Abstract of dissertation entitled

“An evidence-based protocol of gum chewing in preventing postoperative paralytic ileus in adult patients after abdominal surgeries”

Submitted by

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Postoperative paralytic ileus is a very common complication following with abdominal surgeries. It has been affecting a lot of patients in the local setting. It is also a difficult situation for the health care providers.

In many studies, the use of chewing gum has been shown to be an effective method for the prevention of postoperative ileus. It is significant in helping patients to resume their bowel function in an easy and harmless way. It is hopeful that this innovation can help more patients in the local setting.

In this regard, this translational research aims at developing an evidence-based protocol on using chewing gum in the prevention of postoperative paralytic ileus for adult patients after abdominal surgeries. A systematic search for relevant literatures was performed with the use of three electronic databases. Five relevant studies were found. Critical appraisal on the relevant studies was conducted. The level of evidence extracted from the studies was graded according to the Scottish Intercollegiate Guidelines Network (SIGN) and were synthesized to establish the protocol for patients in the proposed setting. The implementation potential of the protocol was assessed in terms of the transferability, feasibility, and cost benefit ratio. An implementation and evaluation plan was established for comprehensive evidenced-based protocol development.

The successful implementation of the protocol will be beneficial for the patients undergoing abdominal surgeries as it may prevent them from ileus, minimizing their suffering and hasten their recovery.
“An evidence-based protocol of gum chewing in preventing postoperative paralytic ileus in adult patients after abdominal surgeries”

by

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Declaration

I declare that this thesis represents my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation on report submitted to this University or to any other institution for a degree, diploma or other qualification.

Signed _______________________

Li Fong Ming
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Chapter 1 Introduction

1.1 Background

Postoperative care (Nicholas, 1941) plays an important role in nursing for patients’ recovery after surgery. Along the recovery process, ileus has been a great challenge, which is a common complication in patients who have undergone abdominal surgeries. Postoperative ileus (POI) is defined as “A temporary impairment in gastrointestinal motility following surgery” (Artinyan, 2008). After surgery, affecting by anesthesia or other drugs effect, complete bed rest, and continuously keeping nil by mouth, the GI system is likely to “switching off” for a certain period of time. For patients who have difficulties in “switching on” again so as to resume the normal GI function, ileus may have been occurred. It causes trouble to both patients and the medical staff. It also adds burden to the medical system of the community.

Patients’ suffering

For patients, POI is a huge suffering combining with pain, vomiting and bloating (Quatromoni, 1980). It often let patients down by destroying their prior expectation to the operation. POI prolongs patients’ postoperative recovery and could lead to further health problems such as nutritional and psychological problems.

Nurses’ challenge

For nurses, POI is a difficult situation to deal with. POI increases nurses’ workload by requiring close monitoring. Also, active intervention to cases of severe ileus, intensive explanation of condition to patients and their relative, are all hardship to the frontline staff. POI challenges nurses with the nurse-patient
communication, symptom controlling for patients, maintenance of patients’ quality of life and also the long way of their rehabilitation.

**System’s challenge**

For the medical system, POI increases medical expenditure of the community by prolonged hospitalization of patients. Additional treatment, medication and care are all needed for POI. It stressed the medical system and the staff thus threatens the medical service (Bisanz, 2008).

**1.2 Affirming needs**

**Insufficient current guidelines**

My setting is a surgical unit at a local government hospital. Traditional postoperative care has been practiced for many years. For cases of POI, medical staff in my local setting tends to make use of nasogastric tube insertion in most of the time (Sagar, 1992). It is to drain out excessive excretion and gas from the patients’ stomach so as to promote their comfort and gut movement in a certain extent. However, the insertion of NG tube always causes another way of suffering to the patients. Normally, physiotherapy is relied to be the main treatment for POI. By mobilizing the patients, it is believed to be useful in stimulating the body functioning including the GI system. In reality, physiotherapy has its limit to postoperative patients. It is not suitable for ill cases. Wound bleeding, wound pain, and the risks of fall are all obstacles for physiotherapy. In other words, although physiotherapy is still the golden treatment for POI in the setting, it is not always applicable to all POI cases. On the other hand, it can be harmful if implementing inappropriately.

**Gap in current practice**
The treatment for POI is generally conservative in the local setting. POI is treated as a normal complication. Under the current guidelines, medical staff has little preparation for the occurrence of POI since it is not a complication that happens absolutely in every single case. In most of the cases, medical staff would just deal with it when it happens. The readiness for managing POI is limited, as it is not directly fatal, however, it is unpleasant and traumatic. There is always an old saying of “Prevention better than cure”, and this should also be applied to POI. To deal with POI, there is a variation in care between units and even between staff. In some units, early feeding after surgery is advised to be beneficial in resuming patients’ GI function (Seenu, 1995). In other unit, early ambulation is suggested. There are also units suggesting massage to abdomen could stimulate gut movement. There is no conclusive management method for POI and it is always hard to judge which is better or worse. There is no evidence-based guideline, which tells nurses how to manage POI systemically. There is no structural practice but medical staff tends to manage POI by their own experience or basing on senior staff’s experience. The practice gap is significant. Need for a change

Managing the problem of POI should be in high priority in the surgical department. It is still a very common complication with limited prevention and education available in the settings. POI is known to be one of the most torturing postoperative experiences of patients. It is a clinical problem created additional to the primary illness, which made the disease process become complex. Moreover, in terms of prevalence and severity, POI has never been behind any other postoperative complication such as wound infection or chest infection. However, when management protocols for wound infection and chest infection
are available and keep on developing, it is still a blank page for POI. When POI occurs among patients, it always takes a long way to have it resolved. It keeps demanding on patients, nurses and even the medical service without significant breakthrough in recent years.

1.3 Significance and objectives

Significance

Over the decade, gum chewing has been studied for its effectiveness in preventing POI in many western countries. There have been a lot of clinical trials done to prove the significance of gum chewing. There are also studies done by researchers to learn about the mechanism of gum chewing in stimulating gut movement. In most of the researches, gum chewing has been positively commented on its effectiveness. In some western hospitals, it is even practiced by nurses under evidence-based guideline. Unlike physiotherapy, gum chewing is known to be a safe treatment with no complication to implement after surgery. There is no reason of not adding gum chewing into the postoperative care protocol in terms of POI prevention.

In the local setting, however, gum chewing for POI still has much room of development in the surgical aspect. New innovation is often difficult to introduced unless it arrives at the most critical moment. It tends to be conservative and passive in making changes in the local setting. Therefore, gum-chewing protocol is still not yet been approved to used.

Objectives

Understanding the possible advantage of gum chewing with balancing its cost effectiveness, gum chewing is considered as a feasible innovation to support.
By designing an evidenced-based guideline for gum chewing in POI prevention, it is believed that the patients, the nurses and the medical system would be benefited from it. With evidenced-based gum chewing protocol, patients would have a great chance in preventing POI. This allows an additional aid on top of the traditional care in helping patients with the return of bowel function. This would possibly minimize their postoperative suffering and improving comfort. Also, this innovation would provide a clear guideline for nurses, helping nurses to have consistent practice in preventing POI of the patients, thus increasing the quality of care. The gum chewing guideline would probably raise the awareness of the prevention of POI among the medical staff. The prevention of POI would eventually reduce the stress to front line nurses by reducing the occurrence of it. To the medical services, burden in caring complicated postoperative cases would also be minimized with less POI cases. Confidence towards the medical service would be increased with the rapid recovery of patients. This would also improve the whole medical system by encouraging evidence-based practice. All in all, the chewing gum protocol is worth to implement. It is supported by many previous studies and it is transferable. It should be the time of bringing its benefit to patients in the local setting.
Chapter 2 Critical appraisal

2.1 Search and appraisal strategies

In this dissertation, three electronic databases have been used. They are the PubMed, the CINAHL and the Mosby’s nursing consult. For search keywords, “chewing gum”, “sham feeding”, “postoperative ileus”, “bowel movement” and “postoperative care” are used in different combination throughout the search process.

Inclusion and exclusion criteria

There are several inclusion criteria for the search. To be selected, subjects have to be aged 18 or above, who has undergone abdominal surgery under general anesthesia for any indication. They have to be able to provide written informed consent. They also have to be able to chew gum. Cases of emergency surgery, postoperative admission to ICU or requiring postoperative intubation, subjects with previous bowel surgery, complaints of chronic constipation, history of inflammatory bowel diseases, thyroid diseases, intestinal obstruction, abdominal radiation or neoadjuvant chemotherapy are all excluded in the selection.

Summary of searching

In total, there are five different papers selected from the three databases. More details of the five studies are summarized in form of table of evidence attached in appendix 1. SIGN is selected as the appraisal tool in this dissertation. It is a methodology checklist to rate the quality of the research papers. In this paper, SIGN checklist for controlled trials would be used since all selected papers are using randomized control trials. Every selected paper would be assessed for
its internal validity and overall quality by SIGN checklist. Rates of quality would be given to each study at the end. For the selected five papers, they all rated acceptable quality with one paper got high quality through the assessment. Individual comment was made to each paper in the checklists. All SIGN checklists would be attached in appendix 2 in this paper. For grades of recommendations, please kindly refer to the next chapter of this dissertation.

2.2 Results

The period of search is from the December of 2013 to May of 2014.

PubMed

From PubMed, 145 citations were found after keyword search; 11 citations were chosen after further screening of titles and abstracts; 2 citations were chosen after reading the full text; 1 more citation was chosen after checking reference and removing duplicates. At the end, 3 citations were selected from PubMed.

