Value, Technology, and Our Role As Surgeons: It's Time for a Call to Action

To the Editor:

Recently at this year's AAOS annual meeting during the combined AANA/AOSSM specialty day, a speaker posed a question to the audience: "How many of you make decisions about technology based on cost?" Not a single surgeon in the room of thousands raised their hand. The speaker's conclusion was that it was "good that no one is constrained by cost."

We all went into surgery in part because of an affinity for using our hands and technology to help patients in amazing new ways. However, is it really "good" that physicians have no accountability or interest in unmitigated technology cost? Are we entitled to the luxury of the latest incremental improvement, no matter what the premium cost to our system and our patients? This concept, although apparently ubiquitously accepted by sports surgeons, defies common sense when viewed from a system perspective. How long can we afford to be ignorant of opaque technology cost and pretend that our only concern is the medical treatment of the patient while our reimbursements, which provide clinical care and stem from the same source, continue to decline? Perhaps some decision making from the person most accountable to the patient and competent to assess technology is in order? Perhaps we should engage our industry partners to value cost containment as much as usability, the "wow" factor, and theoretical surrogate end points for clinical success, such as wear simulation rates in total joints or pullout strength of screws. To quote C. Everett Coop, "Americans have three incompatible basic demands when it comes to health care: immediate access, the latest high-tech medicine, and a limited price."[1] It is generally accepted that only 2 of these demands may be satiated at 1 time. We have some hard decisions to make.

Humans have always been superb technology makers and tool users. However, we are not the only example of a complex organism evolving tools to improve its quality of life. Take as an example *Megaloceros giganteus*, the now extinct Irish elk. The gigantic antlers of this once magnificent animal were initially excellent tools for securing a mate and fighting off predators. Selection pressures increased the size of its antlers to such a span and great biological cost, they may have contributed to its demise by decreasing its ability to adapt to climate and resource changes, as well as additional hunting pressures.[2,3] We must take heed of this metaphor and ask ourselves, is technology driving medicine, or is medicine driving technology? Only the surgeon can decide.

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Synthetic Grafts—Where Is the Common Sense?

To the Editor:

With great interest, we recently read the article entitled "Synthetic Devices for Reconstructive Surgery of the Cruciate Ligaments: A Systematic Review" published in the May 2015 issue of *Arthroscopy*.[1] Thank you for acknowledging our skepticism about the resurgent use of synthetic grafts in your editorial commentary.[2] At first blush, this systematic review of synthetic implants, particularly the Ligament Augmentation and Reconstruction System (LARS) device (Surgical Implants and Devices, Arc-sur-Tille, France), shows quite good results, almost too good to be true. However, this highlights one of the inherent problems with systematic reviews. In other words, the science and methodology are sound and well intentioned, but they tend to encompass investigations with bad science, significant confounding, or notable conflicts of interest. Many of the included papers that are reviewed reveal subtle sources of bias: selection bias in sedentary patient recruitment, reporting bias with a lack of patient-reported functional activity

levels, and non-responder bias that fails to account for clinical failures on subsequent follow-up. Where is the common sense?

Anyone who has worked with this graft option is well aware of its high failure rate in active cohorts. The published literature is also replete with reports of its pitfalls, including issues related to attritional wear particles, pseudoseptic synovitic reaction, significant stress shielding, and poor biologic integration.[3] Despite its initial development in France, the French medical society banned its use nearly 15 years ago. Prior to its latest resurgence in Asia and Australia, many vocal critics attempted to prohibit use of the LARS graft, in large part due to some high-profile failures among professional rugby athletes and inconsistency in clinical results.[4] Currently, the Food and Drug Administration only provides for conditional use of graft augmentation devices in certain salvage situations in the United States. Where is the common sense?

Current synthetic grafts are marketed for patients desiring an early aggressive rehabilitation and rapid return to athletic function. However, among active, pivoting athletes, synthetic grafts have classically failed by abrasion about the femoral tunnel. In our anecdotal experience, the senior author had a 40% failure rate at 2 years for posterior cruciate ligament reconstruction using the LARS device. Subsequent revisions were complicated and required extensive debridement of all the synthetic particulate debris and grafting of sizable bony defects. Is this 2-stage procedure good for the patient? Despite redesigning by the manufacturer to limit complications associated with its predecessors, the long-term track record of the third-generation LARS is sparse and the methodologic quality of existing studies is fairly poor. Many authors also continue to recommend against routine, first-line use of the LARS graft[5] or consider its use in only older, lower-demand patients.[6]

When evaluating synthetic grafts and their potential utility in knee reconstruction, we need to be careful about the messages we promote to patients, surgeons, and health care policymakers and avoid reproducing the errors of history. We are, however, excited to see a renewed focus and further innovation in primary anterior cruciate ligament repair, as there have been numerous improvements over the Marshall technique dating back to the 1980s. The use of a small-diameter, synthetic "internal brace" can protect the repair construct during the healing phase,[7] while the addition of biologic healing, whether "healing response" through stimulation of the notch wall[8] or the incorporation of a super clot described by Proffen et al.,[9] may facilitate greater tissue remodeling. For acute, proximal anterior cruciate ligament tears, primary repair in selected high-functioning athletes may quickly emerge as a successful operation for earlier return to previous level of activity. Now that is common sense!

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