

# A Prospective Randomised Study of Effectiveness of Chewing Gum on Post-Operative Ileus among the Patients who have Undergone Abdominal Surgery

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## How to cite this article:

Shilpa H, Dayananda R, Shreeniketan Nayak et al. A Prospective Randomised Study of Effectiveness of Chewing Gum on Post-Operative Ileus among the Patients who have Undergone Abdominal Surgery. *New Indian J Surg.* 2019;10(1):83-89.

## Abstract

**Context:** Postoperative ileus limits early hospital discharge for patients who had undergone abdominal surgery. Literature indicates that chewing gum is evaluated as a convenient method to enhance recovery from postoperative ileus after abdominal surgery. **Aims:** To evaluate the efficacy of chewing gum on post-operative ileus among the patients of abdominal surgery. **Settings and Design:** Prospective randomized interventional study. **Methods and Material:** Patients were assigned randomly to one of two groups of each procedure depending on condition of the patient. Interview schedule and checklist were used to assess the bowel sounds, passage of first flatus, passage of stool and return of appetite. The patients in the study group as per planned protocol were administered chewing gum three times a day for 30 min starting from the time patient become conscious till the onset of one of the primary endpoints. The patients are allowed to chew the gum even with Ryle's tube. **Statistical analysis used:** Data was analysed using IBM SPSS version 22 software with Chi-square test used for test of significance. **Results:** The mean duration of return of first bowel sounds, the passage of first flatus and return of appetite was significantly shorter in the study group as compared to the control group as per tests of statistical significance. **Conclusions:** It is concluded that use of chewing gum in the postoperative period is a safe and cheap method to stimulate bowel motility and reduce the postoperative ileus after abdominal surgery.

**Keywords:** chewing gum; bowel motility; postoperative ileus.

## Introduction

Postoperative ileus limits early hospital discharge for patients who had undergone abdominal surgery [1]. Literature indicates that chewing gum is evaluated as a convenient method to enhance recovery from postoperative ileus after abdominal surgery [2]. The present study was aimed to evaluate the efficacy of chewing gum on bowel motility among patient who had undergone abdominal surgery for significant difference in early return of first bowel sound, passage of flatus, passage of stool and return of appetite with the administration of chewing gum. A total of 111 patients who underwent both elective and emergency open abdominal surgeries were participating in the study.

## Aims and Objectives

To study the effectiveness of chewing gum in postoperative patients by reducing the time to first passage of flatus, time to first feces and time to the first appearance of good appetite between the control and study group.

## Methodology

### Source of data and materials

All patients who underwent abdominal surgery (Emergency and Elective cases) between January

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**Received on** 04 | 01 | 2019, **Accepted on** 08 | 01 | 2019

2016 and September 2017 at KIMS, Hubballi were included in the study. Initially, the patient was identified according to condition and procedure he had undergone. A total of 111 patients who fulfilled the inclusion and exclusion criteria were included.

The study involves 37 patients in Omental patch repair group for intestinal perforation, 43 patients in Appendicectomy group for acute appendicitis, 13 patients in Biliary surgery group for calculous cholecystitis with Common bile duct stone, 18 patients for other abdominal procedure.

Patients were randomized within the group to control and study group. Randomization is done with simple random sampling technique. So each group has two groups of control and study group. The tools and protocol were developed through a review of relevant literature and validated by experts from the field department of General Surgery. Tools used in the study were interview schedule and checklist to assess the bowel sounds, the passage of first flatus, the passage of stool, and the return of appetite.

**Type of study:** A prospective Randomised control study

**Sample size:** 111 patients

**Method of collection of data:** The patients in the study group as per planned protocol were administered chewed gum three times a day for 30 min starting from the time patient become conscious (<12 hr) till the passage of the bowel sounds, passage of first flatus, the passage of stool, and return of appetite. Patients were evaluated as per the symptoms and detailed history, the complete physical examination was done. Preoperative investigations, mechanical bowel preparation, intraoperative findings including incision size, procedure, type of anesthesia, postoperative investigations, the appearance of bowel sounds, flatus, stool, and appetite were all documented.

#### **Inclusion criteria**

All patients who have undergone abdominal surgeries, aged above 14 years who require postoperative care are all included.

#### **Exclusion criteria**

- Patients who are unconscious.
- Patients who are intubated and not extubated within 12 hrs of postoperative period.
- Patients who had facial and maxillofacial injuries.

## **Results**

Our study is a randomized control study of the effectiveness of chewing gum on post-operative ileus among the patients who have undergone abdominal surgery between January 2016 and September 2017 at KIMS Hubballi.

