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48.4 Abstract

This paper presents a newly proposed rating system for the knee, developed by The Knee Society. The rating system allows for the documentation of the knee in isolation (including pain, stability and range of motion) as well as patient functioning (including walking and stair climbing).

48.5 Summary

The Knee Society Clinical Rating System was proposed as a disease specific assessment tool for use in total knee replacement patients. Its aim was to allow for a comprehensive evaluation of the knee (pain, stability, range of motion), and patient function whilst removing the confounder of age related degenerative changes. Pain, stability and range of motion are assessed separately to function. A pain free knee receives 50 points. Pain is assessed according to both severity and frequency, as well as whether pain is present in walking or stair negotiation. A stable knee receives 25 points and is evaluated in terms of anteroposterior and mediolateral stability, with deductions for flexion contracture and extension lag. A range of motion of 125° receives 25 points. Patients that are able to walk for an unlimited distance and negotiate stairs without using the handrails are awarded 100 points, with deductions for use of walking aids.

48.6 Citation Count

1,600

48.7 Related References


48.8 Key Message

The Knee Society Clinical Rating System has become a simple, widely used and accepted tool for objectively evaluating patients undergoing total knee arthroplasty (TKA) surgery. It contains both a knee score and a patient’s function score for activities such as walking and stair climbing before and after TKA.

Rationale of the Knee Society Clinical Rating System

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48.9 Why It’s Important

The rating system assesses three parameters, including pain, stability and range of motion. This eliminates the problem of declining knee scores associated with patient infirmity. The Hospital for Special Surgery Rating System is perhaps the most widely used, but was compiled many years ago at a time when knee arthroplasty was in its infancy and expectations of the result were lower.

In the past many scoring systems had been used to assess the outcomes of TKA. The Knee Society attempted to standardize outcome measures to allow for valid comparison of patient and prostheses outcome from across different centres.

It has become the most popular method of tracking and reporting outcomes after total and partial knee arthroplasty worldwide.

In these times of re-validation and audit there is a clear need for orthopedic surgeons to be familiar with the available scoring systems and their relative strength and weaknesses.

48.10 Strengths

The Knee Society Clinical Rating System is a relatively simple tool to allow the objective assessment of knee pain, knee joint stability and range of motion. It also assesses walking and stair negotiation ability. Unlike many patient self-reported outcome measures (e.g. WOMAC, SF-36), the Knee Society Clinical Rating System is physician administered. The rating system has been shown to have good responsiveness to changes after total knee replacement surgery [1].

Lingard et al. [2] used a large prospective sample of patients from the United Kingdom, United States of America and Australia to compare the validity and responsiveness of the physician administered Knee Society Clinical Rating System with two patient self-administered questionnaires: WOMAC and SF-36. In order to make valid comparisons, relevant elements of the Knee Society score were compared to the corresponding elements of either the WOMAC or SF-36 (e.g. pain). The Knee Society Rating System pain score was found to show good agreement with both the WOMAC pain score and the SF-36 bodily pain score, both pre- and post-total knee replacement surgery. For physical function, the Knee Society score showed good agreement with SF-36 physical function score and WOMAC function score, both pre- and post-surgery. These findings suggested that the Knee Society Clinical Rating System had adequate construct validity for use as an objective outcome measure for total knee replacement patient populations.

The Knee Society Clinical Rating System had separate scales for knee rating and functional assessment in order to remove the declining scores associated with patient infirmity associated with combined functional and joint related parameters. Konig et al. [3] observed that the knee score element of the Knee Society system was not affected by confounds including walking distance, age, body mass index and patient category.

48.11 Weaknesses

The Knee Society Clinical Rating System was originally proposed in 1989 and subsequently became widely used in TKA patients to provide an objective measure of knee pain, stability, range of motion and function. However, the validity of the rating system was not determined until 2001. Lingard et al. [2], despite demonstrating the construct validity of the Knee Society score, suggested that it is not as useful as questionnaires, such as WOMAC and SF-36, due to the additional time taken to complete and required clinical staff to administer.

Liow et al. [4] determined the inter- and intra-rater reliability of the Knee Society Clinical Rating System using a group of raters including two arthroplasty nurse practitioners, one junior doctor, two registrars and one consultant. Relatively large inter-rater variability was found for both the knee and function scores, which was influenced by the experience of the rater. Variability in measurements such as mediolateral stability were notably different for the nurse practitioners compared to the consultant. However, due to the small number of raters, any inter-rater variability as a function of clinical post/experience should be viewed with caution. Intra-rater reliability was also relatively poor, suggesting the need to take multiple repeat measurements to improve data reliability.

Due to the design of the physician-administered Knee Society Rating System, data are open to researcher bias. Typically the form would be completed by a member of the surgical team, potentially leading to bias in that they will want to demonstrate the success of their surgical intervention. There are also known differences in how patients and physicians rate pain making it difficult to directly compare findings from the Knee Society Clinical Rating System with patient self-administered questionnaires such as WOMAC and SF-36.

Guidelines are not provided in the original text to indicate what a good or poor score would be using the Knee Society Clinical Rating System. Other systems provide such information to allow physicians to identify potentially problematic knees. Without such information, the Knee Society system can be used for comparing pre- and post-surgery, but cannot be used to easily identify potential osteoarthritic knees.

Despite the knee score element of the Knee Society system not being influenced by confounders such as walking distance, age, body mass index and patient category, Konig...
et al. [3] found that the function score was influenced, suggesting the importance of keeping the knee and function scores separate in any analysis.

No explanation is given for the weightings between each section of the Knee Society Clinical Ratings System. Although it provides a score up to 100 each for the knee and function elements, this scale should not be considered continuous. The data are ordinal and any statistical analysis should appropriately reflect this.

In the original version of the Knee Society Clinical Rating System, pain was assessed using categories that left the data open to bias and confusion. For example, pain could be reported that was during “stairs only” or during “walking and stairs”. These categories were found under the “mild or occasional” level of pain, and patients experiencing pain that was moderate or severe during stair negotiation alone, for example, would not be able to have this adequately reflected in their score. A subsequent amendment to the form in 1993 split the pain score into two sections, walking and stairs, each giving scores for mild, moderate or severe pain, or no pain.

The walking element of the function score is scored out of 50 points, yet unlimited walking only receives a maximum of 40 points. In the original system for range of motion, one point is given for every 5° of knee flexion (maximum 125° and 25 points). In the amended form of 1993, one point is given for 8°. Thus, for the maximum score of 25 points to be achieved a patient would need to demonstrate an unachievable knee flexion range of motion of 200°.

Despite providing valid knee and functional measures, the Knee Society Clinical Rating System does not give any indication of patient quality of life or satisfaction with the surgical intervention. It is important that these measures be obtained in many circumstances. This would necessitate the use of additional patient-reported questionnaires.

48.12 Relevance

Scuderi et al. [5] recently expressed concerns that ambiguities and deficiencies with the original Knee Society Clinical Rating System challenged its utility and validity in contemporary patients, who often have expectations, demands, and functional requirements that were different from those of prior generations of patients who underwent TKA. As such a new Knee Society Knee Scoring System was developed and validated in 2012, in part, to better characterize the expectations, satisfaction, and physical activities of the younger and more diverse population of current patients undergoing TKA. It is both physician and patient derived.

The objective knee score, completed by the surgeon, includes a VAS score of pain when walking on level ground and on stairs or inclines, as well as an assessment of alignment, ligament stability, and ROM, along with deductions for flexion contracture or extensor lag. Patients then record their satisfaction, functional activities, and expectations.

References
