Paper #11: Effectiveness of Serial Derotational Casting for Treatment of Children with Early Onset Scoliosis

Anny Hsu, MD; Hiroko Matsumoto, PhD; Mark Sullivan, BA; Evan Trupia, BS; Benjamin Roye, MD, MPH; David P. Roye, MD; Michael G. Vitale, MD, MPH


Introduction: Early onset scoliosis (EOS) is a challenging orthopedic disorder and can be disabling or even fatal if left untreated. Serial derotational casting has emerged as a potentially curative technique for EOS patients. The purpose of this study is to examine the effectiveness of scoliosis casting and to identify factors that will affect the efficacy of casting treatment for children with EOS.

Methods: We retrospectively reviewed 28 patients who underwent serial casting for EOS at a single institution from 2009 to 2014. Sixteen patients met our inclusion criteria including a diagnosis of EOS, having undergone serial Mehta/Cotrel derotational casting, and radiographic evaluation between treatments. Patients with prior spine casting or pertinent surgical interventions were excluded. Diagnosis, time in cast, and number of casts were recorded. Cobb angles were calculated.

Results: 16 patients met the inclusion criteria (13 idiopathic, 1 congenital/structural, 2 syndromic). The mean age at initial casting was 2.4 years old with mean major curvature of 50.3°. Patients had an average of 4.4 derotational casts with a range of 3-8. At final casting, 50% (8/16) had notably smaller curvatures (> 10% of degree curvature improvement), 31.3% (5/16) maintained their curve, and 18.8% (3/16) had significant progression (>10%). Patients with an initial curvature < 50° were five times more likely to have at least 10% curvature improvement after the final cast compared to patients with initial curve > 50°. Patients under 20 months of age at initial casting were five times more likely to have at least 10% curvature improvement after the final cast compared to patients over 20 months old. The average curvature improvement among all patients from initial casting until after 3 derotational casts was 22.4%, and from initial casting until after the final cast was 16.8%.

Conclusion: Serial derotational casting is an effective treatment for EOS capable of maintaining or even correcting progressive scoliosis curvature. Children younger than 20 months or with major curvature <
50° are more responsive to scoliosis casting treatment. Positive benefits of casting were seen after as few as three serial castings.