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Clinical and radiographical outcomes of the K-MOD PS total knee prosthesis: a retrospective analysis of 178 cases

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Summary

Introduction. The demand for primary total knee prosthesis is growing globally with an annual rate ranging from 5% to 17%, representing the most valid solution in patients with advanced osteoarthritis, providing significant pain relief and an overall improvement in quality of life.

Over the years, the evolution of knee prosthetic surgery has led to the development of numerous types of implants, different in materials in design philosophies and surgical approach, with the aim of ensuring the improvement of joint functionality, duration and better adaptation to the patient.

The differences concern, for example, the degree of constraint, whether or not the posterior cruciate ligament is preserved and the type of osteointegration.

Among the various proposals, PS prostheses are still the most used alternative, based on the "cam-post" system, guaranteeing an improvement of the ROM and a femoral rollback.

Objectives. The aim of this study is to report the clinical and radiographic results of the Biompianti K-MOD PS total knee prosthesis.

Materials and methods. 190 prosthesis implanted between September 2019 and January 2024 were evaluated in 181 patients. The outcome was evaluated through the presence of painful symptomatology, ROM and radiographic aspect, evaluating the presence of possible complications such as mobilization and infection.

Results. Among the 190 implants, 178 were considered for follow up. The 178 prostheses were analyzed retrospectively with an average follow-up of 2.7 years (minimum 7 months, maximum 5 years, SD 1.3). The 88.8% obtained an improvement of the painful symptomatology and a satisfactory final ROM with no signs of mobilization at the radiographic control. 11.2% had complications, including the persistence of painful symptoms with ROM limitation (75%) and aseptic mobilization in 2 cases (10%); a single case of infection and one case of instability to varo-valgus stress were documented.

Conclusions. This study showed an excellent outcome in terms of improved painful symptoms and ROM recovery associated with a low incidence of complications.

Key words: arthroplasty, posterior-stabilized total knee arthroplasty (PS-TKA), osteoarthritis, treatment outcome, prosthesis design

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Introduction

The demand for primary total knee prosthesis is growing globally with an annual rate ranging from 5% to 17%, representing the most valid solution in patients with advanced osteoarthritis, providing significant pain relief and an overall improvement in quality of life [1].
Over the years, the evolution of knee prosthetic surgery has led to the development of numerous types of implants, different in materials in design philosophies and surgical approach, with the aim of ensuring the improvement of joint functionality, duration and better adaptation to the patient [2,3].
The differences concern, for example, the degree of constraint, whether or not the posterior cruciate ligament is preserved and the type of osteointegration [4].
Among the various proposals, PS prostheses are still the most used alternative, based on the "cam-post" system, guaranteeing an improvement of the ROM and a femoral rollback [5,6].
However, despite their popularity, recent studies have raised questions about long-term outcomes, especially when certain alignment techniques such as restricted kinematic alignment are used, which may increase the risk of aseptic loosening in PS implants [7]. Comparative analyses continue to explore the relative performance of PS versus cruciate-retaining (CR) designs, with some studies highlighting no substantial difference in clinical outcomes, while others indicate biomechanical or functional preferences depending on patient profiles and surgical techniques [3,4].

Materials and methods

Sample

The sample included 190 total K-MOD PS knee implants implanted between September 2019 and January 2024 in 181 patients. In the follow-up period 9 patients were lost, while 1 died; one patient with bilateral prosthesis was also excluded with bone metabolism problems. The remaining 178 prostheses (170 patients) were included in the study. The sample consists mainly of women (64.6%), patients have an average age of 72 years (50-87, SD 8). The main indication has been given for primary osteoarthritis of the knee, there are two cases of post-traumatic arthrosis.

Surgical technique

The interventions were performed in the operating room with laminar flows. Antibiotic prophylaxis with a single dose of vancomycin (1 g) was performed 60 minutes before the incision. No tourniquet was placed. A standard medial parapatellar approach was used in all cases. Femoral and tibial incisions were performed with dedicated tools. The prosthetic components were cemented at the femoral and tibial level; in 5 cases the femur was not cemented. The patella has always been denervated and the osteophytes removed. Patellar prosthesis was performed in only one case.

