BMJ Open

Is there a causal link between knee loading and knee osteoarthritis progression? A systematic review and meta-analysis of cohort studies and randomised trials

Marius Henriksen,[1] Mark W Creaby,[2] Hans Lund,[3] Carsten Juhl,[3,4] Robin Christensen[1,3]

To cite: Henriksen M, Creaby MW, Lund H, *et al*. Is there a causal link between knee loading and knee osteoarthritis progression? A systematic review and meta-analysis of cohort studies and randomised trials. *BMJ Open* 2014;**4**:e005368. doi:10.1136/bmjopen-2014-005368

▸ Prepublication history and additional material is available. To view please visit the journal (http://dx.doi.org/10.1136/bmjopen-2014-005368).

Received 31 March 2014
Revised 16 June 2014
Accepted 23 June 2014

For numbered affiliations see end of article.

Correspondence to
Dr Robin Christensen; robin.christensen@frh.regionh.dk

ABSTRACT

Objective: We performed a systematic review, meta-analysis and assessed the evidence supporting a causal link between knee joint loading during walking and structural knee osteoarthritis (OA) progression.

Design: Systematic review, meta-analysis and application of Bradford Hill's considerations on causation.

Data sources: We searched MEDLINE, Scopus, AMED, CINAHL and SportsDiscus for prospective cohort studies and randomised controlled trials (RCTs) from 1950 through October 2013.

Study eligibility criteria: We selected cohort studies and RCTs in which estimates of knee joint loading during walking were used to predict structural knee OA progression assessed by X-ray or MRI.

Data analyses: Meta-analysis was performed to estimate the combined OR for structural disease progression with higher baseline loading. The likelihood of a causal link between knee joint loading and OA progression was assessed from cohort studies using the Bradford Hill guidelines to derive a 0–4 causation score based on four criteria and examined for confirmation in RCTs.

Results: Of the 1078 potentially eligible articles, 5 prospective cohort studies were included. The studies included a total of 452 patients relating joint loading to disease progression over 12–72 months. There were very serious limitations associated with the methodological quality of the included studies. The combined OR for disease progression was 1.90 (95% CI 0.85 to 4.25; I^2=77%) for each one-unit increment in baseline knee loading. The combined causation score was 0, indicating no causal association between knee loading and knee OA progression. No RCTs were found to confirm or refute the findings from the cohort studies.

Conclusions: There is very limited and low-quality evidence to support for a causal link between knee joint loading during walking and structural progression of knee OA.

Trial registration number: CRD42012003253

Strengths and limitations of this study

- We performed the first systematic evaluation of the evidence for a causal link between mechanical loading of the knee during walking and structural progression of knee osteoarthritis.
- This systematic review, meta-analysis, and causation analysis find very limited evidence of a causal link between knee joint loading during walking and structural progression of knee osteoarthritis.
- Few studies were included in the meta-analysis since only a small number of studies have been conducted. Further research is needed.

BACKGROUND

Osteoarthritis (OA) is the most common form of arthritis affecting a large section of the population, and is a major cause of illness and disability.[1 2] The knee joint is most frequently affected,[3] and due to the knee's crucial role in independent ambulation, knee OA leads to considerable disability affecting an individual's participation in society and independent living. Because no cure is available and many people are affected, healthcare costs associated with knee OA are enormous—even higher than for the more high-profile diseases such as diabetes, cancer and cardiovascular diseases.[4] With its prevalence on the rise, knee OA poses a substantial socioeconomic and public health burden.

Walking is the most common form of human locomotion, and most people walk every day, resulting in millions of steps per year. Biomechanical loading on the knee joint during walking is estimated to exceed 2–3 times body weight[5]; thus, knee joint loading is unavoidable component of an

independent lifestyle. One widely accepted theory is that higher knee joint loading during walking is causally linked with accelerated structural knee OA progression.[6–8] In accordance with this theory, unloading is advocated in an attempt to slow or halt disease progression.[9] Unspecific measures of high joint loading, such as excess body mass and body mass index (BMI), have been associated with OA development,[10 11] and obesity is believed to act mainly through high mechanical loads,[12] although systemic effects have also been indicated.[13] However, higher body mass does not necessarily lead to higher joint loading during walking,[14] and more specific measures of joint loading are necessary to apply.

Objective estimates of joint loading during walking can be obtained by three-dimensional gait analysis. Typically, the knee adduction moment (KAM) or biomechanical modelling of compression forces is used. The KAM has been of particular interest because it reflects the medial to lateral joint load distribution,[15] with good face validity with respect to the relative prevalence of medial, as opposed to lateral compartment, tibiofemoral knee OA.[16] Despite its common usage, a recent systematic review did not find consistent evidence to the fact that the KAM differs between those with and without knee OA.[17]

The relationship between knee joint loading during walking and knee OA has been a focus of knee OA-related biomechanical research for 10–20 years. Studies reveal that symptomatic treatment of knee OA results in increases in knee joint loads during walking,[5 18–20] which are unwanted according to the hypothesised structural consequences of increased joint loading. This may generate confusion among researchers, clinicians and patients, who are interested in this information to aid them in prevention, palliation and treatment strategies. Establishing causal relationship among modifiable factors, such as knee joint loading, and disease-specific measures, such as structural disease progression, is imperative in the generation of effective strategies.

Seminal epidemiological work by Hill proposed a set of considerations (the Bradford Hill criteria) to systematically evaluate the existence of a causal link between an exposure and a health outcome.[21] These criteria have been previously employed to demonstrate the causal link between smoking and lung cancer,[22] and between dietary factors and coronary heart disease,[23] and have the capacity to evaluate the link between knee joint loading and structural knee OA progression.

Therefore, the objectives of this study were (1) to systematically evaluate the evidence supporting a causal link between exposure to knee joint loading during walking and structural progression of knee OA based on Hill's considerations on causality[21] and (2) to determine which knee joint load variables had been studied sufficiently in randomised controlled trials (RCTs) and found to support the findings of prospective cohort studies.

METHODS

The methods of the study search strategy, inclusion criteria and data analysis were prespecified in a protocol (see online supplementary file 1) and pre-registered (PROSPERO 2012:CRD42012003253).

We searched MEDLINE, Scopus, AMED, CINAHL and SportsDiscus for prospective cohort studies and RCTs from 1950 through October 2013. Search strategies are available as an online supplementary file 2. The reference lists of the retrieved articles were also searched for additional cohort studies and RCTs. Two reviewers (MH and MWC) independently assessed study eligibility. Excluded studies and reasons for exclusion were recorded. Disagreement was resolved by discussion and consensus. We included original full-length articles pertaining to the association between knee joint loading during walking, measured by three-dimensional gait analysis, and structural disease progression assessed quantitatively or semiquantitatively by X-ray or MRI. We considered only those studies that included participants diagnosed with knee OA that were followed for at least 1 year (necessarily because of the sensitivity of imaging and slow disease progression[24]). Cohort studies had to include estimates of knee joint loading during walking at baseline and imaging-based assessment of structural disease progression. Clinical trials had to be randomised and compare image-based structural disease progression among different knee joint loading interventions (eg, increase vs decrease), placebo or control.

Data extraction and analysis

The following data were extracted from the studies: (1) Study design; (2) Country of origin; (3) Number of subjects; (4) Characteristics of the subjects; (5) Type of knee joint loading estimate; (6) Magnitudes of the estimate; (7) Description of the interventions (if any) and (8) Structural disease progression outcome (ie, semiquantitative or quantitative measures on X-ray and/or MRI).

For prospective cohort studies, we extracted estimates of the association between baseline knee joint loading and structural disease progression from baseline to follow-up. A progression group is typically compared to a non-progression group at baseline and the results are typically reported as ORs for disease progression for a one-unit higher baseline knee joint loading. If no OR was reported, we either calculated it from the reported data (if possible), or contacted the study authors and requested for the OR. For the RCTs we aimed to compare relative risks of structural disease progression between knee joint loading modification and control groups.

The individual study results (ie, log OR values and their corresponding SEs) were combined in a random effects meta-analysis model using the generic inverse variance outcome type in Review Manager.[25] Heterogeneity between trials was assessed using the standard Q-test statistic (testing the hypothesis of

homogeneity), and we present the I^2 value, which can be interpreted as the percentage of total variation across the studies due to heterogeneity.[26]

Methodological quality and risk of bias assessment

The methodological quality of the cohort studies was assessed using a published check list.[27] Two of the authors (MH and MWC) assessed this individually and judged each criterion to be 'Adequately described', 'Unclear', or 'Inadequately described'–corresponding to 'low risk of bias', 'unclear risk of bias', and 'high risk of bias', respectively. Disagreement was resolved by discussion. If an included study was authored by one or more of the current authors, a third reviewer (HL) was asked to perform a quality assessment. One quality assessment item was omitted ("Was a dose–response relationship between exposure and outcome demonstrated?") because this item relates to the findings of the study and not the methodological quality, and assessment of dose–response forms part of the Bradford Hill criteria for causation (see below). The overall extent of risk of bias and methodological quality within each study was assessed using the GRADE approach to evaluate study limitations.[28]

Evaluation of evidence for causality

Based on the Bradford Hill considerations on causality,[21] a causation score was developed and used to systematically evaluate the evidence of a causal link between knee joint loading during walking and structural progression of knee OA. A similar score has previously been derived from the Bradford Hill considerations to assess the causal relationship between dietary factors and coronary heart disease.[23] The following criteria were used in the review of the cohort studies and given a score of 1 (criterion satisfied) or 0 (criterion not satisfied):

1. *Strength of association*: Associations quantified as a pooled OR ≥5.0, with lower 95% CI above 2.0; the expected direction was defined as 'strong association.' 'Moderate association' is defined as any statistically significant pooled OR ($p<0.05$). A statistically non-significant pooled OR was defined as 'no association.'
2. *Consistency across studies*: An association requires replication in other studies. Consistency is defined as ≥75% of associations being strong or moderate.
3. *Temporality*: Refers to temporal relationship of association between exposure and outcome; exposure has to precede outcome. It is difficult to ensure temporal correctness because study participants are assumed to walk daily and are, therefore, exposed to knee joint loading throughout observation periods. We retained this criterion because temporality is necessary to infer causation; absence of temporal relationship between exposure and outcome precludes a causal link. Our analysis accepted studies with a temporally correct design defined as baseline knee joint loading related to disease progression over time from that baseline. The temporality criterion was satisfied when temporal correctness was accepted in ≥75% of the included studies.
4. *Biological gradient*: When rate of progression increases (or decreases) incrementally as dose of exposure increases; provides strong evidence of causal relationship. This criterion is satisfied when ≥75% of tests for a trend pertaining to structural progression outcomes are statistically significant in the expected direction for knee joint loading.

The aforementioned four criteria scores were applied to derive one causation score for each knee joint loading variable. The scores were computed as the unweighted sum of the scores from each of the above criteria, for a possible range of 0–4. A score of 4 is considered strong evidence of a cause-and-effect relationship. A score of 3 is deemed to indicate moderate evidence. A score of 2 or less is considered weak evidence of causation.

A fifth criterion, *experimental evidence*, was used to examine whether the evidence from the prospective cohort studies was consistent with that from RCTs. Experimental evidence enhances the probability of causation, and may be used to upgrade or downgrade the calculated causation score.

The following four criteria were omitted:

Coherence: Causation is more likely if what is observed is supported by and in agreement with the natural history of the disease. This criterion is usually applied when the outcome is assessed by surrogate outcomes. This criterion is omitted because it is satisfied by default since imaging modalities are surrogate outcomes.

Plausibility relates to the assessment of whether the association is plausible or not. This criterion is omitted because of the highly subjective nature of this criterion.

Specificity relates to the specific response to the exposure. This criterion is omitted because OA is a multistructure disease; an association between knee joint loading and disease progression in multiple structures does not preclude a possible causal relationship.

Analogy relates to the possibility that existing similar association can support causation (eg, Does the same association exist for hip or hand OA? If so, causation may be supported). This criterion is omitted because this review focuses specifically on knee OA.

RESULTS

Study selection and characteristics

The search yielded 1078 potentially eligible studies (figure 1; references available in online supplementary file 3). Of those, we included five prospective cohort studies published between 2002 and 2013 and involving a total of 452 patients with knee OA[29–33] and 0 RCTs. The diagnostic criteria for knee OA used to determine participant inclusion in individual studies varied. The American College of Rheumatology (ACR) criteria[34] were used in one study,[32] whereas a combination of

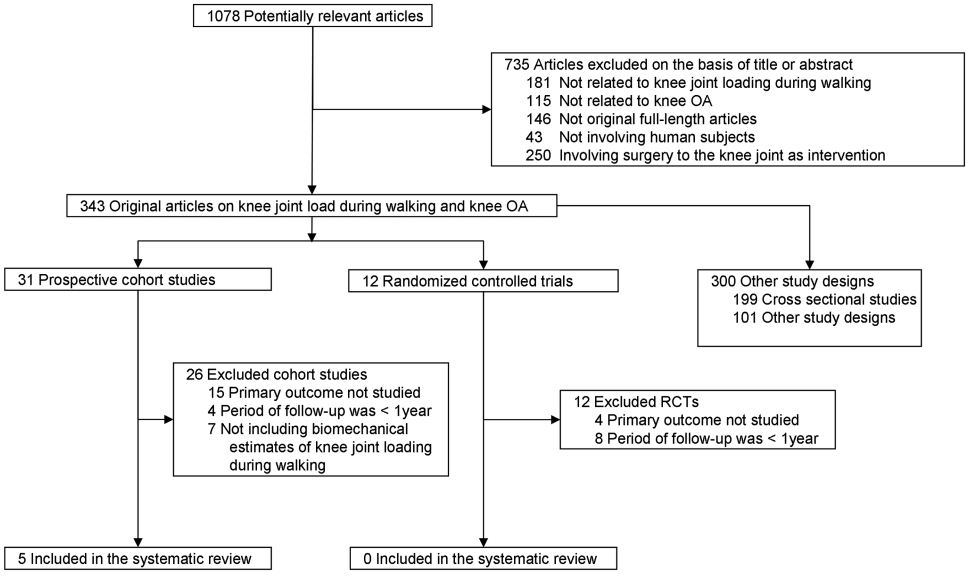

Figure 1 Flow chart of the literature selection process (OA, osteoarthritis; RCTs, randomised controlled trials).

clinical and radiographic signs of knee OA was used as criteria in three studies,[29 31 33] and one study did not report the diagnostic criteria used.[30] Study characteristics are summarised in table 1.

Joint loading and structural progression measures

Four cohort studies[29–32] focused on the same knee joint loading estimate: the peak KAM. In these studies, peak KAM was assessed at baseline and related to structural medial disease progression assessed after a median of 15 months from that baseline (12–72 months). In one study,[29] the baseline KAM impulse (area under the curve) was also related to medial disease progression. In the fifth study,[33] overall knee compression loading was used as load exposure.

Two studies[30 31] defined structural disease progression as any worsening in semiquantitative radiographic medial joint space grade.[36] One study[32] defined structural disease progression as any loss of medial femoral cartilage volume (quantitative MRI) above a measurement error previously established. In another study,[33] structural disease progression was assessed from semiquantitative grading of tibiofemoral cartilage loss and bone marrow lesions. In one study,[29] structural progression was assessed semi-quantitatively as medial tibiofemoral cartilage loss and medial tibiofemoral bone marrow lesions, and quantitatively as medial tibial cartilage volume loss. For the meta-analysis, we extracted the association (OR) between peak KAM and semiquantitative progression in medial tibiofemoral cartilage loss. No ORs were available for the association between KAM and cartilage volume loss because both were continuous variables. However, the linear regression analysis was extracted for the assessment of the biological gradient criteria.

Association between joint loading and progression

ORs were not reported in three studies,[31–33] but in[32] individual patient data were reported and an OR was calculated. We contacted the authors of ref. 31 asking them to provide an OR if possible. The authors returned a conference abstract including an OR published 4 years prior to the article.[35] The abstract recorded 64 patients in contrast to the 57 patients included in ref. 31 The authors could not account for the difference in number of the subjects between the full paper and conference abstract. One study[33] grouped participants based on changes in joint loading following weight loss (increased vs reduced loads) and found no between group differences in structural disease progression. Owing to the use of an intervention (weight loss), it was not appropriate to extract OR for baseline loading.

The ORs for structural disease progression ranged from 0.40 to 6.46 for each unit higher baseline peak KAM magnitudes. From the random effects model, the combined OR was estimated to 1.90 (95% CI 0.85 to 4.25). The confidence in this estimate was downgraded due to heterogeneity (I^2=77%). Figure 2 summarises the individual and pooled estimates.

In ref 29, the OR for progression of bone marrow lesions was 1.31 (95% CI 0.86 to 1.98) with every unit increment in baseline peak KAM; ORs for progression of cartilage defects and bone marrow lesions were 0.42 (95% CI 0.12 to 1.48) and 1.8 (95% CI 0.63 to 5.17), respectively, with every unit increment in baseline KAM impulse.

Methodological quality of the studies

One or more criteria were limited in the assessments of risk of selection, detection and attrition biases. Individual risk assessments are presented in online

Table 1 Summary of the characteristics of the included studies

Author (year) country	Knee loading variable	Structural progression measure		Follow-up time (months)	Number of patients (total/progressors/ non-progressors)	Females (%)	Reference
Miyazaki *et al* (2002) Japan	Peak KAM (unit: %BW×HT)	≥1 grade according to Altman atlas	sq X-ray	72	74/42/32	78	30
Chang *et al* (2007) USA	Peak KAM (unit: %BW×HT)	≥1 grade according to Altman atlas	sq X-ray	18	56 (64*)/41/15	59	31 35*
Bennell *et al* (2011) Australia	Peak KAM (unit: %BW×HT)	≥1 grade medial tibiofemoral cartilage defects	sq MRI	12	138/45/93	56	29
	KAM impulse (unit: %BW×HT)	Cartilage volume loss (mm^3)	q MRI		144/NA/NA		
Woollard *et al* (2011) USA	Peak KAM (unit: Nm/kg)†	Cartilage volume loss (mm^3)	q MRI	12	13/6/7	23	32
Henriksen *et al* (2013) Denmark	Peak overall knee compression force (unit: N)	Cartilage loss	sq MRI	12	157/NA/NA	89	33
				Median: 12	Totals: 452/134/147	Mean: 67	

*On request, the authors forwarded a conference abstract with additional data based on 64 subjects. The number of progressors/non-progressors was not available from that abstract.
†We converted the data into %BW×HT after requesting for body weight and height data from the authors.
KAM, knee adduction moment; BW, body weight; HT, height; q, quantitative; sq, semiquantitative grading; NA, non-applicable.

supplementary appendix A. Across the studies, the comparability of the groups at baseline was generally inadequately or unclearly described (selection bias). Also, descriptions of how reliably the joint load exposures were ascertained were not included in four of the five studies (detection bias), and group differences in loss of subjects were not accounted for (attrition bias). The discrepancy in subject numbers in reports from one cohort,[31 35] induced a high risk of selection and attrition bias. Table 2 presents summaries of the quality assessment. Agreement between quality raters was good (κ=0.73 (95% CI 0.48 to 0.97)).

Causality assessment

The non-significant combined OR indicates no association between knee joint load during walking and structural disease progression. Thus, a score of 0 in the *Strength of Association* criterion was assigned. The associations were not consistently replicated (50%), resulting in a score of 0 in the *Consistency* criterion. This finding was further supported by the heterogeneity between the studies (I^2=77%; figure 2), and the discrepancies between baseline peak KAM magnitudes among progressors and non-progressors across the cohorts (figure 3). Temporal correctness was accepted in one cohort.[30] After requesting for additional information from the authors of one cohort study,[31] we discovered that the article reported only part of the study. The additional information retrieved[35] showed that the study consisted of three measurements taken every 18 months. Joint space and Kellgren-Lawrence grades (X-rays) were recorded at all three time points, whereas the KAM was obtained at time points 2 and 3 (18 and 36 months). KAM at time point 2 (18 months) was associated with structural disease progression from 18 to 36 months and structural disease progression from time points 1 to 2

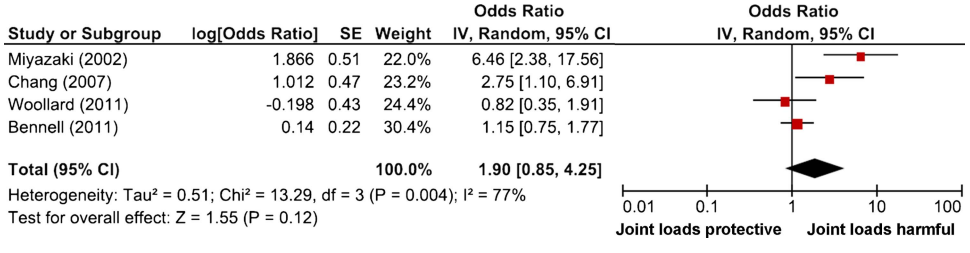

Figure 2 Forest plot of the individual ORs of structural disease progression with every increment in baseline peak knee adduction moment. Weights are from a random effects analysis. Individual and pooled estimates are shown with 95% CIs.

Table 2 Summary of the quality assessment (risk of bias)

Bias type	Quality criteria	Miyazaki *et al*[30]	Chang *et al*[31 35]	Bennell *et al*[29]	Woollard *et al*[32]	Henriksen *et al*[33]
Selection	Were the descriptions of the groups and the distribution of prognostic factors sufficient?	A	I	I	A	A
	Were the groups assembled at a similar point in their disease progression?	A	I	I	A	A
	Were the groups comparable on all important confounding factors?	I	I	I	U	A
Detection	Was the joint load estimate reliably ascertained?	U	U	U	U	I
	Was adequate adjustment made for the effects of these confounding variables?	A	I	A	I	I
	Was outcome assessment blind to exposure status?	A	A	I	I	A
	Was follow-up long enough for the outcomes to occur?	A	A	A	A	A
	What proportion of the cohort was followed-up?*	U	A	U	A	A
Attrition	Were dropout rates and reasons for drop-out similar across groups?	I	I	I	A	A
Overall risk of bias†		Very serious limitations; high risk of bias	Very serious limitations; high risk of bias	Very serious limitations; high risk of bias	Very serious limitations; high risk of bias	Very serious limitations; high risk of bias
Methodological quality		Low	Low	Low	Low	Low

*Adequate=follow-up proportion >80%; unclear 50–80%; inadequate=<50%.
†Risk of bias within studies is assessed using GRADE's approach to study limitations: No serious limitation defined as all criteria being adequately described (high methodological quality); serious limitations defined as one criterion being inadequately described or >1 criterion being unclearly described (moderate methodological quality); very serious limitation defined as >1 criterion being inadequately described (low methodological quality).
A, adequately described; I, inadequately described; U, unclear.

(baseline to 18 months) was associated with increased KAM from 18 to 36 months.[35] Thus, temporal correctness cannot be assigned to the observed associations in this study, and the overall *Temporality* criterion was not satisfied (a 0 score). *Biological Gradient* was investigated in one cohort[29] that showed no positive association between baseline peak KAM and loss of medial tibial cartilage volume over 12 months, resulting in a score of 0. Consequently, the causation score based on the included cohort studies was 0 for the association between peak KAM during walking and structural disease progression in patients with knee OA (table 3).

For the KAM impulse and overall knee compression loading, only one study was available for each exposure,[29 33] and therefore no causation scores were calculated for these loading exposures.

As the systematic literature search did not identify any RCTs, the findings from the cohort studies can neither be confirmed nor refuted by experimental evidence. Hence, the fifth criterion could not be used to upgrade or downgrade the causation scores.

DISCUSSION

This review is the first to systematically assess—using systematic review, meta-analysis, and the Bradford Hill considerations on causality—whether a causal link exists between knee joint loading during walking and structural disease progression of knee OA. The systematic literature search identified five prospective cohort studies focusing on three estimates of knee joint loading: the peak KAM, KAM impulse and overall tibiofemoral compression force. Using a predefined algorithm, a causation score of 0 was reached, showing that there is no evidence of a causal link between knee joint loading during walking and structural progression of knee OA.

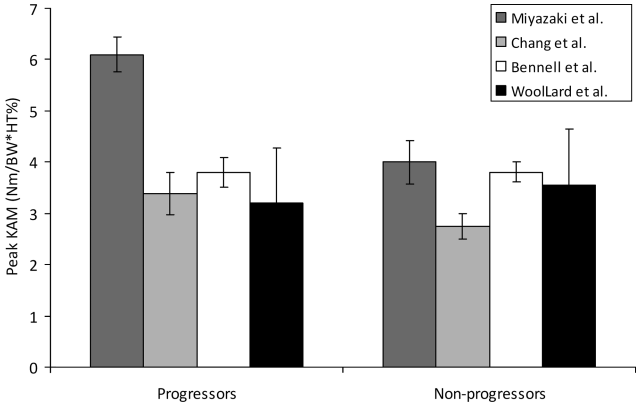

Figure 3 The mean baseline knee adduction moment (KAM) knee joint load exposures in patients with and without structural disease progression from the four individual cohorts. Note the overlap between progressors and non-progressors in the different studies. Error bars: 95% CI.

Furthermore, no experimental data from RCTs exist to support or oppose the findings from the cohort studies. One of the prospective cohort studies[33] compared increased versus decreased loads, without demonstrating differences in structural disease progression opposing a causal link.

Indirectly supporting the current findings, a longitudinal randomised trial comparing laterally wedged insoles (previously demonstrated to reduce loading[37 38]) with placebo insoles, showed no group differences in structural disease progression.[39] While that study seemingly provided experimental evidence, no joint load exposure data were included to document the assertion that joint loadings were in fact reduced in the 'wedged insole' group. Thus, the study did not fulfil the criteria for inclusion in this review. A recent meta-analysis on symptomatic effects of laterally wedged insoles showed no beneficial effects over neutral insoles, indicating limited effects of laterally wedged insoles.[40] However, the null outcome is supported by the results in ref. 33, included in this review, showing neither detrimental effects of increased loading nor beneficial effects of decreased loading over 12 months in a group of knee OA patients.

The quality assessment of the included studies showed high risks of selection, detection and attrition biases (table 3). An important precondition for valid results in cohort studies is that groups should be comparable at baseline. Unless the groups are balanced for relevant baseline characteristics, differences in structural disease progression cannot confidently be attributed to the effects of interest (joint loads during walking). The included studies revealed significant inadequacies when assessing the comparability of the groups on relevant baseline characteristics, leading to prognostic imbalance. Four of the five cohort studies did not report how reliably the joint loading estimates were ascertained (detection bias), which could influence the individual results. Moreover, the loss of subjects at follow-up in two of the five cohort studies was beyond 20%, with the dropout rates and reasons for dropout across groups not adequately accounted for (attrition bias). Finally, the discrepant numbers of subjects presented in different reports from the same cohort[31 35] introduced a serious risk of bias and low confidence in the results. The overall low methodological quality of the included studies gives little confidence in the reported estimates of causation.

Despite the shortage of studies reporting a causal link between joint loading and structural disease progression, the conjectured relationship underlies the rationale for many clinical efforts to reduce knee loading during walking in attempts to retard disease progression. Weight loss, insoles, modified footwear, strengthening exercises, knee braces and gait modifications have been

Table 3 Causation criteria and scores for the identified knee joint loading exposures

Knee joint load exposure	Strength* Summary or OR (95% CI)	Consistency† N (%)	Temporality‡ N (%)	Biological gradient§ N (%)	Causation score (number of criteria met)
Peak KAM	1.90 (0.85 to 4.25)	2/4 (50%)	1/4 (25%)	0/4 (0%)	0
KAM impulse	0.42 (0.12 to 1.48)¶	–**	0/1 (0%)	1/1 (100%)	–††
Peak overall compression	No group difference	–**	1/1 (100%)	0/1 (0%)	–††

*Strong association is defined as a pooled OR ≥5 with lower 95% CI excluding 2.0. Moderate association is any statistically significant association.
†Consistency is defined as ≥75% of associations showing strong or moderate associations.
‡In cohort studies it is difficult if not impossible to ensure temporal correctness because participants in the studies are expected to walk daily and are, therefore, exposed to knee joint loading throughout the observation period. In the current analysis, the temporality criterion is satisfied in studies that relate baseline knee joint loading exposures to disease progression over time from that baseline and demonstrate a statistically significant association with structural disease progression.
§Biological gradient is defined as demonstrated when the rate of progression increases (or decreases) incrementally as dose of exposure increases.
¶Estimate based on one cohort study[29] assessing baseline KAM impulse to progression of cartilage defects assessed by semiquantitative grading of MRI.
**Consistency not possible to assess with only one cohort.
††Causality score not calculated because only one study available.
KAM, knee adduction moment.

suggested as means to lower knee joint loads and thus slow structural disease progression through mechanical pathways,[41–46] with effects yet to be proven. The rationale for such efforts is diluted by the current results, not only by the low causality score, but also by the inconsistency across studies in the loading magnitudes between individuals who progress and those that do not. Figure 3 illustrates that patients with a certain baseline peak KAM magnitude in one study progress, whereas those with similar baseline peak KAM magnitudes in other studies do not. These differences in knee joint loading magnitudes between studies may be due to differences in gait analysis protocols across the involved gait labs, for example, in the selection of reference frame convention for the calculation of the KAM[47] and footwear condition.[44] However, including diversity of measures of the same variable can strengthen the confidence in the results of a systematic review.

The results from the included studies exhibited a high degree of heterogeneity (I^2 from the meta-analysis) (figure 2). The two cohorts with significant OR[30 31 35] both used radiography as the structural outcome assessment, whereas the studies reporting non-significant ORs used MRI.[29 32] Furthermore, the two studies reporting significant associations had longer follow-up periods (72 and 18 months), whereas the studies without significant associations assessed disease progression after 12 months. This concurrence of follow-up time and imaging modality precludes conclusions about whether the differences in results are based on follow-up time or imaging modality. Radiography is the current clinical gold standard for assessing structural disease progression, but it has low temporal sensitivity, making long follow-up times necessary. MRI—with its shorter temporal sensitivity—is possibly the more promising tool for assessing single structures and should be used in studies with longer follow-up times. The total number of patients was 452 in five cohorts; that is a very small number of patients when considering the large population and when compared to similar reviews in other chronic diseases. For instance, a recent review of the causal relationship between dietary factors and coronary heart disease included several millions of individuals in 361 cohorts and a multitude of dietary exposures.[23]

Our study has strengths because we undertook several measures to minimise bias, restricting our review to studies with the strongest causal inference (cohort studies and RCTs), conducted independent assessments of study eligibility, and using predefined criteria to evaluate causation and methodological quality. We may be criticised for using arbitrary OR cut-offs to define strong and moderate association, but identifying the true cut-off for defining clinically meaningful OR values is impossible in a field that has few longitudinal studies to consult. An important limitation is the causality score that applied. The score is a modification of a previous similar score,[23] thus it has limited empirical evidence to support its validity. Also, the causality score omitted several of the original causation considerations as proposed by Hill,[21] yet the applied method was prespecified. We may also be criticised for analysing any image-based structural deterioration, rather than separating the analyses in X-ray and MRI-based assessments. However, the analysis plans were also prespecified, without prior knowledge of the number of studies and specifics of the outcomes.

Current guidelines on interpretation of data from observational studies and data combined from repeated observational studies (with a reasonable internal validity) would correspond to confidence in the estimate's being 'Low-quality evidence', but could be upgraded if there is great confidence in the estimates and the effects are large.[48] However, the current analysis revealed a large inconsistency among study results, poor precision of the combined analysis, and low methodological quality. Thus, we downgraded further to 'very low quality evidence'. The inconsistency of the available studies may limit the appropriateness of meta-analyses, yet support the overall conclusion of this systematic literature review.

In conclusion, our systematic review, meta-analyses, and application of Bradford Hill's considerations on causation shows that there is no evidence of a causal link between estimates of knee joint loading during walking and structural progression of knee OA. Future large well-designed prospective cohorts with subsequent confirmation from randomised trials are strongly recommended. The current study findings question the rationale behind clinical efforts to reduce knee joint loading during walking as such efforts are currently supported by very low-quality evidence showing no causal link between knee joint loading during walking and progression of knee OA.

Author affiliations
[1]The Parker Institute, Copenhagen University Hospitals Bispebjerg and Frederiksberg, Copenhagen, Denmark
[2]School of Exercise Science, Australian Catholic University, Brisbane, Queensland, Australia
[3]Faculty of Health Sciences, Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark
[4]Department of Rheumatology and Gerontology, Copenhagen University Hospital Gentofte, Copenhagen, Denmark

Contributors MH, MWC, HL, CJ and RC were responsible for study concept and design. RC and MH supervised the study. HL and CJ performed the literature search. MH and MWC acquired the data, which were analysed and interpreted by MH, MWC, CJ, HL and RC. MH drafted the manuscript, which was critically revised for important intellectual content by MWC, HL, CJ and RC. RC did the statistical analysis. MH is the guarantor.

Funding The Parker Institute holds a grant from The Oak Foundation.

Competing interests MH was supported by a grant from The Danish Council for Independent Research|Medical Sciences (Grant number: 10-093704).

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement Extra data can be accessed via the Dryad data repository at http://datadryad.org/ with the doi:10.5061/dryad.b40hm.

