

A User's Guide to: **Rheumatoid and Arthritis Outcome Score** **RAOS**

RAOS is developed as an instrument to assess the patients' opinion about their hips/knees and/or feet and associated problems.

RAOS is intended to be used for patients with chronic inflammatory joint diseases, such as rheumatoid arthritis, spondyloarthropathies, psoriatic arthritis and polyarthritis etc. with problems from lower extremity.

RAOS is meant to be used over short and long time; to assess changes from week to week induced by treatment (medication, operation, physical therapy) or over years.

RAOS can be used to assess groups and to monitor individuals.

RAOS content validity was ensured through literature search and an expert panel of patients, medical doctors and physical therapists.

RAOS consists of 5 subscales; **Pain**, other **Symptoms**, **Function in daily living (ADL)**, **Function in sport and recreation (Sport/Rec)** and **knee related Quality of life (QOL)**. The last week is taken into consideration when answering the questions. Standardized answer options are given (5 Likert boxes) and each question gets a score from 0 to 4. A normalized score (100 indicating no symptoms and 0 indicating extreme symptoms) is calculated *for each subscale*. The result can be plotted as an outcome profile.

RAOS is patient-administered, the format is user friendly, and takes about 10 minutes to fill out.

RAOS is self-explanatory and can be administered in the waiting room or used as a mailed survey.

RAOS has been used in patients 20-85 years old.

RAOS has high reliability (ICC >0.76, Chronbach's alpha >0.78).

KOOS includes WOMAC Osteoarthritis Index LK 3.0 (1) in its complete and original format (with permission), and WOMAC scores can be calculated. WOMAC is valid for subjects with rheumatoid arthritis (2).

RAOS construct validity has been determined in comparison with SF-36 (3, 4), the HAQ (5, 6) and four subscales of the AIMS2 (7, 8) and expected correlations were found (9).

RAOS responsiveness in subjects undergoing multidimensional team care (3-4 weeks) has been studied. A significant change was found in all scores. Small to

medium effect sizes (mean score change/preoperative SD) were found (0.30 – 0.44), as could be expected from the intervention multidiscipline care.

RAOS validation work is ongoing. RAOS is currently being used in a clinical study involving patients with rheumatoid arthritis undergoing arthroplasty of the knee or the hip. A paper regarding the RAOS has just been published (9).

RAOS is currently available in two versions, an English version and a Swedish version.

REFERENCES

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2. Wolfe F, Kong SX. Rasch analysis of the Western Ontario MacMaster questionnaire (WOMAC) in 2205 patients with osteoarthritis, rheumatoid arthritis, and fibromyalgia. *Ann Rheum Dis* 1999;58(9):563-8.
3. Ware JE, Jr., Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care* 1992;30(6):473-83.
4. Sullivan M KJ. Hälsoenkät: Svensk Manual och Tolkningsguide (Swedish Manual and Interpretation Guide). Gothenburg: Health Care Unit, Sahlgrenska Hospital, Sweden; 1994.
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7. Meenan RF, Mason JH, Anderson JJ, Guccione AA, Kazis LE. AIMS2. The content and properties of a revised and expanded Arthritis Impact Measurement Scales Health Status Questionnaire. *Arthritis Rheum* 1992;35(1):1-10.
8. Archenholtz B, Bjelle A. Reliability, validity, and sensitivity of a Swedish version of the revised and expanded Arthritis Impact Measurement Scales (AIMS2). *J Rheumatol* 1997;24(7):1370-7.
9. Bremander ABI, Petersson IF, Roos EM. Validation of the Rheumatoid and Arthritis Outcome Score for the lower extremity. *Health and Quality of Life Outcomes* 2003, 1:55

RAOS Reference data - multidimensional team care

RAOS has been used in studies of multidiscipline team care. RAOS scores from this study are given to enable RAOS-users to get familiar with the score. The data is visualized in graphs. The mean scores for all five subscales are given and connected with a line, which gives a **KOOS Profile**. 0 indicates extreme problems and 100 indicate no problems.