Post-operative treatment

Patients were given low molecular weight heparin antithromboembolic prophylaxis. From the first day after surgery they were treated with Kinetec 0-45°, with progressive increase in bending. The patient then began active and passive mobilization and ambulatory training with supervision of the physiotherapist; these exercises were continued for a minimum of one month up to 6 months. Full load was immediately granted with the aid of two Canadian sticks/walker.

Clinical and radiological assessment

Patients were evaluated with clinical and radiographic follow-up at 1, 3, 6 and 12 months after the intervention.
The ROM, varo-valgus stress stability, improvement of pain symptoms and return to daily activities were examined.
The radiographic imaging allowed to verify the possible presence of radiotrasparence lines, osteolysis and mobilization of the prosthetic components.
It was considered as a positive outcome the recovery of mobility in the absence of pain, instability and signs of mobilization at the radiographic imaging. The negative outcome was defined by painful prostheses with ROM limitation and prostheses subject to revision.
All data was collected retrospectively.

Results

178 total knee prostheses in 170 patients were retrospectively analyzed with a mean follow-up of 2.7 years (7 months to 5 years, SD 1.3 years). 88.8% of the prostheses evaluated resulted in a complete resolution of the patient's reported painful symptomatology, with satisfactory ROM recovery and in the absence of complications such as aseptic mobilization and infection. Among those patients, 5.70% (9 patients) have undergone a course of drug therapy with Clodronate within 6 months of surgery before achieving full recovery.
Among the negative outcomes, the persistence of painful symptomatology (75%) is the predominant element. In cases where painful symptoms persist, 93.3% are women and 60% have an age of more than 70 years at the time of surgery.
There were 3 cases of failure of the prosthetic implant with subsequent revision: 2 cases of aseptic mobilization and one case of infection treated with 2-stage revision.
Lastly, we report one case of instability still in follow-up phase and one case of rigidity in
which a joint release under narcosis was performed.
Both implants performed for posttraumatic secondary arthrosis had a negative outcome (persistence of pain and stiffness).

Discussion

The outcomes achieved with the implantation of the K-MOD PS total knee prosthesis confirm the clinical effectiveness of this model, with significant improvement in pain symptoms and range of motion (ROM) in 88.8% of cases. These results are consistent with findings in the literature, where posterior-stabilized (PS) systems have proven effective in enhancing joint function and promoting femoral rollback during daily activities thanks to the cam-post mechanism [5,8-10].

The complications observed, particularly the two cases of aseptic loosening and one case of instability, fall within the incidence rates reported in previous studies comparing PS and cruciate-retaining (CR) implants. These studies suggest a comparable safety profile, though a higher risk of loosening may be associated with restricted kinematic alignment techniques [2,7].

In our cohort, complications occurred mainly in elderly and female patients, suggesting a possible influence of systemic factors (such as osteoporosis or mood disorders) on unfavorable postoperative evolution, as also reported in other follow-up studies [4,11]. In relation to the persistence of pain symptoms (75% of negative outcomes), this essentially concerns anterior patellar pain. Factors related to postoperative anterior knee pain and its impact on patient outcomes are poorly understood. As highlighted by some studies, patients who had preoperative anterior knee pain had twice the risk of experiencing anterior knee pain after TKA than patients who did not have preoperative anterior knee pain [12]. According to some authors, anterior knee pain is significantly greater when patellar replacement is not associated with TKA [13]. As regards our patients, the indication for patellar replacement in conjunction with total knee replacement surgery is given only in cases of severe patellofemoral osteoarthritis, however, the indication can also be given secondarily when we find persistence of patellar pain due to conflict with the prosthesis already implanted.

Finally, the low incidence of infectious complications and the complete absence of early loosening in the majority of cases suggest that the adopted surgical technique, combined with a structured rehabilitation protocol, played a favorable role in the overall outcomes.

These results reinforce the conclusions of the most recent meta-analyses, which recognize PS designs as offering a good balance between mechanical stability and functional recovery [2,6].

Conclusions

In our experience, the K-MOD PS is an excellent choice for prosthetic replacement of the knee. This retrospective study showed an excellent outcome in most patients, with resolution of the painful symptoms and return to daily life activities, associated with a low incidence of complications. The results are in line with what is reported in the most recent meta-analyses. However, this study has some limitations: it is a retrospective study in the absence of a control group; moreover, a longer follow-up would be required to assess the survival of the prosthesis over time and the possible occurrence of late complications.

