



## THE STUDY OF EFFECT OF SUGAR FREE CHEWING GUM ON PERISTALSIS ACTIVITY IN POST-CAESAREAN PATIENTS.

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### ABSTRACT

**Objectives:** To find out the effect of chewing-gum on peristalsis in post-caesarean patients.

**Materials and Methods:** In prospective study, 90 patients with post-caesarean section were divided into 2 groups- study group (n=45) and control group (n=45). Study group patients were given chewing-gum with addition to standard regime and control group patients were given only standard regime.

**Results:** Both samples were comparable regarding demographic characters, intraoperative, and post-operative care. There was a significant difference in the return of bowel movement (8.8 versus 17.5 hours), first feeling of hunger (7.2 versus 12.5 hours), first passage of flatus (17.5 versus 26.4 hours) first defecation (27.1 versus 37.2 hours) respectively in study and control group. All the patients' chewing-gum was tolerated well without any side effects.

**Conclusion:** Study concludes that post-caesarean bowel mobility can be accelerated by gum chewing and it is cost-effective, safe, tolerable.

### KEYWORDS

POP, LSCS, chewing-gum

### INTRODUCTION

Caesarean section is most common interventional surgery in obstetric practice all over the world. It is a procedure whereby fetuses after 28 weeks are delivered through incision on abdomen and uterine wall. Lower segment caesarean section (LSCS) is performed by taking incision on lower uterine segment and most commonly performed surgery as opposed to classical or upper segment caesarean section. International health community has considered ideal rate of caesarean section is 10-15%. In practice this goal is never achieved and incidence has been increasing steadily day by day by 2-3 folds as shown in article by shewli shabnam. She has taken detailed review of lower segment caesarean section in Indian scenario and statistics given by her is as follows. Average caesarean section rate in all over India is 12% in public institution and it's much higher in private sector almost more than double that is 28% as it depends on many factors. There is a significant difference from state to state ranging from 3.8% in Bihar to Kerala 27.8% in public institution as opposed to 17.0% in Rajasthan to 55% in west Bengal.

Caesarean section which is associated with central nervous system (CNS) changes in post-operative period leading to decreased post-operative peristalsis (POP), bowel movements and other driven problems like post-operative paralytic ileus<sup>3</sup>. Post-operative ileus is a transient cessation of coordinated bowel motility after post abdominal surgery<sup>4</sup>, leading to abdominal pain, abdominal distension, inability to start oral feeding and breast feeding. Hence delaying the hospital discharge and increases the cost of hospital care for patients<sup>5</sup>. Actually pathogenesis of paralytic ileus is multifactorial mediated through a stress response that results in a state of high sympathetic activity; a known extrinsic inhibitor of intestinal motility. In addition inflammatory mediators such as nitric oxide, vasoactive intestinal peptide, substance P and calcitonin gene-related peptide are released as part of the stress response

and these also appear to contribute to postoperative ileus. The basic related mechanism being dysfunction in parasympathetic system activity (inhibitory neurons)<sup>6</sup>. In addition drugs used for anaesthesia can also play a major role in its pathophysiology e.g. Atropine and halothane.<sup>7,8,9</sup>

In practice the assessment of peristalsis movement is monitored clinically and obstetrician cannot shift patient on oral diet unless satisfactory peristaltic activity is demonstrated. So researchers have tried to stimulate peristaltic activity by mechanism like "sham feeding" which is the process of chewing food but spitting it out before swallowing. In our research we are using sugar free chewing gum to study its effect on peristalsis. Few studies have shown favourable effect in stimulation of peristalsis activity by chewing gum which is nothing but the modified sham feeding with more advantages like easy to practice, more acceptable and hygienic and cost effective. It is supposed to enhance the gastrointestinal activity through cephalic-vagal reflex stimulation, increasing the gastric and intestinal enzyme secretion, return of peristaltic bowel movements and hastens recovery from paralytic ileus<sup>10,11,12</sup>. The sugar substitutes in sugar-free gum (e.g., sorbitol and xylitol) may stimulate bowel function and have a non-stimulant laxative effect.

The physiologic mechanism for the enhanced recovery of bowel motility by gum chewing is assumed to be the activation of the cephalic-vagal pathway, which is stimulating intestinal myoelectric activity in an attempt to counteract activation of the gastrointestinal  $\mu$  opioid receptors. This response leads to both humoral and nervous stimulation of bowel motility. Given this, gum chewing might be a safe and inexpensive way to provide the benefits of early stimulation of the gastrointestinal tract<sup>13</sup>. In addition the content of the chewing gum like maxitol is supposed to have synergistic action.

