

COILS

Clinical
Osteopathically
Integrated
Learning
Scenarios

Patient with

Postsurgical Sternotomy

Prepared by: AACOM's Educational Council on Osteopathic Principles

Part 2: Chapter 1

Surgery Clinical Osteopathically Integrated Learning Scenario:

Post-Sternotomy Patient



Description

This Clinical Osteopathically Integrated Learning Scenario (COILS) focuses primarily on the palpatory evaluation and supportive osteopathic manipulative treatment for the post-operative care of a patient who has had a sternotomy for a coronary artery bypass surgical procedure.

The COILS is divided into two sections:

Section One

The **Roundtable Discussion Workshop** includes a discussion and evaluation of the patient's case history, diagnosis, pathophysiology, osteopathic principles involved, functional anatomy, treatment options, contraindications, and (if time permits) a demonstration of manipulative treatment techniques applicable to the patient's homeostatic needs.

Section Two

The **Patient-Based Application Workshop** is the supervised application of manipulative treatment techniques for a patient with this diagnosis. The workshop is designed to evaluate the student's or physician's diagnostic and psychomotor skills when providing an osteopathic manipulative treatment for an actual (or simulated) patient.

If time permits, the instructor may deliver this entire two-section program at one time. Ideally, however, Section One should be taught several days before Section Two to allow time for the student or physician to review and practice appropriate techniques. If an actual patient is not available for Section Two, a simulated patient may be used.

Section One: Roundtable Discussion Workshop

I. Description

This section is a roundtable-type presentation and discussion on the osteopathic approach to the treatment of a post-sternotomy patient.

II. Cognitive Components

A. Case Presentation

A 58-year-old male presented in the ER with chest pain. The patient was diaphoretic. EKG demonstrated significant ST segment elevation in leads V2–V4. Cardiac enzymes were significantly elevated, confirming a myocardial infarction (MI). Pain had been present for 20 hours prior to presentation. The patient had been brought to the ER by his family. After stabilization, the patient was admitted to the ICU. Further work-up revealed multi-vessel stenosis of greater than 95%, with poor collateral circulation.

The patient was taken to surgery, during which a sternotomy and a four-vessel bypass grafting using mammary artery and saphenous vein auto grafts were performed. Postoperative course was uneventful, other than persistent chest pain.

Physical Examination

Vital signs:	Temperature, 98° F; Blood Pressure, 140/90; Heart Rate, 62; Respiratory Rate, 22 and shallow
General:	Patient appears to be in distress
Head:	Normocephalic; atraumatic
Eyes:	Pupils equally round and react to light.
Mouth:	Missing 1st and 2nd molars bilaterally lower jaw.
Cardiac:	Regular rate and rhythm at 62; no rubs or clicks; no gallop or murmur
Lungs:	Decreased respiratory effort and excursion; few scattered bibasilar crackles; midline sternal dressing and sutured sternotomy incision present; no apparent drainage; wound has mild erythema
Abdomen:	Flat with mild guarding and splinting; scattered bowel sounds
Extremities:	Strong peripheral pulses; dressing and surgical wound on left medial lower limb; no evidence of infection; no peripheral edema

Diagnostics

- CBC shows a mild anemia, platelets and wbc are within normal limits
- EKG reveals q waves, pt in sinus rhythm without st elevation or depression
- CXR shows mild atelectasis, no infiltrate or effusion

Osteopathic Structural Examination

- T1-T4 left side tissue texture changes.
- Ribs exhibit decreased excursion; Ribs 3–5 left, exhalation dysfunction present (inhalation restriction).
- Diaphragm excursion decreased; thoraco-abdominal fascias prefer right rotation and right side bending.
- Left sternal half of the chest 3 mm anterior to right sternal half.
- Shoulders drawn up toward ears.
- Scalene muscles tight bilaterally and firm to touch.
- Thoracic inlet rotation to the right.
- OA flexed, side bent left, rotated right.