Conflict of interest statement

The authors declare no conflict of interest.

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Author contributions

Each author participated in the data collection, analysis and writing of this article.

Ethical consideration

Patient data was retrospectively analyzed and did not change patient care. Ethical Committee approval was therefore deemed unnecessary.

References

1 Torre M, Romanini E, Zanoli G, et al. Monitoring outcome of joint arthroplasty in Italy: implementation of the National Registry. Joints 2017;05:070-078. https://doi.org/10.1055/s-0037-1603899

2 Zaid M, Vail T. Posterior stabilized total knee arthroplasty. https://doi.org/10.1007/978-3-662-22663113-3_28

3 Sun K, Wu Y, Wu L, et al. Comparison of clinical outcomes among total knee arthroplasties using posterior-stabilized, cruciate-retaining, bi-cruciate substituting, bi-cruciate retaining designs: a systematic review and network meta-analysis. Chinese Med J 2023;136:1817-1831. https://doi.org/10.1097/cm9.0000000000002183

4 Reckermann I, Orth P, Götze C, et al. Perioperative and follow-up analyses of primary posterior stabilized and cruciate retaining knee arthroplasty. J Clin Med 2025;14:3752-3752. https://doi.org/10.3390/jcm14113752

5 Fantozzi S, Catani F, Ensini A, et al. Femoral rollback of cruciate-retaining and posterior-stabilized total knee replacements: in vivo fluoroscopic analysis during activities of daily living. J Orthop Res 2006;24:2222-2229. https://doi.org/10.1002/jor.20306

6 Migliorini F, Eschweiler J, Tingart M, et al. Posterior-stabilized versus cruciate-retained implants for total knee arthroplasty: a meta-analysis of clinical trials. Eur J Orthop Surg Traumatol 2019;29:937-946. https://doi.org/10.1007/s00590-019-02370-1

7 Sappey-Marinier E, Shatrov J, Batailler C, et al. Restricted kinematic alignment may be associated with increased risk of aseptic loosening for posterior-stabilized TKA: a case-control study. Knee Surg Sports Traumatol Arthr 2021;Aug 23. https://doi.org/10.1007/s00167-021-06714-5

8 Wagner A, Wittig U, Leitner L, et al. Comparison of revision rates and epidemiological data of a single total knee arthroplasty system of different designs (cruciate retaining, posterior stabilized, mobile bearing, and fixed bearing): a meta-analysis and systematic review of clinical trials and national arthroplasty registries.

Arch Orthop Trauma Surg 2024;144:1997-2006. https://doi.org/10.1007/s00402-024-05286-6

9 Kim SE, Ro DH, Lee MC, et al. Early- to mid-term review of a prospective, multi-center, international, outcomes study of an anatomically designed implant with posterior-stabilized bearing in total knee arthroplasty. Medicina (Kaunas) 2023;59:2105. https://doi.org/10.3390/medicina59122105

10 Garabano G, Rodriguez JA, Perez Alamino L, et al. Functional and radiological outcomes of total knee arthroplasty using posterior-stabilized U2 knee system: a retrospective study in 560 cases at five years of follow-up. Eur J Orthop Surg Traumatol 2024;34:3939-3945. https://doi.org/10.1007/s00590-024-04082-7

11 Can A, Erdogan F, Erdogan AO. Tibiofemoral instability after primary total knee arthroplasty: posterior-stabilized implants for obese patients. Orthopedics 2017;40:E812-E819. https://doi.org/10.3928/01477447-20170608-02

12 De Oliveira Silva D, Webster KE, Feller JA, et al. Anterior knee pain following primary unilateral total knee arthroplasty with posterior-stabilized prosthesis and patellar resurfacing: prevalence and clinical implications. J Arthroplasty 2023;38:281-285. https://doi.org/10.1016/j.arth.2022.08.042

13 Thiengwittayaporn S, Srungboonmee K, Chiamtrakool B. Resurfacing in a posterior-stabilized total knee arthroplasty reduces patellar crepitus complication: a randomized, controlled trial. J Arthroplasty 2019;34:1969-1974. https://doi.org/10.1016/j.arth.2019.04.050