

Supplementary article data

Development of the Knee Injury and Osteoarthritis Outcome Score for Children (KOOS-Child)

Comprehensibility and content validity

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Table 1. Interview guide and verbal probes, general (A) and item specific (B), for cognitive interviewing of children regarding the comprehensibility of the KOOS

A

Do you have any general comments about the questionnaire?
What did you think about the questionnaire?
Were there some items that were easier/harder to answer than others? Why?
Which question/-s do you believe capture your knee problems the most?
Is there any part or question you think is less important?
Do you have any suggestions to make this questionnaire easier to understand?
If we would like to make a shorter version of this questionnaire, any suggestions?
What activities do you do during a week that you think affects your injured knee?

B

S1	What does the word “swollen” mean to you?
S2	How would you explain the word “grinding” to a friend?
S3	Can you tell me what you believe is the difference between “catch” and “hang up”?
S4	Can you repeat this question in your own words?
S5	How did you arrive at the answer?
S6	How would you explain the concept of “joint stiffness”?
S7	What do you think is the difference between this question and #S6?
P1	How did you pick the timeframe of this question?
P2	How would you explain the activity “twisting/pivoting on your knee” to a friend
P3	What would you say is the difference between this question and #S4?
P4	What would you say is the difference between this question and #S5?
P5	Can you give me an example of a “flat surface”?
P6	What do think we mean by asking this question?
P7	What do you picture in your mind when answering this question?
P8	How difficult did you think it was to answer this question? Why?
P9	How did you interpret this question?
A1	What do you believe is the difference between this question and #P6?
A2	Do you think there is a difference when ascending- or descending stairs? Why?
A3	Why do you think we ask this question?
A4	How far back in time did you think when answering this question?
A5	How would you describe the activity “bending to floor” to a friend?
A6	Do you think there is a difference between this question and #P5, Yes/No? Why?
A7	Are the answers easy or difficult to understand? Why?
A8	How would you think the activity “going shopping” would affect your injured knee?
A9	Do you have any suggestions to make the response alternatives easier to understand?
A10	What do you think this question means? Try to explain in your own words?
A11	Do you have any comments about this specific question? Yes/No? What are your thoughts?
A12	What do you believe is the difference between this question and #P7?
A13	What do you think this question was asking about?
A14	Can you explain the difference between this question and #P8?
A15	Do you believe this question is important if you have a knee injury? Why? Why not?
A16	Can you give me any examples of “heavy domestic duties” that you do?
A17	Can you give me any examples of “light domestic duties” that you do?
SP1	What does “squatting” mean to you?
SP2	Please try to restate the response alternatives in your own words.
SP3	You have several responses to choose from, how did you pick your answer?
SP4	Can you explain what you believe is the difference between this question and #P2?
SP5	How would you describe the activity “kneeling” to a friend?
Q1	Try to explain the response alternatives in your own words?
Q2	What do you think we mean when we ask this question?
Q3	What does “moderate” mean to you?
Q4	What do you think is meant by “In general”?

Table 2. Key examples of problems found in the original KOOS when interviewing children and the revised questions in KOOS-child

S2. Original question

S2. Do you feel grinding, hear clicking or any other type of noise when your knee moves?				
Never <input type="checkbox"/>	Rarely <input type="checkbox"/>	Sometimes <input type="checkbox"/>	Often <input type="checkbox"/>	Always <input type="checkbox"/>

Comments

32 children (94%) had difficulty understanding the terms “grinding” and “clicking”. Most issues related to the term “grinding”. E.g. -“I do not know, grinding makes me think about when you grind something like a vegetable”. The double-barreled nature of the item was also problematic. E.g. -” It feels like two different questions, I have not felt that it’s grinding but I have heard a sound so I don’t know how to answer...”

Revised question

S2. During the past 7 days, how often has your knee made any noise/sounds?				
Never <input type="checkbox"/>	Rarely <input type="checkbox"/>	Sometimes <input type="checkbox"/>	Often <input type="checkbox"/>	Always <input type="checkbox"/>

P6. Original question

What amount of knee pain have you experienced the last week during the following activities?				
P6. Going up or down stairs				
None <input type="checkbox"/>	Mild <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	Extreme <input type="checkbox"/>

Comments

P6 is a double-barreled question, referring to pain with ascending and descending stairs. Since children reported their pain differed with these two activities, they were unsure how to respond. E.g. -“I get more pain when I walk down stairs and less pain when I walk up stairs”, -“Down does not hurt but up hurts pretty much”, -“I chose "mild" because I have more difficulty walking down stairs, up the stairs is nothing. Go down stairs is difficult”. The two activities have been separated into two items in the new questionnaire.

Revised question

How much knee pain have you experienced in the past 7 days during the following activities?					
	No Pain	A little pain	Some pain	A lot of pain	Extreme pain
P6a. Walking up stairs					
P6b. Walking down stairs					

SP5. Original question

The following questions concern your physical function when being active on a higher level. The questions should be answered thinking of what degree of difficulty you have experienced during the last week due to your knee pain.

