Responsiveness of the Cochin rheumatoid hand disability scale after surgery


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Abstract

Objective. To assess the responsiveness of the Cochin functional disability scale for the rheumatoid hand after surgery.

Method. In a prospective study, patients with rheumatoid arthritis (RA) scheduled for surgery of the wrist and/or fingers were evaluated within 48 h before surgery and at least 6 months after surgery. Clinical outcome measures included duration of morning stiffness, total score for tenderness, total score for swelling, visual analogue scale score for pain in the hands and wrists, a score for overall mobility of the wrist and the fingers, grip and pinch strength, the Hand Functional Index (HFI), the Kapandji index and the Cochin scale. Responsiveness was assessed with the paired t-test, the effect size (ES), the standardized response mean (SRM) and the non-parametric Spearman rank correlation coefficient ($r_S$).

Results. Fifty patients (42 women) were evaluated twice at an interval of 7.16 ± 2.10 months (mean ± S.D.) (range 6–15 months). Thirty-six patients (72%) were very satisfied or satisfied with the results of surgery, seven (14%) were not satisfied or dissatisfied and seven (14%) were dissatisfied or very dissatisfied. The Cochin scale score improved at the second visit ($P < 0.0001$), with SRM and ES values of 0.66 and 0.58 respectively. The correlation of the change in Cochin score with patient overall satisfaction was $r_S = 0.40$. Among the impairment measures, grip strength showed the best responsiveness ($SRM = -0.43$, $ES = -0.36$, correlation with patient overall satisfaction $r_S = 0.46$). The change in Kapandji index had the best correlation ($r_S = 0.51$) with patient overall satisfaction but its SRM and ES values were low ($-0.19$ and $-0.10$ respectively).

Conclusion. The Cochin scale is responsive and appropriate for the assessment of the effects of surgical treatments on disability in RA hands.

Key words: Responsiveness, Rheumatoid arthritis, Hand surgery, Hand function.

The rheumatoid hand is a major cause of pain and functional disability [1]. Over 90% of rheumatoid arthritis (RA) patients suffer from involvement of the hand joints [2]. Hand pain, swelling, loss of range of motion, muscle weakness and deformity lead to decreased grip strength, which compromises grasp and fine manipulation and alters hand function [3, 4]. The resulting hand disability affects the activities of daily living and may cause dependency on others, which is a major problem in RA [5]. Thus the main goal of treating the rheumatoid hand is to enhance functional ability. Surgery of the rheumatoid hand decreases pain [6–8], but there are few data concerning the improvement of disability regarding daily living activities. Most studies of rheumatoid hand surgery use disability scales that have not been tested for reliability and validity [9, 10] or measures of impairment (range of motion and grip strength). More recently two surgical studies assessing recovery after distal radius fracture used a patient rating scale (Disability of the Arm, Shoulder and Hand; DASH) that focuses on quality of life, related to disability of the arm, shoulder and hand and a patient-rated wrist evaluation (PRWE) [11, 12].


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Assessment tools with good metrical properties are needed to evaluate hand disability. In RA, most disability scales assess overall disability but few are focused on the hand joints [13–16]. It has been suggested that a specific test could be better adapted than a generic test to assess regional pathology [17]. Most of the scales assessing disability in the rheumatoid hand use standardized tasks requiring special equipment, trained personnel, or both and are complicated for routine use [18–21].

Recently, a specific scale comprising 18 items—the Cochin scale—was developed to assess disability and functional handicap caused by the rheumatoid hand [22]. This scale is based on questions concerning activities commonly performed by the hand in a person’s daily environment; and it is designed to assess the efficacy of local treatment and surgery on rheumatoid hand function. This scale has been shown to be valid and reliable and to be well correlated with the patient’s perceived handicap. It takes only few minutes (3 ± 1 min), without equipment, to complete the questionnaire, and no trained physicians are needed. However, the sensitivity to change (responsiveness) of this scale is unknown.

As the usefulness of an outcome measurement instrument is highly related to its responsiveness [23, 24], the aim of our study was to assess the responsiveness of the Cochin rheumatoid hand disability scale after surgery.