CINAHL

From CINAHL, 285 citations were found after keyword search; 19 citations were chosen after further screening of titles and abstracts; 1 citation was chosen after reading the full text; no more citation was chosen after checking. At the end, only 1 citation was selected from CINAHL.

Mosby’s

From Mosby’s, 43 citations were found after keyword search; 12 citations were chosen after further screening of titles and abstracts; 3 citations were chosen after reading the full text. At the end, 1 citation was selected after
removing all duplicates from the previous search results of the other two databases.

**Summary of data**

All search history is available in *appendix 3* in table form. There are totally five RCTs selected in this paper whereas three from the PubMed, one from the CINAHL and one from the Mosby’s. Among the five studies, two of them are from Turkey, and the other is from India, California and Korea accordingly. The five papers were published between 2006-2013 with all of them presented in English. The sample size of the five studies varies from 34 to 152 participants. Abdominal surgeries with any indication are selected with fulfillment of the inclusion criteria and exclusion criteria. Gender of subjects is not specifically selected.

All the five papers support the possibility of chewing gum to be implemented for POI prevention. They all show significant data in proving the effectiveness of chewing gum in hastening bowel motility. They also share similar inclusion and exclusion criteria. Effects from extrinsic variables are successfully minimized through the selection in the five papers. They share similar protocol of chewing gum implementation as well with all of them choosing sugarless gum in the trails. However, the schedule of gum chewing varies between the five studies. Moreover, they have similar outcome measurement with all of them focusing on the response from the bowel including bowel sound and the passage of flatus. Lastly, they all use mean for their statistical comparison between intervention and control groups. They all present a shorter time, in term of mean, in having the return of bowel function for the gum-chewing intervention groups.
2.3 Summary and synthesis

Summary

In summary, the five papers share no diversity of conclusion. According to their results, patients in their intervention group, who have gum-chewing regime, generally experienced an earlier return of bowel moment. In terms of time measuring in hours, they all show a shorter period of time to have the first flatus and bowel sound heard after surgery from the intervention group comparing to the control group that received only standard normal care. The presence of the first flatus and bowel sound after surgery does imply the absence of POI. This shows how the chewing gum works in getting rid of POI by motivating the gut movement of the patients. Although there is small variation in methodology such as blinding, randomization procedures, and chewing gum protocol, the conclusion of the five papers are still consistent.

Synthesis

It is believed that gum-chewing protocol for POI prevention is applicable to implement in my local government setting. Making use of the five selected papers, several recommendations are made for the innovation and the target group.

Choice of gum

For the innovation, sugarless gum should be used. All the five papers have selected sugarless gum with obvious reasons. Sugarless gum is suitable for the largest number of target group including those who have limitation in taking sugar such as the diabetic patients. It is suggested to choose chewing gum with
the simplest component so as to minimize any risk of allergy or unpleasant reaction in patients.

Timing for implementation

For the timing of implementing the chewing gum protocol, which is the time to let patients start gum chewing, two out of the five papers suggested to start on postoperative day one while one paper suggested 6 hours after surgery and the other papers did not specify the start time. It is believed that postoperative day one would be a good timing to start the gum chewing protocol. It is because at the day of surgery, patients may fail to return full conscious level. Gum chewing requires a person’s self-initiation in the movement of chewing. Role of nurses and target patients

For nurses, their job may be administrating the gum and help with the time keeping in schedule. Patients need to initiate the chewing procedure on their own effort so it is better not choosing the time right after the surgery but postoperative day one. It allows the target patients enough time to rest and wake. It prevents the insufficient chewing due to fatigue or accidental swallowing of gum due to unconsciousness. Postoperative day one is believed to be the best timing to start the gum chewing protocol. It is commonly suggested in the five papers that, the sooner to start with the protocol, the earlier patients could resume their gut moment through the simulation from chewing. As long as having the target patients have their conscious level return normal, the chewing gum protocol should not be delayed.

Chewing gum regime schedule

In terms of the chewing gum regime schedule, the five papers had the largest diversity in it, despite sharing almost everything in common. Four out of
the five papers suggested having gum chewing three times a day with different
duration while one paper suggested eight times a day with chewing gum two-
hourly from 8am to midnight every day. According to the result from the papers,
the one suggested chewing gum two-hourly did produce in the shortest time for
first flatus and first bowel sound with 6.07 hours and 3.92 hours compared to the
other four papers. From the results of all papers, it can be roughly concluded that
the more gum patients chew, the less time to spend time in resuming their bowel
movement. The time need for the first bowel sound heard and the first flatus
noticed decreased from the increased amount of gum chewing. However,
considering having gum chewing two-hourly from 8am to the midnight, there are
totally eight times of chewing to patients and also eight times of administration
and time management of chewing gum from nurses. Although it produces the
best result of gut motility after surgery, it can be a demand to both patients and
nurses. From the beginning, it is wished to relieve nurses and patients’ burden
from POI, however, the frequent gum chewing become another stress to the both
side. Therefore, in order to balance a suitable regime for gum chewing,
administrating three times a day suggested by the majority of papers should be
considered. For the papers suggested three times a day for gum chewing, they
suggested each time for chewing from 30 min to 60min. Considering having gum
chewing for 60min did not resulted in a shorter time for the first flatus from the
paper, 30min of gum chewing is recommended.

**Target group**

For the target group, patients who have undergone abdominal surgeries
are believed to be a large group with large effect size beneficial from the chewing
gum protocol. Abdominal surgery is a very common operation. Many surgical
illnesses would need involvement of abdominal surgery along the disease process. In terms of inclusion criteria, it is known to be a flexible selection according to the five papers. Restriction in age at 18 or above is reasonable, while the ability of providing inform consent and chewing gum are also reasonably specified for this kind of study. Comparing the five chosen papers, they commonly have no strict criteria for the selection of target group unless it is a complex abdominal surgery with potential difficulty in implementing the gum chewing protocol. The exclusion criteria are also reasonable without significant avoidant of unwanted results. They all stressed that patients who had previous bowel problem should be excluded in the study since it may not reflect the effectiveness of gum chewing in reality. Those previous bowel problems may yield false results. For cases of emergency surgery and postop admission and intubation to be excluded, it is also reasonable, as it is a very common exclusion criterion in many other medical studies. Therefore, the common exclusion criteria from the five papers are appreciated and should be make use of.

**Conclusion of synthesis**

All in all, summarizing from the five papers, it is recommended that making use of sugarless gum, by first administrating gum chewing at postoperative day one for the target patients, with three times a day and 30min of chewing in each section would possibly yield the best result balancing the pros and cons in all aspects. For the selection of subjects, all the five papers are appreciated in their reasonable inclusion and exclusion criteria. There is no intention of them to yield results on their preference. The degree of randomization is also satisfactory.
According to the five papers, the chewing gum protocol will be continued until the return of target patients' gut motility unless they are no longer suitable to follow the protocol along the way. The length of follow up would be the time when the first flatus passes and the first bowel sound heard. Prevention of POI is achieved with the active stimulation of the return of gut moment. Patients would be possibly beneficial from it without experiencing the torture from POI. In this paper, it is hopefully to illustrate the effectiveness of the chewing gum protocol for patients who have undergone abdominal surgeries, in prevention of POI and to hasten the return of their bowel function, comparing with the patients from abdominal surgeries, who receive traditional postoperative care.
Chapter 3: Implementation potential

In this chapter, implementation potential of using chewing gum to prevent POI will be discussed. Discussion will be made on the target setting, the target audience, transferability of findings, feasibility and the cost-benefit analysis. An evidence based practice protocol will be proposed in the later part, illustrating with recommendations.

3.1 Target setting and target audience

Target setting

The target setting will be the surgical wards from a local government hospital at the Kowloon west cluster. There are five surgical wards at the target hospital. There are totally 200 beds and the yearly admission rate is around 3000 patients. There are roughly 300 patients receive abdominal surgeries every year. The selected ward provides surgical service to population mainly living at Kwai Chung, Tsing Yi and Mei Foo with around 0.56million of residents, which is around 8% of the total Hong Kong population (Population Census, 2011).

Target audience

The target audience will be the patients who admitted to the target setting. They have to be aged 18 or above with any indication which have them undergone abdominal operation under general anesthesia.

3.2 Transferability of the findings

3.2.1 Target setting and audience

Target setting
All selected studies were conducted in surgical wards with similar setting with the target setting.

**Target audience**

Subjects in the selected studies share similar characteristics with the target audience including age, disease and intervention. They are aged 18 or above with major operation done under general anesthesia. Thirdly, as both the subject from the studies and the target audience have to be undergone abdominal surgeries, they all face similar risk of postoperative ileus as it has a high incidence rate among this kind of operation. Moreover, all the selected studies were conducted in cities, which share similar economic and social background with the target setting.

### 3.2.2 The philosophy of care

The philosophy of care underlying the new innovation fits to the target setting. Prevention better than cure is one important belief of the target hospital. It is always hoped by the target hospital that, to help patient by taking Preventing measure could let them get rid of suffering. Besides, the target hospital also believes in humanism. It encouraged all kind of non-invasive measure before the need of invasive intervention. It believes that minimizing the suffering of patients along their hospitalization is one important mission. The use of chewing gum is a new kind of preventive treatment for POI. It is also a non-invasive measure, which is harmless to patients. This innovation fit the philosophy of care of the target hospital.

After comparison between the target setting and the selected studies, it is found that the new innovation is fit to the target setting with high level of transferability from the findings.
3.2.3 Number of people benefiting

A sufficient amount of surgical patients will be beneficial from the new innovation. According to the statistic of the target hospital, there are roughly 250 surgical admissions every month with around 10% of them have the need of abdominal surgeries. Most of them face difficulties in having return of bowel function mainly due to drug effect and prolong bed rest. For rough estimation, by implementing the new innovation, it could help around 300 patients to prevent POI and to enhance bowel motility annually in the target setting.

