

Effect of Gum-chewing on the Movement of Intestines after Abdominal Resection and Length of Hospital Stay

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Abstract

Background and Objectives: Postoperative ileus is common after abdominal resection. It causes gas store, distention, nausea, vomiting, and even pain. This study examines the impact of gum chewing as a type of sham feeding on the duration of postoperative ileus.

Methods: In this randomized control trial study, 70 patients in two groups (each group n = 35) underwent abdominal resection. The A group chewed sugarless gum three times (each time 20 minutes) in 4, 10, and 18 hours after discharge on operation room. Both groups were matched in terms of demographics, intraoperative and postoperative care data. The data regarding the first passage of flatus, defecation and bowel sound in every two hours for each patient were completed in questioning. With esthetes cop muse ring each two hours. T-test was used for comparison of the means.

Findings: The initial bowel sound began at 3 ± 1.3 and 2.8 ± 1.3 hours after operation in the gum and control groups, respectively. No significant difference was found between the two groups. Furthermore, gas passing has been reported at 18.3 ± 10.5 and 36.28 ± 12.6 hours after operation in gum and control group respectively. The first defecation was an accident at 36.8 ± 21.7 and 69.5 ± 19.2 hours after operation in gum and control groups, respectively ($P = 0.001$).

Conclusions: This study indicates that gum-chewing in the immediate postoperative period helps to enhance movement of intestines and facilitates recovery from ileus following abdominal resection. This inexpensive and well-tolerated treatment also results in earlier hospital discharge.

Keywords: Gum-chewing, Mastication, Postoperative care, Ileus, Abdominal resection, Defecation

Background and Objectives

Postoperative ileus (POI) is a form of gastrointestinal dysfunction that commonly occurs after abdominal surgery and results in the absent or delayed gastrointestinal motility. POI is hypothesized to be the body's sympathetic-induced response to overstimulation and stress imposed by large abdominal incisions, extensive manipulation of the bowel, and section of abdominal lesions [1-4]. It is a major health care problem and an important cause of prolonged hospital stay [5]. Its economic consequences in the US health care system are estimated to surpass \$1 billion [6]. Previous studies reported the rates of ileus ranging from

26% to 31% in a heterogeneous population [7].

After abdominal resection, there is a period of time for most patients before normal intestinal function returns. The stress of surgery, pain, and bowel paralysis all contribute to this delay. Prolonged delay in bowel function (ileus) may lead to lengthened hospital stay, hospital-acquired infections or complications, and pulmonary compromise. Patients with postoperative ileus have symptoms of pain, distention, and emesis. Treatment including nasal gastric tube decompression, as well as fluid and electrolyte replacement; analgesia may be required. As a result, the lengthened hospitalization resulted from ileus may lead to increased health costs [8].

Postoperative ileus can cause the accumulation of secretions and gas, resulting in nausea, vomiting and abdominal distension and pain. Prolonged paralytic

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Table 1 Patients' Demographic Characteristics and Surgery Types

Characteristic	Gum group (n=35)		Control group (n=35)	
	Number	%	Number	%
Sex				
Male	19	54.3	19	54.3
Female	16	45.7	16	45.7
Type of surgery				
Appendectomy	23	65.7	23	65.7
Cholecystectomy	12	34.3	12	34.3

ileus is one of the most common reasons for delayed recovery and discharge from hospital following abdominal surgery. Advances in surgical techniques and per-operative management such as the use of laparoscopic surgery, thoracic epidural analgesia, early postoperative feeding and mobilization, amongst others, have been shown to help in the resolution of postoperative ileus [9-10].

Chewing something also is a kind of sham feeding that has been reported to stimulate bowel motility in humans [11-12]. Gum-chewing in the present study

was studied for its effect on the patients with abdominal surgery.

