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The Knee



No associations between self-reported knee joint instability and radiographic features in knee osteoarthritis patients prior to Total Knee Arthroplasty: A cross-sectional analysis of the Longitudinal Leiden Orthopaedics Outcomes of Osteo-Arthritis study (LOAS) data

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ABSTRACT

Background: To describe the prevalence of self-reported knee joint instability in patients with pre-surgery knee osteoarthritis (OA) and to explore the associations between self-reported knee joint instability and radiological features.

Methods: A cross-sectional study including patients scheduled for primary Total Knee Arthroplasty (TKA). Self-reported knee instability was examined by questionnaire. Radiological features consisted of osteophyte formation and joint space narrowing (JSN), both scored on a 0 to three scale. Scores > 1 are defined as substantial JSN or osteophyte formation. Regression analyses were provided to identify associations of radiological features with self-reported knee joint instability.

Results: Two hundred and sixty-five patients (mean age 69 years and 170 females) were included. Knee instability was reported by 192 patients (72%). Substantial osteophyte formation was present in 78 patients (41%) reporting and 33 patients (46%) not reporting knee joint instability. Substantial JSN was present in 137 (71%) and 53 patients (73%), respectively. Self-reported knee instability was not associated with JSN (relative to score 0, odds ratios (95% CI) of score 1, 2 and 3 were 0.87 (0.30–2.54), 0.98 (0.38–2.52), 0.68 (0.25–1.86), respectively) or osteophyte formation (relative to score 0, odds ratios (95% CI) of score 1, 2 and 3 were 0.77 (0.36–1.64), 0.69 (0.23–1.45), 0.89 (0.16–4.93), respectively). Stratified analysis for pain, age and BMI showed no associations between self-reported knee joint instability and radiological features.

Conclusion: Self-reported knee joint instability is not associated with JSN or osteophyte formation.

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1. Introduction

Self-reported knee instability has been defined as a sensation of buckling, shifting, or giving way of the knee [1]. Knee joint stability has been studied in patients with mild to moderate knee osteoarthritis (OA), of which 60–80% of the patients reported this sensation [1–4]. The sensation itself or fear of the sensation may lead to limitations in daily life [3]. Besides, self-reported knee joint instability is associated with pain and muscle strength [1–3]. So far, knowledge on joint stability in patients with knee OA prior to Total Knee Arthroplasty (TKA) is scarce with only one study reporting a prevalence of 72% [5]. A clear cause for this sense of instability in patients with knee OA has not been elucidated yet. A possible mechanism underlining the presence of self-reported knee instability in severe knee OA is structural damage of the knee joint. No studies have so far addressed the relationship between self-reported knee instability in knee OA prior to TKA and structural damage of the knee presented by radiological features.

With respect to radiological features, two opposing hypotheses on knee joint instability have been described in patients with knee OA: (i) knee joint instability is low due to osteophyte formation and (ii) knee joint instability is high due to joint space narrowing [6,7]. The first hypothesis is based on the premise that osteophytes, fibrosis of joint ligaments and capsular thickening are responsible for an increased tightness of the joint and restriction of movement, resulting in a stiff and stable knee joint. The second hypothesis is based on the premise that more pronounced joint space narrowing leads to reduced stress on the ligaments and capsule of the knee, resulting in a less stable knee joint. In severe knee OA, osteophytes and joint space narrowing are well-known features, however in mild knee OA these features are less pronounced [8]. In mild to moderate knee OA no associations were found between radiographic features and knee joint stability, which might be explained by a reduced emphasis of these features [3]. It is to be expected that in patients with knee OA prior to TKA, osteophyte formation is more distinct and will result in a more stable knee joint. Whereas, in patients with a more distinct joint space narrowing instability will be more reported.

The aims of the study were to determine the prevalence of self-reported knee joint instability and to determine the association between radiographic features (i.e. joint space narrowing and osteophyte formation) with self-reported knee joint stability in patients with knee OA prior to TKA.

2. Materials and methods

2.1. Study design

The study participants were selected from the Longitudinal Leiden Orthopaedics Outcomes of Osteo-Arthritis study (LOAS), which is an ongoing multi-centre, longitudinal prospective cohort study designed to determine long-term outcomes of Total Hip Arthroplasty (THA) and TKA. The LOAS study (Trial ID NTR3348) started in June 2012 and included 2556 participants until December 2014, of which 1234 underwent TKA.

2.2. Study population

The present cross-sectional sub-study included all patients scheduled for primary TKA in the Alrijne (former Rijnland) Hospital Leiderdorp, the Netherlands. Patients who were able to complete questionnaires in Dutch and who were 18 years or older were included. Excluded were patients who did not provide informed consent, possessed insufficient Dutch language skills, had a physical or mental status not allowing participation, already underwent TKA or received a Unicompartmental Knee Arthroplasty (UKA) instead of a TKA after surgery. Eligible patients were informed about the study through written and oral information by their treating medical specialist at the outpatient clinic. Only patients who approved to be approached by the researcher received additional written information about the study by regular mail, as well as a questionnaire, a stamped return envelope and a consent form. Patients who did not return their preoperative questionnaire within one week were contacted by telephone. Patients were included once written informed consent was obtained according to the Declaration of Helsinki. For the purpose of the present analysis only data from patients who provided information about the presence of self-reported knee joint instability were included. Ethical approval was obtained by the Medial Ethics Committee of the Leiden University Medical Center (registration number P12.047) and funding was received from the Dutch Arthritis Foundation (LLP13).

The inclusion of patients is shown in Figure A.1. During the first months of recruitment (June 2012–December 2014) a sample of 349 participants with knee OA, scheduled for TKA was included at baseline in the Alrijne Hospital, Leiden, the Netherlands. Of these, 73 patients already possessed a TKA in the contralateral knee, three patients did not provide information on knee joint instability and eight patients received a UKA instead of TKA, resulting in 265 patients (76%) eligible for the present analysis.

2.3. Assessments

2.3.1. Sociodemographic characteristics

Patient characteristics included: age, sex, weight (kg), height (m), Body Mass Index (BMI) and the duration of knee complaints (less than one year; between one and five years; between five and 10 years; more than 10 years).

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