



Trends in
Medical Research

ISSN 1819-3587



Academic
Journals Inc.

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Large Study of Arthroscopic Rotator Cuff Repair Reveals Some Surprises

Arthroscopic rotator cuff repair is highly effective and provides durable results five years after surgery, according to a large, prospective study by Hospital for Special Surgery investigators. The study also surprisingly revealed that the rotator cuff has the ability to heal even when early imaging studies have found a defect at the site of repair.

The research was presented at the American Shoulder and Elbow Surgeons (ASES) 2011 Specialty Day meeting, which was held Feb. 19 in San Diego, Calif., following the annual meeting of the American Academy of Orthopaedic Surgeons.

"Our study demonstrates that arthroscopic rotator cuff repair results remain excellent when followed over five years, and we found that some tendons that were incompletely healed at two years appeared to heal fully by five years, suggesting that rather than deteriorating over time, results may in fact improve over time," said David Altchek, M.D., attending orthopedic surgeon and co-chief in the Sports Medicine and Shoulder Service at Hospital for Special Surgery (HSS) in New York, who was involved with the study.

These days, arthroscopy is the standard of care for repairing rotator cuffs. Most patients who have this procedure have excellent clinical results, but surprisingly the results sometimes don't correlate to whether the rotator cuff is healed or not. "When your rotator cuff is torn, you attribute all your pain and dysfunction to your torn rotator cuff, then you have it fixed and you feel better, but sometimes when you take an ultrasound or an MRI, the rotator cuff looks exactly like it did before you had the surgery," said Lawrence Gulotta, M.D., who led the study and is a sports medicine and shoulder surgeon at HSS. "Before this study, we thought that once a rotator cuff had re-torn or failed to heal following surgery, it had no capacity to heal in the future. Now we know that the rotator cuff does have the capacity to heal itself, even if early radiographic studies showed there was a defect at the repair site."

At one year following surgery, ultrasound results showed that 64.3 percent of patients had a healed rotator cuff. This percentage went up to 75.4 percent at two years and 81.2 percent at five years.

The study involved 193 patients who underwent arthroscopic rotator cuff repair at HSS and then were evaluated annually for five years. In 2003, HSS established the Arthroscopic Rotator Cuff Registry to prospectively evaluate the functional and radiographic outcomes of patients undergoing this procedure and this study comes from that registry. "When the study was started, arthroscopic rotator cuff repairs were really just coming

onto the scene, so the HSS Sports Medicine and Shoulder Service decided to start a prospective study to evaluate the outcomes of them," Dr. Gulotta said.

After five years of follow-up, the investigators found that arthroscopy was highly effective at restoring function and produced long-lasting results. In addition to ultrasounds each year, outcome measurements included the American Shoulder and Elbow Surgeon (ASES) score, range of motion, and manual muscle testing. ASES scores, which range from 0 to 100, improved from 52.6 pre-operatively to 92.6 at five years ($P < 0.001$). There was no difference between ASES scores at two and five years. "What we found is that patients continued to get better between years one and two, but they stay the same between years two and five," Dr. Gulotta said. There are five motor grades of function and investigators found that after surgery, patients improved a full motor grade in forward elevation and external rotation, and these improvements remained stable over time.

The investigators also identified a slight decrease in the range of motion between years two and five, but it didn't seem to be enough to affect overall function. From two to five years, passive forward elevation decreased from 173 to 168.6 degrees ($P = 0.02$) and external rotation decreased from 73.6 to 67.8 degrees. "While those numbers are getting worse, they are not really clinically applicable at this time point," Dr. Gulotta said, referring to the fact that the differences are small and therefore would not be noticed by a person. He said, however, that the study was ongoing and they would continue to track these numbers to make sure there wasn't further deterioration at further time points.

This is the largest study to date to prospectively evaluate the long-term outcomes of arthroscopic rotator cuff repair surgery. "This study has a relatively large number of patients, it has five years of prospective data, and it has both clinical and radiology results too," Dr. Gulotta said.

Other Hospital for Special Surgery investigators involved in the study include Shane Nho, M.D., former resident now at Rush; Christopher Dodson, M.D., former resident and fellow now at Thomas Jefferson University Hospital; Ronald Adler, Ph.D., M.D., and John MacGillivray, M.D., though all members of the HSS Sports Medicine and Shoulder Service assisted in the study design and data accumulation.