

PROXIMAL ROW CARPECTOMY : AN ALTERNATIVE TO WRIST FUSION ?

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Problems with implant failure (4) and silicone synovitis (22) and a high complication rate in wrist arthrodesis (3, 11) have recently increased the interest in solutions that use residual biological articular surfaces. These include limited intercarpal fusions and proximal row carpectomy (PRC). PRC is a relatively easy procedure with few complications. We reviewed 27 personal cases. According to this study PRC offers a painless range of motion, with an average of 68° flexion/extension range and an average grip strength of 60% of the contralateral side. The failure rate is 18.5%. However, failures can be successfully converted into wrist arthrodesis. Our follow-up period ranges from 6 to 36 months. Late deterioration has not been reported in the literature. On the contrary, improvement of mobility and grip strength several months after operation have been observed (12, 23).

We still favor PRC as a salvage procedure in order to offer the patient some motion, provided that there is no osteoarthritis over the capitate and the lunate facet preoperatively.

Keywords : wrist ; proximal row carpectomy.

Mots-clés : poignet ; résection de la première rangée du carpe.

INTRODUCTION

Wrist fusion has been considered "the gold standard" of salvage procedures for chronic wrist pain. It has however the major disadvantage of abolishing all mobility and reportedly has a major complication rate (3).

Arthroplasties are complicated with implant failure (4) and silicone synovitis (22). Proximal row carpectomy (PRC) and limited intercarpal fusions are alternative procedures that claim to preserve

a functional range of motion. PRC transforms a complex linked system into a simple hinged joint. Despite this nonphysiological approach, results are surprisingly good (1, 2, 4, 6-10, 13-21). This had resulted in renewed interest in this procedure.

MATERIALS AND METHODS

Patients

We reviewed 27 consecutive PRC's performed between January 1991 and June 1993. Eighteen patients were men and 9 women. Their ages range from 22 to 75 years, with a mean age of 41 years. The dominant hand was involved in 16 patients. Nineteen performed manual labor, 4 patients were retired, 3 were housewives and one was a clerk.

PRC was proposed in every instance as an alternative to avoid wrist fusion in a salvage situation. Therefore PRC has been performed for scaphoid pseudarthrosis (8 cases), scapholunate dissociations (6 cases), Kienböck's disease (9 cases) and Preiser's disease (4 cases).

Nine patients had had previous surgery (table I). Diagnostic arthroscopies were not considered as "previous surgery".

Operative technique

The technique described by Green (12) was used. The carpus was approached through a straight longitudinal dorsal incision. The space between the extensor digitorum communis and extensor pollicis longus was opened.

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The posterior interosseous nerve was always severed. The triquetrum, lunate and scaphoid were completely removed by sharp dissection. Attention was paid to preserve the palmar capsule. The proximal capitate was aligned in the lunate fossa. K-wire fixation and radial styloidectomy were never performed. The dorsal capsule was overlapped and closed. The extensor retinaculum was repaired anatomically. The skin was closed over a suction drain, and a compression dressing was applied postoperatively. This dressing was converted into a below-elbow plaster cast for 4 weeks.

Mobilization was encouraged after 4 weeks; more vigorous rehabilitation was started at the sixth week.

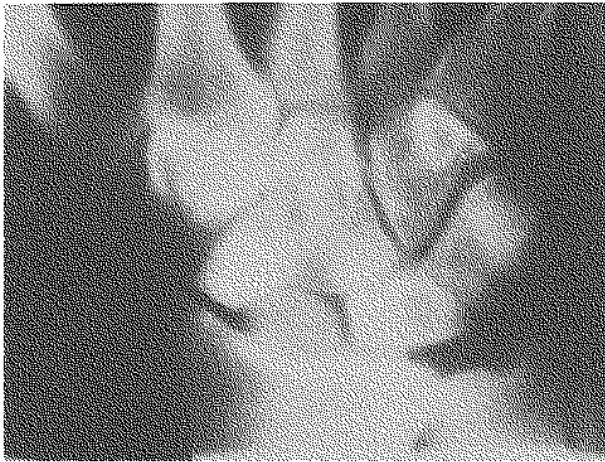


Fig. 1. — Preoperative : scaphoid silastic implant.

