# Surgeon Autonomy and Implant Choice

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**KEYWORDS**

• Surgeon autonomy • Implant choice • Price transparency • Capitation pricing

**KEY POINTS**

- The increasing volume of joint replacement with diminishing reimbursements demands a focus on value-based care, one aspect of which is implant cost.
- There is a spectrum of interventions aimed at implant use restrictions with varying impacts on physician autonomy.
- The benefits of various strategies for controlling implant price for optimizing cost must be weighed against surgeon autonomy.

## INTRODUCTION

Total hip and knee arthroplasty (THA and TKA) are cost-effective and life-changing surgical procedures. Over the past few decades, surgeons have done an excellent job of decreasing complications, readmissions, length of stay, and skilled nursing facility utilization in an effort to decrease costs.[1–4] The most commonly utilized venous thromboembolism prophylaxis is now a low-cost aspirin rather than a more expensive direct oral anticoagulant.[5–8] With the subsequent transition away from coumadin, home health medication services are now rarely required. The duration of postoperative physical therapy protocols has decreased as well due to advances in surgical techniques, improved pain control, and accelerated postoperative rehabilitation pathways.[9–11] However, despite these changes, with improvements in patient outcomes and the decrease in the overall cost of joint replacement, this procedure is constantly targeted by Centers for Medicare and Medicaid Services (CMS) for further reductions in reimbursement. Given the steadily increasing volume of these procedures in the United States with an estimated 2 million procedures performed annually by 2030 means that they will continue to be the target of CMS to decrease reimbursements.[12,13] As a consequence of cost cutting, surgeons have seen dramatic decreases in their reimbursement, as have hospitals.[14–18] This is despite multiple studies demonstrating THA and TKA are very cost-effective procedures, more than many common medical interventions including coronary artery bypass, hemodialysis for end-stage kidney disease, and screening breast mammography when calculated based on quality-adjusted life years.[19–23]

In fact, despite a net inflation rate of 4.1% over the past 50 years, the reimbursement for total joint arthroplasty by Medicare has significantly decreased when adjusted for inflation in the same time frame.[16–18,24] Private insurance companies have followed this governmental trend by decreasing their reimbursement in tandem. With decreasing reimbursement comes decreasing revenues, which has forced hospitals to find additional methods to minimize costs. More recently this has included participating in bundled payment programs and limiting access to care for poorly insured, less healthy, or obese patients.[25,26] Interestingly, until recent years, implant costs have kept pace with inflation, partly due to innovation.[14] Hence, they represent a potential area for cost savings as they can comprise between 23% to 87% of total inpatient costs.[27–30] However, this cost savings often comes in the form of structuring contracts with vendors that limit surgeon choice in implant selection.

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Implant choice is a very personal issue to surgeons.[31] Many feel that these devices are not fungible commodities, and while the published literature in most cases may not demonstrate large differences in survivorship, the surgeon as artisan feels the implant choice affects the outcome of his or her patients.[32] An analogy is dictating which guitar a musician plays, or which golf clubs a professional utilizes. A large data study may not show differences in those products, but they do matter to the artist or the athlete. Aside from the potential impact on patient outcomes, restricting implant choice is a threat to the autonomy of the surgeon as a professional. However, it is also clear that containing costs is necessary to maintain wide patient access to this highly efficacious procedure. This article explores the balance between these 2 competing factors.

## IMPLANT PREFERENCE AND THE ECONOMICS OF ARTHROPLASTY

Surgeons sit at the end of a complex supply chain and a multitude of factors influence implant choice.[33,34] This primarily includes hospital administration and implant vendors, but at some point may include insurance companies. Historically, surgeons have maintained autonomy in implant choice. Within the hospital purchasing supply chain, cost reductions were primarily focused on commodities items such as staples, drapes, laps, dressings, and so forth. However, attempts at limiting costs by restricting implant choice have become increasingly prevalent over time.[35–37]

Additionally, there is increasing pressure from patients on surgeons regarding implant choice. While patients typically disagree with a hospital's administrative staff dictating implant choice and would like their surgeon to make the decision, many patients see no issue with requesting a specific implant or technology and are even willing to pay additional costs if needed for novel premium implant.[34,38,39] While many surgeons view this as akin to a passenger telling a commercial pilot how to fly the plane, others see it as free market choice like choosing an airline. Increased patient preference is likely due to increased direct consumer marketing, the rise of proprietary technology associated with specific implant brands, and improved access to information through the Internet. Surgeons are informed advocates for the patient and act in their best interests, as patients typically lack the highly specialized education and training that the surgeon does. Whether this means the patient should be involved in a discussion regarding implant choice and the use of technology is unclear. Nevertheless, this leads to pressure on the surgeon and possible influence on implant selection.

