Study shows that modern surgery for scoliosis has good long-term outcomes

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Daniel Green, M.D., pediatric orthopedic surgeon at Hospital for Special Surgery, examines images showing fusion for adolescent idiopathic scoliosis using the newer generation spine implants. Credit: Hospital for Special Surgery

Teenagers who undergo spine fusion for scoliosis using the newest surgical techniques can expect to be doing well 10 years after surgery, according to a Hospital for Special Surgery study published online ahead of print in the [TK issue] of the journal *Spine*. Researchers had thought that the surgery would cause damage to the spine just below the fused discs, but the study showed that this was not the case.

"Fusion for adolescent idiopathic scoliosis using the newer generation spine implants appears to spare junctional disc degeneration and allows patients ten years out to have a relatively normal pain free lifestyle," said Daniel Green, M.D., a pediatric orthopedic surgeon at Hospital for

Special Surgery in New York who led the study.

Scoliosis is a condition in which a person's spine is curved. The condition can be classified as congenital (caused by vertebral anomalies present at birth), idiopathic (arising after birth and caused by unknown factors) or neuromuscular, where it is a secondary symptom of another condition such as spina bifida. Starting in the early 1960s and up until the late 1990s, scoliosis was treated with surgery with so-called Harrington rods that were implanted along the spinal column. Starting in the late 1990s, surgeons started using newer techniques to fuse the spinal column together and these straight rods became obsolete.
Spinal fusion is basically a procedure where doctors "weld" parts of the spine together, so the vertebral column heals into a single, solid rigid unit.

The modern surgery is superior to the Harrington rods surgery because it allows the spine to be corrected in a much more natural, physiologic way, but there haven't been many studies evaluating how patients who undergo the surgery fare years down the road. To remedy this, HSS investigators conducted a pre- and post-operative MRI analysis in patients undergoing the surgery with modern techniques.

The investigators reviewed all spinal fusions performed by four senior scoliosis surgeons at HSS between 1991 and 1997. Patients were included in the study if they had idiopathic scoliosis, were 21 years or younger and had surgery that had the surgeon approach the patient's spine from the patient's back versus the front or side. Patients had to have fusion of the spine in their lower back (between vertebra T12 and L3).

Thirty-three potential study participants were located and 20 agreed to participate. These patients returned for a physical examination by an orthopedic surgeon that included an MRI. Doctors recorded their

medical history with special attention to level and location of pain and whether or not the patient was taking pain medication. Doctors compared the new MRIs to the ones taken ten years prior, before the surgery.

"We wanted to see how the patients were doing ten years down the road, specifically focusing on the part of the spine that didn't have surgery. The standard belief was that the area of the spine just below the surgery would wear out, because of the increased stress that the surgery or the fusion would put on that part of the spine," Dr. Green said. "That isn't what we found. We found that the area of the spine adjacent to the fusion was pretty healthy and didn't show any major degeneration ten years later. While mild degenerative changes were noted in almost every patient, the severe changes that we were concerned that we might find were not there at all."

The investigators also found that patients had good functional scores and maintenance of balance. No patients reported significant lower back pain. No patients took analgesic medications for their pain, with the exception of four patients (20%) who took occasional non-prescription non-steroidal anti-inflammatory drugs.

The investigators say the study results are good news for patients. Dr. Green also said the results may cause worry for investigators and companies who are trying to develop surgeries for scoliosis that do not involve fusing the spine. "There is a lot of research and investment being done looking for new technologies that do not use fusion," Dr. Green said. "This study would suggest that there is a challenge for those trying to do that because the patients doing fusion are doing well."

Provided by Hospital for Special Surgery