SP5. Kneeling

None Mild Moderate Severe Extreme

Comments

The children had many different ideas about what kneeling meant. E.g. -“Like, lying down on your belly and then you have your knees to the floor” or -“I think you bend your knees backwards and lay on your back”. Pictures have been included in the new questionnaire to illustrate sport and recreational activities.

Revised question

SP5. During the past 7 days, how much difficulty have you had to kneel because of your injured knee?

No difficulty A little Some A lot Extreme difficulty



Q4. Original question

Q4. In general, how much difficulty do you have with your knee?

None Mild Moderate Severe Extreme

Comments

18 (53%) children had trouble with the phrase “difficulties in general” with your knee. E.g. - "Generally means like, as in ordinary cases, so before the injury I had like, no problems”, -“How much difficulty do you have with your knee normally”. The children suggested removing this or replacing the word with “overall”. This suggestion was implemented in the new questionnaire.

Revised question

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

No difficulty A little Some A lot Extreme difficulty

Table 4. The revised KOOS-Child questionnaire in English

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					
P5. Walking on a paved flat surface					
P6a. Walking up stairs					
P6b. Walking down stairs					
P7. If you wake up at night					
P8a. Sitting with your injured knee bent					
P8b. Lying down with your injured knee straight					
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

A4. During the past 7 days, how much difficulty have you had to stand on both legs?

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

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
<input type="checkbox"/>				

A6. During the past 7 days, how much difficulty have you had to walk on a paved surface?

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

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
<input type="checkbox"/>				

A8. During the past 7 days, how much difficulty have you had to walk around inside stores?

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

A9. During the past 7 days, how much difficulty have you had to put on socks?

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

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
<input type="checkbox"/>				

A11. During the past 7 days, how much difficulty have you had to take off your socks?

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

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
<input type="checkbox"/>				

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
<input type="checkbox"/>				

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
<input type="checkbox"/>				

A15. During the past 7 days, how much difficulty have you had getting on/off the toilet?

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

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</p> <p><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</p> <p><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</p> <p><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</p> <p><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 KNEE INJURY AFFECTED YOUR LIFE?

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

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

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

Not at all	A little	Some	A lot	Very much
<input type="checkbox"/>				

Q3. How much do you trust your injured knee?

Not at all	A little	Some	A lot	Completely
<input type="checkbox"/>				

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

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

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
<input type="checkbox"/>				

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
<input type="checkbox"/>				

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

Knee and Osteoarthritis Outcome Score for Children (KOOS-Child), Swedish version LK1.0

Table 5. The revised KOOS-Child questionnaire in Swedish

KOOS-Child knäformulär

DATUM: _____ PERSONNUMMER: _____

NAMN: _____

INSTRUKTIONER

De här frågorna handlar om hur ditt skadade knä påverkar dig. Svara på varje fråga genom att kryssa för det alternativ du tycker är bäst (endast ett alternativ per fråga). Om du är osäker, kryssa ändå för det alternativ som känns riktigast.

KNÄPROBLEM

S1. Hur ofta har knät varit svullet de senaste 7 dagarna?

Aldrig	Sällan	Ibland	Ofta	Alltid
<input type="checkbox"/>				

S2. Hur ofta har du hört något ljud från knät de senaste 7 dagarna?

Aldrig	Sällan	Ibland	Ofta	Alltid
<input type="checkbox"/>				

S3. Hur ofta har ditt knä hakat upp sig (fastnat) de senaste 7 dagarna?

Aldrig	Sällan	Ibland	Ofta	Alltid
<input type="checkbox"/>				

S4. Hur ofta har du, utan hjälp, kunnat sträcka knät helt de senaste 7 dagarna?

Alltid	Ofta	Ibland	Sällan	Aldrig
<input type="checkbox"/>				

S5. Hur ofta har du, utan hjälp, kunnat böja knät helt de senaste 7 dagarna?

Alltid	Ofta	Ibland	Sällan	Aldrig
<input type="checkbox"/>				

S6. Hur svårt har du haft att röra på knät när du vaknat på morgonen de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

S7. Hur svårt har du haft att röra på knät om du varit stilla en stund senare under dagen de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

P1. Hur ofta har du haft ont i knät den senaste månaden?

