

Impact of Sugarless Chewing gum Versus Peppermint on First Bowel Movement after Cesarean Section: Randomized Controlled Trial

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ABSTRACT

Background: Cesarean delivery (CD) became one of the commonest major surgical operations performed daily worldwide. Postoperative ileus (POI), Cesarean section (CS), is the most critical form of intestinal dysfunction that leads to absolute constipation and oral intake intolerance. It is mainly a result of a non-mechanical injury that disturbs the normal gastrointestinal tract motor activity. **Objective:** To assess which is more effective sugarless chewing gum or peppermint on first bowel movement after cesarean section. **Patients and Methods:** A randomized controlled study was conducted at Ain shams University Maternity Hospital in the period between (June to August 2021). The study included 300 full-term pregnant ladies after elective cesarean section under spinal anesthesia, aged 20-40, BMI ≤ 30 and Hb ≥ 10 . The patients had been randomly allocated to two groups: Group A received 200 ml of warm water with 2 packets of peppermint without sugar 2 hours after the surgery. Group B chewed sugarless chewing gum for 15 minutes 2 hours after the surgery. **Results:** Statistical analysis of current results showed that time to regain of GIT motility (4.4 ± 1.5 versus 2.8 ± 0.9 hours) and passage of flatus (8.3 ± 2.0 versus 7.1 ± 1.8 hours) were significantly longer among peppermint than gum group. **Conclusion:** Both peppermint and sugarless gum are effective nonpharmacological options for enhancement of post-cesarean section motility. The gum was more effective in shortening of time to regain GIT motility and passage of flatus with higher women's acceptance. No side effects were noted except slight heartburn, nausea, and vomiting with peppermint of no significant importance.

Keywords: Sugarless chewing gum, Peppermint, Bowel movement.

INTRODUCTION

Physiologic postoperative ileus is generally a benign condition that resolves without serious sequelae. However, when ileus is prolonged, it leads to patient discomfort, dissatisfaction, and prolonged hospitalization and it must be differentiated from mechanical bowel obstruction or other postoperative complications⁽¹⁾. However, this belief has been challenged; the duration of postoperative gastrointestinal dysmotility appears to be shorter than previously thought. Generally, gastric and small intestinal activity appears to return within hours of surgery, and colonic activity returns by postoperative day 2 or 3⁽²⁾.

Although the most affected parts of the intestine are those that have been manipulated during the surgery, there is experimental evidence that inflammation of the intestinal muscle extends from manipulated areas to nonmanipulated parts of the intestinal tract. When the expected time extends beyond what is acceptable, the patient is diagnosed as having a "prolonged" or "pathologic" postoperative ileus, provided there are no signs of mechanical intestinal obstruction⁽³⁾.

Chewing gum has been tested to accelerate the recovery from postoperative ileus for over a decade. This intervention is effective in the postoperative period of gastrointestinal surgery and some studies are showing that it can also be effective after a CS.

Most of the studies that tested chewing gum to enhance post-cesarean recovery of bowel function used between three to 12 pieces of gum per day and chewing times ranging from 15 to 60 minutes per session⁽⁴⁾.

It appears that peppermint oil may have several mechanisms of action including smooth muscle relaxation (via calcium channel blockade or direct enteric nervous system effects); visceral sensitivity modulation (via transient receptor potential cation channels); anti-microbial effects; anti-inflammatory activity; modulation of psychosocial distress. Peppermint oil has been found to affect esophageal, gastric, small bowel, gallbladder, and colonic physiology. It has been used to facilitate the completion of colonoscopy and endoscopic retrograde cholangiopancreatography. Placebo-controlled studies support its use in irritable bowel syndrome, functional dyspepsia, childhood functional abdominal pain, and postoperative nausea⁽⁵⁾.

PATIENTS AND METHODS

This cross-sectional study was conducted at Ain shams University Maternity Hospital in the period between June and August 2021. The study included full-term pregnant ladies aged 20 to 40 years, BMI ≤ 30 , Hb ≥ 10 , undergoing elective cesarean section under spinal anesthesia.

Exclusion Criteria:

Women who had any medical disorder or had a previous history of bowel surgery or chronic gastrointestinal problems (chronic constipation, peptic ulcer, and irritable bowel syndrome) or had intraoperative or immediate post-operative major complications or added any antiemetic/ prokinetic/



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antacid during anesthesia were excluded from the present study.

The study included 300 pregnant females who fulfilled inclusion criteria. They were subjected to full detailed history taking including personal, menstrual, obstetric, past, and family history.

Study procedure:

A detailed history was taken to exclude the previous exclusion criteria in selected cases: Personal history including name, age, present, past and family history, obstetric history including gravidity, parity, and gestational age.