REFERENCES

1. Nguyen US, Zhang Y, Zhu Y, *et al*. Increasing prevalence of knee pain and symptomatic knee osteoarthritis: survey and cohort data. *Ann Intern Med* 2011;155:725–32.
2. Felson DT, Naimark A, Anderson J, *et al*. The prevalence of knee osteoarthritis in the elderly. The Framingham Osteoarthritis Study. *Arthritis Rheum* 1987;30:914–18.
3. Lawrence RC, Felson DT, Helmick CG, *et al*. Estimates of the prevalence of arthritis and other rheumatic conditions in the United States. Part II. *Arthritis Rheum* 2008;58:26–35.
4. Aspden RM. Osteoarthritis: a problem of growth not decay? *Rheumatology (Oxford)* 2008;47:1452–60.
5. Henriksen M, Simonsen EB, Alkjaer T, *et al*. Increased joint loads during walking—a consequence of pain relief in knee osteoarthritis. *Knee* 2006;13:445–50.
6. Andriacchi TP, Mündermann A. The role of ambulatory mechanics in the initiation and progression of knee osteoarthritis. *Curr Opin Rheumatol* 2006;18:514–18.
7. Felson DT. Osteoarthritis as a disease of mechanics. *Osteoarthritis Cartilage* 2013;21:10–15.
8. Andriacchi TP. Valgus alignment and lateral compartment knee osteoarthritis: a biomechanical paradox or new insight into knee osteoarthritis? *Arthritis Rheum* 2013;65:310–13.
9. Lafeber FP, Intema F, Van Roermund PM, *et al*. Unloading joints to treat osteoarthritis, including joint distraction. *Curr Opin Rheumatol* 2006;18:519–25.
10. Lohmander LS, Gerhardsson dV, Rollof J, *et al*. Incidence of severe knee and hip osteoarthritis in relation to different measures of body mass: a population-based prospective cohort study. *Ann Rheum Dis* 2009;68:490–6.
11. Coggon D, Reading I, Croft P, *et al*. Knee osteoarthritis and obesity. *Int J Obes Relat Metab Disord* 2001;25:622–7.
12. Pottie P, Presle N, Terlain B, *et al*. Obesity and osteoarthritis: more complex than predicted! *Ann Rheum Dis* 2006;65:1403–5.
13. Richette P, Poitou C, Garnero P, *et al*. Benefits of massive weight loss on symptoms, systemic inflammation and cartilage turnover in obese patients with knee osteoarthritis. *Ann Rheum Dis* 2011;70:139–44.
14. DeVita P, Hortobagyi T. Obesity is not associated with increased knee joint torque and power during level walking. *J Biomech* 2003;36:1355–62.
15. Zhao D, Banks SA, Mitchell KH, *et al*. Correlation between the knee adduction torque and medial contact force for a variety of gait patterns. *J Orthop Res* 2007;25:789–97.
16. Ledingham J, Regan M, Jones A, *et al*. Radiographic patterns and associations of osteoarthritis of the knee in patients referred to hospital. *Ann Rheum Dis* 1993;52:520–6.
17. Mills K, Hunt MA, Ferber R. Biomechanical deviations during level walking associated with knee osteoarthritis: a systematic review and meta-analysis. *Arthritis Care Res (Hoboken)* 2013;65:1643–65.
18. Shrader MW, Draganich LF, Pottenger LA, *et al*. Effects of knee pain relief in osteoarthritis on gait and stair-stepping. *Clin Orthop* 2004;421:188–93.
19. Schnitzer TJ, Popovich JM, Andersson GB, *et al*. Effect of piroxicam on gait in patients with osteoarthritis of the knee. *Arthritis Rheum* 1993;36:1207–13.
20. Hurwitz DE, Sharma L, Andriacchi TP. Effect of knee pain on joint loading in patients with osteoarthritis. *Curr Opin Rheumatol* 1999;11:422–6.
21. Hill AB. The environment and disease: association or causation? *Proc R Soc Med* 1965;58:295–300.
22. DOLL R, Hill AB. Smoking and carcinoma of the lung; preliminary report. *BMJ* 1950;2:739–48.
23. Mente A, de KL, Shannon HS, *et al*. A systematic review of the evidence supporting a causal link between dietary factors and coronary heart disease. *Arch Intern Med* 2009;169:659–69.
24. Bellamy N, Kirwan J, Boers M, *et al*. Recommendations for a core set of outcome measures for future phase III clinical trials in knee, hip, and hand osteoarthritis. Consensus development at OMERACT III. *J Rheumatol* 1997;24:799–802.
25. DerSimonian R, Laird N. Meta-analysis in clinical trials. *Control Clin Trials* 1986;7:177–88.
26. Higgins JP, Thompson SG, Deeks JJ, *et al*. Measuring inconsistency in meta-analyses. *BMJ* 2003;327:557–60.
27. Khan K, ter Riet G, Popay J, *et al*. *Undertaking systematic reviews of research on effectiveness. STAGE II—conducting the review. PHASE 5—study quality assessment. Undertaking systematic reviews of research on effectiveness: CRD's guidance for carrying out or commissioning reviews*. 2nd edn. York: Centre for Reviews and Dissemination, 2001.
28. Guyatt GH, Oxman AD, Vist G, *et al*. GRADE guidelines: 4. Rating the quality of evidence—study limitations (risk of bias). *J Clin Epidemiol* 2011;64:407–15.
29. Bennell KL, Bowles KA, Wang Y, *et al*. Higher dynamic medial knee load predicts greater cartilage loss over 12 months in medial knee osteoarthritis. *Ann Rheum Dis* 2011;70:1770–4.
30. Miyazaki T, Wada M, Kawahara H, *et al*. Dynamic load at baseline can predict radiographic disease progression in medial compartment knee osteoarthritis. *Ann Rheum Dis* 2002;61:617–22.
31. Chang A, Hurwitz D, Dunlop D, *et al*. The relationship between toe-out angle during gait and progression of medial tibiofemoral osteoarthritis. *Ann Rheum Dis* 2007;66:1271–5.
32. Woollard JD, Gil AB, Sparto P, *et al*. Change in knee cartilage volume in individuals completing a therapeutic exercise program for knee osteoarthritis. *J Orthop Sports Phys Ther* 2011;41:708–22.
33. Henriksen M, Hunter DJ, Dam EB, *et al*. Is increased joint loading detrimental to obese patients with knee osteoarthritis? A secondary data analysis from a randomized trial. *Osteoarthritis Cartilage* 2013;21:1865–75.
34. Altman R, Asch E, Bloch D, *et al*. Development of criteria for the classification and reporting of osteoarthritis. Classification of osteoarthritis of the knee. Diagnostic and Therapeutic Criteria Committee of the American Rheumatism Association. *Arthritis Rheum* 1986;29:1039–49.
35. Sharma L, Dunlop D, Andriacchi T, *et al*. The adduction moment and knee osteoarthritis (OA), a longitudinal study. *Arthritis Rheum* 2003;48(9 Suppl):S452.
36. Altman RD, Hochberg M, Murphy WA Jr, *et al*. Atlas of individual radiographic features in osteoarthritis. *Osteoarthritis Cartilage* 1995;3 (Suppl A):3–70.
37. Hinman RS, Bowles KA, Bennell KL. Laterally wedged insoles in knee osteoarthritis: do biomechanical effects decline after one month of wear? *BMC Musculoskelet Disord* 2009;10:146.
38. Hinman RS, Bowles KA, Metcalf BB, *et al*. Lateral wedge insoles for medial knee osteoarthritis: effects on lower limb frontal plane biomechanics. *Clin Biomech (Bristol, Avon)* 2012;27:27–33.
39. Bennell KL, Bowles KA, Payne C, *et al*. Lateral wedge insoles for medial knee osteoarthritis: 12 month randomised controlled trial. *BMJ* 2011;342:d2912.
40. Parkes MJ, Maricar N, Lunt M, *et al*. Lateral wedge insoles as a conservative treatment for pain in patients with medial knee osteoarthritis: a meta-analysis. *JAMA* 2013;310:722–30.
41. Gross KD, Hillstrom HJ. Noninvasive devices targeting the mechanics of osteoarthritis. *Rheum Dis Clin North Am* 2008;34:755–76.
42. Bennell KL, Kean CO, Wrigley TV, *et al*. Effects of a modified shoe on knee load in people with and those without knee osteoarthritis. *Arthritis Rheum* 2013;65:701–9.
43. Bennell KL, Egerton T, Wrigley TV, *et al*. Comparison of neuromuscular and quadriceps strengthening exercise in the treatment of varus malaligned knees with medial knee osteoarthritis: a randomised controlled trial protocol. *BMC Musculoskelet Disord* 2011;12:276.
44. Kemp G, Crossley KM, Wrigley TV, *et al*. Reducing joint loading in medial knee osteoarthritis: shoes and canes. *Arthritis Rheum* 2008;59:609–14.
45. Hinman RS, Bennell KL. Advances in insoles and shoes for knee osteoarthritis. *Curr Opin Rheumatol* 2009;21:164–70.
46. Simic M, Hinman RS, Wrigley TV, *et al*. Gait modification strategies for altering medial knee joint load: a systematic review. *Arthritis Care Res (Hoboken)* 2011;63:405–26.
47. Schache AG, Baker R, Vaughan CL. Differences in lower limb transverse plane joint moments during gait when expressed in two alternative reference frames. *J Biomech* 2007;40:9–19.
48. Guyatt G, Oxman AD, Akl EA, *et al*. GRADE guidelines: 1. Introduction-GRADE evidence profiles and summary of findings tables. *J Clin Epidemiol* 2011;64:383–94.

Supplementary file 1: Protocol

Causal link between knee joint loading during walking and structural progression of knee osteoarthritis: a systematic review of cohorts and randomized trials

Authors:

Marius Henriksen*, Mark Creaby, Hans Lund, Carsten Juhl, Robin Christensen

***Contact person:**

Dr Marius Henriksen

Senior Researcher, PT, MSc, PhD.

The Parker Institute: Clinical Motor Function Laboratory

Copenhagen University Hospital, Frederiksberg

Nordre Fasanvej 57

DK-2000 Copenhagen F

Denmark

Email: marius.henriksen@regionh.dk

Fax: +45 3816 4159

ABSTRACT

Background

XXXXXXX

Objectives

XXXXXXX

Search methods

XXXXX

Selection criteria

XXXXX

Data collection and analysis

XXXX

Results

XXXXXX

Authors' conclusions

XXXXXX

INTRODUCTION

Description of the condition

Osteoarthritis (OA) is the most common form of arthritis (1) affecting a large part of the population, and is a major cause of disability (2). The incidence and prevalence of OA increase with age (3). Among joints affected by OA, the knee joint is among the most frequently affected (1). Due to the knee's crucial role in independent ambulation knee OA leads to considerable disability affecting the individual's participation in society and independent life style. Pathologically, knee OA is defined as is a progressive structural disorder of the joints primarily characterized by gradual loss of cartilage with concurrent development of osteophytes, meniscal degeneration, bone marrow lesions, synovitis and effusions. The diagnosis is clinical – in the main by the presence of pain - and is most often confirmed by radiography or magnetic resonance imaging (MRI). Symptomatic knee OA is defined as the presence of the radiographic features of OA in combination with symptoms attributable to knee OA. Because no cure is available the burden of morbidity, primary care visits, and health care costs associated with knee OA are enormous and even higher than more high-profile diseases such as diabetes, cancer and cardiovascular diseases (4). Thus knee OA poses a substantial public health burden given its prevalence in the population that continues to rise.

Description of the exposure

Walking is a natural way of moving. Most people walk short distances every day and estimates of steps/day have been reported to be 9300 (women) and 11 900 (men) for young subjects decreasing with age (5), giving approximately between 3.4 and 4.3 million steps/year. With every step the knee joint is loaded, and biomechanical studies estimate the joint loads to exceed 2-3 times body weight (6), and thus knee joint loading is a necessity in independent life style.

While internal forces at joints cannot be measured directly, estimates of joint loads during walking can be obtained non-invasively by means of 3-dimensional gait analysis. Typically, medial tibiofemoral compartment joint loads are estimated using the external knee adduction moment (KAM) as a proxy, because this moment has been shown to be determinative of the medial to

lateral joint load distribution (7). More detailed biomechanical models have also been used to assess joint loads, in which overall compression forces (i.e., both medial and lateral compartment forces) are estimated based on the summation of joint, muscle, and soft tissue reaction forces (8). More recently, the total reaction moment has been suggested as a measure of overall joint loading during walking (9).

Efforts to reduce the dynamic loads on the knee during walking have been made with the scope to potentially delay or stop structural deterioration. Braces, wedged insoles, exercise, and weight loss are among interventions that have been suggested to have beneficial effects on structural progression of knee OA mainly through mechanical pathways.

How the exposure might work

Knee OA has traditionally been categorized as a "wear and tear" disease, which by definition suggests mechanical factors as being causally involved in both disease initiation and progression. A widely accepted hypothesis is that higher knee joint compression forces and moments during walking are associated with structural knee OA degeneration and changes in knee joint forces and moments must change the distribution, magnitude and direction of forces between and within the joint structures with possible effects on the structural disease progression. Within the knee structural signs of OA commonly occur in weight bearing structures, strengthening the belief that load is involved in knee OA progression. According to the prevailing theories higher loading is believed to accelerate structural progression of knee OA and thus unloading is advocated in an attempt to slow or halt disease progression.

Why it is important to do this review

The relationship between knee joint loads during walking and knee OA has been a focus of research for 10-20 years. The original work of Miyazaki et al. (10) indicating that higher joint loads increase the odds of structural disease progression has stimulated subsequent studies of knee joint loading during walking and knee OA. However, the majority of studies are cross sectional and results of prospective cohort studies and RCTs are discrepant. Results from studies on symptomatic treatment of knee OA paradoxically reveals (presumably) unwanted increase in knee joint loads during walking that were previously suggested to exert detrimental structural effects in

cohort studies (6;11-13). This may generate confusion among researchers, health care professionals, policy makers, and the population at large who are interested in this information to aid them in knee OA prevention and treatment strategies.

In a classic study, Hill (14) proposed a set of criteria (the Bradford Hill criteria) to evaluate systematically whether a causal link between an exposure of interest and a health outcome exists. These guidelines are used by epidemiologists to test causal hypotheses and have undergone little modification since their original publication. Before advocating that knee joint loadings during walking should be targeted therapeutically, it is necessary to base recommendations on the best available scientific evidence. To address this issue, we conducted a systematic review of the literature examining the association between knee joint loads during walking (hereafter referred to as knee joint load exposures) and structural degeneration in knee osteoarthritis.

Objectives

Our specific objectives are 1) to systematically evaluate the evidence supporting a causal link between exposures to knee joint loadings during walking and progression of structural knee joint degeneration in patients with knee OA using the Bradford Hill criteria; 2) to determine which knee joint load exposures that have been studied sufficiently in RCTs and found to support the findings of prospective cohort studies; and 3) to identify the knee joint load exposures deemed to have insufficient evidence to be conclusive.

METHODS

Criteria for considering studies for this review

Types of studies

Prospective cohort studies and RCTs.

We only consider studies that follow-up subjects for at least 1 year (according to the OMERACT-III Recommendations for a Core Set of Outcome Measures relating to the sensitivity of imaging and slow disease progression (15)). Cohort studies need to include estimates of joint loading during walking and assessment of disease structural progression. RCTs need to intervene on joint loading and assess the impact on structural disease progression.

Types of participants

The studies must include participants with knee OA diagnosed according to the ACR-criteria (16).

Types of interventions

Clinical trials have to be randomized and compare structural disease progression between different knee joint load exposures (high vs. low or increase vs. decrease), or knee joint load exposures interventions (increase or decrease), placebo or control.

Types of outcome measures

The articles must pertain to the effect of exposure to knee joint loading during walking (e.g. joint moments or estimated joint compression forces from 3-dimensional gait analysis) on structural disease progression assessed by X-ray or MRI.

Outcome measures

Primary – major – outcomes

Structural disease progression assessed by X-ray or MRI.

Semi quantitative assessments:

X-rays: K/L, Ahlback, Altman

MRI: WORMS/BLOKS/MOAKS assessments of cartilage defects, bone marrow lesions, osteophytes, meniscal lesions and extrusions, synovitis, effusion.

Quantitative assessments:

X-rays: Joint space width (mm), alignment (degrees)

MRI: Cartilage thickness (mm), volume (mm^3), bone marrow lesion area/volume (mm^2/mm^3), meniscal extrusions (mm)

Search methods for identification of studies

Electronic searches

We will search MEDLINE, Scopus, AMED, CINAHL and SportsDiscus for prospective cohort studies and RCTs from 1950 through October 2012.

Searching other resources

The reference lists of the retrieved articles will also be scanned for additional cohort studies and RCTs.

Own files for yet unpublished data (e.g. Loader/Unloader manuscript at present in review at A&R, and the knee rotation moment manuscript at present in review at O&C)

Data collection and analysis

Selection of studies

Two of the authors (MH and MC) will independently assess study eligibility. Excluded studies and reasons for exclusion will be listed, and disagreement is resolved by discussion and consensus.

Data extraction and management

The following data will be extracted from the selected studies

1. Study design (cohort study or RCT)
2. Country of origin
3. Number of participants
4. Demographic characteristics of the participants (ie age sex, BMI etc)

5. Disease specific characteristics of the participants (ie baseline symptoms (pain, function etc), radiographic disease severity (ie baseline Kellgren-Lawrence, Ahlback, Altman etc), knee joint alignment etc)
6. Knee joint load exposure assessment tool (ie, joint moment, compression force etc)
7. Knee joint load exposure magnitude
8. Description of the interventions (RCTs)
9. Structural disease outcomes (ie, semi-quantitative or quantitative measures on x-ray and/or MRI)

For the prospective cohort studies, data will be extracted on the estimates of the association between knee joint load exposure and structural disease progression. The cohort studies typically report prediction of structural degeneration based on baseline knee joint load exposure. The higher knee joint load exposure is compared with the lower knee joint load exposure and the results are reported as odds ratios (OR) or relative risks (RR) for each structural disease progression outcome. P-values for trends, where available, will be used to evaluate dose-response relationships.

For the RCTs we compare RRs of structural disease progression between knee joint load exposure modification and control groups.

Assessment of risk of bias in included studies

The Cochrane Collaboration's tool for assessing risk of bias in randomized trials will apply for these particular studies (17). Risk of bias in cohort studies will be assessed in accordance with recommendations from the Center for Reviews and Dissemination a the University of York (18):

. Is there sufficient description of the groups and the distribution of prognostic factors?

. Are the groups assembled at a similar point in their disease progression?

. Is the intervention/treatment reliably ascertained?

. Were the groups comparable on all important confounding factors?

. Was there adequate adjustment for the effects of these confounding variables?

. Was a dose-response relationship between intervention/joint load exposure and outcome demonstrated?

. Was outcome assessment blind to exposure status?

. Was follow-up long enough for the outcomes to occur?

. What proportion of the cohort was followed-up?

. Were drop-out rates and reasons for drop-out similar across intervention and unexposed

. groups?

Measures of treatment effect (summary measures)

We will calculate or convert the observed likelihood of progression into odds ratios (ORs) with 95% confidence intervals for each study.

Assessment of heterogeneity

We will examine heterogeneity between trials with a standard Q-test statistic (testing the hypothesis of homogeneity), and present the I^2 value, which can be interpreted as the percentage of total variation across several studies due to heterogeneity.

Data synthesis

Combining results of studies

To combine the individual study results we did meta-analyses using SAS software (version 9.2), applying a restricted maximum likelihood (REML) method to estimate the between study variance and the combined OR.

Subgroup analysis and investigation of heterogeneity

We will explore whether different types of measures for joint loading can explain some of the variation in the odds of joint deterioration.

APPLICATION OF BRADFORD HILL CRITERIA

An algorithm of the Bradford Hill criteria will be used to systematically evaluate the evidence of a causal relationship between knee joint load exposure and structural progression of knee OA.
The following criteria will be used in the review of the retrieved prospective cohort studies:

1. *Strength of association*. Most important factor. Strong associations is defined as RR ≥ 5.0, with lower 95% CI excluding 2.0, and statistically significant at P<0.05, and in expected direction. Moderate association is defined as any statistically significant effect.
2. *Consistency across studies*. Finding of an association needs to be replicated in other studies. Consistency of knee joint load exposures is defined as ≥ 75% of associations showing strong or moderate associations with structural progression.
3. *Temporality*. Refers to temporal relationship of association between exposure and outcome; exposure must precede outcome on progression. In prospective cohort studies and RCTs it is difficult (if not impossible) to ensure temporally correctness because participants in studies all are expected to walk on a daily basis and therefore are exposed to the knee joint load exposure throughout the observation periods. Although temporally correctness may be impossible to ensure and it thus could be argued that this criterion should be omitted from the present review, we retain this criterion in our assessment of causality because temporality is necessary (although not sufficiently enough in itself) to infer causation; thus absence of temporal relationship between knee joint load exposure and structural knee OA progression will preclude a causal link.
4. *Biological gradient*. When risk of progression increase (or decrease) incrementally as dose of exposure increases; provides strong evidence of causal relationship.

These 4 criteria are used to derive a causation score for each knee joint load exposure. The score is computed as the unweighted sum of the number of criteria that is met, for a possible range of 0 to 4. A score of 4 is considered strong evidence of a cause-and-effect relationship. A score of 3 is deemed to indicate moderate evidence. A score of 2 or less is considered weak evidence of causation.
A fifth criterion, e*xperimental evidence*, will be used to examine whether the evidence from the prospective cohort studies is consistent with that from RCTs. Experimental evidence enhances the probability of causation and this analysis may be used to up- or downgrade the computed

causation score. RCT provide the ideal experimental study design to establish causation where randomization is the leading experimental factor that increases confidence in associations.
The following 4 criteria will be omitted

- *Coherence.* Causation is more likely if what is observed is supported by and in agreement with the natural history of the disease. This criterion is usually applied when the outcome of interest is assessed by surrogate outcomes. In the present review this criterion is omitted because it is already satisfied by default, because structural disease progression is by definition a surrogate marker of the disease.
- *Plausibility* relates to the assessment of whether the association is plausible or not. In the present review we omit this criterion because every relation can be described as plausible given that researchers always will think of an explanation once an association is observed. The knee joint load exposures selected in this review all meet plausibility criteria for probable mechanisms to explain associations.
- *Specificity* relates to the specific response to the exposure. In the present review, this criterion is omitted because the single joint load exposures are intercorrelated as are progression of degeneration in the different structures and tissues in the knee and, consequently association between a single knee joint load exposure and progression in multiple structures in the knee does not preclude a possible causal relationship.
- *Analogy* related to the possibility that existing similar association can support causation, e.g. does the same association exist for hip or hand OA, then causation may be supported. Otherwise the evidence is downgraded. This criterion is omitted because this review focuses on knee OA and because argumentation by analogy largely reflects imagination or experience of the scientist and therefore tends to subjective.

The quality of the evidence will also be communicated as recommended by the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group: GRADE, presents a framework that describes both criteria for assessing the quality of research evidence and the strength of recommendations that includes considerations arising from the Bradford Hill criteria (19).

ACKNOWLEDGEMENTS

This study was supported by grants from The Oak Foundation, XXX, and Frederiksberg Hospital.

We wish to acknowledge XXX.

REFERENCES

(1) Lawrence RC, Felson DT, Helmick CG, Arnold LM, Choi H, Deyo RA, et al. Estimates of the prevalence of arthritis and other rheumatic conditions in the United States. Part II. Arthritis Rheum 2008 Jan;58(1):26-35.

(2) Felson DT, Naimark A, Anderson J, Kazis L, Castelli W, Meenan RF. The prevalence of knee osteoarthritis in the elderly. The Framingham Osteoarthritis Study. Arthritis Rheum 1987 Aug;30(8):914-8.

(3) Woolf AD, Pfleger B. Burden of major musculoskeletal conditions. Bull World Health Organ 2003;81(9):646-56.

(4) Aspden RM. Osteoarthritis: a problem of growth not decay? Rheumatology (Oxford) 2008 Oct;47(10):1452-60.

(5) Sequeira MM, Rickenbach M, Wietlisbach V, Tullen B, Schutz Y. Physical activity assessment using a pedometer and its comparison with a questionnaire in a large population survey. Am J Epidemiol 1995 Nov 1;142(9):989-99.

(6) Henriksen M, Simonsen EB, Alkjaer T, Lund H, Graven-Nielsen T, Danneskiold-Samsoe B, et al. Increased joint loads during walking - A consequence of pain relief in knee osteoarthritis. Knee 2006 Sep 28;13:445-50.

(7) Zhao D, Banks SA, Mitchell KH, D'Lima DD, Colwell CW, Jr., Fregly BJ. Correlation between the knee adduction torque and medial contact force for a variety of gait patterns. J Orthop Res 2007 Jun;25(6):789-97.

(8) Schipplein OD, Andriacchi TP. Interaction between active and passive knee stabilizers during level walking. J Orthop Res 1991 Jan;9(1):113-9.

(9) Boyer KA, Angst MS, Asay J, Giori NJ, Andriacchi TP. Sensitivity of gait parameters to the effects of anti-inflammatory and opioid treatments in knee osteoarthritis patients. J Orthop Res 2011 Dec 16.

(10) Miyazaki T, Wada M, Kawahara H, Sato M, Baba H, Shimada S. Dynamic load at baseline can predict radiographic disease progression in medial compartment knee osteoarthritis. Ann Rheum Dis 2002 Jul;61(7):617-22.

(11) Shrader MW, Draganich LF, Pottenger LA, Piotrowski GA. Effects of knee pain relief in osteoarthritis on gait and stair-stepping. Clin Orthop 2004 Apr;(421):188-93.

(12) Schnitzer TJ, Popovich JM, Andersson GB, Andriacchi TP. Effect of piroxicam on gait in patients with osteoarthritis of the knee. Arthritis Rheum 1993 Sep;36(9):1207-13.

(13) Hurwitz DE, Sharma L, Andriacchi TP. Effect of knee pain on joint loading in patients with osteoarthritis. Curr Opin Rheumatol 1999 Sep;11(5):422-6.

(14) Hill AB. The environment and disease: Association or causation? Proc R Soc Med 1965 May;58:295-300.

(15) Bellamy N, Kirwan J, Boers M, Brooks P, Strand V, Tugwell P, et al. Recommendations for a core set of outcome measures for future phase III clinical trials in knee, hip, and hand osteoarthritis. Consensus development at OMERACT III. J Rheumatol 1997 Apr;24(4):799-802.

(16) Altman R, Asch E, Bloch D, Bole G, Borenstein D, Brandt K, et al. Development of criteria for the classification and reporting of osteoarthritis. Classification of osteoarthritis of the knee. Diagnostic and Therapeutic Criteria Committee of the American Rheumatism Association. Arthritis Rheum 1986 Aug;29(8):1039-49.

(17) Higgins JP, Altman DG, Gotzsche PC, Juni P, Moher D, Oxman AD, et al. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. BMJ 2011;343:d5928.

(18) Khan K, ter Riet G, Popay J, Nixon J, Kleijnen J. STAGE II – Conducting the review. PHASE 5 – Study quality assessment. 2001

(19) Schunemann H, Hill S, Guyatt G, Akl EA, Ahmed F. The GRADE approach and Bradford Hill's criteria for causation. J Epidemiol Community Health 2011 May;65(5):392-5.

Supplementary file 2: Literature Search Strategies

PubMed

1. ((knee[Title/Abstract]) OR joint, knee[MeSH Terms]) OR joints, knee[MeSH Terms]
2. ((osteoarthritis[Title/Abstract]) OR osteoarthrosis[Title/Abstract]) OR osteoarthritis[MeSH Terms]
3. (#1) AND #2
4. (((DiseaseExacerbation[Title/Abstract]) OR disease progression[MeSH Terms]) OR disease progressions[MeSH Terms]) OR disease progression[Title/Abstract]
5. ((((radiography[MeSH Terms]) OR radiograph* [Title/Abstract]) OR x-ray*[Title/Abstract]) OR magneticresonance[MeSH Terms]) OR magneticresonance[Title/Abstract]
6. #4 OR #5
7. (((biomechanics[MeSH Terms]) OR biomechanic*[Title/Abstract]) OR gait[Title/Abstract]) OR walking[Title/Abstract
8. #3 AND #6 AND #7

Scopus

1. knee (Ti-Ab-Key)
2. osteoarthritisOR osteoarthrosis(ti-ab-key)
3. progression OR worsening OR magneticresonance OR radiography OR x-ray (Ti-Ab-Key)
4. biomechanic OR gait OR walking (Ti-Ab-Key)
5. #1 AND #2 AND #3 AND #4

AMED, CINAHL, SportsDiscus

1. TI knee OR AB knee OR SU knee
2. TI osteoarthritis OR AB Osteoarthritis OR SU osteoarthritis OR AB osteoarthrosis
3. TI Progression OR AB Progression
4. TI worsening OR AB worsening
5. TI x-ray OR AB x-ray
6. TI radiography OR AB radiography
7. TI magnetic resonance OR AB magnetic resonance
8. #3 OR #4 OR #5 OR #6 OR #7
9. TI biomechanic* OR AB biomechanic*
10. TI gait OR AB gait
11. TI walking OR AB walking
12. #9 OR #10 OR #11
13. #1 AND #2 AND #8 AND #12

Supplementary file 3: Results of the literature search

- Anon. SportsMedUpdate. (Abstracts). British journal of sports medicine 2005;39:971-2.
- Anon. The NIH glucosamine/chondroitin arthritis intervention trial (GAIT). Journal of Pain and Palliative Care Pharmacotherapy 2008;22:39-43.
- Aaboe J, et al. Effects of an intensive weight loss program on knee joint loading in obese adults with knee osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2011;2011/03/29:822-8.
- Aaboe J, et al. The Influence of Radiographic Severity on the Relationship between Muscle Strength and Joint Loading in Obese Knee Osteoarthritis Patients. Arthritis 2011;2011/11/03:571519.
- Aagaard H, et al. Function of the normal meniscus and consequences of meniscal resection. Scandinavian journal of medicine & science in sports 1999;1999/06/25:134-40.
- Abdallah A. EFFECT OF UNILATERAL AND BILATERAL USE OF LATERALLY WEDGED INSOLES WITH ARCH SUPPORTS ON IMPACT LOADING IN MEDIAL KNEE OSTEOARTHRITIS. British journal of sports medicine 2013;47:16-7.
- Abhishek A, et al. Self-reported knee malalignment in early adult life as an independent risk for knee chondrocalcinosis. Arthritis care & research 2011;2011/10/29:1550-7.
- Ackland DC, et al. Future trends in the use of X-ray fluoroscopy for the measurement and modelling of joint motion. Journal of Engineering in Medicine 2011;225:1136-48.
- Adam RF, et al. Primary total knee arthroplasty in the elderly. Journal of Arthroplasty 1994;9:495-7.
- Adu J, et al. A child with knee pain. British medical journal 2012;344.
- Ageberg E, et al. Effect of leisure time physical activity on severe knee or hip osteoarthritis leading to total joint replacement: A population-based prospective cohort study. BMC musculoskeletal disorders 2012;13.
- Ageberg E, et al. Effects of neuromuscular training (NEMEX-TJR) on patient-reported outcomes and physical function in severe primary hip or knee osteoarthritis: A controlled before-and-after study. BMC musculoskeletal disorders 2013;14.
- Aglietti P, et al. High tibial valgus osteotomy for medial gonarthrosis: a 10- to 21-year study. The journal of knee surgery 2003;2003/02/06:21-6.
- Ahmad M, et al. Distinct, autosomal recessive form of spondyloepimetaphyseal dysplasia segregating in an inbred Pakistani kindred. American journal of medical genetics 1998;1998/08/26:468-73.
- Ahn JH, et al. Long-term results of anterior cruciate ligament reconstruction using bone-patellar tendon-bone: an analysis of the factors affecting the development of osteoarthritis. Arthroscopy : the journal of arthroscopic & related surgery : official publication of the Arthroscopy Association of North America and the International Arthroscopy Association 2012;2012/03/17:1114-23.
- Ajadi RA, et al. Short-term changes in lipid profile following experimental osteoarthritis in dogs. Bulgarian Journal of Veterinary Medicine 2012;15:166-71.
- Akgun U, et al. Tuberculosis of the knee joint: A case report. Acta orthopaedica et traumatologica turcica 2008;42:214-8.
- Akpinar S, et al. Knee joint synovial cyst following total knee arthroplasty with bone allograft. Archives of orthopaedic and trauma surgery 2009;129:7-11.
- Al-Rowaih A, et al. Size of osteonecrosis of the knee. Clinical orthopaedics and related research 1993;68-75.
- Al Kaissi A, et al. Osteochondritis dissecans and Osgood Schlatter disease in a family with Stickler syndrome. Pediatric Rheumatology 2009;7.
- Alekseeva LI, et al. Long-term results of structumÂ® administration (data from a multicenter trial). Terapevticheskii Arkhiv 2003;75:82-6.
- Alekseeva LI, et al. Combined medication artra in the treatment of osteoarthrosis. Terapevticheskii Arkhiv 2005;77:69-75.
- Alexander CJ. Utilisation of joint movement range in arboreal primates compared with human subjects: An evolutionary frame for primary osteoarthritis. Annals of the rheumatic diseases 1994;53:720-5.
- Allain J, et al. Isolated patello-femoral osteoarthritis: Introduction, materials and methods. Revue de chirurgie orthopedique et reparatrice de l'appareil moteur 2004;90:1S69-75.
- Allen KD, et al. Associations of occupational tasks with knee and hip osteoarthritis: the Johnston County Osteoarthritis Project. The Journal of rheumatology 2010;2010/02/17:842-50.
- Allen KD. Racial and ethnic disparities in osteoarthritis phenotypes. Current opinion in rheumatology 2010;2010/05/18:528-32.
- Allen PR, et al. Late degenerative changes after meniscectomy. Factors affecting the knee after operation. The Journal of bone and joint surgery British volume 1984;1984/11/01:666-71.
- Alnahdi AH, et al. Gait after unilateral total knee arthroplasty: frontal plane analysis. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2011;2011/03/26:647-52.
- Altman RD. Criteria for the classification of osteoarthritis of the knee and hip. Scandinavian journal of rheumatology Supplement 1987;1987/01/01:31-9.
- Altman RD, et al. Commentary: osteoarthritis of the knee and glucosamine. Osteoarthritis and Cartilage 2006;14:963-6.
- Amendola L, et al. Knee joint arthroplasty after tibial osteotomy. International orthopaedics 2010;34:289-95.
- Amin S, et al. Occupation-related squatting, kneeling, and heavy lifting and the knee joint: a magnetic resonance imaging-based study in men. The Journal of rheumatology 2008;2008/07/04:1645-9.

