

# QUESTIONNAIRES ABOUT EVALUATION OF THE FUNCTION OF KNEE JOINT AND THEIR APPLICATION IN SCIENTIFIC RESEARCH

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**Abstract:** *The publication considers some of the available questionnaires about the evaluation of the function of the knee joint which are filled up by the patients themselves. The particularities, the directions and the number of the questions of KOOS, TLKSS, MCRSQ are compared. A retrospective analysis of the scientific research published in the medical databases, at which the relevant questionnaires were used, was made.*

**Key words:** *evaluation of the function of knee joint, KOOS, TLKSS, MCRSQ.*

## 1. Introduction

The use of standardized questionnaires for evaluation of the function of the separate joints is imposed during the last decades as useful instrument, which allows following quantitatively the change into quality indicators. By using structured questionnaires, it becomes possible for a short time to make a wholesome evaluation of the habitual symptoms, states and heavy functions.

The present publication treats the specificity of three different questionnaires which evaluate the function of the knee joint - Knee Injury and Osteoarthritis Outcome Score; Tegner Lysholm Knee Scoring Scale Modified Cincinnati Rating System Questionnaire.

In the PubMed data base we have found 703 publications related to the „Knee Injury and Osteoarthritis Outcome Score“

from 1998 to 2017; 7 publications related to „Tegner Lysholm Knee Scoring Scale“ from 2012 to 2017 and four publications related to the „Modified Cincinnati Rating System Questionnaire“ from 2012 to 2017. (Fig. 1).

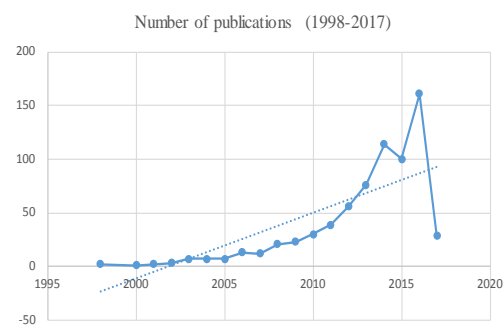


Fig. 1. *Number of publication (1998-2017) related to the „Knee Injury and Osteoarthritis Outcome Score“*

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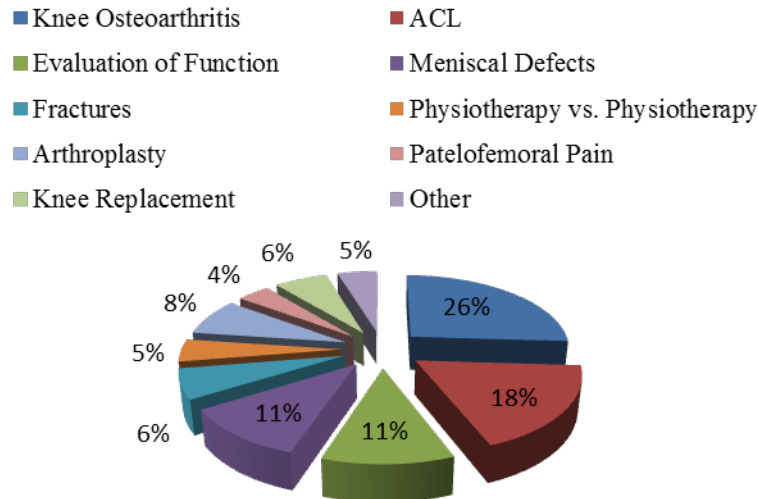


Fig. 2. Topics of publications (n=127)

We have found additionally 127 publications related to Knee Injury and Osteoarthritis Outcome Score and physiotherapy.

The topics of these publications are presented on Fig 2.

Most of publications are for Knee Osteoarthritis in general (26%) followed

by Physiotherapy after Anterior Cruciate Ligament injury (18%); Physiotherapy in the management of Meniscal Defects (11%) and Methods for evaluation of function of knee (11% – including questionnaires).

The specificity of the three questionnaires is presented herein down.