The new innovation would take 58 weeks for implementation and evaluation. A committee would be formed for launching the innovation. The committee would be responsible for planning, training, implementing, data collecting and evaluation. Regular meeting would be held for problem solving and quality control. Timetable of launching the innovation is attached to appendix 5.

3.3 Feasibility

In the target hospital, it encourages evidence-based practice with the setting up of a Journal club. Having previous trails of new innovation supported by the hospital, it is believe the chewing gum protocol would have the freedom to try and the freedom to stop if anything goes wrong. The Journal provides funding to be applied for new program. With funding, it is feasible to carry out staff development and buying equipment such as sugarless gum. It is also feasible to employ extra staff to take up the additional workload from the implementation of new innovation. All nurses from the target ward are familiar with
postoperative care so it is believed that it would be easy for them to carry out the chewing gum protocol since it requires mainly basic care.

Both department manager and ward manager are supportive to new innovation. However, gaining consensus from ward nurses would be the biggest challenge. Although administrating chewing gum is similar to administrating medicines, which requires minimal extra technique, however, monitoring patients under the chewing gum protocol could add workload to ward staff. This could lead to a moderate amount of interference to current staff function. Besides, it is always difficult to make changes with agreement from all staff. Some nurses may be reluctant to new practice while some may feel difficult to comply with new protocol. From observation, nurses from the target ward share different degree of ability in adaptation. The problem of consensus is obvious for the chewing gum protocol.

The evaluation would be divided into two parts: protocol effectiveness and feedback from personnel. Patients’ report of first flatus and first bowel sound heard by nurses are the evaluation tools to use for protocol effectiveness. All record will be kept with time record. All data from target audience will be collected and analyzed to draw a report of effectiveness of the chewing gum protocol. Besides, two sets of questionnaires would be distributed to patients and nurses. For nurses, feedback on the program and guideline would be collected for future modification of the protocol. For patients, their satisfaction level would be assessed. The program committee would be responsible to work on the evaluation at the later part of the program.
3.4 Cost-benefit ratio of the proposed protocol

3.4.1 Potential risk of the innovation

The chewing gum protocol appears to have minimal risk to patients. In the selected studies, most of them stated the harmless use of chewing gum is the biggest advantage of it. Only a few of exceptional cases reported unfavorable condition after using the chewing gum, including gastric discomfort and accidentally swallow of gum.

3.4.2 Potential benefit of the innovation

The chewing gum protocol brings more benefit than risks to patients. All selected studies show scientifically significant result of preventing POI by using chewing gum. They all prove it having a shorter time to first bowel movement and flatus. Chewing gum is cheap and user-friendly. It is easy to administrated by nurses and easy to use by patients. By using sugarless gum, it has no worry in increasing patients’ blood glucose level. Since the gum would not go along the digestive system, it also prevents the possible ileus causing by eating. It stimulates the gut movement by sham feeding.

3.4.3 Cost-benefit analysis

In terms of material cost, it is another advantage of the chewing gum protocol. Sugarless gum is cheap in. Staff training is needed though it doesn’t need a lot since the protocol does not require complicated techniques. The biggest cost comes to the employment of extra staff to share additional workload. The set up and operational cost is illustrated in appendix 6. In terms of non-material cost, it would be the stress from staff. When it reaches to an unacceptable level of stress, turnover of staff would be another cost. Nurses need time for adaptation and training. Along the adaptation process, support from
colleagues and manager are important to overcome difficulties. To deal with staff stress, the committee and the manager can hold briefing session at the beginning of every shift. This could facilitate information exchange and create psychological support to staff. The program committee should actively help with problem solving and encounter difficulties from staff. After that, the non-material cost can become non-material gains, which are the encouragement of evidence-based study and the supporting atmosphere at ward, which enhance staff morale.
Chapter 4: Developing evidence-based practice protocol

4.1 Title
An evidence-based protocol of gum chewing in preventing postoperative paralytic ileus (POI) in adult patients after abdominal surgeries.

4.2 Intended users of the proposed protocol
Surgical nurses who provide postoperative care to patients who are at risk of POI.

4.3 Purpose of proposed protocol
1. To provide an evidence-based protocol of best practice on using chewing gum in preventing POI for adult patients who have undergone abdominal surgeries.
2. To guide and assist nurses in providing care based on the best evidence in preventing POI for adult patients who have undergone abdominal surgeries.
3. To ensure patients receiving consistent, standardized and evidence-based care in the surgical units.

4.4 Target population of the proposed protocol
The target population includes all surgical patients who are aged 18 or above, has undergone abdominal surgeries under general anesthesia for any indication, with the ability to provide informed consent and to chew gum.
4.5 Rating scheme for the strength of the evidence and grades of the recommendations

The Scottish Intercollegiate Guidelines Network (SIGN) is used to rate the level of evidence with scoring from 1++ to 4 with 1++ as the highest and 4 as the lowest. It rates the grades of recommendations with grading with A, B, C, D and whereas A is the highest grade and D is the lowest grade for recommendation. Indicates the best practice recommended. (Scottish Intercollegiate Guidelines Network, 2014) (Appendix 7)

4.6 Recommendations

Assessment

Recommendation 1 Grade of recommendation: A

Assess patients’ ability to follow instruction and to chew gum.

Patients have to be aged 18 or above, whom has the ability to provide written informed consent, to chew gum and to report for their first flatus.

Supporting evidence:

- It is important for the patients have full understanding to the intervention ahead and agreement to undergo. It is also important to ensure patients dental condition. Patients having loose teeth or dentures may not fit for the intervention. Patients’ cooperation of reporting first flatus would help nurses to know the process of the intervention. (Chol. 2011; Ertas, 2013; Marwah, 2012; Schuster, 2006) (1+)

Recommendation 2 Grade of recommendation: A

Exclude the patients who are ineligible to receiving chewing gum.

Cases of emergency surgery, postoperative admission to ICU or requiring
postoperative intubation, subjects with previous bowel surgery, complaints of chronic constipation, history of inflammatory bowel diseases, thyroid diseases, intestinal obstruction, abdominal radiation or neoadjuvant chemotherapy are all not fit to undergo the chewing gum protocol.

Supporting evidence:
-To exclude patients who are ineligible could prevent ineffective use of the new innovation, which may fail to yield expected outcome in specific cases. It also prevents the misuse of chewing gum in patients who are not fit to use. This could minimize the adverse reaction causing from the chewing gum though it is in rare cases. (Chol. 2011; Ertas, 2013; Marwah, 2012; Terzioglu, 2012) (1+)

**Intervention**

Recommendation 3 Grade of recommendation: A

*Using sugarless gum for the chewing gum protocol.*

Sugarless gum would be selected as the only choice of gum for the patients to use.

Supporting evidence:
-Sugarless gum appears to be the best choice of gum comparing to those with taste or flavor. It is because sugarless gum can prevent any harmful event to patients who are restricted to sugar intake or having allergy to any kind of spices or artificial flavoring. (Chol. 2011; Ertas, 2013; Schuster, 2006) (1+)

Recommendation 4 Grade of recommendation: A

*Starts the chewing gum protocol on postoperative day 1.*

The chewing gum protocol will start on postoperative day 1. For patients who have difficulties to start the chewing gum protocol, they could postpone it until they are physically and mentally fit for it; or exclude from it when they meet an
exclusive criteria.

Supporting evidence:

- Most patients recover to full consciousness within 6 hours after the operation.

Concerning of the possible fatigue from the operation, postoperative day 1 appears to be the best timing to start the chewing gum protocol, which allows patients time to rest before getting start. The principle is to start the protocol as soon as possible to make the prevention effective. (Ertas, 2013; Schuster, 2006) (1+)

Recommendation 5 Grade of recommendation: A

*Chewing gum regimen scheduled to 3 times per day, 30min per time.*

The most favorable dosage of chewing gum would be 3 times per day. Having 30min for each section is appropriate after balancing the cost and benefit of using it.

Supporting evidence:

- According to the studies related to chewing gum and the return of gut movement, there is a significant result showing that the more gum patients chew, the shortest time they have their first flatus and bowel sound heard after surgeries. However, it is not a pleasant experience to chew gum all the day. It may cause heavy burden to nurses if the dosage of chewing gum is too frequent. Comparing different results from the studies, 3 times per day and 30min per time appear to be the optimal dosage that is more acceptable for nurses and patients, it also yields reasonable results. (Chol. 2011; Ertas, 2013) (1+)

Recommendation 6 Grade of recommendation: A

*The chewing gum protocol (Appendix 11) will be continued until the return of bowel function.*
The chewing gum protocol starts on postoperative day 1 and would be ended at the time after their first flatus and first bowel sound heard. For patients who are not suitable to continue the protocol, such as having health deterioration, the intervention will also be stopped.

Supporting evidence:
- The chewing gum protocols successfully prevent POI when knowing that the bowel movement is return. Patient would be able to proceed to digest solid food afterwards. (Chol. 2011; Ertas, 2013; Marwah, 2012) (1+)

**Evaluation**

Recommendation 7  
Grade of recommendation: A

*Nurses will check patients’ first bowel sound and will record the time of the first flatus.*

Patients will be asked to report when they pass their first flatus after surgeries. Nurses will also check for patients’ bowel sound hourly using stereoscopes. Nurses will record the time of the first flatus and bowel sound. They are the two important criteria to prove the return of gut motility in the chewing gum protocol.