The influence of the supplier on surgeon implant choice is also complex and dependent upon professional, personal, and financial relationships. Further, there is somewhat of a resource dependency of hospitals and surgeons on suppliers that may influence implant choice. The suppliers often manage inventory and ensure sterilization. While this comes at a loss of control, there are data that this reduces costs.[35,40] Further dependency on suppliers comes in the form of medical education, research support and funding, and consulting relationships. However, it has been previously shown that surgeon financial relationships have minimal impact on implant choice for the vast majority of surgeons.[33,34] Nevertheless, implant companies have varying levels of supply chain efficiency and reliability. In additional, service representatives are also of differing levels of knowledgeability, quality, and dependability. All of these factors affect surgeon implant choice. Finally, suppliers are constantly producing technological improvements in implants, often with surgeon input, and promoting their usage as in many cases these advance the field. But there is often strong industry, and sometimes peer pressure, to adopt these changes without significant research on outcomes or experience with the implant. These advances also rarely come with decreased costs as a result of their technological advantage, and hospital administration may dissuade the surgeon from these devices secondary to increased cost.

Additionally, there is research that suggests surgeons form patterned responses to clinical scenarios over time with experience.[41] While this pattern of thinking often saves time and streamlines decision-making, these constructed biases may prevent a surgeon from objectively evaluating the advantages and disadvantages of a specific implant. The surgeon's subconscious mind may influence implant choice in ways the surgeon himself/herself is not self-aware of.

## HOSPITAL COST-REDUCTION STRATEGIES

While there is a constellation of factors that influence surgeon implant choice, the most apparent factor in many cases is hospital administration limiting the available implant options in an attempt to decrease costs. It is certainly easy to broadly "blame administration" for everything a surgeon disagrees with, particularly when these decisions

are made with relatively minimal surgeon input. However, hospital leadership is tasked with maintaining a profit margin, or at least cost neutrality, in a decreasing reimbursement environment to continue providing care to its patient population. Therefore, the potential root causes of limited implant choice are insurance companies, the government, increasing health care costs compared to gross domestic product, and a societal shift in surgeon-perceived prestige and reimbursement. The list of causes is endless and the current tumultuous health care environment is likely multifactorial. However, most implant cost control strategies do attempt to preserve some form of surgeon autonomy. This is likely due to a combination of factors including some level of philosophic agreement on maintaining surgeon autonomy, an attempt to limit surgeon discontent, and to prevent the economic loss of surgeons taking cases to other hospitals that afford them a greater freedom of choice. The various approaches to implant price control and their impact on physician autonomy are discussed in the following paragraphs and also summarized in Fig. 1.

One simple method of reducing implant cost is to simply make surgeons aware of the cost.[42] This ranges from sharing data on average implant price, creating monthly accounting reports, to requiring surgeons to sign an implant sheet displaying implant prices at the end of a case. These programs allow for complete freedom of implant choice while creating a subtle "nudge" toward cost reduction. The data on these strategies suggest higher volume surgeons are more unwilling to change implant companies but overall are successful in reducing implant cost.[1,43] A similar strategy involves designating a single "preferred" vendor. Surgeons are free to use whatever implant they would like, but utilizing the "preferred" vendor leads to cost savings for the hospital. This has been shown to decrease costs without an increase in adverse patient outcomes.[35]

Another option that has been tried, which in theory preserves surgeon choice, is patient demand matching. The idea is that lower demand patients receive less expensive, "lower demand" implants. The "demand level" of the patient and specific implant choice is at the discretion of the surgeon. However, it is very hard to quantify demand, and age seems to be a poor proxy measure. A similar idea has been advocated to tier implants and pass the cost of "premium" or newer implants to the patient. Insurance companies often tier their pharmaceutical offerings with generics, preferred brand name drugs, and nonpreferred brand name drugs, with patients paying a share of the more expensive options. The issue with this system is that an implant is a relatively permanent choice while a medication can be easily substituted. To the authors' knowledge, there are no published examples of the strategy being implemented, although a few survey-based studies have shown that patients may be willing to pay out of pocket for these premium implants.[34,38,39,44]

Capitation pricing is another option that has been utilized with varying success. In this system, the hospital or health system sets a pricing limit for implants.[45] The suppliers have a choice as to whether to meet this price. In theory, this preserves surgeon choice and transfers the "blame" of limited implant offerings from the health system to the companies. However, there are concerns as to whether the hospitals will set a reasonable price that allows for modern implant choices or advances in technology such as bearing surfaces, cementless fixation, dual mobility, or optimized geometry. This system at its root aims to provide patients with the least expensive implants, rather than the best implants. Clearly the "best" implant is subjective, but often not synonymous with the cheapest option.

