

## Psychometric properties of the Knee injury and Osteoarthritis Outcome Score for Children (KOOS-Child) in children with knee disorders

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**Background** The Knee injury and Osteoarthritis Outcome Score (KOOS) is a self-administered valid and reliable questionnaire for adults with joint injury or degenerative disease. Recent data indicate a lack of comprehensibility when this is used with children<sup>1</sup>. Thus, a preliminary KOOS-Child was developed. This study aims to evaluate psychometric properties of the final KOOS-Child when used in children with knee disorders.

**Methods** 115 children (boys/girls 51/64, 7–16 years) with knee disorders were recruited. All children (n=115) completed the KOOS-Child, the Child-Health Assessment Questionnaire (CHAQ) and the EQ-5D-Youth version (EQ-5D-Y) at baseline to evaluate construct validity. Two additional administrations (1–3 weeks and 3 months) were performed for analyses of reliability (internal consistency and test–retest; n=72) and responsiveness (n=91). An anchor-based approach was used to evaluate responsiveness and interpretability.

**Results** After item reduction, the final KOOS-Child consists of 39 items divided into five subscales. No floor or ceiling effects ( $\leq 15\%$ ) were found. An exploratory factor analysis on subscale level demonstrated that items in all subscales except for Symptoms loaded on one factor (Eigenvalues 3.1–5.5, Symptom: 2 factors, Eigenvalue  $> 1$ ). Sufficient homogeneity was found for all subscales (Cronbach's  $\alpha = 0.80$ – $0.90$ ) except for the Symptoms subscale ( $\alpha = 0.59$ ). Test–retest reliability was substantial to excellent for all subscales (Intraclass Correlation Coefficient 0.78–0.91, Smallest Detectable Change (SDC)<sub>ind</sub> 14.6–22.6, SDC<sub>group</sub> 1.7–2.7). Construct validity was confirmed, and greater effect sizes were seen in those reporting improved clinical status. Minimal important changes greater than the SDCs were found for patients reporting to be better and much better.

**Conclusions** The final KOOS-Child demonstrates good psychometric properties and supports the use of the KOOS-Child when evaluating children with knee disorders.

### Reference:

1) Örtqvist M, Roos EM, Broström E, et al. Development of the Knee Injury and Osteoarthritis Outcome Score for Children (KOOS-Child). *Acta Orthop* 2012;83:666–73.

# KOOS-Child KNEE SURVEY

Today's date: \_\_\_\_\_ Date of birth: \_\_\_\_\_

Name: \_\_\_\_\_

## INSTRUCTIONS

These questions collect information about how your injured knee affects you. Answer every question by ticking the appropriate box, only one box for each question. If you are unsure about how to answer a question, please select the best answer you can.

## KNEE PROBLEMS

S1. During the past 7 days, how often has your knee been swollen?

Never	Rarely	Sometimes	Often	Always
<input type="checkbox"/>				

S2. During the past 7 days, how often has your knee made any noise/sounds?

Never	Rarely	Sometimes	Often	Always
<input type="checkbox"/>				

S3. During the past 7 days, how often did your knee get stuck?

Never	Rarely	Sometimes	Often	Always
<input type="checkbox"/>				

S4. During the past 7 days, how often have you been able to fully straighten your knee on your own?

Always	Often	Sometimes	Rarely	Never
<input type="checkbox"/>				

S5. During the past 7, days how often have you been able to fully bend your knee on your own?

Always	Often	Sometimes	Rarely	Never
<input type="checkbox"/>				

S6. During the past 7 days, how much difficulty have you had moving your knee just after waking up in the morning?

No difficulty	A little	Some	A lot	Extreme difficulty
<input type="checkbox"/>				

S7. During the past 7 days, how much difficulty have you had later in the day moving your knee after being sedentary for a while?

None	A little	Some	A lot	Extreme
<input type="checkbox"/>				

P1. During the past month, how often have you experienced knee pain?

Never	Rarely	Sometimes	Often	All the time
<input type="checkbox"/>				

**HOW PAINFUL**

**How much knee pain** have you experienced **in the past 7 days** during the following activities? Check the best answer for each item

	No pain	A little pain	Some pain	A lot of pain	Extreme pain
P2. Twisting/pivoting on your injured knee when walking/standing/running					
P3. Fully straightening your injured knee					
P4. Fully bending your injured knee					
P6a. Walking up stairs					
P6b. Walking down stairs					
P8a. Sitting with your injured knee bent					
P9. Standing upright on both legs for any amount of time					

**DIFFICULTY DURING DAILY ACTIVITIES**

A1. During the past 7 days, how much difficulty have you had walking down stairs?

