

GMK[®] *Efficiency*

SINGLE USE INSTRUMENTS
IN KNEE REPLACEMENT



GMK EFFICIENCY VALUE DOSSIER



**STRIVING TO IMPROVE
OPERATING ROOM EFFICIENCY**

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1. STRIVING TO IMPROVE OPERATING ROOM EFFICIENCY

Healthcare systems around the world are being daily challenged by a growing demand of orthopaedic elective procedures against a backdrop of economic pressure. In addition to this already challenging situation, the COVID pandemic has increased the need for high-level care to be associated with an optimized operating room efficiency and productivity. Medacta is committed to providing innovative orthopaedic solutions that improve patient well-being, safely and effectively, and deliver sustainability and efficiency to the healthcare system. GMK Efficiency is a complete single-use instrument solution, conceived to optimize surgical tools management when implanting Medacta total knees. As the most complete range on the market of always new, sterile-delivered, single-use instruments for total knee arthroplasties, this product provides all the healthcare stakeholders, from surgeons to hospital administration, with a reliable, easy-to-manage, time-saving and cost-effective solution which decreases the risk of cancellation of surgeries or delays due to missing or worn out items, issues typically associated with reusable instruments, and limits the saturation of the hospitals' sterilization units.

COMPLETE SINGLE-USE INSTRUMENTATION

GMK Efficiency is a complete single use instrument set to implant Medacta total knee system solutions. Thanks to GMK Efficiency, the backtable setup and intra-op management is simplified and the O.R. downtime between surgeries can be reduced.

LOWER INFECTION RISK

Potentially reduced risk of issues like cross-contamination and infections with single-use instruments packaged in terminally sterile blisters.^[1] It has to be noted that the estimated cost for a single surgical site infection is on average \$25,500.^[2]

EFFICIENT AND COST-EFFECTIVE

The time and costs related to the washing, sterilization and functional checking of the instruments before and after each surgical procedure are eliminated.^[3] The potential reduction in O.R. turnover time and the optimization of staff management can lead to additional cases during the same surgical session.

ALWAYS READY, STERILE AND BRAND NEW, OPTIMIZING LOGISTICS

Surgery cancellation or delay caused by non sterile, missing or dysfunctional instruments are prevented. GMK Efficiency is always delivered terminally sterile and, therefore, immediately available also for a last minute surgery. In addition, a complete set of GMK Efficiency weighs almost 10 times less than a conventional re-usable instrument set!

REPRODUCIBLE PROCEDURE

Ergonomic, staff-friendly instruments, brand new for each case. The combination of special medical grade composite technopolymers (MTech) and a precise manufacturing process provides high fatigue and abrasion resistance while granting design versatility. GMK Efficiency is a complete single-use instruments solution conceived to optimize surgical tools management when implanting Medacta total knees. It provides all the healthcare stakeholders, from the surgeons to the hospital administrations, with a reliable, easy to be managed, time saving and cost effective solution to extremely decrease the risk of surgeries cancellation or delay due to re-usable instruments associated issues and sterilization units' saturation thanks to the most complete range on the market of always new, sterile-delivered, single-use instruments options for total knee arthroplasties.

^[1] Siegel G. W., Patel N. N., Milshteyn M. A., Buzas D., Lombardo D. J., Morawa L. G., M.D., Cost Analysis and Surgical Site Infection Rates in Total Knee Arthroplasty Comparing Traditional vs Single-Use Instruments. The Journal of Arthroplasty 30; (2015): 2271-2274.

^[2] Stone et al, American Journal of infection control, 2005.

^[3] Dell'Osso G, Celli F, Bottai V, Bugelli G, Citarelli C, Agostini G, Guido G, Giannotti S Single-Use Instrumentation Technologies in Knee Arthroplasty: State of The Art, Surg Technol Int. 2016 Apr 27;XXVIII. pii: sti28/727.

