

Flaccid neuromuscular scoliosis

see also [Duchenne muscular dystrophy](#).

A study demonstrates a significant decrease in the rate of scoliosis surgery for DMD from 2001 to 2012. It appears that the decline in surgical treatment could be related to the publication and landmark study demonstrating decreased progression of scoliosis with glucocorticoid treatment ¹⁾.

Literature has described treatment of flaccid neuromuscular scoliosis using different instrumentation; however, only one article has been published using posterior-only pedicle screw fixation. Complications using pedicle screws in paralytic neuromuscular scoliosis has not been described before. To present results and complications with posterior-only pedicle screws, a retrospective study was carried out in 27 consecutive patients with flaccid neuromuscular scoliosis (Duchenne muscular dystrophy and spinal muscular atrophy), who were operated between 2002 and 2006 using posterior-only pedicle screw instrumentation. Immediate postoperative and final follow-up results were compared using t test for Cobb angle, pelvic obliquity, thoracic kyphosis and lumbar lordosis. Perioperative and postoperative complications were noted from the hospital records of each patient. Complications, not described in literature, were discussed in detail. Average follow-up was 32.2 months. Preoperative, immediate postoperative and final follow-up Cobb angle were 79.8 degrees , 30.2 degrees (63.3% correction, $p < 0.0001$) and 31.9 degrees , respectively; and pelvic obliquity was 18.3 degrees , 8.9 degrees (52% correction, $p < 0.0001$) and 8.9 degrees . Postoperative thoracic kyphosis remained unchanged from 27.6 degrees to 19.9 degrees ($p = 0.376$); while lumbar lordosis improved significantly from +15.6 degrees to -22.4 degrees lordosis ($p = 0.0002$). Most patients had major to moderate improvement in postoperative functional and ambulatory status compared to the preoperative status. Thirteen (48.1%) perioperative complications were noted with five major complications (four respiratory in the form of hemothorax or respiratory failure that required ventilator support and one death) and eight minor complications (three UTI, two atelectasis, two neurological and one ileus). Postoperatively, we noted complications, such as coccygodynia with subluxation in 7, back sore on the convex side in 4 and dislodging of rod distally in 1 patient making a total of 12 (44.4%) postoperative complications. Of 12 postoperative complications, 6 (50%) required secondary procedure. We conclude that although flaccid neuromuscular scoliosis can be well corrected with posterior-only pedicle screw, there is a high rate of associated complications ²⁾

A retrospective review was done on all patients with [spinal muscular atrophy](#) (SMA) and [muscular dystrophy](#) (MD) undergoing [spinal surgery](#) on a neuromuscular protocol. Baseline demographics, perioperative results, and long-term outcomes were collected. Per the protocol, patients remained intubated after surgery and were transported to the intensive care unit (ICU) for extubation. We present the results of protocol implementation and compare patients with MD to those with SMA.

Twenty-four patients were treated using the protocol. Average age was 13.1 years. Severe restrictive lung disease was present in 75% of patients. Nocturnal BiPAP was required in 68% of patients. Average number of instrumented levels was 17. All patients were immediately extubated upon entering the ICU. There were three respiratory complications and only was patient was re-intubated.

Average ICU stay was 1.8 days and average hospital length of stay was 6.7 days. No differences in postoperative inspiratory or expiratory positive airway pressures were observed between the MD and SMA groups.

Through a multidisciplinary neuromuscular protocol, excellent clinical outcomes were achieved in patients with [neuromuscular scoliosis](#) and restrictive lung disease, with complication rates and length of stay significantly lower than previously published data ³⁾

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Raudenbush BL, Thirukumaran CP, Li Y, Sanders JO, Rubery PT, Mesfin A. Impact of a Comparative Study on the Management of Scoliosis in Duchenne Muscular Dystrophy: Are Corticosteroids Decreasing the Rate of Scoliosis Surgery in the United States? Spine (Phila Pa 1976). 2016 Sep;41(17):E1030-E1038. doi: 10.1097/BRS.0000000000001534. PMID: 26926354.

²⁾

Modi HN, Suh SW, Hong JY, Cho JW, Park JH, Yang JH. Treatment and complications in flaccid neuromuscular scoliosis (Duchenne muscular dystrophy and spinal muscular atrophy) with posterior-only pedicle screw instrumentation. Eur Spine J. 2010 Mar;19(3):384-93. doi: 10.1007/s00586-009-1198-z. Epub 2009 Nov 3. PMID: 19885687; PMCID: PMC2899771.

³⁾

Hatef J, Hatef S, Drain JP, Tobias JD, Martin D, Shell R, Chase M, Beebe A, Samora W, Klamar J. Protocol-driven early tracheal extubation in patients with flaccid neuromuscular scoliosis and pre-existing lung disease. Spine Deform. 2022 Jan 24. doi: 10.1007/s43390-021-00411-6. Epub ahead of print. PMID: 35067898.

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