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Effects of Gum Chewing on Post-Operative Ileus, Specifically Focusing on the Time Taken by the Patients to Pass Flatus After Their Ileostomy Reversal

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ABSTRACT

Background: Postoperative ileus after ileostomy reversal commonly delays recovery of gastrointestinal motility and prolongs hospitalization. Sham feeding through gum chewing may stimulate vagal activity and gastrointestinal hormone release, potentially accelerating bowel function recovery. Objective: To evaluate the effect of postoperative gum chewing on time to first passage of flatus after ileostomy reversal. Methods: This randomized controlled trial was conducted at the General Surgery Department, Unit-I, Lahore General Hospital, Lahore, from June 23, 2022, to December 23, 2022. Seventy patients aged 13–65 years undergoing ileostomy reversal for typhoid or tuberculous peritonitis were randomized into two groups (n=35 each). Group A received standard postoperative care without gum chewing, while Group B chewed gum for 30 minutes every 6 hours starting 6 hours after surgery. The primary outcome was time from surgery completion to first passage of flatus; secondary outcomes included length of hospital stay and duration of surgery. Results: Mean time to first flatus was significantly shorter in Group B than Group A (20.53±9.53 vs 33.27±19.47 hours; p<0.001), with an absolute mean reduction of 12.74 hours (95% CI −20.03 to −5.45). Hospital stay was also reduced (4.40±1.03 vs 5.68±1.07 days; p<0.001), while surgery duration did not differ significantly (p=0.566). Conclusion: Postoperative gum chewing significantly reduced time to first flatus and shortened hospital stay after ileostomy reversal, supporting its use as a safe and inexpensive adjunct to enhance postoperative recovery.

Keywords

Abdominal surgery, chewing gum, gastrointestinal motility, ileus, ileostomy reversal, peritonitis.

INTRODUCTION

Postoperative ileus (POI) is a frequent and clinically important consequence of abdominal surgery, characterized by a transient inhibition of coordinated gastrointestinal motility that delays oral intake, causes patient discomfort, increases the need for supportive care, and prolongs hospitalization (1,5). Although POI is often self-limiting, its persistence is associated with increased morbidity and health-care costs, and remains a key barrier to enhanced recovery protocols (1,6). The burden may be particularly relevant after ileostomy reversal, where prior intra-abdominal inflammation and surgical manipulation can predispose patients to delayed bowel function, especially in those who initially underwent laparotomy for generalized peritonitis (2,4). Patients requiring stoma formation for infectious etiologies such as typhoid ileal perforation or tuberculous peritonitis often represent a subgroup with substantial peritoneal contamination, adhesiogenic inflammatory responses, and repeat exposure to bowel handling at the time of reversal, thereby increasing the likelihood of postoperative gastrointestinal dysmotility (2–4).

Contemporary strategies aimed at reducing POI include technical refinements to minimize bowel trauma, early removal of nasogastric tubes, opioid-sparing analgesia, early mobilization, and early resumption of oral feeding when appropriate (8,9). Nevertheless, despite these measures, POI continues to occur at clinically relevant rates in abdominal surgery and remains incompletely preventable, particularly in resource-constrained environments where standardized enhanced recovery pathways may not be uniformly implemented (5–9). This has encouraged interest in low-cost, non-pharmacological interventions that can complement routine postoperative care and accelerate gastrointestinal recovery without increasing risk.

Chewing gum has gained attention as a form of "sham feeding" that stimulates the cephalic phase of digestion, enhancing vagal activation and promoting gastrointestinal hormone secretion, thereby potentially improving intestinal motility (10,17). Evidence from trials across multiple surgical disciplines suggests that postoperative gum chewing may reduce the time to first flatus and shorten hospital stay, including after colorectal procedures and other gastrointestinal operations (13,16,17). A Cochrane review reported that gum chewing reduced time to first flatus following colorectal surgery by approximately half a day, supporting a clinically meaningful benefit with minimal harm (17). More recent systematic reviews and meta-analyses continue to suggest a favorable effect on bowel function recovery, although the magnitude of benefit varies across procedures and settings (12,16). Importantly, although a randomized trial has previously demonstrated improved postoperative gastrointestinal recovery following ileostomy reversal with gum chewing, the generalizability of these findings to different clinical environments, perioperative practices, and etiologic subgroups remains uncertain (13).

