TITLE: Smith & Nephew Journey Total Knee Replacement Systems: Clinical and Cost-Efficiency and Guidelines

DATE: 19 March 2015

RESEARCH QUESTIONS

1. What is the clinical effectiveness of Smith & Nephew Journey total knee replacement systems in patients requiring total knee replacement?

2. What is the cost-effectiveness of Smith & Nephew Journey total knee replacement systems in patients requiring total knee replacement?

3. What are the evidence-based guidelines associated with the use of Smith & Nephew Journey total knee replacement systems in patients requiring total knee replacement?

KEY FINDINGS

Five non-randomized studies were identified regarding Smith & Nephew Journey total knee replacement systems in patients requiring total knee replacement.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2015, Issue 2), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2005 and March 5, 2015. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.
SELECTION CRITERIA

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

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<th>Table 1: Selection Criteria</th>
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<td><strong>Population</strong></td>
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<td><strong>Study Designs</strong></td>
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RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

Five non-randomized studies were identified regarding Smith & Nephew Journey total knee replacement systems in patients requiring total knee replacement. No relevant health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, economic evaluations, or evidence-based guidelines were identified.

Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

Five non-randomized studies\(^1\)\(^-\)\(^5\) were identified regarding Smith & Nephew Journey total knee replacement systems in patients requiring total knee replacement. One study\(^1\) reported high complication rates (e.g., 1.65 complications requiring major revision surgery per 100 component years) with the Journey bicruciate substituting total knee replacement. Two studies\(^2\)\(^,\)\(^3\) comparing Journey Bicruciate Stabilised knee replacement systems to Scorpio Non-Restrictive Geometry reported better clinical results in the Journey group; in both studies, patients with Journey knee replacements experienced more stiffness. Another study\(^4\) reported good clinical and radiological results with Journey; however, the authors reported that these outcomes did not differ significantly from conventional knee replacements. One study\(^5\) reported iliotibial band friction syndrome in 77 out of 1070 knees with Journey knee replacements.
REFERENCES SUMMARIZED

Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses
No literature identified.

Randomized Controlled Trials
No literature identified.

Non-Randomized Studies


BACKGROUND: The Journey bicruciate substituting (BCS) total knee replacement (TKR) is intended to improve knee kinematics by more closely approximating the surfaces of a normal knee. The purpose of this analysis was to address the safety of Journey BCS knees by studying early complication and revision rates in a consecutive case series. METHODS: Between December 2006 and May 2011, a single surgeon implanted 226 Journey BCS total knee prostheses in 191 patients (124 women, 67 men) who were eligible for study. Mean age at surgery was 68 years (41-85 years). Outcome measures were early complications and minor and major revision rates. All complications were considered, irrespective of whether conservative treatment or revision was required. RESULTS: The average implantation time was 3.5 years (range 1.3-5.8 years). Thirty-three complications (14.6% of 226 knees) required minor or major revision surgery in 25 patients. The remaining eight patients were treated conservatively. Sixteen minor revisions were performed in 12 patients. Thirteen major revisions were required in 13 patients, which results in a rate of 1.65 major revisions per 100 component years. The linear trend of the early complication rate by treatment year was not significant (p = .22). Multivariate logistic regression showed no significant predictors for the occurrence of a complication or for revision surgery. A tendency towards higher complication rates was observed in female patients, although it was not significant (p = .066). CONCLUSIONS: The complication and revision rates of the Journey BCS knee implant are high in comparison with those reported for other established total knee systems. Caution is advised when using this implant, particularly for less experienced knee surgeons.


PURPOSE: Posterior stabilised (PS) total knee arthroplasty (TKA) design development that focused on restoring normal knee kinematics was followed by the introduction of reason-guided motion designs. Although all PS fixed-bearing knee designs were thought
to have similar kinematics, reports show they have differing incidences and magnitudes of posterior femoral rollback and axial rotation. In this retrospective comparative study between two guided-motion total knee systems, we hypothesised that kinematic pattern has an influence on clinical and functional outcomes. METHODS: This study represents the continuation of a previously reported clinical and kinematics analysis. We retrospectively reviewed 347 patients treated with two different TKA designs: Scorpio NRG (Stryker Orthopedics) and Journey Bi-Cruciate Stabilised (BCS) knee system (Smith & Nephew). Two hundred and eighty-one patients were assessed clinically. Patients were divided into groups according to implanted TKA. Clinical evaluation with the Knee Injury and Osteoarthritis Outcome Score (KOOS) questionnaire was performed. Fifteen Scorpio NRG and 16 Journey BCS patients underwent video fluoroscopy during stair climbing, chair rising/sitting and step up/down at six months of follow-up. RESULTS: At an average 29 months of clinical follow-up, patients with Journey BCS TKAs reported better clinical results. Stiffness was more frequently reported in the Journey group (5.2 % vs 1.2 %), whereas anterior knee pain was observed in the Scorpio NRG group (1.9 %) only. Both prosthetic models reported different posterior translation of the medial and lateral contact points (CP) in all analysed motor tasks during knee flexion (BCS 10-18 mm; NRG Scorpio 2-3 mm). Both designs produced progressive external rotation of the femoral component relative to the tibia during flexion. CONCLUSIONS: Journey BCS showed statistically significant better KOOS results. The higher posterior femoral rollback observed in the kinematic assessment of this design, associated with a better patellofemoral design, may be the reason for better clinical outcome. The reported cases of stiffness and anterolateral joint pain could be attributed to excessive medial and lateral tibiofemoral posterior translation. The NRG group demonstrated good axial rotation, but this was not coupled with physiological kinematic patterns. Patellofemoral pain can be explained by a less friendly femoral-groove design. TKA clinical-functional outcome and complications were highly influenced by the bearing geometry and kinematic pattern of prosthetic designs.


