

# What are the benefits and risks of total arthroplasty in arthrodesed knees?

Martín de Amesti<sup>a,b</sup>, Luis Ortiz-Muñoz<sup>b,c</sup>, Sebastián Irrázaval<sup>b,d</sup>

<sup>a</sup> Facultad de Medicina, Pontificia Universidad Católica de Chile, Santiago, Chile

<sup>b</sup> Proyecto Epistemonikos, Santiago, Chile

<sup>c</sup> Centro Evidencia UC, Facultad de Medicina, Pontificia Universidad Católica de Chile, Santiago, Chile

<sup>d</sup> Departamento de Ortopedia y Traumatología, Facultad de Medicina, Pontificia Universidad Católica de Chile, Santiago, Chile

\*Corresponding author [sirarraz@med.puc.cl](mailto:sirarraz@med.puc.cl)

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## Abstract

### Introduction

The conversion of a previously arthrodesed knee to a total knee arthroplasty is an alternative seldom used. However, arthroplasty would provide greater functionality to the arthrodesed joint. Since it is a technically demanding procedure, not exempt from complications, there is controversy about the role of this intervention.

### Methods

To answer this question we used Epistemonikos, the largest database of systematic reviews in health, which is maintained by screening multiple information sources, including MEDLINE, EMBASE, Cochrane, among others. We extracted data from the systematic reviews, reanalyzed data of primary studies, conducted a meta-analysis and generated a summary of findings table using the GRADE approach.

### Results and conclusions

We identified two systematic reviews including 10 studies overall, none of which corresponded to a randomized trial. We concluded the conversion of knee arthrodesis to total knee arthroplasty could increase the functionality, but it is not clear whether it increases the complications or if it has any impact on pain or patient satisfaction because the certainty of the evidence is very low.

## Problem

Arthrodesis is a salvage surgical procedure, whose objective is to achieve fusion between two bones and eliminate movement of the joint between them. It is used as the last surgical option in different articular conditions, usually in the knee and hip, in order to decrease pain and to improve satisfaction. Some examples are advanced inflammatory arthritis, tuberculosis sequelae, hemophilic arthropathies, tumoral lesions, among others. However, immobility secondary to the fusion and the subsequent overload of the adjacent joints, can lead to serious physical and psychosocial limitations.

On the other hand, total knee arthroplasty is a surgical procedure in which the damaged joint surfaces are replaced by modular prosthetic components. This procedure is currently recognized as the first option to treat severe knee osteoarthritis, with good results both in functionality and quality of life.

The objective of the arthrodesis to arthroplasty conversion is to restore the range of movement in the joint, leading to an improvement in the functionality of the patient. However, it is not a procedure that is performed frequently, since it is technically demanding and has a high rate of complications.

It is currently unclear what is the role of the conversion of arthrodesis to total knee arthroplasty.

### Key messages

- Conversion of knee arthrodesis to arthroplasty could increase functionality, but the certainty of the evidence is low.
- It is not clear whether conversion of knee arthrodesis to arthroplasty increases patient satisfaction or impacts on perceived pain, because the certainty of the evidence is very low.
- It is not clear what is the frequency or magnitude of complications after conversion of knee arthrodesis to arthroplasty because the certainty of the evidence is very low.

### Methods

To answer the question, we used Epistemonikos, the largest database of systematic reviews in health, which is maintained by screening multiple information sources, including MEDLINE, EMBASE, Cochrane, among others, to identify systematic reviews and their included primary studies. We extracted data from the identified reviews and reanalyzed data from primary studies included in those reviews. With this information, we generated a structured summary denominated FRISBEE (Friendly Summary of Body of Evidence using Epistemonikos) using a pre-established format, which includes key messages, a summary of the body of evidence (presented as an evidence matrix in Epistemonikos), meta-analysis of the total of studies when it is possible, a summary of findings table following the GRADE approach and a table of other considerations for decision-making.

### About the body of evidence for this question

<p>What is the evidence. See evidence matrix in Epistemonikos later</p>	<p>We found two systematic reviews<sup>1,2</sup> including 10 primary studies<sup>3-12</sup>, none of which corresponded to a randomized trial. All primary studies were retrospective cohorts.</p>
<p>What types of patients were included*</p>	<p>All studies included patients with knee arthrodesis. The average age ranged between 39 and 68.5 years in the different studies.</p> <p>The reason for arthrodesis varied between studies, predominating infectious causes and osteoarthritis.</p> <p>Knees remained arthrodesed prior to arthroplasty for 9 to 25 years in average.</p> <p>Eight studies exclusively included patients with surgical arthrodesis, in which an intervention is performed to produce the arthrodesis<sup>3-5,7,8,9,11,12</sup> and two also included non-surgical arthrodesis, which occur as a result of joint disease (i.e. ankylosis)<sup>6,10</sup>.</p> <p>We excluded case reports that included only one patient and studies that only considered non-surgical arthrodesis (ankylosis).</p>
<p>What types of interventions were included*</p>	<p>Different types of prosthesis were used: non-constrained<sup>9</sup>, semiconstrained<sup>5,11</sup>, with posterior stabilization<sup>5,8,10</sup>, constrained<sup>9</sup> and hinge (rotational true hinge)<sup>5,12</sup>, among others.</p> <p>All studies compared under the assumption that each patient could be considered its own control.</p>