Supporting evidence:
- Gut movement produces stool and gases. For patients who have undergone fasting, the passage of flatus is an important sign of gut movement. By recording the time of first flatus and bowel sound, it can be used for comparison with control groups. (Chol. 2011; Ertas, 2013; Marwah, 2012; Schuster, 2006, Terzioglu, 2012) (1+)
**Chapter 5: Implementation plan**

To implement the use of chewing gum in surgical adult patients into clinical practice, it is important to integrate the concepts from the new evidenced based innovation into the thinking and practice of the healthcare professionals (Melnyk, & Fineout-Overholt, 2005). Disseminating and implementing of the chewing gum protocol to stakeholders need a communication plan. It helps to convince others in the local setting to implement a new innovation.

**5.1 Stakeholders**

Stakeholders are people who are affected by the proposed changes or anticipated results of the proposed innovation (Melnyk, & Fineout-Overholt, 2005). Different categories of stakeholders share different characteristics, role and responsibilities. They may have different concerns and needs in the implementation of the new innovation.

In the chewing gum protocol for postoperative adult patients, the key stakeholders are the Department Operational Manager (DOM), surgical ward managers and the consultants of the department of surgery. They are the administrators who have the highest administrative power to approve the chewing gum protocol. They are also responsible in approving resources such as budgets and manpower for the clinical adjustment and innovation implementation.

Frontline nurses including APN and RN in the surgical units are the largest group of stakeholders. They are responsible to follow the new guidelines and to carry
out pilot study. They are responsible in assessment, planning and evaluation. For APN, they have to be trained to be trainer. They are responsible in problem solving and to act as a bridge of communication between RN and the administrators. The introduction of new chewing gum protocol brings changes to current practice. A certain amount of workload may be added to their duty.

Doctors are involving in selecting suitable patients for the chewing gum protocol. They prescribe chewing gum to those suitable patients and involve in monitoring of effects. They have the responsibly to terminate the intervention if needed.

5.2 Planning

A working group with 7 to 8 people is initiated. The leader is the proposer of the chewing gum protocol. For the members, they are the DOM, the manager, the SMO, the APN and representatives from RN and medical officers. The working group will hold regular meetings for discussing about how and when to implement the chewing gum protocol. Issues on formulating guidelines and staff training will also be discussed. Adjustment for the clinical area will be made after discussion. Possible difficulties and barrier would be discussed in the preparation plan so as to minimize obstacles of the new guidelines. A pilot study plan will eventually scheduled.

After effective and sufficient meetings of the working group, the group members will disseminate plans and information to all stakeholders. Nurses are the first group of stakeholders to be convinced because they are responsible to
many major parts of the protocol. APN and nurse representatives will report the progress from the meeting from time to time. Queries from stakeholders could be raised out at anytime. The working group members will collect all comments and queries back to the meetings for problem shooting. This facilitates information exchange from all levels of stakeholders.

For clinical adjustment, the selected chewing gum will be supplied to ward. A storage area will be assigned for the gum. An additional 50 stereoscopes will also be applied to ward. Staff training will begin shortly; part time nurses will be recruited to replace manpower during training.

5.3 Sustaining the change

Sustaining the change is one important part in translational nursing. Nurses' compliance to the new protocol will be audited by their documentation and charting. Patients' outcome will be monitored. Equipment and resources availability have to be ensured for use. Regular ward meeting and working group meetings will be carry on for discussing feedbacks and comments from stakeholders. In the meetings, difficulties and problems from staff will be encountered. Success stories will also be shared. Modification of the guidelines will be made according to actual needs. New adjustment will be announced to staff during handover time. The guideline will be reviewed from time to time so as to make it updated.
Chapter 6: Pilot study test

A pilot study will be held to test the feasibility of the chewing gum protocol. It is to test the logistics of the guideline before the large-scale implementation. It allows the chewing gum protocol to be revised if needed. Therefore, a pilot study test will be carried out in one surgical ward for eight weeks before the large-scale implementation.

6.1 Objectives of the pilot study test

There are two objectives for the pilot study test. Firstly, it is to test the feasibility of the chewing gum protocol. Secondly, it is to test the logistics of the protocol and to assess the evaluation tools.

6.2 Study design and sample recruitment

The pilot study lasts for eight weeks. It will be held in one male surgical ward of a government hospital. According to the previous admission record of the ward, around 20 eligible patients will be recruited in the pilot study. Nurses will recruit them on the day before their operation. The sample size of this pilot study would therefore be 20. It takes around 3 weeks to recruit 20 patients. The inclusion and exclusion criteria for samples in this pilot test will be the same as the criteria in the proposed chewing gum guideline. Written consent will be obtained from all eligible patients who agree to take part in this pilot study.
6.3 Data collection

Baseline assessment

After recruitment of patients, ward nurses will explain to eligible patients the pilot study in detail. Nurses will have screening on patients’ planned operation; assess their ability in chewing and reporting. Doctors will also access patients’ bowel sound for baseline record. All eligible patients’ information will be documented including their gender, age, chewing ability, bowel habit and bowel sound.

Intervention

Chewing gum will be administered to patients according to the proposed protocol after they have undergone abdominal operation. The proposed administration time will be their postoperative Day 1 but it may varies depending on the actual physical condition of the patients. Patients’ chewing process will be observed and timed by nurses. They are asked to discard gum after 30 min. They will also be asked to discard gum once they have encounter difficulty in chewing so as to avoid accidentally swallow of gum. Nurses will monitor patients’ bowel sound hourly. Patients are responsible to report their first flatus to nurses once it occurs. They are also required to report symptoms of paralytic ileus including abdominal pain and vomiting. Documentation will be done to record patients’ compliance to chewing gum, their bowel sound and their first flatus.
Apart from patient data, opinion from stakeholders from the chewing gum protocol will also be collected for later evaluation. The actual cost spending on the protocol will be recorded for budget evaluation.

6.4 Data analysis

Data on the incidence of paralytic ileus of patients in these eight weeks will be analyzed and compared with the ward record. It is to test the effectiveness and feasibility of the chewing gum protocol. Patients’ time of first bowel sound and their first flatus will be used for comparison. For those who quit the study, their reasons behind will be documented for later analysis. A questionnaire will be distributed to patients for their evaluation of the protocol. It is attached in appendix 8.

For the staff, their compliance and acceptance to the chewing gum protocol will be investigated in the study. Questionnaires will be used to collect staff feedback. The questionnaire is attached in appendix 9. Sharing sections on chewing gum protocol will be conducted weekly at handover time. By observing the logistic of the implementation of the protocol, the effectiveness of the training process and resources support will be evaluated.

6.5 Evaluation of pilot study
Results of the pilot study include feasibility and effectiveness of the new protocol. Through the pilot study, the logistic of the chewing gum intervention can be tested in trial. Potential technical problems in implementing the protocol can be identified. Prevention and solution to the problems can be made before encountering them in the large-scale implementation. Budget plan will be more concrete for revision. Besides, staff compliance and acceptance to the protocol will be evaluated. Difficulties from staff will be identified. Their comments will be considered in revision of the protocol. The experience from the pilot study will be useful for modification of the protocol. Finalized protocol will finally be reported to administer for approval.
**Chapter 7: Evaluation plan**

By evaluation, the proposed protocol could be determined whether it has met the expected outcomes. It is also important in verifying its success or failure. Several outcomes are identified for the evaluation. They are patient outcomes, healthcare provider outcomes and system outcomes.

### 7.1 Identifying outcomes to be achieved

**Patient outcomes**

The primary outcome of the chewing gum protocol is to reduce paralytic ileus in adult patients after abdominal surgeries. The return of bowel sound and first flatus are considered to be measurement in determining the effectiveness of the protocol. Nurses perform auscultation for patients’ bowel sound hourly. Patients’ report on first flatus and ileus symptoms are used as another measurement. The monitoring will start from postoperative day 1 until the return of patient’s bowel movement.

Patient’s satisfaction level towards the chewing gum intervention is considered as the secondary outcome. They will complete an evaluation concerning the intervention before discharge.

**Healthcare provider outcomes**

Health care providers’ acceptance and satisfaction level towards the protocol are considered as their outcomes. Their attitude towards training,
compliance, and competency all along the implementation process will be evaluated. Another set of evaluation form will be distributed to the frontline staff for evaluation. Besides, the working group of the chewing gum protocol will audit the nursing documentation and charting to check for the compliance.

**System outcomes**

The cost effectiveness of the chewing gum protocol will be measured as the system outcomes. All material and non-material cost will be calculated at the end of implementation period. Patients’ outcome will also be considered whether it is worth to continue the protocol. Possible adverse events will be taken into consideration. Comparison will be made between usual practice and the use of new protocol.

7.2 nature and number of patients involved

**Nature of clients to be involved**

The nature of clients in the evaluation plan is the same as the nature of eligible clients in the chewing gum protocol. They have to be aged 18 or above with any indication which have them undergone abdominal operation under general anesthesia, without any exclusive criteria from the protocol, admitting to the target surgical unit.

**Number of clients to be involved**
The number of clients to be involved in the evaluation plan is determined by the incidence rate of abdominal surgeries; which may complicate with paralytic ileus. From the reviewed studies investigating the effectiveness of the use of chewing gum in preventing postoperative ileus, 34 to 152 patients were recruited. Although they share variable sample size, all the selected studies have proved statistically significant in using chewing gum. They all show that patients who start chewing gum after surgery have an earlier return of bowel sound and flatus. Therefore, 175 patients will be recruited in the evaluation plan to examine the effectiveness of the new protocol. According to the admission record of the target institution, it will take 7 months to recruit 175 patients.