B. Pathophysiology

1. A stiff thoracic cage interferes with breathing and lymphatic flow.
2. A secondary somatic dysfunction in distant areas can hinder cardiac rehabilitation.

C. Functional Anatomy

Includes knowledge of structure and physiology necessary to properly carry out the osteopathic manipulative treatment support.

1. Surgical trauma of the spreading of the thoracic cage stresses the ribs and thoracic spine regions and makes the chest cage stiff and difficult to treat.
2. Chronic left upper thoracic dysfunction from cardiac viscerosomatic reflexes has been present for years and requires chronic treatment.
3. Any thoracic and rib somatic dysfunctions that are present are best treated pre-operatively. However, pre-operative treatment is nearly impossible due to patient severity.
4. In the past, persistent chest pain following surgery was due to inadequately corrected cardiac vascular disease. It also was not uncommon to have asymmetrical closure of the sternum, resulting in mechanical chest wall pain.

D. Goals for Osteopathic Manipulative Management

Includes a review of treatment pearls; a general plan for manipulative treatment of the patient; and a discussion of treatment options, contraindications, and plans for follow-up evaluation and treatment.

Initial Management

1. The patient may be breathing in a shallow fashion and using the scalenes as accessory muscles of respiration. This situation necessitates careful treatment of the scalenes and cervical spine.
2. Post-operative symptoms and findings may include cough, neck and back stiffness, and arm and elbow discomfort associated with prolonged bed rest and immobilization because of arm board.
3. The anterior chest is covered with surgical dressings and is inaccessible for adequate palpation. The parascapular tissues can be addressed; however, care must be taken not to disrupt any access lines or pulse oximetry. When the patient is in the unit, it is usually impossible to approach the patient from the head.
4. Provide paraspinal inhibition from the side of the bed with the patient's legs flexed or with pillows positioned under the knees. Apply ileus prevention treatment--slow application of pressure to the maximum, hold until muscles relax, and then slow release.
5. Review the thoracic inlet for fascial pattern abnormality, and treat somatic dysfunction with indirect myofascial techniques.
6. Relax the thoraco-abdominal muscles with soft tissue techniques, and redome a flattened diaphragm using indirect, gentle myofascial techniques.

Long-Term Management

1. Continue to monitor and treat the upper thoracic cage until motion remains free and chronic viscero-somatic influences are eliminated.
2. Prior musculoskeletal dysfunction can interfere with cardiac rehabilitation. Cardiac rehabilitation can add stress to the musculoskeletal system as well.

E. Contraindications and Cautions Regarding Treatment

See contraindications to treatment, Foundations, pp. 1015-1024.

1. Limit the doses of treatments. Do not to disturb the patient's access lines. Treatments should not produce negative iatrogenic effects.
2. Treat the patient in the bed in the supine position unless the cardiologist has cleared the patient to sit up.
3. Apply paralytic ileus prevention and gentle myofascial treatment, as described.

F. Instructor's Notes

Personal clinical pearls and lessons learned from previous COILS presentations, especially those dealing with the heart, lungs, and GI tract.

1. Indirect myofascial release of the sternum, rib cage, and transthoracic anterior–posterior fascial release has anecdotally been reported to be beneficial. As well as direct myofascial release. Treatment is appropriate several weeks to months post-operation and should continue as this is still myofascial restrictions and costal (thoracic) cage somatic dysfunction.
2. Chapman's reflex points should be treated, if present.
3. Suboccipital release and CV–IV OMT can decrease sympathetic tone and relax the patient.

III. Psychomotor Components

If time permits, this part can be carried out on a simulated patient.

