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Nighttime bracing with the Providence brace in adolescent girls with idiopathic scoliosis

C R D'Amato[1], S Griggs, B McCoy
Affiliations Expand

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Abstract

Study design: A prospective study was conducted of 102 consecutive female patients with adolescent idiopathic scoliosis. Those patients with Risser 0, 1, and 2 met the criteria for inclusion and were treated only with the Providence brace.

Objectives: To report the authors' experience with a hypercorrective nighttime brace and to evaluate the results with respect to risk factors for progression. Second, the study compares results with expectations from the natural history as reported by others.

Summary of background data: Compliance with full-time brace treatment for adolescent idiopathic scoliosis has been a problem. Since the introduction of the Milwaukee brace, alternatives such as low-profile braces, reduced wearing schedules, and nighttime only bracing have been tried. However, many factors influence the success or failure besides compliance. These include in-brace correction, brace design, and the orthotist's skills. This is the first report of the results of treatment with a new nighttime brace that is made with CAD/CAM technology that can achieve higher initial in-brace corrections than other reported methods.

Methods: Results were analyzed with respect to curve size, curve pattern, maturity, and level of the primary curve apex. Both compliant and noncompliant patients were included in the analysis. A univariate analysis was done on those factors thought to influence success with bracing using the Pearson chi2 test.

Results: The average initial in-brace correction with a supine radiograph was 96% for major curves and 98% for minor curves. Seventy-five patients (74%) did not progress >5 degrees and 27 patients (26%) progressed > or =6 degrees or went on to surgery. Twenty-nine percent of Risser 0 or 1 patients progressed and 17% of patients Risser 2 progressed. The risk of progression anticipated by natural history data, which included all curve patterns, was 68% for Risser 0 and 1 and 23% for Risser 2. Risser 3 and 4 patients were excluded from the study. Seventy-six percent of patients with curve apexes between T8 and L1 had successful outcomes using the Providence brace. This is compared with a 74% success rate in the prospective Scoliosis Research Society study of patients wearing a thoraco lumbar sacral orthosis for 16 hours per day with curve apexes between T8 and L1. With the Providence brace, 63% of thoracic curves and 65% of double curves were successful. Ninety-four percent of lumbar curves and 93% of thoracolumbar curves were successful.

Conclusion: Excellent initial in-brace correction of adolescent idiopathic scoliosis was observed with this computer-designed and manufactured recumbent brace. Patients with high apex curves cephalad to T8 (n = 31) had a success rate of 61% compared with a success rate of 79% (n = 71) if the apex was at or below T9. Compared with previous natural history and the prospective study data, the Providence brace is effective in preventing progression of adolescent idiopathic scoliosis for curves <35 degrees. It was effective for larger curves with a low apex. The authors' experience with patients with curves >35 degrees (n = 8) is too small to validate its effectiveness for larger curves with a higher ape