

KOOS Scoring 2012

A change in how to manage missing items was introduced in 2012. Previously, 2 missing items were allowed in each subscale. From 2012, at least 50% of the items should be responded to. The differences in subscale level are outlined in the following table:

	Number of items needed for calculation of subscale score (2012 rule for missing items)	Number of items needed for calculation of subscale score (1998 rule for missing items)
Pain	5	7
Symptoms	4	5
ADL	9	15
Sport/Rec	3	3
QOL	2	2

KOOS Scoring instructions

Assign the following scores to the boxes:

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

Each subscale score is calculated independently. Calculate the mean score of the individual items of each subscale and divide by 4 (the highest possible score for a single answer option). Traditionally in orthopedics, 100 indicates no problems and 0 indicates extreme problems. The normalized score is transformed to meet this standard.

Missing data: If a mark is placed outside a box, the closest box is chosen. If two boxes are marked, that which indicates the more severe problem is chosen. As long as at least 50% of the subscale items are answered for each subscale, a mean score can be calculated. If more than 50% of the subscale items are omitted, the response is considered invalid and no subscale score should be calculated. For the subscale Pain, this means that 5 items must be answered; for Symptoms, 4 items; for ADL, 9 items; for Sport/Rec, 3 items; and for QOL, 2 items must be answered in order to calculate a subscale score. Subscale scores are independent and can be reported for any number of the individual subscales, i.e. if a particular subscale is not considered valid (for example, the subscale Sport/Rec 2 weeks after total knee replacement), the results from the other subscale can be reported at this time-point.

KOOS Excel scoring files

Excel spreadsheets with formulae to calculate the five subscale scores are available from www.koos.nu. If, for any reason, you prefer to use your own spreadsheets, the Excel formulae are given below. NB: The excel spreadsheet available from koos.nu does not take the number of missing items into account and will return a total subscale score regardless of missing items.

Excel formulation: When the raw data have been entered in the order the items occur in the KOOS questionnaires available from koos.nu, these Excel formulations can be copied and pasted directly into an English version of an Excel spreadsheet to automatically calculate the five subscore scales. Please note that it has been assumed that the items in the subscale symptoms appear first in the questionnaire.

KOOS Pain: $= 100 - \text{AVERAGE}(I2:Q2) / 4 * 100$

KOOS Symptoms: $= 100 - \text{AVERAGE}(B2:H2) / 4 * 100$

KOOS ADL: $= 100 - \text{AVERAGE}(R2:AH2) / 4 * 100$

KOOS Sport/Rec: $= 100 - \text{AVERAGE}(AI2:AM2) / 4 * 100$

KOOS QOL: $= 100 - \text{AVERAGE}(AN2:AQ2) / 4 * 100$

KOOS Manual Score calculation

The slightly updated version of the formulae (presented above and used from August 2012 in the spreadsheets available from www.koos.nu) does not need any manual imputation: Apply the mean of the observed items within the subscale (e.g. KOOS Pain), divide by 4, and multiply by 100; when this number is then subtracted from 100, you have the KOOS subscale estimate for that particular cross-sectional assessment of the individual patient. For manual calculations, please use the formulae provided below for each subscale:

$$1. \text{ PAIN} \quad 100 - \frac{\text{Mean Score (P1-P9)} \times 100}{4} = \text{KOOS Pain}$$

$$2. \text{ SYMPTOMS} \quad 100 - \frac{\text{Mean Score (S1-S7)} \times 100}{4} = \text{KOOS Symptoms}$$

$$3. \text{ ADL} \quad 100 - \frac{\text{Mean Score (A1-A17)} \times 100}{4} = \text{KOOS ADL}$$

$$4. \text{ SPORT/REC} \quad 100 - \frac{\text{Mean Score (SP1-SP5)} \times 100}{4} = \text{KOOS Sport/Rec}$$

$$5. \text{ QOL} \quad 100 - \frac{\text{Mean Score (Q1-Q4)} \times 100}{4} = \text{KOOS QOL}$$

WOMAC - How to score from the KOOS

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 KOOS, use the formula provided below to convert the original WOMAC scores.

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

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

KOOS Profile

To visualize differences in the five different KOOS subscores and change between different administrations of the KOOS (e.g. pre-treatment to post-treatment), KOOS Profiles can be plotted. The example from Nilsson et al. [17] shows KOOS profiles prior to and at three time points following total knee replacement (TKR).

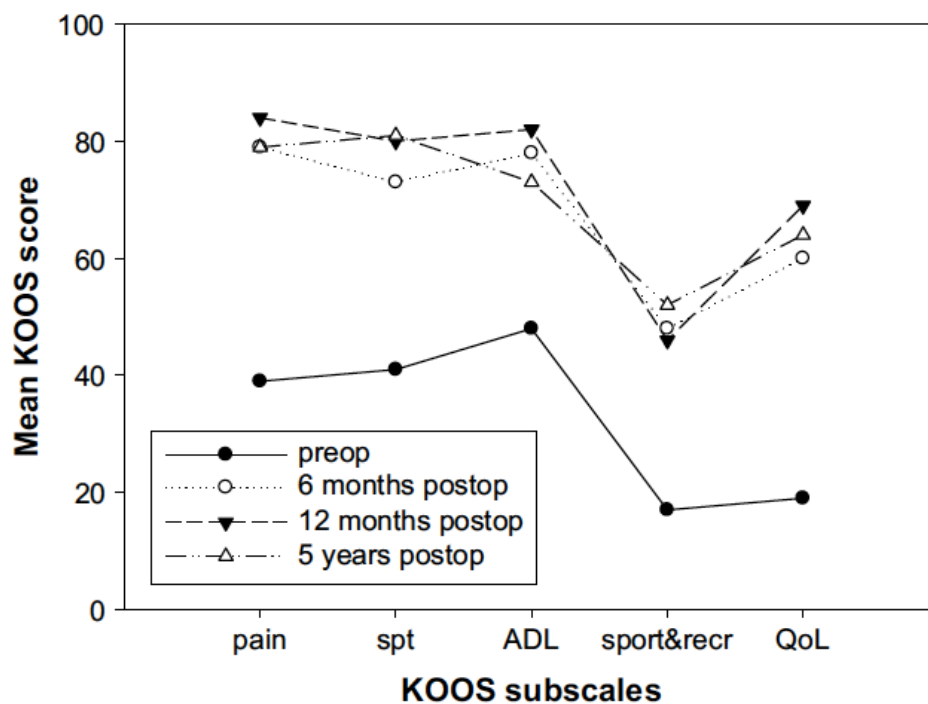


Fig. 1. KOOS profiles prior to and up to 5 years after TKR. Mean KOOS scores ($n=80$) at the preoperative, 6 months, 12 months and 5 year assessments after TKR.