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CORR Insights®: New Total Knee Arthroplasty Designs: Do Young Patients Notice?

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Where Are We Now?

Since the introduction of total knee and hip replacements, some design innovations and

This CORR Insights® is a commentary on the article “New Total Knee Arthroplasty Designs: Do Young Patients Notice?” by Nunley and colleagues available at: DOI: [10.1007/s11999-014-3713-8](https://doi.org/10.1007/s11999-014-3713-8).

The author certifies that he, or any member of his immediate family, has no funding or commercial associations (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with the submitted article.

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This *CORR Insights®* comment refers to the article available at DOI: [10.1007/s11999-014-3713-8](https://doi.org/10.1007/s11999-014-3713-8).

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newer materials have improved clinical performance and longevity. The implant industry has thrived, as these newer implant designs typically are accompanied by escalations in implant prices. Advocates for three recent design modifications, namely, gender-specific implants, high-flex designs, and rotating platforms have touted the alleged attributes of these more-costly implants versus more traditional models. Notably, implant companies are beginning to introduce direct marketing campaigns to potential patients. But are the more expensive implants truly superior to cruciate retaining models?

The study by Nunley and colleagues is the first to employ multiple centers while also using an independent and blinded third-party to compare the clinical results of a conventional cruciate-retaining implant design with the comparable results after the use of gender-specific, high-flex, and rotating platform designs. While this investigation was retrospective, it was meticulously executed in terms of how it compared clinical outcomes in important functional activities, as well as in the assessment of patients' pain levels. The failure of the newer

implant designs to demonstrate improved results as perceived by patients was striking. The conclusions by Nunley and colleagues should be important to patients, surgeons, implant companies, and third-party payers. Implant manufacturers in particular will find it challenging to develop new implants in the face of mounting pressures to limit costs, particularly in the absence of demonstrable improvements in patients' results.

Where Do We Need To Go?

Third-party payers increasingly demand financial accountability for the implants we use. It will take years to arrive at valid conclusions about longevity and function. As healthcare dollars grow scarcer, it is unclear where the resources will come from to design, test, and introduce implants given the lag time between introduction and any demonstration of efficacy. The current study — which calls into question whether these “improvements” are even perceptible to patients — should encourage us to think carefully about these important questions.

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Nunley and colleagues endorse the need for structured, multicentered clinical trials to confirm or refute the benefits of novel implant designs. While such rigorous investigations are costly and time consuming, the studies are less costly than the widespread adoption of new implant designs prior to their confirmation of superiority. One necessary functional improvement novel implant designs should address pertains to pain while climbing stairs or transferring from a low chair or toilet. Longevity and function remain unresolved issues. As of now, so-called accelerated testing protocols have been notoriously unreliable. Testing formats, comparable to the one outlined in the current study, could address these widespread problems. To date, the sole effective assessment has been an evaluation of patients who have enjoyed a prolonged duration of performance of their prosthetic joints, and good comparative trials using this approach have been rare [1].

How Do We Get There?

The authors of the current study do well in considering the many challenges associated with assessing novel implant designs. Their approach in evaluating whether a new implant design is truly superior to more-conventional versions is a promising one. I imagine that this approach will be used to test other designs, helping us expand our knowledge regarding this important issue. I believe that implant manufacturers should conduct multicenter trials of new implant designs before encouraging widespread use or direct marketing to the public. But given the realities of healthcare economics in the United States and elsewhere, a decrease in the per-case cost of TKA is the foremost need. We should look for ways to reduce costs by decreasing the magnitude of the surgery, improving postoperative pain management, and accelerating and

simplifying physical therapy. I believe that the continued introduction of newer, more expensive, and unproven (and, as we see from Nunley's work, perhaps ineffective) implants is at odds with this goal. If we can improve our approaches to medical management and postoperative pain such that more of these procedures can be performed safely as outpatients, this will further reduce costs and perhaps help patients return to productive activities more quickly. The approach to patient assessment used in the study by Nunley et al. will be useful to evaluate patients' perceptions of important changes along these lines, as well.

References

1. Stern SH, Insall JN. Posterior stabilized prosthesis. Results after follow-up of nine to twelve years. *J Bone Joint Surg Am.* 1992;74:980–986.