Patients and methods

Eligibility criteria

To be eligible for the study, the patients had to fulfill the criteria of RA defined in 1987 by the American Rheumatism Association [25] and to be scheduled for surgery of the wrist and/or fingers. Subjects were excluded if they had (i) a severe psychiatric disorder (particularly psychosis or depression requiring a change in treatment within the last 30 days), (ii) neurological disorders of the upper limbs, or (iii) hand and wrist surgery or trauma within 90 days of entry into the study.

Surgical procedure and specified indications

There is a wide variety of surgical treatment options for the RA hand, depending on the patient’s clinical presentation. Several surgical procedures were allowed in this study.

Rheumatoid wrist synovectomy, realignment and stabilization (SRS) accounts for up to 70% of the surgical operations carried out on the rheumatoid wrist [8]; in the present patients it consisted of articular and tenosynovectomy, stabilization of the distal radioulnar joint (DRUJ) by Sauve-Kapandji’s operation and tendon transfers associated with dorsal ligamentoplasty [6, 7]. The indication for this surgical treatment was a painful DRUJ with clinical instability, persistent synovitis or extensor tendon ruptures unresponsive to conservative care, and X-ray film evidence of destruction of the DRUJ.

Other types of surgery were arthrodesis of the wrist and thumb, synovectomy, repair or realignment of the tendon, repair of swan-neck and boutonniere deformities, and Swanson Silastic arthroplasty of the metacarpophalangeal (MCP) and wrist joints. Each procedure was decided upon by the surgeon responsible for treatment according to the patient’s clinical presentation.

Study design

Patients were selected prospectively from three orthopaedic departments over an 18-month period. Surgery was performed by four surgeons specializing in hand surgery. The patients were evaluated for disability, impairment and disease activity before and after surgery by the first author, a physician independent of the surgeons. The first examination took place in the orthopaedic department during hospitalization, within 48 h before surgery. The second examination was performed at a follow-up visit or at the patient’s home at least 6 months after surgery. The following information was recorded.

Baseline visit only

Information on demographic and disease characteristics was recorded. Radiographic hand and wrist lesions were assessed by the number of erosions and joint space narrowing according to the score of Larsen et al. [26] in the five MCP joints, the five proximal interphalangeal (PIP) joints and the wrists (range).

Baseline and follow-up visits

Disease activity, impairment and disability measures were recorded at the baseline and follow-up visits, as described below.

Disease activity measures. Morning stiffness duration (min), total swelling score (0 = no swelling, 1 = probable swelling, 2 = definite swelling, 3 = tense swelling) and total tenderness score, as measured by the Ritchie articular index [34], were recorded. Joints examined were the wrist (radiocarpal, intercarpal, carpometacarpal as one unit), MCP (five units), interphalangeal of the thumb, and proximal and distal interphalangeal joints of the fingers (nine units) of the operated hand.

Impairment measures. A visual analogue scale was used to assess the intensity of pain in the hands and wrists (VAS pain) [30]. It ranged from 0 mm (no pain) to 100 mm (maximum pain) and was recorded by the patients.

Passive range of motion was measured in degrees with a standard finger-goniometer [31, 32]. For the wrist, six movements were assessed: flexion, extension, ulnar inclination, radial inclination, pronation and supination. For the thumb and fingers, 10 movements were assessed: flexion of the MCP and PIP joints. For the fingers, flexion of the DIP joint was also measured. The score of overall mobility was defined as the sum of these measures.

Grip and pinch strength of the operated hand were measured with an electronic dynamometer (Amplifier
Hand disability measures. The Cochin scale (Appendix 1) was used to assess disability [22]. The Cochin scale is a questionnaire completed by the practitioner in the light of the patient’s answers to 18 questions concerning daily living activities, each question being scored from 0 (impossible to do) to 5 (accomplished completely), and the third test assesses finger extension and is scored from 0 (impossible to do) to 5 (accomplished completely) [28, 29].

Follow-up visit only

The patient’s overall satisfaction with the result of surgery was recorded on a five-level ordinal adjectival scale (very satisfied, satisfied, not satisfied or dissatisfied, dissatisfied, very dissatisfied).

Statistical analysis

Data were analysed with Systat 5.2.1 software (Chicago, IL, USA). Quantitative variables were recorded as mean ± S.D. and minimum and maximum values. Qualitative variables were recorded as proportion and percentage.

Responsiveness

We used four statistical approaches to assess responsiveness [35–38].