In Pakistan, ileostomy formation remains a common management approach for severe infectious peritonitis, and ileostomy reversal constitutes a significant surgical workload. However, locally generated evidence evaluating gum chewing specifically after ileostomy reversal—using clearly defined recovery endpoints such as time to first passage of flatus—remains limited, despite the attractiveness of this intervention as an inexpensive adjunct to routine postoperative care (18,19). Therefore, the present randomized controlled trial was designed to evaluate whether postoperative gum chewing reduces POI following ileostomy reversal, with the primary focus on the time from surgery to first passage of flatus. We hypothesized that gum chewing initiated early in the postoperative period would significantly reduce the time to first flatus compared with standard care alone, thereby contributing to earlier recovery and shorter hospitalization.

MATERIALS AND METHODS

This randomized controlled trial was conducted in the General Surgery Department, Unit-I, Lahore General Hospital, Lahore, Pakistan, from June 23, 2022 to December 23, 2022. Patients of either gender aged 13 to 65 years who previously underwent ileostomy formation for typhoid or tuberculous peritonitis (confirmed by biopsy report) and were planned for ileostomy reversal were assessed for eligibility. Patients were required to have no distal obstruction on loopogram prior to reversal. Individuals with malignancy, evidence of distal mechanical obstruction, or any condition that precluded safe gum chewing or could independently mandate prolonged postoperative bowel rest were excluded.

After institutional ethical approval and written informed consent, a total of 70 eligible patients were recruited from the outpatient clinic and admitted for planned ileostomy reversal. Preoperative baseline characteristics including age, gender, weight, comorbidities, and etiology of peritonitis were recorded on a predesigned proforma. Patients were kept nil per os for at least 6 hours prior to surgery. All procedures were performed by a single surgical team using a standardized technique: ileostomy reversal with a single-layer extramucosal interrupted hand-sewn anastomosis. Standard postoperative care was provided to both groups, and patients were monitored for return of bowel function.

Participants were randomly allocated into two equal groups (1:1). Randomization was performed using a lottery method after enrollment. Group A (control) received standard postoperative care without gum chewing. Group B (intervention) received standard postoperative care plus postoperative gum chewing starting 6 hours after surgery; patients were instructed to chew gum for 30 minutes every 6 hours in the postoperative period until passage of first flatus. The primary outcome was time to first passage of flatus, operationalized as the duration in hours from completion of surgery to the first passage of flatus. To improve measurement consistency, patients were counseled preoperatively to inform the doctor on duty immediately upon passing flatus; the reported time was recorded contemporaneously. Secondary outcomes included length of hospital stay in days (from surgery to discharge) and duration of surgery in hours.