2. GMK EFFICIENCY: PLENTY OF OPTIONS FOR TOTAL KNEE ARTHROPLASTY

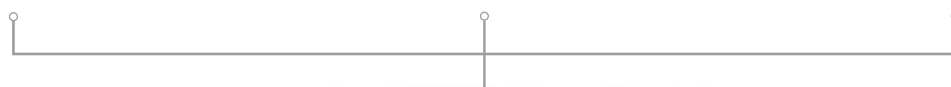
GMK Efficiency instrumentation provides the surgeons with a comprehensive and unparalleled platform of options to manage their total knee arthroplasties. They can choose the instrument solution that best fit their usual approach:

EFFICIENCY KNEEPACK: GMK EFFICIENCY + MYKNEE PATIENT-MATCHED TECHNOLOGY

When the surgeons are or are willing to be PSI users, the combination of our MyKnee patient-matched technology and GMK Efficiency can further improve the time-saving and logistics benefits associated to the single-use instrumentation. The MyKnee set of 3D-printed guides allows the surgeon to easily and accurately replicate the preoperative planning evaluated and validated on Medacta dedicated 3D webplanner. These guides are shipped together with GMK Efficiency sets needed for the specific surgery, including the General set and the Femoral/Tibial trays of the planned sizes: all the instruments needed to complete the surgery.

A MyKnee Efficiency surgery can be easily booked on the dedicated web platform, which is always accessible from every device, and the surgeon will have the possibility to follow the development of each case anytime. After the upload of the CT or MRI scans of the patient's leg, Medacta needs only 3 (in the case of non-sterile guides) to 5 weeks (in the case of sterile guides) to supply the MyKnee guides and the corresponding GMK Efficiency sets to the surgeon, on time for surgery.

This unparalleled synergy can be further enhanced with the Efficiency KneePack solution that for each case includes the MyKnee guides, the GMK Efficiency sets and the femoral and tibial implant of the planned sizes. The best-in-class solution to optimize the surgical session agenda and the hospital stock.



Everything you need in **JUST ONE BOX, STERILE and READY TO USE**



GMK EFFICIENCY CONVENTIONAL

GMK Efficiency is also available as a stand-alone solution for surgeons not PSI-users thanks to the conventional tray. This set is available in two different versions: one to be used for the mechanical alignment approach, the other one specific for the kinematic alignment philosophy.

This tray includes, the jigs and the dedicated alignment tools to plan the distal femur and proximal tibia resections and to position accordingly the cutting guides. In addition, a dedicated anterior/posterior reference sizer is available to evaluate the correct femoral implant size to be used.

The GMK Efficiency conventional can be also kept in the hospital stock to be used as backup in the case that a problem occurs with standard, reusable instruments in order to avoid surgery cancellation. In addition, the GMK Efficiency conventional set can be also used to manage a last-minute surgery avoiding the handling of heavy and bulky metal instrumentation trays.



GMK ULTIMATE EFFICIENCY HYBRID SOLUTION

As another alternative, GMK Efficiency can be also used in combination with GMK ULTIMATE metal instrumentation in a reusable/single-use hybrid solution. GMK ULTIMATE conventional tray is the Medacta advanced metal set that includes alignment jigs and femoral sizers totally compatible with GMK Efficiency tools. The GMK ULTIMATE Efficiency instrumentation combines all the advantages of modern metal instrumentation with the logistical benefits of a single-use set.



A versatile, straightforward and user-friendly solution to support the surgeon's daily activity that features a streamlined instrument management, with only one tray to be washed and sterilized, and the potential reduction in O.R. set-up and clean-up time to optimize O.R. scheduling, thanks to the benefits of GMK Efficiency.

3. GMK EFFICIENCY: PROVEN CLINICAL AND ECONOMICAL BENEFITS

GMK Efficiency clinical and economical benefits in the surgeons' and hospitals' daily practice have been evaluated and analyzed in a wide number of published papers. The main findings shown that GMK Efficiency can be:

COST EFFECTIVE!

Money saving up to 1'200\$ per case avoiding sterilization of instruments trays and eventual surgery cancellation due to unavailable items

TIME SAVING!

Up to 35 minutes saved per procedure by decreasing the OR downtime in-between surgeries, due to an easier and faster backtable set up/disposing process

ACCURATE!

GMK Efficiency combined to MyKnee resulted the most accurate solution in replicating the pre-operative planning parameters.