Standardized response mean. The SRM is defined as the mean difference in score before and after surgery divided by the S.D. of the individual changes in scores. A higher SRM indicates greater responsiveness. A negative value indicates that the mean score before surgery is lower than the mean score after surgery.

Paired t-test. This was used to compare the mean of the individual changes for each subject with 0. The level of significance chosen was α = 0.01.

Clinical relevance. Spearman’s correlation coefficient (rS) was used to assess the relationship between the patient overall satisfaction index with the individual changes in each quantitative variable assessing disability, impairment and disease activity [39–42].

Results

Demographic and clinical data

Fifty-five RA patients who underwent hand surgery were considered for enrolment in the study. Five patients were excluded from analysis: one was excluded because of a change of slow-acting anti-rheumatic drug, two were lost to follow-up and two patients refused to cooperate further in the study. As a result, data from 50 patients were used in the study. Forty-two women and eight men were evaluated twice at an interval of 7.16 ± 2.10 months (range 6–15 months). Patients were aged 54.18 ± 14.69 yr (mean ± S.D.) (range 19–77 yr). At the first visit, disease duration was 190.02 ± 124.38 months (range 24–696 months) and duration of disease of the hand was 164.38 ± 101.39 months (range 24–504 months). Twenty-four patients (48%) had undergone SRS, nine (18%) arthrodesis of the wrist or the thumb, seven (14%) tenosynovectomy of the extensor or flexor tendons or synovectomy of the distal radioulnar joint or radiocarpal joint, five (10%) repair and realignment of the tendon and five (10%) another type of surgery. As different types of surgery were performed in this study and as 24 patients (48%) had the same well-standardized procedure (SRS of the rheumatoid wrist) [8], a separate analysis was performed on the former subgroup and on the miscellaneous procedure subgroup.

The scores for the disease activity measures (morning stiffness, swelling, tenderness), the impairment measures (VAS for pain, global mobility, grip strength, pinch strength, HFI, Kapandji index) and the Cochin scale before and after surgery are summarized in Tables 1 and 2. At the second visit, 36 patients (72%) were very satisfied or satisfied with the results of surgery, seven patients (14%) were not satisfied or dissatisfied, and 2. At the second visit, 36 patients (72%) were very satisfied or satisfied with the results of surgery, seven patients (14%) were not satisfied or dissatisfied, and 2. At the second visit, 36 patients (72%) were very satisfied or satisfied with the results of surgery, seven patients (14%) were not satisfied or dissatisfied, and 2.

Responsiveness

As shown in Table 3, a significant improvement in the Cochin scale score after surgery was observed (paired t-test = 4.7, P < 0.0001) when the whole group was considered. This improvement was also significant in the SRS subgroup (paired t-test = 3.6, P < 0.001) and the miscellaneous subgroup (paired t-test = 3.1, P < 0.003)

The other significant improvements observed in the whole group were VAS score for pain (paired t-test = 2.9, P < 0.005), grip strength (paired t-test = 3.09, P < 0.003) and HFI score (paired t-test = 2.5,
When the miscellaneous subgroup was considered, a significant improvement was observed in grip strength (paired t-test = 2.3, \(P < 0.01\)). A significant decrease in overall mobility was observed in the three groups. An improvement very near the chosen level of significance was observed for all the disease activity measures in the whole group and the SRS subgroup, for the VAS score for pain in the SRS subgroup and for the HFI score in the miscellaneous subgroup (Table 3).

As shown in Table 4, the values of SRM (0.66) and ES (0.58) for the Cochin scale were the highest for all outcome measures in the whole group as well as in the SRS and the miscellaneous subgroup (SRM = 0.75 and 0.63 respectively, ES = 0.75 and 0.42 respectively).

Among the disease activity measures, the results for SRM (0.44) and ES (0.53) were the highest for swelling score in the whole group and in the SRS subgroup (SRM = 0.70, ES = 0.90).

Clinical relevance of individual changes in the Cochin scale

The Spearman correlation coefficients for the change in the Cochin scale with the patient’s overall satisfaction index were fair (0.40, 0.44 and 0.44 for the whole group, the SRS and miscellaneous subgroups respectively) and were among the highest of the outcome measures.

