



Original Article

Chewing Gum and Postoperative Ileus in Children after an Appendectomy in Terms of Early Gut Motility, Resumption of Feed, and Hospital Stay

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ARTICLE INFO

Key Words:

Chewing gum, Postoperative ileus, Early gut motility

How to Cite:

Rehana, G. ., Hanif, S. . ., Tasneem Kausar, S. S. ., Raza, Z. ., & Peter, L. . (2022). Chewing Gum And Postoperative Ileus In Children After An Appendectomy In Terms Of Early Gut Motility, Resumption Of Feed, And Hospital Stay: Chewing gum and Postoperative ileus in children after an appendectomy. *Pakistan Journal of Health Sciences*, 3(05). <https://doi.org/10.54393/pjhs.v3i05.273>

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Received Date: 6th October, 2022

Acceptance Date: 14th October, 2022

Published Date: 31st October, 2022

ABSTRACT

Chewing gum usage decreases the postoperative ileus in kids who have had appendectomies in terms of quick gut motility, feeding resumption, and hospital stay. **Objective:** The goal of this study was to determine how chewing gum affects early intestinal motility and how to avoid postoperative ileus in children who have had appendectomies. **Methods:** In this study, children who had appendectomies at a children's hospital in Lahore underwent a randomized control experiment. This study included elderly pediatric patients between the ages of 5 and 18. Two groups—one serving as the control group and the other as the interventional group—were formed. 51 patients made up the study's sample size, as determined by G power. In this study, 25 patients were placed in the control group and 26 patients were divided into the intervention and control groups. **Results:** In terms of early gut motility, early flatus pass, early bowel motions, early appetites, and early stool pass, gum chewing produced favorable effects in patients. Gum chewing can be effective in preventing intestinal paralysis or as a technique to improve gut motility after surgery, as it demonstrated early flatus, early bowel movements, early appetites, and early stool pass, protecting our children from the suffering of postoperative ileus. These metrics demonstrate how successful chewing gum is in preventing post-operative ileus in pediatric patients. **Conclusions:** The findings of this study demonstrated that chewing gum is one method for promoting oral intake, enhancing intestinal movement, and shortening the interval between the first flatulence and bowel movement.

INTRODUCTION

Due to surgical interventions and the use of different opioids, the gastrointestinal tract is markedly affected in approximately every other abdominal surgery [1]. In some patients, the recovery of bowel movements comes within a few days whereas many patients face prolong intestinal paralysis [2]. This intestinal paralysis is perceived as postoperative ileus. Postoperative ileus (POI) describes the disturbance in gastrointestinal motility which usually occurs after abdominal surgery and includes distention, lack of bowel sounds, accumulation of gas and fluids in the bowel, and delays in the passage of flatus and stool [3]. Post-operative ileus happens due to the hypo-motility of

the intestines and the limited working ability of the parasympathetic nervous system [4]. Extreme manipulation during various abdominal surgery stimulates the parasympathetic nervous system which inhibits neuronal activities that leads to the paralysis of the intestines [5]. The prolonged recovery of intestinal motility increases abdominal distention which causes gas and ultimately becomes the reason for abdominal discomfort and pain [6]. which also becomes the reason for the delay in the patient's discharge from the hospital. It has been seen that surgical trauma activates stress response and inflammatory mediators. The combination of different