Methods

Patients and Study Design

This study was a randomized prospective trial. Patients eligible for participation were those who were scheduled for elective abdominal resection for recurrent appendectomy and cholecystectomy and those who consented preoperatively to participate in this study. A randomized

Table 2 Effects of Gum-chewing on Recovery from Postoperative Ileus

Characteristic	Gum group (n=35)		Control group (n=35)		Significance of Difference
	Mean	SD	Mean	SD	
Appendectomy					
Time to first bowel sound (h)	2.08	0.41	3.13	1.45	0.003
Time to first passage of flatus (h)	11.91	10.77	29.21	12.11	0.001
Time to first defecation (h)	26.86	14.59	50.08	13.92	0.001
Length of hospital stay (h)	44.86	13.15	53.21	12.44	0.032
Cholecystectomy					
Time to first bowel sound (h)	3.00	1.04	2.83	1.33	0.737
Time to first passage of flatus (h)	18.33	10.5	36.16	12.60	0.001
Time to first defecation (h)	36.83	21.78	69.5	19.22	0.001
Length of hospital stay (h)	51.83	17.44	92.83	40.31	0.006
Total					
Time to first bowel sound (h)	2.40	0.81	3.02	1.40	0.026
Time to first passage of flatus (h)	14.11	10.97	31.60	12.55	0.001
Time to first defecation (h)	30.29	17.73	56.74	18.28	0.001
Length of hospital stay (h)	47.25	14.88	66.8	31.46	0.002

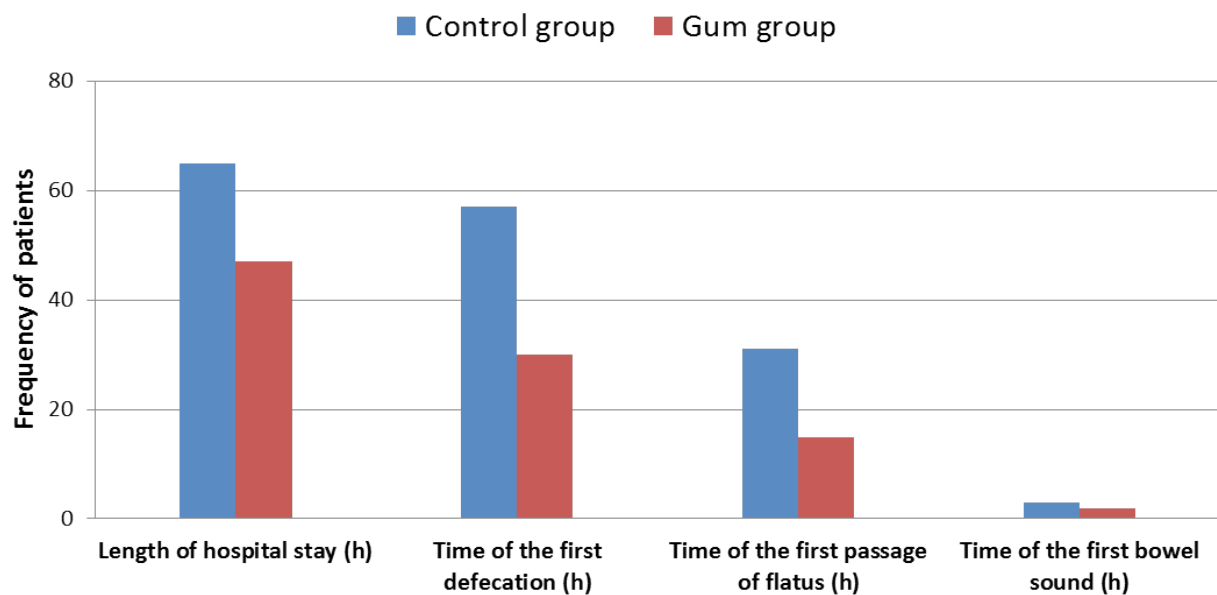


Figure 1 A comparison between the time of the first bowel sound, passage of flatus, defecation, and the length of hospital stay after surgery between the two groups

Card-pull design was adopted. Following the informed consent, the patients were randomly assigned into two groups (group A or gum and group B or non-gum) after their operation. The patients in group A were given gum three times. Every gum-chewing period took 20 minutes and they were performed in 4, 10 and 18 hours after discharging from the operation room. The patients in group B, however, were kept "nil by mouth" in this period. Demographics, intra-operative and postoperative care data were equivalent between the two groups. The data re-sending the first passage of flatus, defecation and bowel sound in every 2 hours for each patient were completed in questioning.