PURPOSE: In a retrospective comparative analysis in patients undergoing primary guided-motion total knee arthroplasty (TKA), the authors have evaluated whether different TKA implant design would influence the clinical and functional outcomes. METHODS: Between 2007 and 2009, 227 computer-assisted primary TKAs were performed in 219 consecutive patients. Patiens received one of the two different fixed-bearing guided-motion TKA designs assisted by navigation surgery: the Scorpio Non-Restrictive Geometry (NRG) knee system and the Journey Bi-Cruciate Stabilized (BCS) knee systems. RESULTS: Data were available for 180 patients (187 knees). No significant differences were observed between the two groups with respect to preoperative demographic characteristics, range of motion (ROM) and radiographic knee alignment. At a mean follow-up of 29 months, the Journey BCS group had higher mean Knee Injury and Osteoarthritis Outcome Score (KOOS) in all subscales and a greater ROM than the Scorpio NRG group. This difference was statistically significant for the KOOS subscales of pain (p = 0.007) and knee-related quality of life (p = 0.045), as well as for postoperative ROM (p = 0.018). Considering the overall complications,
1 patient of Scorpio NRG group (0.5%) and 5 in Journey BCS (2.7%) had stiffness. Anterior knee pain was reported in 4 cases of Scorpio NRG group (2.1%). In the Journey BCS group were observed 2 cases (1.1%) of frontal plane instability and 1 case (0.5%) of synovitis pain. CONCLUSIONS: The bearing geometry and kinematic pattern of different guided-motion prosthetic designs can affect the clinical-functional outcome and complications type in primary TKA.

**LEVEL OF EVIDENCE:** Clinical study, Level III


**BACKGROUND:** Growing expectations regarding TKA inspire the researchers to look for a perfect endoprosthesis. One of the new-generation prostheses is Journey BCS (Smith & Nephew), introduced in 2004, which, according to its inventors, completely restores anatomy and kinematics of the knee.

**The aim of this study was to evaluate TKA with Journey endoprosthesis in a two-year follow-up.**

**MATERIAL/METHODS:** The study was a prospective analysis. It included 61 patients aged 52-87 years, with primary OA and axial deformity under 15 degrees, and without a significant instability in the frontal plain. A total of 61 TKAs were assessed with the use of WOMAC OI, KSS clinical and radiological scales. The group was evaluated after 6, 12, 24 weeks, 1 and 2 years postoperatively. **RESULTS:** At the end point of observation, 97% of the patients obtained good and very good clinical and radiological results.

Mean knee flexion in the study group increased until 24 week and reached 121.8 degrees. These results are comparable with the results described in the literature, but do not differ significantly from the outcomes of conventional endoprostheses.

**CONCLUSIONS:** In the presented material, TKA with the application of anatomic endoprosthesis Journey allowed to obtain in the majority of patients very good and good early clinical and radiological results.


This study aimed at systematic documentation of lateral knee pain in a consecutive series of 1102 cruciate-substituting, guided motion total knee arthroplasties (TKA) (Journey, Smith and Nephew, Memphis, TN, USA) performed in 1085 patients; 1070 knees were available for review. Follow-up time ranged from one to five years, with a mean of 2.5 years. **Symptoms mimicking the well known iliotibial band (ITB) friction syndrome were observed in 77 knees (7.2%).** Initial conservative treatment consisted of anti-inflammatory medication (77 knees) and local steroid injection (35 knees). The pain persisted in 22 knees (2%), leading to a surgical release of the iliotibial band. Other surgical interventions included revision for infection (6 knees, 0.5%), revision for tibial component loosening (6 knees, 0.5%), revision for tibiofemoral dislocation (3 knees, 0.3%), revision for patellar component loosening (5 knees, 0.4%), revision for instability (1 knee, 0.1%) and secondary patellar resurfacing (1 knee, 0.1%). **The overall survivorship with partial or total implant revision as an endpoint was 98%**. The development of lateral knee pain in association with the use of a guided motion design can be explained by the forced posterior translation of the lateral condyle in flexion. The asymmetric cam and post mechanism, acting as a hard driver of posterior femoral translation and internal
tibial rotation during flexion, does not allow for the natural kinematic variability occurring in native knees. **This repetitive and forced stretching of the ITB seems to induce a painful traction syndrome in some patients.**

**Economic Evaluations**
No literature identified.

**Guidelines and Recommendations**
No literature identified.

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APPENDIX – FURTHER INFORMATION:

Additional References