mediators for example nitric oxide, vasoactive intestinal peptide, substance P, and Calcitonin leads to the postoperative ileus [7]. Experts have differing opinions on changes in bowel activity because the gastrointestinal tract takes varied times for activity and motility, such as the stomach, which takes 24 to 48 hours, and the sigmoid colon, which takes 3 to 5 days [8]. However, a variety of approaches and interventions, including pharmacological and non-pharmacological methods, have been suggested to prevent postoperative ileus. The use of non-steroidal anti-inflammatory medicines, laparoscopic operations rather than whole abdominal surgeries, and better carbohydrate consumption following abdominal surgery are just a few of the many measures that have lately been developed to combat this issue [9]. But it has been seen that all the pharmacological interventions left one or other residual effects on the health of the patient which prolonged opioids requirements postoperatively, severe withdrawal symptoms, or surgical bleeding [10]. On the other hand, no such effects were seen in any non-pharmacological strategy. Non-pharmacological recovery from post-operative ileus includes early oral intake, early mobilization, and pre-operative psychological training of the patients. Among these strategies, gum chewing has proven to be simple but effective in accelerating complication-free recovery of gastrointestinal function after abdominal surgery [11]. However, Postoperative ileus has been a common problem among pediatric patients after an appendectomy. It increases the medical cost to the patient because of prolonged hospitalization, then there are many other concerns regarding hospital-acquired infection for the surgeons and working staff [12]. Previous research has downplayed the value of non-pharmacological methods for treating post-operative ileus. Furthermore, in countries with a high population density like Pakistan, a large percentage of youngsters undergo various abdominal procedures. As a result of a larger patient-to-staff ratio and a delay in healing brought on by post-operative ileus, public hospitals are under a heavy patient load. Healthcare professionals throughout the world have recently implemented a variety of pharmacological, non-pharmacological, and interventional strategies to lessen the suffering caused by postoperative ileus. Therefore, this study considers chewing gum as the nonpharmacological intervention to reduce the POI among the peds. Chewing gum accelerates salivation, it increases gastric secretions and gut motility [13]. Therefore, chewing gum after abdominal surgery has recently become the simple way of mobility and reduces POI. Previously, It is suggested that chewing gum after surgery may help in the functioning of the gastrointestinal and resumption of bowel activity. It is

previously noted that chewing gum is an example of sham feeding and helps in gastrointestinal function without causing any complications [14]. The use of chewing gum as a useful non-pharmacological technique of gastrointestinal functioning following abdominal surgery, particularly in children, has not been empirically shown in prior investigations. In other industrialized nations, this type of non-pharmacological intervention has been carried out, but in Pakistan, no such data analysis has been carried out to treat postoperative ileus. Therefore, the purpose of this study is to determine if chewing gum reduces postoperative ileus in pediatric patients who have undergone an appendectomy. With the aid of this study's findings, pediatric patients will be shielded from the agony of postoperative ileus. Literature has noted that sham feeding significantly contributes to the motility of the gastrointestinal tract from the stomach and duodenum [15]. It is also noted that sham feeding increases the peptide hormone gastrin, the neuropeptide neurotensin, and pancreatic polypeptide which is helpful after surgery in passing the latus postoperatively [16]. Besides, sham feeding also enhances duodenal alkaline secretion [17]. Further, chewing gum mimics the food intake and is considered sham feeding. Chewing gum activates the cephalic-vagal pathway and leads the intestinal myoelectric activity to counteract the activation of the gastrointestinal μ opioid receptors [18]. which leads the bowel motility through hormonal and nervous stimulation. Further, chewing gum is safe and cheap way of stimulating the gastrointestinal tract. In adolescents chewing gum has been seen a simple and secure way of speeding up bowel motility and early oral intake [19]. The need of the hour is improvising such tools and tricks that can improve the postoperative health of the patients by providing effective preoperative and intraoperative care. Therefore, a range of pharmacologically and non-pharmacologically based approaches have been used to address potential risks and high financial impacts. The use of nasogastric intubation was the cornerstone of therapy for many years. The most prevalent difficulty is gastrointestinal tract defect, which leads to nausea, vomiting, abdominal distension, delayed defecation and even obstruction of the intestine. More specifically, Sorbitol and other hexitols is the main ingredient of sugar free chewing gum and causes the gastrointestinal gas, bloating and cramps, however, maxitols in 'sugar-free' chewing gums may play a role in the amelioration of ileus after surgery [20,21]. Therefore, maxitols based sugar free chewing gum is more helpful in gastrointestinal motility.