Data Analysis

Statistical analysis for continuous variables was performed using *t-test*. Statistical significance was considered at the level of $P < 0.05$ for all compared variables. SPSS Version 18 Software was used for statistical analyses.

Results

A total of 70 patients participated in the present study. Thirty-five patients were randomized to the non-gum chewing group and 35 patients were in the gum chewing group. There were no significant differences between the two groups in terms of age, sex, indications for surgery, or previous surgeries (surgery history) (Table 1). Intra-operative findings and postoperative course were also

not different between the two groups. The type of postoperative analgesia was chosen by the attending surgeons' practice. No significant difference was seen in the amount of parenteral narcotics received between the two groups. All gum-chewing patients completed their course of gum chewing until bowel function. All gum-chewing patients tolerated the gum. Mobilization for all patients began on the first postoperative day. The first bowel sound was at 2.4 postoperative hours in the gum-chewing group and at 3.02 postoperative hours in the non-gum group. The first passage of flatus was seen at 14.1 postoperative hours in the gum-chewing group and at 31.6 postoperative hours in the non-gum group. The first defecation in the gum-chewing group was reported at 30.2 postoperative hours and at 56.7 postoperative hours in non-gum group. No surgical complications were found in the two groups. The total length of hospital stay was shorter in the gum-chewing group (47.25 hours) than in the non-gum group (66.80 hours) ($P = 0.002$) (Table 2).

The results showed that the average operation time was going to hear hours of the intestine in the control group is less than but gas passage of stool and control group were almost uniformly increases as compared with control group less (Figure 1).

Discussion

Despite the widespread use of chewing gums for both hedonistic and therapeutic purposes, quantitative descriptions of chewing activity, load and possible side effects

with different types of gums are generally scarce.

The present study documents a further advance in postoperative management of abdominal surgery. Our data show a beneficial effect of gum chewing in terms of shorter mean time intervals to normal intestinal sounds (2.4 versus 3.02 hours), passage of flatus (14.11 versus 31.6 hours), first defecation (30.29 versus 56.74 hours), and length of hospital stay (47.25 versus 66.8 hours). Interestingly, the time intervals to passage of flatus or defecation in the present study are generally shorter in comparison with those reported with gum chewing or early entreat feeding after abdominal surgery in previous studies [13].

Sham feeding and the action of chewing stimulate bowel motility by a cephalic-vagal mechanism and have been shown to increase levels of neural and humoral factors that subsequently increase function in several different segments of the gastrointestinal tract [13-16]. Early postoperative feeding may stimulate bowel motility [17]. However, many patients fed early after colostomies do not tolerate this. Gum chewing was shown to enhance bowel function after laparoscopic colostomy [18] and sigmoid colostomy [19] and after surgery for colorectal cancer [20], but open colostomy for left-sided colon and rectal cancer did not conform [21].

Purkayastha *et al.* (2010) investigated effect of chewing gum on return to normal bowel function after colectomy in a Meta-analysis of randomized trials. They found a decrease in time to first flatus and bowel movement. However, the decrease in length of hospital stay was not statistically significant. Since time to return to normal bowel function (first flatus or bowel movement) often determines the length of hospital stay, one would also expect to see a significant decrease in the latter's outcome. The results of Meta-analysis showed that only 4 of 5 trials measured the length of hospital stay, and although the observed reduction was not statistically significant, such differences would be clinically important. Because lengthened hospital stay can be associated with more clinical complications, and any decrease in the length of hospital stay could benefit both patients and institutions [22].

Conclusions

In conclusion, this study failed to show that gum chewing on its own facilitated early recovery from postoperative ileus in the patients undergoing open left-sided colorectal resection for malignancy. However, gum chewing did offer an improved sense of general well-being for the patients who used it postoperatively. We

conclude that gum chewing early in the postoperative period following elective partial sigmoid colon resections hastens time to bowel motility and ability to tolerate feedings. This inexpensive and well-tolerated treatment results in earlier hospital discharge.

Abbreviations

(POI): postoperative ileus

Competing Interests

The authors declare no competing interests.

Authors' Contributions

AAA designed the study, coordinated study procedure, and contributed to interpretation of study results. KY participated in data collection and analysis. NB undertook statistical analysis of the collected data and participated in interpretation of the results. MN collaborated in data collection and provided the required facilities.

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