## 2. Knee Injury and Osteoarthritis Outcome Score

Table 1

*Specificity of Knee Injury and Osteoarthritis Outcome Score*

Name/ Abbreviation	Domain	Number of questions
Knee Injury and Osteoarthritis Outcome Score / KOOS	Symptoms	7
	Pain	9
	Function, daily living	16
	Function, sports and recreational activities	5
	Quality of Life	4

The questionnaire concerns the functions of the knee joint and is structured into 5 fields: availability of symptoms; availability of pain; effect on the daily activities; effect on the sports and recreative activities; effect on the quality of life.

The patient fills in the questionnaire alone while he/she has been instructed to point out the most suitable answer according to him/her reflecting his/her status during the last 4 weeks.

The first five of the questions related to the symptoms have the following possible answers – „rarely”, „sometimes”, „often”,

and „always”. Questions related to swell up of the knee joint: availability of sound when moving; blockage during walking; ability of entire unfolding of the knee; ability of entire folding of the knee.

Two of the questions in the field of the symptoms are related to the stiffness of the movements; questions about the degree of morning stiffness and the degree of stiffness after standing up or lying down for a long time during the day. The possible answers are - “lack of stiffness”; “weak”, “moderate”, “strong” and “very strong”.

In the field of pain, two types of questions are asked. There is one question in the first group related to the frequency of the pain while the possible answers are „lack of pain”, „once per month”, „once per week”, „once per day”, „permanently”.

The second group of question are related to the appearance of the pain during certain activities as twisting/turning the knee; complete unfolding of the knee; complete folding of the knee; walking along a flat surface; climbing up and down the stairs; during night sleep; during sitting down or, standing position.

The next group of questions relate to the self-service abilities of the patient and fulfillment of the everyday activities. The patient has to point out to what degree the function of the knee joint is made difficult under certain activities along the following scale: „it is not affected”; „weakly”; „moderately”; „strongly”; „very strongly”.

Questions entered into the questionnaire: climbing up stairs; climbing down stairs; getting up while sitting; taking up standing position; bending to the floor; as well as to take up a subject from the floor; walking along flat surface; entering in and out of a car; going to the market; putting on

stockings/socks; taking down stocking/socks; turning round in the bed; entering in and going out of a bathroom; sitting position; sitting or getting up from the toilet.

Another group of questions relate to difficulties connected to the function of the knee joint when practicing sport or recreates activities. The possible answers are the same above “not affected”; “weakly”; “moderately”, “strongly” and “very strongly”; and the activities under study: squatting; running; jumping; twisting/turning round the knee; kneeling.

Questions related to the quality of life: how often the function of knee creates a problem; do you change your mode of life because of the eventual problem with the knee; to what degree the availability of the problem with the knee joint is disturbing for the patient and as a whole what is the degree of the problem created by the function of the knee

Each of the fields mentioned above is calculated in percentage which reflects the degree of effect on the function while 100% means lack of percentage. The final evaluation is also calculated with up to 100 points which analogically means lack of the problem.

### **3. Tegner Lysholm Knee Scoring Scale**

The questionnaire evaluates the function of the knee joints during the last 4 weeks.

It consists of eight sections. The first section is about availability of limp. The possible answers are three: None; Slight or periodical; Severe and constant.

The second section relates to the support function. Is it necessary to use additional means or not, is weight bearing possible?

Table 2

*Specificity of Tegner Lysholm Knee Scoring Scale*

Name	Domain	Possible answers
Tegner Lysholm Knee Scoring Scale	Limp	3
	Support	3
	Pain	6
	Instability	6
	Locking	4
	Swelling	4
	Stair-climbing	4
	Squatting	4

The third relates to pain. There are six possible answers ranging from lack of pain to strong pain. The appearance of pain when walking under and above 2 km is a characteristic indicator.

The fourth section concerns instability. Six answers are again possible starting from lack of instability to the heaviest form of instability upon each step. The intermediate answers describe the appearance of instability upon fulfillment of exercises, force exercises and everyday activities.

The fifth section is devoted to the characteristic for the knee joint symptom of dysfunction, i.e. locking the joint. Five are the possible answers and they describe the symptom according to its intensity and frequency of appearance.

The availability of swelling relates to the sixth section. Four possible answers - None; On severe exertion; On ordinary exertion; Constant.