- Examination after cesarean section:
 - a- General examination for vital signs and data.
 - b- Abdominal examination: inspection for the size of the abdomen.
- Palpation of abdomen for distension.
- Auscultation of bowel sound.

The patients had been randomly allocated to two groups: Group A received 200 ml of warm water with 2 packets of peppermint without sugar 2 hours after the surgery, and Group B chewed sugarless chewing gum for 15 minutes 2 hours after the surgery.

After administration, we started to auscultate the patient’s abdomen every 30 minutes till the first bowel sound had been heard. After 2 hours of administration, we started to check temperature, nausea, vomiting, and satisfaction. If the patient was tolerated well, and the was no distension, she started to drink fluids after (6 hours after CS).

RESULTS

Ethical Considerations:

Approval of the study was obtained from Ain Shams University's academic and ethical committee. Every patient signed informed written consent for the acceptance of the operation. This work has been carried out following The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Data analysis

The collected data were coded, tabulated, and statistically analyzed using IBM SPSS statistics (Statistical Package for Social Sciences) software version 22.0, IBM Corp., Chicago, USA, 2013. Descriptive statistics were done for quantitative data as minimum& maximum of the range as well as mean±SD (standard deviation) for quantitative normally distributed data, while it was done for qualitative data as number and percentage. Inferential analyses were done for quantitative variables using the Shapiro-Wilk test for normality testing and ANOVA test with post hoc Bonferroni test for more than two independent groups with normally distributed data. In qualitative data, inferential analyses for independent variables were done using the Chi-square test for differences between proportions. A log-rank test was used to compare delivery rates. The level of significance was taken at a P-value < 0.050 is significant, otherwise is non-significant.

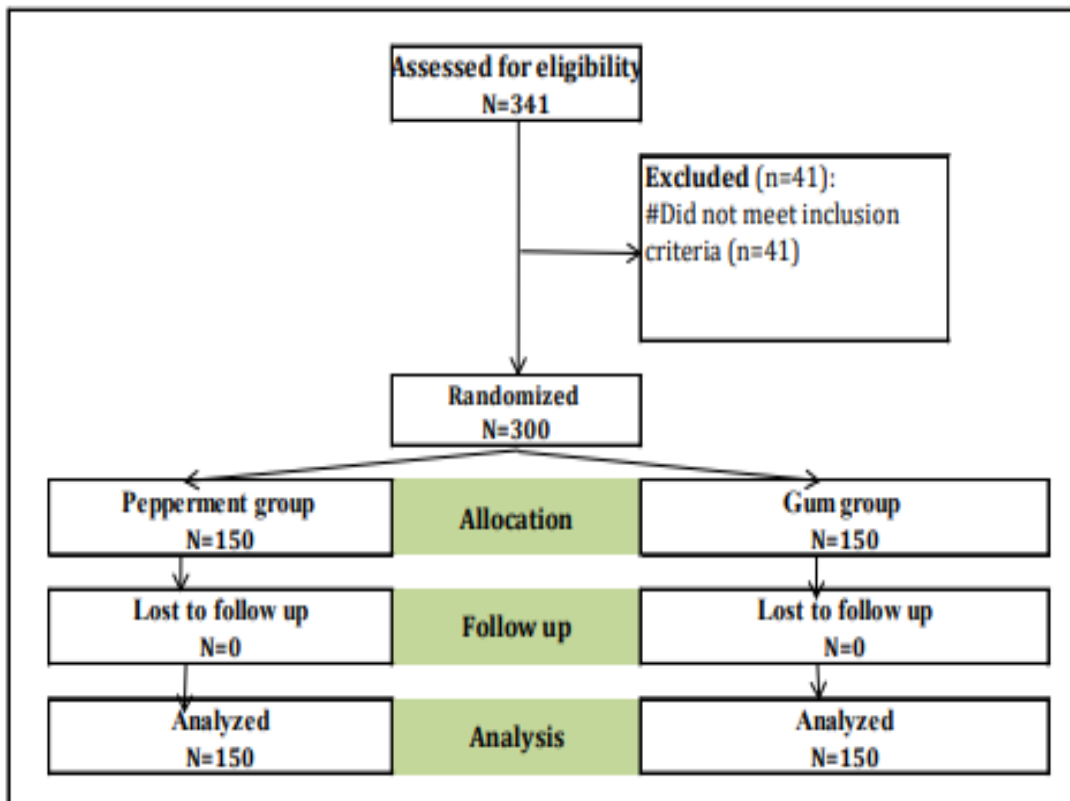


Figure (1): Flow chart of the studied cases.

Table (1): Baseline characteristics among the studied groups.

