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The Knee



Outcome of prosthesis matched and unmatched patella components in primary and revision total knee replacement

Peter L. Lewis^{a,b,*}, Ai E. Gamboa^a, David G. Campbell^a, Michelle Lorimer^c

^a Wakefield Orthopaedic Clinic, Adelaide, South Australia, Australia

^b Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR), Adelaide, South Australia, Australia

^c South Australian Health and Medical Research Institute (SAHMRI), Adelaide, South Australia, Australia

ARTICLE INFO

Article history:

Received 8 December 2016

Received in revised form 26 May 2017

Accepted 9 July 2017

Available online xxx

Keywords:

Patella

Total knee

Resurfacing

Primary procedures

Revision procedures

Patella components

ABSTRACT

Background: Although knee replacements have specifically designed patella prostheses that correspond to the geometry of their femoral components, a patella prosthesis that is unmatched to the femoral component may occasionally be inserted. In revision total knee arthroplasty (TKA), an originally resurfaced patella may be left, but the femoral component revised to one that does not match the patella. Few studies have compared the outcome of matched and unmatched patella components in TKA. This study compared the primary or revision TKA outcome of procedures where patella components matched to their femoral counterparts were inserted, with procedures using patella and femoral components that were unmatched.

Methods: Data on all primary and revision TKA procedures without a patella component or a matched or an unmatched patella component were obtained from the Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR). Revision surgery was the outcome measure. Cumulative percent revised (CPR) were calculated and Hazard ratios with p values were used to test statistical significance.

Results: In primary TKA, there were higher rates of revision where unmatched patella components were used, regardless of implant design. There was no difference in the second revision rates of unmatched versus matched patella component groups. This was evident where delayed resurfacing was carried out, and where the patella prosthesis was left alone but the femoral component was changed.

Conclusions: All primary TKA procedures require a patella component corresponding to the femoral component if the patella is resurfaced. Conversely, revision knee arthroplasties are not affected by the use of dissimilar patella and femoral components.

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1. Introduction

There are three approaches that surgeons use with regard to patella resurfacing in total knee arthroplasty (TKA): those that never resurface, those that always resurface, and those that selectively resurface [1]. When the patella is resurfaced, it may be matched or unmatched to the femoral component. This may be due to preference for certain techniques or instruments for a particular patella component's insertion, or for design features of the patella prosthesis. Examples may be the choice of an inset style

* Corresponding author at: AOANJRR, Level 4, SAHMRI, North Terrace, Adelaide, South Australia 5001, Australia.

E-mail address: plewis@aoanjrr.org.au (P.L. Lewis).

of patella component for a knee system that offers only the onlay style, or the use of a round domed style of patella in preference to an asymmetrical patella prosthesis.

In the revision setting where an unresurfaced patella is subsequently resurfaced, an unmatched patellar component may be used. This may be due to a variety of reasons, including surgeon preference or when the original knee design cannot be identified or if the matching patella component is no longer available. On occasion, in major TKA revision procedures both the femoral and tibial components are revised to a different system, but the original patella component remains in situ. Potential concerns with an unmatched patella component are risk of instability, maltracking, point loading leading to focal polyethylene wear, and anterior knee pain [2].

The objective of this study was to compare the outcome of matched and unmatched patella components in both primary and revision TKA.

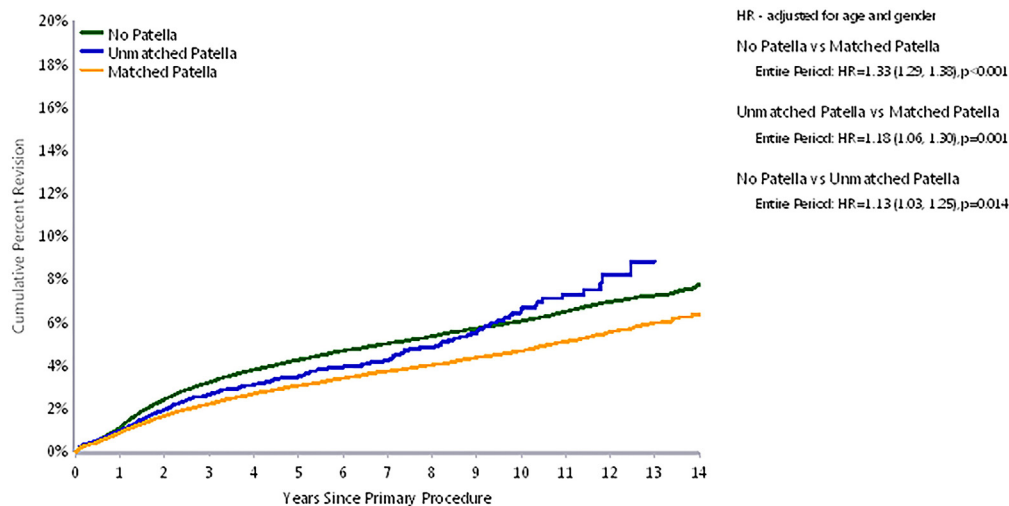
2. Materials and methods

All data were provided and analyzed by the Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR). Since beginning in 1999, the AOANJRR has collected data on TKA procedures in Australia with complete nationwide data commencing in 2002. The data included procedures to the end of December 2014.

Data analysis for primary TKA only included procedures with a diagnosis of osteoarthritis (OA). There were two groups for the TKA revision analysis: all first revision TKA where the patella was not resurfaced in the primary procedure, and all revision TKA that had a patella resurfacing in the primary and where the revision procedure replaced the femoral component. All primary and revision TKA procedures were classified as having either no patella prosthesis, or a patella component that was either matched or unmatched to the femoral component. This categorization was made by assessing the make and manufacturer of the prostheses. For example, if a procedure recorded an LCS femoral component (DePuy, Warsaw, Ind, US) and a PFC patella (DePuy, Warsaw, Ind, US) this would be considered an unmatched patella even though the same company produces both of these prostheses. Further analysis was performed to determine the impact of age, gender, prosthesis stability and mobility of the tibial insert. Revisions for infection were excluded.

2.1. Statistical analysis

Kaplan–Meier estimates of survivorship were used to describe the time to revision of an arthroplasty, with censoring at the time of death or closure of the dataset at the end of December 2014. The unadjusted cumulative percent revision, with an accompanying 95% confidence interval (CI), was calculated with the use of unadjusted point wise Greenwood estimates. Hazard ratios were calculated with use of Cox proportional-hazards models, adjusting for age and sex, and were used to make statistical comparisons of the revision rates between groups. The assumption of proportional hazards was checked analytically for each model; if the interaction between the



Number at Risk	0 Yr	1 Yr	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 Yrs	8 Yrs	9 Yrs	10 Yrs	11 Yrs	12 Yrs	13 Yrs	14 Yrs
No Patella	220957	198053	175027	153048	131940	111372	92325	74332	58893	44651	31538	21100	12440	5547	1507
Unmatched Patella	14688	11639	9190	6999	5219	3702	2629	1906	1391	1018	751	523	234	95	12

Figure 1. Cumulative percent revision of primary total knee arthroplasty by patella usage (Primary Diagnosis OA). There was a higher rate of revision when the patella was not resurfaced or an unmatched patella implant was used.

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