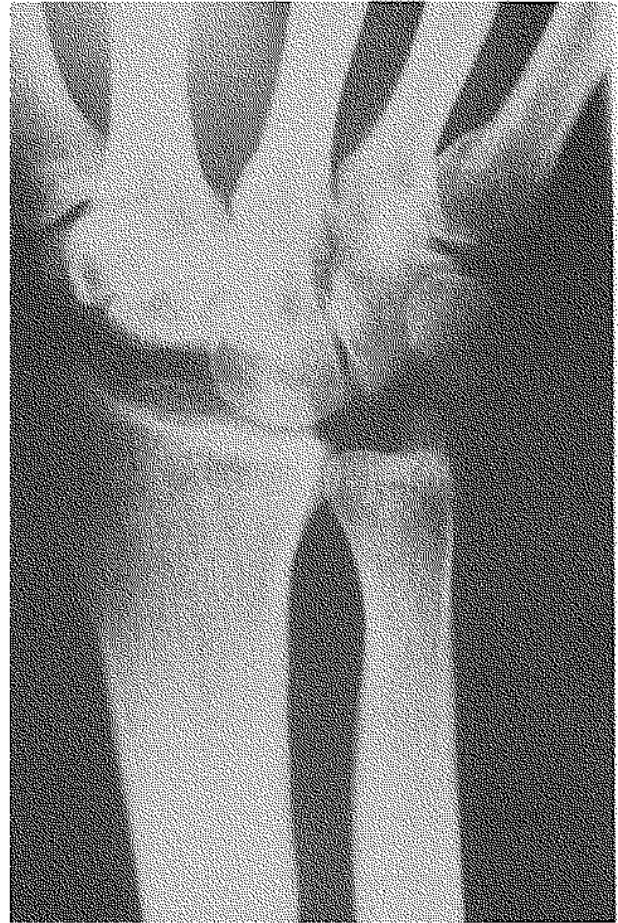


Fig. 2. — Postoperative : one year after P.R.C.

Table I

| | number of patients previously operated | type of operations |
|------------------------------|---|--|
| Scaphoid pseudarthrosis | 3/8 | 2 × osteosynthesis of scaphoid 1 × dorsal ganglion resection |
| scapholunate dissociation | 1/6 | 1 × dorsal ganglion resection |
| Kienböck's disease | 5/9 | 2 × radial shortening 1 × radial short. + silicone implant 1 × silicone implant 1 × dorsal ganglion resection |
| Preiser's disease | 0/4 | |

Evaluation

All operations were performed by 2 surgeons (L.D.S., B.Z.). Their evaluation was performed by the first author, who did not participate in the treatment. Results were evaluated according to Foucher's criteria (10) and Cooney's scoring system (5). The patient's subjective evaluation and complications were noted. Student's t test, chi square test and regression analyses were used for statistical analysis of data. The level of significance was set at $p < 0.05$.

RESULTS

There were no immediate postoperative complications. Five patients complained of severe residual pain and were considered failures. Two patients developed reflex sympathetic dystrophy postoperatively. One underwent fusion ; the other refused further treatment. Two others had a stage III SLAC-wrist preoperatively. This has recently been recognized as one of the reasons for residual wrist pain after PRC (23). We now perform arthrodesis of the wrist whenever there is marked osteoarthritis over the capitate or the lunate fossa of the radius. The last failure was a case of severe pain due to rhizarthrosis. However, she refused all further treatment. All failures were offered a wrist fusion as first treatment. Two of them refused it, and three had a successful wrist fusion. However this makes their Cooney score irrelevant,

and they were therefore left out of the average. The average Cooney score of the nonfailed PRC was 62, with an average flexion-extension range of 68° and an average grip strength of 60% of the opposite side.