The seventh section is devoted to the stair climbing. The possible answers cover four degrees - from lack of the problem to impossibility.

The last section treats the possibility of sitting down. Characteristic sign of such an activity is the possibility of folding the knee above 90 degrees.

The general functional diagnostics for the Tegner Lysholm Knee Scoring Scale is on the base of giving points. Upon less than 56 points, the result is Poor, for the interval between 65-83 points, the result is Fair, between 84-90 - Good; above 90 points Excellent.

**4. Modified Cincinnati Rating System Questionnaire**

Table 3

*Specificity of Modified Cincinnati Rating System Questionnaire*

Name	Domain	Possible answers
Modified Cincinnati Rating System Questionnaire	Pain Intensity	6
	Swelling	6
	Giving Way	6
	Overall activity level	6
	Walking	5
	Stairs	5
	Running activity	5
	Jumping or Twisting	5

The first field relates to the intensity of pain – six grade scale from lack of pain-to-pain all the time even when still. Grading of pain – from nonpermanent one during heavy physical efforts and sport to persisting pain during walking.

The second field of the questionnaire treats the swelling of the knee joint. The possible answers are six - from lack of swelling nearly all the time upon habitual activities like walking. Limiting answer characterizing the degree of swelling is its appearance upon moderate activity three times per year.

The feeling of instability is determined in the third section as giving way; six degrees of the symptom intensity from lack through incidental up to once per month upon habitual load and the heaviest degree upon each change of the walking direction. The fourth section studies the general level of activity. Six stages of limitation of the activity are given according to various intensity of the activity.

The fifth section treats the ability of moving – walking. Five possible answers – from lack of limitation through the possibility of walking up to 800 m to the impossibility for independent moving and the need of supports.

The ability of climbing up and down stairs refers to the sixth section. Five are the possible answers – from lack of a problem, through moderate problem of climbing up 10-15 stairs and a serious problem with the possibility of climbing up between 1-5 stairs.

The seventh section refers to the possibility of running; there are also quantitative indicators like ability of running 2 to 4 km.

The eighth section treats the possible problems when jumping and twisting the knee. Possible answers – from normal function to strongly limited ability for practicing sports activity.

Grading of the function evaluation as follows: under 30 Poor; 30-54 Fair; 55-79 Good; above 80 Excellent.

## 5. Discussion

All three questionnaires presented above are suitable for working with them and in their structures form represent the basic problems related to the dysfunction of the knee joint.

Knee Injury and Osteoarthritis Outcome Score (KOOS) is composed of greater number of questions, which on one side provides the possibility for more detailed research of the problems related to the knee joint but on the other side, it requires more time to be filled in. Additionally, questions that are more detailed could create some discomfort and disturbance for the patients – “Does he/she provide the best possible answers to the questions?”

According to us, the best priority of the Tegner Lysholm Knee Scoring Scale is in the shortest possible descriptions of the symptoms and possible limitations. In comparison with the other two questionnaires, the patient has to read the smallest number of words while this is not on the account of losing the thought.

Characteristic for the Modified Cincinnati Rating System Questionnaire is the way of asking some of the questions and the evaluation of the patient about the gravity of the problem. Such a manner is indisputably suitable for the establishment of the objective facts, provides an idea about the subjective evaluation of the patient. The quantitative orientation is another positive fact in the questionnaire – swelling of the knee three times per year, ability for walking up to 800 m, ability of climbing up 10-15 stairs, ability for running 2-4 km, etc.

## 6. Conclusion

It is indisputable that the scales for evaluation of the function of the knee joint, presented in the publication, the Knee Injury and Osteoarthritis Outcome Score is best preferred by the scientific workers.

The basic reason for the relatively frequent use of the questionnaire is the fact that it is suitable for evaluating the dysfunction of the knee joint caused by the frequent posttraumatic osteoarthritis (OA), as well as those with injuries that may lead to posttraumatic OA (e.g., anterior cruciate ligament [ACL], meniscal, or chondral injury) [6].

Another possible reason is the popularity and the convenience for comparing the results with the results of other researchers.

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