



Kansas City

An Independent Licensee of the Blue Cross and Blue Shield Association

Electrical Stimulation for Scoliosis

Policy Number: 1.01.509

Last Review: 8/2014

Origination: 8/2008

Next Review: 8/2015

Policy

Blue Cross and Blue Shield of Kansas City (Blue KC) will not provide coverage for electrical stimulation for scoliosis. This is considered investigational.

When Policy Topic is covered

Not Applicable

When Policy Topic is not covered

Electrical stimulation for scoliosis is considered **investigational**.

Description of Procedure or Service

Electric stimulation has been investigated as a non-invasive treatment for idiopathic scoliosis (a type of adolescent scoliosis that presents itself while a child is still growing). In this approach, muscles on one side of the spine are stimulated electrically (direct or alternating current, not high-voltage galvanic current) to contract and pull the vertebrae into a more normal position. Surface electrical muscle stimulation is usually applied for 8 to 10 hours during sleep. Treatment is terminated when patients reach skeletal maturity and structural stability. It is thought this treatment will reverse or prevent the progression of scoliosis over time. The traditional treatment for adolescent idiopathic scoliosis is the use of a supportive brace, (e.g., the Milwaukee brace, the Boston brace).

Rationale

Bertrand, et al. (1) conducted a retrospective review of the effectiveness of lateral electrical spinal stimulation for idiopathic scoliosis on 87 patients treated with this modality. All patients had no prior treatment, had a documented progression of more than 5 degrees, and were skeletally immature. Forty-seven patients were compliant and followed until skeletal maturity or institution of other treatment. Fifty percent of patients with a high probability of progression required surgery. For compliant patients, 51% progressed 5 degrees or more and 36% progressed 10 degrees or more or required a change to another treatment modality. Statistical analysis demonstrated no significant difference in the probability of progression between this group of treated patients and previously published groups of untreated patients.

Nachemson, et al. (3) states in a prospective study by the Scoliosis Research Society, 286 girls who had adolescent idiopathic scoliosis, a thoracic or thoracolumbar curve of 25 to 35 degrees, and a mean age of twelve years and seven months (range, ten to fifteen years) were followed to determine the effect of treatment with observation only (129 patients), an underarm plastic brace (111 patients), and nighttime surface electrical stimulation (forty-six patients). Thirty-nine patients were lost to follow-up, leaving 247 (86 per cent) who were followed until maturity or who were dropped from the study because of failure of the assigned treatment. The end point of failure of treatment was defined as an increase in the curve of at least 6 degrees, from the time of the first roentgenogram, on two consecutive roentgenograms. As determined with use of this end point, treatment with a brace failed in seventeen of the 111 patients; observation only, in fifty-eight of the 129 patients; and electrical stimulation, in twenty-two of the forty-six patients. According to survivorship analysis, treatment with a brace was associated

with a success rate of 74 per cent (95 per cent confidence interval, 52 to 84) at four years; observation only, with a success rate of 34 per cent (95 per cent confidence interval, 16 to 49); and electrical stimulation, with a success rate of 33 per cent (95 per cent confidence interval, 12 to 60).

Rowe, et al. (4) reports that with use of data culled from twenty studies, members of the Prevalence and Natural History Committee of the Scoliosis Research Society conducted a meta-analysis of 1910 patients who had been managed with bracing (1459 patients), lateral electrical surface stimulation (322 patients), or observation (129 patients) because of idiopathic scoliosis. Three variables - the type of treatment, the level of maturity, and the criterion for failure - were analyzed to determine which had the greatest impact on the outcome. Also examined was the effect of the type of brace that was used and the duration of bracing on the success of treatment. The number of failures of treatment in each study was determined by calculating the total number of patients who had unacceptable progression of the curve (as defined in the study), who could not comply with or tolerate treatment, or who had an operation. The percentage of patients who completed a given course of treatment without failure, adjusted for the sample sizes of the studies in which that treatment was used, yielded the weighted mean proportion of success for that treatment. The weighted mean proportion of success was 0.39 for lateral electrical surface stimulation, 0.49 for observation only, 0.60 for bracing for eight hours per day, 0.62 for bracing for sixteen hours per day, and 0.93 for bracing for twenty-three hours per day. The twenty-three-hour regimens were significantly more successful than any other treatment ($p < 0.0001$). The difference between the eight and sixteen-hour regimens was not significant, with the numbers available. Although lateral electrical surface stimulation was associated with a lower weighted mean proportion of success than observation only, the difference was not significant, with the numbers available. This meta-analysis demonstrates the effectiveness of bracing for the treatment of idiopathic scoliosis. The weighted mean proportion of success for the six types of braces included in this review was 0.92, with the highest proportion (0.99) achieved with the Milwaukee brace. The study found that use of the Milwaukee brace or another thoracolumbosacral orthosis for twenty-three hours per day effectively halted progression of the curve. Bracing for eight or sixteen hours per day was found to be significantly less effective than bracing for twenty-three hours per day ($p < 0.0001$).

In a study by Bowen, et al. (5) the effectiveness of managing adolescent idiopathic scoliosis with a total contact bending spine orthosis worn only during nighttime sleep with established bracing programs and electrical stimulation treatment was evaluated. Brace treatment was prescribed for 30 patients with adolescent idiopathic scoliosis for the management of 50 spinal curvatures averaging 28.5 degrees (range: 13 degrees-40 degrees). Average patient age at the initiation of brace wear was 12+/-10 years (range: 9+/-10 to 16+/-8 years). All 30 patients were skeletally immature (Risser sign, 0-3) at initiation of orthotic treatment and underwent follow-up to maturity. Patients were instructed to wear the braces for at least 8-10 hours a day during nighttime sleep. Eighteen of 30 patients were compliant with the bracing program. Compliance with the nighttime bending brace was no better than the reported compliance with established thoracolumbosacral orthosis programs. Moreover, noncompliant patients and those treated by the ineffective electrical stimulation program also did not differ in curve progression. Curve progression was controlled in 56% of the compliant patients, and the nighttime bending brace was considered as effective as the Wilmington brace in controlling adolescent idiopathic scoliosis. Both braces were more effective than the ineffective electrical stimulation treatment.

