The arthroscopic biologic total shoulder replacement is a new procedure that I have been working on for more than two years in partnership with my colleagues at Arthrex, Inc. The procedure is designed to resurface, a term used in orthopaedics to commonly refer to ‘replace’, the worn cartilage of the shoulder joint with transplanted donor cartilage and bone. In order to understand the rationale for developing this new procedure, it’s important to consider what is currently done to treat end-stage or late osteoarthritis of the shoulder.

The hallmarks of symptomatic osteoarthritis in the shoulder, as with other joints, are pain and stiffness. Patients who have a painful stiff shoulder usually try conservative treatments in the form of oral anti-inflammatories, activity modification, or physical therapy among other modalities. Once conservative measures to relieve pain and/or increase function have failed, which will typically occur over time as part of the natural history of this disorder, operative intervention may be indicated. Typical operative treatments employed for arthritis in the shoulder include arthroscopic debridement with or without chondroplasty and capsular release, partial shoulder replacement, or total shoulder replacement. The outcomes for arthroscopic debridement and chondroplasty as well as other experimental procedures are unpredictable according to several studies reported in the literature. The most reliable operative interventions for the treatment of symptomatic late osteoarthritis have been reported with total shoulder replacement or partial shoulder replacements (hemiarthroplasty). These partial or total shoulder replacements involve removing a substantial part of the ball (proximal humerus) and/or socket (glenoid) bone and replacing the bone with metal and/or plastic. There is significant long-term outcomes data for these procedures demonstrating reliable pain relief and improved function for most patients.

The arthroscopic biological total shoulder replacement possesses three potential advantages as a resurfacing procedure over total or partial shoulder replacements with metal and/or plastic parts. First, the procedure is done arthroscopically as an outpatient procedure. Second, unlike conventional total or partial shoulder replacement, the arthroscopic total shoulder replacement does not cut through any of the rotator cuff muscles in order to gain access to the shoulder joint in order to perform the replacement. Rather, the arthroscopic technique works between the muscles of the rotator cuff, in a space called the rotator interval, without violating or injuring any of the rotator cuff muscles. Violation of the rotator cuff as part of performing a total shoulder replacement has been reported as a significant source of complications with this procedure. Third, one of the primary goals of the arthroscopic biologic shoulder replacement is to replace the worn cartilage of osteoarthritis with transplanted ‘healthy’ cartilage from a cadaver donor rather than synthetic metal and/or plastic as with a conventional partial or total shoulder replacement. Hence, the fact that I am replacing worn cartilage with a biologic material, cadaveric cartilage-bone transplants, is the rationale for the use of the word ‘biologic’ in describing the replacement. The use of cartilage-bone transplants...
has been employed in numerous orthopaedic procedures with good results in both
the shoulder and the knee. The use of cartilage transplantation on the socket
(glenoid) of the shoulder is relatively new. However, the use of cartilage-bone
cadaver transplants on the ball (humerus) of the shoulder joint has been performed
with good results reported. If the arthroscopic biologic total shoulder replacement
is able to demonstrate successful durability and wear over time, then I believe it
would represent a significant advance in the treatment of osteoarthritis of the
shoulder. Finally, the arthroscopic biologic total shoulder replacement removes a
minimal amount of bone that makes revision to conventional total shoulder
replacement or arthroscopic revision with another graft technically feasible without
‘burning any bridges’.

The arthroscopic biologic total shoulder replacement is a new procedure and does
not have long-term outcomes data demonstrating its efficacy. The main risk for this
procedure is that the cartilage-bone transplant may not incorporate, or ‘take’, in a
given patient’s shoulder joint. If this problem occurs, a patient who has this
procedure may require a second operation, likely a total shoulder replacement with
metal and plastic parts, in order to definitely treat the arthritis in the shoulder. I am
in the process of organizing a clinical study currently to evaluate this procedure’s
efficacy.

In conclusion, the arthroscopic biologic total shoulder replacement is a new and
innovative procedure aimed at treating symptomatic late-stage osteoarthritis using
cadaver cartilage-bone transplants to replace worn cartilage in the shoulder using
an all-arthroscopic outpatient minimally invasive technique that does not violate the
rotator cuff. I am performing this procedure on select patients in order to
understand whether or not this procedure can successfully treat patients with
osteoarthritis of the shoulder by restoring shoulder function and relieving arthritis
pain. In my opinion, if this procedure successfully treats osteoarthritis, then it will
represent a major advance in the treatment of shoulder arthritis.

- *I am a paid consultant for Arthrex, Inc., and receive monetary compensation
  related to this procedure.*