Postoperative Peristalsis and Osteopathic Manipulation (POP-OM)

**Specific Objective:** A randomized clinical trial to discover if osteopathic manipulation in the immediate postoperative period reduces the time to return of normal bowel function after open abdominal surgery.

**Background and Significance:** There is little research available on surgical outcomes with Osteopathic Manipulative Medicine (OMM), as is true of OMM in general.¹ One area of deficiency is OMM as adjunctive therapy in support of patients’ own healing processes following surgical insult. This is a core concept in osteopathic medicine, as stated in the basic principles: the body is a unit, which has inherent capacity for defense, self-regulation, and healing; and that structure and function are inextricably related.² Postoperative ileus is a common result of abdominal surgery, which is governed chiefly by the enteric neural reflex axis. It can be worsened by several factors, including degree of operative manipulation of bowel, drugs (especially opioids), comorbid inflammation, and pain.³ A number of treatments have been tried with little success, including drugs and hormones (metoclopramide, erythromycin, cisapride, neostigmine, cholecystokinin); chewing gum; early ambulation; and early feeding. Treatment is supportive, sometimes including nasogastric decompression and IV fluids, as well as treatment of suspected underlying contributing problems such as electrolyte abnormalities, sepsis, precipitating drugs.⁴⁵ Parasympathetic stimulation increases GI motility; sympathetic stimulation inhibits it. Sympathetic activity is increased with surgery and is thought to contribute significantly to altered peristaltic activity in the postoperative period.⁶ A concept in osteopathic medicine is that of the viscerosomatic and somatovisceral reflex. The viscerosomatic reflex includes the idea of referred pain, such as pain in the arm or jaw of a patient with cardiac ischemia. The somatovisceral concept is the one in which treatment of somatic components may help to relieve visceral difficulties (such as postoperative ileus). There would therefore be two major targeted areas in treatment; one of alleviation of sympathetic overstimulation (and perhaps enhancement of parasympathetic activity); the other employing the somatovisceral reflex to reduce tissue tension changes in tissues through which innervating nerves, lymph, and blood flow occur. For this reason, treatment might involve areas seemingly distant from the site of surgery as well as ones in the immediate neighborhood. The somatic dysfunctions present in individual patients vary. As we are not clear which, if any, make what contribution to osteopathic treatment in the postoperative period, we place no restriction on the specific protocol used with each patient, though we will document the specific findings and treatment in each. There is one study⁷, a retrospective chart review of two groups of patients. A group of 317 who received osteopathic manipulation in the postoperative period, compared with a group of 92 who did not. The incidence of adynamic ileus in the treated group was 0.3% (one case), compared to 7.6% (seven patients) in the untreated group. The study design is not well-documented; it was not a controlled, randomized trial; though it is suggestive of benefit in this population. We have chosen, therefore, to submit a more rigorously designed study examining this issue.
Methods

Design Overview: We plan to undertake a randomized, blinded clinical trial. A consecutive sample of patients presenting for non-emergent abdominal surgery will be randomized to two groups. The treatment group will receive osteopathic manipulative treatment in the immediate postoperative period (recovery area); the other group will be untreated. Small digital recording devices will be placed on the abdominal wall so as not to interfere with dressings, and recordings obtained of bowel activity and checked daily for up to 72 hours. Patients who do not have return of normal bowel activity at 72 hours (the generally recognized time to recovery of normal bowel activity; beyond the is considered paralytic ileus^8) will be offered osteopathic manipulative treatment and outcomes recorded. Other outcomes to be measured include self-report of passing of flatus, stool times and consistency, length of stay, time to ambulation, and pain by visual analog scale on each day beginning on post-op day one. Patients will also be asked to speculate on whether or not they have received treatment, to test validity of blinding in the immediate recovery period.

Study Subjects
Sample Population: All adult patients (consecutive sample) presenting for non-emergent open abdominal surgery in a surgeon’s practice at St Luke’s Hospital in San Francisco, California.

Risks to Subjects
Risks associated with OMM are minimal, provided patients with unstable spinal injury or disease are excluded.

Exclusion Criteria:
- Patients unable to give informed consent (altered mental status, language)
- Patients who have a history of unstable spinal/cervical injury or disease

Variables
Main predictor variable: Osteopathic manipulative treatment
Main outcome variable: Time to resumption of peristaltic activity (bowel sounds) in hours
Alternate outcome variables: self-report of flatus; stool timing and consistency; pain (as measured by validated visual analog scale); length of stay; time to ambulation.