### Table 1. Disease activity, impairment and disability measure scores before surgery in the whole group, the SRS subgroup and the miscellaneous subgroup

<table>
<thead>
<tr>
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<th>Whole group</th>
<th>SRS subgroup</th>
<th>Miscellaneous subgroup</th>
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<tr>
<td></td>
<td>Mean s.d. (range)</td>
<td>Mean s.d. (range)</td>
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<tr>
<td>Disease activity measures</td>
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<tr>
<td>Morning stiffness (min)</td>
<td>40.80 57.80 (0–240)</td>
<td>44.58 61.05 (0–240)</td>
<td>37.30 55.61 (0–240)</td>
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<tr>
<td>Swelling (range 0–90)</td>
<td>4.88 4.26 (0–19)</td>
<td>5.29 3.97 (0–14)</td>
<td>4.50 4.56 (0–19)</td>
</tr>
<tr>
<td>Tenderness (range 0–90)</td>
<td>2.60 4.02 (0–17)</td>
<td>2.87 3.67 (0–12)</td>
<td>2.34 4.38 (0–17)</td>
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<tr>
<td>Impairment measures</td>
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<tr>
<td>VAS pain (range 0–100)</td>
<td>45.22 29.87 (0–98)</td>
<td>53.25 28.68 (2–94)</td>
<td>37.80 29.55 (0–98)</td>
</tr>
<tr>
<td>Overall mobility (°)</td>
<td>1250.14 174.63 (680–1840)</td>
<td>1256.29 127.70 (1000–1459)</td>
<td>1244.46 211.42 (680–1840)</td>
</tr>
<tr>
<td>Grip strength (N)</td>
<td>103.80 69.41 (19–403)</td>
<td>96.66 52.75 (36–220)</td>
<td>110.38 82.39 (19–403)</td>
</tr>
<tr>
<td>Pinch strength (N)</td>
<td>32.80 22.17 (5–122)</td>
<td>31.37 18.76 (14–100)</td>
<td>34.11 25.22 (5–122)</td>
</tr>
<tr>
<td>Larsen score (range 0–50)</td>
<td>26.12 11.62 (1–45)</td>
<td>23.00 11.11 (1–45)</td>
<td>28.88 11.56 (10–45)</td>
</tr>
<tr>
<td>HFI (range 4–42)</td>
<td>12.78 4.54 (4–23)</td>
<td>11.50 4.39 (4–22)</td>
<td>13.96 4.44 (6–21)</td>
</tr>
<tr>
<td>Kapandji index (range 0–50)</td>
<td>56.46 10.75 (0–50)</td>
<td>40.45 9.13 (14–50)</td>
<td>32.76 10.97 (0–48)</td>
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<tr>
<td>Hand disability measure</td>
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<tr>
<td>Cochin scale (range 0–90)</td>
<td>27.16 14.03 (3–62)</td>
<td>29.66 14.34 (3–62)</td>
<td>24.84 13.60 (4–52)</td>
</tr>
</tbody>
</table>

### Table 2. Disease activity, impairment and disability measure scores after surgery in the whole group, the SRS subgroup and the miscellaneous subgroup

<table>
<thead>
<tr>
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<tr>
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<td>Mean s.d. (range)</td>
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<td>Mean s.d. (range)</td>
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<tr>
<td>Disease activity measures</td>
<td></td>
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<tr>
<td>Morning stiffness (min)</td>
<td>24.00 39.93 (0–180)</td>
<td>16.45 32.65 (0–120)</td>
<td>30.96 45.16 (0–180)</td>
</tr>
<tr>
<td>Swelling (range 0–90)</td>
<td>2.62 2.95 (0–12)</td>
<td>1.62 1.74 (0–5)</td>
<td>3.53 3.53 (0–12)</td>
</tr>
<tr>
<td>Tenderness (range 0–90)</td>
<td>1.38 2.23 (0–8)</td>
<td>1.58 2.28 (0–8)</td>
<td>1.19 2.20 (0–8)</td>
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<tr>
<td>Impairment measures</td>
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</tr>
<tr>
<td>VAS pain (range 0–100)</td>
<td>32.62 27.77 (0–100)</td>
<td>39.25 26.54 (0–84)</td>
<td>26.50 27.97 (0–100)</td>
</tr>
<tr>
<td>Overall mobility (°)</td>
<td>1117.30 154.49 (740–1390)</td>
<td>1128.70 149.51 (740–1390)</td>
<td>1106.76 161.17 (780–1385)</td>
</tr>
<tr>
<td>Grip strength (N)</td>
<td>129.18 90.25 (19–404)</td>
<td>116.08 79.61 (24–375)</td>
<td>141.26 99.08 (19–404)</td>
</tr>
<tr>
<td>Pinch strength (N)</td>
<td>33.66 21.09 (1–100)</td>
<td>29.20 19.20 (1–80)</td>
<td>37.76 22.27 (8–100)</td>
</tr>
<tr>
<td>HFI (range 4–42)</td>
<td>11.36 5.06 (0–20)</td>
<td>10.16 4.55 (0–16)</td>
<td>12.46 5.33 (2–20)</td>
</tr>
<tr>
<td>Kapandji index (range 0–50)</td>
<td>37.56 10.32 (10–50)</td>
<td>40.66 10.49 (10–50)</td>
<td>34.69 9.47 (16–50)</td>
</tr>
<tr>
<td>Hand disability measure</td>
<td></td>
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</tr>
<tr>
<td>Cochin scale (range 0–90)</td>
<td>19.24 14.50 (0–58)</td>
<td>18.83 14.43 (0–58)</td>
<td>19.07 14.48 (0–52)</td>
</tr>
</tbody>
</table>