Below you find the list of some of the main published papers available on GMK Efficiency. The results of each one of them are displayed and analyzed in the next pages of this brochure:



Logistical and Economic Advantages of Sterile-Packed, Single-Use Instruments for Total Knee Arthroplasty

*T. Goldberg, MD;
J. Maltry, MD et al.*



Health costs and efficiencies of patient-specific and single-use instrumentation in total knee arthroplasty: a randomised controlled trial

Prof. Leela C. Biant et al.



CT-based patient-specific instrumentation for total knee arthroplasty in over 700 cases: single-use instruments are as accurate as standard instruments

PD Dr. med. Peter Koch et al.



Can a Single-Use and Patient-Specific Instrumentation Be Reliably Used in Primary Total Knee Arthroplasty? A Multicenter Controlled Study

*Prof. Moussa Hamadouche,
PhD et al.*



Improving Intra-Operative Efficiency of Total Knee Arthroplasty with Patient-specific and Single-use Instrumentation

Prof. Leela C. Biant et al.



Improving Operating Room Efficiency with Single-Use Disposable Instruments for Total Knee Arthroplasty

*Adolph V. Lombardi Jr., MD,
FACS; Keith R. Berend, MD;
David A. Crawford, MD*



Value in Single-Use Instruments for Total Knee Arthroplasty: Patient Outcomes and Operating Room Efficiency

T. Goldberg, MD et al.



Time is Money! Influence on Operating Theatre and Sterilization Times of Patient-specific Cutting Guides and Single-use Instrumentation for Total Knee Arthroplasty: A Full Factorial Design of 136 Patients

*M. Hamadouche, MD, PhD,
P. Anract, MD, PhD*

LOGISTICAL AND ECONOMIC ADVANTAGES OF STERILE-PACKED, SINGLE-USE INSTRUMENTS FOR TOTAL KNEE ARTHROPLASTY

Tyler D. Goldberg, MD, John A. Maltry, MD, Mukesh Ahuja, MBBS, MS, CPI, Jason A. Inzana, PhD

The Journal of Arthroplasty

- The median total cost savings with GMK Efficiency is \$994 per case.
- Half of the 12-hours operating days can accommodate an additional case.

ABSTRACT

Background: Total knee arthroplasty (TKA) is well established as a clinically successful and cost-effective procedure. The transition of the US healthcare system from a fee-for-service model to a value-based care model requires careful examination of patient care to ensure both quality and efficiency. Sterile-packed, single-use instruments have been introduced as a tool to help streamline the operating room (OR) logistics while reducing sterilization requirements. The aim of this study was to examine the potential logistic and economic benefits of single-use instruments compared to traditional, reusable instruments for TKA.

Methods: Four variables related to TKA costs and logistics were modeled in this study: OR turnover time tray sterilization, tray management time, and 90-day infection rates. Model input data for traditional instruments and single-use instruments were based on peer-reviewed literature. A total of 200 sites and 500 cases per site were simulated using the Monte-Carlo-Technique.

Results: The median total cost savings with single-use instruments was \$994 per case. The largest driver for cost savings was tray sterilization. Sites with higher staff wages and sterilization costs had a larger probability of realizing greater cost savings with adoption of single-use instruments. In cases using single-use instruments, up to 51% of operating days could have accommodated an additional procedure due to the time savings in OR turnover.

Conclusion: This cost modeling study observed significant potential for logistical and economic improvements in TKA with single-use vs reusable instruments. Although few studies have been conducted to measure the impact of single-use instruments in practice, the results of these simulations motivate further investigation.

This paper explores logistical and economic benefits associated to GMK Efficiency through a probabilistic cost model and the results highlight that GMK Efficiency single use instrumentation has a compelling potential to help improve the quality and efficiency of delivering TKA procedures.

The Monte Carlo method was used to realize the economic model then used to simulate a wide range of scenarios. The potential logistical and economic advantages that healthcare providers may realize by using single-use instruments for TKA procedures instead of conventional metal instruments has been evaluated. A total of 200 sites (e.g., hospitals) and 500 cases per site were simulated (100,000 total cases).