Initially, patients were identified according to the condition and procedure they had undergone. A total of 111 patients who fulfilled the inclusion criteria were included.

For study group chewing gum was given for about 30 minutes 3 times a day and observed for results.

1. 111 patients who had undergone abdominal surgery were included in the study. Patients were evaluated with a detailed history and complete physical examination. All routine investigations, intraoperative findings, bowel parameters were noted.
2. Distribution of patients among different surgeries

Procedure	Study group (No. of Patients)	control group (No. of Patients)	total
Appendicectomy	22	21	43
Omental patch repair	18	19	37
Biliary procedures	6	7	13
Other procedure	9	9	18
total	55	56	111

3. Mean age of patients in the study group was 41.3 years and in the control group was 38.27 years
4. In our study, emergency surgeries were 84 and elective surgeries were 27.
5. In our study most of the surgeries were on intestine and 5 patients had undergone both intestinal and non-intestinal surgery.
6. In our study, 43 patients had local peritonitis and 41 patients had diffuse peritonitis. 27 patients did not have peritonitis.
7. In omental patch repair group bowel parameters came earlier in the study group compared to the Control group. There was a significant difference between the two groups ( $p < 0.05$ ) But it is found that no statistical significance was there in return of flatus ( $p = 0.053$ ).
8. In appendectomy group bowel parameters came earlier in the study group compared to the Control group. However, there was no significant difference in time between the

two groups. But it is found that statistical significance was there in appearance bowel sound ( $p = 0.019$ ).

9. In biliary procedures, bowel parameters came earlier in the study group compared to the Control group. There was a significant difference between the two groups ( $p < 0.05$ ) But it is found that no statistical significance was there in return of appetite ( $p = 0.227$ ).
10. Bowel parameters came earlier in the study group compared to the Control group in other procedures. However, there was no significant difference in time between the two groups. But it is found that statistical significance was there in the appearance of stool ( $p = 0.031$ ).
11. Most of the patients liked the chewing gum. Only 7.1% did not like the chewing gum.

Bowel parameters came earlier in the study group compared to the Control group in Overall group. There was a significant difference between the two

groups ( $p < 0.05$ ) But it is found that no statistical significance was there in return of flatus ( $p = 0.064$ ) and the return of appetite ( $p = 0.202$ ) (Table 1).

Bowel parameters came earlier in the study group compared to the Control group in omental patch repair. There was a significant difference between the two groups ( $p < 0.05$ ). But it was found that no statistical significance was there in return of flatus ( $p = 0.053$ ) (Table 2).

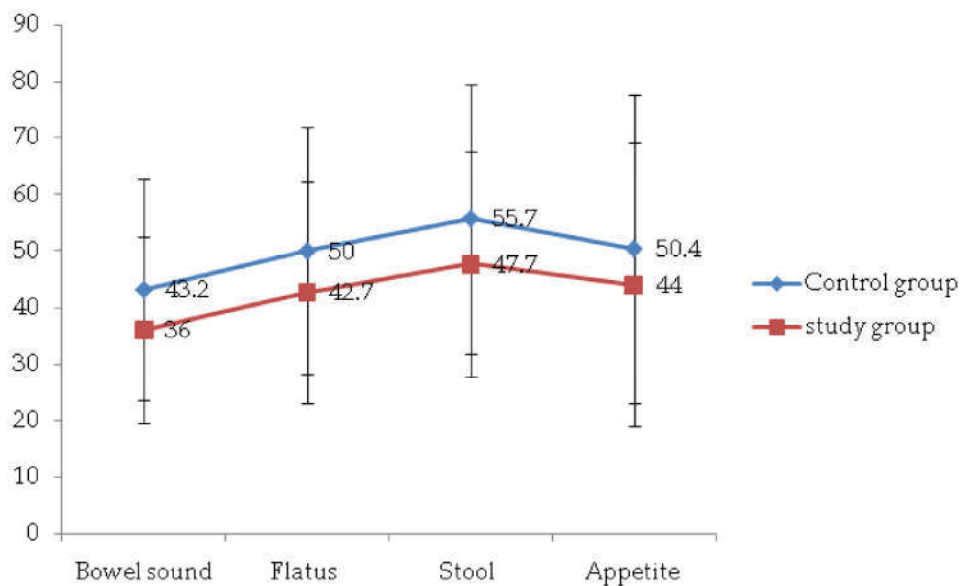
Bowel parameters came earlier in the study group compared to the Control group in appendectomy group. However, there was no significant difference in time between the two groups. But it is found that statistical significance was there in appearance bowel sound ( $p = 0.019$ ) (Table 3).

