

## Patient satisfaction after scoliosis surgery

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### Abstract

**Background:** Patient satisfaction with the cosmetic result of spinal fusion surgery was studied in 40 cases of adolescent idiopathic scoliosis. Neutral or dissatisfied patients were compared with satisfied patients in several physical and psychological characteristics. The aim of the study was to determine whether adolescents generally report satisfaction with the postoperative appearance of their back after the correction of severe curves and whether preoperative medical and/or psychological factors could distinguish between patients who report satisfaction with the cosmetic surgical result from those who report neutrality or dissatisfaction. Previous reports emphasize the need for medical outcome research that evaluates both patient satisfaction and technical success. Patient satisfaction with spinal surgery has largely been evaluated in retrospective studies and most consistently is related to postoperative cosmesis and degree of curve correction.

**Methods:** 40 adolescents with idiopathic scoliosis without any comorbidity who were 10 years of age or older were studied preoperatively by physical and psychological measurements.

**Results:** Of patients undergoing surgical correction of severe curves, 50% reported satisfaction with the cosmetic result. Neutral or dissatisfied patients were more likely to have a King II or King IV curve types and less correction than satisfied patients. Preoperative psychological difficulties ( $P < 0.05$ ) and unmet expectations regarding postoperative cosmesis ( $P < 0.05$ ) were more common among neutral or dissatisfied patients.

**Conclusion:** Most adolescents with idiopathic scoliosis expressed satisfaction with the cosmetic surgical result. Preoperative physical characteristics, psychological difficulties, and unrealistic expectations regarding postoperative cosmesis are associated with patient neutrality or dissatisfaction.

**Keywords:** patient satisfaction, adolescent idiopathic scoliosis, spinal surgery

### Introduction

Adolescent idiopathic scoliosis often becomes apparent at or near the onset of puberty, a period characterized by preoccupation with physical appearance. Individuals with progressive idiopathic scoliosis may have several pro-

nounced body deformities, including scapular and rib prominence, uneven shoulders, and an asymmetric waistline. Spinal fusion surgery with instrumentation often successfully reduces severe curves and minimizes the risk of curve progression [1,12]. Unfortunately, success of surgical technique does not necessarily translate into patient satisfaction. In fact, pa-

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<i>Variable</i>	<i>Min-Max</i>	<i>Mean(SD)</i>	<i>SD</i>
Height (cm)	143- 173	159.71	7.693
Weight(kg)	33- 67	51	7.827
Maximum Cobb's angle	45-140	84.875	21.6074

Table 1. Medical and physical development variables.

tient satisfaction with the surgical result appears unrelated to the physical benefits of spinal fusion surgery [4] which include the preservation of pulmonary function and the prevention of osteoarthritis [4]. The cosmesis of the back and shoulders, however, is critically important to the adolescent with idiopathic scoliosis [11] making the patient's perception of postoperative cosmesis a salient indicator of satisfaction with the surgical result.

Understanding the sources of patient satisfaction with the surgical outcome may be beneficial to surgeons in several ways. First, an awareness of the sources of patient satisfaction allows surgeons to appreciate which aspects of surgical correction are important to the adolescent, aside from mechanical correction. Outcome research validates medical interventions through a comparison of technical success with patient perception of well being [4]. Therefore, the demonstration of mechanical correction and patient satisfaction are effective methods for assessing outcome and justifying surgical procedures. Second, understanding how preoperative physical and psychological traits relate to postoperative satisfaction allows surgeons to approach surgical candidates with greater sensitivity. Preoperative identification of physical and/or psychological characteristics associated with patient neutrality or dissatisfaction, and assessment of unrealistic patient expectations regarding the postoperative cosmesis, allow surgeons to address concerns before surgery, possibly mitigating a negative reaction to the surgical result.

This study was undertaken to investigate patient satisfaction with spinal fusion surgery. Specifically investigated were the following re-

search questions:

1. Are adolescents generally satisfied with the postoperative appearance of their back after the correction of severe curves?
2. Do preoperative medical and/or psychological factors distinguish patients who are more likely to be satisfied with the cosmetic surgical result from those who are more likely to be neutral or dissatisfied?