- Anchuela Ocana J, et al. Objective benefits of knee arthroplasty. Revista de Ortopedia y Traumatologia 1999;43:327-34.
- Anderson DD, et al. Implementation of discrete element analysis for subject-specific, population-wide investigations of habitual contact stress exposure. Journal of applied biomechanics 2010;26:215-23.
- Anderson DD, et al. Reliability of semiautomated computational methods for estimating tibiofemoral contact stress in the Multicenter Osteoarthritis Study. Computational and mathematical methods in medicine 2012;2012/10/26:767469.
- Anderson T, et al. Uncemented STAR total ankle prostheses. Three to eight-year follow-up of fifty-one consecutive ankles. The Journal of bone and joint surgery American volume 2003;2003/07/10:1321-9.
- Anderst WJ, et al. In vivo serial joint space measurements during dynamic loading in a canine model of osteoarthritis. Osteoarthritis and Cartilage 2005;13:808-16.
- Anderst WJ, et al. The association between velocity of the center of closest proximity on subchondral bones and osteoarthritis progression. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2009;2008/07/18:71-7.
- Andrews FJ. Retroperitoneal haematoma after paracetamol increased anticoagulation. Emergency Medicine Journal 2002;19:84-5.
- Andrews M, et al. Lower limb alignment and foot angle are related to stance phase knee adduction in normal subjects: A critical analysis of the reliability of gait analysis data. Journal of Orthopaedic Research 1996;14:289-95.
- Andriacchi TP. Dynamics of knee malalignment. Orthopedic Clinics of North America 1994;25:395-403.
- Andriacchi TP, et al. Methods for evaluating the progression of osteoarthritis. Journal of rehabilitation research and development 2000;2000/06/13:163-70.
- Andriacchi TP, et al. A framework for the in vivo pathomechanics of osteoarthritis at the knee. Annals of biomedical engineering 2004;2004/04/21:447-57.
- Andriacchi TP, et al. The role of ambulatory mechanics in the initiation and progression of knee osteoarthritis. Current opinion in rheumatology 2006;18:514-8.
- Andriacchi TP, et al. Rotational changes at the knee after ACL injury cause cartilage thinning. Clinical orthopaedics and related research 2006;2006/01/06:39-44.
- Andriacchi TP, et al. Gait mechanics influence healthy cartilage morphology and osteoarthritis of the knee. The Journal of bone and joint surgery American volume 2009;2009/02/21:95-101.
- Appelt CJ, et al. Arthritis-specific health beliefs related to aging among older male patients with knee and/or hip osteoarthritis. Journals of Gerontology - Series A Biological Sciences and Medical Sciences 2007;62:184-90.
- Appleton CTG, et al. Forced mobilization accelerates pathogenesis: Characterization of a preclinical surgical model of osteoarthritis. Arthritis Research and Therapy 2007;9.
- Argenson JN, et al. Long-term results with a lateral unicondylar replacement. Clinical orthopaedics and related research 2008;2008/06/25:2686-93.
- Argenson JNA, et al. Minimally invasive unicompartmental knee arthroplasty. The Knee 2004;11:341-7.
- Armagan O, et al. Inhalation therapy of calcitonin relieves osteoarthritis of the Knee. Journal of Korean Medical Science 2012;27:1405-10.
- Asay JL, et al. Adaptive patterns of movement during stair climbing in patients with knee osteoarthritis. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2009;2008/10/15:325-9.
- Ashraf T, et al. Symmetrical vs asymmetrical total knee replacement--a medium term comparative analysis. The Knee 2003;2003/03/22:61-6.
- Astephen JL, et al. Changes in frontal plane dynamics and the loading response phase of the gait cycle are characteristic of severe knee osteoarthritis application of a multidimensional analysis technique. Clinical Biomechanics 2005;20:209-17.
- Astephen JL, et al. Gait and neuromuscular pattern changes are associated with differences in knee osteoarthritis severity levels. Journal of biomechanics 2008;41:868-76.
- Astephen JL, et al. Biomechanical changes at the hip, knee, and ankle joints during gait are associated with knee osteoarthritis severity. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2008;2007/10/26:332-41.
- Astephen JL. Challenges in dealing with walking speed in knee osteoarthritis gait analyses. Clinical Biomechanics 2012;27:210-2.
- Azzoni R. Clinical results in treatment of osteoarthritis of the knee with intraarticular hyaluronic acid. Reumatismo 1994;46:74-80.
- Bae JY, et al. Biomechanical analysis of the effects of medial meniscectomy on degenerative osteoarthritis. Medical & biological engineering & computing 2012;2011/11/01:53-60.
- Baert IAC, et al. Gait characteristics and lower limb muscle strength in women with early and established knee osteoarthritis. Clinical Biomechanics 2013;28:40-7.
- Baier C, et al. Comparing navigation-based in vivo knee kinematics pre- and postoperatively between a cruciate-retaining and a cruciate-substituting implant. International orthopaedics 2013;2013/01/31:407-14.
- Baker-LePain JC, et al. Role of bone architecture and anatomy in osteoarthritis. Bone 2012;2012/03/10:197-203.
- Baker K, et al. A randomized crossover trial of a wedged insole for treatment of knee osteoarthritis. Arthritis and rheumatism 2007;56:1198-203.
- Baliunas AJ, et al. Increased knee joint loads during walking are present in subjects with knee osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2002;2002/07/20:573-9.

- Bamac B, et al. Evaluation of medial and lateral meniscus thicknesses in early osteoarthritis of the knee with magnetic resonance imaging. Saudi medical journal 2006;2006/06/08:854-7.
- Bargiotas K, et al. Arthrodesis of the knee with a long intramedullary nail following the failure of a total knee arthroplasty as the result of infection. Surgical technique. The Journal of bone and joint surgery American volume 2007;2007/03/03:103-10.
- Barker K, et al. Association between radiographic joint space narrowing, function, pain and muscle power in severe osteoarthritis of the knee. Clinical rehabilitation 2004;2004/12/03:793-800.
- Barrack RL, et al. Component rotation and anterior knee pain after total knee arthroplasty. Clinical orthopaedics and related research 2001;2001/11/22:46-55.
- Barrance PJ, et al. Do ACL-injured copers exhibit differences in knee kinematics?: An MRI study. Clinical orthopaedics and related research 2007;2006/11/09:74-80.
- Barrett WP, et al. Comparison of radiographic alignment of imageless computer-assisted surgery vs conventional instrumentation in primary total knee arthroplasty. Journal of Arthroplasty 2011;26:1273-84.
- Barrios J. Progression of dynamic knee loading at one year in medial knee osteoarthritis: the influence of baseline load... Combined Sections Meeting 2008: section on geriatrics poster and platform presentations. February 6-9, 2008, Nashville, TN. Journal of Geriatric Physical Therapy 2007;30:148-9.
- Barrios JA, et al. Dynamic Versus Radiographic Alignment in Relation to Medial Knee Loading in Symptomatic Osteoarthritis. Journal of applied biomechanics 2011;2011/11/16.
- Bartels EM, et al. Aquatic exercise for the treatment of knee and hip osteoarthritis. Cochrane database of systematic reviews (Online) 2007;2007/10/19:CD005523.
- Bastick AN. Incident knee osteoarthritis-related outcomes and slower walking speed: Comment on the article by Purser et al. Arthritis care & research 2012;64:1937-8.
- Baur W, et al. Proximal tibial osteotomy for osteoarthritis of the knee with varus deformity. Operative Orthopadie und Traumatologie 2005;17:326-44.
- Beary JF, III. Joint structure modification in osteoarthritis: development of SMOAD drugs. Current rheumatology reports 2001;2001/11/16:506-12.
- Beischer AD, et al. Functional outcome and gait analysis after triple or double arthrodesis. Foot & ankle international / American Orthopaedic Foot and Ankle Society [and] Swiss Foot and Ankle Society 1999;1999/10/06:545-53.
- Belcaro G, et al. Variations in C-reactive protein, plasma free radicals and fibrinogen values in patients with osteoarthritis treated with Pycnogenol. Redox report : communications in free radical research 2008;2008/11/20:271-6.
- Bellemans J, et al. Fluoroscopic analysis of the kinematics of deep flexion in total knee arthroplasty. Influence of posterior condylar offset. The Journal of bone and joint surgery British volume 2002;2002/02/12:50-3.
- Benedetti MG, et al. Is there a role for patellar and quadriceps tendons impairment on knee function during gait in patients who are obese?... Patellofemoral pain syndrome: proximal, distal, and local factors, an international research retreat, April 30-May 2, 2009, Fells Point, Baltimore, MD. Journal of orthopaedic and sports physical therapy 2010;40:A43-A44.
- Bennell KL, et al. The effects of hip muscle strengthening on knee load, pain, and function in people with knee osteoarthritis: a protocol for a randomised, single-blind controlled trial. BMC musculoskeletal disorders 2007;2007/12/11:121.
- Bennell KL, et al. Hip strengthening reduces symptoms but not knee load in people with medial knee osteoarthritis and varus malalignment: a randomised controlled trial. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2010;2010/02/24:621-8.
- Bennell KL, et al. Bone marrow lesions are related to dynamic knee loading in medial knee osteoarthritis. Annals of the rheumatic diseases 2010;69:1151-4.
- Bennell KL, et al. Comparison of neuromuscular and quadriceps strengthening exercise in the treatment of varus malaligned knees with medial knee osteoarthritis: a randomised controlled trial protocol. BMC musculoskeletal disorders 2011;2011/12/07:276.
- Bennell KL, et al. Higher dynamic medial knee load predicts greater cartilage loss over 12 months in medial knee osteoarthritis. Annals of the rheumatic diseases 2011;2011/07/12:1770-4.
- Bennell KL, et al. Effects of a modified shoe on knee load in people with and those without knee osteoarthritis. Arthritis and rheumatism 2013;2012/12/04:701-9.
- Bennemann M, et al. [Pathogenesis of knee osteoarthrist]. MMW Fortschritte der Medizin 2007;2007/08/24:25-7.
- Berning ET, et al. Thermal Damage and Tracker-Pin Track Infection in Computer-Navigated Total Knee Arthroplasty. Journal of Arthroplasty 2011;26:977.
- Berry PA, et al. The role of biomechanical factors on patellofemoral osteoarthritis. Current Rheumatology Reviews 2007;3:123-7.
- Beyaert C, et al. The effect of inturning of the foot on knee kinematics and kinetics in children with treated idiopathic clubfoot. Clinical Biomechanics 2003;18:670-6.
- Beyaert C, et al. The effect of tibio-talar arthrodesis on foot kinematics and ground reaction force progression during walking. Gait and Posture 2004;20:84-91.
- Beynnon BD, et al. Accelerated versus nonaccelerated rehabilitation after anterior cruciate ligament reconstruction: a prospective, randomized, double-blind investigation evaluating knee joint laxity using roentgen stereophotogrammetric analysis. The American journal of sports medicine 2011;2011/09/29:2536-48.

- Bhan S, et al. High valgus tibial osteotomy for osteoarthritis of the knee. International orthopaedics 1992;1992/01/01:13-7.
- Bierlaire JP, et al. Total knee arthroplasty with total condylar prosthesis. Acta orthopaedica Belgica 1990;56:569-75.
- Bijlsma JW, et al. Strategies for the prevention and management of osteoarthritis of the hip and knee. Best practice & research Clinical rheumatology 2007;2007/03/14:59-76.
- Bilgici A, et al. The influence of weight loss on symptomatic relief of knee osteoarthritis. Journal of Rheumatology and Medical Rehabilitation 2001;12:232-5.
- Birmingham TB, et al. Association among neuromuscular and anatomic measures for patients with knee osteoarthritis. Archives of physical medicine and rehabilitation 2001;2001/08/09:1115-8.
- Birmingham TB, et al. Medial opening wedge high tibial osteotomy: a prospective cohort study of gait, radiographic, and patient-reported outcomes. Arthritis and rheumatism 2009;2009/05/01:648-57.
- Bito H, et al. Opening wedge high tibial osteotomy affects both the lateral patellar tilt and patellar height. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2010;2010/03/11:955-60.
- Bizzini M, et al. Rehabilitation guidelines after total knee arthroplasty. Orthopade 2003;32:527-34.
- Blin O, et al. Quantitative analysis of walking in patients with knee osteoarthritis: A method of assessing the effectiveness of non-steroidal anti-inflammatory treatment. Annals of the rheumatic diseases 1990;49:990-3.
- Block JA, et al. The biomechanics of osteoarthritis: Implications for therapy. Current rheumatology reports 2009;11:15-22.
- Block JA, et al. Lower limb osteoarthritis: biomechanical alterations and implications for therapy. Current opinion in rheumatology 2010;2010/07/02:544-50.
- Bohannon RW, et al. Distribution and progression of muscle weakness in two cases of polymyositis. Isokinetics and Exercise Science 2012;20:1-4.
- Bolog N, et al. MR imaging of the posterolateral corner of the knee. Skeletal radiology 2007;2007/03/06:715-28.
- Bonnet CS, et al. AMPA/kainate glutamate receptors contribute to inflammation, degeneration and pain related behaviour in inflammatory stages of arthritis. Annals of the rheumatic diseases 2013;2013/10/17.
- Boocock M, et al. The short-term effects of running on the deformation of knee articular cartilage and its relationship to biomechanical loads at the knee. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2009;2009/02/28:883-90.
- Borotikar BS, et al. A methodology to accurately quantify patellofemoral cartilage contact kinematics by combining 3D image shape registration and cine-PC MRI velocity data. Journal of biomechanics 2012;2012/01/31:1117-22.
- Borotikar BS, et al. In vivo patellofemoral contact mechanics during active extension using a novel dynamic MRI-based methodology. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2013;2013/09/10.
- Bourne RB, et al. Resurfacing versus not resurfacing the patella during total knee replacement. Clinical orthopaedics and related research 1995;156-61.
- Bowditch M, et al. Successful two-stage revision of a KineSpringÂ® joint unloading implant: A case study. International Medical Case Reports Journal 2012;5:91-5.
- Boyer KA, et al. Gender differences exist in the hip joint moments of healthy older walkers. Journal of biomechanics 2008;41:3360-5.
- Boyer KA, et al. Sensitivity of gait parameters to the effects of anti-inflammatory and opioid treatments in knee osteoarthritis patients. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2012;2011/12/20:1118-24.
- Bradbury N, et al. Participation in sports after total knee replacement. American Journal of Sports Medicine 1998;26:530-5.
- Braham R, et al. The effect of glucosamine supplementation on people experiencing regular knee pain... including commentary by McNaughton L. British journal of sports medicine 2003;37:45-9.
- Brakke R, et al. Physical Therapy in Persons With Osteoarthritis. PM and R 2012;4:S53-S58.
- Brandon SCE, et al. Robust features of knee osteoarthritis in joint moments are independent of reference frame selection. Clinical Biomechanics 2011;26:65-70.
- Brandt KD, et al. Anterior (cranial) cruciate ligament transection in the dog: a bona fide model of osteoarthritis, not merely of cartilage injury and repair. The Journal of rheumatology 1991;1991/03/01:436-46.
- Brandt KD, et al. Hyaluronan injection affects neither osteoarthritis progression nor loading of the OA knee in dogs. Biorheology 2004;2004/08/10:493-502.
- Brennan SL, et al. Women lose patella cartilage at a faster rate than men: a 4.5-year cohort study of subjects with knee OA. Maturitas 2010;2010/08/17:270-4.
- Brennan SL, et al. Bone mineral density is cross sectionally associated with cartilage volume in healthy, asymptomatic adult females: Geelong Osteoporosis Study. Bone 2011;2011/07/05:839-44.
- Briem K, et al. Effects of the amount of valgus correction for medial compartment knee osteoarthritis on clinical outcome, knee kinetics and muscle co-contraction after opening wedge high tibial osteotomy. Journal of Orthopaedic Research 2007;25:311-8.
- Briem K, et al. Proximal gait adaptations in medial knee OA. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2009;2008/07/18:78-83.
- Briem K, et al. Medial knee joint loading increases in those who respond to hyaluronan injection for medial knee osteoarthritis. Journal of Orthopaedic Research 2009;27:1420-5.

- Brinkman J, et al. Osteotomies around the knee: patient selection, stability of fixation and bone healing in high tibial osteotomies. Journal of Bone and Joint Surgery 2008;90B:1548-57.
- Brouwer RW, et al. Braces and orthoses for treating osteoarthritis of the knee. Cochrane database of systematic reviews (Online) 2005;2005/01/28:CD004020.
- Brouwer RW, et al. Osteotomy for medial compartment arthritis of the knee using a closing wedge or an opening wedge controlled by a Puddu plate: A ONE-YEAR RANDOMISED, CONTROLLED STUDY. Journal of Bone and Joint Surgery 2006;88B:1454-9.
- Brown GA, et al. Radiographic Evaluation and Preoperative Planning for High Tibial Osteotomies. Operative Techniques in Sports Medicine 2012;20:93-102.
- Bruce-Brand RA, et al. Effects of home-based resistance training and neuromuscular electrical stimulation in knee osteoarthritis: A randomized controlled trial. BMC musculoskeletal disorders 2012;13.
- Brugioni DJ, et al. A functional and radiographic analysis of the total condylar knee arthroplasty. The Journal of arthroplasty 1990;1990/06/01:173-80.
- Bruni D, et al. Minimally invasive unicompartmental knee replacement: retrospective clinical and radiographic evaluation of 83 patients. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2010;2009/09/19:710-7.
- Bruyere O, et al. Glucosamine and chondroitin sulfate as therapeutic agents for knee and hip osteoarthritis. Drugs & aging 2007;2007/07/31:573-80.
- Buckland-Wright C. Subchondral bone changes in hand and knee osteoarthritis detected by radiography. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2004;2003/12/31:S10-S19.
- Burger C, et al. The sheep as a knee osteoarthritis model: early cartilage changes after meniscus injury and repair. Laboratory animals 2007;2007/11/09:420-31.
- Burns R, et al. Differences of self-reported osteoarthritis disability and race. Journal of the National Medical Association 2007;2007/10/05:1046-51.
- Butler RJ, et al. The effect of a subject-specific amount of lateral wedge on knee mechanics in patients with medial knee osteoarthritis. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2007;2007/05/01:1121-7.
- Butler RJ, et al. Gait mechanics after ACL reconstruction: implications for the early onset of knee osteoarthritis. British journal of sports medicine 2009;2008/12/02:366-70.
- Caborn DNM, et al. The natural history of the anterior cruciate ligament-deficient knee: A review. Clinics in Sports Medicine 1993;12:625-36.
- Cahue S, et al. Varus-valgus alignment in the progression of patellofemoral osteoarthritis. Arthritis and rheumatism 2004;50:2184-90.
- Cake MA, et al. The nitric oxide donor glyceryl trinitrate increases subchondral bone sclerosis and cartilage degeneration following ovine meniscectomy. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2004;2004/11/27:974-81.
- Cameron M, et al. The natural history of the anterior cruciate ligament-deficient knee. Changes in synovial fluid cytokine and keratan sulfate concentrations. The American journal of sports medicine 1997;1997/12/16:751-4.
- Carbone LD, et al. Assistive Walking Device Use and Knee Osteoarthritis: the Health, Aging, and Body Composition Study (Health ABC Study). Archives of physical medicine and rehabilitation 2012;2012/10/09.
- Cartier P, et al. Clinical and radiographic evaluation of modular knee replacement. A review of 95 cases. International orthopaedics 1982;1982/01/01:35-44.
- Catani F, et al. In vivo kinematics and kinetics of a bi-cruciate substituting total knee arthroplasty: a combined fluoroscopic and gait analysis study. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2009;2009/07/03:1569-75.
- Catani F, et al. The Mark Coventry Award: Articular contact estimation in TKA using in vivo kinematics and finite element analysis. Clinical orthopaedics and related research 2010;2009/06/24:19-28.
- Celiker R. Current treatment approaches for osteoarthritis in the elderly. Turkiye Fiziksel Tip ve Rehabilitasyon Dergisi 2009;55:75-9.
- Cetin N, et al. Comparing hot pack, short-wave diathermy, ultrasound, and TENS on isokinetic strength, pain, and functional status of women with osteoarthritic knees: a single-blind, randomized, controlled trial. American Journal of Physical Medicine & Rehabilitation 2008;87:443-51.
- Chang A, et al. Thrust during ambulation and the progression of knee osteoarthritis. Arthritis and rheumatism 2004;2004/12/14:3897-903.
- Chang A, et al. Hip abduction moment and protection against medial tibiofemoral osteoarthritis progression. Arthritis and rheumatism 2005;2005/10/29:3515-9.
- Chang A, et al. The relationship between toe-out angle during gait and progression of medial tibiofemoral osteoarthritis. Annals of the rheumatic diseases 2007;2007/02/03:1271-5.
- Chang A, et al. Frequency of varus and valgus thrust and factors associated with thrust presence in persons with or at higher risk of developing knee osteoarthritis. Arthritis and rheumatism 2010;62:1403-11.
- Chang AH, et al. TOE-OUT ANGLE DURING GAIT AND PROTECTION AGAINST PROGRESSION OF MEDIAL TIBIOFEMORAL KNEE OSTEOARTHRITIS. (Abstract). Journal of orthopaedic and sports physical therapy 2005;35:A21.
- Chang AH, et al. THE HIP ABDUCTION MOMENT AND PROGRESSION OF KNEE OSTEOARTHRITIS. (Abstract). Journal of orthopaedic and sports physical therapy 2005;35:A2.
- Chang AH, et al. Varus thrust and knee frontal plane dynamic motion in persons with knee osteoarthritis. Osteoarthritis and Cartilage 2013;21:1668-73.

- Chang CW, et al. Kinematic navigation in total knee replacement--experience from the first 50 cases. Journal of the Formosan Medical Association = Taiwan yi zhi 2006;2006/06/28:468-74.
- Chang QZ, et al. Alternation of trunk movement after arthroplasty in patients with osteoarthritis of the knee. Journal of orthopaedic science : official journal of the Japanese Orthopaedic Association 2011;2011/05/10:382-8.
- Chantarapanich N, et al. A finite element study of stress distributions in normal and osteoarthritic knee joints. Journal of the Medical Association of Thailand = Chotmaihet thangphaet 2009;2010/02/04:S97-103.
- Chao EY, et al. Computer-aided preoperative planning in knee osteotomy. The Iowa orthopaedic journal 1995;1995/01/01:4-18.
- Chaudhari AMW, et al. Knee kinematics, cartilage morphology, and osteoarthritis after ACL injury. Medicine and science in sports and exercise 2008;40:215-22.
- Chautems R, et al. [Bifocal avulsion of the patellar tendon in an adult: a case report]. Revue de chirurgie orthopedique et reparatrice de l'appareil moteur 2001;2001/06/30:388-91.
- Cheng CK, et al. Surgery simulation analysis of anterior advancement of the tibial tuberosity. Clinical biomechanics (Bristol, Avon) 1995;1995/04/01:115-21.
- Chevalier X. Early diagnosis of knee osteoarthritis. Revue du Praticien 2009;59:1243-5+1248.
- Childs JD, et al. Alterations in lower extremity movement and muscle activation patterns in individuals with knee osteoarthritis. Clinical Biomechanics 2004;19:44-9.
- Cho TJ, et al. TRPV4-pathy manifesting both skeletal dysplasia and peripheral neuropathy: A report of three patients. American Journal of Medical Genetics, Part A 2012;158 A:795-802.
- Choi JA, et al. MR imaging of articular cartilage physiology. Magnetic resonance imaging clinics of North America 2011;2011/06/15:249-82.
- Chotanaphuti T, et al. The rotational axis of the tibia and relationship to the tibial torsion in varus osteoarthritic knee. Journal of the Medical Association of Thailand = Chotmaihet thangphaet 2012;2013/03/05:S6-11.
- Chotivichit AL, et al. Total knee arthroplasty using the total condylar III knee prosthesis. Journal of Arthroplasty 1991;6:341-50.
- Chouteau J, et al. Kinematics of a cementless mobile bearing posterior cruciate ligament-retaining total knee arthroplasty. The Knee 2009;2008/12/17:223-7.
- Chu LX, et al. [Biomechanical and morphological measurement and analysis of roentgenograph for knee osteoarthritis patients]. Zhong xi yi jie he xue bao = Journal of Chinese integrative medicine 2004;2004/11/13:432-4.
- Chung BJ, et al. Differences between sagittal femoral mechanical and distal reference axes should be considered in navigated TKA. Clinical orthopaedics and related research 2009;2009/02/27:2403-13.
- Cibere J, et al. Reliability of the knee examination in osteoarthritis: effect of standardization. Arthritis and rheumatism 2004;2004/02/12:458-68.
- Cibere J, et al. Association of clinical findings with pre-radiographic and radiographic knee osteoarthritis in a population-based study. Arthritis care & research 2010;2010/07/29:1691-8.
- Clarke JV, et al. Non-invasive computer-assisted measurement of knee alignment. Computer aided surgery : official journal of the International Society for Computer Aided Surgery 2012;2011/12/02:29-39.
- Clayton ML, et al. Correction of alignment deformities during total knee arthroplasties: staged soft-tissue releases. Clinical orthopaedics and related research 1986;1986/01/01:117-24.
- Clockaerts S, et al. Statin use is associated with reduced incidence and progression of knee osteoarthritis in the Rotterdam study. Annals of the rheumatic diseases 2012;2011/10/13:642-7.
- Coggon D, et al. Occupational physical activities and osteoarthritis of the knee. Arthritis Rheum 2000;43:1443-9.
- Cohen ZA, et al. Computer simulations of patellofemoral joint surgery: patient-specific models for tuberosity transfer. The American journal of sports medicine 2003;31:87-98.
- Colbert CJ, et al. Knee confidence as it relates to physical function outcome in persons with or at high risk of knee osteoarthritis in the osteoarthritis initiative. Arthritis and rheumatism 2012;64:1437-46.
- Cole BJ, et al. Degenerative arthritis of the knee in active patients: evaluation and management. The Journal of the American Academy of Orthopaedic Surgeons 1999;2001/08/17:389-402.
- Cole BJ, et al. Use of a lateral offset short-leg walking cast before high tibial osteotomy. Clinical orthopaedics and related research 2003;408:209-17.
- Collier MB, et al. Patient, implant, and alignment factors associated with revision of medial compartment unicondylar arthroplasty. The Journal of arthroplasty 2006;2006/09/05:108-15.
- Collins A, et al. The impact of stochastic resonance electrical stimulation and knee sleeve on impulsive loading and muscle co-contraction during gait in knee osteoarthritis. Clinical Biomechanics 2011;26:853-8.
- Collins B, et al. A case series of lateral opening wedge high tibial osteotomy for valgus malalignment. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2012;2012/06/19.
- Conesa X, et al. Stress fracture of the femoral neck as a complication of total arthroplasty of the knee: Clinical case and literature review. Current Orthopaedic Practice 2012;23:158-62.

- Confalonieri N, et al. Mini-invasive computer assisted bi-unicompartimental knee replacement. The international journal of medical robotics + computer assisted surgery : MRCAS 2005;2007/05/24:45-50.
- Conroy MB, et al. Muscle strength, mass, and quality in older men and women with knee osteoarthritis. Arthritis care & research 2012;2012/01/04:15-21.
- Conrozier T, et al. Early effect of hyaluronic acid intra-articular injections on serum and urine biomarkers in patients with knee osteoarthritis: An open-label observational prospective study. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2012;2011/10/26:679-85.
- Cooke TD, et al. Analysis of limb alignment in the pathogenesis of osteoarthritis: a comparison of Saudi Arabian and Canadian cases. Rheumatology international 2002;2002/08/13:160-4.
- Cooke TDV, et al. Axial alignment of the lower limb and its association with disorders of the knee. Operative Techniques in Sports Medicine 2000;8:98-107.
- Cooper C, et al. Mechanical and constitutional risk factors for symptomatic knee osteoarthritis: differences between medial tibiofemoral and patellofemoral disease. The Journal of rheumatology 1994;1994/02/01:307-13.
- Cordier W. Slipped capital femoral epiphysis. Padiatrische Praxis 2006;69:327-37.
- Coughlin KM, et al. In vivo loads in the medial compartment of the rabbit knee. Clinical biomechanics (Bristol, Avon) 2005;2005/08/16:1007-9.
- Crawford C, et al. Anatomic double bundle ACL reconstruction: a literature review. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2007;2007/05/31:946-64.
- Crawford JR, et al. Total knee arthroplasty in a below-knee amputee. Journal of Arthroplasty 2003;18:662-5.
- Creaby MW, et al. Varus-valgus laxity and passive stiffness in medial knee osteoarthritis. Arthritis care & research 2010;2010/05/28:1237-43.
- Creaby MW, et al. Dynamic knee loading is related to cartilage defects and tibial plateau bone area in medial knee osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2010;2010/09/08:1380-5.
- Creaby MW, et al. Insole effects on impact loading during walking. ergonomics 2011;54:665-71.
- Creaby MW, et al. Gait differs between unilateral and bilateral knee osteoarthritis. Archives of physical medicine and rehabilitation 2012;2012/03/06:822-7.
- Creamer P, et al. Determinants of pain severity in knee osteoarthritis: effect of demographic and psychosocial variables using 3 pain measures. The Journal of rheumatology 1999;1999/08/18:1785-92.
- Crema MD, et al. Peripatellar synovitis: comparison between non-contrast-enhanced and contrast-enhanced MRI and association with pain. The MOST study. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2013;2013/01/02:413-8.
- Crossley KM, et al. Altered hip muscle forces during gait in people with patellofemoral osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2012;2012/08/14:1243-9.
- Cubukcu D, et al. Hylan G-F 20 efficacy on articular cartilage quality in patients with knee osteoarthritis: clinical and MRI assessment. Clinical rheumatology 2005;2004/12/16:336-41.
- Curkovic M, et al. Proximal tibial stress frac ture associated with mild osteoar thritis of the knee: Ca se report. Acta Clinica Croatica 2011;50:107-11.
- D'Lima DD, et al. The Mark Coventry award: In vivo knee forces during recreation and exercise after knee arthroplasty. Clinical orthopaedics and related research 2008;466:2605-11.
- Daans M, et al. GDF5 deficiency in mice is associated with instability-driven joint damage, gait and subchondral bone changes. Annals of the rheumatic diseases 2011;70:208-13.
- Daniilidis K, et al. Highly conforming polyethylene inlays reduce the in vivo variability of knee joint kinematics after total knee arthroplasty. The Knee 2012;2011/05/13:260-5.
- De Carlo M, et al. Rehabilitation of the Knee Following Sports Injury. Clinics in Sports Medicine 2010;29:81-106.
- Deakin AH, et al. Natural distribution of the femoral mechanical-anatomical angle in an osteoarthritic population and its relevance to total knee arthroplasty. The Knee 2012;2011/03/01:120-3.
- Debi R, et al. Correlation between single limb support phase and self-evaluation questionnaires in knee osteoarthritis populations. Disability and rehabilitation 2011;2011/01/07:1103-9.
- DeFrate LE, et al. The 6 degrees of freedom kinematics of the knee after anterior cruciate ligament deficiency: an in vivo imaging analysis. The American journal of sports medicine 2006;2006/04/26:1240-6.
- DellaMaggiora R, et al. Osteochondritis Dissecans of the Adult Knee. Operative Techniques in Sports Medicine 2008;16:65-9.
- Deluzio KJ. MECHANICAL FACTORS OF KNEE OSTEOARTHRITIS DETECTED THROUGH GAIT ANALYSIS. (Abstract). In Canadian Society for Biomechanics, Proceedings, 13th Biennial Conference, Canadian Society for Biomechanics, Halifax Aug 4-7 2004, Nova Scotia, Canadian Institutes of Health Research, 2004, p.146.Canada: 2004.
- Dempsey AR, et al. The relationship between patellofemoral and tibiofemoral morphology and gait biomechanics following arthroscopic partial medial meniscectomy. Knee Surgery, Sports Traumatology, Arthroscopy 2013;21:1097-103.
- Deneweth JM, et al. Tibiofemoral joint kinematics of the anterior cruciate ligament-reconstructed knee during a single-legged hop landing. The American journal of sports medicine 2010;2010/05/18:1820-8.