**MATERIALS AND METHODS**

The randomized controlled trial was conducted on 90 women who had undergone caesarean section under spinal anaesthesia to maintain the uniformity of samples, & to remove the bias of type of anaesthesia as well as to avoid drug action used in general anaesthesia. All patients had undergone primary caesarean section (emergency as well as elective) by a transverse incision on the uterus and a pfannelstiel incision on the abdomen. Inclusion criteria consisted of primigravida with singleton pregnancy undergoing caesarean delivery and willingness to participate in the study. Patients who has inability to chew gum, water electrolyte imbalance, evidence of infection and sepsis, history of intestinal diseases like inflammatory bowel syndrome, pancreatitis etc., history of chemotherapy and radiotherapy, patients with pre-existing co-morbidities like gestational hypertension, pre-eclampsia, gestational diabetes mellitus, previous history of abdominal surgery, premature rupture of membranes, thyroid disorders, multiple gestation and patients who had intra and/or post-op complications were excluded from the study. The participants of the study were divided into 2 groups- study group and control group and they were explained the nature of the study and we asked to fill the consent form and a questionnaire which was to collect demographical information about the participants.

The study group received sugar free chewing gum after recovery from anaesthesia in addition to standard post-operative treatment and care (approximately 6-8 hours post-surgery), three times a day for at least 15 minutes till they were discharged. The control group received the ward's standard and routine care. The patients were asked to report immediately when she felt the first intestinal movement in order to record the time. The time of the first bowel movement, passage of flatus, defecation and feeling of hunger were recorded every 2 hours and the data was analysed. If at all any patients showed any signs suggestive of postoperative paralytic ileus like vomiting and abdominal distension, she was excluded from the study and treated immediately by gastric decompression through Ryle's tube.

**OBSERVATION & RESULTS**

**Table 1**  
**Table no 1 showing socio demographic characteristics of both the groups.**

SOCIO-DEMOGRAPHIC CHARACTERISTICS	STUDY GROUP (N=45)		CONTROL GROUP (N=5)		P-VALUE#
	NO.	%	NO.	%	
AGE (IN YEARS):	6	14	8	17	0.8773#
=<25	39	86	37	83	
LEVEL OF EDUCATION:	15	33	22	49	0.2651#
-BASIC READ AND WRITE	23	51	18	40	
-SECONDARY PASS	7	16	5	11	
-COLLEGE OR MORE					
OCCUPATION:	29	65	27	60	0.8674#
-HOUSEWIFE	16	35	18	40	
-WORKING					
BODY MASS INDEX:	40	89	37	82	0.4258#
- NORMAL (18.5-<25)	5	11	8	18	
-OVERWEIGHT (25-30)					

#Chi square has been applied for statistical calculations and p value found to be not significant to any of the factor. There was no statistical difference between the two groups in terms of

demographic characteristics such as age, education, occupation, body mass index, type of caesarean section or the duration of the surgery. The type of the surgery- whether emergency or elective also did not have any effect on the return of bowel function.

**Table 2**  
**Table no 2 showing duration of operation for both the groups.**

DURATION OF OPERATION	STUDY GROUP (N=45)		CONTROL GROUP (N=45)		P-VALUE #
	Number	%	Number	%	
< 50 minutes	38	83	33	73	0.2033#
<60 minutes	7	17	12	27	

#Chi square has been applied for statistical calculations and p value found to be not significant to any of the factor.

**Table 3**  
**Table no 3 showing different criteria for accessing peristaltic activity.**

INDICATORS OF PERISTALTIC MOVEMENT (IN HOURS)	STUDY GROUP (N=45)	CONTROL GROUP (N=45)	T-TEST VALUE (P-VALUE)*
	MEAN & S.D.	MEAN & S.D.	
TIME OF FEELING HUNGER	7.25 (0.510)	12.50 (0.641)	34.805(<0.0001)*
TIME OF FEELING FIRST INTESTINAL SOUNDS	8.81 (0.342)	17.50 (0.104)	163.27 (<0.0001)*
TIME OF HEARING FIRST INTESTINAL SOUNDS	11.75 (0.342)	18.20 (0.408)	81.273 (<0.0001)*
TIME OF FIRST FLATUS	17.51 (0.456)	26.45 (0.332)	106.916 (<0.0001)*
TIME TO FIRST BOWEL MOVEMENT	27.10(0.510)	37.20 (0.680)	79.71 (<0.0001)*

\* P-value are highly significant with respect to (p<0.0001) for all the 5 criteria for this study.