## Methods

### *Sample size and selection criteria*

Potential candidates for this study included patients diagnosed with adolescent idiopathic scoliosis without comorbidity, including body image disfigurement from congenital or traumatic causes, and patients requiring both anterior and posterior spinal fusion.

From 2006 to 2007, an attempt was made to recruit 40 consecutive surgical patients and their families, being treated by one of three orthopedic surgeons.

### *Physical Development and Measures of Cosmetic Deformity*

Menarchal status was determined by the patient's and the parent's report of onset of menses. Height and weight were measured at admission to hospital before surgery (Table 1). One surgeon (JGB) measured Cobb's angle on the preoperative standing posteroanterior radiograph.

### *Psychological Assessment*

After written informed consent was obtained from each patient's parent or legal guardian, patients completed the preoperative assessment within 2 weeks before surgery. The patients

completed several self-report questionnaires including the Offer Self-Image Questionnaire Revised (OFFER) [9], the Multidimensional Body-Self Relations Questionnaire (MBSRQ) [2], and the Pre-surgery Questionnaire.

The OFFER, a 129-item, standardized, self-report instrument, evaluated multiple areas of body satisfaction and self-image. The MBSRQ, a 69-item, standardized self-report inventory measured patients' satisfaction with their physical appearance, health, and fitness. The Pre-surgery questionnaire requested information about adolescents' expectations regarding surgical outcome and their preoperative levels of participation in social and physical activities.

Six weeks after surgery, the patient returned for a follow up appointment, during which he or she completed the postoperative assessment, which included the OFFER, the MBSRQ, and a Post-surgery questionnaire (Table 2). The Post-surgery questionnaire required adolescents to rank their degree of satisfaction (1= Definitely Disagree through 5= Definitely Agree) with both the physical result and the cosmetic surgical result, and their overall medical care. Patients again provided information about participation in social and physical activities, relationships with parents, and school performance.

Preoperative and postoperative comparisons were performed by use of the paired t test. The two-sample t test was used for group comparisons and correlational analyses to evaluate the correspondence between physical and psychological characteristics and patient satisfaction with the cosmetic result. The results were considered to be statistically significant at  $P < 0.05$ .

## Results

The sample consisted of 40 patients, 21 girls and 19 boys, ranging in age from 10 years to 24 years (mean age 16.67 years). The sample included 6 premenarchal girls at the time of surgery and 15 postmenarchal girls (mean number of months postmenarchal was 19; range: 2-76 months).

### *Physical development and body measurements*

Surgical correction of the curvature resulted in significant reductions in structural deformities such as Cobb's angle.

The maximum Cobb angles ranged between 45 and 140 (84.875). The number of patients and the Cobb angles for each King type classification [5] are given in Table 3. Assessment of skeletal maturity was made by the Risser [10] method; 1 patient was Risser 1, 6 patients were Risser 2, 8 patients were Risser 3, 18 patients were Risser 4 and 7 patients were Risser 5 at the time of the operation. With regard to the surgical approach, 18 patients had posterior spinal fusions, and 22 had anterior and posterior fusion.

Four of the 40 patients (10%) reported complications. One patient who experienced dysesthesia in the right lower extremity after surgery was referred for physical therapy and a transcutaneous electrical nerve stimulator unit. This symptom resolved by 3 months after surgery. In one patient, a superficial wound infection developed and was treated successfully with surgical debridement.

In another patient, a deep wound infection developed that required surgical removal of grafts; healing occurred without further complications. The fourth patient began to experience pain at the location of the lower cross-link approximately 6 months after surgery and underwent removal of the lower portions of the rods and three hooks on either side of the spine. In the latter two patients who required second procedures, the complications developed after their postoperative assessment by the orthopedic surgeons.

Because these two patients did not report complications until after the psychological evaluation, their data were included in the study. Thus, the four patients who experienced complications were included in the psychological follow up evaluation.