Aldrig	Sällan	Ibland	Ofta	Hela tiden
<input type="checkbox"/>				

HUR ONT

Hur ont har du haft i knät när du har gjort följande aktiviteter de **senaste 7 dagarna**?
Kryssa för det bästa svarsalternativet för varje fråga

	Inte ont	Lite ont	Ganska ont	Mycket ont	Extremt ont
P2. Snurra/vrida på det skadade knät när du går/står/springer					
P3. Sträcka fullt på ditt skadade knä					
P4. Böja fullt på ditt skadade knä					
P5. Gå på asfalt					
P6a. Gå upp för trappor					
P6b. Gå ner för trappor					
P7. Om du vaknar på natten					
P8a. Sitta med ditt skadade knä böjt					
P8b. Ligga med ditt skadade knä rakt					
P9. Stå på båda benen, oberoende av hur länge					

SVÅRIGHETER VID VARDAGSAKTIVITETER

A1. Hur svårt har du haft att gå ner för trappor de senaste 7 dagarna?

Inte alls svårt

Lite

Ganska

Mycket

Extremt svårt

A2. Hur svårt har du haft att gå upp för trappor de senaste 7 dagarna?

Inte alls svårt

Lite

Ganska

Mycket

Extremt svårt

A3. Hur svårt har du haft att resa dig från en stol de senaste 7 dagarna?

Inte alls svårt

Lite

Ganska

Mycket

Extremt svårt

A4. Hur svårt har du haft att stå på båda benen de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A5. Hur svårt har du haft att böja dig ned och plocka upp något från golvet de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A6. Hur svårt har du haft att gå på asfalt de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A7. Hur svårt har du haft att gå i/ur en bil de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A8. Hur svårt har du haft att gå i affärer de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A9. Hur svårt har du haft att ta på dig strumporna de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A10. Hur svårt har du haft att resa dig från sängen de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A11. Hur svårt har du haft att ta av dig strumporna de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A12. Hur svårt har du haft att ändra läge på knät när du har legat i sängen de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A13. Hur svårt har du haft att gå i/ur badkaret/duschen de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A14. Hur svårt har du haft att sitta på en stol med ditt skadade knä böjt de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A15. Hur svårt har du haft att sätta dig och resa dig från toalettstolen de senaste 7 dagarna?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

A16. Hur svårt har du haft att bära tunga väskor, ryggsäck eller liknande de senaste 7 dagarna?

Inte alls svårt Lite Ganska Mycket Extremt svårt

A17. Hur svårt har du haft att bädda sängen, städa ditt rum, plocka i/ur diskmaskin eller liknande de senaste 7 dagarna?

Inte alls svårt Lite Ganska Mycket Extremt svårt

SVÅRIGHETER VID LEK OCH IDROTT

SP1. Hur svårt har du haft att gå ner på huk när du har lekt eller idrottat under de senaste 7 dagarna?

Inte alls svårt Lite Ganska Mycket Extremt svårt



SP2. Hur svårt har du haft att springa när du har lekt eller idrottat under de senaste 7 dagarna?

Inte alls svårt Lite Ganska Mycket Extremt svårt



SP3. Hur svårt har du haft att hoppa när du har lekt eller idrottat under de senaste 7 dagarna?

Inte alls svårt Lite Ganska Mycket Extremt svårt



SP4. Hur svårt har du haft att snurra/vrida på det skadade knät när du har lekt eller idrottat under de senaste 7 dagarna?

Inte alls svårt Lite Ganska Mycket Extremt svårt



SP5. Hur svårt har du haft att sitta på knä under de senaste 7 dagarna?

Inte alls svårt Lite Ganska Mycket Extremt svårt



SPN6. Hur svårt har du haft att hålla balansen när du har gått/sprungit på ojämn mark de senaste 7 dagarna?

Inte alls svårt Lite Ganska Mycket Extremt svårt



SPN7. Hur svårt har du haft att vara med på sportaktiviteter på grund av din knäskada under de senaste 7 dagarna?

Inte alls svårt Lite Ganska Mycket Extremt svårt



HUR HAR DIN KNÄSKADA PÅVERKAT DITT LIV?

Q1. Hur ofta tänker du på ditt skadade knä?

Aldrig	Sällan	Ibland	Ofta	Hela tiden
<input type="checkbox"/>				

Q2. Hur mycket har du ändrat ditt sätt att leva på grund av ditt skadade knä?

Inte alls	Lite	Ganska	Mycket	Väldigt mycket
<input type="checkbox"/>				

Q3. Hur mycket kan du lita på ditt skadade knä?

Helt och hållet	Mycket	Ganska	Lite	Inte alls
<input type="checkbox"/>				

Q4. Hur mycket problem har du med ditt skadade knä över huvudtaget?

Inga alls	Små	Mitt i mellan	Stora	Mycket stora
<input type="checkbox"/>				

QN5. Hur svårt har du haft att ta dig till eller runt i skolan (gå i trappor, öppna dörrar, bära böcker, vara med på rasten) på grund av ditt skadade knä?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

QN6. Hur svårt har du haft att göra saker med vänner på grund av ditt skadade knä?

Inte alls svårt	Lite	Ganska	Mycket	Extremt svårt
<input type="checkbox"/>				

Tack för att Du tagit dig tid att besvara samtliga frågor!