The main outcomes are listed below:

- 95% of the sites simulated saved at least \$500 per case, while 48% saved at least \$1000 per case using GMK Efficiency. Centers with higher staff wages and sterilization costs had a greater opportunity to realize substantial cost savings using single-use instrumentation.
- GMK Efficiency drastically reduces OR downtime in between surgeries, creating the opportunity for a substantial increase in the number of cases per day. For example, accounting for an 8-hour OR day, the simulation shows that in the 11% of the working days, one additional case can be performed.



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READ THE STUDY

DOI: [10.1016/j.arth.2019.03.011](https://doi.org/10.1016/j.arth.2019.03.011)
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HEALTH COSTS AND EFFICIENCIES OF PATIENT-SPECIFIC AND SINGLE-USE INSTRUMENTATION IN TOTAL KNEE ARTHROPLASTY: A RANDOMISED CONTROLLED TRIAL

Andre Attard, Gwenllian Fflur Tawy, Michiel Simons, Philip Riches, Philip Rowe, Leela C Biant

BMJ Open Quality

- MyKnee Efficiency is the faster solution in O.R.
- GMK Efficiency resulted the most cost effective.

ABSTRACT

Aim: To investigate whether patient-specific instrumentation (PSI) and single-use instrumentation (SUI) improve operating room efficiency in terms of time and cost to the healthcare provider over conventional/reusable instrumentation (CVR) when performing total knee arthroplasty (TKA).

Patients and methods: Patients requiring TKA were randomised into one of four surgical groups: CVR, CVS (conventional/SUI), PSR (PSI/reusable) and PSS (PSI/SUI). All surgical procedures were video recorded to determine specific surgical time intervals. Other variables reported included the number of instrument trays used, missing equipment, direct instrument costs and the weight of the instruments the staff had to handle. Oxford Knee Score (OKS), estimated blood loss and lengths of hospital stay were also recorded as markers of patient experience.

Results: PSR was significantly quicker in all the recorded time intervals, used less trays, experienced less missing equipment and resulted in lower blood loss and shorter hospital stays. SUI reported significantly slower operating room times and resulted in higher blood loss, but SUI was 88% lighter and 20% cheaper on average when compared with their reusable counterparts. Despite the economic advantages of PSI and SUI, the patients who reported greatest improvements in OKS were those allocated to the CVR group, but no clinically meaningful difference in OKS was found at any time point.

Conclusions: PSI and SUI for TKA have the potential of reducing operating room times over conventional, reusable sets. This reduction will benefit theatre personnel ergonomically, while presenting the healthcare provider with potential cost-saving benefits in terms of reduced sterilisation costs and surgical times.

This study shows that MyKnee and GMK Efficiency have the potential of reducing operating room times over conventional, reusable sets. This reduction would benefit OR staff, while presenting the healthcare provider with potential cost-saving reducing sterilization costs and surgical times. Patients requiring TKA were randomised into one of four surgical groups to implant a GMK Sphere using conventional re-usable instruments, MyKnee with re-usable instruments, GMK Efficiency conventional instrumentation or MyKnee Efficiency instrumentation.

Below the main outcomes are listed:

- **MyKnee was significantly quicker in the OR, resulting in lower blood loss and shorter patients' hospital stays.**
- **Without the need for sterilization, GMK Efficiency resulted more cost-effective than re-usable instruments** that can also run into complications such as missing or malfunctioning items during surgery.
- **No clinically meaningful difference in terms of patient outcomes** have been found at any time point (immediately after the surgery, at 6 weeks and at 1 year) among the four patient groups.

As presented in this study, **surgical efficiency was significantly improved by MyKnee.** Moreover, **GMK Efficiency has the potential to further increase MyKnee benefits, reducing backtable set up times, OR turnover and downtime between cases.** It has to be noted that these GMK Efficiency benefits were limited during this study due to learning curve effects. However, **the overall cost of GMK Efficiency and MyKnee presents the healthcare provider with potential cost savings.**



READ THE STUDY

DOI:10.1136/bmjopen-2018-000493

CT-BASED PATIENT-SPECIFIC INSTRUMENTATION FOR TOTAL KNEE ARTHROPLASTY IN OVER 700 CASES: SINGLE-USE INSTRUMENTS ARE AS ACCURATE AS STANDARD INSTRUMENTS

Stefan Gaukel, Raphael N. Vuille-dit-Bille, Michel Schläppi, Peter P. Koch

Knee Surgery, Sports Traumatology, Arthroscopy

GMK Efficiency combined to MyKnee resulted the most accurate solution in replicating the pre-operative planning parameters.

