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# The Use of Chewing Gum Postoperatively in Pediatric Scoliosis Patients Facilitates an Earlier Return to Normal Bowel Function

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## Abstract

**Purpose:** In surgical correction of scoliosis in pediatric patients, gastrointestinal complications including postoperative ileus can result in extended hospital stays, poorer pain management, slower progression with physical therapy, and overall decreased patient satisfaction. In patients undergoing gastrointestinal, gynecological, and urological surgery, gum chewing has been shown to reduce time to flatus and passage of feces. The authors hypothesized that chewing gum could also speed return to normal bowel function in pediatric patients undergoing surgical correction of scoliosis.

**Methods:** The researchers obtained institutional review board approval for a prospective, randomized, controlled trial. Eligible patients included all adolescent idiopathic scoliosis patients undergoing posterior spinal fusion. Exclusion criteria included previous gastrointestinal surgery or preexisting gastrointestinal disease. Patients were randomized by coin flip. The treatment group chewed sugar-free bubble gum 5 times a day for 20 to 30 minutes beginning on postoperative day 1; the control group did not chew gum. Patients were asked a series of questions regarding subjective gastrointestinal symptoms each day. Time to flatus and first passage of feces were recorded as indicators of return to normal bowel function. Normality of data was assessed using normal probability plots.

**Results:** A total of 83 patients completed the study (69 females and 14 males; mean age, 14.4 years). Of the 42 patients in the chewing gum group, 8 elected to stop chewing gum regularly before discharge for to a variety of reasons. Patients who chewed gum experienced first bowel movement on average 145.9 hours after surgery, 30.9 hours before those who did not chew gum ($p = .04$). Gum-chewing patients first experienced flatus an average of 55.2 hours after surgery, compared with 62.3 hours for controls. This trend did not reach statistical significance ($p = .12$). No difference was noted in duration of hospital stay, medications administered as required, or subjective symptoms.

**Conclusion:** Chewing gum after posterior spinal fusion for scoliosis is safe and may speed return of normal bowel function. Chewing gum after surgical correction of scoliosis facilitates an earlier return to normal bowel function, which may improve patient satisfaction in the early postoperative period.

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*Keywords:* Adolescent; Scoliosis; Complications; Gum

## Introduction

In pediatric patients undergoing posterior spinal instrumentation and fusion for adolescent idiopathic scoliosis, minor complications can result in extended hospital stays and decreased patient satisfaction. Postoperative ileus is known to occasionally occur after the surgical correction of scoliosis [1-4]. Gastrointestinal complications such as nausea, vomiting, constipation, and abdominal pain may also result in delaying postoperative recovery in this patient population. It has been theorized that ileus after scoliosis surgery may result from distraction of the innervation of the posterior peritoneum [1]. The physiologic stress of surgery, pain, narcotic pain medication, and electrolyte disturbances resulting from resuscitative fluids may also serve to delay the return to normal bowel function.

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In patients undergoing gastrointestinal, urologic, vascular, obstetric, and gynecological surgery, several studies and meta-analyses have shown the usefulness of gum chewing for reducing first time to flatus and passage of feces [5-19]. The act of chewing may: 1) serve as cephalic-vagal stimulation of the gastrointestinal tract [20]; 2) be a form of sham feeding stimulating bowel motility [21-23]; or 3) stimulate salivary and pancreatic secretions [22]. The action of hexitols in chewing gum also have been hypothesized to have a role in hastening return to normal bowel function [24]. Because of the enhanced bowel recovery reported with the use of chewing gum in multiple other surgical fields, the current authors hypothesized that chewing gum postoperatively in pediatric scoliosis patients would result in decreased gastrointestinal symptoms and an earlier return to normal bowel function.

Chewing gum is an inexpensive and well-tolerated dietary supplement that can serve as a simple and safe adjuvant for pediatric patients. The goal of this study was to observe whether there were differences in postoperative gastrointestinal symptoms and time to first flatus and bowel movement in patients who chewed gum postoperatively compared with those who did not.

## Materials and Methods

This prospective randomized study received approval from the institutional review board. From July 2009 to July 2013, patients aged 10 to 19 years were enrolled to participate in the study. Patients were prospectively enrolled at a tertiary pediatric hospital and were scheduled to undergo posterior spinal instrumentation and fusion by 1 of the 4 attending pediatric orthopedic surgeons on staff (all co-authors of this article). All patients had adolescent idiopathic scoliosis and elected to undergo posterior spinal instrumentation and fusion for correction of scoliosis.

Patients were randomized to 2 groups: one that chewed gum for 15 to 30 minutes 5 times a day beginning on postoperative day 1, and a control group that did not chew gum postoperatively. Patients were randomized by the flip of a coin. Table 1 lists inclusion and exclusion criteria. The chewing gum used in this study was bubble gum–flavored and sugar-free. The senior author of this study purchased the gum was purchased and provided it to patients randomized to the chewing gum group on the first day of their postoperative course.

Beginning on postoperative day 1, patients reported daily scores from 1 to 10 rating abdominal discomfort and nausea. Patients were instructed to report the time of first flatus and first bowel movement. Many patients did not have a bowel movement while inpatient and were followed up with a phone call to report the first time they had a bowel movement.

Residents and attending physicians taking care of patients were encouraged to treat all patients in the study in the same manner as they would patients who were not involved in a study. Therefore, participation in this study was not to preclude any scheduled or as-needed medications (PRN) that may relieve a patient's pain or gastrointestinal symptoms, including pain medications, anxiolytics, muscle relaxants, stool softeners, enemas, bowel stimulants, and antiemetics. All patients were allowed to advance to general diet as tolerated at their own pace and had several meal options available to them.

Table 1
Inclusion and exclusion criteria.

| Inclusion criteria | Exclusion criteria |
|---|---|
| Must meet criteria for surgical correction of scoliosis | Neuromuscular scoliosis |
| Must possess mental capacity to understand purpose of the study | Anterior or combined approach |
| Patient must carry diagnosis of adolescent idiopathic scoliosis | Inability to chew gum safely (oropharyngeal or airway concerns) |
| Surgery must be performed via posterior approach | History of gastrointestinal surgery (gastrostomy tube, fundoplication, ostomy, etc) |

Data including operative time, estimated intraoperative blood loss, and segments fused were obtained from the anesthesia record and operative report. The nursing record was accessed to obtain information regarding medications administered during the hospitalization.

In addition, patients and their families randomized to the chewing gum group were given the opportunity to opt out of the chewing gum group if at any time they felt they did not enjoy chewing the gum or that adhering to the guidelines set for regular chewing of gum interfered with their postoperative recovery. Patients who opted out were still followed up as regular participants to observe whether chewing gum postoperatively provided a positive effect on reducing postoperative gastrointestinal symptoms.

The researchers used the SPSS Statistics Version 22 (IBM, Armonk, New York) software program for statistical analysis. Normality of data was accessed using normal probability plots. Because no major deviations from normality were observed, outcomes for the 2 treatments were compared using the 2-sample t test assuming unequal variance. Chi-square test was used to compare proportions between groups. All p values were compared at a .05 significance level.

## Results

A total of 83 patients participated in the study. Forty-two patients were randomized to chew gum and 41 were randomized to the control group that did not chew gum. Tables 2 and 3 list demographic and operative data of each study group, respectively. No significant differences demographically or intraoperatively were noted between groups. There was no difference in the number of patients in each group who had fusions extending into the lumbar spine.

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