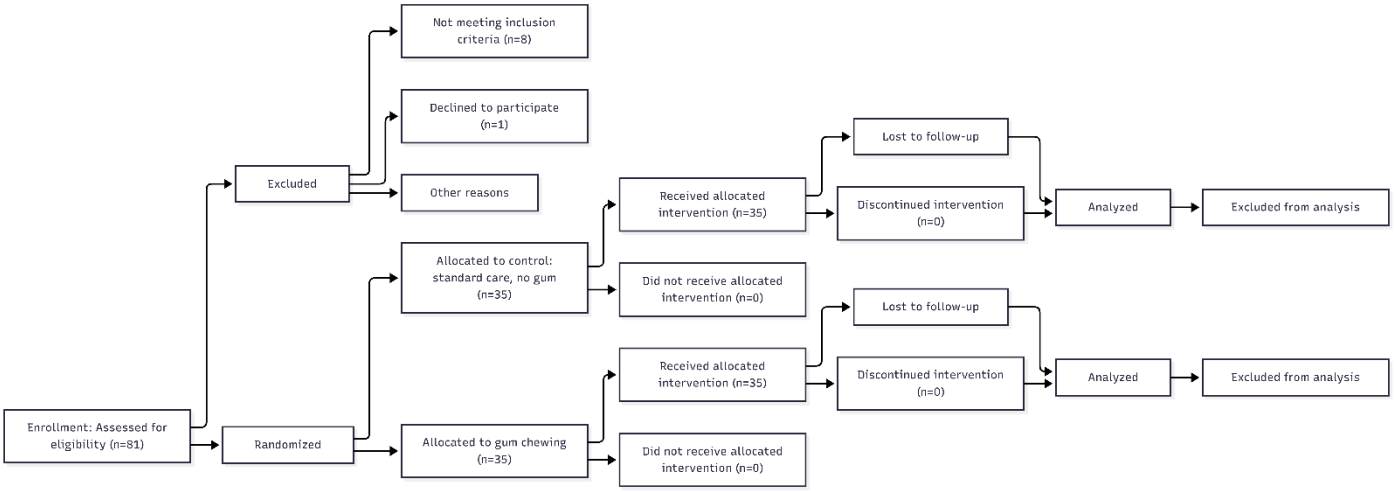

Figure 1 CONSORT Flow Chart

The sample size was calculated with an 80% power and 95% confidence level, based on expected differences in time to pass flatus between gum chewing and control groups derived from previous evidence (13). Statistical analysis was performed using SPSS version 26. Continuous variables were summarized as mean ± standard deviation and categorical variables as frequency and percentage. Between-group comparisons for continuous outcomes were conducted using an independent sample t-test, while categorical variables were compared using chi-square tests, with Fisher's exact test applied where expected cell counts were small. Stratified comparisons of the primary outcome were performed by age group (≤40 and >40 years), gender, and etiology of peritonitis (tuberculosis vs typhoid). A p-value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 70 patients were included, with 35 allocated to Group A (control) and 35 to Group B (gum chewing). Baseline demographic and clinical characteristics were comparable between the groups. The mean age was 38.28 ± 14.76 years in Group A and 33.03 ± 13.72 years in Group B (p = 0.127). Males constituted 62.9% of Group A and 77.1% of Group B (p = 0.192). Mean body weight was similar between groups (56.74 ± 8.57 kg vs 55.31 ± 10.01 kg; p = 0.524). Tuberculous peritonitis was present in 45.7% of Group A and 31.4% of Group B, whereas typhoid peritonitis accounted for 54.3% and 68.6% respectively (p = 0.220).

Table 1. Baseline Demographic and Clinical Characteristics (n = 70)

Variables	Group A (n = 35)	Group B (n = 35)	p-value
Age (years), mean ± SD	38.28 ± 14.76	33.03 ± 13.72	0.127[a]
Gender, n (%)			0.192[b]
• Male	22 (62.9)	27 (77.1)	

Variables	Group A (n = 35)	Group B (n = 35)	p-value
• Female	13 (37.1)	8 (22.9)	
Weight (kg), mean ± SD	56.74 ± 8.57	55.31 ± 10.01	0.524[a]
Comorbidities, n (%)			
• Diabetes mellitus	15 (42.9)	14 (40.0)	0.808[b]
• Hypertension	22 (62.9)	19 (54.3)	0.467[b]
• Ischemic heart disease	2 (5.7)	4 (11.4)	0.673[b]
• Chronic kidney disease	4 (11.4)	0 (0.0)	0.114[c]
Etiology of peritonitis, n (%)			0.220[b]
• Tuberculosis	16 (45.7)	11 (31.4)	
• Typhoid	19 (54.3)	24 (68.6)	

Notes: [a] Independent sample t-test; [b] Chi-square test; [c] Fisher's exact test (due to small cell counts). SD = standard deviation. $p \leq 0.05$ considered significant.

Both groups were broadly comparable at baseline. Although Group A was older by 5.25 years on average (38.28 vs 33.03 years), this difference was not statistically significant (p = 0.127). Male predominance was observed in both arms (62.9% vs 77.1%), and mean body weight differed by only 1.43 kg (p = 0.524). The distribution of etiologic diagnosis was also similar, with typhoid peritonitis representing the larger share in both groups (54.3% in Group A vs 68.6% in Group B), supporting overall baseline comparability.

Patients receiving gum chewing achieved earlier recovery of bowel function as measured by time to first flatus. Mean time to first flatus was 33.27 ± 19.47 hours in Group A versus 20.53 ± 9.53 hours in Group B (p < 0.001). This corresponds to an absolute mean reduction of 12.74 hours, with a 95% confidence interval (CI) of −20.03 to −5.45 hours. Hospital stay was also significantly shorter in the gum chewing group (4.40 ± 1.03 vs 5.68 ± 1.07 days; p < 0.001), with an absolute mean reduction of 1.28 days (95% CI −1.78 to −0.78 days). Mean duration of surgery did not differ significantly (2.40 ± 3.18 vs 2.83 ± 3.13 hours; p = 0.566).