Patient satisfaction after scoliosis surgery

<i>Patient Satisfaction questionnaire</i>	1	2	3	4	5
	N (%)	N (%)	N (%)	N (%)	N (%)
1. I am satisfied with how my back and shoulders look.	(0)(0)	2 (5)	14 (35)	21 (52.5)	3 (7.5)
2. I like my physical appearance now.	(0)(0)	6 (15)	11 (27.5)	18 (45)	5 (12.5)
3. I am satisfied with how my scar looks.	1(2.5)	5 (12.5)	13 (32.5)	17 (42.5)	4 (10)
4. This surgery has improved my looks.	(0)(0)	2 (5)	15 (37.5)	14 (42.5)	6 (15)
5. I am disappointed that my back is still somewhat curved after the surgery.	(0)(0)	7 (17.5)	23 (57.5)	7 (17.5)	2 (5)
6. I think I look worse now than I did before having the surgery.	(0)(0)	1 (2.5)	32 (80)	6 (15)	(0)(0)
7. Overall satisfaction with cosmetic result of surgery.	(0)(0)	1 (2.5)	19 (47.5)	18 (45)	2 (5)

Table 2. Frequency distribution for items assessing postoperative patient satisfaction with the cosmetic surgical result.

*Patient satisfaction with the cosmetic result of surgery*

Of the 40 surgery patients who completed the post surgery questionnaire, 50% expressed overall satisfaction with the cosmetic result of surgery, 47.5% reported neutrality, and 2.5% reported dissatisfaction with postoperative cosmesis (Table 2, item 7). Specifically, 57.5% indicated that they liked their physical appearance after surgery, 27.5% reported neutrality, and 15% expressed dissatisfaction with their postoperative appearance (Table 2, item 2). Sixty percent reported either satisfaction or extreme satisfaction with the appearance of their back and shoulders (Table 2, item 1), 35% felt neutral, and 5% felt dissatisfied with the postoperative cosmesis. 46.5 % expressed satisfaction with the scar's appearance (Table 2, item 3), 32.5 % reported neutrality, and 15% reported dissatisfaction. 17.5 % reported no disappointment with the residual curve (Table 2, item 5), 57.5% felt neutral, and 22.5% expressed disappointment. 57.5 percent of patients agreed that the surgery improved their "looks" (Table 2, item 4); only 6 patients agreed with the state-

ment that surgery brought about a worse appearance than before the surgery (Table 2, item 6).

Patients receiving anterior and posterior fusion expressed significantly greater disappointment with the scar appearance than those receiving posterior fusions ( $P < 0.01$ , student's t test). However, patients receiving anterior and post fusions reported significantly greater satisfaction with the appearance of their back and shoulders than patients receiving posterior fusions ( $P < 0.005$ , student's t test).

This may be associated with the finding that anterior and posterior fusion patients had significantly smaller postoperative Cobb angles and significantly larger amounts of curve correction than posterior fusion patients ( $P < 0.001$ , student's t test).

The measures for King types I, II and V curves are listed with the Cobb angle of the upper curve on top and measure of the lower curve below it. The measures for King type V curves are the Cobb angles of upper and lower thoracic curves.

A relation appears to exist between dissatis-

<i>King type</i>	<i>No (%)</i>	<i>Preoperative mean</i>	<i>Postoperative mean</i>
Type I	1 (2.7)		
Type II	26 (70.3)	56.65	18.1349
Type III	7 (17.9)	52.2857	11.67
Type IV	3 (8.1)	60	4.041
Type V	0 (0)		

Table 3. Mean Cobb's angle measurements for the various curve types.

faction and classification of the curvature according to King et al [5]. A larger percentage of those patients who reported neutrality or dissatisfaction with the cosmetic result of surgery had King II or King IV curves. 15 of the 26 patients (57.5%) with King II curve were in the neutral/dissatisfied group, and 2 of the 3 patients (66.6%) with a King 4 curve were in the neutral/dissatisfied group ( Table 4).