Further analysis of the results according to the evaluation method, the diagnosis, the number of previous operations and the pathogenesis is demonstrated in tables III to VI.

There is an obvious difference between the Cooney score and the Foucher score, with the first being much more severe than the second. However numbers are too small to allow statistical analysis.

The failure rate is higher in those wrists with previous surgery : 3 out of 9, in contrast to those without previous surgery : 2 out of 18. This difference however is not significant (chi square test, $p = 0.258$) (table IV).

Table III. — Results according to evaluation method

| | | | |
|----|--------------|---------------|------------------------|
| 27 | Cooney score | Foucher score | Patient's satisfaction |
| | 1 Excellent | 10 Excellent | 17 Satisfied |
| | 8 Good | 9 Good | 4 Undecided |
| | 10 Fair | 3 Fair | 6 Not satisfied |
| | 8 Poor | 5 Poor | |

Table II. — Failures

| | Diagnosis | Previous operations nr. & type | Possible cause of failure | Treatment |
|---|-----------------|--|---------------------------|--------------|
| 1 | Kienböck's | 1 : radial shortening | RSD | none |
| 2 | Preiser's | none | RSD | wrist fusion |
| 3 | SL-dissociation | 1 : - dorsal ganglion - wrist arthroscopy | SLAC stage III | wrist fusion |
| 4 | Pseud, scaphoid | none | rhizarthrosis | none |
| 5 | Pseud, scaphoid | 2 : - Screw fixation - Bone graft & K-wires | SLAC stage III | wrist fusion |

RSD : Reflex sympathetic dystrophy
SLAC : Scapholunate advanced collapse

Table IV. — Results according to number of previous operations

| 27 | # of operations | # of patients | average Cooney score | Foucher score |
|----|-----------------|---------------|----------------------|-------------------|
| | 3 | 1 | 55 | 1G |
| | 2 | 2 | 65 (1F) | 1E + 1P |
| | 1 | 6 | 55 (2F) | 1E + 2G + 1F + 2P |
| | 0 | 18 | 60 (2F) | 7E + 8G + 2F + 2P |

Diagnostic arthroscopies have not been considered as "previous surgery".

Failures are left out of the Cooney score.

E = excellent

G = good

F = fair

P = poor

Table V. — Results according to diagnosis

| Diagnosis | # failures/total | F + E° | % force | Cooney score mean (max/min) | Foucher score |
|-----------------|------------------|--------|---------|-----------------------------|---------------|
| Kienböck's | 1/9 | 68° | 62% | 64 (80/55) | 3E + 5G |
| Preiser's | 1/4 | 96° | 81% | 83 (90/80) | 3E |
| SL-Dissociation | 1/6 | 59° | 64% | 68 (80/55) | 3E + 2G |
| # Pseud | 2/8 | 62° | 44% | 46 (75/25) | 1E + 2G + 3F |

Failures (5) are left out of the scores as some of them had fusions of their wrist subsequent to the PRC.

E = excellent

G = good

F = fair

Table VI. — Results according to pathogenesis

| | # of failures/total | F + E° | % force | Cooney score mean (max/min) | Foucher score |
|-------------------------|---------------------|--------|---------|-----------------------------|---------------|
| avascular bone necrosis | 2/13 | 76° | 67% | 69 (90/55) | 6E + 5G |
| trauma | 3/14 | 60° | 53% | 56 (80/25) | 4E + 4G + 3F |

Failures are left out of the scores as some of them had a wrist fusion subsequent to the PRC.

E = excellent

G = good

F = fair

difficulties into wrist fusions. However, this is a major drawback for patients who require a definitive solution for their wrist problem with a single intervention. The follow-up period of this series ranged from 6 to 36 months. Improvement of mobility and grip strength has been observed up to several months postoperatively (12, 23). Late deterioration of clinical results is not frequently reported in the literature. Jorgensen (16) could find radiological changes in only one patient out of 22, including several patients with more than 10 years' follow-up. Tomaino *et al.* (23) reported one deterioration out of 15 PRC due to progressive radiocarpal osteoarthritis.