ABSTRACT

Purpose: Efforts in total knee arthroplasty are made to improve accuracy for a correct leg axis and reduce component malpositioning using patient-specific instruments. It was hypothesized that use of patient-specific instruments (vs. computer-navigated and conventional techniques) will reduce the number of outliers. Our second hypothesis was that single-use instrumentation will lead to the same accuracy compared to patient-specific instruments made of metal.

Methods: 708 primary total knee arthroplasties between 2014 and 2018 using computer tomography (CT)-based patient-specific cutting block technique and a preoperative planning protocol were retrospectively reviewed. Preoperative data [hip-knee-angle (HKA), lateral distal femoral angle (LDFA), medial proximal tibial angle (MPTA), tibial slope, femoral component flexion] was compared to postoperative performed standard radiological follow-up X-rays. Differences of $> 3^\circ$ between measurements were defined as outliers.

Results: Overall 500 prosthesis using standard instrumentation and 208 prosthesis using single-use instruments were implanted. Preoperative HKA axes (-1.2° ; $p < 0.001$), femoral component flexion ($\Delta 0.8^\circ$, $p < 0.001$), LDFA ($\Delta -1.5^\circ$, $p < 0.001$), MPTA ($\Delta -0.5^\circ$, $p < 0.001$) and tibial posterior slopes ($\Delta 0.5^\circ$, $p < 0.001$), respectively, were different from postoperative axes. More outliers occurred using standard (vs. single-use) instruments ($p < 0.001$) regarding postoperative HKA (ranges of standard- vs. single-use: instruments: HKA 178.0° – 180.5° vs. 178.0° – 180.5° , femoral component flexion 0.0° – 6.0° vs. 0.0° – 4.5° , LDFA 90.0° – 91.0° vs. 90.0° – 90.0° , MPTA 90.0° – 90.0° vs. 90.0° – 90.0° , tibial posterior slope -10° to 10° vs. -1° to 10°). No differences were seen for other angles measured. Comparing both systems, total number of outliers was higher using standard (8%) vs. single-use instruments (4.3%).

Conclusion: This study shows a high accuracy of CT-based patient-specific instrumentation concerning postoperative achieved knee angles and mechanical leg axes. Single-use instruments showed a similar accuracy.

In this paper, Dr. Koch retrospectively reviewed more than 700 CT-based TKA MyKnee cases performed between 2014 and 2018, comparing the preoperatively planned knee angles and HKA with the postoperative ones, measured on standard radiological follow-up X-rays. The surgical procedures were performed coupling MyKnee guides with standard metal instruments (500 cases) or with GMK Efficiency single-use instruments (208 cases). Delta of more than 3° between planned value and measured post-op value were considered as outliers. The main findings of this study showed that:

- Overall, there were 49 out of 708 outliers (6.9%) in HKA, 96 outliers (13.6%) in femoral component flexion, 53 in femoral V/V alignment (7.7%), 16 in tibial V/V alignment (2.3%) and 86 in tibial slope (12.2%).
- Comparing both systems used, GMK Efficiency showed a lower total rate of outliers with respect to all measurements combined (7/208 (4.3%)) than the standard metal instrumentation (40/500 (8.0%)) when coupled with the MyKnee technology.
- In comparison to published data regarding the accuracy of PSI, the present results are comparable to published data of CAS TKA and show more favorable outcomes than conventional techniques.



READ THE STUDY

DOI:10.1007/s00167-020-06150-x

CAN A SINGLE-USE AND PATIENT-SPECIFIC INSTRUMENTATION BE RELIABLY USED IN PRIMARY TOTAL KNEE ARTHROPLASTY? A MULTICENTER CONTROLLED STUDY

Laurent Abane, MD, Amine Zaoui, MD, Philippe Anract, MD, Nicolas Lefevre, MD, Serge Herman, MD, Moussa Hamadouche, MD, PhD

The Journal of Arthroplasty

Proven equivalence in terms of clinical outcomes between SUI, PSI and conventional instruments.

