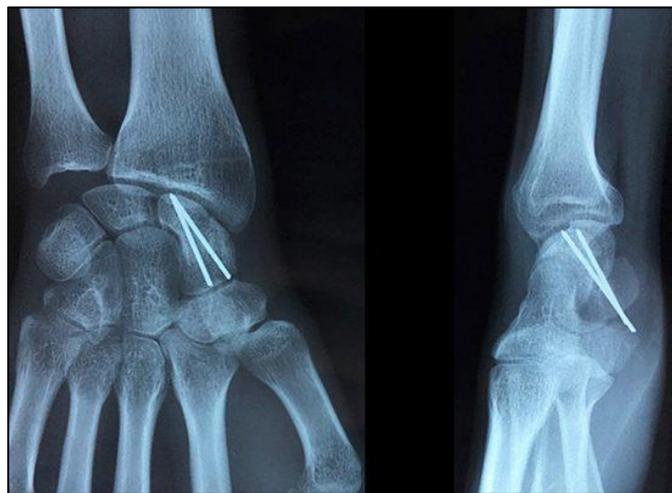


Figure 6: Osteosynthesis with Kirschner wires



Figure 7: Osteosynthesis with Herbert screw

DISCUSSION

Five to ten percent of scaphoid fractures carpal do not consolidate definitively and thus evolve towards pseudarthrosis [1]. In the literature, pseudarthrosis of

the scaphoid occurs in about 5-10% of treated fractures by plaster [1], although Herbert and Filer have reported an incidence of around 50% [6]. There Non-union also occurs in an unknown number of scaphoid fractures not recognized initially [4-7]. Pseudarthrosis usually seen in

young adults male, which matches the profile epidemiology of our study. Events symptoms of pseudarthrosis are variable and may be absent and this clinical mutism explains the frequent delay in diagnosis. In our study, pain is the master symptom but also in the whole literature [8-9]. THE average fractures (II+III+IV of Schernberg) represent 96% in our series, so we find the same result in other works literature [9-10]. Eight case of carpal instability confirmed by the radiolunar angle were found. This frequency is close to what we found in the literature [9-10]. It is necessary here to obtain the consolidation of the pseudarthrosis site and to restore the normal height of the scaphoid, this double imperative has been perfectly underlined by FIK [5]. The approach anterior was performed in all patients of our serie and has several advantages essentially the preservation of predominantly scaphoid dorsal vascularization [11]. Removal of a corticospongiosum graft at the level of the iliac crest was used in all our patients. The authors report that the graft of iliac spongy bone is of very good quality [12].

In our serie, 10 patients were treated with Matti-Russian technique. The other six cases have benefited from an associated corticocancellous graft to Kirschner wire osteosynthesis. The union was obtained in all the cases.

Although the number of cases treated with a transplant corticocancellous associated with

osteosynthesis is low (36%). Some authors report the superiority of the results obtained by corticospongious graft associated with osteosynthesis. By against Munk and Larsen in a meta-analysis of the literature, found similar rates for conventional grafts whether with or without osteosynthesis, respectively 84 and 80% of consolidation [14]. We compare between the graft conventional and vascularized graft of which we have no experience, several studies have demonstrated the superiority of the graft technique vascularized bone with a rate of 100% found by several authors. Nevertheless, in view from the literature and in particular from the meta-analysis of Merrell *et al.*, vascularized grafts seem be the most logical and appropriate solution in terms of case of necrosis of the proximal pole [15]. In our serie no cases of proximal necrosis were found. The only Schernberg stage I fracture has well evolved. Another Schernberg type II case has presented a radiological aspect in favor of the necrosis but intraoperatively the existence of signs of vitality (punctiform bleeding). All the patients resumed their previous work, the good and enough results have resumed their sports activity prior to the initial accident.

The improvement brought especially on pain since all patients are painless or painless only occasionally, without the need for support medicated. Mobility is often reduced, strength is also on average diminished, but improves after rehabilitation.