- Dennis DA, et al. Gap balancing versus measured resection technique for total knee arthroplasty. Clinical orthopaedics and related research 2010;2009/10/01:102-7.
- Derek T, et al. Radiographic grading for knee osteoarthritis. A revised scheme that relates to alignment and deformity. The Journal of rheumatology 1999;1999/03/25:641-4.
- Desmeules F, et al. Waiting for total knee replacement surgery: factors associated with pain, stiffness, function and quality of life. BMC musculoskeletal disorders 2009;2009/05/22:52.
- Dieppe P, et al. The Bristol 'OA500 study': Progression and impact of the disease after 8 years. Osteoarthritis and Cartilage 2000;8:63-8.
- Dieppe PA, et al. The Bristol 'OA500' study: progression of osteoarthritis (OA) over 3 years and the relationship between clinical and radiographic changes at the knee joint. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 1997;1997/03/01:87-97.
- Dieppe PA, et al. Pathogenesis and management of pain in osteoarthritis. Lancet 2005;365:965-73.
- Dillon CF, et al. Prevalence of knee osteoarthritis in the United States: arthritis data from the Third National Health and Nutrition Examination Survey 1991-94. The Journal of rheumatology 2006;2006/10/03:2271-9.
- Doral MN, et al. Meniscectomy. Techniques in Knee Surgery 2010;9:150-8.
- Doschak MR, et al. Antiresorptive therapy conserves some periarticular bone and ligament mechanical properties after anterior cruciate ligament disruption in the rabbit knee. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2004;2004/08/12:942-8.
- Dossett HG, et al. Kinematically versus mechanically aligned total knee arthroplasty. Orthopedics 2012;2012/02/09:e160-e169.
- Dowling AV, et al. Gait modification via verbal instruction and an active feedback system to reduce peak knee adduction moment. Journal of biomechanical engineering 2010;132.
- Draganich L, et al. The effectiveness of self-adjustable custom and off-the-shelf bracing in the treatment of varus gonarthrosis. The Journal of bone and joint surgery American volume 2006;2006/12/05:2645-52.
- Dretakis EK, et al. Cervical hip fractures do not occur in arthrotic joints: A clinicoradiographic study of 256 patients. Acta Orthopaedica Scandinavica 1998;69:384-6.
- Duncan CP. Fusion takedown: Can be a letdown. Orthopedics 2007;30:758-9.
- Dunlop DD, et al. Moving to Maintain Function in Knee Osteoarthritis: Evidence From the Osteoarthritis Initiative. Archives of physical medicine and rehabilitation 2010;91:714-21.
- Durmus D, et al. Assessment of the effect of glucosamine sulfate and exercise on knee cartilage using magnetic resonance imaging in patients with knee osteoarthritis: A randomized controlled clinical trial. J Back Musculoskelet Rehabil 2012;25:275-84.
- Dutoit M. Percutaneous partial epiphysiodesis for persistent adolescent genu valgum. Revue de chirurgie orthopedique et reparatrice de l'appareil moteur 1998;84:623-7.
- Ebert JR, et al. Traditional vs accelerated approaches to post-operative rehabilitation following matrix-induced autologous chondrocyte implantation (MACI): comparison of clinical, biomechanical and radiographic outcomes. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2008;2008/04/25:1131-40.
- Ebert JR, et al. A randomized trial comparing accelerated and traditional approaches to postoperative weightbearing rehabilitation after matrix-induced autologous chondrocyte implantation: Findings at 5 years. American Journal of Sports Medicine 2012;40:1527-37.
- Ebert JR, et al. Factors predictive of outcome 5 years after matrix-induced autologous chondrocyte implantation in the tibiofemoral joint. The American journal of sports medicine 2013;2013/04/27:1245-54.
- Eckhoff DG, et al. Location of the femoral sulcus in the osteoarthritic knee. The Journal of arthroplasty 1996;1996/02/01:163-5.
- Eckstein F, et al. In vivo cartilage deformation after different types of activity and its dependence on physical training status. Annals of the rheumatic diseases 2005;2005/01/14:291-5.
- Eckstein F, et al. Patterns of femorotibial cartilage loss in knees with neutral, varus, and valgus alignment. Arthritis and rheumatism 2008;2008/11/01:1563-70.
- Edwards DJ, et al. Radiographic changes in the knee after meniscal transplantation. An experimental study in a sheep model. The American journal of sports medicine 1996;1996/03/01:222-6.
- Edwards PK, et al. Accelerated weightbearing rehabilitation after matrix-induced autologous chondrocyte implantation in the tibiofemoral joint: early clinical and radiological outcomes. The American journal of sports medicine 2013;2013/07/25:2314-24.
- Egloff C, et al. Biomechanics and pathomechanisms of osteoarthritis. Swiss medical weekly 2012;2012/07/21:w13583.
- Ehlinger M, et al. Reliability of locked plating in tibial plateau fractures with a medial component. Orthopaedics & traumatology, surgery & research : OTSR 2012;2012/02/22:173-9.
- Eitzen I, et al. Sagittal plane gait characteristics in hip osteoarthritis patients with mild to moderate symptoms compared to healthy controls: a cross-sectional study. BMC musculoskeletal disorders 2012;2012/12/22:258.
- El Amrani MH, et al. Patellar height relevance in opening-wedge high tibial osteotomy. Orthopaedics & traumatology, surgery & research : OTSR 2010;2010/02/23:37-43.
- Elahi S, et al. The association between varus-valgus alignment and patellofemoral osteoarthritis. Arthritis and rheumatism 2000;2000/08/16:1874-80.
- Elbaz A, et al. Can single limb support objectively assess the functional severity of knee osteoarthritis? The Knee 2012;2011/01/29:32-5.

- Emadedin M, et al. Intra-articular injection of autologous mesenchymal stem cells in six patients with knee osteoarthritis. Archives of Iranian medicine 2012;2012/06/26:422-8.
- Englund M, et al. Risk factors for symptomatic knee osteoarthritis fifteen to twenty-two years after meniscectomy. Arthritis and rheumatism 2004;2004/10/01:2811-9.
- Englund M. Meniscal tear--a feature of osteoarthritis. Acta orthopaedica Scandinavica Supplementum 2004;2004/06/11:1-45, backcover.
- Englund M. The role of biomechanics in the initiation and progression of OA of the knee. Best practice & research Clinical rheumatology 2010;2010/02/05:39-46.
- Erhart-Hledik JC, et al. A relationship between mechanically-induced changes in serum cartilage oligomeric matrix protein (COMP) and changes in cartilage thickness after 5 years. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2012;2012/08/08:1309-15.
- Erhart JC, et al. A variable-stiffness shoe lowers the knee adduction moment in subjects with symptoms of medial compartment knee osteoarthritis. Journal of biomechanics 2008;41:2720-5.
- Erhart JC, et al. Changes in knee adduction moment, pain, and functionality with a variable-stiffness walking shoe after 6 months. Journal of Orthopaedic Research 2010;28:873-9.
- Ersoz M, et al. Relationship between knee range of motion and Kellgren-Lawrence radiographic scores in knee osteoarthritis. American Journal of Physical Medicine and Rehabilitation 2003;82:110.
- Eser F, et al. Comparison of efficacy of hyaluronic acid and rofecoxib in the treatment of patients with Gonarthrosis. Turkiye Fiziksel Tip ve Rehabilitasyon Dergisi 2003;49:28-9.
- Eskelinen EV, et al. Canine total knee replacement performed due to osteoarthritis subsequent to distal femur fracture osteosynthesis. Two-year objective outcome. Veterinary and comparative orthopaedics and traumatology : V C O T 2012;2012/06/15:427-32.
- Esser S, et al. Effects of exercise and physical activity on knee osteoarthritis. Current Pain and Headache Reports 2011;15:423-30.
- Ettinger WH, Jr., et al. A randomized trial comparing aerobic exercise and resistance exercise with a health education program in older adults with knee osteoarthritis. The Fitness Arthritis and Seniors Trial (FAST). JAMA : the journal of the American Medical Association 1997;1997/01/01:25-31.
- Evcik D, et al. [Relationship between the mechanical and anatomic axis and orientation angles of the knee joint and functional capacity of patients with osteoarthritis]. Acta orthopaedica et traumatologica turcica 2006;2006/05/02:38-43.
- Falah M, et al. Treatment of articular cartilage lesions of the knee. International orthopaedics 2010;2010/02/18:621-30.
- Fantini Pagani CH, et al. The effect of valgus bracing on the knee adduction moment during gait and running in male subjects with varus alignment. Clinical Biomechanics 2010;25:70-6.
- Fantini Pagani CH, et al. Short-term effects of a dedicated knee orthosis on knee adduction moment, pain, and function in patients with osteoarthritis. Archives of physical medicine and rehabilitation 2010;91:1936-41.
- Fantini Pagani CH, et al. Influence of a valgus knee brace on muscle activation and co-contraction in patients with medial knee osteoarthritis. Journal of electromyography and kinesiology : official journal of the International Society of Electrophysiological Kinesiology 2013;2012/11/13:490-500.
- Farquhar S, et al. Frontal plane knee motion during stair climbing has implications for osteoarthritic progression in the nonoperated knee after unilateral total knee arthroplasty... 2010 Combined Sections Meeting (CSM), San Diego, California, February 17-20, 2010. Journal of Orthopaedic & Sports Physical Therapy 2010;40:A27.
- Farrokhi S, et al. Are the kinematics of the knee joint altered during the loading response phase of gait in individuals with concurrent knee osteoarthritis and complaints of joint instability? A dynamic stereo X-ray study. Clinical biomechanics (Bristol, Avon) 2012;2011/11/11:384-9.
- Farrokhi S, et al. A Biomechanical Perspective on Physical Therapy Management of Knee Osteoarthritis. J Orthop Sports Phys Ther 2013;43:600-19.
- Felson DT, et al. Osteophytes and progression of knee osteoarthritis. Rheumatology (Oxford, England) 2005;2004/09/24:100-4.
- Felson DT. Osteoarthritis of the knee. New England Journal of Medicine 2006;354:841-8.
- Felson DT, et al. Effect of recreational physical activities on the development of knee osteoarthritis in older adults of different weights: The Framingham study. Arthritis Care and Research 2007;57:6-12.
- Fisher NM. Muscle rehabilitation of patients with osteoarthritis of the knees. 1992. Eugene, Ore.; United States, Microform Publications, College of Human Development and Performance, University of Oregon.
  Ref Type: Generic
- Fitz W, et al. Does a modified gap-balancing technique result in medial-pivot knee kinematics in cruciate-retaining total knee arthroplasty? A pilot study. Clinical orthopaedics and related research 2012;2011/10/11:91-8.
- Fontbote RC, et al. [Rosenberg projection for the radiological diagnosis of knee osteoarthritis]. Revista medica de Chile 2008;2008/10/25:880-4.
- Foroughi N, et al. The association of external knee adduction moment with biomechanical variables in osteoarthritis: A systematic review. The Knee 2009;16:303-9.
- Foroughi N, et al. Progressive resistance training and dynamic alignment in osteoarthritis: A single-blind randomised controlled trial. Clinical Biomechanics 2011;26:71-7.
- Foucher KC, et al. Contralateral hip and knee gait biomechanics are unchanged by total hip replacement for unilateral hip osteoarthritis. Gait & posture 2012;35:61-5.

- Foucher KC, et al. Does hip implant positioning affect the peak external adduction moments of the healthy knees of subjects with total hip replacements? j orthop res 2013;31:1187-94.
- Frank W, et al. [The total x-ray-picture in the planning of correction-osteotomy-operations on legs (author's transl)]. Zeitschrift fur Orthopadie und ihre Grenzgebiete 1974;1974/04/01:344-7.
- Franz JR, et al. The Influence of arch supports on knee torques relevant to knee osteoarthritis. Medicine and science in sports and exercise 2008;40:913-7.
- Freedman Silvernail J, et al. The influence of body mass index and velocity on knee biomechanics during walking. Gait & posture 2013;37:575-9.
- Fregly BJ, et al. Design of patient-specific gait modifications for knee osteoarthritis rhabilitation. IEEE Transactions on Biomedical Engineering 2007;54:1687-95.
- Fregly BJ, et al. Evaluation of a patient-specific cost function to predict the influence of foot path on the knee adduction torque during gait. Computer Methods in Biomechanics and Biomedical Engineering 2008;11:63-71.
- Freiling D, et al. [The medial closed-wedge osteotomy of the distal femur for the treatment of unicompartmental lateral osteoarthritis of the knee]. Operative Orthopadie und Traumatologie 2010;2010/08/03:317-34.
- Frost-Christensen LN, et al. Degeneration, inflammation, regeneration, and pain/disability in dogs following destabilization or articular cartilage grooving of the stifle joint. Osteoarthritis and Cartilage 2008;16:1327-35.
- Fuchs S, et al. Proprioception with bicondylar sledge prostheses retaining cruciate ligaments. Clinical orthopaedics and related research 2003;148-54.
- Fujioka H, et al. Stress fracture of the fifth metatarsal bone as a late complication of total knee arthroplasty. Kobe Journal of Medical Sciences 2009;55:E93-E97.
- Fujita T, et al. Analgesic effect of etidronate on degenerative joint disease. Journal of bone and mineral metabolism 2001;2001/07/13:251-6.
- Fukagawa S, et al. Anterior border of the tibia as a landmark for extramedullary alignment guide in total knee arthroplasty for varus knees. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2011;2011/01/25:919-24.
- Furman BD, et al. Tibial post wear in posterior-stabilized knee replacements is design-dependent. Clinical orthopaedics and related research 2008;466:2650-5.
- Gaasbeek R, et al. The influence of open and closed high tibial osteotomy on dynamic patellar tracking: a biomechanical study. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2007;2007/05/08:978-84.
- Gadeyne S, et al. [Results of self-centering patellofemoral prosthesis: a retrospective study of 57 implants]. Revue de chirurgie orthopedique et reparatrice de l'appareil moteur 2008;2008/05/06:228-40.
- Gajre SS, et al. Novel method of using dynamic electrical impedance signals for noninvasive diagnosis of knee osteoarthritis. Conference proceedings : Annual International Conference of the IEEE Engineering in Medicine and Biology Society IEEE Engineering in Medicine and Biology Society Conference 2006;2007/10/20:2207-10.
- Gajre SS, et al. Electrical impedance signal analysis in assessing the possibility of non-invasive diagnosis of knee osteoarthritis. Journal of medical engineering & technology 2007;2007/06/15:288-99.
- Gandhi R, et al. Bilateral non-union of high tibial osteotomies treated by total knee arthroplasty: a case report. The Knee 2008;2008/02/29:242-5.
- Gao B, et al. Three-dimensional joint kinematics of ACL-deficient and ACL-reconstructed knees during stair ascent and descent. Human Movement Science 2012;31:222-35.
- Gaudreault N, et al. Effects of physiotherapy treatment on knee osteoarthritis gait data using principal component analysis. Clinical Biomechanics 2011;26:284-91.
- Gebhard F, et al. [Computer-assisted knee surgery, what can we expect?]. Zentralblatt fur Chirurgie 2005;2005/08/17:321-6.
- Geenen R, et al. Psychological management of osteoarthritic pain. Osteoarthritis and Cartilage 2010;18:873-5.
- Gelber AC. Exercise and osteoarthritis: Not necessarily an all-or-nothing proposition! Journal of Rheumatology 2012;39:672-4.
- Georgoulis AD, et al. Three-dimensional tibiofemoral kinematics of the anterior cruciate ligament-deficient and reconstructed knee during walking. American Journal of Sports Medicine 2003;31:75-9.
- Gerus P, et al. Subject-specific knee joint geometry improves predictions of medial tibiofemoral contact forces. Journal of biomechanics 2013.
- Getgood A, et al. Short-term safety and efficacy of a novel high tibial osteotomy system: a case controlled study. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2013;2011/10/19:260-9.
- Ghosh P, et al. The effects of intraarticular administration of hyaluronan in a model of early osteoarthritis in sheep. I. Gait analysis and radiological and morphological studies. Seminars in arthritis and rheumatism 1993;1993/06/01:18-30.
- Gil AB. The association between lower extremity movement patterns and physical function in people with knee osteoarthitis University of Pittsburgh; 2010.
- Gillam MH, et al. The progression of end-stage osteoarthritis: analysis of data from the Australian and Norwegian joint replacement registries using a multi-state model. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2013;2013/01/01:405-12.
- Gillette RL, et al. Recent developments in canine locomotor analysis: A review. Veterinary Journal 2008;178:165-76.
- Gillies RM, et al. Adaptive bone remodelling of all polyethylene unicompartmental tibial bearings. ANZ journal of surgery 2007;2007/02/14:69-72.

- Glimet T. Natural history of femorotibial osteoarthritis. Annales de Radiologie 1993;36:220-4.
- Godfrey JR. Toward optimal health: D. Casey Kerrigan, M.D., discusses the impact of footwear on the progression of osteoarthritis in women. Journal of Women's Health 2006;15:894-7.
- Goh JCH, et al. Gait analysis study on patients with varus osteoarthrosis of the knee. Clinical orthopaedics and related research 1993;223-31.
- Gok H, et al. Kinetic and kinematic characteristics of gait in patients with medial knee arthrosis. Acta Orthopaedica Scandinavica 2002;73:647-52.
- Golightly YM, et al. A comprehensive review of the effectiveness of different exercise programs for patients with osteoarthritis. The Physician and sportsmedicine 2013;40:52-65.
- Gomes WF, et al. Effect of aerobic training on plasma cytokines and soluble receptors in elderly women with knee osteoarthritis, in response to acute exercise. Clinical rheumatology 2012;2012/01/05:759-66.
- Goossen A, et al. Automatic joint alignment measurements in pre- and post-operative long leg standing radiographs. Methods of information in medicine 2012;2012/10/06:406-14.
- Goradia VK, et al. Chronic lateral knee instability treated with a high tibial osteotomy. Arthroscopy 2002;18:807-11.
- Goutallier D, et al. [Effect of osseous torsions of the lower limb on the development of lateral femorotibial knee arthrosis]. Revue de chirurgie orthopedique et reparatrice de l'appareil moteur 1997;1997/01/01:613-21.
- Götze C, et al. Is there a need of custom-made prostheses for total hip arthroplasty? Gait analysis, clinical and radiographic analysis of customized femoral components. Archives of orthopaedic and trauma surgery 2009;129:267-74.
- Grauer JD, et al. Bilateral hip and knee arthroplasty. The Journal of arthroplasty 1986;1986/01/01:283-91.
- Greitemann B. Conservative therapy of osteoarthritis. Technical orthopedic fittings. Zeitschrift für Rheumatologie 2009;68:797-803.
- Griebel AJ, et al. Noninvasive dualMRI-based strains vary by depth and region in human osteoarthritic articular cartilage. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2013;2012/11/29:394-400.
- Griffin TM, et al. Why is obesity associated with osteoarthritis? Insights from mouse models of obesity. Clinical orthopaedics and related research 2008;45:387-98.
- Griffin TM, et al. Extreme obesity due to impaired leptin signaling in mice does not cause knee osteoarthritis. Arthritis and rheumatism 2009;2009/10/01:2935-44.
- Griffin TM, et al. Diet-induced obesity differentially regulates behavioral, biomechanical, and molecular risk factors for osteoarthritis in mice. Arthritis research & therapy 2010;2010/07/08:R130.
- Guccione AA, et al. Defining arthritis and measuring functional status in elders: methodological issues in the study of disease and physical disability. American journal of public health 1990;1990/08/01:945-9.
- Gudbergsen H. MRI in knee osteoarthritis. Application in diet intervention. Danish medical journal 2013;2013/03/15:B4594.
- Guermazi M, et al. Arab translation and assessment of metric properties of the Lequesne index. Annales de Readaptation et de Medecine Physique 2004;47:195-203.
- Gulati A, et al. Localization of the full-thickness cartilage lesions in medial and lateral unicompartmental knee osteoarthritis. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2009;2009/04/28:1339-46.
- Gungen G, et al. The effect of mud pack therapy on serum YKL-40 and hsCRP levels in patients with knee osteoarthritis. Rheumatology international 2012;2011/01/25:1235-44.
- Guo M, et al. The influence of foot progression angle on the knee adduction moment during walking and stair climbing in pain free individuals with knee osteoarthritis. Gait and Posture 2007;26:436-41.
- Güven Z, et al. The effect of high voltage galvanic stimulation on quadriceps femoris muscle strength knee osteoarthritis. Journal of Rheumatology and Medical Rehabilitation 2003;14:72-9.
- Haim A, et al. Effect of center of pressure modulation on knee adduction moment in medial compartment knee osteoarthritis. Journal of Orthopaedic Research 2011;29:1668-74.
- Haladik JA, et al. Bracing improves clinical outcomes but does not affect the medial knee joint space in osteoarthritic patients during gait. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2013;2013/07/13.
- Halder A, et al. Influence of limb alignment on mediolateral loading in total knee replacement: in vivo measurements in five patients. Journal of Bone and Joint Surgery 2012;94:1023-9.
- Hall M, et al. The effects of neuromuscular exercise on medial knee joint load post-arthroscopic partial medial meniscectomy: 'SCOPEX' a randomised control trial protocol. BMC musculoskeletal disorders 2012;13.
- Hamai S, et al. Three-dimensional knee joint kinematics during golf swing and stationary cycling after total knee arthroplasty. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2008;2008/06/05:1556-61.
- Hamai S, et al. Knee kinematics in medial osteoarthritis during in vivo weight-bearing activities. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2009;2009/06/09:1555-61.
- Hamerman D. Osteoarthritis. Orthopaedic review 1988;1988/04/01:353-60.
- Han CD, et al. Femoral component fracture due to osteolysis after cemented mobile-bearing total knee arthroplasty. The Journal of arthroplasty 2009;2008/06/07:323.

- Hanratty BM, et al. The influence of posterior condylar offset on knee flexion after total knee replacement using a cruciate-sacrificing mobile-bearing implant. The Journal of bone and joint surgery British volume 2007;2007/08/04:915-8.
- Hansen P, et al. Does Running Cause Osteoarthritis in the Hip or Knee? PM and R 2012;4:S117-S121.
- Hanson GR, et al. In vivo anterior tibial post contact after posterior stabilizing total knee arthroplasty. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2007;2007/06/09:1447-53.
- Harato K, et al. Extension Limitation in Standing Affects Weight-Bearing Asymmetry After Unilateral Total Knee Arthroplasty. Journal of Arthroplasty 2010;25:225-9.
- Harato K, et al. Asymmetry of the knee extension deficit in standing affects weight-bearing distribution in patients with bilateral end-stage knee osteoarthritis. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2013;2013/02/12.
- Harding GT, et al. Body mass index affects knee joint mechanics during gait differently with and without moderate knee osteoarthritis. Osteoarthritis and Cartilage 2012;20:1234-42.
- Hare KB, et al. Arthroscopic partial meniscectomy in middle-aged patients with mild or no knee osteoarthritis: a protocol for a double-blind, randomized sham-controlled multi-centre trial. BMC musculoskeletal disorders 2013;2013/02/28:71.
- Harrington MA, et al. Fixed- vs mobile-bearing total knee arthroplasty: does it make a difference?--a prospective randomized study. The Journal of arthroplasty 2009;2009/06/26:24-7.
- Harrison MM, et al. Patterns of knee arthrosis and patellar subluxation. Clinical orthopaedics and related research 1994;1994/12/01:56-63.
- Hart JM, et al. Multiple ligament knee reconstruction clinical follow-up and gait analysis. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2009;2008/12/25:277-85.
- Hart R, et al. Comparison of long-term clinical and radiological results after meniscectomies. Acta chirurgiae orthopaedicae et traumatologiae Cechoslovaca 2005;72:304-7.
- Hart R, et al. Minimally invasive and navigated implantation for total knee arthroplasty. X-ray analysis and early clinical results. Orthopade 2006;35:552-7.
- Hashemi J, et al. The geometry of the tibial plateau and its influence on the biomechanics of the tibiofemoral joint. Journal of Bone and Joint Surgery 2008;90:2724-34.
- Hawkins A, et al. Meniscectomy and arthritis. CME Orthopaedics 2001;2:51-6.
- Hayes KW, et al. Observation of varus thrust during gait as a test to predict progression of medial tibiofemoral osteoarthritis. (Abstract). Journal of orthopaedic and sports physical therapy 2004;34:A10.
- Hazaki S, et al. A radiographic analysis of anterior-posterior translation in total knee arthroplasty. Journal of orthopaedic science : official journal of the Japanese Orthopaedic Association 2001;2002/02/15:390-6.
- Hedlund R. Pedicle subtraction osteotomy in flat back syndrome 38 years after Harrington instrumentation for AIS. European Spine Journal 2012;21:563-5.
- Heep H, et al. Osteoarthitis of leptin-deficient ob/ob mice in response to biomechanical loading in micro-CT. International journal of biological sciences 2009;2009/04/04:265-75.
- Heesterbeek P. Mind the gaps! Acta orthopaedica 2011;82:1-26.
- Hefzy MS, et al. Kinematics of the knee joint in deep flexion: a radiographic assessment. Medical engineering & physics 1998;1998/09/05:302-7.
- Heiden TL, et al. Knee joint kinematics, kinetics and muscle co-contraction in knee osteoarthritis patient gait. Clinical biomechanics (Bristol, Avon) 2009;2009/09/22:833-41.
- Hendren L, et al. A review of the differences between normal and osteoarthritis articular cartilage in human knee and ankle joints. Foot (Edinburgh, Scotland) 2009;2010/03/24:171-6.
- Henriksen M, et al. Impulse-forces during walking are not increased in patients with knee osteoarthritis. Acta orthopaedica 2006;77:650-6.
- Henriksen M, et al. Gait changes in patients with knee osteoarthritis are replicated by experimental knee pain. Arthritis care & research 2010;2010/04/15:501-9.
- Henriksen M, et al. The relationship between pain and dynamic knee joint loading in knee osteoarthritis varies with radiographic disease severity. A cross sectional study. The Knee 2012;2011/08/16:392-8.
- Henriksen M, et al. Is increased joint loading detrimental to obese patients with knee osteoarthritis? A secondary data analysis from a randomized trial. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2013;2013/10/19.
- Hernborg JS, et al. The natural course of untreated osteoarthritis of the knee. Clinical orthopaedics and related research 1977;1977/03/01:130-7.
- Hernigou P, et al. Posterior slope of the tibial implant and the outcome of unicompartmental knee arthroplasty. The Journal of bone and joint surgery American volume 2004;2004/03/05:506-11.
- Hertel P, et al. ACL reconstruction using bone-patellar tendon-bone press-fit fixation: 10-year clinical results. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2005;2005/02/04:248-55.
- Hilding MB, et al. A relationship between dynamic and static assessments of knee joint load. Gait analysis and radiography before and after knee replacement in 45 patients. Acta Orthopaedica Scandinavica 1995;66:317-20.
- Hill BW, et al. Paradoxical cerebral embolism after total knee arthroplasty. Orthopedics 2012;35:e1659-e1663.

- Hillstrom HJ, et al. Lower extremity conservative realignment therapies for knee osteoarthritis. Physical medicine and rehabilitation 2002;16:507-20.
- Hinman R, Bennell K. Insoles and footwear in the management of knee osteoarthritis. Bentham Science Publishers Ltd.; 2012. p. 103-14.
- Hinman RS, et al. Delayed onset of quadriceps activity and altered knee joint kinematics during stair stepping in individuals with knee osteoarthritis. Archives of physical medicine and rehabilitation 2002;83:1080-6.
- Hinman RS, et al. Patellofemoral joint osteoarthritis: an important subgroup of knee osteoarthritis. Rheumatology (Oxford, England) 2007;2007/05/15:1057-62.
- Hinman RS, et al. Lateral wedges in knee osteoarthritis: what are their immediate clinical and biomechanical effects and can these predict a three-month clinical outcome? Arthritis and rheumatism 2008;2008/03/04:408-15.
- Hinman RS, et al. Advances in insoles and shoes for knee osteoarthritis. Current opinion in rheumatology 2009;2009/04/03:164-70.
- Hinrichs T, et al. Recessive multiple epiphyseal dysplasia (rMED) with homozygosity for C653S mutation in the DTDST gene - Phenotype, molecular diagnosis and surgical treatment of habitual dislocation of multilayered patella: Case report. BMC musculoskeletal disorders 2010;11.
- Hinterwimmer S, et al. Patella kinematics and patello-femoral contact areas in patients with genu varum and mild osteoarthritis. Clinical Biomechanics 2004;19:704.
- Hirschmann MT, et al. Anterolateral approach with tibial tubercle osteotomy versus standard medial approach for primary total knee arthroplasty: Does it matter? BMC musculoskeletal disorders 2010;11.
- Hirschmann MT, et al. Assessment of loading history of compartments in the knee using bone SPECT/CT: a study combining alignment and 99mTc-HDP tracer uptake/distribution patterns. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2013;2012/08/14:268-74.
- Ho C, et al. Magnetic resonance imaging in assessing cartilage changes in experimental osteoarthrosis of the knee. Investigative radiology 1992;1992/01/01:84-90.
- Hochberg MC, et al. Potential effects of chondroitin sulfate on joint swelling: a GAIT report. Osteoarthritis and Cartilage 2008;16:S22-S24.
- Hoffmeister E. Distraction Arthroplasty Technique Promising for Treating Knee Osteoarthritis. Lippincott's Bone and Joint Newsletter 2011;17:121-3.
- Hohmann E, et al. MR imaging of the hip and knee before and after marathon running. The American journal of sports medicine 2004;2004/02/03:55-9.
- Holla JF, et al. Diagnostic accuracy of range of motion measurements in early symptomatic hip and/or knee osteoarthritis. Arthritis care & research 2012;2011/09/29:59-65.
- Hollinghurst D, et al. In vivo sagittal plane kinematics of the Avon patellofemoral arthroplasty. The Journal of arthroplasty 2007;2007/01/02:117-23.
- Holten KB. How should we diagnose and treat osteoarthritis of the knee? Journal of Family Practice 2004;53:134-6.
- Holzmuller W, et al. [Mechanical properties of PDS-augmented patellar tendon transplants in reconstruction of the anterior cruciate ligament]. Der Unfallchirurg 1992;1992/06/01:306-10.
- Hood RW, et al. The correction of knee alignment in 225 consecutive total condylar knee replacements. Clinical orthopaedics and related research 1981;1981/10/01:94-105.
- Horiuchi H, et al. In vivo kinematic analysis of cruciate-retaining total knee arthroplasty during weight-bearing and non-weight-bearing deep knee bending. The Journal of arthroplasty 2012;2012/04/06:1196-202.
- Hortobagyi T, et al. Altered hamstring-quadriceps muscle balance in patients with knee osteoarthritis. Clinical biomechanics (Bristol, Avon) 2005;2004/11/30:97-104.
- Horton WE, Jr., et al. An association between an aggrecan polymorphic allele and bilateral hand osteoarthritis in elderly white men: data from the Baltimore Longitudinal Study of Aging (BLSA). Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 1998;1999/01/07:245-51.
- Hosalkar HS, et al. Outcomes of total joint arthroplasties in adults with post-polio syndrome: Results from a tertiary neuro-orthopaedic center. Current Orthopaedic Practice 2010;21:273-81.
- Hoshino Y, et al. Internal tibial rotation during in vivo, dynamic activity induces greater sliding of tibio-femoral joint contact on the medial compartment. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2012;2011/11/02:1268-75.
- Howell SM, et al. Assessment of the radii of the medial and lateral femoral condyles in varus and valgus knees with osteoarthritis. The Journal of bone and joint surgery American volume 2010;2010/01/06:98-104.
- Hsieh RL, et al. Short-term effects of 890-nanometer radiation on pain, physical activity, and postural stability in patients with knee osteoarthritis: a double-blind, randomized, placebo-controlled study. Archives of physical medicine and rehabilitation 2012;2012/03/31:757-64.
- Hsu RW, et al. Hybrid total knee arthroplasty: a 3- to 6-year outcome analysis. Journal of the Formosan Medical Association = Taiwan yi zhi 1998;1998/07/03:410-5.
- Hu DY, et al. Jingusu glucosamine hydrochloride functional food for improving knee joint function in patients with knee osteoarthritis: A human intake trial. Chinese Journal of Clinical Rehabilitation 2005;9:8-9.
- Hu YZ, et al. [Application of orientation to the mechanical alignment of lower limbs in operation of high tibial osteotomy]. Zhongguo gu shang = China journal of orthopaedics and traumatology 2012;2012/12/22:751-4.