ABSTRACT

Background: The aim of this controlled multicenter study is to evaluate the clinical and radiologic outcomes of primary total knee arthroplasty (TKA) using single-use fully disposable and patient-specific cutting guides (SU) and compare the results to those obtained with traditional patient-specific cutting guides (PSI) vs conventional instrumentation (CI).

Methods: Seventy consecutive patients had their TKA performed using SU. They were compared to 140 historical patients requiring TKA that were randomized to have the procedure performed using PSI vs CI. The primary measure outcome was mechanical axis as measured on a standing long-leg radiograph using the hip-knee-ankle angle. Secondary outcome measures were Knee Society and Oxford knee scores, operative time, need for postoperative transfusion, and length of hospital stay.

Results: The mean hip-knee-ankle value was 179.8° (standard deviation [SD] 3.1°), 179.2° (SD 2.9°), and 178.3° (SD 2.5°) in the CI, PSI and SU groups, respectively ($P = .0082$). Outliers were identified in 16 of 65 (24.6%), 15 of 67 (22.4%), and 14 of 70 (20.0%) knees in the CI, PSI, and SU group, respectively ($P = .81$). There was no significant difference in the clinical results ($P = .29$ and $.19$, respectively). Operative time, number of unit transfusion, and length of hospital stay were not significantly different between the 3 groups ($P = .45$, $.31$, and 0.98 , respectively).

Conclusion: The use of an SU in TKA provided similar clinical and radiologic results to those obtained with traditional PSI and CI. The potential economic advantages of single-use instrumentation in primary TKA require further investigation.

This study confirms equivalence of clinical outcomes of **single-use, patient-specific instrumentation MyKnee Efficiency and conventional instrumentation**, in a high volume surgical center (Hôpital Cochin, Paris) and in a private hospital (Clinique du Sport, Paris).

In this study, 70 consecutive patients had TKA performed using **MyKnee Efficiency (SU)**; they were compared to 140 historical TKA patients that were randomized to have the procedure performed using **MyKnee + metal instruments (PSI) or conventional instruments (CI)**.

The outcomes show:

- **Equivalence is almost reached in the mean HKA between the 3 groups** (CI: 179.8°, PSI: 179.2°, SU: 178.3°). However, the difference in HKA values did not carry any clinical significance.
- A percentage of outliers **not significantly different among the 3 groups** for the investigated radiographic parameters.
- The **equivalence** in terms of **operative time, blood loss, length of hospital stay, Knee Society and Oxford Knee Scores** among the 3 groups.
- **Extreme accuracy of MyKnee technology in predicting size of the final implants** (in particular, 98.5% of femurs have been implanted using the planned size). It should be noted that when intra-op size changes were made, these were all within one size of the planned one.



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READ THE STUDY

DOI: [10.1016/j.arth.2018.02.038](https://doi.org/10.1016/j.arth.2018.02.038)
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IMPROVING INTRAOPERATIVE EFFICIENCY OF TOTAL KNEE ARTHROPLASTY WITH PATIENT-SPECIFIC AND SINGLE-USE INSTRUMENTATION

Gwenllian F Tawy, Leela C Biant

Journal of Orthopaedic Experience & Innovation

- Optimized OR productivity and potentially reduced staff required to set up the theatre.
- GMK Efficiency is paramount in the return to a more normal practice after pandemic.

ABSTRACT

As a result of the COVID-19 pandemic, elective orthopaedic surgery was suspended in many parts of the world, and patients may now face long waits for total knee arthroplasty (TKA). Potential hospital financial constraints and restrictions on operating room use are likely to affect the number of weekly cases surgeons are able to perform. Efficiency in the operating room (OR) will therefore be paramount in the return to a more normal practice. Patient-specific (PSI) and single-use instrumentation (SUI) for TKA have been found to save time in the OR, both intraoperatively and between cases. The time saved by adopting this technology could offset those that are likely to be added to turnaround times due to COVID-19, to allow for deeper cleaning of the OR and rest following cleaning between cases. This article outlines a protocol for the use of PSI and SUI for elective TKA and explains the potential economic and clinical benefits of their uses. This protocol can be used in multiple hospital environments.