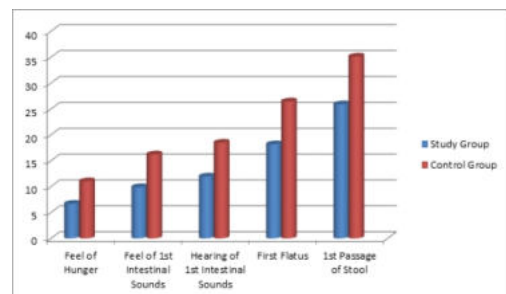
From table 3 we can deduce that the p-values for all the parameters are of high significance (p<0.0001) T-Test has been used for calculations.

**DISCUSSION**

According to table 1 study findings, no significant difference was seen in terms of age, education, occupation and BMI between the study group and the control group. The former tolerated the gum showing no feeling of dissatisfaction, or no advent of abdominal discomfort was seen.

Table no 2 shows that there is no significant difference in operative time on GI tract motility.

The following histogram shows the statistical significance of the means measured in hours for both the study and the control group.



The table 3 parameters are considered most important ones for discussion. In this study we have considered 5 different points to access the difference between two groups.

1. Feeling of hunger which is felt as soon as peristaltic activity has begun to start. That time patient also gets feeling of comfort. There was difference of about 5-6 hours between 2 groups. That is study group felt hunger 5-6 hours earlier than control group. The results are also found to be high statistical significance seen by p value <0.0001.
2. Feeling of intestinal sound i.e., gurgling by the patient as seen in the table. The difference between two groups was about 8-9 hours i.e. the study group patients felt intestinal sounds 8-9 hours earlier than control group patients which also shows highly significant statistical value i.e. p value < 0.0001. Our findings are similar to study of Dehcheshmeh<sup>15</sup> et al and Rashad<sup>16</sup> et al who has also got difference of 6-7 hours in study group and control group patients.
3. Regarding the audibility of bowel sound by auscultation there was difference of 6-7 hours in both the groups i.e. in study group it was 6-7 hours earlier than in control group patients showing again highly significant statistical value ( p value < 0.0001 ) and our results are similar to other studies such as Rashad<sup>16</sup> et al, Ledari<sup>17</sup> et al, Yaghmaei<sup>9</sup> et al.
4. About the time of first flatus there was difference of 8-9 hours in both the groups i.e study group patients passed flatus 8-9 hours earlier than control group showing highly significant statistical value.(p value<0.0001). Our study similar to study of Rashad<sup>16</sup> et al.
5. Passage of stool is most important amongst the all criteria which is 100% proof that intestinal function has completely regained. About 10 hours difference was found in both the groups i.e. the study group passed stool approximately 10 hours earlier than the control group showing highly significant statistical value ( p value < 0.0001). These results are similar to study of Rashad<sup>16</sup> et al and ledari<sup>17</sup> et al who got the difference of 7-8 hours between study and control group.

All the criteria in table number 3 are of high statistical significance value and proves that chewing gum can play definite role in stimulating peristaltic activity. Also other study done by Bahen<sup>18</sup> et al have concluded and confirmed the usefulness of chewing gum in reduction of post-operative paralytic ileus.

Cochren<sup>11</sup> data base review published in February 15 by analysing 81 studies shows beneficial effect of chewing gum in post-operative recovery of gastrointestinal function.

Similarly Vasquez<sup>19</sup> has also found favourable effect of chewing gum on peristalsis & have strongly recommended addition of chewing gum in standard treatment.

## CONCLUSION

A conclusion has been drawn on the basis of the results and observations of the present study indicating effectiveness of sugar-free gum chewing on peristalsis activity after primary lower segment caesarean section. It is an acceptable and inexpensive physiological method for decreasing the time of regaining bowel movements and earlier passage of flatus and stool. Sugar-free gum chewing has also shown to lower the incidence of post-operative paralytic ileus which is considered as the biggest fatal concern after any abdominal surgery.

Hence, gum chewing can be added to the routine regimen of post-caesarean care in every two or three hours without any concern as it is a low-cost, safe, tolerable treatment in early intestinal stimulation.

This study only included women who has their first caesarean delivery, and has been a success in showing the marked statistical differences in the study group compared to the control group. The interaction of sugar free gum in patients with underlying factors like hypertension, eclampsia and pre-eclampsia, diabetes and obesity must be studied. If it proves to be effective with no adverse effects then this method can be used more widely in LSCS and other abdominal surgeries.

Lastly, it will also help to open a new window of possibility

regarding complete avoidance of POPI and prove to be a major economical breakthrough in India by reducing the duration of stay in the hospital by two or three days which can also reduce the overall cost. Also decreasing the cost of treatment for ileus and associated complications like infection, bed sores and venous thromboembolism. Early ambulation is one of the important factors for the prevention of postoperative complications. In short chewing gum method is most simple, acceptable, well tolerated, and cost effective and can be added routinely along with other standard regime as suggested by Vasquez<sup>19</sup> et al study.

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