- Huang MH, et al. A comparison of various therapeutic exercises on the functional status of patients with knee osteoarthritis. Seminars in arthritis and rheumatism 2003;32:398-406.
- Huang MH, et al. Use of ultrasound to increase effectiveness of isokinetic exercise for knee osteoarthritis. Archives of physical medicine and rehabilitation 2005;86:1545-51.
- Hubley-Kozey CL, et al. Neuromuscular alterations during walking in persons with moderate knee osteoarthritis. Journal of electromyography and kinesiology : official journal of the International Society of Electrophysiological Kinesiology 2006;2005/10/11:365-78.
- Hubley-Kozey CL, et al. Co-activation differences in lower limb muscles between asymptomatic controls and those with varying degrees of knee osteoarthritis during walking [corrected] [published erratum appears in CLIN BIOMECH 2009 Jul;24(6):529]. Clinical Biomechanics 2009;24:407-14.
- Hudson D, et al. Bone mineral density of the proximal tibia relates to axial torsion in the lower limb. Gait and Posture 2007;26:446-51.
- Hulet C, et al. [Functional gait adaptations in patients with painful hip]. Revue de chirurgie orthopedique et reparatrice de l'appareil moteur 2000;2000/11/04:581-9.
- Hulet C, et al. [Dual x-ray absorptiometry assessment of bone density of the proximal tibia in advanced-stage degenerative disease of the knee]. Revue de chirurgie orthopedique et reparatrice de l'appareil moteur 2001;2001/03/10:50-60.
- Hunt MA. Measures of static and dynamic alignment in individuals with osteoarthritis of the knee University of Western Ontario (Canada); 2007.
- Hunt MA, et al. Towards a biopsychosocial framework of osteoarthritis of the knee. Disability and rehabilitation 2008;2007/09/14:54-61.
- Hunt MA, et al. Measures of frontal plane lower limb alignment obtained from static radiographs and dynamic gait analysis. Gait & posture 2008;2007/10/20:635-40.
- Hunt MA, et al. Lateral trunk lean explains variation in dynamic knee joint load in patients with medial compartment knee osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2008;2008/01/22:591-9.
- Hunt MA, et al. Individuals with severe knee osteoarthritis (OA) exhibit altered proximal walking mechanics compared with individuals with less severe OA and those without knee pain. Arthritis care & research 2010;2010/05/28:1426-32.
- Hunt MA, et al. Predictors of single-leg standing balance in individuals with medial knee osteoarthritis. Arthritis care & research 2010;2010/04/15:496-500.
- Hunt MA, et al. Quadriceps strength is not related to gait impact loading in knee osteoarthritis. The Knee 2010;2010/03/23:296-302.
- Hunt MA, et al. Varus thrust in medial knee osteoarthritis: Quantification and effects of different gait-related interventions using a single case study. Arthritis Care and Research 2011;63:293-7.
- Hunt MA, et al. Predicting dynamic knee joint load with clinical measures in people with medial knee osteoarthritis. The Knee 2011;2010/08/31:231-4.
- Hunt MA, et al. Relationships amongst osteoarthritis biomarkers, dynamic knee joint load, and exercise: results from a randomized controlled pilot study. BMC musculoskeletal disorders 2013;2013/03/28:115.
- Hunt MA, et al. A physiotherapist-delivered, combined exercise and pain coping skills training intervention for individuals with knee osteoarthritis: a pilot study. The Knee 2013;2012/08/28:106-12.
- Hunt MA, et al. Foot rotational effects on radiographic measures of lower limb alignment. Canadian Journal of Surgery 2006;49:6.
- Hunter DJ, et al. The Management of Osteoarthritis: An Overview and Call to Appropriate Conservative Treatment. Rheumatic Disease Clinics of North America 2008;34:689-712.
- Hunter DJ, et al. Imaging the Role of Biomechanics in Osteoarthritis. Rheumatic Disease Clinics of North America 2009;35:465-83.
- Hunter DJ, et al. Role of alignment and biomechanics in osteoarthritis and implications for imaging. Radiologic clinics of North America 2009;2009/07/28:553-66.
- Hunter DJ, et al. Alignment and osteoarthritis of the knee. The Journal of bone and joint surgery American volume 2009;2009/02/21:85-9.
- Hunter DJ, et al. Structural correlates of pain in joints with osteoarthritis. Osteoarthritis and Cartilage 2013;21:1170-8.
- Hunter D. Biomechanical Mechanisms in OA Pathogenesis. Seminars in arthritis and rheumatism 2011;41:91.
- Hurley MV. The role of muscle weakness in the pathogenesis of osteoarthritis. Rheumatic Disease Clinics of North America 1999;25:283-98.
- Hurwitz DE, et al. Effect of knee pain on joint loading in patients with osteoarthritis. Current opinion in rheumatology 1999;1999/09/30:422-6.
- Hurwitz DE, et al. Knee pain and joint loading in subjects with osteoarthritis of the knee. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2000;2000/10/29:572-9.
- Hurwitz DE, et al. The knee adduction moment during gait in subjects with knee osteoarthritis is more closely correlated with static alignment than radiographic disease severity, toe out angle and pain. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2002;2002/02/21:101-7.
- Huskisson EC, et al. Hyaluronic acid improved walking ability and short term knee function in osteoarthritis of the knee: Commentary. Evidence-Based Medicine 2000;5:73.
- Hwang J, et al. Increased hydraulic conductance of human articular cartilage and subchondral bone plate with progression of osteoarthritis. Arthritis and rheumatism 2008;2008/11/28:3831-42.
- Ickinger C, et al. Current approach to diagnosis and management of osteoarthritis. South African Family Practice 2010;52:382-90.
- Inaba Y, et al. Provoked anterior knee pain in medial osteoarthritis of the knee. The Knee 2003;2003/11/25:351-5.

- Iorio R, et al. Unicompartmental arthritis of the knee. Journal of Bone and Joint Surgery - Series A 2003;85:1351-64.
- Ip S, et al. Frequency of bone marrow lesions and association with pain severity: results from a population-based symptomatic knee cohort. The Journal of rheumatology 2011;2011/03/03:1079-85.
- Ishida K, et al. In vivo comparisons of patellofemoral kinematics before and after ADVANCE Medial-Pivot total knee arthroplasty. International orthopaedics 2012;2012/08/14:2073-7.
- Ishii Y, et al. Extramedullary versus intramedullary alignment guides in total knee arthroplasty. Clinical orthopaedics and related research 1995;1995/09/01:167-75.
- Ishii Y, et al. Gait analysis after total knee arthroplasty. Comparison of posterior cruciate retention and substitution. Journal of Orthopaedic Science 1998;3:310-7.
- Ishii Y, et al. Changes in lower extremity 3-dimensional load-bearing axes before and after mobile-bearing total knee arthroplasty. The Journal of arthroplasty 2012;2012/02/07:1203-9.
- Ishii Y, et al. Posterior condylar offset does not correlate with knee flexion after TKA. Clinical orthopaedics and related research 2013;2013/04/24:2995-3001.
- Issack PS, et al. Failure at the taper lock of a modular stemmed femoral implant in revision knee arthroplasty: A report of two cases and a retrieval analysis. Journal of Bone and Joint Surgery - Series A 2007;89:2271-4.
- Iversen MD. Rehabilitation Interventions for Pain and Disability in Osteoarthritis: A review of interventions including exercise, manual techniques, and assistive devices... Reprinted with permission from American Journal of Nursing, 112(3), S32-S37, 2012. Orthopaedic Nursing 2012;31:103-8.
- Izumi M, et al. MR-guided focused ultrasound for the novel and innovative management of osteoarthritic knee pain. BMC musculoskeletal disorders 2013;14.
- Jackson BD, et al. The effect of the knee adduction moment on tibial cartilage volume and bone size in healthy women. Rheumatology (Oxford, England) 2004;2003/12/18:311-4.
- Jaeger S, et al. The influence of the femoral force application point on tibial cementing pressure in cemented UKA: an experimental study. Archives of orthopaedic and trauma surgery 2012;2012/07/14:1589-94.
- Jakob RP, et al. [Closing wedge osteotomy of the tibial head in treatment of single compartment arthrosis]. Der Orthopade 2004;2004/02/12:143-52.
- Jan MH, et al. Effects of Weight-Bearing Versus Nonweight-Bearing Exercise on Function, Walking Speed, and Position Sense in Participants With Knee Osteoarthritis: A Randomized Controlled Trial. Archives of physical medicine and rehabilitation 2009;90:897-904.
- Jani L, et al. Experiences with MacIntosh hemiarthroplasty of the knee joint. Archiv für Orthopädische und Unfall-Chirurgie 1973;75:81-96.
- Jay GD, et al. Prevention of cartilage degeneration and gait asymmetry by lubricin tribosupplementation in the rat following anterior cruciate ligament transection. Arthritis and rheumatism 2012;64:1162-71.
- Jean JL, et al. Stress fracture of the proximal tibia after total knee arthroplasty: A case report. Journal of the Formosan Medical Association 2001;100:561-4.
- Jepsen KJ, et al. A syndrome of joint laxity and impaired tendon integrity in lumican- and fibromodulin-deficient mice. Journal of Biological Chemistry 2002;277:35532-40.
- Jezussek D, et al. Clinical picture and diagnosis of knee osteoarthritis. MMW-Fortschritte der Medizin 2007;149:28-30.
- Jezussek D, et al. [Manifestations and diagnosis of hip osteoarthritis]. MMW Fortschritte der Medizin 2007;2007/10/09:29-31.
- Jones J, et al. A case of a sural neuroma as a cause of lateral ankle pain. Foot 2012;22:138-40.
- Jones RK, et al. A comparison of the biomechanical effects of valgus knee braces and lateral wedged insoles in patients with knee osteoarthritis. Gait & posture 2013;37:368-72.
- Jones RK, et al. A new approach to prevention of knee osteoarthritis: reducing medial load in the contralateral knee. The Journal of rheumatology 2013;2013/01/17:309-15.
- Jordan JM, et al. The impact of arthritis in rural populations. Arthritis Care and Research 1995;8:242-50.
- Joseph RM. Osteoarthritis of the ankle: bridging concepts in basic science with clinical care. Clinics in podiatric medicine and surgery 2009;2009/04/25:169-84.
- Judkins TR, et al. Femoral neck fracture during physical therapy following surface replacement arthroplasty: A preventable complication? A case report. Patient Safety in Surgery 2010;4.
- Jung HJ, et al. Fractures associated with computer-navigated total knee arthroplasty: A report of two cases. Journal of Bone and Joint Surgery - Series A 2007;89:2280-4.
- Jung KA, et al. Fracture of a second-generation highly cross-linked UHMWPE tibial post in a posterior-stabilized scorpio knee system. Orthopedics 2008;31:1137.
- Jüni P, et al. Osteoarthritis: rational approach to treating the individual. Best Practice and Research: Clinical Rheumatology 2006;20:721-40.
- Kacar C, et al. The prevalence of symptomatic knee and distal interphalangeal joint osteoarthritis in the urban population of Antalya, Turkey. Rheumatology international 2005;2003/12/09:201-4.
- Kaczmarczyk J, et al. Opening-wedge high tibial osteotomy to treat osteoarthritis of the knee with use of OSTEO+ system--initial report. Chirurgia narzadow ruchu i ortopedia polska 2004;69:97-9.

- Kaczmarczyk J, et al. Walking ability after treatment of the knee osteoarthritis with OSTEO+ system. Chirurgia narzadów ruchu i ortopedia polska 2006;71:427-9.
- Kapadia RD, et al. Meniscal ossification in spontaneous osteoarthritis in the guinea-pig. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2000;2000/09/01:374-7.
- Karagülle M, et al. A 10-day course of SPA therapy is beneficial for people with severe knee osteoarthritis. Clinical rheumatology 2007;26:2063-71.
- Karamanidis K, et al. Altered control strategy between leading and trailing leg increases knee adduction moment in the elderly while descending stairs. Journal of biomechanics 2011;44:706-11.
- Karan A, et al. Intraarticular Na-hyaluronate (Orthovisc) injection in knee osteoarthritis: Comparison of different injection techniques and short term efficacy. Agri 2000;12:31-5.
- Kashyap SN, et al. Clinical experience with less invasive surgery techniques in total knee arthroplasty: A comparative study. Knee Surgery, Sports Traumatology, Arthroscopy 2008;16:544-8.
- Katz JN, et al. Associations among preoperative MRI features and functional status following arthroscopic partial meniscectomy. Osteoarthritis and Cartilage 2006;14:418-22.
- Kauppila AM, et al. Disability in end-stage knee osteoarthritis. Disability and rehabilitation 2009;31:370-80.
- Kawakami H, et al. Gait analysis system for assessment of dynamic loading axis of the knee. Gait and Posture 2005;21:125-30.
- Kawano T, et al. Factors affecting patellar tracking after total knee arthroplasty. The Journal of arthroplasty 2002;2002/10/11:942-7.
- Kean CO, et al. Comparison of peak knee adduction moment and knee adduction moment impulse in distinguishing between severities of knee osteoarthritis. Clinical biomechanics (Bristol, Avon) 2012;2012/01/17:520-3.
- Keene GCR, et al. Mini-symposium: surgery for knee arthritis. (iii) Modern unicompartmental knee replacement. Current Orthopaedics 2005;19:428-45.
- Kemp G, et al. Reducing joint loading in medial knee osteoarthritis: shoes and canes. Arthritis and rheumatism 2008;2008/04/29:609-14.
- Kerrigan DC, et al. Knee joint torques: A comparison between women and men during barefoot walking. Archives of physical medicine and rehabilitation 2000;81:1162-5.
- Kerrigan DC, et al. Effectiveness of a lateral-wedge insole on knee varus torque in patients with knee osteoarthritis. Archives of physical medicine and rehabilitation 2002;2002/07/05:889-93.
- Kerrigan DC, et al. Men's shoes and knee joint torques relevant to the development and progression of knee osteoarthritis. The Journal of rheumatology 2003;2003/03/01:529-33.
- Kerrigan DC, et al. Moderate-heeled shoes and knee joint torques relevant to the development and progression of knee osteoarthritis. Archives of physical medicine and rehabilitation 2005;86:871-5.
- Kharwadkar N, et al. 5 degrees to 6 degrees of distal femoral cut for uncomplicated primary total knee arthroplasty: is it safe? The Knee 2006;2005/08/30:57-60.
- Kienapfel H, et al. [2- to 5-year follow-up of cementless implantable knee joint prosthesis of the Miller-Galante type]. Der Orthopade 1991;1991/06/01:189-96.
- Kim I, et al. Tibiofemoral osteoarthritis affects quality of life and function in elderly Koreans, with women more adversely affected than men. BMC musculoskeletal disorders 2010;11.
- Kim SJ, et al. Medial opening wedge high-tibial osteotomy using a kinematic navigation system versus a conventional method: a 1-year retrospective, comparative study. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2009;2008/10/14:128-34.
- Kim YH, et al. Alignment and orientation of the components in total knee replacement with and without navigation support. Journal of Bone and Joint Surgery - Series B 2007;89:471-6.
- Kimmatkar N, et al. Efficacy and tolerability of Boswellia serrata extract in treatment of osteoarthritis of knee - A randomized double blind placebo controlled trial. Phytomedicine 2003;10:3-7.
- King LK, et al. Resistance training for medial compartment knee osteoarthritis and malalignment. Medicine and science in sports and exercise 2008;2008/07/11:1376-84.
- Kitagawa A, et al. In vivo comparison of knee kinematics before and after high-flexion posterior cruciate-retaining total knee arthroplasty. The Journal of arthroplasty 2010;2009/09/05:964-9.
- Klatt BA, et al. Treatment options in knee osteoarthritis: Total knee arthroplasty versus platelet-rich plasma. PM and R 2011;3:377-86.
- Kleinert B, et al. Results of proximal tibia osteotomy. Orthopade 1985;14:154-60.
- Knoop J, et al. Association of lower muscle strength with self-reported knee instability in osteoarthritis of the knee: Results from the Amsterdam Osteoarthritis Cohort. Arthritis care & research 2012;64:38-45.
- Knoop J, et al. Biomechanical factors and physical examination findings in osteoarthritis of the knee: associations with tissue abnormalities assessed by conventional radiography and high resolution 3.0 Tesla magnetic resonance imaging. Arthritis research & therapy 2012;2012/10/09:R212.
- Ko FC, et al. In vivo cyclic compression causes cartilage degeneration and subchondral bone changes in mouse tibiae. Arthritis and rheumatism 2013;2013/02/26:1569-78.

- Kobayashi H, et al. Spontaneous dislocation of a mobile-bearing polyethylene insert after posterior-stabilized rotating platform total knee arthroplasty: A case report. The Knee 2011;18:496-8.
- Koca NT, et al. Our patients with knee osteoarthritis risk factors and relationship with osteoarhritis-osteoporosis. Turk Osteoporoz Dergisi 2011;17:14-20.
- Koeck FX, et al. Removal and successful re-implantation of a customized interpositional knee device following an early postoperative infection: A case report. Central European Journal of Medicine 2010;5:442-6.
- Kohl S, et al. Anterior crucial ligament rupture: self-healing through dynamic intraligamentary stabilization technique. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2013;21:599-605.
- Konradsen L, et al. Long distance running and osteoarthrosis. The American journal of sports medicine 1990;1990/07/01:379-81.
- Koo S, et al. Considerations in measuring cartilage thickness using MRI: Factors influencing reproducibility and accuracy. Osteoarthritis and Cartilage 2005;13:782-9.
- Koo S, et al. Knee joint kinematics during walking influences the spatial cartilage thickness distribution in the knee. Journal of biomechanics 2011;44:1405-9.
- Kornaropoulos EI, et al. Frontal plane alignment: An imageless method to predict the mechanical femoral-tibial angle (mFTA) based on functional determination of joint centres and axes. Gait and Posture 2010;31:204-8.
- Koshino T. Etiology, classifications and clinical findings of osteoarthritis of the knee. Ryumachi 1985;25:191-203.
- Koshino T, et al. Grading system of articular cartilage degeneration in osteoarthritis of the knee. Bulletin: Hospital for Joint Diseases 1993;53:41-6.
- Koshino T, et al. Medial opening-wedge high tibial osteotomy with use of porous hydroxyapatite to treat medial compartment osteoarthritis of the knee. Journal of Bone and Joint Surgery - Series A 2003;85:78-85.
- Kovar PA, et al. Supervised fitness walking in patients with osteoarthritis of the knee: A randomized, controlled trial. Annals of Internal Medicine 1992;116:529-34.
- Kozlowski K, et al. Hereditary dysplasia epiphysealis multiplex. Clinical Radiology 1967;18:330-6.
- Krackow KA, et al. Torsion deformity and joint loading for medial knee osteoarthritis. Gait & posture 2011;2011/03/29:625-9.
- Kramer DE, et al. Juvenile Osteochondritis Dissecans of the Knee. Operative Techniques in Sports Medicine 2008;16:70-6.
- Kraus VB, et al. A comparative assessment of alignment angle of the knee by radiographic and physical examination methods. Arthritis and rheumatism 2005;2005/06/04:1730-5.
- Krause F, et al. [Medium-term results after m. vastus medialis obliquus-plasty for lateral patellar dislocation]. Der Orthopade 2006;2005/09/30:94-101.
- Krauss I, et al. Efficacy of conservative treatment regimes for hip osteoarthritis - Evaluation of the therapeutic exercise regime "hip School": A protocol for a randomised, controlled trial. BMC musculoskeletal disorders 2011;12.
- Kreuz PC, et al. Repair of focal cartilage defects with scaffold-assisted autologous chondrocyte grafts: clinical and biomechanical results 48 months after transplantation. The American journal of sports medicine 2011;2011/05/05:1697-705.
- Krohn K. Footwear alterations and bracing as treatments for knee osteoarthritis. Current opinion in rheumatology 2005;2005/08/12:653-6.
- Król R, et al. Operative tactics and results of treatment of patients with coxarthrosis secondary to congenital high luxation of hip joints. Ortopedia Traumatologia Rehabilitacja 2007;9:604-11.
- Kröner AH, et al. Influence of high tibial osteotomy on bone marrow edema in the knee. Clinical orthopaedics and related research 2007;454:155-62.
- Kubes¡ R, et al. Results of the first trial of the implantation of cemented prosthesis, type beznoska/S.V.L., in total knee arthroplasty. Acta chirurgiae orthopaedicae et traumatologiae Cechoslovaca 2003;70:39-46.
- Kubinski AJ, et al. Strategies used during a challenging weighted walking task in healthy adults and individuals with knee osteoarthritis. Gait & posture 2012;2011/10/04:6-10.
- Kubovy P, et al. Influence of SYSADOA group chemicals on progression of human knee joint osteoarthritis: new objective evaluation method - measuring of rheological properties in vivo. Neuro endocrinology letters 2012;2012/11/20:651-9.
- Kullich W, et al. One-year-survey with multicenter data of more than 4,500 patients with degenerative rheumatic diseases treated with therapeutic nuclear magnetic resonance. J Back Musculoskelet Rehabil 2013;26:93-104.
- Kumagai K, et al. Sodium pentosan polysulfate resulted in cartilage improvement in knee osteoarthritis--an open clinical trial. BMC clinical pharmacology 2010;2010/03/30:7.
- Kumagi M, et al. Total knee replacement for osteoarthritis of the knee with congenital dislocation of the patella. Journal of Bone & Joint Surgery, British Volume 2007;89B:1522-4.
- Kumar D, et al. EMG-driven modeling approach to muscle force and joint load estimations: Case study in knee osteoarthritis. Journal of Orthopaedic Research 12 A.D. Feb.
- Kuptniratsaikul V, et al. The efficacy of a muscle exercise program to improve functional performance of the knee in patients with osteoarthritis. Journal of the Medical Association of Thailand = Chotmaihet thangphaet 2002;2002/06/22:33-40.
- Kuptniratsaikul V, et al. The epidemiology of osteoarthritis of the knee in elderly patients living an urban area of Bangkok. Journal of the Medical Association of Thailand 2002;85:154-61.

- Kuriwaka Y. [A biomechanical study of osteoarthritis of the knee with special reference to the rotatory movement of the knee joint]. Nihon Seikeigeka Gakkai zasshi 1982;1982/08/01:713-26.
- Kuroyanagi Y, et al. A quantitative assessment of varus thrust in patients with medial knee osteoarthritis. The Knee 2012;2011/02/09:130-4.
- Kutzner I, et al. The influence of footwear on knee joint loading during walking -- in vivo load measurements with instrumented knee implants. Journal of biomechanics 2013;46:796-800.
- LaclÃ©riga GimÃ©nez AF, et al. Self-knowledge, treatment adherence and comorbidity in knee-osteoarthritis. SCOPIA study. trauma 2012;23:84-90.
- Lai DT, et al. Ultrasound monitoring of inter-knee distances during gait. Conference proceedings : Annual International Conference of the IEEE Engineering in Medicine and Biology Society IEEE Engineering in Medicine and Biology Society Conference 2009;2009/12/08:725-8.
- Laidlaw MS, et al. Assessment of tibiofemoral position in total knee arthroplasty using the active flexion lateral radiograph. The Knee 2010;2009/09/08:38-42.
- Lammentausta E, et al. Quantitative MRI of parallel changes of articular cartilage and underlying trabecular bone in degeneration. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2007;2007/05/16:1149-57.
- Lancianese SL, et al. Predicting regional variations in trabecular bone mechanical properties within the human proximal tibia using MR imaging. Bone 2008;2008/08/30:1039-46.
- Lane NE. Osteoarthritis of the hip. New England Journal of Medicine 2007;357:1413-21.
- Lange AK, et al. Degenerative meniscus tears and mobility impairment in women with knee osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2007;2007/01/09:701-8.
- Lange AK, et al. Strength training for treatment of osteoarthritis of the knee: A systematic review. Arthritis Care and Research 2008;59:1488-94.
- Lange AK, et al. Resistive Exercise for Arthritic Cartilage Health (REACH): a randomized double-blind, sham-exercise controlled trial. BMC geriatrics 2009;2009/01/16:1.
- Langguth DM, et al. Synovial osteochondromatosis. Internal Medicine Journal 2002;32:419-20.
- Lankester BJA, et al. Variation in the anatomy of the tibial plateau: a possible factor in the development of anteromedial osteoarthritis of the knee. Journal of Bone & Joint Surgery, British Volume 2008;90B:330-3.
- Lankester BJA, et al. Variation in the anatomy of the tibial plateau. Journal of Bone and Joint Surgery - Series B 2008;90:330-3.
- Lapane KL, et al. Use of complementary and alternative medicine among patients with, radiographic-confirmed knee osteoarthritis. Osteoarthritis and Cartilage 2012;20:22.
- LaPrade RF, et al. The effects of aggressive notchplasty on the normal knee in dogs. American Journal of Sports Medicine 1998;26:193-200.
- LaPrade RF, et al. Winner of the AlbertTrillat Young Investigator Award. The effects of aggressive notchplasty on the normal knee in dogs. The American journal of sports medicine 1998;1998/04/21:193-200.
- Larsson AC, et al. Functional capacity and early radiographic osteoarthritis in middle-aged people with chronic knee pain. Physiotherapy research international : the journal for researchers and clinicians in physical therapy 1998;1998/10/23:153-63.
- Lassoued S, et al. Fatty Involution of the Gluteus Medius Muscles: A Late-Onset Girdle Myopathy? Seminars in arthritis and rheumatism 2011;41:477-81.
- Lattermann C, et al. Staging and comorbidities. The journal of knee surgery 2011;2012/02/07:217-24.
- Lazebnik LB, et al. Efficacy of chondroitin sulphate in the treatment of elderly patients with gonarthrosis and coxarthrosis. Terapevticheskii Arkhiv 2005;77:64-9.
- Le Graverand MP, et al. Assessment of the radioanatomic positioning of the osteoarthritic knee in serial radiographs: comparison of three acquisition techniques. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2006;2006/06/21:A37-A43.
- Lee CS, et al. Early Nontraumatic Fracture of the Polyethylene Tibial Post in a NexGen LPS-Flex Posterior Stabilized Knee Prosthesis. Journal of Arthroplasty 2009;24:1292.
- Lee DH, et al. Osteoporosis affects component positioning in computer navigation-assisted total knee arthroplasty. The Knee 2012;2011/05/03:203-7.
- Lee DH, et al. Preoperative and postoperative comparisons of navigation and radiologic limb alignment measurements after high tibial osteotomy. Arthroscopy : the journal of arthroscopic & related surgery : official publication of the Arthroscopy Association of North America and the International Arthroscopy Association 2012;2012/08/07:1842-50.
- Lee HJ, et al. Comparison of joint line position changes after primary bilateral total knee arthroplasty performed using the navigation-assisted measured gap resection or gap balancing techniques. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2011;2011/03/25:2027-32.
- Lee JA. Adult degenerative joint disease of the knee: Maximizing function and promoting joint health. Postgraduate Medicine 1997;102:167-79.
- Leitch KM, et al. Changes in valgus and varus alignment neutralize aberrant frontal plane knee moments in patients with unicompartmental knee osteoarthritis. Journal of biomechanics 2013;46:1408-12.
- Leonard GR, et al. Total Knee Arthroplasty in Patients With a Left Ventricular Assist Device. Journal of Arthroplasty 2013;28:376.
- Levine HB, et al. Sagittal and coronal biomechanics of the knee: A rationale for corrective measures. Bulletin of the NYU Hospital for Joint Diseases 2007;65:87-95.

- Levinger P, et al. Relationship between foot function and medial knee joint loading in people with medial compartment knee osteoarthritis. Journal of foot and ankle research 2013;2013/08/10:33.
- Lewek MD, et al. Control of frontal plane knee laxity during gait in patients with medial compartment knee osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2004;2004/08/25:745-51.
- Lewek MD. Knee malalignment and the progression of osteoarthritis University of Delaware; 2004.
- Lewek MD, et al. Stride-to-stride variability of knee motion in patients with knee osteoarthritis. Gait & posture 2006;2005/07/19:505-11.
- Li G, et al. In vivo articular cartilage contact kinematics of the knee: an investigation using dual-orthogonal fluoroscopy and magnetic resonance image-based computer models. The American journal of sports medicine 2005;2004/12/22:102-7.
- Li MG, et al. Mobile vs. fixed bearing unicondylar knee arthroplasty: A randomized study on short term clinical outcomes and knee kinematics. The Knee 2006;2006/06/27:365-70.
- Li Q, et al. [Case-control study on the relationship between body mass index and lower limb alignment of patients with knee osteoarthritis]. Zhongguo gu shang = China journal of orthopaedics and traumatology 2011;2012/02/03:911-4.
- Liden M, et al. Osteoarthritic changes after anterior cruciate ligament reconstruction using bone-patellar tendon-bone or hamstring tendon autografts: a retrospective, 7-year radiographic and clinical follow-up study. Arthroscopy : the journal of arthroscopic & related surgery : official publication of the Arthroscopy Association of North America and the International Arthroscopy Association 2008;2008/07/29:899-908.
- Lidtke RH, et al. Foot center of pressure and medial knee osteoarthritis. Journal of the American Podiatric Medical Association 2010;2010/05/19:178-84.
- Liikavainio T, et al. Loading and gait symmetry during level and stair walking in asymptomatic subjects with knee osteoarthritis: importance of quadriceps femoris in reducing impact force during heel strike? The Knee 2007;2007/04/25:231-8.
- Liikavainio T, et al. Physical Function and Properties of Quadriceps Femoris Muscle in Men With Knee Osteoarthritis. Archives of physical medicine and rehabilitation 2008;89:2185-94.
- Liikavainio T, et al. Gait and muscle activation changes in men with knee osteoarthritis. The Knee 2010;17:69-76.
- Lim BW, et al. Varus malalignment and its association with impairments and functional limitations in medial knee osteoarthritis. Arthritis and rheumatism 2008;2008/06/26:935-42.
- Lim BW, et al. The association of quadriceps strength with the knee adduction moment in medial knee osteoarthritis. Arthritis and rheumatism 2009;2009/04/01:451-8.
- Lim HC, et al. Bilateral stress fracture of the femoral shaft after total knee arthroplasty. A case report. The Knee 2011;18:354-7.
- Lim YZ, et al. Are biomechanical factors, meniscal pathology, and physical activity risk factors for bone marrow lesions at the knee? A systematic review. Seminars in arthritis and rheumatism 2013;2013/10/26:187-94.
- Lin D, et al. Efficacy of 2 non-weight-bearing interventions, proprioception training versus strength training, for patients with knee osteoarthritis: a randomized clinical trial. Journal of Orthopaedic & Sports Physical Therapy 2009;39:450-7.
- Lin J, et al. Marked disability and high use of nonsteroidal antiinflammatory drugs associated with knee osteoarthritis in rural China: a cross-sectional population-based survey. Arthritis research & therapy 2010;2010/12/31:R225.
- Lin JH, et al. [Disability and common treatment strategies associated with knee pain in a rural Chinese population]. Zhonghua yi xue za zhi 2010;2010/10/27:1477-81.
- Lin WP, et al. Quadriceps-sparing, minimal-incision total knee arthroplasty: a comparative study. The Journal of arthroplasty 2009;2008/09/02:1024-32.
- Lind M, et al. Gait analysis of walking before and after medial opening wedge high tibial osteotomy. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2011;2011/04/13.
- Ling J, et al. Marked disability and high use of nonsteroidal antiinflammatory drugs associated with knee osteoarthritis in rural China: A cross-sectional population-based survey. Arthritis Research and Therapy 2010;12.
- Linley HS, et al. A biomechanical analysis of trunk and pelvis motion during gait in subjects with knee osteoarthritis compared to control subjects. Clinical Biomechanics 2010;25:1003-10.
- Liu X, et al. Redistribution of knee stress using laterally wedged insole intervention: Finite element analysis of knee-ankle-foot complex. Clinical Biomechanics 2013;28:61-7.
- Lizaur Utrilla A, et al. Position of the components of total knee prostheses and their clinical correlation. Revista de Ortopedia y Traumatologia 1998;42:438-42.
- Lizaur A, et al. The patella in total knee replacements with a symmetric femoral component: A prospective study with a 3 to 7 year followup. Revista de Ortopedia y Traumatologia 2006;50:441-6.
- Llopis E, et al. Anterior knee pain. European Journal of Radiology 2007;62:27-43.
- Lo GH, et al. Associations of varus thrust and alignment with pain in knee osteoarthritis. Arthritis and rheumatism 2012;2012/02/07:2252-9.
- Logan M, et al. The Effect of Posterior Cruciate Ligament Deficiency on Knee Kinematics. American Journal of Sports Medicine 2004;32:1915-22.
- Logan M, et al. Tibiofemoral Kinematics of the Anterior Cruciate Ligament (ACL)-Deficient Weightbearing, Living Knee Employing Vertical Access Open "Interventional" Multiple Resonance Imaging. American Journal of Sports Medicine 2004;32:720-6.
- Lone AR, et al. Analgesic efficacy of transcutaneous electrical nerve stimulation compared with diclofenac sodium in osteo-arthritis of the knee. Physiotherapy 2003;89:478-85.