Peterson, et al. (6) report on a study conducted by the Scoliosis Research Society in which 159 girls with a mean age of thirteen years (range, ten to fifteen years) who had adolescent idiopathic scoliosis were followed prospectively until skeletal maturity or until the curve had increased 6 degrees or more. All patients had had an initial curve of 25 to 35 degrees and an apical level between the eighth thoracic and first lumbar vertebrae, inclusive. Of the 159 patients, 120 were observed without treatment and thirty-nine were managed with lateral electrical surface stimulation. The curve progressed at least 6 degrees in eighty patients. There was no apparent difference in the outcome between the patients who were managed with observation only and those who were given electrical stimulation. Logistic regression analysis was performed to determine which of eleven factors were predictive of progression of the scoliotic curve. A Risser sign of 0 or 1, an apical level cephalad to the twelfth thoracic vertebra, and an imbalance of ten millimeters or less were found to be independently prognostic of progression of

more than 6 degrees. A prognostic model that included these three factors and chronological age allowed correct classification of the curve as either progressive or non-progressive in 81 per cent of these patients who had a thoracic or thoracolumbar adolescent idiopathic scoliosis. The positive predictive value was 82 per cent, the negative predictive value was 80 per cent, and the sensitivity and specificity were each 81 per cent.

Lenssinck, et al. (7) state that while many conservative treatments are available for adolescents with idiopathic scoliosis, the evidence for their accepted use is still unclear. The purpose of their study was to evaluate the effectiveness of braces and other conservative treatments of idiopathic scoliosis in adolescents by systematically reviewing the literature. The literature was searched in the PubMed, CINAHL, Cochrane, and PEDro databases. Studies were selected if the design was a randomized clinical trial or a controlled clinical trial, if all patients had an idiopathic scoliosis, if all patients were less than 18 years of age during the intervention, and if the type of intervention was a conservative one. Two reviewers independently assessed the methodological quality using the Delphi list and performed data extraction. Analysis was based on the levels of evidence. Thirteen studies met the final inclusion criteria, showing a wide range of interventions such as bracing, electrical surface stimulation, and exercises. The authors conclude that the effectiveness of bracing and exercises is not yet established, but might be promising. They found no evidence of the effectiveness of electrical stimulation.

The National Scoliosis Foundation states, "After five years, 70% of those using electrical stimulation or being observed had progressed 6 degrees or more. We found there is no difference whatsoever between electrical stimulation and observation. Electrical stimulation is now discarded as a method of treatment." (8)

References:

1. Bertrand SL, et al. Electrical stimulation for idiopathic scoliosis. *Clinical Orthopedic and Related Research* 1992 March; (276):176-181.
2. Danielsson AJ, Hasserijs R, Ohlin A, Nachemson AL. A prospective study of brace treatment versus observation alone in adolescent idiopathic scoliosis: a follow-up mean of 16 years after maturity. *Spine*. 2007 Sep 15;32(20):2198-207.
3. Nachemson AL, Peterson LE, Effectiveness of treatment with a brace in girls who have adolescent idiopathic scoliosis. A prospective, controlled study based on data from the Brace Study of the Scoliosis Research Society. *J Bone Joint Surg Am*. 1995 Jun;77(6):815-22.
4. Rowe DE, Bernstein SM, et al. A meta-analysis of the efficacy of non-operative treatments for idiopathic scoliosis. *J Bone Joint Surg Am*. 1998 Jun;80(6):923-5.
5. Bowen JR, Keeler KA, Pelegie S. Adolescent idiopathic scoliosis managed by a nighttime bending brace. *Orthopedics*. 2001 Oct;24(10):967-70.
6. Peterson LE; Nachemson AL. Prediction of Progression of the curve in girls who have adolescent idiopathic scoliosis of moderate severity. Logistic regression analysis based on data from The Brace Study of the Scoliosis Research Society. *J Bone Surg Am*. 1995 June; 77(6):823-7.
7. Lenssinck ML, Frijlink AC, Berger MY, Bierman-Zeinstra SM, Verkerk K, Verhagen AP. Effect of bracing and other conservative interventions in the treatment of idiopathic scoliosis in adolescents: a systematic review of clinical trials. *Phys Ther*. 2005 Dec;85(12):1329-39.
8. National Scoliosis Foundation. "Bracing Works", an update on bracing from the scoliosis research society annual meeting. Available at: <http://www.scoliosis.org/resources/medicalupdates/bracingworks.php> Accessed June 23, 2008.

Billing Coding/Physician Documentation Information

- 97014** Application of a modality to one or more areas; electrical stimulation (unattended)
- 97032** Application of a modality to one or more areas; electrical stimulation (manual), each 15 minutes
- E0744** Neuromuscular stimulator for scoliosis
- G0283** Electrical stimulation (unattended), to one or more areas for indication(s) other than wound care, as part of a therapy plan of care

Additional Policy Key Words

N/A

Policy Implementation/Update Information

8/1/08	New policy; considered investigational.
2/1/09	No policy statement changes.
8/1/09	No policy statement changes.
8/1/10	No policy statement changes.
8/1/11	No policy statement changes.
8/1/12	No policy statement changes.
8/1/13	No policy statement changes.
8/1/14	No policy statement changes.

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