METHODS

This was a randomized controlled trial study for children with appendices undergoing an appendectomy. In this

study, ethical approval was taken from the Children's Hospital Lahore, Pakistan to conduct the experimental study on admitted patients for abdominal surgery. Thus, the department of pediatric surgery of Children's Hospital and the Institute of Child Health Lahore was the selected setting for this study. In this study, 51 patients were considered for this study and consent was also taken. The patient was randomly divided into two groups. The Intervention Group 'A' was given chewing gum after they were shifted to a recovery room. On the other hand Control Group 'B' was treated with traditional methods postoperatively i.e. NPO, intravenous fluids, and antibiotics. Out of 51 patients, 26 patients were taken in the intervention group and 25 were taken in the control group. The data were collected from the experimental group who chewed the gum after surgery and the control group. Further post-operative gastrointestinal functioning data was also collected from the patients as suggested in previous findings [22]. In this study, children of age 16-18 years were selected who went through appendectomy because of appendicitis. Moreover, patients who had perforated appendix, appendicular mass, and appendectomy with other procedures such as LADD's procedure were not included in this study. The patients who met the selection criteria were included in the study and consent form was also taken from the patients. Consequently, data were analyzed by using SPSS 21.0.

RESULTS

The results in Table 1 shows that 8 (30.8%) patients in Group-A and 19 (76%) patients in Group B were of 5-9 years. Further, 12 patients (46.2%) in Group-A and 6 patients (24%) in Group B were of 10-15 years. Likewise, 6 patients (23%) of 16-18 years were in Group-A and none of the patients from Group B of this age group. Similarly, Table 1 reveals the age of this study participant 11 patients (42.3%) were male, and 15 patients (57.7%) were female in Group-A. While in Group B, 18 patients (72%) were male, and 7 patients (28%) were female. Moreover, the weight of this study participants was also checked and Table 1 shows the results that in Group-A, 5 patients (19.2%) weight 15-18 kg, 13 patients (50%) were having a weight of 19-30 kg and 8 patients (30.8%) were having the weight of 31-45 kg. Likewise, in Group B, 10 patients (40%) weight 15-18kg, 14 patients (56%) were weighting 19-30 kg and only 1 patient (4%) weight was in between 31-45 kg respectively.

Parameter		Group-A (26)	Group-B (25)	Total
Age	5-9	8(30.8%)	19(76%)	27
	10-15	12(46.2%)	6(24%)	18
	16-18	6(23.1%)	0(0%)	6
	Total	26	25	51
	Male	11(42.3%)	18(72%)	29

Gender	Female	15(57.7%)	7(28%)	22
	Total	26	25	51
Weight	15-18	5(19.2%)	10(40%)	15
	19-30	13(50%)	14(56%)	27
	31-45	8(30.8%)	1(4%)	9
Total		26	25	51

Table 1: Demographic Analysis

Table 2 shows the results of the randomized control trial results of this study. It is revealed in Table 2 that patients from group A who chewed the gum stayed significantly shorter than patients of group B as the majority (18; 69.2%) of the patients from group A were discharged in 1-2 days as compared to the only 6(24%) patients from group B discharged in 1-2 days. Further, Table 2 shows that is no significant difference regarding nausea and vomiting between both groups as 21 (81.8%) patients from Group-A and 20(80%) from group-B have not experienced nausea and vomiting. In the same manner, chewing efficacy was also higher in group-A patients as compared to group B. On the other hand, the time of the first bowel movement (less than 12 hours) was significantly less in group-A as 20(76.9%) patients experienced the first bowl moment earlier as compared to only 6(24%) patients from group B. Likewise, 73.1% of the patients from group-A passed a stool within 24 hours as compared to only 16% patients from group-B. Further, table 2 shows the results that the feeling of hunger was also significantly higher (92.3%) in patients of group-A as compared to patients from group B (36%). However, there was no significant difference regarding abdominal distention between group-A and group B (both groups shows only 6% of patient felt abdominal distention). Additionally, Table 2 shows that patients from both groups A and B have been given the same type of Analgesia and there is no significant difference regarding the type of Analgesia.