- Lonner JH, et al. Robotic arm-assisted UKA improves tibial component alignment: a pilot study. Clinical orthopaedics and related research 2010;2009/07/14:141-6.
- Lootvoet L, et al. Total knee arthroplasty in severe valgus deformity. Acta orthopaedica Belgica 1997;63:278-86.
- Lopez MJ, et al. Hamstring Graft Technique for Stabilization of Canine Cranial Cruciate Ligament Deficient Stifles. Veterinary Surgery 2003;32:390-401.
- Lopez MJ, et al. A comparison of joint stability between anterior cruciate intact and deficient knees: A new canine model of anterior cruciate ligament disruption. Journal of Orthopaedic Research 2003;21:224-30.
- Luo CF, et al. Reliability of the transepicondylar line as a parameter of femoral axial alignment. Journal of orthopaedic science : official journal of the Japanese Orthopaedic Association 2001;2002/02/15:373-7.
- Lynn SK, et al. The influence of gait pattern on signs of knee osteoarthritis in older adults over a 5-11 year follow-up period: a case study analysis. The Knee 2007;2006/11/10:22-8.
- Lynn SK, et al. Effect of foot rotation on knee kinetics and hamstring activation in older adults with and without signs of knee osteoarthritis. Clinical Biomechanics 2008;23:779-86.
- Lynn SK, et al. Frontal plane knee moments in golf: Effect of target side foot position at address. Journal of Sports Science and Medicine 2010;9:275-81.
- Lynn SK, Costigan PA. THE EFFECT OF GAIT LOADS ON THE PROGRESSION OF RADIOGRAPHIC KNEE OSTEOARTHRITIS: A 5-11 YEAR FOLLOW-UP. (Abstract). In Canadian Society for Biomechanics, Proceedings, 13th Biennial Conference, Canadian Society for Biomechanics, Halifax Aug 4-7 2004, Nova Scotia, Canadian Institutes of Health Research, 2004, p.204.Canada: 2004.
- Ma SM, et al. Anametric total knee arthroplasty. Orthopedic Clinics of North America 1982;13:45-54.
- Ma YF, et al. [Multiple linear regression analysis of X-ray measurement and WOMAC scores of knee osteoarthritis]. Zhongguo gu shang = China journal of orthopaedics and traumatology 2012;2012/08/09:373-6.
- MacDonald P, et al. A biomechanical analysis of joint contact forces in the posterior cruciate deficient knee. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 1996;1996/01/01:252-5.
- Madan S, et al. Intermediate follow-up of high tibial osteotomy: a comparison of two techniques. Bulletin (Hospital for Joint Diseases (New York, N Y)) 2002;2003/06/28:11-6.
- Madry H, et al. Biological aspects of early osteoarthritis. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2012;2011/10/20:407-22.
- Madsen OR, et al. Isometric and isokinetic quadriceps strength in gonarthrosis; inter-relations between quadriceps strength, walking ability, radiology, subchondral bone density and pain. Clinical rheumatology 1995;14:308-14.
- MagalhÃ£es CMB, et al. Increased hip internal abduction moment and reduced speed are the gait strategies used by women with knee osteoarthritis. Journal of electromyography and kinesiology 2013;23:1243-9.
- Magyar G, et al. Changes in osseous correction after proximal tibial osteotomy. Acta Orthopaedica Scandinavica 1999;70:473.
- Mak J, et al. Ipsilateral total hip arthroplasty in a dysvascular below-knee amputee for advanced hip osteoarthritis: A case report and review of the literature. Prosthetics and Orthotics International 2008;32:155-9.
- Malfait AM, et al. ADAMTS-5 deficient mice do not develop mechanical allodynia associated with osteoarthritis following medial meniscal destabilization. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2010;2009/12/29:572-80.
- Malvankar S, et al. How Effective are Lateral Wedge Orthotics in Treating Medial Compartment Osteoarthritis of the Knee? A Systematic Review of the Recent Literature. The open orthopaedics journal 2012;2012/12/19:544-7.
- Maly M, et al. Static and dynamic biomechanics of foot orthoses in people with medial compartment knee osteoarthritis. Clinical Biomechanics 2002;17:603.
- Maly MR, et al. Contribution of psychosocial and mechanical variables to physical performance measures in knee osteoarthritis. Physical Therapy 2005;85:1318-28.
- Maly MR, et al. Mechanical factors relate to pain in knee osteoarthritis. Clinical Biomechanics 2008;23:796-805.
- Maly MR. Linking biomechanics to mobility and disability in people with knee osteoarthritis. Exercise and Sport Sciences Reviews 2009;37:36-42.
- Maly MR, et al. Cumulative knee adductor load distinguishes between healthy and osteoarthritic knees--a proof of principle study. Gait & posture 2013;2012/09/22:397-401.
- Maly M, Costigan P, Olney S. KNEE KINEMATICS, KNEE KINETICS AND HIP KINETICS IN MEDIAL COMPARTMENT KNEE OA. (Abstract). In Canadian Society for Biomechanics, Proceedings, 13th Biennial Conference, Canadian Society for Biomechanics, Halifax Aug 4-7 2004, Nova Scotia, Canadian Institutes of Health Research, 2004, p.136.Canada: 2004.
- Mancuso CA, et al. Indications for total hip and total knee arthroplasties. Results of orthopaedic surveys. The Journal of arthroplasty 1996;1996/01/01:34-46.
- Manetta J, et al. Comparison of hip and knee muscle moments in subjects with and without knee pain. Gait & posture 2002;16:249.
- Maquet P, et al. Mechanical pressure on the knee during walking. Acta orthopaedica Belgica 1975;41:119-32.
- Marks R. Obesity profiles with knee osteoarthritis: correlation with pain, disability, disease progression. Obesity (Silver Spring, Md) 2007;2007/07/20:1867-74.

- Marks R. Physical and psychological correlates of disability among a cohort of individuals with knee osteoarthritis. Canadian journal on aging = La revue canadienne du vieillissement 2007;2008/02/29:367-77.
- Marks R. Knee osteoarthritis and exercise adherence: A review. Current Aging Science 2012;5:72-83.
- Marsh AP, et al. Baseline balance and functional decline in older adults with knee pain: The Observational Arthritis Study in Seniors. Journal of the American Geriatrics Society 2003;51:331-9.
- Martel-Pelletier J, et al. Is osteoarthritis a disease involving only cartilage or other articular tissues? Eklem hastaliklari ve cerrahisi = Joint diseases & related surgery 2010;2010/03/23:2-14.
- Martin A, et al. [Post-traumatic osteoarthritis of the knee: special indication for navigated TKA]. Der Unfallchirurg 2008;2008/02/28:754-8.
- Mason RB, et al. The posteroanterior 45 degrees flexion weight-bearing radiograph of the knee. The Journal of arthroplasty 1995;1995/12/01:790-2.
- Massai F, et al. Tibial stress fracture after computer-navigated total knee arthroplasty. Journal of Orthopaedics and Traumatology 2010;11:123-7.
- Matsuno H, et al. Generation II knee bracing for severe medial compartments osteoarthritis of the knee. Archives of physical medicine and rehabilitation 1997;78:745-9.
- Matziolis G, et al. Kinematic analysis of the flexion axis for correct femoral component placement. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2011;2011/05/26:1504-9.
- Mayr HO, et al. Revision of anterior cruciate ligament reconstruction with patellar tendon allograft and autograft: 2- and 5-year results. Archives of orthopaedic and trauma surgery 2012;2012/02/22:867-74.
- Mazzuca SA, et al. Is knee radiography useful for studying the efficacy of a disease-modifying osteoarthritis drug in humans? Rheumatic diseases clinics of North America 2003;2003/11/08:819-30.
- Mazzuca SA, et al. Malalignment and subchondral bone turnover in contralateral knees of overweight/obese women with unilateral osteoarthritis: Implications for bilateral disease. Arthritis care & research 2011;63:1528-34.
- McCarthy CJ, et al. Supplementing a home exercise programme with a class-based exercise programme is more effective than home exercise alone in the treatment of knee osteoarthritis. Rheumatology 2004;43:880-6.
- McDaniel G, et al. Association of knee and ankle osteoarthritis with physical performance. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2011;2011/02/12:634-8.
- McKean KA, et al. Gender differences exist in osteoarthritic gait. Clinical biomechanics (Bristol, Avon) 2007;2007/01/24:400-9.
- McNamara I, et al. High tibial osteotomy: Evolution of research and clinical applications-a Canadian experience. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2013;21:23-31.
- McNicholas MJ, et al. The influence of external knee moments on the outcome of total meniscectomy. A comparison of radiological and 3-D gait analysis measurements. Gait and Posture 2000;11:233-8.
- McWalter EJ, et al. Relationship between varus-valgus alignment and patellar kinematics in individuals with knee osteoarthritis. The Journal of bone and joint surgery American volume 2007;2007/12/07:2723-31.
- McWalter EJ, et al. The effect of a patellar brace on three-dimensional patellar kinematics in patients with lateral patellofemoral osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2011;2011/03/15:801-8.
- McWilliams DF, et al. Self-reported knee and foot alignments in early adult life and risk of osteoarthritis. Arthritis care & research 2010;2010/04/15:489-95.
- Meding JB, et al. Total knee arthroplasty after high tibial osteotomy: a comparison study in patients who had bilateral total knee replacement. Journal of Bone and Joint Surgery 2000;82A:1252-9.
- Meding JB, et al. The planovalgus foot: A harbinger of failure of posterior cruciate-retaining total knee replacement. Journal of Bone and Joint Surgery - Series A 2005;87:59-62.
- Meehan JP, et al. Closing wedge retrotubercular tibial osteotomy and TKA for posttraumatic osteoarthritis with angular deformity. Orthopedics 2009;2009/05/29:360.
- Mehling I, et al. (i) Comminuted patellar fractures. Current Orthopaedics 2006;20:397-404.
- Mermerci BaÅŸkan B, et al. Factors related with quality of life in patients with knee osteoarthritis. Journal of Rheumatology and Medical Rehabilitation 2009;20:53-9.
- Messieh SS, et al. Anteroposterior radiographs of the osteoarthritic knee. The Journal of bone and joint surgery British volume 1990;1990/07/01:639-40.
- Messier SP, et al. Exercise and weight loss in obese older adults with knee osteoarthritis: a preliminary study. Journal of the American Geriatrics Society 2000;2000/09/13:1062-72.
- Messier SP, et al. Exercise and Dietary Weight Loss in Overweight and Obese Older Adults with Knee Osteoarthritis: The Arthritis, Diet, and Activity Promotion Trial. Arthritis and rheumatism 2004;50:1501-10.
- Messier SP, et al. Weight loss reduces knee-joint loads in overweight and obese older adults with knee osteoarthritis. Arthritis and rheumatism 2005;2005/06/30:2026-32.
- Messier SP, et al. Do older adults with knee osteoarthritis place greater loads on the knee during gait? A preliminary study. Archives of physical medicine and rehabilitation 2005;2005/04/14:703-9.

- Messier SP, et al. Does high weight loss in older adults with knee osteoarthritis affect bone-on-bone joint loads and muscle forces during walking? Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2011;2010/12/08:272-80.
- Messier SP, et al. Strength training for arthritis trial (START): Design and rationale. BMC musculoskeletal disorders 2013;14.
- Messier SP, et al. Effects of intensive diet and exercise on knee joint loads, inflammation, and clinical outcomes among overweight and obese adults with knee osteoarthritis: the IDEA randomized clinical trial. JAMA : the journal of the American Medical Association 2013;2013/09/26:1263-73.
- Messner K, et al. Radiographic joint space narrowing and histologic changes in a rabbit meniscectomy model of early knee osteoarthrosis. American Journal of Sports Medicine 2001;29:151-60.
- Mi Lee J, et al. Natural history of the post-meniscectomy knee. Sports Medicine and Arthroscopy Review 2002;10:236-43.
- Miller GD, et al. The Arthritis, Diet and Activity Promotion Trial (ADAPT): design, rationale, and baseline results. Controlled clinical trials 2003;2003/07/17:462-80.
- Miller RH, et al. Predicting sagittal plane biomechanics that minimize the axial knee joint contact force during walking. J biomech eng 2013;135:011007.
- Miller RH, et al. Why don't most runners get knee osteoarthritis? A case for per-unit-distance loads. Medicine and science in sports and exercise 2013.
- Mills K, et al. Between-Limb Kinematic Asymmetry During Gait in Unilateral and Bilateral Mild to Moderate Knee Osteoarthritis. Archives of physical medicine and rehabilitation 2013.
- Mills K, et al. A systematic review and meta-analysis of lower limb neuromuscular alterations associated with knee osteoarthritis during level walking. Clinical biomechanics (Bristol, Avon) 2013;2013/08/21:713-24.
- Milner CE. Interlimb asymmetry during walking following unilateral total knee arthroplasty. Gait and Posture 2008;28:69-73.
- Milner SA, et al. Long-term outcome after tibial shaft fracture: is malunion important? The Journal of bone and joint surgery American volume 2002;2002/06/14:971-80.
- Minick KI, et al. Gait mechanics in asymptomatic males and females ages 18 to 40: implications for differential knee osteoarthritis progression between genders. Journal of Orthopaedic & Sports Physical Therapy 2009;39:A51-A52.
- Minoda M, et al. Multiple huge subchondral cysts associated with pseudogout in the bilateral knees: A case report and review of the literatures. Journal of orthopedic science 2012;17:817-21.
- Minor MA. Physical activity and knee osteoarthritis: answers and questions. Arthritis and rheumatism 2007;2007/02/03:1-2.
- Miyazaki T, et al. Dynamic load at baseline can predict radiographic disease progression in medial compartment knee osteoarthritis. Annals of the rheumatic diseases 2002;2002/06/25:617-22.
- Miyazaki T, et al. Anteroposterior and varus-valgus laxity of the knee increase after stair climbing in patients with mild osteoarthritis. Rheumatology international 2012;32:2823-8.
- Miyazaki T, et al. Knee laxity after staircase exercise predicts radiographic disease progression in medial compartment knee osteoarthritis. Arthritis and rheumatism 2012;64:3908-16.
- Mizner RL. Quadriceps femoris weakness and functional outcome in individuals with end-stage knee osteoarthritis University of Delaware; 2004.
- Mizu-Uchi H, et al. Three-dimensional analysis of computed tomography-based navigation system for total knee arthroplasty: the accuracy of computed tomography-based navigation system. The Journal of arthroplasty 2009;2008/10/14:1103-10.
- Mochizuki T, et al. In vivo pre- and postoperative three-dimensional knee kinematics in unicompartmental knee arthroplasty. Journal of orthopaedic science : official journal of the Japanese Orthopaedic Association 2013;2012/11/02:54-60.
- Moffat M. Braving new worlds: To conquer, to endure. Physical Therapy 2004;84:1056-86.
- Moisio K, et al. Varus-valgus alignment: reduced risk of subsequent cartilage loss in the less loaded compartment. Arthritis and rheumatism 2011;2011/01/13:1002-9.
- Molli RG, et al. Computer-assisted navigation software advancements improve the accuracy of total knee arthroplasty. The Journal of arthroplasty 2011;2010/03/26:432-8.
- Monk AP, et al. In vivo sagittal plane kinematics of the FPV patellofemoral replacement. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2012;2011/10/20:1104-9.
- Mononen ME, et al. Alterations in structure and properties of collagen network of osteoarthritic and repaired cartilage modify knee joint stresses. Biomechanics and modeling in mechanobiology 2011;2010/07/16:357-69.
- Mononen ME, et al. Effect of superficial collagen patterns and fibrillation of femoral articular cartilage on knee joint mechanics-a 3D finite element analysis. Journal of biomechanics 2012;2011/12/06:579-87.
- Mononen ME, et al. Implementation of a gait cycle loading into healthy and meniscectomised knee joint models with fibril-reinforced articular cartilage. Computer Methods in Biomechanics and Biomedical Engineering 2013;2013/04/11.
- Morgan SS, et al. The influence of postoperative coronal alignment on revision surgery in total knee arthroplasty. International orthopaedics 2008;2007/07/06:639-42.
- Mori S, et al. Tibia vara affects the aspect ratio of tibial resected surface in female Japanese patients undergoing TKA. Clinical orthopaedics and related research 2013;2013/01/31:1465-71.

- Moroni A, et al. State of the art review: techniques to avoid pin loosening and infection in external fixation. Journal of orthopaedic trauma 2002;2002/03/07:189-95.
- Mosher TJ, et al. Functional cartilage MRI T2 mapping: evaluating the effect of age and training on knee cartilage response to running. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2010;2009/12/02:358-64.
- Motlagh FN, et al. Ankle rotation changes and its influences in knee osteoarthritis. Medical Journal of the Islamic Republic of Iran 2013;27:67-76.
- Mounach A, et al. Risk factors for knee osteoarthritis in Morocco. A case control study. Clinical rheumatology 2008;27:323-6.
- Moussa M. Rotational malalignment and femoral torsion in osteoarthritic knees with patellofemoral joint involvement. A CT scan study. Clinical orthopaedics and related research 1994;1994/07/01:176-83.
- Moyer RF, et al. Alignment, body mass and their interaction on dynamic knee joint load in patients with knee osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2010;2010/04/27:888-93.
- Mueller PS. Osteoarthritis of the hip or knee raises mortality risk. New England Journal of Medicine 2011;12:86-7.
- Mukaimi AA, et al. Osteoarthritis of the knee: Review of risk factors and treatment programs with special reference to evidence-based research. Kuwait Medical Journal 2011;43:176-88.
- Mullaji A, et al. Persistent hindfoot valgus causes lateral deviation of weightbearing axis after total knee arthroplasty. Clinical orthopaedics and related research 2011;2010/12/02:1154-60.
- Mullaji AB, et al. Unicompartmental knee arthroplasty: functional recovery and radiographic results with a minimally invasive technique. The Journal of arthroplasty 2007;2007/08/25:7-11.
- Mullaji AB, et al. A comparison of coronal plane axial femoral relationships in Asian patients with varus osteoarthritic knees and healthy knees. The Journal of arthroplasty 2009;2008/08/15:861-7.
- Muller-Rath R, et al. [Clinical and gait analytical investigation of valgus knee bracing in therapy for medial degenerative joint disease of the knee]. Zeitschrift fur Orthopadie und Unfallchirurgie 2011;2010/04/15:160-5.
- Mullis BH, et al. Characterization of a consistent radiographic finding in chronic anterior cruciate ligament deficiency: the posteromedial osteophyte. American journal of orthopedics (Belle Mead, N J) 2007;2007/10/20:494-7.
- Mundermann A, et al. Secondary gait changes in patients with medial compartment knee osteoarthritis: Increased load at the ankle, knee, and hip during walking. Arthritis and rheumatism 2005;52:2835-44.
- Munnich U, et al. [Development of physical and sports activity in patients before and after implantation of a total knee endoprosthesis. A prospective study of 40 patients]. Versicherungsmedizin / herausgegeben von Verband der Lebensversicherungs-Unternehmen e V und Verband der Privaten Krankenversicherung e V 2003;2003/07/04:82-6.
- Muraki S, et al. Association of occupational activity with radiographic knee osteoarthritis and lumbar spondylosis in elderly patients of population-based cohorts: a large-scale population-based study. Arthritis and rheumatism 2009;2009/05/30:779-86.
- Muraki S, et al. Risk factors for falls in a longitudinal population-based cohort study of Japanese men and women: The ROAD Study. Bone 2012;2012/10/30.
- Muraki S, et al. Physical performance, bone and joint diseases, and incidence of falls in Japanese men and women: a longitudinal cohort study. Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA 2013;2012/03/22:459-66.
- Murphy KP. Cerebral palsy lifetime care - Four musculoskeletal conditions. Developmental Medicine and Child Neurology 2009;51:30-7.
- Murray MP, et al. Kinesiologic measurements of functional performance before and after McKee-Farrar total hip replacement. A study of thirty patients with rheumatoid arthritis, osteoarthritis, or avascular necrosis of the femoral head. Journal of Bone and Joint Surgery - Series A 1972;54:237-56.
- Musacchio E, et al. The impact of knee and hip chondrocalcinosis on disability in older people: the ProVA Study from northeastern Italy. Annals of the rheumatic diseases 2011;2011/08/09:1937-43.
- Musil D, et al. [Minimally invasive anterolateral surgical approach for total hip arthroplasty: seven-year results]. Acta chirurgiae orthopaedicae et traumatologiae Cechoslovaca 2013;2013/04/09:138-41.
- Nadaud MC, et al. Proximal tibiofibular arthritis: An unusual cause of lateral knee pain. Orthopedics 2001;24:397-8.
- Nadaud MC, et al. In vivo three-dimensional determination of the effectiveness of the osteoarthritic knee brace: A multiple brace analysis. Journal of Bone and Joint Surgery - Series A 2005;87:114-9.
- Nafei A, et al. Total condylar arthroplasty for gonarthrosis. A prospective 10-year study of 138 primary cases. Acta Orthopaedica Scandinavica 1993;64:421-7.
- Nagaosa Y, et al. Characterisation of size and direction of osteophyte in knee osteoarthritis: a radiographic study. Annals of the rheumatic diseases 2002;2002/03/05:319-24.
- Nagashima H, et al. Preliminary assessment of the safety and efficacy of tanezumab in Japanese patients with moderate to severe osteoarthritis of the knee: a randomized, double-blind, dose-escalation, placebo-controlled study. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2011;2011/10/19:1405-12.
- Nakajima K, et al. Addition of an arch support improves the biomechanical effect of a laterally wedged insole. Gait and Posture 2009;29:208-13.
- Nakamura E, et al. Three-dimensional tibiofemoral kinematics during deep flexion kneeling in a mobile-bearing total knee arthroplasty. The Journal of arthroplasty 2009;2008/10/01:1120-4.
- Nakamura N, et al. Selections From Recent Japanese Language Journals. American Journal of Sports Medicine 2011;39:435-7.

- Nakamura S, et al. Fluoroscopic and computed tomographic analysis of knee kinematics during very deep flexion after total knee arthroplasty. The Journal of arthroplasty 2010;2009/02/07:486-91.
- Nam D, et al. Radiographic analysis of a hand-held surgical navigation system for tibial resection in total knee arthroplasty. The Journal of arthroplasty 2011;2011/03/15:1527-33.
- Nam J, et al. Transcriptome-wide gene regulation by gentle treadmill walking during the progression of monoiodoacetate-induced arthritis. Arthritis and rheumatism 2011;63:1613-25.
- Nash MS, et al. Magnetic resonance imaging of osteonecrosis and osteoarthrosis in exercising quadriplegics and paraplegics. American journal of physical medicine & rehabilitation / Association of Academic Physiatrists 1994;1994/06/01:184-92.
- Neame R, et al. Distribution of radiographic osteoarthritis between the right and left hands, hips, and knees. Arthritis and rheumatism 2004;2004/05/18:1487-94.
- Nebel MB, et al. The relationship of self-reported pain and functional impairment to gait mechanics in overweight and obese persons with knee osteoarthritis. Archives of physical medicine and rehabilitation 2009;2009/11/06:1874-9.
- Nelson AE, et al. Composite measures of multi-joint symptoms, but not of radiographic osteoarthritis, are associated with functional outcomes: the Johnston County Osteoarthritis Project. Disability and rehabilitation 2013;2013/05/04.
- Neogi T, et al. Osteoarthritis prevention. Current opinion in rheumatology 2011;2011/01/06:185-91.
- Nestor BJ, et al. Mini-Midvastus vs Standard Medial Parapatellar Approach: A Prospective, Randomized, Double-Blinded Study in Patients Undergoing Bilateral Total Knee Arthroplasty. Journal of Arthroplasty 2010;25:5-11.
- Netravali NA, et al. The effect of kinematic and kinetic changes on meniscal strains during gait. Journal of biomechanical engineering 2011;2010/12/29:011006.
- Neyret P, et al. [Total knee replacement after valgus tibial osteotomy. Technical problems]. Revue de chirurgie orthopedique et reparatrice de l'appareil moteur 1992;1992/01/01:438-48.
- Ng NTM, et al. Efficacy of a progressive walking program and glucosamine sulphate supplementation on osteoarthritic symptoms of the hip and knee: A feasibility trial. Arthritis Research and Therapy 2010;12.
- Ng YCS, et al. Management of knee osteoarthritis presenting with tibial stress fractures. Singapore Medical Journal 2010;51:e149-e152.
- Nicklas BJ, et al. Diet-induced weight loss, exercise, and chronic inflammation in older, obese adults: a randomized controlled clinical trial. The American Journal of Clinical Nutrition 2004;79:544-51.
- Niki Y, et al. Is greater than 145{degrees} of deep knee flexion under weight-bearing conditions safe after total knee arthroplasty?: a fluoroscopic analysis of Japanese-style deep knee flexion. The bone & joint journal 2013;2013/06/01:782-7.
- Nishimura A, et al. Total knee arthroplasty in osteogenesis imperfecta: Case report. The Knee 2008;15:494-6.
- Noda M, et al. Surgical treatment for permanent dislocation of the patella in adults. Orthopedics 2011;2011/12/08:e948-e951.
- Norman Scott W, et al. Early knee arthritis: The role of arthroscopy: Beneficial or placebo? Orthopedics 2003;26:943-4.
- Nunley RM, et al. Do patient-specific guides improve coronal alignment in total knee arthroplasty? Clinical orthopaedics and related research 2012;2011/12/21:895-902.
- Nunn T, et al. (viii) Blount's disease. Orthopaedics and Trauma 2011;25:454-61.
- Oakley SP, et al. A critical appraisal of quantitative arthroscopy as an outcome measure in osteoarthritis of the knee. Seminars in arthritis and rheumatism 2003;2003/11/20:83-105.
- Okamoto R. [High tibial osteotomy for osteoarthritis of the knee]. Clinical calcium 2002;2005/03/19:70-6.
- Ollivier M, et al. Relation between lower extremity alignment and proximal femur anatomy. Parameters during total hip arthroplasty. Orthopaedics & traumatology, surgery & research : OTSR 2013;2013/06/29:493-500.
- Omori G. Epidemiology of knee osteoarthritis. Acta Medica et Biologica 2005;53:1-11.
- Orishimo KF, et al. Does total knee arthroplasty change frontal plane knee biomechanics during gait? Clinical orthopaedics and related research 2012;2011/11/30:1171-6.
- Orlic D. [Endoprosthetic procedures in rheumatoid patients]. Reumatizam 2003;2004/04/22:7-14.
- Orlik B, Dunbar MJ, Amirault DJ, Hennigar AW, Leahey L. VALIDITY AND RELIABILITY OF ACCELEROMETRIC GAIT ANALYSIS IN THE ASSESSMENT OF OSTEOARTHRITIS OF THE KNEE. (Abstract). In Canadian Society for Biomechanics, Proceedings, 13th Biennial Conference, Canadian Society for Biomechanics, Halifax Aug 4-7 2004, Nova Scotia, Canadian Institutes of Health Research, 2004, p.22.Canada: 2004.
- Osaki M, et al. Physical performance and knee osteoarthritis among community-dwelling women in Japan: the Hizen-Oshima Study, cross-sectional study. Rheumatology international 2012;2011/05/06:2245-9.
- Oztuna V, et al. Involvement of the proximal tibiofibular joint in osteoarthritis of the knee. Knee 2003;10:347-9.
- Paans N, et al. Effect of exercise and weight loss in people who have hip osteoarthritis and are overweight or obese: A prospective cohort study. Physical Therapy 2013;93:137-46.
- Pagani CH, et al. Short-term effects of a dedicated knee orthosis on knee adduction moment, pain, and function in patients with osteoarthritis. Archives of physical medicine and rehabilitation 2010;2010/11/30:1936-41.
- Pagenstert G, et al. Simultaneous bilateral total knee and ankle arthroplasty as a single surgical procedure. BMC musculoskeletal disorders 2011;12.

- Pagenstert GI, et al. Realignment surgery as alternative treatment of varus and valgus ankle osteoarthritis. Clinical orthopaedics and related research 2007;156-68.
- Palacios Blancarte F, et al. [Unicompartment knee arthroplasty with an Oxford prosthesis]. Acta ortopedica mexicana 2007;2007/08/19:49-54.
- Palmu SA, et al. Childhood femoral fracture can lead to premature knee-joint arthritis. Acta orthopaedica 2013;84:71-5.
- Pandit H, et al. Influence of surface geometry and the cam-post mechanism on the kinematics of total knee replacement. The Journal of bone and joint surgery British volume 2005;2005/06/24:940-5.
- Pang CH, et al. Comparison of total knee arthroplasty using computer-assisted navigation versus conventional guiding systems: a prospective study. Journal of orthopaedic surgery (Hong Kong) 2009;2009/09/02:170-3.
- Pang H, et al. Computational modeling of bone density profiles in response to gait: a subject-specific approach. Biomechanics and modeling in mechanobiology 2012;2011/05/24:379-90.
- Panula HE, et al. Slowly progressive osteoarthritis after tibial valgus osteotomy in young beagle dogs. Clinical orthopaedics and related research 1997;1997/11/05:192-202.
- Papachristou G. Photoelastic study of the internal and contact stresses on the knee joint before and after osteotomy. Archives of orthopaedic and trauma surgery 2004;2004/04/03:288-97.
- Papadopulos JS. [Gonarthrosis: is the role of pathological statics overestimated?]. Zeitschrift fur Orthopadie und ihre Grenzgebiete 1991;1991/01/01:65-71.
- Papagelopoulos PJ, et al. Hip and knee replacement in osteogenesis imperfecta. Journal of Bone and Joint Surgery - Series A 1993;75:572-80.
- Papas TT, et al. Popliteal artery pseudoaneurysm after total knee replacement. VASA Zeitschrift fur Gefasskrankheiten 2007;2007/08/22:145-8.
- Park JW, et al. Simultaneous cemented and cementless total knee replacement in the same patients: A prospective comparison of long-term outcomes using an identical design of NexGen prosthesis. Journal of Bone & Joint Surgery, British Volume 2011;93:1479-86.
- Park SE, et al. Comparison of robotic-assisted and conventional manual implantation of a primary total knee arthroplasty. The Journal of arthroplasty 2007;2007/10/09:1054-9.
- Parmet S, et al. Osteoarthritis of the Knee. Journal of the American Medical Association 2003;289:1068.
- Paus AC, et al. Arthroscopic and radiographic examination of patients with juvenile rheumatoid arthritis before and after open synovectomy of the knee joint. A prospective study with a 5-year follow-up. Annales Chirurgiae et Gynaecologiae 1993;82:55-61.
- Pavelka¡ K, et al. Glucosamine sulfate use and delay of progression of knee osteoarthritis: A 3-year, randomized, placebo-controlled, double-blind study. Archives of internal medicine 2002;162:2113-23.
- Pearle AD, et al. Robot-assisted unicompartmental knee arthroplasty. The Journal of arthroplasty 2010;2008/12/06:230-7.
- Pedersen EN, et al. Walking pattern in 9 women with hip dysplasia 18 months after periacetabular osteotomy. Acta orthopaedica 2006;2006/06/06:203-8.
- Peixoto JG, et al. Relationships between measures of muscular performance, proprioceptive acuity, and aging in elderly women with knee osteoarthritis. Archives of Gerontology and Geriatrics 2011;53:e253-e257.
- Penninx BWJH, et al. Inflammatory markers and physical function among older adults with knee osteoarthritis. Journal of Rheumatology 2004;31:2027-31.
- Percope Andrade MA, et al. Medial osteoarthritis of the knee: Evaluation of a valgus proximal tibial osteotomy with fixation by Weber's technique. Revista Brasileira de Ortopedia 1996;31:377-82.
- Petersen W, et al. [Chronic patellofemoral instability]. Der Unfallchirurg 2012;2012/05/17:397-409.
- Petrella RJ, et al. Home based exercise therapy for older patients with knee osteoarthritis: a randomized clinical trial. The Journal of rheumatology 2000;2000/09/16:2215-21.
- Petrella RJ. Hyaluronic acid for the treatment of knee osteoarthritis: long-term outcomes from a naturalistic primary care experience. American journal of physical medicine & rehabilitation / Association of Academic Physiatrists 2005;2005/03/24:278-83.
- Petrella RJ, et al. A prospective, randomized, double-blind, placebo controlled study to evaluate the efficacy of intraarticular hyaluronic acid for osteoarthritis of the knee. Journal of Rheumatology 2006;33:951-6.
- Petterson SC, et al. Disease-specific gender differences among total knee arthroplasty candidates. Journal of Bone and Joint Surgery - Series A 2007;89:2327-33.
- Pieler-Bruha E. Effect of exercise and weight loss in people who have hip osteoarthritis and are overweight or obese: A prospective cohort study. Mineralstoffwechsel 2013;20:69.
- Pierson JL, et al. Ipsilateral stress fracture of the proximal tibia after primary hybrid total hip arthoplasty. Orthopedics 2005;28:409-10.
- Pietrosimone BG, et al. Effects of disinhibitory transcutaneous electrical nerve stimulation and therapeutic exercise on sagittal plane peak knee kinematics and kinetics in people with knee osteoarthritis during gait: a randomized controlled trial. Clinical rehabilitation 2010;2010/08/18:1091-101.
- Platzer P, et al. Management and outcome of interprosthetic femoral fractures. Injury 2011;2010/12/24:1219-25.
- Podskubka A, et al. Arthoscopic reconstruction of the anterior cruciate ligament by transtibial technique and graft from the patellar tendon - Results after 5 to 6 years. Acta chirurgiae orthopaedicae et traumatologiae Cechoslovaca 2002;69:169-74.
- Pohl MB, et al. Gait biomechanics and hip muscular strength in patients with patellofemoral osteoarthritis. Gait & posture 2013;2012/10/11:440-4.

