A User's Guide to:

Hip disability and Osteoarthritis Outcome Score HOOS

HOOS is developed as an instrument to assess the patients' opinion about their hip and associated problems.

HOOS is intended to be used for hip disability with or without osteoarthritis (OA).

HOOS is validated in two slightly different versions, LK 1.1 and LK 2.0.

HOOS is meant to be used over both short and long time intervals; to assess changes from week to week induced by treatment (medication, operation, physical therapy) or over years due to the primary injury or post traumatic OA.

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

HOOS content validity was ensured through literature search, through interviews with more than 100 patients with hip disability, with and without hip OA [1], and by questioning 90 patients undergoing total hip replacement [5].

HOOS consists of 5 subscales; **Pain**, other **Symptoms**, **Function in daily living (ADL)**, **Function in sport and recreation (Sport/Rec)** and **hip 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.

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

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

HOOS has been used in patients 42-89 years old.

HOOS has high test-retest reproducibility (ICC >0.78)[1].

HOOS includes WOMAC Osteoarthritis Index LK 3.0 [2, 3] in its complete and original format, and WOMAC scores can be calculated. WOMAC is valid for elderly subjects with hip OA.

HOOS construct validity has been determined by comparing it with SF-36 [4] and expected correlations were found [5].

HOOS responsiveness has been determined in one study (n=90) after total hip replacement [5]. The responsiveness, calculated as SRM (standardized response mean), was significantly higher for the HOOS subscales Pain and Symptoms than for the WOMAC subscales Pain and Stiffness. High SRM was also found for the subscales "Sport and Recreation function" and "Quality of life". High SRM indicates that fewer subjects are needed to yield statistically significant differences.

HOOS validation work is ongoing. HOOS is currently being used in several clinical studies involving patients with or without hip OA. Two methodological papers regarding the HOOS were published during 2003 [1] [5].

HOOS is currently available in two versions, an American-English version and a Swedish version.

HOOS *Reference data*

- total hip replacement and rehabilitation

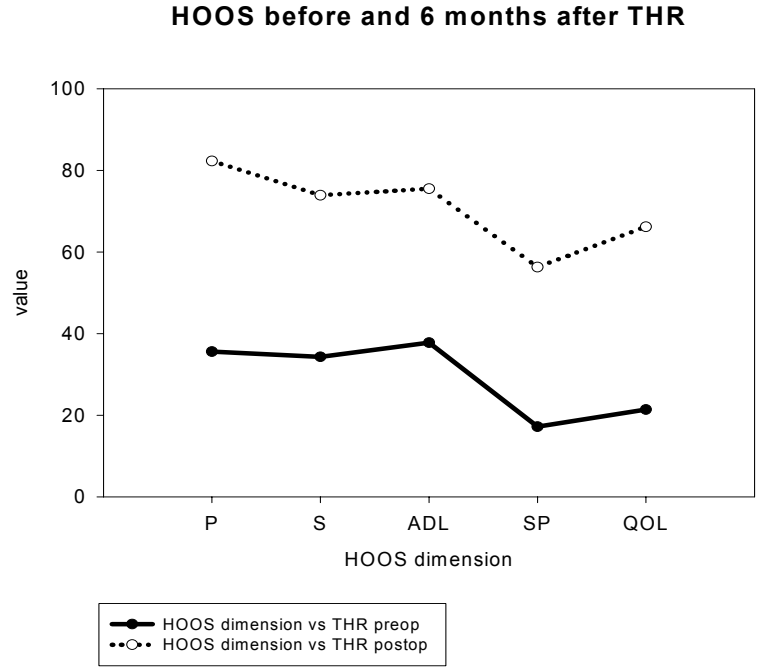
HOOS has been used in studies of hip OA in patients assigned for total hip replacement and patients who have received postoperative rehabilitation after discharge and those who have not. HOOS scores from these studies are given to enable HOOS-users to get familiar with the score. The data is visualized in graphs. The mean scores for all five subscales are given and connected with a line that gives a **HOOS profile.** 0 indicates extreme problems and 100 indicates no problems.