7.3 Data collection and analysis

Based on the previous selected studies, patients’ return of gut motility will be monitored from postoperative day one until their first flatus and first bowel sound heard. Patients’ data will be collected and input to computer for analysis. For satisfaction level, all evaluation questionnaires will be collected after the implementation period. The defined level of significance for the analysis is 0.05 and the confidence interval is 95%.

Patient outcomes

Nurse assesses the bowel movement of patients routinely. They make use of stereoscope to auscultate patient’ lower abdomen hourly. The bowel sound would either be heard or not heard. Therefore, it will be documented as bowel
sound positive (+) or negative (-). Moreover, nurses will also assess patients’ occurrence of flatus and ileus symptoms. They will all be documented as positive (+) or negative (-) in the documentation with accurate time record.

For the satisfaction level of patients, they will fill in a questionnaire before discharge. The questionnaire consists of 7 questions for rating whereas 1 = strongly disagree and 5 = strongly agree (Appendix 8). The total score of the questionnaire raged from 7 to 35. The last question is open-ended; which allows patients to reflect their own comments. Mean, SD and descriptive statistics will be used to illustrate the data. All comments from the last question will be collected and discuss in the meetings.

Healthcare provider outcomes

Questionnaire for healthcare provider will be distributed at the end of implementation period of the protocol. It is a set of questionnaire with similar format with the patient evaluation form. The total score of the questionnaire raged from 7 to 35. The last question is open-ended; which allows healthcare provider to reflect their opinion to the protocol. Mean, SD and descriptive statistics will be used to illustrate the data. All comments from the last question will be collected considered as valuable resources for further modification of the protocol.

System outcomes

Comparison on incidence rate of postoperative paralytic ileus and total cost will be made between the chewing gum protocol and the original practice.
The protocol will be regarded as successful if the incidence rate decreased with 30% and the cost is cut down with 30% for maintaining current practice.

### 7.4 Effective criteria for the protocol

#### Time to first bowel movement

The time to first bowel movement was monitored in all of the five studies (Ertas, 2013; Terzioglu, 2012; Schuster, 2006; Marwah, 2012; Chol, 2011). Among all review studies, they record the time from the time patient return from recovery room until their first bowel sound heard. The time record is measured in terms of hour. Comparison between control group (CG) and intervention group (IG) were made. All resulted in a shorter time in the intervention group for the first bowel sound. The shorter mean time of IG from the five studies varies from 3.92 (24.3%) hours to 26.2 (29.3%) hours. After analysis, the protocol will be regarded as successful if the patients under the chewing gum protocol have 25% faster in time for first bowel sound compared with patients without chewing gum treatment.

#### Time of postoperative first flatus

In the review studies, the time reported from patients under chewing gum protocol for their first flatus is commonly faster than patients with normal practice. The shorter mean time of IG from the five studies varies from 6.07 (18.8%) hours to 14.8 (18.5%) hours. After analysis, the protocol will be regarded as successful if the patients under the chewing gum protocol have 18%
faster in time for first flatus compared with patients without chewing gum treatment.

**Satisfaction level of patients and healthcare provider**

All numeric data will be collected and analyzed with SD and mean. Comments from the last question of both set of questionnaire will be remarked for discussion during meeting. It is expected that over 75% of patients and healthcare providers are satisfactory to the chewing gum protocol.
Chapter 8: Conclusion

Conclusion

The chewing gum protocol is feasible and transferable. It is harmless with low cost. It is a noninvasive, which is favorable for patients with postoperative ileus (POI). Although there is still data showing not all patients receive effect from it, it brings no complication. It is worth to apply the protocol so as to reduce POI in patients.

Establishing the chewing gum protocol can help patients, health care staff and also the medical system. There is not much extra skill and workload for staff. There is not much expenditure for the medical system as well. However, it brings much more comfort and recovery to patients. By fine-tuning the protocol from time to time, it is believed that the chewing gum protocol will be considered as an easy prevention for POI.
Appendix
### Appendix 1: Table of evidence

<table>
<thead>
<tr>
<th>Citation/Study Design/Country of study</th>
<th>Evidence level</th>
<th>Subject Characteristics</th>
<th>Intervention</th>
<th>Control</th>
<th>Outcomes measures/Length of follow up</th>
<th>Effect size</th>
<th>Interpretation</th>
</tr>
</thead>
</table>
| Ertas (2013) Influence of gum chewing on postoperative bowel activity after complete staging surgery for gynecological malignancies: A randomized controlled trial, Gynecologic oncology 131 (2013) 118-122 | • RCT   • Turkey | 1(+) | Standard normal care  
Began chewing gum on postop D1 and chew gum three times daily. Each chewing lasts 30min. | Standard normal care | 1. Time to first bowel movement (h)  
2. Postop first flatus time (h)  
Length of FU  
Period from the end of surgery until the time patient has bowel sound return. | 1. The mean time to bowel movement in IG is 8.6 (h) faster than CG.  
2. The mean time of first flatus in IG is 9.6 (h) faster than CG. | Gum chewing early in the postoperative period following elective total abdominal hysterectomy and systematic retroperitoneal lymphadenectomy hastens time to bowel motility. |

**Footnote:** h=hours; IG=intervention group; CG=control group
<table>
<thead>
<tr>
<th>Citation/Study Design/Country of study</th>
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<th>Effect size</th>
<th>Interpretation</th>
</tr>
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<tbody>
<tr>
<td>Terzioglu (2012) Multimodal interventions (chewing gum, early oral hydration and early mobilization) on the intestinal motility following abdominal gynaecologic surgery, Journal of clinical Nursing, 22, 1917-1925</td>
<td>• RCT &lt;br&gt; • Turkey</td>
<td>1(+) &lt;br&gt; • n=60 &lt;br&gt; • Aged 50 or below=73.3%; aged 51 or above=26.7%</td>
<td>Standard normal care &lt;br&gt; Chewing sugarless gum for a period of 15 minutes once every 2 hours after the operation, which was ceased between 00:00 and 08:00.</td>
<td>Standard normal care</td>
<td>1. Time of first bowel sound (h) &lt;br&gt; 2. Time of first passage of flatus (h)</td>
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<td></td>
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<td></td>
<td>Length of FU &lt;br&gt; Period from the end of surgery until the time patient has bowel sound return.</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1. The mean time of first bowel sound in IG is 3.92 (h) faster than CG. &lt;br&gt; 2. The mean time of first flatus in IG is 6.07(h) faster than CG.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Chewing gum is an effective method in preventing paralytic ileus after gynaecological surgeries with significant improvement in patients’ comfort.</td>
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</tbody>
</table>

Footnote: h=hours; IG=intervention group; CG=control group
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<th>Outcomes measures/Length of follow up</th>
<th>Effect size</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Schuster (2006), Gum chewing reduces ileus after elective open sigmoid colectomy, American Medical Association, ARCG SURG/VOL 141, Feb 2006</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
| • RCT  
• California | 1(+) | • n=34  
• Mean age= 61.5 | Standard normal care  
Gum chewing began in the morning of postoperative day 1, patients chew sugarless gum 3 times daily in the morning, afternoon and evening. | Standard normal care | 1. Time of first bowel movement (h)  
2. Time of first passage of flatus (h)  
Length of FU  
Period from the end of surgery until the time patient has bowel function return. | 1. The mean time of first bowel movement in IG is 26.2 (h) faster than CG.  
2. The mean time of first flatus in IG is 14.8(h) faster than CG. | Gum chewing speeds up recovery after elective open sigmoid resection by stimulating bowel motility. |

Footnote: h=hours; IG=intervention group; CG=control group
<table>
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<tr>
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<th>Control</th>
<th>Outcomes measures/Length of follow up</th>
<th>Effect size</th>
<th>Interpretation</th>
</tr>
</thead>
</table>
| Marwah (2012), Role of gum chewing on the duration of postoperative ileus following ileostomy closure done for typhoid ileal perforation: A prospective randomized trial, The Saudi Journal of gastroenterology, Volume 18, no. 2, Rabi Ai Thany 1433 | 1(+) | • n=100  
• Mean age= 38.42 | Standard normal care  
To chew sugar-free gum 3 times per day for 1 hour each time, starting from 6 hours after the surgery until the passage of first flatus. | Standard normal care | 1. Time of first bowel sound (h)  
2. Time of first passage of flatus (h)  
Length of FU  
Period from the end of surgery until the time patient has bowel sound return. | 1. The mean time of first bowel sound in IG is 7.92(h) faster than CG.  
2. The mean time of first flatus in IG is 14.64(h) faster than CG. | Gum chewing shows significance in reducing the duration of POI after laparotomy for ileostomy closure, which was done for typhoid perforation peritonitis. |

Footnote: h=hours; IG=intervention group; CG=control group
<table>
<thead>
<tr>
<th>Citation/Study Design/Country of study</th>
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</thead>
<tbody>
<tr>
<td>• RCT</td>
<td>1(+)</td>
<td>n=64</td>
<td>Standard normal care</td>
<td>Standard normal care</td>
<td>1. Time of first bowel sound (h) 2. Time of first passage of flatus (h) Length of FU Period from the end of surgery until the time patient has bowel sound return.</td>
<td>1. The mean time of first bowel sound in IG is 16.6 (h) faster than CG. 2. The mean time of first flatus in IG is 12.4 (h) faster than CG.</td>
<td>Chewing gum has stimulatory effects on bowel motility after cystectomy and urinary diversion. It is safe and could be used for postoperative ileus.</td>
</tr>
<tr>
<td>• Korea</td>
<td></td>
<td>Mean age= 64</td>
<td>To chew sugar-free gum 3 times per day for 30min each time until the passage of first flatus.</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Footnote: h=hours; IG=intervention group; CG=control group
Appendix 2 SIGN Checklist