\(P < 0.015\). When the miscellaneous subgroup was considered, a significant improvement was observed in grip strength (paired \(t\)-test = 2.3, \(P < 0.01\)). A significant decrease in overall mobility was observed in the three groups.

An improvement very near the chosen level of significance was observed for all the disease activity measures in the whole group and the SRS subgroup, for the VAS score for pain in the SRS subgroup and for the HFI score in the miscellaneous subgroup (Table 3).

As shown in Table 4, the values of SRM (0.66) and ES (0.58) for the Cochin scale were the highest for all outcome measures in the whole group as well as in the SRS and the miscellaneous subgroup (SRM = 0.75 and 0.63 respectively, ES = 0.75 and 0.42 respectively).

Among the disease activity measures, the results for SRM (0.44) and ES (0.53) were the highest for swelling score in the whole group and in the SRS subgroup (SRM = 0.70, ES = 0.90).

Among the impairment measures, the SRM and ES values of the VAS of pain, grip strength, and of overall mobility in the whole group were the highest (SRM = −0.42, −0.43 and 1.06 respectively, ES = −0.42, −0.36 and 0.99 respectively) as well as in both subgroups.

Lack of responsiveness was observed for the HFI score (SRM = 0.35, ES = 0.31) for the Kapandji index score (SRM = 0.19, ES = −0.10) and the pinch strength score (SRM = −0.05, ES = −0.03) in the whole group.
Clinical relevance of individual changes in the disease activity and impairment outcome measures

The Spearman correlation coefficients for the changes in grip strength and the Kapandji score with the patient’s overall satisfaction index were fair for the whole group (0.46 and 0.51 respectively) as well as for the SRS (0.56 and 0.62 respectively) and the miscellaneous subgroups (0.37 and 0.45 respectively) (Table 4). They were among the highest of the outcome measures.

Discussion

The results of this study show the Cochin scale to be a responsive tool. The Cochin scale had better responsiveness (SRM, ES) than impairment and disease activity measures such as pain, HFI, morning stiffness duration, swelling and tenderness, which have already been shown to have marked sensitivity to change after the introduction of slow-acting anti-rheumatic drugs [43] in RA. In accordance with our results, better responsiveness of disability outcome measures over impairment measures has been demonstrated previously in patients treated for Colle’s fracture [12].

Responsive measures should also discriminate between relevant and irrelevant clinical changes, and the patient’s opinion can be considered as a logical external indicator of change [23]. Considering that patient overall satisfaction is influenced by multiple components, the correlation coefficient between the patients’ opinions about the result of surgery (reflecting the treatment effect) and the individual changes in the Cochin scale score (\(r_S = 0.40\)) suggests that disability is a relevant outcome measure. Thus disability improvement should be one of the goals of management of patients with RA.

Among the impairment and disease activity outcome measures tested, grip strength had the best SRM and ES values and its changes had the second best correlation coefficient with the patient’s overall opinion. In accordance with our results, grip strength responsiveness has been shown previously to be the highest among impairment outcome measures in RA patients [44].