Over the next months/years, orthopaedic surgeons and OR staff will be returning to the OR with longer elective waiting lists, but a potentially limited daily capacity for OR use. The pressure to return to business-as-usual and accelerate throughput will be heightened by changes to departmental budgets and rising expenditures in certain areas (particularly infection control and testing for COVID-19). Orthopaedic departments will need to adapt to the crisis by increasing OR efficiency, whilst maintaining good clinical outcomes and standards of care.

This article has described how Dr Biant's team optimises OR efficiency both intraoperatively and between cases. Although the instrumentation used in TKA with PSI is more expensive, the reduced hospital stay may result in a negligible cost difference overall. Combining this approach with SUI also has ergonomic benefits, potentially reducing the number of OR staff required to prepare the OR. SUI also have benefits for infection control. TKA with PSI and SUI is therefore economic and appropriate for orthopaedic departments resuming elective procedures 'post' pandemic.



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IMPROVING OPERATING ROOM EFFICIENCY WITH SINGLE-USE DISPOSABLE INSTRUMENTS FOR TOTAL KNEE ARTHROPLASTY

David A. Crawford, MD, Adolph V. Lombardi Jr., MD, FACS, Keith R. Berend, MD

Surgical Technology International

- Up to 280\$ saved per tray avoiding sterilization.
- 20 to 30 minutes of time savings per surgery.

ABSTRACT

Many strategies have been employed to improve operating room efficiency when performing total knee arthroplasty. The goals of efficiency improvements are to decrease operative time and reduce healthcare expenses while providing patients the best quality surgical care. Single-use disposable instruments are one technique to accomplish efficiency. The authors describe their experience with a specific implant manufacturer's disposable single-use instruments for total knee arthroplasty and analyze the cost and time savings compared to traditional instrumentation.

In this paper, the authors present their experience with single-use instrumentation as a standard solution in their practice and highlight the logistical and economic benefits associated with this option. They confirm that the impact of single-use instrumentation in total knee replacement and the consequent cost savings is multifactorial:

- First of all, the cost savings are associated with the reduction of sterile processing of multiple instrument sets. While this cost varies from facility to facility, sterile processing can amount to \$0.59 - \$11.52 per instrument when considering materials, labor costs, and capital expenses. (Considering an average of 25 instruments per trays, the saving are up to \$280 per tray).
- The second factor for cost savings is the decreased operative time. Studies have shown an average of 20 to 30 minutes of time savings when using single-use instruments compared to traditional instruments.
- Lastly, and most importantly to the patient, is the cost burden to patients of a periprosthetic joint infection (PJI). The healthcare cost per patient of a PJI can be over \$65,000, and an expected annual aggregate cost of PJI in the US is projected to be over \$1.85 billion. Furthermore, the impact on a patient's quality of life is immeasurable, along with very high mortality rates. Single-use instruments have shown to decrease the risk of surgical site infections.

Conclusion: Single-use disposable instruments are a viable option to improve OR efficiency, decrease sterile processing burden, and ensure sterile instrumentation for total knee arthroplasty. Furthermore, cost savings can be realized based on an institution's sterile processing expenses and whether the manufacturer or facility covers the cost of the single-use instruments.



READ THE STUDY

DOI: 10.52198/22.STI.40.OS1553

VALUE IN SINGLE USE INSTRUMENTS FOR TOTAL KNEE ARTHROPLASTY: PATIENT OUTCOMES AND OPERATING ROOM EFFICIENCY

Tyler Goldberg, MD

Whitepaper on the M.O.R.E. Journal

- Decreased OR downtime in-between surgeries of 25 to 35 minutes.
- +1'200\$ saved per surgery.

ABSTRACT

The US healthcare system is moving towards a value-based model to increase the quality of patient outcomes while simultaneously reducing cost. Total Knee Arthroplasty (TKA) has been shown to be one of the most clinically and cost effective procedures in orthopedics. Single-use instruments, relative to traditional metal instruments, provide the potential to reduce costs while maintaining or improving quality in TKA. Single use instruments, delivered terminally sterile, are ready for immediate use. Single-use instruments are designed with the following goals: reducing the direct cost of processing and sterilizing traditional instruments, decreasing operating room turn-around time, reducing the logistical burden of loaner instrumentation, and reducing infection risk.

