The "Holy Grail," Where Do We Go From Here?

Lyle Cain, MD

As physicians, we are always trying to keep up with the latest techniques and technology to provide the best possible care for our patients. However, history shows us that many of the "newest and greatest" devices have poorly understood, or maybe even, unknown consequences. You may remember the excitement over the Gortex ligament augmentation device (LAD) for ACL reconstruction in the 1970's or the thermal capsular shrinkage "heat probe" of the 1990's. The orthopedic annals are littered with groundbreaking technologies that proved to be, at best, merely failures, or, at worst, dangerous to the patients we are trying to heal.

We are now in a time of rapidly changing technology and information overload, clogged with access to reams of information through our PDAs and the internet. Patients learn about new techniques and technology not from their physician, but from advertisements in the media or online. This dissemination of information without any real "filter" to verify accuracy and safety has heightened the burden on us, as surgeons, to be up to speed and critical of every "better mousetrap." Patients may request or even demand a certain technique based on limited study of online discussions, chat rooms, or non–peer reviewed data. It is our obligation to "first, do no harm" even if the patient demands it.

How can we possibly provide the best for our patients and keep up with technology that may prove to be "the holy grail"? We must rely on well planned, peer-reviewed research studies that clearly analyze not only the positive results, but also the potential complications of new technology. In this month's issue, E. Carlos Rodríguez-Merchán MD, PhD, ("The Treatment of Cartilage Defects in the Knee Joint: Microfracture, Mosaicplasty, and Autologous Chondrocyte Implantation," on page 236) reviews the treatment of cartilage defects in the knee joint: comparing microfracture, mosaicplasty, and autologous chondrocyte implantation (ACI). However, he concludes that good level I evidence is lacking to show significant difference between any of the 3 commonly performed techniques. Does this mean that all of the procedures result in equal outcomes? No. Does this mean that we should abandon the more costly procedures, such as ACI? No. What Dr. Rodríguez-Merchán does is highlight the need for carefully designed level I studies to define the real outcomes, indications, and complications of our new technologies.

What is the holy grail in orthopedics? I would argue that the ability to take an easily obtained and prepared stem cell line and use the appropriate growth factors and chemical signals to cause the cells to differentiate into different tissue types (eg, bone, cartilage, ligament, etc.) represents this holy grail. Think about all of the potential uses for this technology and it is easy to see the whole field of orthopedic surgery being transformed during my lifetime. Imagine being able to grow new cartilage or ligament tissue and direct the body's response to these new tissues. However, with these possibilities also come enormous risk.

One significant unpredicted outcome or inappropriate application could lead to huge consequences, terrible complications, bad publicity, and loss of patient-physician trust. Just imagine the late night television commercials and billboards advertising for the local law firm that "you may be entitled to compensation." Or just imagine the uncertainty injected into the physician-patient relationship, "you aren't going to put one of those recalled parts in me are you?" You may have followed the recent controversy over "pink slime," the "lean, finely textured beef" added to processed hamburger patties. Although used for decades, the recent media coverage of beef filler has severely affected the public's trust in the food industry. Can you imagine how a similar public relations nightmare over failed technology could affect the orthopedic industry?

I have often been guilty of complaining about the arduous task of getting new technology approved though the regulatory bodies in the United States, compared with the perceived progressive nature of the process in Europe. I do believe that we should have a streamlined process for some new technology that may save lives, especially chemotherapy medications. However, a more diligent, and thorough process must be applied to new technology used for elective procedures, as in most orthopedic applications. Unfortunately, until sufficient safety data and good outcomes research is completed and analyzed, we must temper the enthusiasm of doctors and patients alike.

Dr. Cain is Fellowship Director, American Sports Medicine Institute, and Founding Partner, Andrews Sports Medicine & Orthopaedic Center, Birmingham, Alabama.

Address correspondence to: Lyle Cain, MD, 805 St. Vincent's Drive, OrthoSports Center, Suite 100, Birmingham, AL 35205 (tel, 205-939-3699; fax, 205-581-7155; email, lylecain@aol.com).

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