Total hip replacement data

(From: Nilsdotter A-K, Lohmander LS, Klässbo M, Roos EM.) Hip disability and Osteoarthritis Outcome Score (HOOS) Validity and Responsiveness in total hip replacement. BMC Musculoskeletal Disorders 2003;4:10.

In figure 1 data is given for 90 patients (mean age 71, range 42-89) with primary hip OA assigned for total hip replacement (THR). All patients were investigated preoperatively and six months postoperatively with HOOS 2.0. ***Interpretation:*** The scores from all subscales improved significantly ($p<0.001$) postoperatively compared to preoperative values. The subscale Pain showed the highest responsiveness. Pain seems to be the most serious problem in this group of patients. Nevertheless, there is a great improvement concerning Sport and Recreation as well as Hip Related Quality of Life.

Figure 1



Postoperative rehabilitation data

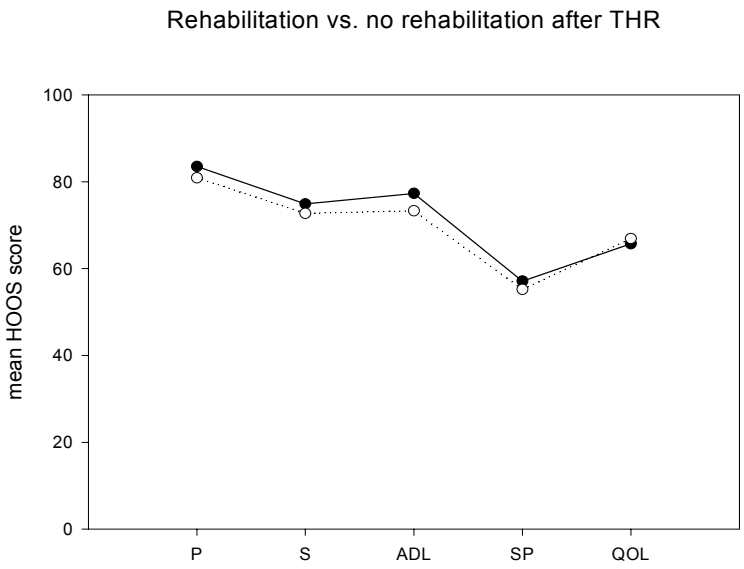
(From: Nilsdotter A-K, Westerlund JP, Roos EM.) Effectiveness of Postoperative Rehabilitation after Total Joint Replacement. Manuscript.

In figure 2 data is given for 67 patients who have received total hip replacement due to OA. Their mean age was 71 years (range 42-85). 36 of the patients received postoperative rehabilitation after discharge and 31 of them did not.

Interpretation

In accordance with previous studies the present study could not reveal any difference between the two groups of patients who received THR with or without postoperative rehabilitation after discharge. This is in contrast to the two groups of patients who received total knee replacement where there was a significant difference in ADL after 6 months. The patients who received postoperative rehabilitation scored better than the patients who did not.

Figure 2



HOOS *Manual scoring sheet*

Instructions:
Assign the following scores to the boxes!

None	Mild	Moderate	Severe	Extreme
□	□	□	□	□
0	1	2	3	4

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!
Missing data: If a mark is placed outside a box, the closest box is used. If two boxes are marked, the box which indicates the most severe problems has to be chosen. If more than two items are omitted, the response is considered invalid.