### Table 3. Changes in outcome measures after surgery in the whole group, the SRS subgroup and the miscellaneous subgroup

<table>
<thead>
<tr>
<th></th>
<th>Whole group</th>
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<th>SRS subgroup</th>
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<tr>
<td></td>
<td>Mean (s.d.)</td>
<td>P</td>
<td>Mean (s.d.)</td>
<td>P</td>
<td>Mean (s.d.)</td>
<td>P</td>
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<tr>
<td>Disease activity measures</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Morning stiffness</td>
<td>16.80 (56.58)</td>
<td>0.041</td>
<td>28.12 (56.17)</td>
<td>0.022</td>
<td>6.34 (55.99)</td>
<td>0.568</td>
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<tr>
<td>Swelling</td>
<td>2.26 (5.08)</td>
<td>0.003</td>
<td>3.60 (4.60)</td>
<td>0.001</td>
<td>0.96 (5.18)</td>
<td>0.354</td>
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<td>Tenderness</td>
<td>1.22 (3.59)</td>
<td>0.02</td>
<td>1.20 (2.40)</td>
<td>0.018</td>
<td>1.15 (4.42)</td>
<td>0.196</td>
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<td>Impairment measures</td>
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<tr>
<td>VAS pain</td>
<td>12.60 (29.98)</td>
<td>0.005</td>
<td>14.00 (29.10)</td>
<td>0.02</td>
<td>11.30 (31.25)</td>
<td>0.077</td>
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<tr>
<td>Overall mobility</td>
<td>132.84 (165.10)</td>
<td>0.000</td>
<td>127.50 (119.80)</td>
<td>0.0001</td>
<td>137.69 (200.40)</td>
<td>0.002</td>
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<td>Grip strength</td>
<td>−25.38 (58.03)</td>
<td>0.003</td>
<td>19.40 (59.10)</td>
<td>0.12</td>
<td>−30.88 (57.60)</td>
<td>0.011</td>
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<td>Pinch strength</td>
<td>−0.36 (15.34)</td>
<td>0.69</td>
<td>2.16 (14.40)</td>
<td>0.47</td>
<td>−3.65 (15.89)</td>
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<td>HFI</td>
<td>1.42 (3.98)</td>
<td>0.015</td>
<td>1.30 (4.50)</td>
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<td>1.50 (3.52)</td>
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<td>Kapandji index</td>
<td>−1.10 (5.54)</td>
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<td>−0.20 (4.8)</td>
<td>0.8</td>
<td>−1.92 (6.08)</td>
<td>0.120</td>
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<td>Hand disability measure</td>
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<tr>
<td>Cochin scale</td>
<td>7.92 (12.45)</td>
<td>0.0001</td>
<td>10.80 (14.40)</td>
<td>0.001</td>
<td>5.76 (9.11)</td>
<td>0.003</td>
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### Table 4. Responsiveness of the outcome measures after surgery in the whole group, the SRS subgroup and the miscellaneous subgroup

<table>
<thead>
<tr>
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<th>Whole group</th>
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<tr>
<td></td>
<td>SRM</td>
<td>ES  (r_S^a)</td>
<td>SRM</td>
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<td>Morning stiffness</td>
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<td>Swelling</td>
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<td>0.33</td>
<td>0.30</td>
<td>0.09</td>
</tr>
<tr>
<td>Impairment measures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAS pain</td>
<td>0.42</td>
<td>0.42</td>
<td>0.05</td>
</tr>
<tr>
<td>Overall mobility</td>
<td>1.06</td>
<td>0.99</td>
<td>−0.24</td>
</tr>
<tr>
<td>Grip strength</td>
<td>−0.43</td>
<td>−0.36</td>
<td>−0.46</td>
</tr>
<tr>
<td>Pinch strength</td>
<td>−0.05</td>
<td>−0.03</td>
<td>−0.22</td>
</tr>
<tr>
<td>HFI</td>
<td>0.35</td>
<td>0.31</td>
<td>0.18</td>
</tr>
<tr>
<td>Kapandji index</td>
<td>−0.19</td>
<td>−0.10</td>
<td>0.51</td>
</tr>
<tr>
<td>Hand disability measure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cochin scale</td>
<td>0.66</td>
<td>0.58</td>
<td>0.40</td>
</tr>
</tbody>
</table>

\(^a\)Spearman’s correlation coefficient (\(r_S\)) between the patient’s overall satisfaction with the results of the surgery and the individual changes in each of the outcome measures.
grip force is a major symptom in RA and leads to problems in daily living activities because it causes difficulty in gripping objects [45, 46]. It has been shown previously that reduction in grip strength is correlated with global HAQ (Health Assessment Questionnaire) score [47].