Variables		Peppermint (N=150)	Gum (N=150)	P-value	Sig.
Maternal age (years)	Mean±SD	30.2±5.2	29.7±4.9	^0.338	N.S
	Range	20.0–40.0	20.0–40.0		
BMI (kg/m ²)	Mean±SD	27.6±1.8	27.4±1.6	^0.441	N.S
Parity	Nulli	51 (34.0%)	60 (40.0%)	#0.282	N.S
	Parous	99 (66.0%)	90 (60.0%)		
GA (weeks)	Mean±SD	37.9±1.0	37.9±1.1	^0.829	N.S
Cesarean section indications (minutes)	Repeat CS	65 (43.3%)	60 (40.0%)	#0.166	N.S
	CPD	47 (31.3%)	36 (24.0%)		
	Malpresentation	27 (18.0%)	34 (22.7%)		
	Postdate	11 (7.3%)	20 (13.3%)		
Operation duration (minutes)	Mean±SD	48.4±10.7	46.9±10.7	^0.217	N.S

BMI: Body mass index, GA: Gestational age, CS: Cesarean section, CPD: Cephalopelvic disproportion, ^Independent t-test, #Chi square test, N.S: Not significant.

Table (2): Acceptance to given intervention among the studied groups

Measures	Peppermint (N=150)	Gum (N=150)	#P-value	Effect size Relative rate 95% CI
Satisfied	89 (59.3%)	143 (95.3%)	<0.001**	0.62 (0.54–0.71)
Unsatisfied	61 (40.7%)	7 (4.7%)		

#Chi square test, CI: Confidence interval. **Highly significant, Effect size: Value of peppermint over the gum.

Table (2) show that: Patient satisfaction in the gum group was higher by 36%.

Table (3): Time of first bowel movement (hours) among the studied groups.

Measures	Peppermint (N=150)	Gum (N=150)	^P-value	Effect size Mean±SE 95% CI
Mean±SD	4.4±1.1	2.8±0.9	<0.001**	1.6±0.1
Range	2.0–8.5	2.0–8.0		1.3–1.9

^Independent t-test, CI: Confidence interval, **Highly significant, Effect size: Value of peppermint over the gum.

Table (3) show that: Time of the first bowel movement was statically highly significant less in the gum group with 1.6 hours (96 minutes) difference.

Table (4): Time to the passage of flatus (hours) among the studied groups.

Measures	Peppermint (N=150)	Gum (N=150)	^P-value	Effect size Mean±SE 95% CI
Mean±SD	8.3±2.0	7.1±1.8	<0.001**	1.2±0.2
Range	4.0–16.5	3.0–14.0		0.8–1.6

^Independent t-test, CI: Confidence interval, **Highly significant, Effect size: Value of peppermint over the gum.

Table (4) show that: Time to the passage of flatus was statically highly significant less among gum group with 1.2 hours (72 minutes) difference.

Table (5): Postoperative GIT-related symptoms among the studied groups.

Complications	Peppermint (N=150)	Gum (N=150)	p-value	Effect size Relative rate 95% CI	Sig.
Fever	0 (0.0%)	0 (0.0%)	Not applicable	Not applicable	N.S
Heartburn	18 (12.0%)	10 (6.7%)	#0.112	1.80 (0.86–3.77)	N.S
Nausea	9 (6.0%)	3 (2.0%)	#0.077	3.00 (0.83–10.86)	N.S
Vomiting	2 (1.3%)	1 (0.7%)	§0.999	2.00 (0.18–21.82)	N.S

#Chi square test, §Fisher's Exact test, CI: Confidence interval, Effect size: Value of peppermint over the gum, N. S: Not significant.

DISCUSSION

This pilot randomized controlled trial was conducted at Ain Shams University Maternity Hospital to compare between effect of peppermint and sugarless chewing gum on the first bowel movement after cesarean section. Three hundred women were randomized into 2 equal groups (150/each); **group (A):** received 200 ml of warm water with 2 packets of peppermint without sugar 2 hours after the surgery and **group (B):** chewed sugarless chewing gum for 15 minutes 2 hours after the surgery. Four hours after surgery, both groups started to drink fluids if well tolerated.

Regarding **basal demographic data;** statistical analysis of current results showed that there was no significant difference between study groups as regards maternal age, body mass index, parity, gestational age, cesarean section indications, and operation duration.

Ajuzieogu et al. ⁽⁶⁾ agreed with the current study and stated that there was no statistically significant difference in demographic variables of study groups such as age, BMI, and parity. They evaluated the efficacy of gum-chewing in reducing POI following cesarean section in Enugu. One hundred and eighty women booked for elective cesarean section were randomized into gum-chewing group ($n = 90$) or control group ($n = 90$) The subjects chewed sugarless gum three times daily from 6 h postoperatively until the first passage of flatus. Each chewing session lasted 30 min.