- Prix R. [Opening-wedge osteotomy of the proximal tibia]. Acta chirurgiae orthopaedicae et traumatologiae Cechoslovaca 2005;2005/12/01:308-12.
- Provelengios S, et al. The role of pantalar arthrodesis in the treatment of paralytic foot deformities. A long-term follow-up study. The Journal of bone and joint surgery American volume 2009;2009/03/04:575-83.
- Provelengios S, et al. The role of pantalar arthrodesis in the treatment of paralytic foot deformities. Surgical technique. The Journal of bone and joint surgery American volume 2010;2010/03/18:44-54.
- Provenzano DA, et al. Chronic pain syndromes: How to break the cycle, part 1. Consultant 2008;48:297-304.
- Pua YH, et al. Association of physical performance with muscle strength and hip range of motion in hip osteoarthritis. Arthritis and rheumatism 2009;2009/04/01:442-50.
- Pua YH, et al. Physical function in hip osteoarthritis: relationship to isometric knee extensor steadiness. Archives of physical medicine and rehabilitation 2010;2010/07/06:1110-6.
- Purser JL, et al. Association of slower walking speed with incident knee osteoarthritis-related outcomes. Arthritis care & research 2012;2012/03/07:1028-35.
- Rajabi R, et al. Radiographic knee osteoarthritis in ex-elite table tennis players. BMC musculoskeletal disorders 2012;2012/02/09:12.
- Ramaswamy R, et al. Total knee replacement with rotational proximal tibial osteotomy for osteoarthritis with severe external tibial torsion and patellar instability. Journal of Bone & Joint Surgery, British Volume 2009;91:1466-71.
- Ramsey DK, et al. Effect of anatomic realignment on muscle function during gait in patients with medial compartment knee osteoarthritis. Arthritis and rheumatism 2007;2007/03/31:389-97.
- Ramsey DK, et al. A mechanical theory for the effectiveness of bracing for medial compartment osteoarthritis of the knee. The Journal of bone and joint surgery American volume 2007;2007/11/03:2398-407.
- Ranawat CS, et al. The press-fit condylar modular total knee system. Four-to-six-year results with a posterior-cruciate-substituting design. Journal of Bone and Joint Surgery - Series A 1997;79:342-8.
- Rao C, et al. A statistical finite element model of the knee accounting for shape and alignment variability. Medical engineering & physics 2013;2013/05/08:1450-6.
- Rasquinha VJ, et al. The press-fit condylar modular total knee system with a posterior cruciate-substituting design: A concise follow-up of a previous report. Journal of Bone and Joint Surgery - Series A 2006;88:1006-10.
- Raynauld JP, et al. Safety and efficacy of long-term intraarticular steroid injections in osteoarthritis of the knee: a randomized, double-blind, placebo-controlled trial. Arthritis and rheumatism 2003;2003/02/07:370-7.
- Reeves ND, et al. Conservative biomechanical strategies for knee osteoarthritis. Nature Reviews Rheumatology 2011;7:113-22.
- Remes V, et al. Walking ability in patients with diastrophic dysplasia: A clinical, electroneurophysiological, treadmill, and MRI analysis. Journal of Pediatric Orthopaedics 2004;24:546-51.
- Repicci JA, et al. Minimally invasive unicondylar knee arthroplasty for the treatment of unicompartmental osteoarthritis: An outpatient arthritic bypass procedure. Orthopedic Clinics of North America 2004;35:201-16.
- Richards C, et al. Knee contact force in subjects with symmetrical OA grades: Differences between OA severities. Journal of biomechanics 2010;43:2595-600.
- Richards JD, et al. A comparison of knee braces during walking for the treatment of osteoarthritis of the medial compartment of the knee. Journal of Bone & Joint Surgery, British Volume 2005;87B:937-9.
- Riddle DL, et al. Psychological health impact on 2-year changes in pain and function in persons with knee pain: Data from the osteoarthritis initiative. Osteoarthritis and Cartilage 2011;19:1095-101.
- Riebel GD, et al. Early failure of the femoral component in unicompartmental knee arthroplasty. The Journal of arthroplasty 1995;1995/10/01:615-21.
- Rienmuller A, et al. The effect of femoral component rotation on the five-year outcome of cemented mobile bearing total knee arthroplasty. International orthopaedics 2012;2012/08/02:2067-72.
- Ring D, et al. Treatment of deformity of the lower limb in adults who have osteogenesis imperfecta. Journal of Bone and Joint Surgery - Series A 1996;78:220-5.
- Rinonapoli E, et al. Arthroplasty of the knee using total condylar prosthesis. Long term results (10 to 17 years) and survival analysis. Revue de chirurgie orthopedique et reparatrice de l'appareil moteur 1994;80:223-9.
- Riordan EA, et al. The health and structural consequences of acute knee injuries involving rupture of the anterior cruciate ligament. Rheumatic diseases clinics of North America 2013;2013/01/15:107-22.
- Riskowski J, et al. Arthritis, foot pain and shoe wear: Current musculoskeletal research on feet. Current opinion in rheumatology 2011;23:148-55.
- Ritter MA, et al. Long-term deterioration of joint evaluation scores. The Journal of bone and joint surgery British volume 2004;2004/05/06:438-42.
- Ritter MA, et al. The clinical effect of gender on outcome of total knee arthroplasty. The Journal of arthroplasty 2008;2008/03/25:331-6.
- Robbins SM, et al. Association of pain with frequency and magnitude of knee loading in knee osteoarthritis. Arthritis care & research 2011;2011/04/13:991-7.

- Robbins SMK, et al. Comparative diagnostic accuracy of knee adduction moments in knee osteoarthritis: A case for not normalizing to body size. Journal of biomechanics 2011;44:968-71.
- Robinson SP, et al. Insufficiency Fracture of the Acetabular Medial Wall. Journal of Arthroplasty 2007;22:768-70.
- Robon MJ, et al. The relationship between ankle plantar flexor muscle moments and knee compressive forces in subjects with and without pain. Clinical Biomechanics 2000;15:522-7.
- Rodgers JA, et al. Preoperative physical therapy in primary total knee arthroplasty. The Journal of arthroplasty 1998;1998/06/30:414-21.
- Rolauffs B, et al. Vulnerability of the superficial zone of immature articular cartilage to compressive injury. Arthritis and rheumatism 2010;2010/06/18:3016-27.
- Rolland E. L'osteotomie de valgisation. / Valgisation osteotomy. Journal de Traumatologie du Sport 2001;18:184-92.
- Romero J, et al. The clinical consequences of flexion gap asymmetry in total knee arthroplasty. The Journal of arthroplasty 2007;2007/02/06:235-40.
- Roos EM, et al. Positive effects of moderate exercise on glycosaminoglycan content in knee cartilage: a four-month, randomized, controlled trial in patients at risk of osteoarthritis. Arthritis and rheumatism 2005;2005/11/01:3507-14.
- Rosemann T. Evidence based therapy of degenerative joint diseases - Surgical treatment options. Zeitschrift fur Allgemeinmedizin 2008;84:21-7.
- Rosenberger RE, et al. Improved accuracy of component alignment with the implementation of image-free navigation in total knee arthroplasty. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2008;2007/12/25:249-57.
- Roth SH, et al. Efficacy and safety of a topical diclofenac solution (pennsaid) in the treatment of primary osteoarthritis of the knee: a randomized, double-blind, vehicle-controlled clinical trial. Archives of internal medicine 2004;2004/10/13:2017-23.
- Ru JY, et al. Hybrid metal-on-metal hip surface arthroplasty in 18 cases: 2 -year follow-up study. Journal of Clinical Rehabilitative Tissue Engineering Research 2008;12:770-4.
- Rudolph KS, et al. Age-related changes in strength, joint laxity, and walking patterns: are they related to knee osteoarthritis? Physical Therapy 2007;87:1422-32.
- Russell EM, et al. Lateral wedges decrease biomechanical risk factors for knee osteoarthritis in obese women. Journal of biomechanics 2011;44:2286-91.
- Rutherford DJ, et al. Foot progression angle and the knee adduction moment: a cross-sectional investigation in knee osteoarthritis. Osteoarthritis and Cartilage 2008;16:883-9.
- Rutherford DJ, et al. The neuromuscular demands of altering foot progression angle during gait in asymptomatic individuals and those with knee osteoarthritis. Osteoarthritis and Cartilage 2010;18:654-61.
- Rutherford DJ, et al. Neuromuscular alterations exist with knee osteoarthritis presence and severity despite walking velocity similarities. Clinical biomechanics (Bristol, Avon) 2011;2010/12/28:377-83.
- Rutherford DJ, et al. Changes in knee joint muscle activation patterns during walking associated with increased structural severity in knee osteoarthritis. Journal of electromyography and kinesiology : official journal of the International Society of Electrophysiological Kinesiology 2013;2013/01/30:704-11.
- Rydevik K, et al. Functioning and disability in patients with hip osteoarthritis with mild to moderate pain. The Journal of orthopaedic and sports physical therapy 2010;2010/09/03:616-24.
- Rytter S, et al. Clinical knee findings in floor layers with focus on meniscal status. BMC musculoskeletal disorders 2008;2008/10/24:144.
- Saari T, et al. Knee kinematics in medial arthrosis. Dynamic radiostereometry during active extension and weight-bearing. Journal of biomechanics 2005;2004/12/16:285-92.
- Sagawa Y, Jr., et al. Associations between gait and clinical parameters in patients with severe knee osteoarthritis: a multiple correspondence analysis. Clinical biomechanics (Bristol, Avon) 2013;2013/02/16:299-305.
- Sahin N, et al. Reactive arthritis following tetanus vaccination: A case report. Modern Rheumatology 2009;19:209-11.
- Saito S, et al. Bilateral fatigue fracture of the femoral components in a cruciate-retaining cementless total knee prosthesis. Orthopedics 2011;2011/10/01:e688-e691.
- Salih S, et al. Hip and knee replacement. Surgery 2013;31:482-7.
- Sambataro S, et al. A Non-Traumatic Stress Fracture of the Tibial Plateau. PM and R 2009;1:691-3.
- Sanchez-Ballester J, et al. Alternative surgeries for patello-femoral disorders. Current Orthopaedics 2006;20:121-7.
- Saragaglia D, et al. Computer-assisted double level osteotomy for severe genu varum. Sports Medicine and Arthroscopy Review 2008;16:91-6.
- Sarsan A, et al. Comparing the efficacy of mature mud pack and hot pack treatments for knee osteoarthritis. Journal of Back and Musculoskeletal Rehabilitation 2012;25:193-9.
- Sasaki T, et al. High tibial osteotomy combined with anterior displacement of the tibial tubercle for osteoarthritis of the knee. International orthopaedics 1986;10:31-40.
- Sasaki T, et al. Clinical evaluation of the treatment of osteoarthritic knees using a newly designed wedged insole. Clinical orthopaedics and related research 1987;1987/08/01:181-7.
- Satku K, et al. Stress fractures around the knee in elderly patients. A cause of acute pain in the knee. The Journal of bone and joint surgery American volume 1990;1990/07/01:918-22.

- Sattler M, et al. Side differences of thigh muscle cross-sectional areas and maximal isometric muscle force in bilateral knees with the same radiographic disease stage, but unilateral frequent pain - data from the osteoarthritis initiative. Osteoarthritis and Cartilage 2012;20:532.
- Sauer B, et al. [Acute exacerbation of tuberculous osteoarthritis of the knee caused by trauma: clinical management]. Zeitschrift fur Orthopadie und Unfallchirurgie 2009;2010/02/26:734-9.
- Sawitzke AD, et al. The effect of glucosamine and/or chondroitin sulfate on the progression of knee osteoarthritis: A report from the glucosamine/chondroitin arthritis intervention trial. Arthritis and rheumatism 2008;58:3183-91.
- Sawitzke AD, et al. Clinical efficacy and safety of glucosamine, chondroitin sulphate, their combination, celecoxib or placebo taken to treat osteoarthritis of the knee: 2-year results from GAIT. Annals of the rheumatic diseases 2010;2010/06/08:1459-64.
- Sayre EC, et al. Does moderate or severe nonspecific knee injury affect radiographic osteoarthritis incidence and progression? BMC musculoskeletal disorders 2013;309.
- Scanlan SF, et al. Graft orientation influences the knee flexion moment during walking in patients with Anterior cruciate ligament reconstruction. American Journal of Sports Medicine 2009;37:2173-8.
- Scanlan SF, et al. Interactions Between Graft Placement, Gait Mechanics, and Premature Osteoarthritis Following Anterior Cruciate Ligament Reconstruction. Journal of Experimental and Clinical Medicine 2011;3:207-12.
- Scanlan SF, et al. The relationship between peak knee extension at heel-strike of walking and the location of thickest femoral cartilage in ACL reconstructed and healthy contralateral knees. Journal of biomechanics 2013;46:849-54.
- Scarvell JM, et al. Association between abnormal kinematics and degenerative change in knees of people with chronic anterior cruciate ligament deficiency: a magnetic resonance imaging study. The Australian journal of physiotherapy 2005;2005/12/03:233-40.
- Scarvell JM, et al. Magnetic resonance imaging analysis of kinematics in osteoarthritic knees. The Journal of arthroplasty 2007;2007/04/03:383-93.
- Schmitt LC, et al. Instability, laxity, and physical function in patients with medial knee osteoarthritis. Physical Therapy 2008;88:1506-16.
- Schneider T, et al. Recurrent dislocation of the patella and the Goldthwait operation. Archives of orthopaedic and trauma surgery 1997;1997/01/01:46-9.
- Schnitzer TJ, et al. Effect of piroxicam on gait in patients with osteoarthritis of the knee. Arthritis and rheumatism 1993;36:1207-13.
- Schultz W, et al. Gait-analytical studies in patients treated by valgus tibial head osteotomy. Orthopade 2003;32:331-9.
- Schwarzberg AB, et al. A joint venture. New England Journal of Medicine 2008;358:2496-501+2432.
- Scott RD, et al. Unicompartmental knee arthroplasty: Eight- to 12-year follow-up evaluation with survivorship analysis. Clinical orthopaedics and related research 1991;96-100.
- Segal NA, et al. Effects of concurrent use of an ankle support with a laterally wedged insole for medial knee osteoarthritis. PM & R : the journal of injury, function, and rehabilitation 2009;2009/07/25:214-22.
- Segal NA, et al. Baseline articular contact stress levels predict incident symptomatic knee osteoarthritis development in the MOST cohort. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2009;2009/06/18:1562-8.
- Segal NA, et al. The multicenter osteoarthritis study: Opportunities for rehabilitation research. PM and R 2013;5:647-54.
- Sell S, et al. Proprioception decline in the osteoarthritic knee. Zeitschrift fur Rheumatologie 1993;52:150-5.
- Sen C, et al. The advantages of circular external fixation used in high tibial osteotomy (average 6 years follow-up). Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2003;2003/04/02:139-44.
- Seon JK, et al. Functional comparison of total knee arthroplasty performed with and without a navigation system. International orthopaedics 2009;2008/07/01:987-90.
- Servien E, et al. Reliability of bony landmarks for restoration of the joint line in revision knee arthroplasty. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2008;2007/11/30:263-9.
- Shah RR, et al. Total Hip Arthroplasty in a Patient With Myelomeningocele. Journal of Arthroplasty 2012;27:820.
- Shakoor N, et al. Asymmetric knee loading in advanced unilateral hip osteoarthritis. Arthritis and rheumatism 2003;2003/06/10:1556-61.
- Shakoor N, et al. Walking barefoot decreases loading on the lower extremity joints in knee osteoarthritis. Arthritis and rheumatism 2006;54:2923-7.
- Shakoor N, et al. Effects of specialized footwear on joint loads in osteoarthritis of the knee. Arthritis and rheumatism 2008;59:1214-20.
- Shakoor N, et al. Effects of common footwear on joint loading in osteoarthritis of the knee. Arthritis care & research 2010;2010/03/02:917-23.
- Shakoor N, et al. Asymmetric loading and bone mineral density at the asymptomatic knees of patients with unilateral hip osteoarthritis. Arthritis and rheumatism 2011;2011/12/01:3853-8.
- Shakoor N, et al. The relationship of vibratory perception to dynamic joint loading, radiographic severity, and pain in knee osteoarthritis. Arthritis and rheumatism 2012;2011/09/08:181-6.
- Shakoor N, et al. Improvement in knee loading after use of specialized footwear for knee osteoarthritis: results of a six-month pilot investigation. Arthritis and rheumatism 2013;2013/04/12:1282-9.
- Sharma L, et al. Impaired proprioception and osteoarthritis. Current opinion in rheumatology 1997;1997/05/01:253-8.
- Sharma L, et al. Knee adduction moment, serum hyaluronan level, and disease severity in medial tibiofemoral osteoarthritis. Arthritis and rheumatism 1998;41:1233-40.

- Sharma L, et al. The role of knee alignment in disease progression and functional decline in knee osteoarthritis. JAMA : the journal of the American Medical Association 2001;2001/07/13:188-95.
- Sharma L. The role of proprioceptive deficits, ligamentous laxity, and malalignment in development and progression of knee osteoarthritis. The Journal of rheumatology Supplement 2004;2004/05/11:87-92.
- Sharma L. The role of varus and valgus alignment in knee osteoarthritis. Arthritis and rheumatism 2007;56:1044-7.
- Sharma L, et al. Relationship of meniscal damage, meniscal extrusion, malalignment, and joint laxity to subsequent cartilage loss in osteoarthritic knees. Arthritis and rheumatism 2008;2008/06/03:1716-26.
- Sharma L, et al. Varus and valgus alignment and incident and progressive knee osteoarthritis. Annals of the rheumatic diseases 2010;2010/06/01:1940-5.
- Sharma L, et al. The role of varus and valgus alignment in the initial development of knee cartilage damage by MRI: the MOST study. Annals of the rheumatic diseases 2013;2012/05/03:235-40.
- Sharma V, et al. Does patellar eversion in total knee arthroplasty cause patella baja? Clinical orthopaedics and related research 2008;466:2763-8.
- Shefelbine SJ, et al. MRI analysis of in vivo meniscal and tibiofemoral kinematics in ACL-deficient and normal knees. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2006;2006/05/03:1208-17.
- Shelbourne KD, et al. Loss of normal knee motion after anterior cruciate ligament reconstruction is associated with radiographic arthritic changes after surgery. American Journal of Sports Medicine 2012;40:108.
- Shen Y, et al. Knee arthroplasty using rotating hinged knee systems for complex knee disease. Journal of Clinical Rehabilitative Tissue Engineering Research 2009;13:6931-4.
- Shetty GM, et al. Computer guided restoration of joint line and femoral offset in cruciate substituting total knee arthroplasty. The Knee 2012;2011/12/20:611-6.
- Shimada S, et al. Effects of disease severity on response to lateral wedged shoe insole for medial compartment knee osteoarthritis. Archives of physical medicine and rehabilitation 2006;2006/11/07:1436-41.
- Shin CS, et al. In vivo tibiofemoral cartilage-to-cartilage contact area of females with medial osteoarthritis under acute loading using MRI. Journal of magnetic resonance imaging : JMRI 2011;2011/09/29:1405-13.
- Shipley MT. Osteoarthritic knee rehabilitation in an elderly male: A functional approach. Journal of Sports Chiropractic and Rehabilitation 2000;14:62-9.
- Shull PB, et al. Training multi-parameter gaits to reduce the knee adduction moment with data-driven models and haptic feedback. Journal of biomechanics 2011;44:1605-9.
- Shull PB, et al. Toe-in gait reduces the first peak knee adduction moment in patients with medial compartment knee osteoarthritis. Journal of biomechanics 2013;46:122-8.
- Shull PB, et al. Six-week gait retraining program reduces knee adduction moment, reduces pain, and improves function for individuals with medial compartment knee osteoarthritis. Journal of Orthopaedic Research 2013;31:1020-5.
- Siebold R, et al. Posterior stability in fixed-bearing versus mobile-bearing total knee replacement: a radiological comparison of two implants. Archives of orthopaedic and trauma surgery 2007;2006/10/06:97-104.
- Silverton C, et al. The prosthesis-bone interface adjacent to tibial components inserted without cement. Clinical and radiographic follow-up at nine to twelve years. Journal of Bone and Joint Surgery - Series A 1996;78:340-7.
- Simic M, et al. Gait modification strategies for altering medial knee joint load: a systematic review. Arthritis care & research 2011;2010/10/29:405-26.
- Simic M, et al. Altering foot progression angle in people with medial knee osteoarthritis: The effects of varying toe-in and toe-out angles aremediated by pain and malalignment. Osteoarthritis and Cartilage 2013;21:1272-80.
- Sims EL, et al. Racial differences in gait mechanics associated with knee osteoarthritis. Aging clinical and experimental research 2009;2010/02/16:463-9.
- Sims EL, et al. Sex differences in biomechanics associated with knee osteoarthritis. Journal of women & aging 2009;2010/02/26:159-70.
- Singer F, et al. Untersuchung von zwei Fragebogen hinsichtlich ihrer Eignung fÃ¼r die Selbstbewertung durch Patienten mit Gonarthrose: Ein Beitrag zur QualitÃ¤tssicherung in der Rheumatologie. Acta Medica Austriaca 1996;23:136-41.
- Sischek EL, et al. Staged medial opening wedge high tibial osteotomy for bilateral varus gonarthrosis: biomechanical and clinical outcomes. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2013;2013/06/14.
- Skou ST, et al. Knee confidence is associated with pain, knee instability, muscle strength and dynamic varus-valgus joint motion in knee osteoarthritis. Arthritis care & research 2013;2013/10/16.
- Skytta ET, et al. Reliability of the hip-to-ankle radiograph in determining the knee and implant alignment after total knee arthroplasty. Acta orthopaedica Belgica 2011;2011/08/19:329-35.
- Sluijter ME, et al. Intra-articular application of pulsed radiofrequency for arthrogenic pain - Report of six cases. Pain Practice 2008;8:57-61.
- Smith Jr GN, et al. Effect of intraarticular hyaluronan injection on vertical ground reaction force and progression of osteoarthritis after anterior cruciate ligament transection. Journal of Rheumatology 2005;32:325-34.
- Snyder-Mackler L. Lateral wedge insoles worn for 12 months provided no symptomatic or structural benefit for people with medial knee osteoarthritis. Journal of physiotherapy 2011;2011/08/17:195.

- Somogyi S, et al. Sports and exercise in case of arthroses of the shoulder and knee joints Discipline, dosage and therapeutic action. Klinikarzt 2010;39:292-5.
- Song LL, et al. Value of dGEMRIC in diagnosing early cartilage degeneration of knee joint. Chinese Journal of Medical Imaging Technology 2009;25:1078-80.
- Song R, et al. A randomized study of the effects of t'ai chi on muscle strength, bone mineral density, and fear of falling in women with osteoarthritis. Journal of alternative and complementary medicine 2010;16:227-33.
- Song Y, et al. Meniscectomy alters the dynamic deformational behavior and cumulative strain of tibial articular cartilage in knee joints subjected to cyclic loads. Osteoarthritis and Cartilage 2008;16:1545-54.
- Sontag L, et al. An uncommon cause of gait disturbance and cognitive decline. Clinical Geriatrics 2008;16:21-4.
- Soran N, et al. Radiological findings and its relation with clinical parameters in knee osteoarthritis. Turkiye Fiziksel Tip ve Rehabilitasyon Dergisi 2008;54:59-62.
- Souza RB, et al. The effects of acute loading on T1rho and T2 relaxation times of tibiofemoral articular cartilage. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2010;2010/10/19:1557-63.
- Sowers M, et al. Performance-based physical functioning in African-American and Caucasian women at midlife: considering body composition, quadriceps strength, and knee osteoarthritis. American journal of epidemiology 2006;2006/03/24:950-8.
- Sowers M, et al. Associations of anatomical measures from MRI with radiographically defined knee osteoarthritis score, pain, and physical functioning. The Journal of bone and joint surgery American volume 2011;2011/01/27:241-51.
- Sørensen TJ, et al. The Association Between Submaximal Quadriceps Force Steadiness and the Knee Adduction Moment During Walking in Patients With Knee Osteoarthritis. Journal of orthopaedic and sports physical therapy 2011;41:592-9.
- Specogna AV, et al. Radiographic measures of knee alignment in patients with varus gonarthrosis: effect of weightbearing status and associations with dynamic joint load. The American journal of sports medicine 2007;2006/09/26:65-70.
- Spector TD, et al. Effect of risedronate on joint structure and symptoms of knee osteoarthritis: results of the BRISK randomized, controlled trial [ISRCTN01928173]. Arthritis research & therapy 2005;2005/05/19:R625-R633.
- Spencer BA, et al. Initial experience with custom-fit total knee replacement: intra-operative events and long-leg coronal alignment. International orthopaedics 2009;2008/12/23:1571-5.
- Squire MW, et al. Unicompartmental knee replacement: A minimum 15 year followup study. Clinical orthopaedics and related research 1999;61-72.
- Stattin EL, et al. Familial osteochondritis dissecans associated with early osteoarthritis and disproportionate short stature. Osteoarthritis and Cartilage 2008;16:890-6.
- Stefanik JJ, et al. Association between patella alta and the prevalence and worsening of structural features of patellofemoral joint osteoarthritis: the multicenter osteoarthritis study. Arthritis care & research 2010;2010/05/28:1258-65.
- Stein V, et al. Pattern of joint damage in persons with knee osteoarthritis and concomitant ACL tears. Rheumatology international 2012;2011/01/22:1197-208.
- Steiner S, et al. Effects of firocoxib therapy on progression of osteoarthritis in a canine model. Current Orthopaedic Practice 2009;20:304-12.
- stephen Wilson JL, et al. The association between knee joint biomechanics and neuromuscular control and moderate knee osteoarthritis radiographic and pain severity. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2011;2010/11/16:186-93.
- Steultjens M, et al. Joint proprioception, muscle strength, and functional ability in patients with osteoarthritis of the knee. Arthritis and rheumatism 2007;57:787-93.
- Steven Borland W, et al. In vivo detachment of a tibial stemmed component and subsequent extraction. The Knee 2013;20:148-50.
- Stief F, et al. Dynamic loading of the knee and hip joint and compensatory strategies in children and adolescents with varus malalignment. Gait and Posture 2011;33:490-5.
- Stitik TP, et al. Osteoarthritis of the knee and hip: Part 2 - Keys to successful nondrug therapy. Consultant 1999;39:1975-81.
- Street BD, et al. The effects of an adopted narrow gait on the external adduction moment at the knee joint during level walking: Evidence of asymmetry. Human Movement Science 2013.
- Strutzenberger G, et al. Effects of obesity on the biomechanics of stair-walking in children. Gait and Posture 2011;34:119-25.
- Stuart MJ, et al. Late recurrence of varus deformity after proximal tibial osteotomy. Clinical orthopaedics and related research 1990;61-5.
- Sturnieks DL, et al. Muscle activations to stabilize the knee following arthroscopic partial meniscectomy. Clinical Biomechanics 2011;26:292-7.
- Sun Y, et al. Calcium deposition in osteoarthritic meniscus and meniscal cell culture. Arthritis research & therapy 2010;2010/04/01:R56.
- Suri P, et al. Epidemiology of osteoarthritis and associated comorbidities. PM & R : the journal of injury, function, and rehabilitation 2012;2012/06/01:S10-S19.
- Suter E, et al. One-year changes in hind limb kinematics, ground reaction forces and knee stability in an experimental model of osteoarthritis. Journal of biomechanics 1998;1998/10/01:511-7.
- Suzuki R, et al. Etiology of osteoarthritis of the knee joint. Fukushima journal of medical science 1967;14:55-87.
- Svetlova MS, et al. Clinicoinstrumental and laboratory characteristics of early stages of gonarthrosis. Terapevticheskii Arkhiv 2010;82:54-8.
- Sy MH, et al. A new case of tibial stress fracture as a complication of knee osteoarthritis. Revue de chirurgie orthopédique et réparatrice de l'appareil moteur 1995;81:445-8.

- Tabak AY, et al. Bilateral total knee arthroplasty in chronic, neglected congenital dislocation: A case report. European Journal of Orthopaedic Surgery and Traumatology 2010;20:423-7.
- Takacs J, et al. The effect of contralateral pelvic drop and trunk lean on frontal plane knee biomechanics during single limb standing. Journal of biomechanics 2012;45(16):2791-6.
- Takacs J, et al. Lower body positive pressure: An emerging technology in the battle against knee osteoarthritis? Clinical interventions in aging 2013;8:983-91.
- Takahashi A, et al. Patellar morphology and femoral component geometry influence patellofemoral contact stress in total knee arthroplasty without patellar resurfacing. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2012;2011/11/17:1787-95.
- Takai S, et al. Revision total knee arthroplasty after failed high tibial osteotomy. Bulletin: Hospital for Joint Diseases 1997;56:245-50.
- Takigami H, et al. An evaluation of the velocity of the lateral thrust in osteoarthritic knees with a varus deformity. The Knee 2000;7:11-5.
- Talbot LA, et al. A home-based protocol of electrical muscle stimulation for quadriceps muscle strength in older adults with osteoarthritis of the knee. Journal of Rheumatology 2003;30:1571-8.
- Tallroth K, et al. Ankle osteoarthritis is associated with knee osteoarthritis. Conclusions based on mechanical axis radiographs. Archives of orthopaedic and trauma surgery 2008;2007/11/22:555-60.
- Talmo CT, et al. Total joint replacement in the elderly patient. Clinics in Geriatric Medicine 2010;26:517-29.
- Tamaki M, et al. In vivo kinematic analysis of a high-flexion posterior stabilized fixed-bearing knee prosthesis in deep knee-bending motion. The Journal of arthroplasty 2008;2008/06/17:879-85.
- Tanaka A, et al. Three-dimensional kinematics during deep-flexion kneeling in mobile-bearing total knee arthroplasty. The Knee 2011;2010/09/14:412-6.
- Tanaka Y. Gait analysis of patients with osteoarthritis of the hip and the those with total hip arthroplasty. Bio-Medical Materials and Engineering 1998;8:187-96.
- Tang SFT, et al. Improvement of muscle strength in osteoarthritic knee patients after intraarticular knee injection of hyaluronan. American Journal of Physical Medicine and Rehabilitation 2005;84:274-7.
- Tang SY, et al. Local tissue properties of human osteoarthritic cartilage correlate with magnetic resonance T(1) rho relaxation times. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2011;2011/03/30:1312-9.
- Tareef AA. Falls in the elderly: Spectrum and prevention. Canadian Family Physician 2011;57:771-6.
- Tashiro Y, et al. Minimally invasive versus standard approach in total knee arthroplasty. Clinical orthopaedics and related research 2007;144-50.
- Tashman S, et al. Kinematics of the ACL-deficient canine knee during gait: serial changes over two years. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2004;2004/08/12:931-41.
- Teichtahl AJ, et al. A comparison of gait patterns between the offspring of people with medial tibiofemoral osteoarthritis and normal controls. Clinical and Experimental Rheumatology 2003;21:421-3.
- Teichtahl AJ, et al. The relationship between the knee adduction moment and knee pain in middle-aged women without radiographic osteoarthritis. The Journal of rheumatology 2006;2006/09/09:1845-8.
- Teichtahl AJ, et al. Sagittal plane movement at the tibiofemoral joint influences patellofemoral joint structure in healthy adult women. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2006;2006/01/24:331-6.
- Teichtahl AJ, et al. Frontal plane knee alignment is associated with a longitudinal reduction in patella cartilage volume in people with knee osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2008;2008/01/16:851-4.
- Teichtahl AJ, et al. Occupational activity is associated with knee cartilage morphology in females. Maturitas 2010;2010/02/16:72-6.
- Teixeira LF, et al. Relationship between alignment and kinematic and kinetic measures of the knee of osteoarthritic elderly subjects in level walking. Clinical biomechanics (Bristol, Avon) 1996;1996/04/01:126-34.
- Teixeira PEP, et al. Effects of Impairment-Based Exercise on Performance of Specific Self- Reported Functional Tasks in Individuals With Knee Osteoarthritis. Physical Therapy 2011;91:1752-65.
- Tenforde AS, et al. Neuromuscular prehabilitation to prevent osteoarthritis after a traumatic joint injury. PM & R : the journal of injury, function, and rehabilitation 2012;2012/06/01:S141-S144.
- Teoh JC, et al. Investigation of the biomechanical effect of variable stiffness shoe on external knee adduction moment in various dynamic exercises. Journal of foot and ankle research 2013;39.
- Tetsworth K, et al. Malalignment and degenerative arthropathy. Orthopedic Clinics of North America 1994;25:367-77.
- Tey IK, et al. Stress fracture of the distal tibia secondary to severe knee osteoarthritis: a case report. Journal of orthopaedic surgery (Hong Kong) 2006;2006/08/18:212-5.
- Thompson JA, et al. Gluteus maximus and soleus compensate for simulated quadriceps atrophy and activation failure during walking. Journal of biomechanics 2013;46:2165-72.
- Thorndike EA, et al. In search of an animal model for postmenopausal diseases. Frontiers in bioscience : a journal and virtual library 1998;1998/04/18:c17-c26.
- Thorp LE, et al. Bone mineral density in the proximal tibia varies as a function of static alignment and knee adduction angular momentum in individuals with medial knee osteoarthritis. Bone 2006;2006/06/20:1116-22.