2.1 Ertas (2013), Gynecologic oncolgy 131 (2013) 118-122
2.2 Terzioglu (2012), Journal of clinical Nursing, 22, 1917-1925
2.3 Schuster (2006), American Medical Association, ARCG SURG/VOL 141, Feb 2006
2.4 Marwah (2012), Volume 18, no.2, Rabi Ai Thany 1433
<table>
<thead>
<tr>
<th>Section 1: Internal Validity</th>
<th>Does this study do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 The study addresses an appropriate and clearly focused question.</td>
<td>Yes ☑</td>
</tr>
<tr>
<td>1.2 The assignment of subjects to treatment groups is randomised.</td>
<td>Yes ☑</td>
</tr>
<tr>
<td>1.3 An adequate concealment method is used.</td>
<td>Yes ☑</td>
</tr>
<tr>
<td>1.4 Subjects and investigators are kept ‘blind’ about treatment allocation.</td>
<td>Yes ☑</td>
</tr>
<tr>
<td>1.5 The treatment and control groups are similar at the start of the trial.</td>
<td>Yes ☑</td>
</tr>
<tr>
<td>1.6 The only difference between groups is the treatment under investigation.</td>
<td>Yes ☑</td>
</tr>
<tr>
<td>1.7 All relevant outcomes are measured in a standard, valid and reliable way.</td>
<td>Yes ☑</td>
</tr>
<tr>
<td>1.8 What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
<td>1.97%</td>
</tr>
<tr>
<td>1.9 All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).</td>
<td>Yes ☑</td>
</tr>
<tr>
<td>1.10 Where the study is carried out at more than one site, results are comparable for all sites.</td>
<td>Yes ☑</td>
</tr>
</tbody>
</table>
SECTION 2: OVERALL ASSESSMENT OF THE STUDY

2.1 How well was the study done to minimise bias?  
*Code as follows:*  
- High quality (++)
- Acceptable (+)
- Unacceptable – reject

2.2 Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?  
Cannot say

2.3 Are the results of this study directly applicable to the patient group targeted by this guideline?  
Yes

2.4 Notes. Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.

There is significant different difference between IG and CG. The patients are not blind but it is blind to the assessors. It may be possible to make it blind to patients in this study as well.

---

**Notes:**

i Unless a clear and well defined question is specified, it will be difficult to assess how well the study has met its objectives or how relevant it is to the question you are trying to answer on the basis of its conclusions.

ii Random allocation of patients to receive one or other of the treatments under investigation, or to receive either treatment or placebo, is fundamental to this type of study.

iii Allocation concealment refers to the process used to ensure that researchers are unaware which group patients are being allocated to at the time they enter the study. Research has shown that where allocation concealment is inadequate, investigators can overestimate the effect of interventions by up to 40%.

iv Blinding refers to the process whereby people are kept unaware of which treatment an individual patient has been receiving when they are assessing the outcome for that patient. It can be carried out up to three levels. Single blinding is where patients are unaware of which treatment they are receiving. In double blind studies neither the clinician nor the patient knows which treatment is being given. In very rare cases studies may be triple blinded, where neither patients, clinicians, nor those conducting the analysis are aware of which patients received which treatment. The higher the level of blinding, the lower the risk of bias in the study.

v Patients selected for inclusion in a trial must be as similar as possible. The study should report any significant differences in the composition of the study groups in relation to gender mix, age, stage of disease (if appropriate), social background, ethnic origin, or co-morbid conditions. These factors may be covered by inclusion and exclusion criteria, rather than being reported directly. Failure to address this question, or the use of inappropriate groups, should lead to the study being downgraded.

vi If some patients received additional treatment, even if of a minor nature or consisting of advice and counselling rather than a physical intervention, this treatment is a potential confounding factor that may invalidate the results. If groups were not treated equally, the study should be rejected unless no other evidence is available. If the study is used as evidence it should be treated with caution.

vii The primary outcome measures used should be clearly stated in the study. If the outcome measures are not stated, or the study bases its main conclusions on secondary outcomes, the study should be rejected. Where outcome measures require any degree of subjectivity, some evidence should be provided that the measures used are reliable and have been validated prior to their use in the study.

viii The number of patients that drop out of a study should give concern if the number is very high. Conventionally, a 20% drop out rate is regarded as acceptable, but this may vary. Some regard should be paid to why patients dropped out, as
well as how many. It should be noted that the drop out rate may be expected to be higher in studies conducted over a long period of time. A higher drop out rate will normally lead to downgrading, rather than rejection of a study.

In practice, it is rarely the case that all patients allocated to the intervention group receive the intervention throughout the trial, or that all those in the comparison group do not. Patients may refuse treatment, or contra-indications arise that lead them to be switched to the other group. If the comparability of groups through randomisation is to be maintained, however, patient outcomes must be analysed according to the group to which they were originally allocated irrespective of the treatment they actually received. (This is known as intention to treat analysis.) If it is clear that analysis was not on an intention to treat basis, the study may be rejected. If there is little other evidence available, the study may be included but should be evaluated as if it were a non-randomised cohort study.

In multi-site studies, confidence in the results should be increased if it can be shown that similar results were obtained at the different participating centres.

Rate the overall methodological quality of the study, using the following as a guide: High quality (++): Majority of criteria met. Little or no risk of bias. Results unlikely to be changed by further research. Acceptable (+): Most criteria met. Some flaws in the study with an associated risk of bias. Conclusions may change in the light of further studies. Low quality (0): Either most criteria not met, or significant flaws relating to key aspects of study design. Conclusions likely to change in the light of further studies.
Methodology Checklist 2: Controlled Trials

Key Question No: Reviewer: 

Study identification  (*Include author, title, year of publication, journal title, pages*)


Guideline topic: Multimodal interventions (chewing gum, early oral hydration and early mobilization) on the intestinal motility following abdominal gynaecologic surgery

**Before** completing this checklist, consider:

1. Is the paper a **randomised controlled trial** or a **controlled clinical trial**? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a **controlled clinical trial** questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+

2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

Reason for rejection: 1. Paper not relevant to key question ☐ 2. Other reason ☐ (please specify):

### SECTION 1: INTERNAL VALIDITY

**In a well conducted RCT study…**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Does this study do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>The study addresses an appropriate and clearly focused question.</td>
<td>Yes ☑ No ☐ Can't say ☐</td>
</tr>
<tr>
<td>1.2</td>
<td>The assignment of subjects to treatment groups is randomised.</td>
<td>Yes ☑ No ☐ Can't say ☐</td>
</tr>
<tr>
<td>1.3</td>
<td>An adequate concealment method is used.</td>
<td>Yes ☑ No ☐ Can't say ☐</td>
</tr>
<tr>
<td>1.4</td>
<td>Subjects and investigators are kept ‘blind’ about treatment allocation.</td>
<td>Yes ☑ No ☐ Can't say ☐</td>
</tr>
<tr>
<td>1.5</td>
<td>The treatment and control groups are similar at the start of the trial.</td>
<td>Yes ☑ No ☐ Can't say ☐</td>
</tr>
<tr>
<td>1.6</td>
<td>The only difference between groups is the treatment under investigation.</td>
<td>Yes ☑ No ☐ Can't say ☐</td>
</tr>
<tr>
<td>1.7</td>
<td>All relevant outcomes are measured in a standard, valid and reliable way.</td>
<td>Yes ☑ No ☐ Can't say ☐</td>
</tr>
<tr>
<td>1.8</td>
<td>What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
<td>Did not mention</td>
</tr>
<tr>
<td>1.9</td>
<td>All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).</td>
<td>Yes ☑ No ☐ Can't say ☐ Does not apply ☐</td>
</tr>
<tr>
<td>1.10</td>
<td>Where the study is carried out at more than one site, results are comparable for all sites.</td>
<td>Yes ☑ No ☐ Can't say ☐ Does not apply ☐</td>
</tr>
</tbody>
</table>
## SECTION 2: OVERALL ASSESSMENT OF THE STUDY

### 2.1 How well was the study done to minimise bias?

*Code as follows:*  
- High quality (++)
- Acceptable (+)
- Unacceptable – reject

### 2.2 Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?

Can’t say

### 2.3 Are the results of this study directly applicable to the patient group targeted by this guideline?

Yes

### 2.4 Notes. Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.

**Chewing gum may have its optimal effectiveness in preventing POI when using together with other intervention such as early oral hydration and early mobilization. Drop out rate from this study should be mentioned.**

---

1. Unless a clear and well defined question is specified, it will be difficult to assess how well the study has met its objectives or how relevant it is to the question you are trying to answer on the basis of its conclusions.

2. Random allocation of patients to receive one or other of the treatments under investigation, or to receive either treatment or placebo, is fundamental to this type of study.

3. Allocation concealment refers to the process used to ensure that researchers are unaware which group patients are being allocated to at the time they enter the study. Research has shown that where allocation concealment is inadequate, investigators can overestimate the effect of interventions by up to 40%.

4. Blinding refers to the process whereby people are kept unaware of which treatment an individual patient has been receiving when they are assessing the outcome for that patient. It can be carried out up to three levels. Single blinding is where patients are unaware of which treatment they are receiving. In double blind studies neither the clinician nor the patient knows which treatment is being given. In very rare cases studies may be triple blinded, where neither patients, clinicians, nor those conducting the analysis are aware of which patients received which treatment. The higher the level of blinding, the lower the risk of bias in the study.

5. Patients selected for inclusion in a trial must be as similar as possible. The study should report any significant differences in the composition of the study groups in relation to gender mix, age, stage of disease (if appropriate), social background, ethnic origin, or co-morbid conditions. These factors may be covered by inclusion and exclusion criteria, rather than being reported directly. Failure to address this question, or the use of inappropriate groups, should lead to the study being downgraded.