### **Psychological Variables**

#### *Offer Self–Image Questionnaire*

Positive correlations existed between postoperative satisfaction with surgery and preoperative emotional stability ( $r = 0.51$ ,  $P < 0.001$ ), mental health ( $r = 0.49$ ,  $P < 0.01$ ), social functioning ( $r = 0.54$ ,  $P < 0.001$ ), self-confidence ( $r = 0.57$ ,  $P < 0.0001$ ), and total self-image ( $r = 0.49$ ,  $P < 0.01$ ). These correlations suggest that the better the psychological adjustment before surgery, the greater the patient satisfaction with the cosmetic result. Student's t test showed that patients in the neutral/dissatisfied group scored significantly lower than did satisfied/very satisfied patients on measure of emotional stability ( $P < 0.05$ ), mental health ( $P < 0.001$ ), social functioning ( $P < 0.05$ ), and total self-image ( $P < 0.05$ ) before surgery. Mean score for the neutral/dissatisfied group fell in the lower limit of the average range and indicate increased risk for psychopathologic conditions, problems peer relationships, and feeling of loneliness and isolation. Statistically significant difference between the neutral/dissatisfied group and the satisfied/very satisfied group on self-image scores were maintained at the 8-month follow-up period.

#### *Multidimensional Body-Self Relations Questionnaire*

No differences were found between neutral/dissatisfied patients and satisfied/very satisfied patients with regard to preoperative body satisfaction variables. However, after surgery neutral/dissatisfied patients were significantly less

King	Overall satisfaction			
	2	3	4	5
I	0	0	1	0
II	1	14	9	2
III	0	3	4	0
IV	0	2	1	0

Table 4. Correlation between overall satisfaction and King classification.

satisfied with their bodies especially the mid-torso (waist and stomach) and upper torso regions. (chest or breasts, shoulders, arms) than were the satisfied/very satisfied patients ( $P < 0.05$ , Student's t test). In addition, paired sample t test, comparing preoperative with postoperative result, showed significant decreases in satisfaction with the midtorso and upper regions for patients in the neutral/dissatisfied group ( $P < 0.05$ ). Because surgery mostly affects the midtorso and upper torso regions, these results corroborate their classification as "neutral or dissatisfied" patients.

#### *Preoperative Questionnaire*

Student's t test showed that patients in the satisfied/very satisfied group expressed more certainty about the desire for surgery ( $P < 0.05$ ). They anticipated greater satisfaction with their physical appearance after surgery ( $P < 0.05$ ) and believed the surgery would make their back stronger for recreational activities ( $P < 0.05$ ) than those in the neutral/dissatisfied group.

### **Discussion**

50% of patients expressed satisfaction with the postoperative appearance of their back after surgical correction of severe curve. Neutral or dissatisfied patients, with an otherwise satisfactory medical outcome, had identifiable differences in preoperative medical and psychological variables in comparison with their satisfied counterparts. Patients who underwent anterior and posterior fusion generally expressed more disappointment with the postoperative appearance of their scar but indicated greater satisfaction with their back and shoulders than did the

patients who underwent posterior fusion. Neutral or dissatisfied patients, in general, were more likely to be thin and have King II or King IV curve types than were satisfied patients. Likewise, dissatisfied female patients were also more likely to be younger in menarcheal age than their satisfied counterparts. Thus, the orthopedist should be particularly sensitive to thin girls who are premenarchal or have a younger menarchal status, because they may be particularly susceptible to dissatisfaction with the cosmetic outcome. Age and gender did not differ between patients who reported satisfaction with the surgical outcome and those who expressed neutrality or dissatisfaction; however preoperative and postoperative Cobb angles and percent curve correction were significant ( $P < 0.00$ ). These findings only partially corroborate those of Haher et al [4] who also reported percent of curve correction as unrelated to patient satisfaction.

Neutral or dissatisfied patients were more likely to report a history of sadness, anxiety, loneliness, problems with relationships, and negative self perception before surgery than satisfied patients. These patients did not expect satisfaction with their physical appearance after surgery and were less likely to expect that surgery would make their back stronger. They expressed more ambivalence about the desire for surgery and reported significant postoperative dissatisfaction with their midtorso and upper torso area in comparison with their satisfied counterparts.

Body satisfaction and self-image scores for the neutral or dissatisfied groups showed two subgroups of adolescents. The first subgroup had preoperative problems in social relationships, psychopathologic states, loneliness and isolation. Seventy-five percent of this subgroup expressed dissatisfaction with the cosmetic surgical result. Each body satisfaction rating was well below the normative mean before surgery. All except one reported increased feeling of attractiveness at the follow-up period. However,

those measures of self perceived attractiveness still fell below the normative mean, suggesting that they continued to perceive themselves as less attractive than their peers. This group contained adolescents with multiple coping problems and a more critical, negative view of themselves. Other studies have shown strong correlations between feeling of sadness and low body satisfaction in children and adults [6,7,8].