Dr Tyler Goldberg (Austin, TX - USA) in this whitepaper compared the potential benefits of GMK Efficiency single-use instrumentation to conventional reusable TKA metal instruments. The main outcomes showed:

- **No substantial difference in clinical results** for patients receiving a GMK Sphere knee considering average HKA angle, average KSS (Knee Society Score) and operative time.
- **Decreased OR downtime in-between surgery of 25 to 35 minutes** mainly due to an easier backtable set-up and faster disposing of used material after each surgical procedure.
- **Savings of \$1,198 per TKA** mainly through time savings in the OR setup and turnover, elimination of sterilization procedure and streamlined instruments management.



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READ THE STUDY
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TIME IS MONEY! INFLUENCE ON OPERATING THEATRE AND STERILIZATION TIMES OF PATIENT-SPECIFIC CUTTING GUIDES AND SINGLE-USE INSTRUMENTATION FOR TOTAL KNEE ARTHROPLASTY: A FULL FACTORIAL DESIGN OF 136 PATIENTS

Victoria Teissier, MD, David Biau, MD, PhD, Moussa Hamadouche, MD, PhD, Damien Talon, PharmD, PhD, Philippe Anract, MD, PhD

- GMK Efficiency halves the cleaning and sterilization time for each TKA.
- Not-compliant instruments related issues in OR are prevented with GMK Efficiency.

ABSTRACT

Background: Patient-specific cutting guides (PSGs) and single-use disposable instrumentation (SUI) have emerged as potential beneficial innovations for total knee arthroplasty. The aim of this study was to evaluate the impact of PSG and SUI for total knee arthroplasty on operating room (OR) and sterilization times.

Methods: A monocentric, prospective, interventional, full factorial design study, including 136 patients, compared patient-specific (PSG, n = 68) to conventional cutting guides (n = 68) and SUI (n = 68) to conventional instrumentation (CVI, n = 68). In the OR, we recorded the number of instrument trays, operating time, and room occupancy time. In the central sterile services department, the total sterilization duration was assessed. The primary outcome was operating time and sterilization duration. Secondary outcomes were difference in the number of trays, Oxford Knee Score, and postoperative mechanical axis.

Results: The median operating time was 80 minutes (Q1-Q3: 73-90) and was significantly increased for SUI compared to that for CVI (+5 minutes, P = .0072). The median sterilization duration was 1261 minutes (Q1-Q3: 934-1603). It was significantly in favor of SUI (936 minutes) over CVI (1565 minutes) (+629 minutes, P < .0001). The total number of instrument trays was 404 for 136 patients: 252 for CVI and 152 for SUI (P < .0001) and 189 for PSG and 215 for conventional cutting guides (P = .0006). There was no significant difference in OKS (P = .86) nor in the postoperative alignment which was between 177° and 183° (75% patients, P = .24).

Conclusions: SUI lowers the number of instrument trays and sterilization duration. PSG is not associated with significant OR or sterilization time reduction. The use of SUI could reduce the risk of noncompliance of instrument trays.

This paper compares the impact on operating room and sterilization times of GMK Efficiency (SUI) and reusable metal instruments in total knee replacement, by coupling them with MyKnee guides (PSG) or by following a conventional approach.

The major outcomes showed that:

- At the 2-month follow-up checkpoint, all the clinical parameters considered (post-op HKA, Oxford Knee Score and Knee Society Score) did not show any statistically significant difference among the groups investigated.
- Considering the total amount of surgical instruments, SUI reduces the median sterilization time by 40% and the median cleaning time by 57%, approximately halving the number of instrument trays compared to the conventional setup.
- Up to 25% of the reusable metal instruments are not compliant after the sterilization, causing surgery cancellations and delays. This issue is drastically reduced with SUI, since most of the necessary surgical items are brand new, and they are packaged in sterile single-use sets that are directly opened in the operating room.



READ THE STUDY

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