



Clinical Studies

Motivations for Compliance With Bracing in Adolescent Idiopathic Scoliosis

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Abstract

Study Design: Cross-sectional study.

Objective: To determine motivations for compliance with bracing among female patients with adolescent idiopathic scoliosis (AIS).

Summary of Background Data: Bracing prevents the need for surgery for the majority of girls with AIS with curves of 20° to 40° and 2 or more years of growth remaining. The main obstacle to success is compliance. The factors that either promote or impede compliance previously have not been fully clarified.

Methods: Participants were females 10 to 16 years of age who were prescribed a brace to be worn 16 hours per day for AIS. Each completed a “Scoliosis Compliance Questionnaire” composed of the SRS-22r and five original sections focused on patients’ attitudes to scoliosis, situations in which they found wearing the brace to be most and least difficult, factors that motivate brace wear, and interventions that could potentially improve compliance.

Results: Thirty-nine subjects completed the study, mean age 13 years (range 11–15 years), at a mean of 15.4 months (range 4–39 months) of brace wear at the time of recruitment. More than 90% of patients stated that their main motivations for compliance were the desire to avoid surgery and to prevent curve progression. Compliance was most challenging during the summer and while at school. Many patients reported pain and skin irritation in the brace. The majority reported they would likely improve their hours of wear if they were able to communicate with a peer in the same situation. SRS-22r scores were similar to those of healthy adolescents.

Conclusions: The most important influences promoting brace wear are the patient’s desire to avoid surgery and to prevent curve progression. Peer support potentially may improve compliance.

Level of Evidence: Level III.

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Keywords: Adolescent idiopathic scoliosis; Bracing; Treatment; Compliance; Females

Introduction

Bracing is effective in preventing the need for surgery for the majority of girls with adolescent idiopathic scoliosis (AIS) who have curves of 25° to 40° and 2 or more years of growth remaining [1-3]. Using temperature sensors to

record compliance, Weinstein and colleagues found that an average of 12.9 hours per day of brace wear was protective against the need for surgery in 90% to 93% of patients [1]. They found a significant association between hours of wear and the likelihood of success, defined as curve magnitude less than 50° at maturity.

An earlier study also using monitoring devices determined that curves did not progress 6° or more in 82% of patients who wore their brace more than 12 hours per day, whereas those who wore their brace fewer than 7 hours per day had no better results than the natural history [2]. In a study of the same group of patients, Sanders and associates determined that “high compliance,” defined as 10 or more hours of brace wear per day, is protective against the need for surgery [3]. Only 2 of 31 patients who

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wore a brace for 10 hours or more per day developed curves $\geq 50^\circ$, and none of the 13 patients who wore a brace for 14 hours per day progressed to a surgical range. However, compliance was low: 31% of patients wore the brace 10 or more hours per day and only 13% wore it 14 or more hours per day. The authors stated, “many factors likely contribute to the low overall compliance with bracing for adolescent scoliosis, including comfort, social issues, and self-image. Some patients may decide that the risk of progression to surgery is more acceptable than wearing a brace.” Counseling of patients based on monitor reports is an effective strategy to improve compliance [4]. Karol and coauthors determined that patients who were counseled based on actual hours of wear wore their orthosis an average of 13.8 hours per day, whereas noncounseled patients wore their brace an average of 10.8 hours per day.

Compliance with the prescription for bracing is a choice and may be affected by individual attitudes to the condition and treatment and perceived stress. The effect of spine deformity and its conservative management on quality of life and stress experienced by scoliosis patients has been extensively studied using various outcome instruments [5–15]. In a study that investigated patient pretreatment attitudes and subsequent compliance with bracing, the questionnaire was administered prior to initiation of treatment [16]. To now, no investigations have been performed to determine the specific factors and circumstances that may either promote or impede compliance with bracing during the treatment period.

The purpose of the present study was to elucidate external factors and individual attitudes that may affect compliance with the prescription for bracing in girls with AIS.

Materials and Methods

Inclusion criteria were girls between the ages of 10 and 16 years of age with AIS and prescribed a Boston Brace (Boston Brace International, Avon, MA) to be worn for 16 hours per day. At the time of initiation of bracing, patients were instructed to sleep in the brace and to also wear it during the daytime for a total 16 hours per day. They were allowed to select hours of daytime wear

based on their activities and preferences and to remove the brace for recreational sports if necessary. Patients were encouraged to be physically active and to exercise regularly.

Recruitment was by the investigators in the spine deformity clinic. Primary caregivers were responsible for monitoring compliance. Each participant completed a “Scoliosis Compliance Questionnaire.” This was composed of the SRS-22r and sets of questions related to the participant’s attitude toward her scoliosis, challenges to bracing, motivations promoting brace wear, obstacles to wearing the brace, and potential interventions that might improve compliance (Tables 1–4) [17–20]. The SRS-22r is a standard validated outcomes instrument [17]. We used this as a standard to determine well-being and health of the subjects and the effect of bracing. In addition, five sets of questions were used to study patient attitudes to bracing. The questions were developed de novo by one of the investigators (Tables 1–4). All participants were treated at the same center by one surgeon. This study was approved by our institutional review board. Statistical analysis of the SRS-22r data was performed using one-sample *t* test. Normal values for SRS-22r and minimum clinically important differences were calculated using previously published data and conversion factors [18–20]. We used the normal overall SRS-22 values from the study by Daubs et al. and did not distinguish by race/ethnicity [18].

Results

Thirty-nine participants completed the questionnaire. Two families refused to participate and one was dropped from the study because of a parental language barrier. Mean age at the time of enrollment was 13 years (range 11–15). The average length of time participants had worn a brace before the study was 15.4 months (range 4–39 months). Mean curve magnitude at initiation of bracing was 29° (range 23° – 38°). Participants self-identified average daily number of hours they wore their brace. Overall, 30 of 38 participants (79%) reported wearing the brace 10 or more hours per day.

Overall, participants scored well on the SRS-22r (Table 5). Although the mean scores in Function and Self

Table 1
Part II: Attitude to scoliosis.

How often do the following bother you about your scoliosis?	1 = never, n (%)	2 = rarely, n (%)	3 = sometimes, n (%)	4 = often, n (%)	5 = always, n (%)	No response, n (%)
Appearance of your shoulders	24 (67)	8 (22)	4 (11)	0 (0)	0 (0)	3
Appearance of your ribs	31 (86)	1 (3)	2 (6)	2 (6)	0 (0)	3
Appearance of your hips	21 (58)	6 (17)	5 (14)	3 (8)	1 (3)	3
Back Pain	10 (28)	10 (28)	11 (31)	3 (8)	2 (6)	3
How you look in clothing	16 (44)	8 (22)	6 (17)	3 (8)	3 (8)	3
Ability to do daily activities	18 (50)	8 (22)	7 (19)	1 (2)	2 (6)	3
Ability to play sports	23 (66)	4 (11)	3 (9)	3 (9)	2 (6)	4

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