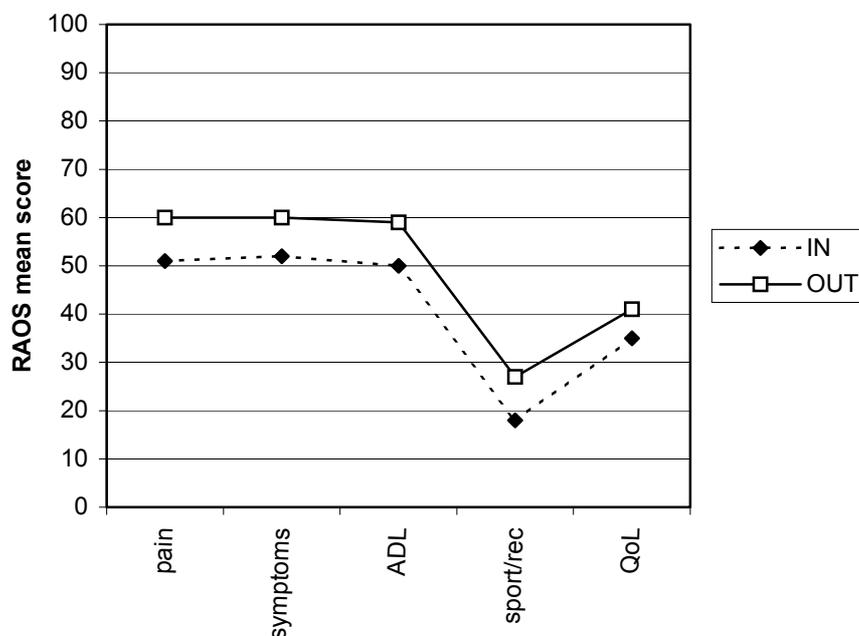
Multidimensional Team Care data

(From: *Bremander ABI, Petersson IF, Roos EM. Validation of the Rheumatoid and Arthritis Outcome Score for the lower extremity. Health and Quality of Life Outcomes 2003, 1:55*)

In figure 1 data is given for 119 subjects (32 males and 87 females) with inflammatory joint diseases (rheumatoid arthritis, spondyloarthropathies, psoriatic arthritis, polyarthritis, polymyalgia reumatica, Sjögren’s syndrome, Reiter’s disease, juvenile chronic arthritis). Their mean age was 56 (range 20 to 85), mean years of disease duration 18 years (range 0.3 – 61), mean HAQ disability score 1.3 (range 0 – 2.88).

Interpretation: The scores from all subscales improved significantly ($p < 0.001$) after 3-4 weeks of multidiscipline care. The four subscales Pain, Symptoms, ADL and Sport and Recreation improved more than Leg related Quality of Life during these 3-4 weeks of intervention.

RAOS profile



RAOS *Manual scoring sheet*

Instructions:

Assign the following scores to the boxes!

None	Mild	Moderate	Severe	Extreme
<input type="checkbox"/>				
0	1	2	3	4

Missing data. If a mark is placed outside a box, the closest box is chosen. If two boxes are marked, that which indicated the more severe problems is chosen. Missing data are treated as such; one or two missing values are substituted with the average value for that subscale. If more than two items are omitted, the response is considered invalid and no subscale score is calculated.

Sum up the total score of each subscale and divide by the possible maximum score for the scale. Traditionally in orthopedics, 100 indicates no problems and 0 indicates extreme problems. The normalized score is transformed to meet this standard. Please use the formulas provided for each subscale!

$$1. \text{ PAIN} \quad 100 - \frac{\text{Total score P1-P9} \times 100}{36} = 100 - \frac{\quad}{36} = \underline{\quad}$$

$$2. \text{ SYMPTOMS} \quad 100 - \frac{\text{Total score S1-S7} \times 100}{28} = 100 - \frac{\quad}{28} = \underline{\quad}$$

$$3. \text{ ADL} \quad 100 - \frac{\text{Total score A1-A17} \times 100}{68} = 100 - \frac{\quad}{68} = \underline{\quad}$$

$$4. \text{ SPORT\&REC} \quad 100 - \frac{\text{Total score SP1-SP5} \times 100}{20} = 100 - \frac{\quad}{20} = \underline{\quad}$$

$$5. \text{ QOL} \quad 100 - \frac{\text{Total score Q1-Q4} \times 100}{16} = 100 - \frac{\quad}{16} = \underline{\quad}$$

WOMAC How to score from the RAOS

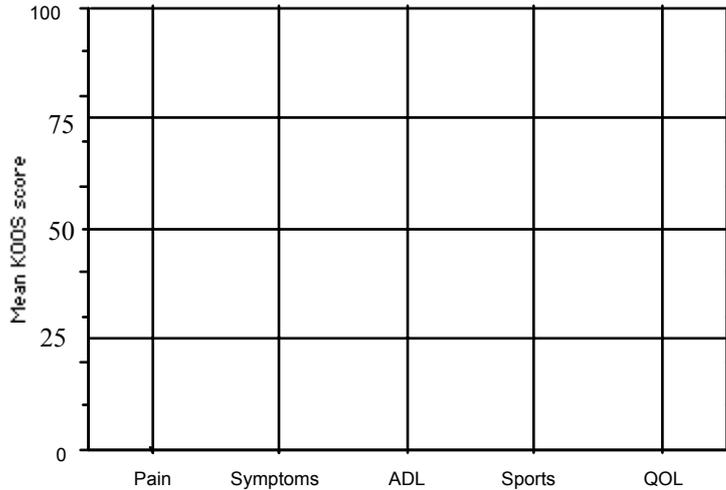
Assign scores from 0 to 4 to the boxes as shown above. To get original WOMAC scores sum the item scores for each subscale. If you prefer percentage scores in accordance with the RAOS, use the formula provided below to convert the original WOMAC scores.

$$\text{Transformed scale} = 100 - \frac{\text{actual raw score} \times 100}{\text{Possible raw score range}}$$

WOMAC subscores	Original score = sum of the following items	Possible raw score range
Pain	P5-P9	20
Stiffness	S6-S7	8
Function	A1-A17	68

RAOS Profile

To visualize differences in the five different RAOS subscores and change between different administrations of the RAOS (e.g. pre-treatment to post-treatment), RAOS Profiles can be plotted.



Legend

Symbol/color	Description (pre-treatment, post-treatment etc)	Date

Name: _____