Table 2. Comparison of Postoperative Outcomes Between Groups (n = 70)

Outcome	Group A (n = 35) mean ± SD	Group B (n = 35) mean ± SD	Difference	95% CI for Mean Difference	p-value
Hospital stay (days)	5.68 ± 1.07	4.40 ± 1.03	−1.28	−1.78 to −0.78	<0.001
Duration of surgery (hours)	2.83 ± 3.13	2.40 ± 3.18	−0.43	−1.93 to 1.07	0.566
Time to first flatus (hours)	33.27 ± 19.47	20.53 ± 9.53	−12.74	−20.03 to −5.45	<0.001

Notes: Independent sample t-test used. Mean difference shown as (Group B − Group A); negative values favor gum chewing (shorter duration). CI = confidence interval; SD = standard deviation.

Gum chewing was associated with a clinically and statistically meaningful acceleration of bowel recovery. Patients in Group B passed flatus approximately 12.7 hours earlier than controls (20.53 vs 33.27 hours), and the confidence interval indicated that the true effect plausibly ranges from about 5.4 hours to 20.0 hours earlier, supporting robust clinical benefit. In parallel, the intervention reduced length of stay by 1.28 days, with a relatively narrow confidence interval (−1.78 to −0.78 days), suggesting a consistent benefit on discharge timing. Surgical duration was comparable, indicating that differences in postoperative recovery were unlikely to be explained by operative time alone.

Stratified comparisons demonstrated that gum chewing reduced time to first flatus in most strata, with statistically significant differences in younger patients (≤40 years), older patients (>40 years), male patients, and typhoid peritonitis subgroup. In females and tuberculous peritonitis subgroup, the reductions remained numerically favorable but did not reach statistical significance.

Table 3. Stratified Comparison of Time to First Flatus (hours)

Stratification Variable	Category	Group A mean ± SD	Group B mean ± SD	p-value
Age (years)	≤40	26.79 ± 11.08	20.24 ± 9.77	0.037
	>40	43.00 ± 25.16	21.38 ± 9.29	0.009
Gender	Male	33.03 ± 19.08	20.31 ± 9.68	0.004
	Female	33.69 ± 20.89	21.28 ± 9.56	0.133
Etiology of peritonitis	Tuberculosis	38.56 ± 23.42	24.41 ± 12.74	0.081
	Typhoid	28.83 ± 14.61	18.76 ± 7.29	0.011

The effect of gum chewing was particularly pronounced among patients aged >40 years, where mean time to first flatus decreased from 43.00 hours in controls to 21.38 hours in the gum chewing group (p = 0.009), representing an approximate reduction of 21.6 hours. In younger patients (≤40 years), the improvement was smaller but still significant, with reduction from 26.79 to 20.24 hours (p = 0.037). Among males, gum chewing reduced the mean time to flatus by roughly 12.7 hours (33.03 vs 20.31; p = 0.004). In females, the mean difference was similar in direction (33.69 vs 21.28 hours) but did not achieve statistical significance (p = 0.133), likely reflecting reduced subgroup power. Etiology-wise, the intervention significantly improved recovery in typhoid peritonitis (28.83 vs 18.76 hours; p = 0.011) and showed a favorable trend in tuberculous peritonitis without statistical significance (38.56 vs 24.41 hours; p = 0.081).

DISCUSSION

Postoperative ileus remains one of the most frequent and clinically consequential sequelae of abdominal surgery, contributing to delayed enteral tolerance, patient discomfort, prolonged hospitalization, and increased health-care costs (1,5,6). Although enhanced recovery pathways emphasize opioid-sparing analgesia, early mobilization, early nasogastric tube removal, and timely resumption of feeding, POI continues to occur with clinically relevant frequency, particularly in patients undergoing repeat abdominal interventions such as ileostomy reversal after infectious peritonitis (8,9). The present randomized controlled trial demonstrates that postoperative gum chewing initiated six hours after ileostomy reversal

significantly accelerated bowel function recovery, as indicated by time to first flatus, and was associated with a meaningful reduction in length of hospital stay. Specifically, patients in the gum-chewing group passed flatus approximately 12.7 hours earlier than controls, with a corresponding reduction in postoperative hospitalization of 1.28 days, indicating that this low-cost intervention may offer tangible clinical and operational benefits in routine surgical care.