- Practice palpatory diagnosis. (See techniques under Section D above.) Diagnoses procedures include cervical, upper thoracic and ribs, thoracic inlet, anterior chest wall, thoraco-abdominal diaphragm, thoracic cage compliance, tissue texture palpation and evaluation, and Zink whole-body fascial pattern.
- Demonstrate key treatment techniques in the body regions involved. These techniques include inhibitory pressure, release for the upper thoracics and ribs, OA myofascial release/indirect, cervical, and doming the diaphragm. Sutherland's universal rib technique (indirect method treatment) is useful in treating rib somatic dysfunctions.
- Evaluate the plan for treating the patient in the appropriate position, localization of gentle forces, and activation.

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IV. References

Dickey, J. Postoperative osteopathic manipulative management of median sternotomy patients. *J Am Osteopath Assoc.* 1989;89:1309-14, 1319-22.

Patriquin DA. Manipulation for the patient with post sternotomy. *Osteopathic Symposium.*, 1975; pp 16-17.

V. Examination Questions

These multiple-choice questions involve the treatment of a patient post-sternotomy.

(More than one answer is defensible in each of the following questions.)(denotes answer)*

- 1. Which of the following techniques would be contraindicated in the manipulative treatment of the patient who has just had a median sternotomy?**
 - A. Indirect myofascial release of cervicothoracic junction
 - B. Costochondral approach for diaphragm release*
 - C. Rib raising
 - D. Classic thoracic lymphatic pump*
 - E. OA suboccipital release
- 2. What is the most likely etiology of the bibasilar crackles in the patient?**
 - A. Pneumothorax
 - B. Postoperative pneumonia
 - C. Pulmonary embolism
 - D. Postoperative atelectasis*
 - E. Congestive heart failure
- 3. Which of the following manipulative techniques is the most appropriate for treating the cause of the bibasilar crackles?**
 - A. Rib raising*
 - B. OA suboccipital release
 - C. Thoracic lymphatic pump
 - D. Indirect balancing of the sternum
 - E. Paraspinal inhibitory soft tissue technique
- 4. The case patient is found to have marked external rotation of the left leg. What is a probable and reasonable explanation for this finding?**
 - A. Backward sacral torsion as a manifestation of a viscerosomatic reflex
 - B. Prolonged positioning during surgery to harvest the saphenous vein*
 - C. Scrub nurse leaning on patient's leg*
 - D. Increased fascial pull from the right hemidiaphragm
 - E. Adductor spasm on the left
- 5. The subsequent development of pedal edema in the left lower extremity could be due to**
 - A. Angioedema due to allergy
 - B. Immobility
 - C. Loss of venous return
 - D. Decreased cardiac output
 - E. All the above*

Section Two: Patient-Based Application Workshop

I. Description

This section includes the practical application of osteopathic treatment techniques to support the patient with a sternotomy incision and coronary bypass surgery.

II. Psychomotor Components

(Refer to Section One for regions of the body that are involved.)

- Examination of the patient using TART, including postural screen, palpation, segmental motion testing, and diagnosis of somatic dysfunction.
- Application of philosophy and treatment technique.
- Re-evaluation of the patient after treatment is completed to assess results. If a simulated patient is used, then the student or physician should verbalize length of treatment and future treatment goals.

III. Cognitive Components

- Documentation in the medical record.
- Post-treatment discussion.

Note. It is recommended to use the standardized outpatient form included in each of these chapters for documentation.

Physician: _____ Date: _____

Title: Resident (Specialty) _____

Intern OMS III OMS IV

**Critical Actions Evaluation Checklist of Osteopathic Principals
Applicable to a Post-Sternotomy Patient**

CRITICAL ACTION	COMPLETED		COMMENTS
	Yes	No	
Become familiar with the patient's history physical examination findings, laboratory and other diagnostic findings.			
Perform an osteopathic structural examination.			
Determine significant areas of somatic dysfunction.			
Determine body region(s) to be treated with OMT.			
Apply OMT to at least the body region determined to be the most in need of treatment at present time.			
Treat other significant somatic dysfunctions if feasible.			
Document treatment and immediately observable effects.			