Wrists with scaphoid pseudarthrosis have a worse outcome than those with other pathologies of the proximal row. Perhaps this is due to a more advanced osteoarthritis, the more extensive articular damage from the start and the longer duration of the disorder before PRC was considered. Two of our failures had a stage III SLAC wrist preoperatively. This has recently been recognized as a reason for residual wrist pain after PRC. In these cases we would now prefer limited wrist fusion (23). Cases of avascular necrosis of the lunate or scaphoid do surprisingly well with good preservation of mobility and force. This is in agreement with Mansat (18) and Jorgensen (16) for Kienböck's disease and Alnot and Bleton (1) and De Smet *et al.* (8) for Preiser's disease (table VII).

Schernberg *et al.* (21) claimed that a nonoperated wrist had a better outcome than a multioperated wrist. Jorgensen (16) published a series where none of the patients had had any previous surgery. They do have a better flexion/extension range and ulnar/radial deviation range. Our data could not confirm this. We do have less failures in nonoperated wrists, but the difference is not significant.

PRC can offer the patients a functional and painless wrist with a range of movement of 68° flexion/extension and an average grip strength 60% of the opposite side. It is a procedure with minimal complications. In case of failure (18.5%), successful conversion into wrist arthrodesis is still possible.

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SAMENVATTING

A. STEENWERCKX, L. DE SMET, B. ZACHEE, G. FABRY. Resectie van de eerste carpale rij: een waardevol alternatief voor polsfusie?

Problemen met falende prothesen en silicone synovitis alsmede de hoge invaliditeit van een polsarthrodese hebben opnieuw de aandacht voor alternatieven als beperkte intracarpale fusies en de resectie van de eerste carpale rij verhoogd. Deze proximale rij resectie is een eenvoudige procedure met weinig complicaties die volgens onze studie bij 27 patiënten een pijnloze beweeglijkheid kon bieden van gemiddeld 68° flexie-extensie en met een gemiddelde grijpkracht van 60% van de contralaterale zijde. Vijf mislukkingen op 27 patiënten (18,5%) werden genoteerd, maar deze polsen kunnen succesvol gefusioneerd worden.

Onze follow-up is relatief kort, variërend van 6 m tot 36 m, maar nergens wordt er in de literatuur melding

gemaakt van laattijdig deterioreren van de resultaten. Integendeel er wordt frequent melding gemaakt van laattijdig verbeteren van de mobiliteit en de grijpkracht. Wij blijven proximale rij resectie voorstellen in een poging om een polsarthrodese te vermijden op voorwaarde dat er preoperatief geen arthrose is van het capitatum of van de fossa lunatum.

RÉSUMÉ

A. STEENWERCKX, L. DE SMET, B. ZACHEE, G. FABRY. La résection de la première rangée des os du carpe: une alternative à l'arthrodèse du poignet?

Le problèmes suscités par l'arthroplastie et l'arthrodèse du poignet ont ravivé l'intérêt pour les arthrodèses partielles du carpe et la résection de la première rangée. La résection de la première rangée des os du carpe est une intervention facile, qui donne peu de complications. Nous avons revu une série personnelle de 27 patients opérés. Cette opération peut donner un poignet indolore avec en moyenne 60% de la force du côté opposé et une amplitude de 68° en flexion-extension. Cinq cas sur 27 (18,5%) conservent des douleurs importantes, mais dans ces cas une arthrodèse reste possible. Notre recul varie entre 6 mois et 36 mois. La littérature ne rapporte pas de détérioration des résultats avec le temps; au contraire, l'augmentation de la force et de la mobilité est fréquente après plusieurs mois.

Nous continuons de proposer la résection arthroplastique comme une intervention de sauvetage intéressante pour éviter l'arthrodèse dans les atteintes évoluées de la première rangée du carpe, à condition que la tête du grand os et la facette lunarienne du radius soient indemnes d'arthrose.