No difficulty      A little      Some      A lot      Extreme difficulty  
                       

A2. During the past 7 days, how much difficulty have you had walking up stairs?

No difficulty      A little      Some      A lot      Extreme difficulty  
                       

A3. During the past 7 days, how much difficulty have you had standing up from a chair?

No difficulty      A little      Some      A lot      Extreme difficulty  
                       

A5. During the past 7 days, how much difficulty have you had to bend down and pick up an object from the floor?

No difficulty      A little      Some      A lot      Extreme difficulty  
                       

A7. During the past 7 days, how much difficulty have you had getting in to/out of a car?

No difficulty      A little      Some      A lot      Extreme difficulty

A10. During the past 7 days, how much difficulty have you had to get out of bed?

No difficulty      A little      Some      A lot      Extreme difficulty  
                                                                               

A12. During the past 7 days, how much difficulty have you had to change knee position when lying in bed?

No difficulty      A little      Some      A lot      Extreme difficulty  
                                                                               

A13. During the past 7 days, how much difficulty have you had getting in to/out of the bathtub/shower?

No difficulty      A little      Some      A lot      Extreme difficulty  
                                                                               

A14. During the past 7 days, how much difficulty have you had to sit in a chair with your injured knee bent?

No difficulty      A little      Some      A lot      Extreme difficulty  
                                                                               

A16. During the past 7 days, how much difficulty have you had to carry heavy bags /backpacks etc?

No difficulty      A little      Some      A lot      Extreme difficulty  
                                                                               

A17. During the past 7 days, how much difficulty have you had to do light chores such as cleaning your room, filling/emptying the dishwasher, making your bed, etc?

No difficulty      A little      Some      A lot      Extreme difficulty  
                                                                               

**DIFFICULTY DURING SPORTS AND PLAYING**

<p>SP1. During the past 7 days, how much difficulty have you had to squat down during play or sports activities?</p> <p>No difficulty      A little      Some      A lot      Extreme difficulty  <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/></p>	
<p>SP2. During the past 7 days, how much difficulty have you had to run during play or sports activities?</p> <p>No difficulty      A little      Some      A lot      Extreme difficulty  <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/></p>	
<p>SP3. During the past 7 days, how much difficulty have you had to jump during play or sports activities?</p> <p>No difficulty      A little      Some      A lot      Extreme difficulty  <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/></p>	
<p>SP4. During the past 7 days, how much difficulty have you had to twist/pivot because of your injured knee during play or sports activities?</p> <p>No difficulty      A little      Some      A lot      Extreme difficulty  <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/>                    <input type="checkbox"/></p>	

<p>SP5. During the past 7 days, how much difficulty have you had to kneel because of your injured knee?</p> <p>No difficulty      A little      Some      A lot      Extreme difficulty</p> <p><input type="checkbox"/>      <input type="checkbox"/>      <input type="checkbox"/>      <input type="checkbox"/>      <input type="checkbox"/></p>	
<p>SPN6. During the past 7 days, how much difficulty have you had to keep your balance when walking /running on uneven ground?</p> <p>No difficulty      A little      Some      A lot      Extreme difficulty</p> <p><input type="checkbox"/>      <input type="checkbox"/>      <input type="checkbox"/>      <input type="checkbox"/>      <input type="checkbox"/></p>	
<p>SPN7. During the past 7 days, how much difficulty have you had playing sports because of your injured knee?</p> <p>No difficulty      A little      Some      A lot      Extreme difficulty</p> <p><input type="checkbox"/>      <input type="checkbox"/>      <input type="checkbox"/>      <input type="checkbox"/>      <input type="checkbox"/></p>	

## HOW HAS YOUR INJURY AFFECTED YOUR LIFE?

Q1. How often do you think about your knee problem?

Never      Rarely      Sometimes      Often      All the time

                      

Q2. How much have you changed your lifestyle because of your injured knee?

Not at all      A little      Some      A lot      Very much

                      

Q3. How much do you trust your injured knee?

Not at all      A little      Some      A lot      Completely

                      

Q4. Overall, how much difficulty do you have with your injured knee?

No difficulty      A little      Some      A lot      Extreme difficulty

                      

QN5. How much difficulty have you had getting to school or walking around in school (climbing stairs, opening doors, carrying books, participating during recess) because of your injured knee?

No difficulty      A little      Some      A lot      Extreme difficulty

                      

QN6. How much difficulty have you had to do things with friends because of your injured knee?

No difficulty      A little      Some      A lot      Extreme difficulty

                      

**Thank you very much for completing all the questions in this questionnaire!**