Bowel parameters came earlier in the study group compared to the Control group in biliary procedures. There was a significant difference between the two groups ( $p < 0.05$ ) But it is found that no statistical significance was there in return of appetite ( $p = 0.227$ ) (Table 4).

**Table 1:** Effectiveness of chewing gum among the patients in study and control group (overall)

Appearance of bowel parameters postoperatively	Group				Total N	p value *
	Control group Mean time in hours	SD	Study group Mean time in hours	SD		
Bowel sound	43.2	19.6	36.0	16.6	111	0.039
Flatus	50.0	21.9	42.7	19.5	111	0.064
Stool	55.7	24.0	47.7	20.01	111	0.06
Appetite	50.4	27.2	44.0	25.1	111	0.202

\* Unpaired t-test

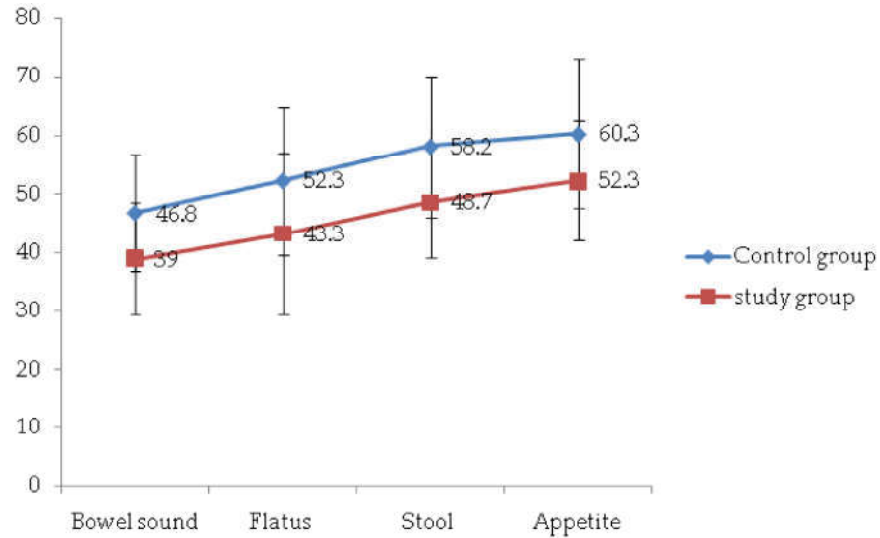


**Graph 1:** Effectiveness of chewing gum among the patients in study and control group (overall).

**Table 2:** Effectiveness of chewing gum among the patients in study and control group Omental patch repair (OPR)

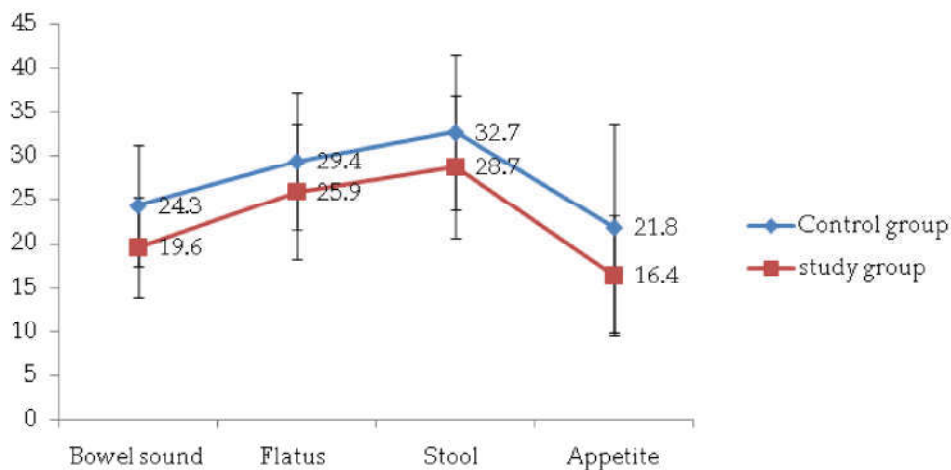
Appearance of bowel parameters postoperatively	Group				Total N	p value *
	Control group		Study group			
	Mean time in hours	SD	Mean time in hours	SD		
Bowel sound	46.8	10.12	39.0	9.6	35	0.026
Flatus	52.3	12.6	43.3	13.8	35	0.053
Stool	58.2	12.0	48.7	9.5	35	0.014
Appetite	60.3	12.7	52.3	10.2	35	0.048