1. PAIN $100 - \frac{\text{Total score P1-P10} \times 100}{40} = 100 - \frac{\_\_\_\_\_}{40} = \_\_\_\_\_$

2. SYMPTOMS $100 - \frac{\text{Total score S1-S5} \times 100}{20} = 100 - \frac{\_\_\_\_\_}{20} = \_\_\_\_\_$

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

4. SPORT&REC $100 - \frac{\text{Total score SP1-SP4} \times 100}{16} = 100 - \frac{\_\_\_\_\_}{16} = \_\_\_\_\_$

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

WOMAC *How to score from the HOOS*

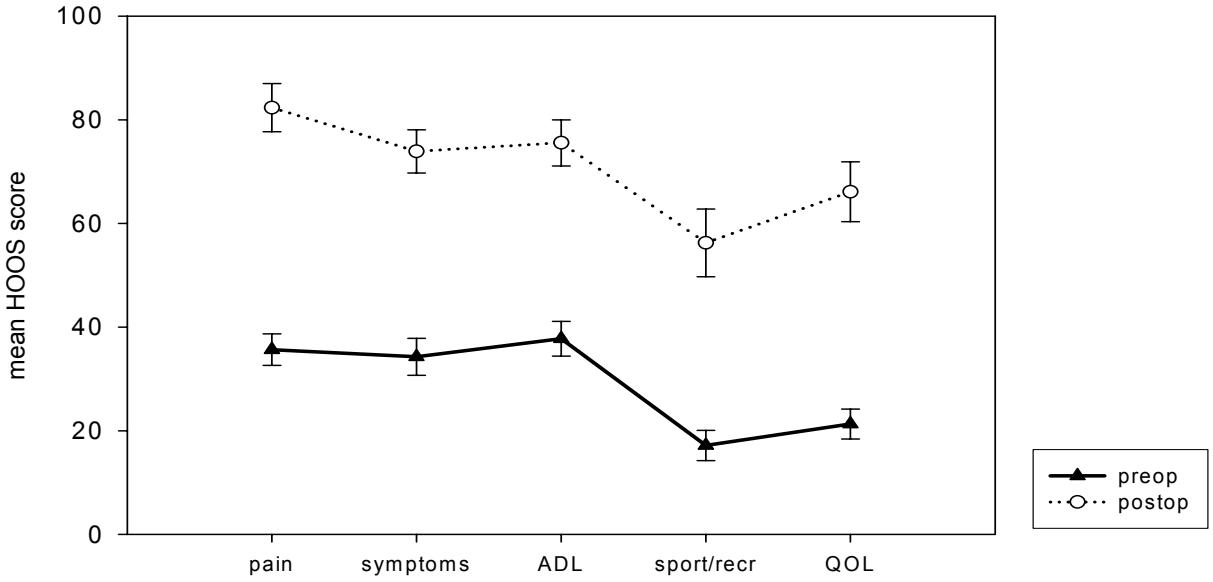
Assign scores from 0 to 4 to the boxes as shown above. To get original WOMAC Scores, sum the item scores for each subscale. If you prefer percentage scores in accordance with the HOOS, use the formula provided below to convert the original WOMAC scores.

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

WOMAC subscores	Original score = sum of the following items	Possible raw score range
Pain	P4-P8	20
Stiffness	S4-S5	8
Function	A1-A17	68

HOOS *Profile*

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



1. **Klassbo M, Larsson E, Mannevik E.** Hip disability and osteoarthritis outcome score. An extension of the Western Ontario and McMaster Universities Osteoarthritis Index. Scand J Rheumatol. 2003;32(1):46-51.
2. **Bellamy N, Buchanan W, Goldsmith C, Campbell J, Stitt LW.** Validation Study of WOMAC: A Health Status Instrument for Measuring Clinically Important Patient Relevant Outcomes to Antirheumatic Drug Therapy in Patients with Osteoarhritis of the Hip or Knee. The Journal of Rheumatology. 1988;15(12):1833-1840.
3. **Bellamy N.** WOMAC Osteoarthritis User's Guide London, Ontario: Victoria Hospital; 1995.
4. **Ware JE, Sherbourne CD.** The MOS 36-Item Short-Form Health Survey (SF-36). Medical Care. 1992;30(6):473-483.
5. **Nilsdotter A-K, Lohmander LS, Klässbo M, Roos EM.** Hip disability and Osteoarthritis Outcome Score (HOOS)- Validity and responsiveness in total hip replacement. BMC Musculoskeletal Disorders. 2003;4:10