Trainer: _____

Osteopathic Musculoskeletal Examination

EXAMINER _____ SIGNATURE _____ DATE OF EXAMINATION _____

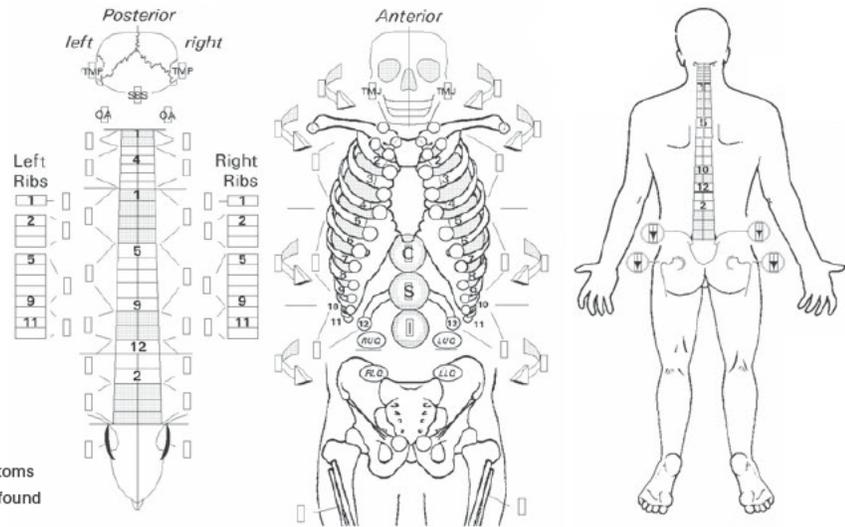
EXAMINER _____ SIGNATURE _____ DATE OF EXAMINATION _____

CHIEF COMPLAINT _____

<p>Required</p> <p>Ant. Post. Spinal Curves:</p> <p>Cervical Lordosis <input type="checkbox"/> Increased <input type="checkbox"/> Normal <input type="checkbox"/> Decreased</p> <p>Thoracic Kyphosis <input type="checkbox"/> Increased <input type="checkbox"/> Normal <input type="checkbox"/> Decreased</p> <p>Lumbar Lordosis <input type="checkbox"/> Increased <input type="checkbox"/> Normal <input type="checkbox"/> Decreased</p>	<p>Scoliosis (Lateral Spine Curves) <input type="checkbox"/> None <input type="checkbox"/> Functional <input type="checkbox"/> Mild <input type="checkbox"/> Moderate <input type="checkbox"/> Severe</p> <p>Assessment Tools</p> <p><input type="checkbox"/> T = Tenderness</p> <p><input type="checkbox"/> A = Asymmetry</p> <p><input type="checkbox"/> R = Restricted Motion <input type="checkbox"/> Active <input type="checkbox"/> Passive</p> <p><input type="checkbox"/> T = Tissue Texture Change</p>	<p>For coding purposes only</p>
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Abbreviation Key

- OA Occipito-Atlantal joint
- Sympathetic Ganglia:**
- C Cellac
- S Superior Mesenteric
- I Inferior Mesenteric
- TMJ Temporomandibular joint
- TMP Temporal Bone
- SBS Sphenobasilar symphysis



Severity Key

- 0 No SD or background (BG) levels
- 1 Minor TART more than BG levels
- 2 TART obvious (R&T esp) +/- symptoms
- 3 Symptomatic, R and T very easily found "key lesion"

Region Evaluated	Severity				Specific Major Somatic Dysfunctions
	0	1	2	3	
Head	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Neck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Thoracic T1-4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
T5-9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
T10-12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Lumbar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Pelvis/Sacrum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Pelvis/Innominate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Extremity Lower R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
L	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Extremity Upper R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
L	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ribs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other/Abdomen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Major Correlations with:

- Traumatic Orthopedic Neurological Viscerosomatic Primary Musculoskeletal Activities of Daily Living
- Rheumatological EENT Cardiovascular Pulmonary Cardiovascular Gastrointestinal Genitourinary Other

Other: _____