6. If some patients received additional treatment, even if of a minor nature or consisting of advice and counselling rather than a physical intervention, this treatment is a potential confounding factor that may invalidate the results. **If groups were not treated equally, the study should be rejected unless no other evidence is available.** If the study is used as evidence it should be treated with caution.

7. The primary outcome measures used should be clearly stated in the study. **If the outcome measures are not stated, or the study bases its main conclusions on secondary outcomes, the study should be rejected.** Where outcome measures require any degree of subjectivity, some evidence should be provided that the measures used are reliable and have been validated prior to their use in the study.
The number of patients that drop out of a study should give concern if the number is very high. Conventionally, a 20% drop out rate is regarded as acceptable, but this may vary. Some regard should be paid to why patients dropped out, as well as how many. It should be noted that the drop out rate may be expected to be higher in studies conducted over a long period of time. A higher drop out rate will normally lead to downgrading, rather than rejection of a study.

In practice, it is rarely the case that all patients allocated to the intervention group receive the intervention throughout the trial, or that all those in the comparison group do not. Patients may refuse treatment, or contra-indications arise that lead them to be switched to the other group. If the comparability of groups through randomisation is to be maintained, however, patient outcomes must be analysed according to the group to which they were originally allocated irrespective of the treatment they actually received. (This is known as intention to treat analysis.) If it is clear that analysis was not on an intention to treat basis, the study may be rejected. If there is little other evidence available, the study may be included but should be evaluated as if it were a non-randomised cohort study.

In multi-site studies, confidence in the results should be increased if it can be shown that similar results were obtained at the different participating centres.

Rate the overall methodological quality of the study, using the following as a guide: High quality (++): Majority of criteria met. Little or no risk of bias. Results unlikely to be changed by further research. Acceptable (+): Most criteria met. Some flaws in the study with an associated risk of bias, Conclusions may change in the light of further studies. Low quality (0): Either most criteria not met, or significant flaws relating to key aspects of study design. Conclusions likely to change in the light of further studies.
### Study identification
*Include author, title, year of publication, journal title, pages*

Schuster (2006), American Medical Association, ARCG SURG/VOL 141, Feb 2006

Guideline topic: Gum chewing reduces ileus after elective open sigmoid colectomy

<table>
<thead>
<tr>
<th>Key Question No:</th>
<th>Reviewer:</th>
</tr>
</thead>
</table>

### Before completing this checklist, consider:

1. Is the paper a **randomised controlled trial** or a **controlled clinical trial**? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a **controlled clinical trial** questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+

2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

**Reason for rejection:**
1. Paper not relevant to key question
2. Other reason (please specify):

### SECTION 1: INTERNAL VALIDITY

**In a well conducted RCT study...**

<table>
<thead>
<tr>
<th>Does this study do it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes ☑</td>
</tr>
<tr>
<td>Can't say ☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Question No.</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>Yes ☑</td>
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<td>1.2 The assignment of subjects to treatment groups is randomised.</td>
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<tr>
<td>1.3 An adequate concealment method is used.</td>
<td>Yes ☑</td>
</tr>
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<td>1.4 Subjects and investigators are kept 'blind' about treatment allocation.</td>
<td>Yes ☑</td>
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<tr>
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<tr>
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</tr>
<tr>
<td>1.8 What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
<td>0%</td>
</tr>
<tr>
<td>1.9 All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).</td>
<td>Yes ☑</td>
</tr>
<tr>
<td>1.10 Where the study is carried out at more than one site, results are comparable for all sites.</td>
<td>Yes ☑</td>
</tr>
</tbody>
</table>
### SECTION 2: OVERALL ASSESSMENT OF THE STUDY

| 2.1 | How well was the study done to minimise bias? | High quality (++)

Code as follows:

- Acceptable (+) ☑
- Unacceptable – reject 0 □ |

| 2.2 | Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention? | Can’t say |

| 2.3 | Are the results of this study directly applicable to the patient group targeted by this guideline? | Yes |

| 2.4 | Notes. Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above. |

The sample size of this study is small. It explains a bit about the mechanism of sham feeding in the discussion part and it is appreciated.

---

1. Unless a clear and well defined question is specified, it will be difficult to assess how well the study has met its objectives or how relevant it is to the question you are trying to answer on the basis of its conclusions.

2. Random allocation of patients to receive one or other of the treatments under investigation, or to receive either treatment or placebo, is fundamental to this type of study.

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5. Patients selected for inclusion in a trial must be as similar as possible. The study should report any significant differences in the composition of the study groups in relation to gender mix, age, stage of disease (if appropriate), social background, ethnic origin, or co-morbid conditions. These factors may be covered by inclusion and exclusion criteria, rather than being reported directly. Failure to address this question, or the use of inappropriate groups, should lead to the study being downgraded.

6. If some patients received additional treatment, even if of a minor nature or consisting of advice and counselling rather than a physical intervention, this treatment is a potential confounding factor that may invalidate the results. **If groups were not treated equally, the study should be rejected unless no other evidence is available.** If the study is used as evidence it should be treated with caution.

7. The primary outcome measures used should be clearly stated in the study. **If the outcome measures are not stated, or the study bases its main conclusions on secondary outcomes, the study should be rejected.** Where outcome measures require any degree of subjectivity, some evidence should be provided that the measures used are reliable and have been validated prior to their use in the study.

8. The number of patients that drop out of a study should give concern if the number is very high. Conventionally, a 20% drop out rate is regarded as acceptable, but this may vary. Some regard should be paid to why patients dropped out, as...
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In practice, it is rarely the case that all patients allocated to the intervention group receive the intervention throughout the trial, or that all those in the comparison group do not. Patients may refuse treatment, or contra-indications arise that lead them to be switched to the other group. If the comparability of groups through randomisation is to be maintained, however, patient outcomes must be analysed according to the group to which they were originally allocated irrespective of the treatment they actually received. (This is known as intention to treat analysis.) If it is clear that analysis was not on an intention to treat basis, the study may be rejected. If there is little other evidence available, the study may be included but should be evaluated as if it were a non-randomised cohort study.

In multi-site studies, confidence in the results should be increased if it can be shown that similar results were obtained at the different participating centres.

Rate the overall methodological quality of the study, using the following as a guide: High quality (++): Majority of criteria met. Little or no risk of bias. Results unlikely to be changed by further research. Acceptable (+): Most criteria met. Some flaws in the study with an associated risk of bias, Conclusions may change in the light of further studies. Low quality (0): Either most criteria not met, or significant flaws relating to key aspects of study design. Conclusions likely to change in the light of further studies.
### Methodology Checklist 2: Controlled Trials

#### Study identification (Include author, title, year of publication, journal title, pages)
Marwah (2012), Volume 18, no.2, Rabi Al Thany 1433

#### Guideline topic: Role of gum chewing on the duration of postoperative ileus following ileostomy closure done for typhoid ileal perforation: A prospective randomized trial, The Saudi Journal of Gastroenterology

#### Key Question No: Reviewer:

#### Before completing this checklist, consider:

1. Is the paper a randomised controlled trial or a controlled clinical trial? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a controlled clinical trial questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+

2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

Reason for rejection: 1. Paper not relevant to key question 2. Other reason (please specify):

### SECTION 1: INTERNAL VALIDITY

#### In a well conducted RCT study…

<table>
<thead>
<tr>
<th>Key Question</th>
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</tr>
</thead>
<tbody>
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<td>Yes ☑</td>
</tr>
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</tr>
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</tr>
<tr>
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<td>1.8 What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
<td>0%</td>
</tr>
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</tr>
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<td>1.10 Where the study is carried out at more than one site, results are comparable for all sites.</td>
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### SECTION 2: OVERALL ASSESSMENT OF THE STUDY

#### 2.1 How well was the study done to minimise bias?

*Code as follows:*  
- High quality (++)
- Acceptable (+)
- Unacceptable – reject 0

#### 2.2 Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?

Yes

#### 2.3 Are the results of this study directly applicable to the patient group targeted by this guideline?

Yes

#### 2.4 Notes.

Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.

- The blinding is uncertain in this study.

---

1. Unless a clear and well defined question is specified, it will be difficult to assess how well the study has met its objectives or how relevant it is to the question you are trying to answer on the basis of its conclusions.

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**Methodology Checklist 2: Controlled Trials**

**Study identification** *(Include author, title, year of publication, journal title, pages)*


**Guideline topic:** Chewing gum has a stimulatory effect on bowel motility in patients after open or robotic radical cystectomy for bladder cancer: A prospective randomized comparative study

**Key Question No:** Reviewer:

**Before** completing this checklist, consider:

1. Is the paper a *randomised controlled trial* or a *controlled clinical trial*? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a *controlled clinical trial* questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+

2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

**Reason for rejection:** 1. Paper not relevant to key question □ 2. Other reason □ (please specify):

**SECTION 1: INTERNAL VALIDITY**

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<td>Yes ☑ No □ Can't say □</td>
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<td>Yes ☑ No □ Can't say □</td>
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<tr>
<td>1.3 An adequate concealment method is used.</td>
<td>Yes □ No □ Can't say ☑</td>
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<tr>
<td>1.4 Subjects and investigators are kept ‘blind’ about treatment allocation.</td>
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<td>Yes ☑ No □ Can't say □</td>
</tr>
<tr>
<td>1.8 What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
<td>6.25%</td>
</tr>
<tr>
<td>1.9 All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).</td>
<td>Yes ☑ No □ Can't say □ Does not apply □</td>
</tr>
<tr>
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</tr>
</tbody>
</table>
SECTION 2: OVERALL ASSESSMENT OF THE STUDY

2.1 How well was the study done to minimise bias?  
Code as follows:xi

<table>
<thead>
<tr>
<th>High quality (++)</th>
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<th>Unacceptable – reject 0</th>
</tr>
</thead>
</table>

2.2 Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?