The second subgroup reported satisfaction with their physical appearance before surgery but then showed less body satisfaction at the follow up period, expressing neutrality with the cosmetic surgical result. On psychological assessment, they showed no adjustment problems before or after surgery. Whereas this group liked their physical appearance before surgery they hoped for substantially improved physical appearance after surgery.

They likely experienced disappointment as a result of unmet expectations regarding improvement in physical appearance.

The result of this study appears to be clinically useful in identifying barriers to postoperative satisfaction with spinal surgery. Referral for preoperative psychological evaluation may identify patients who are likely to be neutral or dissatisfied with the postoperative cosmesis after spinal surgery. Potential barriers to postoperative satisfaction, such as a history of psychological difficulties or unrealistic expectations about the likely cosmetic result, can be evaluated and addressed with the patient and family before surgery, possibly mitigating a negative reaction to surgery.

What can be done for patients who are likely to report neutrality or dissatisfaction with the postoperative cosmesis? Fortunately, adolescents with a history of psychological difficulties generally appear to benefit from improved feeling of attractiveness after spinal surgery, notwithstanding the lower than average rating of physical attractiveness at the postoperative assessment. These adolescents report neutrality or dissatisfaction with the surgical result, but

psychological intervention may help them cope with their postoperative recovery and reduce their anxiety and unhappiness.

For patients with unrealistic expectations, education regarding the likely surgical outcomes may improve the long-term postoperative course. Although not measured in this study, comments from these patients and their families at follow up indicate that the amount of reduced flexibility and the length of the scar surprised them. Gatchel et al reported that providing procedural and sensory information before surgery relieves psychological distress by giving the patient more control over the situation. Providing more detailed preoperative information about change in the appearance of the scar through the healing process and the potential for reduced back flexibility may diminish the magnitude of postoperative disappointment. Surgeons may also wish to discourage patients who desire surgery for mild to moderate curvature when they display preoperative physical and psychological characteristics associated with patient neutrality or dissatisfaction, and when the severity of the curvature does not threaten physical health.

This study was primarily concerned with patient satisfaction with cosmesis after surgical correction of adolescent idiopathic scoliosis. The limitation of this study includes the lack of a comparison group to determine whether adolescent with scoliosis differ from those without disease on the physical and psychological measures. Also, it cannot be said for certain whether the differences between preoperative and postoperative measures are attributable to surgery or simply to the passage of time. Future studies should include a healthy comparison group that is assessed on two occasions comparable to the patients undergoing surgery, using the same preoperative and postoperative measures. Preoperative and postoperative differences in the functional status of the back, and changes in patient-reported back pain, are potential areas of study for other investigators

wishing to pursue outcomes research in adolescent undergoing surgery for idiopathic scoliosis.

Orthopedists recommend surgical treatment for idiopathic scoliosis based on risk factors for progression and the conditions potentiality for detrimental effects on the patient's health. For the majority of patients, satisfaction with the cosmetic result appears to be an ancillary benefit to corrective spinal surgery, providing the surgeon with an additional incentive to correct severe curves. Orthopedists should be particularly cognizant of patient's body type, menarchal status, psychological functioning, and expectations regarding surgery when discussing the prospect of surgery with the patient and family. Some patients, however, will undoubtedly express neutrality or dissatisfaction with the cosmetic result, despite an otherwise satisfactory medical outcome.

Preoperative psychological evaluation effectively identifies those adolescents likely to report effectively or dissatisfaction with the cosmetic result of spinal surgery. Orthopedists should consider referral for preoperative psychological evaluation when spinal surgery becomes a likely treatment option for the correction of scoliosis. Orthopedists' initial identification and subsequent contact with potentially neutral or dissatisfied patients should focus on providing procedural and sensory information regarding surgery, setting realistic expectation regarding surgical outcome, and referring patients to an appropriate mental health professional for treatment when warranted. Surgeons may also consider discouraging spinal fusion surgery in patients likely to be neutral or dissatisfied when the severity of the curvature does threaten physical health.

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