\* Unpaired t-test

**Graph 2:** Effectiveness of chewing gum among the patients in study and control group (OPR).**Table 3:** Effectiveness of chewing gum among the patients in study and control group (appendectomy)

Appearance of bowel parameters postoperatively	Group				Total N	p value *
	Control group		Study group			
	Mean time in hours	SD	Mean time in hours	SD		
Bowel sound	24.3	6.9	19.6	5.7	43	0.019
Flatus	29.4	7.8	25.9	7.7	43	0.136
Stool	32.7	8.8	28.7	8.1	43	0.127
Appetite	21.8	11.9	16.4	6.8	43	0.077

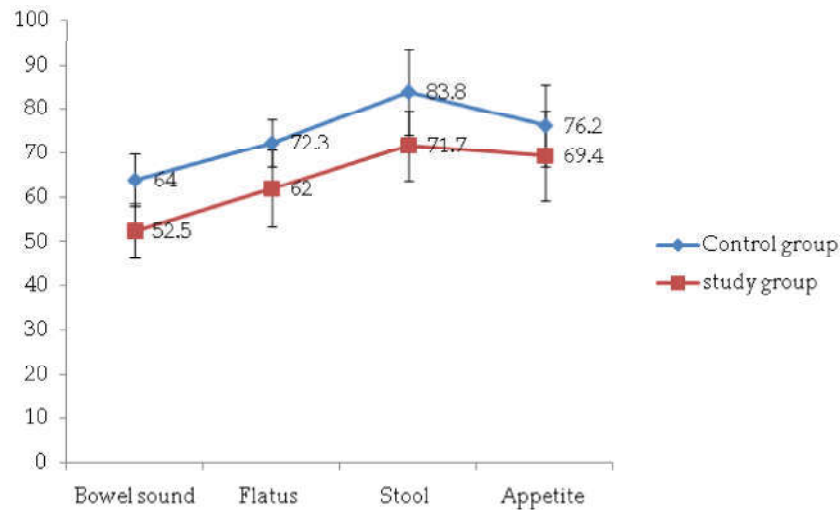
\* Unpaired t-test

**Graph 3:** effectiveness of chewing gum among the patients in study and control group (appendectomy).

**Table 4:** Effectiveness of chewing gum among the patients in study and control group (biliary procedures)

Appearance of bowel parameters postoperatively	Group				Total N	p value *
	Control group		Study group			
	Mean time in hours	SD	Mean time in hours	SD		
Bowel sound	64.0	5.9	52.5	6.2	14	0.004
Flatus	72.3	5.2	62.0	8.7	14	0.025
Stool	83.8	9.7	71.7	8.0	14	0.025
Appetite	76.2	9.2	69.4	10.3	14	0.227

\* Unpaired t-test

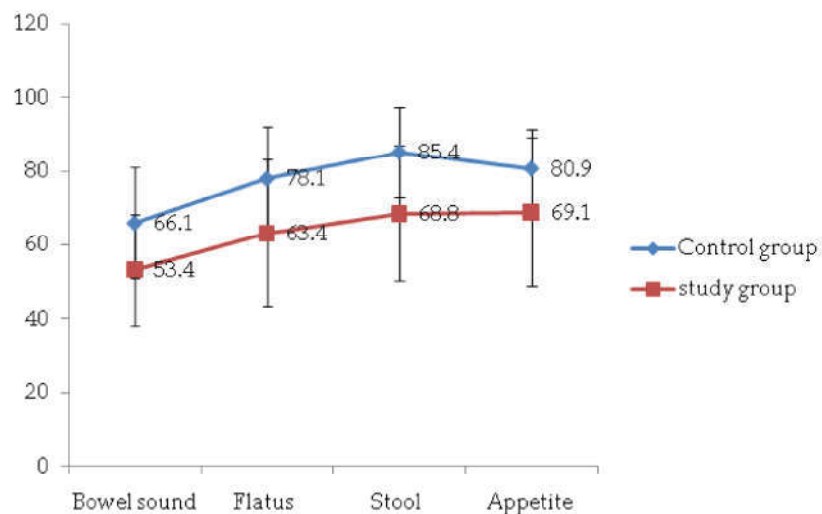


**Graph 4:** Effectiveness of chewing gum among the patients in study and control group (biliary procedures).

**Table 5:** The effectiveness of chewing gum among the patients in study and control group (Other procedures)

Appearance of bowel parameters postoperatively	Group				Total N	p value *
	Control group		Study group			
	Mean time in hours	SD	Mean time in hours	SD		
Bowel sound	66.1	15.0	53.4	15.2	19	0.085
Flatus	78.1	14.0	63.4	19.9	19	0.078
Stool	85.4	12.2	68.8	18.3	19	0.031
Appetite	80.9	10.6	69.1	20.3	19	0.125

\* Unpaired t-test



**Graph 5:** The effectiveness of chewing gum among the patients in study and control group (Other procedures).

Bowel parameters came earlier in the study group compared to the Control group in other procedures. However, there was no significant difference in time between the two groups. But it is found that statistical significance was there in the appearance of stool ( $p = 0.031$ ) (Table 5).