Yes

2.3 Are the results of this study directly applicable to the patient group targeted by this guideline?

Yes

2.4 Notes. Summarise the authors’ conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.

Blinding is used in subjects but isn’t mentioned to investigators.

---

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## Appendix 3 Search history
(Last search in May 2014)

<table>
<thead>
<tr>
<th>After keyword search (chewing gum + postoperative ileus)</th>
<th>PubMed (# Of citation)</th>
<th>CINAHL (# Of citation)</th>
<th>Mosby’s Nursing consult (# Of citation)</th>
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<tbody>
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<td>23</td>
<td>11</td>
</tr>
<tr>
<td>After keyword search (sham feeding + postoperative ileus)</td>
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<td>25</td>
<td>4</td>
</tr>
<tr>
<td>After keyword search (chewing gum + bowel movement)</td>
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<td>107</td>
<td>19</td>
</tr>
<tr>
<td>After keyword search (chewing gum + postoperative care)</td>
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<td>130</td>
<td>9</td>
</tr>
</tbody>
</table>

Total # of citations from keywords | 145 | 285 | 43 | Total # of citations from all databases: 473

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<th>After further screening of titles and abstracts</th>
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<td>After checking reference</td>
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</tr>
<tr>
<td><strong>Total selected citations:</strong></td>
<td><strong>5</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 4 PRISMA flow for searching summary from 3 databases (PubMed, CINAHL, Mosby’s Nursing consult)

**PRISMA 2009 Flow Diagram**

Records identified through database searching (n = 503)

Additional records identified through other sources (n = 2)

Records after duplicates removed (n = 473)

Records excluded (n = 431)
- Non-primary studies (n = 290)
- Non-journal publication (n = 87)
- More than 10 years (n = 54)

Records screened (n = 42)

Records excluded (n = 36)
- Exclude by title (n = 23)
- Exclude by abstract (n = 13)

Full-text articles assessed for eligibility (n = 6)

Full-text articles excluded (n = 1)
- Methodological flaws (n = 1)

Studies included in quantitative synthesis (meta-analysis) (n = 5)
Appendix 5

Time schedule for implementing the innovation

It is estimated that the new innovation will take 58 weeks for implementation and evaluation.

<table>
<thead>
<tr>
<th>Items</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formation of a program committee for the new innovation- the chewing gum protocol</td>
<td>4 weeks</td>
</tr>
<tr>
<td>Planning for the innovation including communication plan</td>
<td>6 weeks</td>
</tr>
<tr>
<td>Staff briefing and training</td>
<td>6 weeks</td>
</tr>
<tr>
<td>Trial running for the program</td>
<td>8 weeks</td>
</tr>
<tr>
<td>Implementation period</td>
<td>28 weeks</td>
</tr>
<tr>
<td>Evaluation of the programs</td>
<td>6 weeks</td>
</tr>
</tbody>
</table>
## Appendix 6
### Estimated set up cost and operational cost

#### Estimated set up cost for implementation for 58 weeks

<table>
<thead>
<tr>
<th>Items</th>
<th>Calculation</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugarless gum</td>
<td>HKD$ 0.1 x 225 x 15 x 3</td>
<td>HKD$ 1012.5</td>
</tr>
<tr>
<td>Stereoscopes</td>
<td>HKD$ 25 x 30 (set)</td>
<td>HKD$ 750</td>
</tr>
<tr>
<td>Staff training</td>
<td>HKD$ 300 (hr) x 50 (staff)</td>
<td>HKD$ 15,000</td>
</tr>
<tr>
<td>Extra staff (registered nurse)</td>
<td>HKD$ 30000 x 1 (staff) x 12.5 (salary of 50 weeks)</td>
<td>HKD$ 375,000</td>
</tr>
<tr>
<td>Information pamphlet</td>
<td>HKD$ 0.1 x 225 (page)</td>
<td>HKD$ 22.5</td>
</tr>
<tr>
<td><strong>Total set up cost</strong></td>
<td></td>
<td><strong>HKD$ 391,785</strong></td>
</tr>
</tbody>
</table>

#### Estimated operational cost per month/4 weeks

<table>
<thead>
<tr>
<th>Items</th>
<th>Calculation</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugarless gum</td>
<td>HKD$ 0.1 (piece) x 25(patients) x 15 x 3 (basic consumption of gum)</td>
<td>HKD$ 112.5</td>
</tr>
<tr>
<td>Staff tutorial class</td>
<td>HKD$300 (hr) x 3 (staff)</td>
<td>HKD$ 900</td>
</tr>
<tr>
<td>Extra staff (registered nurses)</td>
<td>HKD$ 30000 x 1 (staff)</td>
<td>HKD$ 30,000</td>
</tr>
<tr>
<td>Information pamphlet</td>
<td>HKD$0.1 x 25 (page)</td>
<td>HKD$ 2.5</td>
</tr>
<tr>
<td><strong>Total operational cost per month</strong></td>
<td></td>
<td><strong>HKD$ 31,015</strong></td>
</tr>
</tbody>
</table>

**Remarks:**

1. Sugarless gum costs $0.1 per piece.
2. Estimate 25 patients undergo chewing gum protocol monthly (6.25 patients weekly).
3. 255 patients for 36 weeks of implementation including pilot study test.
4. 15 days is estimated as the maximum time for the treatment per patient as most patients will not need to exist 15 days of treatment.
5. Each patient consumes 3 gums daily.
6. Expense on extra staff may have minor variation depending on the individual point of salary.
Appendix 7
Key to evidence statements and grades of recommendations by SCOTTISH INTERCOLLEGIATE GUIDELINES NETWORK

LEVEL OF EVIDENCE
1+++ High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
1++ Well-conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias
1+ Meta-analyses, systematic reviews, or RCTs with a high risk of bias
1- High quality systematic reviews of case control or cohort or studies
2+++ High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
2++ Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
2+ Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
2- Non-analytic studies, e.g. case reports, case series
3 Expert opinions

GRADES OF RECOMMENDATIONS
A- At least one meta-analysis, systematic review, or RCT rated as 1+++, and directly applicable to the target population; or A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results
B- A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1++ or 1+
C- A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2++
D- Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+

Good practice points
Recommended best practice based on the clinical experience of the guideline development group
Appendix 8

Patient evaluation form

Please “tick” the following:
1 = Strongly disagree  2 = Disagree  3 = Neutral  4 = Agree  5 = Strongly agree

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The chewing gum is useful in resuming bowel motility.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The chewing gum intervention is easy to follow.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The new treatment does not induce much discomfort</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4. Nurses are always helpful and available for enquiry.</td>
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</tr>
<tr>
<td>5. Nurses are competent in handling the new treatment protocol.</td>
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<tr>
<td>6. You are willing to use the new treatment protocol.</td>
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<tr>
<td>7. You are satisfied with the new treatment protocol.</td>
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</tr>
<tr>
<td>8. Other comments:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Appendix 9

Health care providers’ evaluation form

Please “tick” the following:

1= Strongly disagree  2= Disagree  3= Neutral  4= Agree  5= Strongly agree

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. There is sufficient resources and support for implementing the protocol.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Sufficient training and instruction is provided for implementing the protocol.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>11. The protocol do not add unacceptable burden to the original practice.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12. Patients are beneficial from the protocol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. The new protocol can bring job satisfaction to you.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>14. You feel confident in conducting the protocol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. The protocol is worth implementing in a long run.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. Other comments:


Appendix 10
Flow chart of decision making in the chewing gum protocol

Patients undergone abdominal surgery and returned from recovery room

Postoperative day 1

Conscious

Recruit to the protocol

Can chew cannot chew ➔ reject

Start the chewing protocol

Follow protocol cannot follow protocol (e.g. fatigue) ➔ reject

Being cooperative in monitoring and reporting of flatus and discomfort

Yield useful data for the chewing gum protocol/
Patients beneficial from the protocol
Appendix 11
Guideline of gum chewing in preventing postoperative paralytic ileus in adult patients after abdominal surgeries

1. Objectives
1.1 To provide care for promoting optimal recovery from surgery
1.2 To minimize risk of postoperative paralytic ileus

2. Scope
2.1 The procedure covers all adult patients who aged 18 or above who have undergone abdominal surgery under general anesthesia.

3. Nursing intervention
3.1 Post-operative care day 1
3.1.1 check patient's conscious level
3.1.2 check patient's ability in chewing and reporting of flatus and discomfort
3.1.3 Medical officer prescribed chewing gum and nurse administrate it
3.2 Instruct patient to chew without swallowing the gum for 30 minutes
3.3 Observe for abnormality
3.4 Use timer for time control
3.5 Assist patient to discard chewing gum after 30 minutes
3.6 Repeat administrating chewing gum as scheduled for 3 times per day
3.7 Use stereoscope to check patients' bowel sound hourly
3.8 Document hourly result properly, report if any abnormality
3.9 Provide call bell to patient, allow immediate report of flatus
3.10 Document date and time of first flatus
3.11 Ensure patient safety throughout procedures

4. Evaluation
4.1 Confirm patients' bowel movement with doctors
4.2 Distributed evaluation form to patients
4.2.1 Provide instruction of filling the evaluation form
4.2.2 Allow privacy and sufficient time for filling form
4.3 Collect evaluation form for later analysis
Reference