What types of outcomes were measured	<p>The studies reported multiple outcomes, which were grouped by the systematic reviews as follows:</p> <ul style="list-style-type: none"> <li>• Functionality, measured with the Hospital for Special Surgery (HSS) functionality score.</li> <li>• Range of movement (degrees).</li> <li>• Satisfaction.</li> <li>• Pain.</li> <li>• Complications.</li> </ul> <p>The average follow-up of the studies was 4.8 years, with a range between two and eight years.</p>
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\* The information about primary studies is extracted from the systematic reviews identified, unless otherwise specified.

## Summary of Findings

The information on the effects of the conversion of knee arthrodesis to total knee arthroplasty is based on ten primary studies including 143 patients.

Five studies reported postoperative functionality (27 patients)<sup>4,8-10,12</sup>; five studies reported satisfaction (40 patients)<sup>5,6,8,9,12</sup>; four studies reported postoperative pain (88 patients)<sup>6,9,10,11</sup> and eight studies reported complications (70 patients)<sup>3,-5,7-9,11,12</sup>. None of the reviews presented data that could be re-analyzed or pooled in a meta-analysis, so the conclusions are presented as they were presented by the systematic reviews identified. The summary of findings is as follows:

- The conversion of knee arthrodesis to arthroplasty might increase functionality, but the certainty of the evidence is low.
- It is not clear what is the effect of the conversion of knee arthrodesis to arthroplasty on patient satisfaction because the certainty of the evidence is very low.
- It is not clear what is the effect of the conversion of knee arthrodesis to arthroplasty on postoperative pain because the certainty of the evidence is very low.
- It is not clear what is the frequency or magnitude of the complications of knee arthrodesis to arthroplasty because the certainty of the evidence is very low.

Conversion of arthrodesis to knee arthroplasty		
<b>Patients</b>	Knee arthrodesis	
<b>Intervention</b>	Conversion to arthroplasty	
<b>Comparison</b>	No conversion to arthroplasty	
Outcome	Effect	Certainty of evidence (GRADE)
Functionality (HSS score)	There was an improvement in functionality according to HSS scale from a baseline of 54.4 points (range: 43.5 to 60) to 77.3 points (range: 68 to 81.5 points). That is, an increase of 22.9 points [1].	⊕⊕○○ <sup>1,2,3</sup> Low
Satisfaction	One study reported satisfaction in 29% of cases [6].	⊕○○○ <sup>1,2</sup> Very low
Postoperative pain	One study reported increased pain according to HSS scale with an average variation of 2.5 points out of 30 [9].	⊕○○○ <sup>1,2</sup> Very low
Complications	The main reported complications were cutaneous necrosis (21%), infection (11%), need for revision (24%), refusal (9%), rupture by extension mechanism (3%), amputation (1%) [1].	⊕○○○ <sup>1,2</sup> Very low
<p>HSS Score: Hospital for Special Surgery Score. GRADE: Evidence grades of the GRADE Working Group (see later).</p> <p><sup>1</sup> Observational studies (case series). <sup>2</sup> One level of certainty of the evidence was downgraded for risk of bias, since the information comes from non-comparative case series presenting before and after data. <sup>3</sup> One level of certainty of the evidence was increased by large effect, since the increase in mobility has a large magnitude.</p>		

Follow the link to access the interactive version of this table ([Interactive Summary of Findings – iSoF](#))

## About the certainty of the evidence

### (GRADE)\*

⊕⊕⊕⊕

**High:** This research provides a very good indication of the likely effect. The likelihood that the effect will be substantially different† is low.

⊕⊕⊕○

**Moderate:** This research provides a good indication of the likely effect. The likelihood that the effect will be substantially different† is moderate.

⊕⊕○○

**Low:** This research provides some indication of the likely effect. However, the likelihood that it will be substantially different† is high.

⊕○○○

**Very low:** This research does not provide a reliable indication of the likely effect. The likelihood that the effect will be substantially different† is very high.