The two measures of functional mobility used in this study, the Kapandji index [28, 29] (widely used by French surgeons) and the HFI index [43], did not show the two properties of a responsive instrument (magnitude and clinical relevance of the change). The Kapandji index had weak SRM and ES values, although changes in it were best correlated with the patient’s overall opinion. This lack of responsiveness, if confirmed by other studies, could limit the use of this functional mobility index. The HFI index had interesting SRM and ES values but the correlation of change in HFI with the patient’s overall opinion was weak.

VAS score for pain and the swelling score had fair SRM and ES values but the correlations of their changes with patient’s overall opinion were weak, suggesting that these changes were not clinically relevant.

The heterogeneity of the surgical procedures analysed in this study may weaken our conclusions. Even though a well-standardized procedure—rheumatoid wrist SRS—accounts for 70% of surgical operations on the rheumatoid wrist [48], there is a wide variety of surgical treatment options for the RA hand depending on the patient’s clinical presentation, and a useful outcome measure should be able to assess all types of surgery. As half of our patients underwent SRS, a separate analysis was performed in this subgroup in order to highlight the influence of the type of intervention on the performance of outcome measures. In this subgroup, the outcome measure responsiveness was unchanged when compared with the whole group of patients or with the miscellaneous subgroup, suggesting that the type of surgery had no influence on the sensitivity to change.

Finally, the Cochin scale, grip strength, and the Kapandji index showed the most clinically relevant changes. The relationship between disability and impairment measures is not clearly established. The first reports found significant correlations between impairment and disability tests [16, 49] but more recent studies showed poor or moderate correlations between disability scores, impairment and disease activity measures when rheumatoid hands were assessed [5, 47, 50]. Dellhag and Burckhardt [5], using multiple regression, showed that impairment measures alone explained nearly 50% of the variance in estimated hand function in patients with RA, and Halaka et al. [47] showed a moderate correlation between a disability questionnaire (Arthritis Impact Measurement Scales dexterity questions) and the HFI in patients with RA. These data suggest that the relationship between impairment and disability is not straightforward. Impairment reflects the consequences of the disease at the organ level and disability reflects the consequences of the disease for functional performance and activity. For comparable lesions, patients may adopt either intrinsic or adaptive recovery mechanisms, the latter depending on the integrity of the unaffected organs/segments and on a complex interaction between psychosocial (e.g. motivation), cognitive (e.g. memory, attention and space perception) and sensorimotor skills. Assessment of impairment measures of the hand represents only some of the functional results and should be complemented by evaluation of the disability.

In conclusion, the Cochin scale is a simple, quick and practical instrument that is appropriate for the assessment of the effects of surgical treatments on RA hand disability and could be useful in clinical follow-up.

Acknowledgements

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References


12. MacDermid JC, Richards RS, Donner A, Bellamy N, Roth JH. Responsiveness of the Short Form-36, disability


Appendix 1. The Cochin scale

Answers to the questions
0 = yes, without difficulty
1 = yes, with a little difficulty
2 = yes, with some difficulty
3 = yes, with much difficulty
4 = nearly impossible to do
5 = impossible to do

In the kitchen
1. Can you hold a bowl?
2. Can you grasp a full bottle and raise it?
3. Can you hold a plate full of food?
4. Can you pour liquid from a bottle into a glass?
5. Can you unscrew the lid from a jar that has been opened before?
6. Can you cut meat with a knife?
7. Can you prick things well with a fork?
8. Can you peel fruit?

Dressing
9. Can you button your shirt?
10. Can you open and close a zip?

Hygiene
11. Can you squeeze a new tube of toothpaste?
12. Can you hold a toothbrush efficiently?

At the office
13. Can you write a short sentence with an ordinary pen?
14. Can you write a letter with an ordinary pen?

Other
15. Can you turn a round door knob?
16. Can you cut a piece of paper with scissors?
17. Can you pick up coins from a table top?
18. Can you turn a key in a lock?