Shabaan and Dieb ⁽⁷⁾ agreed with the current study and stated that both groups were comparable regarding their demographic data as age, gestational age, BMI, parity, and duration of surgery. They assessed the effectiveness of chewing gum as safe, effective, and easy option to compete with paralytic ileus. One 162 parturient women who had cesarean section delivery under spinal anesthesia were recruited and randomly allocated to two groups; group (A) The study group which was allowed to chew sugarless gums two hours after cesarean section for 30 minutes and repeated every two hours till auscultation of normal intestinal sounds or passage of flatus. Group (B) the control group underwent conventional care which is nothing per oral till audible intestinal sounds or passage of flatus.

Regarding **acceptance to given intervention;** statistical analysis of current results showed that it was significantly more frequent among the gum group by 36%.

Shabaan and Dieb ⁽⁷⁾ disagreed with the current study and stated that there was no significant difference between both groups regarding patient acceptance because they had a control group who didn't take any other material to compare its effect with chewing gum.

Regarding **post-operative effects;** statistical analysis of current results showed that **time to regain of GIT motility** was statistically highly significant less in gum group with 1.6 hrs (96 mins) difference and

passage of flatus was statistically highly significant less among gum group with 1.2 hrs (72 mins) difference.

Ajuzieogu et al. ⁽⁶⁾ agreed with the current study and stated that gum-chewing has a beneficial effect on the early return of bowel function following cesarean section and should be included in the postoperative management protocol.

Shabaan and Dieb ⁽⁷⁾ agreed with the current study and stated that the study group had a statistically significant earlier onset of first intestinal sound statically was highly significant less in gum group with 5.17 hrs (310 mins), the passage of flatus and stool statically was highly significant less among gum group with 8.36 hrs (501 minutes) than the control.

Akalpler and Okumus ⁽⁸⁾ agreed with this study and stated that sugar-free gum chewing in the post-operative period after cesarean section under spinal anesthesia shortened the duration of the intestinal movement, the time of the first flatus, and discharge time.

Regarding **postoperative side effects;** statistical analysis of current results showed that heartburn, nausea, and vomiting were non-significantly more frequent among peppermint than among the gum group.

Shabaan and Dieb ⁽⁷⁾ disagreed with the current study and stated that postoperative vomiting and hospital stay were significantly lower in the case group while there was no difference between both groups regarding abdominal distension, postoperative ileus, and obstetric complications.

CONCLUSION

Both peppermint and sugarless gum are effective nonpharmacological options for enhancement of post-cesarean section motility. The gum was more effective in shortening of time to regain GIT motility and passage of flatus with higher women's acceptance. No side effects were noted except slight heartburn, nausea, and vomiting with peppermint of no clinical importance.

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Conflict of interest: Nil.

REFERENCES

1. **Bederman S, Betsy M, Winiarsky R et al. (2001):** Postoperative ileus in the lower extremity arthroplasty patient. *J Arthroplasty*, 16:1066.
2. **Wells C, O'Grady G, Bissett I (2019):** Colonic electromechanical abnormalities underlying post-operative ileus: a systematic and critical review. *Journal of Neurogastroenterology and Motility*, 25(1): 36-41.
3. **Gaschen F (2020):** *Advances in Gastroenterology, An Issue of Veterinary Clinics of North America: Small Animal Practice*, E-Book. Elsevier Health Sciences. Pp. 240. <https://www.elsevier.com/books/advances-in-gastroenterology-an-issue-of-veterinary-clinics-of-north-america-small-animal-practice/gaschen/978-0-323-76187-1>

4. **Mazzotta E, Villalobos-Hernandez E, Fiorda-Diaz J *et al.* (2020):** Postoperative Ileus and Postoperative Gastrointestinal Tract Dysfunction: Pathogenic Mechanisms and Novel Treatment Strategies Beyond CERAS Protocols. *Frontiers in Pharmacology*, 11: 1695-1699.
5. **Harrington A, Castro J, Erickson A *et al.* (2018):** Extrinsic sensory afferent nerves innervating the gastrointestinal tract in health and disease. In *Physiology of the Gastrointestinal Tract*, pp. 387-418. https://www.researchgate.net/publication/324929633_Extrinsic_Sensory_Afferent_Nerves_Innervating_the_Gastrointestinal_Tract_in_Health_and_Disease
6. **Ajuzieogu O, Amucheazi A, Ezike H *et al.* (2014):** The efficacy of chewing gum on postoperative ileus following cesarean section in Enugu, South East Nigeria: A randomized controlled clinical trial. *Nigerian Journal of Clinical Practice*, 17(6): 739-742.
7. **Shabaan M, Dieb A (2019):** The Role of Gum Chewing in Regaining Bowel Motility in Patients Undergoing Cesarean Section: A randomized controlled trial. *Evidence Based Women's Health Journal*, 9(4): 568-573.
8. **Akalpler O, Okumus H (2018):** Gum chewing and bowel function after cesarean section under spinal anesthesia. *Pakistan Journal of Medical Sciences*, 34: 1242-1247.