## Discussion

Postoperative ileus (POI) occurs commonly after abdominal operations and is one of the limiting factors which prevent early hospital discharge. The pathophysiology of POI includes spinal and local sympathetic neural reflexes, local as well as systemic inflammatory mediators released during surgery as part of the stress response.

The potential complications of prolonged POI include increased postoperative pain, increased nausea, and vomiting, pulmonary complications, poor wound healing, delay in resuming oral intake, delay in postoperative mobilization, prolonged hospitalization, and increased health-care costs.

Sham feeding (when food is smelled or chewed but not swallowed) has been demonstrated to be one of the methods to increase bowel motility. It causes both vagal stimulation and hormonal release; either one or both could modulate the bowel motility. Gum chewing, as an alternative to sham feeding, provides the benefits of gastrointestinal stimulation without the complications associated with feeding. In recent years, the use of chewing gum to reduce the postoperative paralytic ileus has been extensively reviewed in various randomized controlled trials on elective intestinal anastomosis and has been found to be beneficial in reducing POI. The present study was aimed to evaluate the effectiveness of chewing gum on the bowel motility among patients who had undergone abdominal surgery.

Total 111 patients were studied prospectively for bowel motility i.e return of first bowel sound, the passage of first flatus, the return of stool and return of appetite with the administration of chewing gum to 55 patients in the study group and routine postoperative management to 56 patients in the control group. Among abdominal surgeries which are included in the study are omental patch repair, appendectomy, biliary procedures and others collectively included in the other procedure group.

In the present study, the commercially available sugar-free chewing gum used the same is used in the study conducted by Gabriela et al. [3].

Unlike other studies like Gabriela et al, Andersson et al. [4], Topcu et al. [5] which have randomized

one type of surgery like Appendectomy, pancreaticoduodenectomy, colorectal surgery respectively, where as our study includes three types of surgeries.

In this study, it was found that patients' postoperative appearance, bowel sounds, flatus, stool and appetite times are extremely short in the gum-chewing group.

Topcu et al. had found patients who had undergone colorectal surgery had flatus and defecation times in gum-chewing groups to be extremely low [5].

Similarly, Gabriela et al. and Anderson et al. in their studies on patients undergoing appendectomy and pancreaticoduodenectomy demonstrated that bowel activity time was shorter in the patients who had chewed gum after surgery [3]

Table 6:

Appearance of bowel parameters postoperatively	Group			
	Topcu et al. [5] (N 60)	P value	Our study (N 111)	p value
Flatus	Mean time in hours 51.07±19.63	<0.001*	Mean time in hours 42.7	0.064
Stool	73.33±30.29	<0.001*	47.7	0.06
Appetite	3.07±1.53	0.005*	44.0	0.202

Appearance of bowel parameters postoperatively	Group			
	Andersson et al. [4] (N 28)	P value	Our study (N 111)	p value
Flatus	Mean time in days 3.7	.340	Mean time in hours 42.7	0.064
Stool	7.6	.882	47.7	0.06
Appetite	5.1	0.068	44.0	0.202

In their systematical review and meta-analysis studies, Purkayastha et al. [6] and Chan et al. [7] reported that first flatus and defecation times were shortened markedly by means of gum chewing after colorectal surgery.

In a further systematic review done by Wallstrom & Frisman [8], it was stated that postoperative gum chewing was a method which ameliorates gastrointestinal functions quickly and safely, and is cheap and easy to apply.

## Conclusion

In conclusion, within the scope of nursing practices for post-operative care, chewing is an effective, easy and cost-effective method for ameliorating of POI in patients undergoing abdominal surgery.

The study recommends that can be replicated on a large sample and in more advanced variables like

length of hospital stay, the rate of postoperative complications and even ileus in medical conditions.

The implications of the study are that surgeons can encourage the postoperative patients to chew the chewing gum to reduce stress enhance relaxation and sense of wellbeing and also act as diversional therapy, which helps in faster recovery, preventing complications and thereby provide cost-effective care and satisfaction to the client.

*Conflict of Interest:* Nil

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