- Thorp LE, et al. Knee joint loading differs in individuals with mild compared with moderate medial knee osteoarthritis. Arthritis and rheumatism 2006;2006/11/30:3842-9.
- Thorp LE, et al. Relationship between pain and medial knee joint loading in mild radiographic knee osteoarthritis. Arthritis and rheumatism 2007;2007/10/02:1254-60.
- Thorp LE, et al. The biomechanical effects of focused muscle training on medial knee loads in OA of the knee: A pilot, proof of concept study. Journal of Musculoskeletal Neuronal Interactions 2010;10:166-73.
- Thorstensson CA, et al. Reduced functional performance in the lower extremity predicted radiographic knee osteoarthritis five years later. Annals of the rheumatic diseases 2004;63:402-7.
- Thorstensson CA, et al. The effect of eight weeks of exercise on knee adduction moment in early knee osteoarthritis--a pilot study. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2007;2007/05/01:1163-70.
- Tibesku CO, et al. Sagittal plane kinematics of fixed- and mobile-bearing total knee replacements. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2011;2011/03/25:1488-95.
- Tigani D, et al. Total knee arthroplasty in patients with poliomyelitis. The Knee 2009;2009/05/16:501-6.
- Tjornstrand B, et al. Prediction of long-term outcome of tibial osteotomy in medial gonarthrosis. Archives of orthopaedic and traumatic surgery Archiv fur orthopadische und Unfall-Chirurgie 1985;1985/01/01:396-401.
- Toda Y, et al. Usefulness of an insole with subtalar strapping for analgesia in patients with medial compartment osteoarthritis of the knee. Arthritis Care and Research 2002;47:468-73.
- Toda Y, et al. Dynamic effect of an elastically strapped lateral wedged insole on the subtalar joint in convenient foot print analysis using facsimile paper. Modern Rheumatology 2003;13:215-9.
- Tohyama H, et al. Treatment of osteoarthritis of the knee with heel wedges. International orthopaedics 1991;1991/01/01:31-3.
- Toksvig-Larsen S, et al. The porous-coated anatomic total knee experience: Special emphasis on complications and wear. Journal of Arthroplasty 1996;11:11-7.
- Torner Baduell CE, et al. Arthroplasty of the femoro-patellar joint. Acta orthopaedica Belgica 1985;51:553-62.
- Torry MR. Scientific and clinical advances leading to improved treatment of knee osteoarthritis. Medicine and science in sports and exercise 2008;40:191-2.
- Troelsen A, et al. Opinions among Danish knee surgeons about indications to perform total knee replacement showed considerable variation. Danish medical journal 2012;59.
- Tsai LC, et al. Increased hip and knee flexion during landing decreases tibiofemoral compressive forces in women who have undergone anterior cruciate ligament reconstruction. The American journal of sports medicine 2013;2012/12/29:423-9.
- Tsuji S, et al. Is minimally invasive surgery-total knee arthroplasty truly less invasive than standard total knee arthroplasty? A quantitative evaluation. Journal of Arthroplasty 2010;25:970-6.
- Tsuneizumi Y, et al. Evaluation of joint laxity against distal traction force upon flexion in cruciate-retaining and posterior-stabilized total knee arthroplasty. Journal of orthopaedic science : official journal of the Japanese Orthopaedic Association 2008;2008/12/18:504-9.
- Tufan A, et al. Familial influence on tibiofemoral alignment. Annals of the rheumatic diseases 2010;2009/04/09:542-5.
- Turcot K, et al. The responsiveness of three-dimensional knee accelerations used as an estimation of knee instability and loading transmission during gait in osteoarthritis patient's follow-up. Osteoarthritis and Cartilage 2009;17:213-9.
- Turcot K, et al. Does knee alignment influence gait in patients with severe knee osteoarthritis? Clinical Biomechanics 2012;28(1):34-9.
- Turpin KM, et al. Biomechanical and clinical outcomes with shock-absorbing insoles in patients with knee osteoarthritis: immediate effects and changes after 1 month of wear. Archives of physical medicine and rehabilitation 2012;2012/01/17:503-8.
- Uebelhart D, et al. Intermittent treatment of knee osteoarthritis with oral chondroitin sulfate: a one-year, randomized, double-blind, multicenter study versus placebo. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2004;2004/03/17:269-76.
- Unsal S, et al. Comparison of effectiveness of intraarticular sodium hyaluronat and physical therapy applications in patients with knee osteoarthritis: Randomized prospective study. Journal of Rheumatology and Medical Rehabilitation 2008;19:16-22.
- Uysal G, et al. Diz Osteoartriti. / Knee Osteoarthritis. Turkiye Fiziksel Tip ve Rehabilitasyon Dergisi 2009;55:1-7.
- Valente G, et al. Influence of weak hip abductor muscles on joint contact forces during normal walking: probabilistic modeling analysis. Journal of biomechanics 2013;2013/07/31:2186-93.
- Valtonen A, et al. Muscle deficits persist after unilateral knee replacement and have implications for rehabilitation. Physical Therapy 2009;89:1072-9.
- van den Heever DJ, et al. Contact stresses in a patient-specific unicompartmental knee replacement. Clinical Biomechanics 2011;26:159-66.
- van den Noort J, et al. Ambulatory measurement of the knee adduction moment in patients with osteoarthritis of the knee. Journal of biomechanics 2013;46:43-9.
- van der Esch M, et al. Structural joint changes, malalignment, and laxity in osteoarthritis of the knee. Scandinavian journal of rheumatology 2005;2005/10/01:298-301.
- van der Esch M, et al. Knee varus-valgus motion during gait - a measure of joint stability in patients with osteoarthritis? Osteoarthritis and Cartilage 2008;16:522-5.

- van der Esch M, et al. Self-reported knee instability and activity limitations in patients with knee osteoarthritis: results of the Amsterdam osteoarthritis cohort. Clinical rheumatology 2012;2012/06/26:1505-10.
- van Dijk GM, et al. Course of functional status and pain in osteoarthritis of the hip or knee: a systematic review of the literature. Arthritis and rheumatism 2006;2006/10/03:779-85.
- van Dijk GM, et al. Prognosis of Limitations in Activities in Osteoarthritis of the Hip or Knee: A 3-Year Cohort Study. Archives of physical medicine and rehabilitation 2010;91:58-66.
- van Duren BH, et al. Bicruciate substituting total knee replacement: how effective are the added kinematic constraints in vivo? Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2012;2011/11/30:2002-10.
- van Haselen RA, et al. A randomized controlled trial comparing topical piroxicam gel with a homeopathic gel in osteoarthritis of the knee. Rheumatology (Oxford, England) 2000;2000/07/26:714-9.
- van Jonbergen HP, et al. Distal femoral bone mineral density decreases following patellofemoral arthroplasty: 1-year follow-up study of 14 patients. BMC musculoskeletal disorders 2010;2010/04/22:74.
- Van Jonbergen HPW, et al. Patellofemoral arthroplasty for symptomatic nonunion after trochlear osteotomy for patellar instability: A case report. Cases Journal 2009;2.
- Vanwanseele B, et al. Frontal knee alignment: three-dimensional marker positions and clinical assessment. Clinical orthopaedics and related research 2009;2008/10/09:504-9.
- Vanwanseele B, et al. The relationship between knee adduction moment and cartilage and meniscus morphology in women with osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2010;2010/04/27:894-901.
- varez-Nemegyei J. Risk factors for pes anserinus tendinitis/bursitis syndrome: a case control study. Journal of clinical rheumatology : practical reports on rheumatic & musculoskeletal diseases 2007;2007/04/07:63-5.
- Vavrik P, et al. [Clinical evaluation of the ceramic femoral component used for reconstruction of total knee replacement]. Acta chirurgiae orthopaedicae et traumatologiae Cechoslovaca 2008;2009/01/20:436-42.
- Veerapen K, et al. Clinical and radiological profile of symptomatic knee osteoarthritis in Malaysia. APLAR Journal of Rheumatology 2004;7:97-107.
- Verdaasdonk AL, et al. Pain and walking problems in three young people with a dislocated hip. Nederlands tijdschrift voor geneeskunde 2001;145:1097-101.
- Verdaasdonk AL, et al. [Pain and gait problems in 3 (almost) adolescents with a dislocated hip]. Nederlands tijdschrift voor geneeskunde 2001;2001/07/14:1097-101.
- vies-Tuck ML, et al. Association between meniscal tears and the peak external knee adduction moment and foot rotation during level walking in postmenopausal women without knee osteoarthritis: a cross-sectional study. Arthritis research & therapy 2008;2008/05/22:R58.
- vies-Tuck ML, et al. Meniscal tear and increased tibial plateau bone area in healthy post-menopausal women. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2008;2007/12/21:268-71.
- Vignon E, et al. Osteoarthritis of the knee and hip and activity: a systematic international review and synthesis (OASIS). Joint, bone, spine : revue du rhumatisme 2006;2006/06/17:442-55.
- Vilensky JA, et al. Serial kinematic analysis of the unstable knee after transection of the anterior cruciate ligament: Temporal and angular changes in a canine model of osteoarthritis. Journal of Orthopaedic Research 1994;12:229-37.
- Vincent KR, et al. The pathophysiology of osteoarthritis: a mechanical perspective on the knee joint. PM & R : the journal of injury, function, and rehabilitation 2012;2012/06/01:S3-S9.
- Viriyavejkul P, et al. Comparison of characteristics of patients with and without calcium pyrophosphate dihydrate crystal deposition disease who underwent total knee replacement surgery for osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2007;2006/10/19:232-5.
- von Bormann RPB. Clinical outcome of double-bundle anterior cruciate ligament reconstruction. Operative Techniques in Sports Medicine 2008;16:171-5.
- von Eisenhart-Rothe R, et al. Tibiofemoral and patellofemoral joint 3D-kinematics in patients with posterior cruciate ligament deficiency compared to healthy volunteers. BMC musculoskeletal disorders 2012;2012/11/28:231.
- Wada J, et al. Natural course of osteoarthritis of the knee treated with or without intraarticular corticosteroid injections. Bulletin: Hospital for Joint Diseases 1993;53:45-8.
- Wada M, et al. Relationship between gait and clinical results after high tibial osteotomy. Clinical orthopaedics and related research 1998;1998/10/02:180-8.
- Wada M, et al. Relationships among bone mineral densities, static alignment and dynamic load in patients with medial compartment knee osteoarthritis. Rheumatology (Oxford, England) 2001;2001/05/24:499-505.
- Wajima D, et al. Spinal subdural hematoma associated with traumatic intracranial interhemispheric subdural hematoma. Neurologia Medico-Chirurgica 2012;52:636-9.
- Walker EA, et al. Rapidly progressive osteoarthritis: biomechanical considerations. Magnetic resonance imaging clinics of North America 2011;2011/06/15:283-94.
- Waller B, et al. Effects of a progressive aquatic resistance exercise program on the biochemical composition and morphology of cartilage in women with mild knee osteoarthritis: protocol for a randomised controlled trial. BMC musculoskeletal disorders 2013;2013/03/19:82.

- Waller C, et al. Unload it: the key to the treatment of knee osteoarthritis. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2011;2011/02/08:1823-9.
- Wallny T, et al. Intra-articular hyaluronic acid in the treatment of haemophilic arthropathy of the knee. Clinical, radiological and sonographical assessment. Haemophilia : the official journal of the World Federation of Hemophilia 2000;2000/09/30:566-70.
- Walter JP, et al. Decreased knee adduction moment does not guarantee decreased medial contact force during gait. Journal of Orthopaedic Research 2010;28:1348-54.
- Wang CJ. Management of patellofemoral arthrosis in middle-aged patients. Chang Gung medical journal 2001;2002/02/01:672-80.
- Wang Y, et al. Factors affecting tibial plateau expansion in healthy women over 2.5 years: a longitudinal study. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2006;2006/06/21:1258-64.
- Watanabe K, et al. Outcomes of knee arthrodesis following infected total knee arthroplasty: a retrospective analysis of 8 cases. Modern rheumatology / the Japan Rheumatism Association 2013;2013/03/20.
- Webster KE, et al. The knee adduction moment in hamstring and patellar tendon anterior cruciate ligament reconstructed knees. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2012;2011/12/27:2214-9.
- Weidenhielm L, et al. Change in adduction moment about the knee after high tibial osteotomy and prosthetic replacement in osteoarthrosis of the knee. Clinical Biomechanics 1992;7:91-6.
- Weidenhielm L, et al. Improvement in gait one year after surgery for knee osteoarthrosis: a comparison between high tibial osteotomy and prosthetic replacement in a prospective randomized study. Scandinavian journal of rehabilitation medicine 1993;1993/03/01:25-31.
- Weidenhielm L, et al. Adduction moment of the knee compared to radiological and clinical parameters in moderate medial osteoarthrosis of the knee. Annales Chirurgiae et Gynaecologiae 1994;83:236-42.
- Weidenhielm L, et al. Surgical correction of leg alignment in unilateral knee osteoarthrosis reduces the load on the hip and knee joint bilaterally. Clinical Biomechanics 1995;10:217-21.
- Weidow J, et al. Medial and lateral osteoarthritis of the knee is related to variations of hip and pelvic anatomy. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2005;2005/06/01:471-7.
- Weidow J. Lateral osteoarthritis of the knee. Etiology based on morphological, anatomical, kinematic and kinetic observations. Acta orthopaedica Supplementum 2006;2006/08/05:3-44.
- Wenham CYJ, et al. New horizons in osteoarthritis. Age and Ageing 2013;42:272-8.
- Westlake CG, et al. Do thigh circumference and mass changes alter knee biomechanics during walking? Gait & posture 2013;37:359-62.
- Wexler G, et al. Functional gait adaptations in patients with anterior cruciate ligament deficiency over time. Clinical orthopaedics and related research 1998;166-75.
- Wheeler JW, et al. Real-time knee adduction moment feedback for gait retraining through visual and tactile displays. Journal of biomechanical engineering 2011;133:041007.
- White DK, et al. Do worsening knee radiographs mean greater chances of severe functional limitation? Arthritis care & research 2010;2010/05/28:1433-9.
- White DK, et al. Clinically important improvement in function is common in people with or at high risk of knee OA: the MOST study. The Journal of rheumatology 2010;2010/04/17:1244-51.
- White DK, et al. Is symptomatic knee osteoarthritis a risk factor for a fast decline in gait speed? Results from the osteoarthritis initiative. Arthritis care & research 2012;2012/08/18.
- White DK, et al. When it hurts, a positive attitude may help: association of positive affect with daily walking in knee osteoarthritis. Results from a multicenter longitudinal cohort study. Arthritis care & research 2012;2012/04/17:1312-9.
- White DK, et al. Walking to meet physical activity guidelines in knee osteoarthritis: Is 10,000 steps enough? Archives of physical medicine and rehabilitation 2013;94:711-7.
- White DK, et al. Do radiographic disease and pain account for why people with or at high risk of knee osteoarthritis do not meet physical activity guidelines? Arthritis and rheumatism 2013;2012/11/06:139-47.
- White DK, et al. Is symptomatic knee osteoarthritis a risk factor for a trajectory of fast decline in gait speed? Results from a longitudinal cohort study. Arthritis care & research 2013;2012/08/18:187-94.
- White DK, et al. Reasons for Functional Decline Despite Reductions in Knee Pain: The Multicenter Osteoarthritis Study. Physical Therapy 2011;91:1849-56.
- Widmyer MR, et al. High body mass index is associated with increased diurnal strains in the articular cartilage of the knee. Arthritis and rheumatism 2013;2013/07/03:2615-22.
- Widuchowski W, et al. Femoral press-fit fixation in ACL reconstruction using bone-patellar tendon-bone autograft: results at 15 years follow-up. BMC musculoskeletal disorders 2012;2012/06/29:115.
- Williams HJ, et al. Comparison of naproxen and acetaminophen in a two-year study of treatment of osteoarthritis of the knee. Arthritis and rheumatism 1993;36:1196-206.
- Wilson AJ, et al. TKA after clamshell osteotomy for femoral diaphyseal malunion. Orthopedics 2012;35:e969-e972.
- Wilson DR, et al. The Measurement of Joint Mechanics and Their Role in Osteoarthritis Genesis and Progression. Medical Clinics of North America 2009;93:67-82.

- Wilson FC. Total replacement of the knee in rheumatoid arthritis. Part II of a prospective study. CLIN ORTHOP 1973;no.94:58-64.
- Wilson JL, et al. The association between knee joint biomechanics and neuromuscular control and moderate knee osteoarthritis radiographic and pain severity. Osteoarthritis and Cartilage 2011.
- Winby CR, et al. Muscle and external load contribution to knee joint contact loads during normal gait. Journal of biomechanics 2009;42:2294-300.
- Windisch C, et al. Osteodensitometry measurements of periprosthetic bone using dual energy X-ray absorptiometry following total knee arthroplasty. Archives of orthopaedic and trauma surgery 2012;2012/08/14:1595-601.
- Windsor RE, et al. Technical considerations of total knee arthroplasty after proximal tibial osteotomy. The Journal of bone and joint surgery American volume 1988;1988/04/01:547-55.
- Wirtz C, et al. Knee axis deviations - Cause of knee osteoarthritis? Schweizerische Zeitschrift fur Sportmedizin und Sporttraumatologie 2011;59:169-73.
- Wluka AE, et al. Knee cartilage loss in symptomatic knee osteoarthritis over 4.5 years. Arthritis research & therapy 2006;2006/05/18:R90.
- Wolterbeek N, et al. No differences in in vivo kinematics between six different types of knee prostheses. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2012;2011/07/16:559-64.
- Woodhouse LJ. Do ibuprofen or glucosamine in addition to resistance exercise training improve muscle strength in patients with knee osteoarthritis? Clinical Journal of Sport Medicine 2012;22:290-2.
- Woollard JD, et al. Change in knee cartilage volume in individuals completing a therapeutic exercise program for knee osteoarthritis. The Journal of orthopaedic and sports physical therapy 2011;2011/09/06:708-22.
- Wright JM, et al. Observations on patellar height following opening wedge proximal tibial osteotomy. The American journal of knee surgery 2001;2001/08/09:163-73.
- Xiao J, et al. Bilateral knee lipoma arborescens combined with osteoarthritis in elderly patients. Journal of International Medical Research 2011;39:1563-9.
- Yamanaka N, et al. Posterior-anterior weight-bearing radiograph in 15 degree knee flexion in medial osteoarthritis. Skeletal radiology 2003;2003/01/15:28-34.
- Yang JH, et al. Primary total knee arthroplasty using rotating-hinge prosthesis in severely affected knees. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2012;2011/07/21:517-23.
- Yang N, et al. The combined effect of frontal plane tibiofemoral knee angle and meniscectomy on the cartilage contact stresses and strains. Annals of biomedical engineering 2009;2009/08/20:2360-72.
- Yang N, Nayeb-Hashemi H, Canavan P. The effect of the frontal plane tibiofemoral angle on the stress and strain at the knee cartilage during the stance phase of the gait cycle. Northeastern University, Boston, MA, United States. 2010 p. 347-53.
- Yang NH, et al. Effect of frontal plane tibiofemoral angle on the stress and strain at the knee cartilage during the stance phase of gait. Journal of orthopaedic research : official publication of the Orthopaedic Research Society 2010;2010/10/26:1539-47.
- Yasuda K, et al. A ten- to 15-year follow-up observation of high tibial osteotomy in medial compartment osteoarthrosis. Clinical orthopaedics and related research 1992;186-95.
- Yercan H, et al. [Osteotomies in the treatment of osteochondral lesions of the knee joint]. Acta orthopaedica et traumatologica turcica 2007;2008/10/11:147-52.
- Yoshimura I, et al. Lateral thrust of anterior cruciate ligament-insufficient knees and posterior cruciate ligament-insufficient knees. International orthopaedics 2002;2002/10/16:303-5.
- Yue B, et al. In vivo function of posterior cruciate ligament before and after posterior cruciate ligament-retaining total knee arthroplasty. International orthopaedics 2012;2012/01/25:1387-92.
- Yusuf E, et al. Body mass index and alignment and their interaction as risk factors for progression of knees with radiographic signs of osteoarthritis. Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society 2011;2011/07/05:1117-22.
- Zeni Jr JA, et al. Dynamic knee joint stiffness in subjects with a progressive increase in severity of knee osteoarthritis. Clinical Biomechanics 2009;24:366-71.
- Zeni Jr JA, et al. Differences in gait parameters between healthy subjects and persons with moderate and severe knee osteoarthritis: A result of altered walking speed? Clinical Biomechanics 2009;24:372-8.
- Zeni JA, et al. Alterations in quadriceps and hamstrings coordination in persons with medial compartment knee osteoarthritis. Journal of electromyography and kinesiology : official journal of the International Society of Electrophysiological Kinesiology 2010;2009/02/19:148-54.
- Zeni JA, Jr. Alterations in joint loading and muscle coordination strategies with the progression of medial compartment knee osteoarthritis University of Delaware; 2008.
- Zeni JA, Jr., et al. Dynamic knee joint stiffness in subjects with a progressive increase in severity of knee osteoarthritis [corrected] [published erratum appears in CLIN BIOMECH 2009 Jul;24(6):531]. Clinical Biomechanics 2009;24:366-71.
- Zeni JA, Jr., et al. Dynamic knee joint stiffness in subjects with a progressive increase in severity of knee osteoarthritis. Clinical biomechanics (Bristol, Avon) 2009;2009/03/03:366-71.
- Zeni JA, Jr., et al. Differences in gait parameters between healthy subjects and persons with moderate and severe knee osteoarthritis: a result of altered walking speed? Clinical biomechanics (Bristol, Avon) 2009;2009/03/17:372-8.

- Zhang HH, et al. Comparison in gait biomechanics of naturally walking patients with different knee osteoarthritis using footscanÂ® SCSI high frequency plate system. Journal of Clinical Rehabilitative Tissue Engineering Research 2010;14:8019-23.
- Zhang Y, et al. [Effect of posterior condylar offset on knee flexion after high-flex posterior-stabilized total knee arthroplasty]. Zhonghua wai ke za zhi [Chinese journal of surgery] 2010;2010/07/22:764-8.
- Zhu XY, et al. Prevalence of primary osteoporosis and osteoarthrosis in 203 middle-aged and elderly women. Chinese Journal of Clinical Rehabilitation 2005;9:136-7.
- Zicat B, et al. Total knee arthroplasty in the octogenarian. The Journal of arthroplasty 1993;1993/08/01:395-400.
- Zifchock RA, et al. Are joint structure and function related to medial knee OA pain? A pilot study. Clinical orthopaedics and related research 2011;2011/07/20:2866-73.
- Zifko B, et al. Behandlung der Schienbeinkopfbruche und ihre Ergebnisse. Archiv für Orthopädische und Unfall-Chirurgie 1969;66:297-309.
- Zilch H, et al. [Corrective osteotomies of the head of the tibia (indications, technique and results) (author's transl)]. Unfallheilkunde 1978;1978/11/01:642-8.

Appendix A

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by publication year]*

Miyazaki et al. 2002

Methods	Prospective cohort study	
Participants	74 patients with medial knee OA	
Joint load exposure	External knee adduction moment during walking assessed at baseline	
Structural knee OA progression outcome	Joint space narrowing grade based on Altman atlas of osteoarthritis. Dichotomous grouping ("progressors"/"non-progressors") based on at least one grade worsening over the observation period.	
Observation period	72 months	
Quality assessment (risk of bias)		
Quality criteria	**Authors' judgement**	**Support for judgement**
Sufficient description of the groups and the distribution of prognostic factors?	Adequate	Tables adequately presenting relevant information about subjects.
Are the groups assembled at a similar point in their disease progression?	Adequate	Quote: "… the number of patients with each radiographic scale (K/L grade and joint space narrowing scale) was similar in the two groups."
Is a potential knee joint loading parameter reliably ascertained?	Unclear	There is no mentioning of reliability assessment or reference.
Were the groups comparable on all important confounding factors?	Inadequate	Quote: "However, there were some significant differences at entry between the groups." Comment:
Was there adequate adjustment for the effects of these confounding variables?	Adequate	The analyses were adequately adjusted (multivariable logistic regression).
Was outcome assessment blind to exposure status?	Adequate	Quote: "All radiographs were evaluated by en experienced reader who was unaware of all other data."
Was follow-up long enough for the outcomes to occur?	Adequate	Satisfied by default, due to inclusion criteria in the present study.
What proportion of the cohort was followed-up? [a]	Unclear	32 out of a total of 106 (~30%) were lost to follow up.
Were drop-out rates and reasons for drop-out similar across exposed and unexposed groups?	Inadequate	Not described. The exposure for those that were lost to follow up was higher than those who completed the study as "non-progressors".
Extent of risk of bias in study [b]	Very serious limitation	>1 criterion being inadequately described.
Methodological quality	Low quality	

[a] Adequate = follow-up proportion >80%; Unclear 50-80%; Inadequate= <50%

[b] Risk of bias is assessed using GRADE's approach to study limitations: No serious limitation defined as all criteria being adequately described (high methodological quality); Serious limitations defined as one criterion being inadequately described or >1 criterion being unclearly described (moderate methodological quality); Very serious limitation defined as >1 criterion being inadequately described (low methodological quality).

Chang et al. 2007 & Sharma et al. 2003*

Methods	Prospective cohort study	
Participants	57 patients with knee OA (64 patients in abstract) from the MAK cohort (300+ patients).	
Joint load exposure	External knee adduction moment during walking assessed at baseline	
Structural knee OA progression outcome	Joint space narrowing grade based on Altman atlas of osteoarthritis. Dichotomous grouping ("progressing knees"/"non-progressing knees") based on at least one grade worsening over the observation period.	
Observation period	18 months	
Quality assessment (risk of bias)		
Quality criteria	**Authors' judgement**	**Support for judgement**
Sufficient description of the groups and the distribution of prognostic factors?	Inadequate	There are no descriptions of the groups, except for the toe-out angle and knee adduction moment.
Are the groups assembled at a similar point in their disease progression?	Inadequate	Not described. Only the distribution of K/L in the full sample is given. The structural disease progression outcome (Altman) is not presented at baseline.
Is a potential knee joint loading parameter reliably ascertained?	Unclear	There is no reliability assessment or reference to previous work.
Were the groups comparable on all important confounding factors?	Inadequate	Not described.
Was there adequate adjustment for the effects of these confounding variables?	Adequate	In the conference abstract there were statistical adjustments for age, gender, BMI, pain, radiographic disease severity (K/L), and varus alignment.
Was outcome assessment blind to exposure status?	Adequate	Quote: "The knee x-ray reader was blinded to the gait analysis data"
Was follow-up long enough for the outcomes to occur?	Adequate	Satisfied by default, due to inclusion criteria in the present study.
What proportion of the cohort was followed-up? [a]	Adequate	This study included 57 at baseline and 56 at follow-up. Note: The underlying MAK cohort is 300+ patients no description of how the gait subgroup was selected
Were drop-out rates and reasons for drop-out similar across exposed and unexposed groups?	Inadequate	The conference abstract (Sharma et al. 2003) included 64 patients in contrast to the 57 patients included in the article (Chang et al. 2007). The authors could not account for the different numbers of subjects.
Extent of risk of bias in study [b]	Very serious limitation	>1 criterion being inadequately described.
Methodological quality	Low quality	

* Conference abstract based on the study.

[a] Adequate = follow-up proportion >80%; Unclear 50-80%; Inadequate= <50%

[b] Risk of bias is assessed using GRADE's approach to study limitations: No serious limitation defined as all criteria being adequately described (high methodological quality); Serious limitations defined as one criterion being inadequately described or >1 criterion being unclearly described (moderate methodological quality); Very serious limitation defined as >1 criterion being inadequately described (low methodological quality).

Bennell et al. 2011

Methods	Prospective cohort study	
Participants	144 patients with medial knee OA	
Joint load exposure	External knee adduction moment during walking assessed at baseline	
Structural knee OA progression outcome	Progression of 1 or more grades in bone marrow lesions and cartilage defects assessed by semi-quantitative evaluation of MRI scans. Loss in medial tibial cartilage volume assessed from manual segmentation of MRI scans.	
Observation period	12 months	
Quality assessment (risk of bias)		
Quality criteria	**Authors' judgement**	**Support for judgement**
Sufficient description of the groups and the distribution of prognostic factors?	Inadequate	There are no descriptions of the groups that progress in BMLs and cartilage defects.
Are the groups assembled at a similar point in their disease progression?	Inadequate	Not described.
Is a potential knee joint loading parameter reliably ascertained?	Unclear	There is no reliability assessment or reference to previous work.
Were the groups comparable on all important confounding factors?	Inadequate	Not described.
Was there adequate adjustment for the effects of these confounding variables?	Adequate	There were statistical adjustments for age, gender, BMI, MRI machine, alignment, baseline values, and treatment group.
Was outcome assessment blind to exposure status?	Inadequate	Not described.
Was follow-up long enough for the outcomes to occur?	Adequate	Satisfied by default, due to inclusion criteria in the present study.
What proportion of the cohort was followed-up? [a]	Unclear	200 enrolled in the underlying study. 144 (72%) had complete data sets.
Were drop-out rates and reasons for drop-out similar across exposed and unexposed groups?	Inadequate	Not described.
Extent of risk of bias in study [b]	Very serious limitation	>1 criterion being inadequately described.
Methodological quality	Low quality	

[a] Adequate = follow-up proportion >80%; Unclear 50-80%; Inadequate= <50%

[b] Risk of bias is assessed using GRADE's approach to study limitations: No serious limitation defined as all criteria being adequately described (high methodological quality); Serious limitations defined as one criterion being inadequately described or >1 criterion being unclearly described (moderate methodological quality); Very serious limitation defined as >1 criterion being inadequately described (low methodological quality).

Woollard et al. 2011

Methods	Prospective cohort study	
Participants	13 patients with knee OA	
Joint load exposure	External knee adduction moment during walking assessed at baseline	
Structural knee OA progression outcome	Loss of tibiofemoral cartilage volume. Dichotomous grouping ("progressing knees"/"non-progressing knees") based on a cartilage loss greater than measurement error over the observation period.	
Observation period	12 months	
Quality assessment (risk of bias)		
Quality criteria	**Authors' judgement**	**Support for judgement**
Sufficient description of the groups and the distribution of prognostic factors?	Adequate	Individual patient data is presented according to group structure.
Are the groups assembled at a similar point in their disease progression?	Adequate	Progressors had more severe radiographic disease at baseline (K/L 3 vs. 2), but similar cartilage volumes at baseline (primary outcome).
Is a potential knee joint loading parameter reliably ascertained?	Unclear	There is no reliability assessment or reference to previous work.
Were the groups comparable on all important confounding factors?	Unclear	Progressors had more severe radiographic disease, BMI and lower age; but comparable on gender, WOMAC (all domains) and alignment.
Was there adequate adjustment for the effects of these confounding variables?	Inadequate	The sample was too small for adjustments of the estimates.
Was outcome assessment blind to exposure status?	Inadequate	Not described.
Was follow-up long enough for the outcomes to occur?	Adequate	Satisfied by default, due to inclusion criteria in the present study.
What proportion of the cohort was followed-up? [a]	Adequate	15 invited. 1 lost; 1 excluded.
Were drop-out rates and reasons for drop-out similar across exposed and unexposed groups?	Adequate	Only 1 dropout.
Extent of risk of bias in study [b]	Very serious limitation	>1 criterion being inadequately described.
Methodological quality	Low quality	

[a] Adequate = follow-up proportion >80%; Unclear 50-80%; Inadequate= <50%

[b] Risk of bias is assessed using GRADE's approach to study limitations: No serious limitation defined as all criteria being adequately described (high methodological quality); Serious limitations defined as one criterion being inadequately described or >1 criterion being unclearly described (moderate methodological quality); Very serious limitation defined as >1 criterion being inadequately described (low methodological quality).

Henriksen et al. 2013

Methods	Secondary data analysis from a randomized trial	
Participants	157 patients with knee OA and a BMI >30 kg/m^2	
Joint load exposure	Change in peak knee joint compression force during walking over the 4 months prior to the 12 month observation period	
Structural knee OA progression outcome	Boston Leeds Knee Osteoarthritis Score (BLOKS) for tibiofemoral cartilage loss and bone marrow lesions	
Observation period	12 months	
Quality assessment (risk of bias)		
Quality criteria	**Authors' judgement**	**Support for judgement**
Sufficient description of the groups and the distribution of prognostic factors?	Adequate	Comment: Demographic, primary outcome and secondary outcome data separated by group are provided in Table 1.
Are the groups assembled at a similar point in their disease progression?	Adequate	Quotation: "There were no other statistically significant differences [including in K&L grade and BLOKS measures of tibiofemoral cartilage and bone marrow lesions] between the Unloaders and Loaders at week 16"
Is a potential knee joint loading parameter reliably ascertained?	Adequate	Quotation: "Based on 30 individuals assessed twice separated by one week done prior to the study, intra-class correlation coefficient for the estimation of peak compression force in our lab is 0.91 (95% CI: 0.83 to 0.96)"
Were the groups comparable on all important confounding factors?	Inadequate	Quotations: "Among the Unloaders the ambulatory knee function was not improved from week 0 to week 16, seen as no statistically significant change in walking speed and a reduction in the knee extensor moment" and "…the ambulatory knee function was improved among the Loaders, seen as increases in walking speed and internal knee extensor moment [from week 0 to week 16]" Comment: These quotations highlight a group difference in the change in walking speed, which may influence the change in knee joint loading which was used to assign group membership.
Was there adequate adjustment for the effects of these confounding variables?	Inadequate	Quotation: "Adjusted analysis: We repeated the analysis further including age, sex, week 16 BMI, and the randomization code in the underlying RCT (Diet, Exercise and Control) as covariates." Comment: Analyses were not adjusted for walking speed or change in walking speed.
Was outcome assessment blind to exposure status?	Adequate	Quotation: "All assessors were blinded to the case status."
Was follow-up long enough for the outcomes to occur?	Adequate	Comment: Satisfied by default, due to inclusion criteria in the present study.
What proportion of the cohort was followed-up? [a]	Adequate	Quotation: "One year after the weight loss (i.e., at week 68), there were 144 subjects (92%) remaining in the biomechanics sub-cohort, i.e., 13 subjects lost to follow-up"
Were drop-out rates and reasons for drop-out similar across exposed and unexposed groups?	Adequate	Quotation: "[participants lost to follow-up] were distributed with 7 (7%) in the Unloader group and 6 (11%) in the Loader group. Comment: Reasons for drop out listed in Figure 2.
Extent of risk of bias in study [b]	Very serious limitation	>1 criterion being inadequately described.
Methodological quality	Low quality	

[a] Adequate = follow-up proportion >80%; Unclear 50-80%; Inadequate= <50%

[b] Risk of bias is assessed using GRADE's approach to study limitations: No serious limitation defined as all criteria being adequately described (high methodological quality); Serious limitations defined as one criterion being inadequately described or >1 criterion being unclearly described (moderate methodological quality); Very serious limitation defined as >1 criterion being inadequately described (low methodological quality).