We chose digitally recorded bowel sounds as they are least subjective, can be recorded and interpreted by blinded interpreters, and the possibility of measuring a continuous variable, obviating the necessity of predetermining intervals for auscultation, or self-reporting. We have added other outcomes as they may provide additional data; for example increasing looseness of stool or increasing pain with longer periods of bowel inactivity, and possible association between ambulation and bowel activity.

Randomization and blinding: Patients will be randomized in blocks of six to ensure similar sample sizes in each group. Sample will be consecutive to reduce random error. Randomization numbers will be in sealed envelopes to reduce the likelihood of selection
bias. It may be difficult to blind patients to treatment, but recorded bowel activity interpreted by blinded interpreters will assist in reduction of potential bias or systematic error. Treating physicians will not be the same as the interpreting ones. Special note is made of a recent contribution by Licciardone and Russo on blinding protocols and credibility of sham treatment in OMM trials, in which credibility of sham treatment for blinding is discussed. The conclusion in that study is that sham treatments have less credibility to patients than genuine ones. For this reason (among others), it has been deemed important in this trial to use recordings rather than self-reporting (of first flatus or stool) to reduce systematic error and bias.

**Statistical issues**

**Analysis:** Student’s \( t \) test for independent variables will be used to compare the primary (continuous) outcome (time to resumption of peristaltic activity) and for other continuous outcomes (pain).

**Sample size estimate:**

**Null hypothesis:** There is not a statistically significant difference in time to return of peristalsis in patients who are treated with osteopathic manipulation in the immediate postoperative period following open abdominal surgery.

**Alternative hypothesis:** Time to return of normal peristalsis shorter in patients who have undergone osteopathic manipulation in the immediate postoperative period.

**Effect size:** This is a continuous predictor variable; an effect size of 4 hours has been chosen as having potential clinical significance. Normal time to return of peristaltic activity is 48-72 hours; this yields a standard deviation of 6 hours, assuming the period 48-72 hours is within 2 standard deviations from the estimated mean of 60 hours.

Standardized effect size: \( \frac{E}{S}=0.67 \)

Alpha (2-sided): 0.05  Beta: 0.10

Sample size: approximately 44 patients in each group.

**Data Management**

Identifying information will be removed stored in a locked cabinet and destroyed at the conclusion of the study. Coding information will be entered on a separate, password-protected sheet.

Data will be entered into an SPSS spreadsheet, with one master read-only copy saved and another on a portable drive, also to be stored in the locked cabinet.

Patients will be enrolled at the time of their preoperative visit; consent obtained at that time. This will be performed by study personnel to reduce any pressure to participate. Patients will have the opportunity to ask questions and there will be a researcher available 24 hours/7 days to answer any other questions and to address problems.

We anticipate piloting all technology prior to beginning, to establish adequate parameters for recording and interpretation, with standards to be applied uniformly.
Budget
Treating physician, 0.4 FTE; $60,000
Research Coordinator; 0.5 FTE, $18,000
SPSS program and computer capacity; available, N/C
Portable (jump) drive for data storage: $100
Locked filing cabinet for data storage: available, N/C
Digital recorders 10 @ $225 = $2250
Total:  $80,350

Timetable:
October-November, 2006; submit to IRB
November-December; pilot recorder testing
January-December, 2007; enroll patients.  15/month (to allow for refusals to participate);
stop at 100 for 50 patients in each group
January-February 2008; data entry and analysis
March/April 2008 submit draft for publication and for presentation at AOA convention in
October, 2008.

References
2 Special committee on Osteopathic Principles and Osteopathic Technic by Kirksville College of
3 Doherty, G.  Postoperative complications.  Current Surgical Diagnosis and Treatment, 12th Ed., Appleton
Lippincott Williams & Wilkins, 2003
8 Lithouki, B., and Muto, M.  Postoperative ileus.  May, 2006 Up To Date.  September 19 2006
<uptodate.com/postoperative ileus>
9 Licciardone, J., and Russo, D.  Blinding Protocols, Treatment Credibility, and Expectancy:  Methodologic
Issues in Clinical Trials of Osteopathic Manipulative Treatment.  JAOA, August, 2006 106(8); 457-463.
10 Lithouki, B., and Muto, M Poststoperative ileus.  May, 2006 Up To Date.  September 19 2006
<uptodate.com/postoperative ileus>