

Editorial

"In My Experience... Maximizing Outcomes After Shoulder Replacement Using Innovative Technology"

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The author discusses his experience in the development of a comprehensive shoulder replacement system using innovative technology.

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Related to shoulder arthroplasty, in addition to pain relief, we strive to optimize patient outcome by providing the opportunity to get back as much function as possible. We also want to do it in a way that stands the test of time. Of course, nothing kills good results like long-term follow-up.

So we start with something like anatomic shoulder arthroplasty, the weak link in that construct has almost always been centered around the glenoid. Then of course, as

we mature, the rotator cuff leads to revisions, but for young patients who, again, need something that is hopefully going to last as long as possible, it is incumbent upon surgeons to figure out a way to have a glenoid implant performs over the patients life. So we're fortunate enough to have developed a relationship with Steve Gunther, who had an epiphany moment driving across a manhole, and realized that maybe the way we are approaching a glenoid in an

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Dr. Chuinard has patents for shoulder arthroplasty implants that have been used around the world. His outcomes data have been reported internationally, and have been used in FDA studies. His experience with these techniques resulted in his being selected as one of only a few surgeons in the West to teach these techniques in Asia. His peers have selected him for membership in the American Orthopedic Association (AOA), American Shoulder and Elbow Society (ASES), the Association of Clinical Elbow and Shoulder Surgeons (ACCESS), and the European Shoulder and Elbow Society (SECEC). He has served on the Value Committee of the ASES, and is a Past President of ACCESS. He served as a question writer and reviewer for the Shoulder and Elbow section of the ABOS board exam and sub-specialty exams, and he has served as a reviewer for several orthopedic journals. He has authored multiple book chapters and papers on both open and arthroscopic techniques of the shoulder and elbow. His expertise has led him to be an invited speaker and lecturer around the world, including performing live surgery. He routinely serves as a faculty instructor at the Orthopedic Learning Center in Chicago.

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anatomic shoulder is wrong. He valiantly came up with the idea of having the component shouldered by the surrounding bone. That was really the birth of the inset glenoid.

I am fortunate enough to work with a company that sees the biomechanical advantages of that construct, and we have data, both Steve's original clinical data that has over 10 years follow-up and biomechanical data, to show if you actually inset a component and get two millimeters of peripheral inset, you have a device that shows almost no micromotion after 100,000 cycles. It's just about 0.1 millimeters after 100,000 cycles. So based upon that idea and that technology, the company Shoulder Innovations was created. Over time, we've now developed a full complement of arthroplasty to embody not just... hopefully, what is a long-lasting anatomic shoulder that has obviated the problems of glenoid loosening, but also a device that can mature with the patient. All of our implants, whether it was a stemless, mini stem or a more robust metaphyseal filling stem are all convertible. They convert the same way, both anatomic and total.

Then we really have championed the notion first started by Mark Frankle, 12 years ago of the anatomic reverse. Part of the technology that we've been really happy to bring to the forefront has been implants on the reverse side that are designed not just to get amazing long-term fixation, but to position the humeral hinge point at the anatomic position. So, while it may be an oxymoron to say, we're looking towards an anatomic reverse; we actually have a device that effectively reproduces the humeral hinge point, the articulating point with inverse bearings. Again, on the face of it, we have what sounds like an oxymoron, but we have a humerus that has a bit of inlay at the cut surface, and we have a lateralized glenoid that then allows the position to maximize any extant rotator cuff function. Also, in the patients that are cuff intact that you're doing a reverse on because of glenoid deformity or age, the construct behaves much more like an anatomic shoulder.

Then there's even the cosmesis, and we do like to give our patients something that looks as close to normal as possible. By having both lateralization on the glenoid side and some lateralization on the humeral side, I think that we can achieve that. One of the other great innovations, too, is when we talk about longevity of the implant, we created a device that adapts to the patient, not vice versa. So, our humeral components are all small enough that they can essentially float within the cut surface and, again, put either the humeral head where it should be anatomically or, give you a reverse that places that humeral hinge point in the center of the humeral articulation. Our foundational stem resembles a stemless implant with a small stem attached, allowing it to fit in small patients or humeral deformity. On the glenoid side, we're able to correct deformity with innovative angled baseplates. Actually, by having a base plate that also has some peripheral rim inset, when we lateralize, we convert shear and deforming forces to compressive forces, resulting in a very stable base plate. Treating deformity with a circular implant, we can dial that implant

around to get biplanar correction. We can also do this on the anatomic side.

Returning to the anatomic inset component, we have what we call a "face-changing" anatomic glenoid. So, rather than convert deformity on the backside of the implant, the correction is on the front side, the articular side, allowing the same "dial-ability" of correction which is important as we are learning that glenoid tilt is probably one of the things that can contribute to early cuff failure after well-done anatomic replacement. So, we can normalize the glenoid tilt back to the theoretical 5 to 8 degrees of norm, while using that same technology to correct version. Couple the implant with additional reaming correction and convertibility, and we have a system that provides the ability to cradle to grave, as it were, someone's arthroplasty situation. This gives both patient and surgeon durable long-lasting implants with this technology.

Lastly, we pushed to have a system that is friendly for the ASC. One thing that is just not emphasized enough is the ability to get your implants in and out of an ASC; the logistics of a system with 10 or 15 trays, or if you're one of the owner-operators, the cost of processing multiple trays, translates to higher costs to the entire system. Our system was designed from the get-go to be friendly to the ASC. So, with 2 trays, you can do the entire gamut. Moreover, once a scrub tech starts using our system, the simplicity of the system, makes them prefer it to all others. Number one, it's faster because of its simplicity, and number two, its more intuitive. My team will roll their eyes when I use one of the legacy systems, or if I'm doing a revision and have to bring in another system. It's not just the familiarity, it is the fact that we have two trays and can do everything. If you really want to pair it down, you can actually do 80% of your cases with a single tray.

Again, it makes for a very efficient system and a very cost-saving approach, because you have to sterilize those trays when they come in the door, and you need to clean them when they come out of the door. That is double the cost, and if you don't think about that when you're treating your patient population, I think you're missing out on the opportunity to be a good steward of what we do for health care. And of course, if you're an owner/investor in a surgery center, you leave money on the table if you use a system that has multiple trays, increasing the fixed costs, unless you pay attention to that.

To summarize, we've designed an implant that adapts to the patient's anatomy. It can treat "garden-variety" osteoarthritis and treat both complex glenoid and complex humeral deformity. Ultimately the Shoulder Innovations device can do anything from an anatomic, with a stemless component (that is convertible to a reverse), to a longer stem meta-diaphyseal filling reverse, should you need it. Its ASC optimized and designed for long term results.

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