The observed improvement in bowel recovery is biologically plausible and consistent with the proposed mechanism of sham feeding. Chewing gum activates the cephalic phase of digestion through vagal stimulation and triggers secretion of gastrointestinal hormones and neuropeptides that enhance peristalsis, thereby potentially restoring coordinated gastrointestinal motility earlier in the postoperative period (10,17). This mechanistic rationale has supported widespread interest in gum chewing as a non-pharmacological adjunct to prevent or reduce POI, especially in settings where pharmacologic prokinetic strategies may be limited, inconsistent, or associated with adverse effects (6,8,9). Importantly, gum chewing carries minimal risk, requires no specialized equipment, and can be implemented without disrupting standard postoperative pathways, making it particularly attractive for resource-constrained environments.

Our findings align with the international evidence base demonstrating that gum chewing reduces time to first flatus and may shorten hospital stay after gastrointestinal surgeries. Bhatti et al. previously reported substantial benefit of gum chewing following ileostomy reversal, with earlier passage of flatus in the intervention arm compared with controls, supporting the applicability of this approach to postoperative stoma-reversal patients (13). Evidence from systematic reviews and meta-analyses also indicates that gum chewing reduces time to first flatus and overall recovery time across colorectal and broader gynecologic surgical procedures, and a Cochrane review similarly demonstrated a reduction in time to first flatus following colorectal surgery (12,16,17). The magnitude of effect observed in our study is clinically meaningful: a reduction of approximately half a day in gastrointestinal recovery can translate into earlier initiation of oral intake, improved patient comfort, and downstream impacts on discharge planning and bed turnover, which are particularly relevant for high-volume public sector hospitals.

The stratified analysis suggested that gum chewing was associated with shorter time to first flatus across most subgroups and was statistically significant in patients aged ≤40 years and >40 years, in male patients, and among those with typhoid-related peritonitis. The effect appeared numerically favorable but not statistically significant in female patients and in those with tuberculous peritonitis. These findings should be interpreted with caution, as subgroup analyses reduce power and increase the risk of chance findings due to multiple comparisons. Nonetheless, the consistency of direction across strata suggests that the intervention effect is likely robust and not limited to a single demographic or etiologic subgroup, while highlighting that larger multicenter trials would be needed to formally assess effect modification by sex or etiology. Notably, the reduction observed among patients aged >40 years is particularly relevant because older age is often associated with slower gastrointestinal recovery and higher vulnerability to postoperative complications, making early recovery interventions especially valuable in this subgroup (5,6).

This study has several limitations that should be acknowledged. First, although randomization was performed, this was a single-center trial, which may limit external generalizability to settings with different perioperative protocols or patient profiles. Second, blinding was not feasible for participants due to the nature of the intervention, and the primary outcome relied on patient-reported flatus passage, which may be subject to reporting bias. However, preoperative counseling and contemporaneous recording by the physician on duty were used to reduce misclassification. Third, perioperative factors that influence gastrointestinal recovery—such as opioid consumption, mobilization timing, and feeding protocols—were not analyzed in detail and could contribute residual confounding, although both groups were managed under the same institutional practices. Fourth, the subgroup comparisons were exploratory and not adjusted for multiple testing; therefore, these findings should be considered hypothesis-generating rather than confirmatory. Despite these limitations, the consistent and statistically significant differences in the primary outcome and hospital stay, combined with the low-risk nature of gum chewing, support the practical relevance of the findings.

From an implementation perspective, gum chewing can be incorporated as a routine postoperative intervention after ileostomy reversal with minimal cost and minimal burden on nursing or medical staff. Its potential benefit extends beyond patient comfort to measurable reductions in hospitalization duration, which may improve surgical unit capacity and reduce institutional costs. Future research should focus on multicenter trials with standardized enhanced recovery elements, prespecified subgroup analyses, measurement of opioid exposure, and reporting of adverse effects and adherence, to better define the optimal gum-chewing protocol and confirm its effectiveness across diverse clinical settings (1,6,8,9,17).

CONCLUSION

Postoperative gum chewing initiated early after ileostomy reversal was associated with a significant reduction in time to first passage of flatus and a shorter postoperative hospital stay compared with standard care alone, supporting its role as a safe, inexpensive, and easily implementable adjunct to accelerate gastrointestinal recovery and reduce the burden of postoperative ileus in patients undergoing ileostomy reversal.

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