Parameter		Group-A (26)	Group-B (25)	Total
Hospital Stay	1-2 Days	18(69.2%)	6(24%)	24
	2-5 Days	5(19.2%)	15(60%)	20
	>5 Days	3(11.5%)	4(16%)	7
	Total	26	25	51
Nausea/Vomiting	No	21(80.8%)	20(80%)	41
	<3	5(19.2%)	5(20%)	10
	Total	26	25	51
Chewing Efficacy	Yes	20(76.9%)	0(0%)	20
	No	6(23.1%)	25(100%)	31
	Total	26	25	51
First Bowl Movement	<12hrs	20(76.9%)	6(24%)	26
	12-24hrs	6(23.1%)	10(40%)	16
	>24hrs	0(0%)	9(36%)	9
	Total	26	25	51
Stool Passing	Within 24hrs	19(73.1%)	4(16%)	23
	24-48hrs	7(26.9%)	3(12%)	10

	>48hrs	0(0%)	18(72%)	18
	Total	26	25	51
Feeling of Hunger	<12 Hours	24(92.3%)	9(36%)	33
	12-24 Hours	2(7.7%)	8(32%)	10
	>24 Hours	0(0%)	8(32%)	8
	Total	26	25	51
Postoperative Abdominal distention	Yes	6(76.9%)	6(76%)	12
	No	2(23.1%)	19(24%)	39
	Total	6	25	51

Table 2: Randomized Controlled Trial Analysis

DISCUSSION

The patients especially children who undergo abdominal surgery face the critical issue of indigestion and bowel movement and ultimately the delay in their digestion, healing, and discharge from the hospital occur. Thus, this study aims to investigate the role of non-pharmaceutical techniques (Chewing gum) in post-operative ileus. Recently, it is noted that chewing gum is the latest method for gastrointestinal relief after abdominal surgery [23]. The findings of this study demonstrate that chewing gum significantly affects gastrointestinal motility and intestinal function in children undergoing abdominal surgery. The findings of this study are consistent with those of a previous study, which found that patients who chewed gum experienced more regular bowel movements than those who did not. In the past, researchers have conducted meta-analyses on the first bowel motions, first flatulence, and gastrointestinal healing. These studies have shown the major stabilizing and health benefits of oral consumption following surgery [24]. The previous finding of Maheshwaran, Ashwin revealed that eating gum during the initial post-operative phase for individuals having abdominal surgery is simple, affordable, and risk-free [25]. Gum chewing has significantly decreased the incidence of DGE and its associated parameters, such as the time to NGT removal, the return to a solid diet, the passage of the first flatus, and the passage of the first stool, and as a result, significantly decreased the length of the postoperative hospital stay. The use of chewing gum following colorectal surgery was also proven to be a safe and effective strategy in lowering the incidence of POI and deserves routine usage in conjunction with other ERAS approaches in the postoperative situation [26]. Additionally, it has been shown that postoperative gum chewing following ileostomy reversal is associated with a noticeably shorter time for flatus to pass and a shorter period of hospital stay [27].

CONCLUSIONS

The purpose of this study is to learn how to prevent postoperative ileus in children who have had appendectomies as well as the impact of chewing gum on

early intestinal motility. The findings of this study demonstrate that chewing gum is one method for promoting oral intake, enhancing intestinal movement, and shortening the interval between the first flatulence and bowel movement. It can be said that giving chewing gum to young patients who have had appendectomies would help them heal more quickly and be discharged from the hospital with better flatulence, flatulence, and stool passing. The findings of this study also show that chewing gum is a low-cost, non-pharmaceutical strategy that significantly boosts hunger in patients. Consequently, the patient's digestive movement begins earlier and eventually.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

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