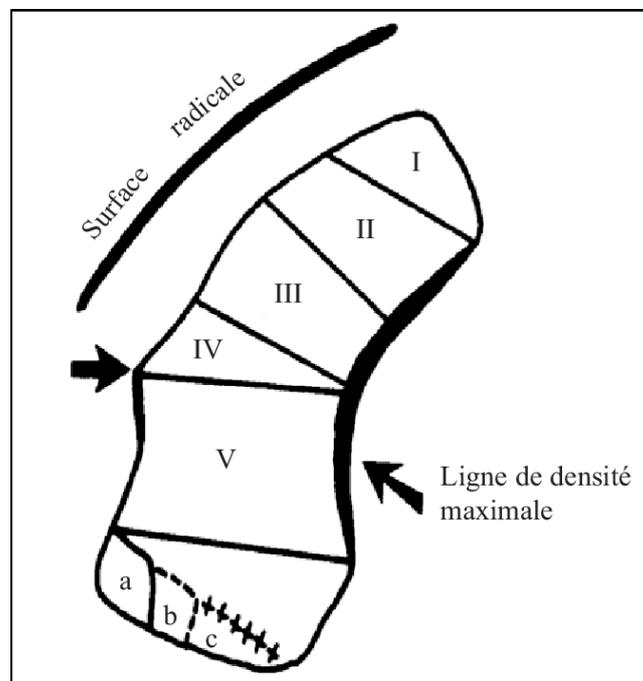


Figure 8: Schernberg classification

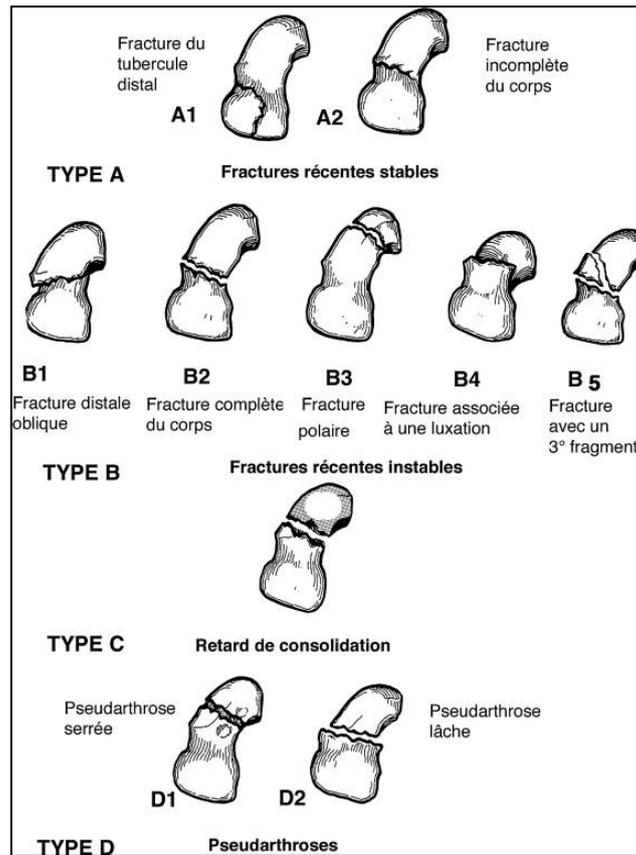


Figure 8: Alnot classification

CONCLUSION

The revision of the 22 observations of pseudarthrosis of the carpal scaphoid allowed us to insist on early intervention on this bone before the installation of instability of the carp and osteoarthritis, and the necessity to treat surgically any pseudarthrosis – even asymptomatic – as will inevitably progress to progressive worsening. Matti Russe technique remains the method of choice, but presents a significant decline compared to the other techniques (percutaneous pinning, arthroscopy. Arthroplasty).

REFERENCES

1. Prosser, G. H., & Isbister, E. S. (2003). The presentation of scaphoid non-union. *Injury*, 34(1), 65-67.
2. Russe, O. (1960). Fracture of the carpal navicular: diagnosis, non-operative treatment, and operative treatment. *JBJS*, 42(5), 759-768.
3. 3-von Salis-Soglio, G. F. (1981). Zur Problematik der ventralen Spondylodese an der Lendenwirbelsäule. *Zeitschrift für Orthopädie und ihre Grenzgebiete*, 119(04), 356-359.
4. BOUSSAKRI, H., & GALUIA, F. L'intérêt de la technique de matti-russe dans le traitement des pseudarthroses du scaphoïde carpien.
5. Fik, G. R. (1970). Carpal instability and the fractured scaphoïde. *Ann Roy coll surg*, 46-76.
6. Herbert, T. J., & Fisher, W. E. (1984). Management of the fractured scaphoid using a new bone screw. *The Journal of bone and joint surgery. British volume*, 66(1), 114-123.
7. Lindström, G., & Nyström, Å. (1992). Natural history of scaphoid non-union, with special reference to "asymptomatic" cases. *Journal of Hand Surgery*, 17(6), 697-700.
8. Mack, G. R., Bosse, M. J., Gelberman, R. H., & Yu, E. (1984). The natural history of scaphoid non-union. *JBJS*, 66(4), 504-509.
9. BOUSSAKRI, H., & GALUIA, F. L'intérêt de la technique de matti-russe dans le traitement des pseudarthroses du scaphoïde carpien.
10. Chantelot, C., Frebault, C., Limousin, M., Robert, G., Migaud, H., & Fontaine, C. (2005). Résultats à long terme des greffes cortico-spongieuses non vascularisées pour pseudarthrose du scaphoïde carpien: Cinquante-huit cas revus au recul moyen de 8, 8 ans. *Revue de chirurgie orthopédique et réparatrice de l'appareil moteur*, 91(8), 724-731.
11. Kuhlmann, J. N., Mimoun, M., Boabighi, A., & Baux, S. (1987). Vascularized bone graft pedicled on the volar carpal artery for non-union of the scaphoid. *Journal of hand surgery*, 12(2), 203-210.
12. Tambe, A. D., Cutler, L., Murali, S. R., Trail, I. A., & Stanley, J. K. (2006). In scaphoid non-union, does the source of graft affect outcome? Iliac crest versus distal end of radius bone graft. *Journal of Hand Surgery*, 31(1), 47-51.

13. Milliez, P. Y., Courandier, J. M., Thomine, J. M., & Biga, N. (1987, January). Histoire naturelle des pseudarthroses du scaphoïde carpien: A propos de cinquante-deux cas. In *Annales de Chirurgie de la Main* (Vol. 6, No. 3, pp. 195-202). Elsevier Masson.
14. Munk, B., & Larsen, C. F. (2004). Bone grafting the scaphoid nonunion a systematic review of 147 publications including 5 246 cases of scaphoid nonunion. *Acta Orthopaedica Scandinavica*, 75(5), 618-629.
15. Merrell, G. A., Wolfe, S. W., & Slade III, J. F. (2002). Treatment of scaphoid nonunions: quantitative meta-analysis of the literature. *The Journal of hand surgery*, 27(4), 685-691.