

Ethnic Variation in Satisfaction and Appearance Concerns in Adolescents With Idiopathic Scoliosis Undergoing Posterior Spinal Fusion With Instrumentation

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Abstract

Study Design: Cohort analysis.

Objective: Document satisfaction with management and appearance concerns in children of different ethnicity who underwent spinal fusion/instrumentation for adolescent idiopathic scoliosis (AIS).

Summary of Background Data: Scoliosis Research Society Questionnaire (SRS-30) outcomes in AIS indicate a link between appearance and satisfaction as well as ethnic variation in appearance domain. Exploration of these findings in the Scoliosis Appearance Questionnaire (SAQ) will allow better understanding of ethnic variation in appearance concerns.

Methods: Children with AIS who underwent posterior-only operations and completed the SAQ's question 31 were identified. Univariate logistic regression of SAQ questions 12-30 was used to assess relationships with ethnicity.

Results: 1,977 children [boys: 281, girls: 1,290, unspecified: 406; average age 15.1 ± 2.0 years preoperatively and 817 children (boys: 113, girls: 569, unspecified: 135; average age 15.1 ± 2.0 years) at 2 years' follow-up met inclusion criteria. The majority were Caucasian (57.3%). Few were Hispanic (3.4%). Preoperatively, the largest percentage of patients in each ethnic group answered "very true" to "wanting to be more even." Preoperatively, Asians were least likely to be concerned about evenness of shoulders, hips, waist, ribs, and chest in back ($p < .05$); however, they expressed greatest concern about height ($p < .05$). African Americans and Hispanics were more likely to be concerned about breast evenness and anterior chest and looking better in clothes ($p < .05$). African Americans were most concerned about overall evenness and evenness of shoulders, hips, waist, ribs, posterior chest, leg length, and looking more attractive ($p < .05$). Surgical scar was most important postoperatively for all ethnicities. African Americans and Hispanics were more self-conscious about scar ($p < .05$). African Americans were most likely to want to be more even and have more even shoulders, hips, waist, leg lengths, ribs, breasts, and chest postoperatively.

Conclusions: Ethnicity influenced appearance concerns in pre- and postoperative SAQ evaluation. Ethnic variation in appearance concerns should be taken into account and differentiated when counseling patients about AIS and surgical correction.

Level of Evidence: Level III.

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Keywords: Adolescent idiopathic scoliosis; Posterior instrumentation and fusion; SRS-30 questionnaire; Scoliosis Appearance Questionnaire (SAQ); Ethnicity

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Introduction

Patient-centered outcome tools in adolescent idiopathic scoliosis (AIS) include the Scoliosis Research Society Questionnaire (SRS-30) and Spinal Appearance Questionnaire (SAQ). The SRS-30 was designed as a patient-based measure of functional outcomes after the surgical treatment of AIS [1]. The SRS-30 measures 5 domains (pain, activity, appearance, mental, satisfaction), of which appearance is the most responsive to treatment [2]. Preoperative SRS evaluation has demonstrated significant ethnic differences across all domains, including appearance [3]. That appearance is the most sensitive outcome of scoliosis treatment makes this measure most worthy of scrutiny.

The Spinal Appearance Questionnaire (SAQ) was developed and validated to differentiate physical attributes in AIS [4-6]. Although SRS studies have demonstrated a correlation between appearance and satisfaction, as well as ethnic variation in the appearance domain, further exploration of these findings in the SAQ has not been reported. The purpose of this study is to evaluate variation of SAQ according to ethnicity, as well as the relationship between ethnicity and the satisfaction domain of SRS-30.

Materials and Methods

Approval was obtained from the Committees for Human Research at the 28 centers and the organizing group's Research Committee. SAQ and SRS-30 were administered to patients at the preoperative visit and at 2 years postoperatively. Patients were asked to complete the forms in clinic—parental involvement was neither discouraged nor encouraged [4]. Parents were asked to identify one of four ethnicities: African American, Asian, Hispanic, and Caucasian. SAQ questions 1–11 ask the patient to choose the pictorial representation of various parts of the body that look most like her or him. SAQ questions 12–30 ask about the patient's expectations and concerns (ie, "I want to be/have..."), with 5 responses ranging from "not true" to "very true." SAQ question 31 asks the patient to then rank which of these questions is most important ("Of questions 12–30, which one is most important to you?"). Within the SRS-30, two questions assess patient satisfaction with management of the spine. Question 21 of the SRS-30 asks, "Are you satisfied with the results of your back management?" with five responses collapsed into "very satisfied/satisfied," "neither," and "unsatisfied/very unsatisfied." SRS question 22 asks, "Would you have the same management again if you had the same condition?" with 5 responses collapsed into "definitely yes/probably yes," "not sure," and "probably not/definitely not."

In this study, the prospectively collected surgical and questionnaire data on children with AIS from 2002 to 2008 were analyzed retrospectively. Inclusion criteria were as follows: age 13–18 years at time of operation, primary procedure, posterior-only approach, and completion of

question 31 of the SAQ on the preoperative assessment. Exclusion criteria included anterior approach either alone or in combination with a posterior approach, thoracoplasty, repeat operation at any time point, incident-related failure, and neural complications (ie, cauda equina injury, nerve root injury, radiculopathy, and spinal cord injury).

Statistical analysis

Descriptive statistics were calculated and are presented as the frequency (percentage) for categorical variables and mean and standard deviation (SD) for variables measured on a continuous scale. Univariate logistic regression of SAQ questions 12–30 was used to assess the relationship with race. Firth's penalized likelihood logistic regression approach was used to address small sample size (ie, for SAQ 15, Asians did not report "Very True" responses). A cumulative logit model was fit to the ordinal data with the variable SRS question 21 and SRS question 22 as the response and the variable race as the covariate. Odds ratio (OR) and 95% confidence intervals (CIs) are presented. A $p < .05$ was considered statistically significant. All analyses were performed using SAS, version 9.4.

Results

Inclusion criteria were met preoperatively by 1,977 children (boys: 281, girls: 1,290, unspecified: 406; average age 15.1 ± 2.0 years; Caucasian [57.3%; $n = 1,133$], African American [11.1%; $n = 220$], Asian/Asian American [5.6%; $n = 111$], Hispanic [3.4%; $n = 68$], Other [1.7%; $n = 33$], unspecified [20.8%; $n = 412$]). Postoperatively, 817 children met inclusion criteria and had 2-year follow-up (boys: 113, girls: 569, unspecified gender: 135; average age 15.1 ± 2.0 years; Caucasian [61.4%; $n = 502$], African American [10.4%; $n = 85$], Asian/Asian American [4.5%; $n = 37$], Hispanic [4.0%; $n = 33$], and Other [1.7%; $n = 14$], unspecified [17.9%; $n = 146$]).

There was significant ethnic variation in pre- and postoperative satisfaction with management (SRS question 21) and likelihood to undergo the same management (SRS question 22) (Table 1). Although preoperative satisfaction with back management was similar among ethnicities, Asians were least likely to want the same management preoperatively ($p < .05$). Approximately 90% of Caucasian and Hispanic children postoperatively stated that they would have the same management. Compared with these groups, African Americans (79%) and Asians (58%) were less likely to want the same management ($p < .05$) postoperatively. Having said this, a notable percentage of Asians (33%) were ambivalent about their management postoperatively. However, there were no differences detected in satisfaction with management among the ethnic groups ($p > .05$).

Preoperative appearance concerns are presented in Tables 2 and 3. Preoperatively, 34.5% of children ranked

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