The option most limiting to surgeon autonomy is a true limited vendor arrangement, where the health system or hospital contracts with a specific number of vendors. There are many variations in these arrangements including differences in number of vendors, percentage of

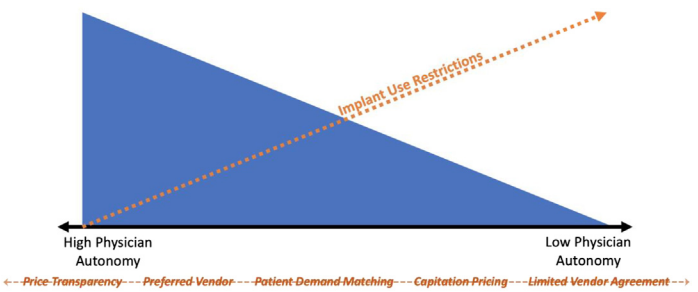


Fig. 1. The various strategies available for implant price restrictions and their impact on surgeon autonomy.

implants that must be purchased from the vendor, a minimum case volume, and whether all or solely primary joint arthroplasty implants are included.[46] Other potential details include whether these percentages of use or volume agreements are monitored at a local, regional, or national level. While in theory these programs have the largest opportunity for cost savings, depending on the size of the health system, they can be difficult to monitor and enforce. This strategy can create strong discontent from surgeons, and many with the option available may move their cases to competing hospitals. The potential cost savings must be weighed against the inevitable decrease in surgical volume. Furthermore, alienating and restricting surgeons is generally not a path to a productive work environment and long-term financial stability for a health system. Historically, these limited vendor agreements have not been as financially successful or long-standing as predicted. However, they continue to be implemented with the trend of decreasing reimbursement for joint replacement.

## EFFECTIVENESS

While these cost reduction programs regarding implant choice have been tried for many years with varying levels of success, conflicting goals and misaligned incentives between surgeons, hospitals, patients, and implant vendors continue to represent barriers to success. Surgeons and patients are relatively immune to implant costs, the hospitals have limited negotiating power, and implants companies are profit-driven entities. While all parties have the patient's best interest in mind at some level, it is a zero-sum game between the surgeon, hospital, and implant company in terms of percentage share of health care dollars received. In physics, geopolitics, human relationships, and many other areas of life, "3 body problems" are much more complex than "2 body" ones. Hospitals, implant companies, and surgeons all have shared and competing interests, which may change over time.[47]

The idea of gainsharing between the hospital and surgeon has been proposed and tried in the past.[4] A variant of this situation is currently happening at many ambulatory surgical centers where surgeons have an ownership stake. However, this can create concerns over public perception of surgeons "profiting" from using "cheaper" implants.[4,48] While this is not necessarily the case, and aligned incentives generally result in more efficient, cost-effective care and bargaining power, surgeons should at least be cognizant of how this could be viewed.[49] Historically, there have been legal structures in place preventing these arrangements, but these rules have been loosened over the past 2 decades.[4] However, for a variety of reasons these gainsharing agreements have had limited success.[3,4]

As with many things in life, implant choice is a result of a balance between multiple dichotomous and conflicting factors. Should a surgeon be autonomous or accountable? Should we use the best or the most cost-effective implants? Given the complex nature of surgery, is shared decision-making or medical paternalism better? Is joint replacement a commodity or an artisan good? Does big data or personalized medicine lead to the best outcomes? Is medicine an art or a science?

## SUMMARY

Overall, this is a complex problem with multiple competing perspectives and many barriers to resolution. The increasing volume of joint replacement with diminishing reimbursements demands a focus on cost. However, diluting a surgeon's autonomy and marginalizing the artisan nature of his or her craft is not a path to better patient care. Orthopedic surgeons must continue to advocate for themselves as a profession while maintaining their ability to help as many patients as possible without financial hurdles to care. Understanding the various methods of decreasing implant costs along with all the factors influencing implant selection may allow for cost reduction while maintaining surgeon autonomy.

## CLINICS CARE POINTS

- The increasing volume of joint replacement with diminishing reimbursements demands a focus on value-based care, one aspect of which is implant cost.
- There is a spectrum of interventions aimed at implant use restrictions with varying impacts on physician autonomy.
- Multiple strategies are available including price transparency, patient demand matching, capitation pricing, and limited vendor agreements.
- The benefits of various strategies for controlling implant price for optimizing cost must be weighed against surgeon autonomy.

## DISCLOSURE

The authors have nothing to disclose as it pertains to this article.

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