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\* This concept is also called 'quality of the evidence' or 'confidence in effect estimates'.

† Substantially different = a large enough difference that it might affect a decision

## Other considerations for decision-making

### To whom this evidence does and does not apply

The evidence presented in this summary applies to patients with knee arthrodesis.

It does not apply to patients with arthrodesis of other joints, since the results probably differ in different joints.

### About the outcomes included in this summary

The outcomes selected are those considered critical for decision-making according to the opinion of the authors of the summary. They coincide in general terms with those presented in the systematic reviews identified.

The outcome of increase in joint range was not included because it is considered as a component of functionality.

### Balance between benefits and risks, and certainty of the evidence

It is important to emphasize that the certainty of the evidence is low or very low for all outcomes evaluated, especially because they come from observational, mostly retrospective studies. For this reason, it is not possible to make an adequate balance between benefits and risks.

### Resource considerations

The reviews did not address the costs associated with performing the surgical procedure.

It is not possible to make an adequate balance between benefits and costs, due to the uncertainty associated with the former.

### What would patients and their doctors think about this intervention

Due to the limitations of the available information, it is unlikely that the existing evidence will significantly influence the surgical decision. Although the decision must be made in a case by case basis, it is particularly important to convey this uncertainty to the patient.

Although the certainty of the evidence is very low, it is interesting to note that the functional results and patient's perception contrast with the high rate of complications reported.

### Differences between this summary and other sources

The conclusions of this summary are consistent with those of the systematic reviews identified<sup>1,2</sup>.

No international clinical guidelines were found that addressed the question of this summary.

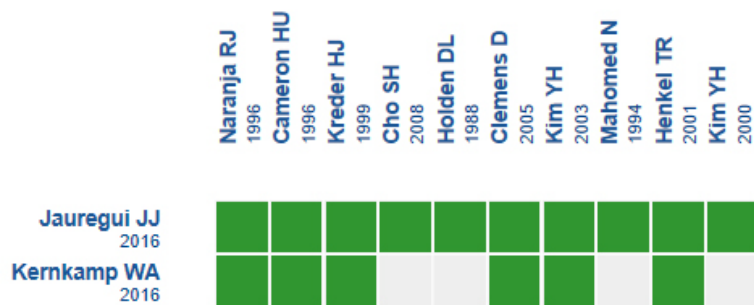
### Could this evidence change in the future?

The probability that future research changes the conclusions of this summary is high, due to the existing uncertainty.

We did not identify ongoing trials answering this question in the International Clinical Trials Registry Platform of the World Health Organization, or systematic reviews in progress in the International Prospective Register of Systematic Reviews (PROSPERO).

## How we conducted this summary

Using automated and collaborative means, we compiled all the relevant evidence for the question of interest and we present it as a matrix of evidence.



An evidence matrix is a table that compares systematic reviews that answer the same question.

Rows represent systematic reviews, and columns show primary studies.

The boxes in green correspond to studies included in the respective revisions.

The system automatically detects new systematic reviews including any of the primary studies in the matrix, which will be added if they actually answer the same question.

Follow the link to access the **interactive version**: [Conversion of knee arthrodesis to arthroplasty](#).

## Referencias

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## Notes

The upper portion of the matrix of evidence will display a warning of “new evidence” if new systematic reviews are published after the publication of this summary. Even though the project considers the periodical update of these summaries, users are invited to comment in *Medwave* or to contact the authors through email if they find new evidence and the summary should be updated earlier.

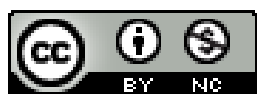
After creating an account in Epistemonikos, users will be able to save the matrixes and to receive automated notifications any time new evidence potentially relevant for the question appears.

This article is part of the Epistemonikos Evidence Synthesis project. It is elaborated with a pre-established methodology, following rigorous methodological standards and internal peer review process. Each of these articles corresponds to a summary, denominated FRISBEE (Friendly Summary of Body of Evidence using Epistemonikos), whose main objective is to synthesize the body of evidence for a specific question, with a friendly format to clinical professionals. Its main resources are based on the evidence matrix of Epistemonikos and analysis of results using GRADE methodology. Further details of the methods for developing this FRISBEE are described here (<http://dx.doi.org/10.5867/medwave.2014.06.5997>)

Epistemonikos foundation is a non-for-profit organization aiming to bring information closer to health decision-makers with technology. Its main development is Epistemonikos database

[www.epistemonikos.org](http://www.epistemonikos.org).

**Correspondencia a**  
Centro Evidencia UC  
Pontificia Universidad Católica de Chile  
Diagonal Paraguay 476  
Santiago  
Chile



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