



UNT HEALTH SCIENCE CENTER

OMT for the Post-Operative Patient

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Professor and Chair Medical Education UNTHSC TCOM

Dallas Southwest Physicians Endowed Professor of Surgery

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Objectives




- Present Osteopathic principals and practices for the post-operative patient
- Discuss the physiological benefits of OMM and post-operative recovery
- Present clinical outcomes with OMM

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Disclosure



- No conflict of interest or disclosures pertinent to this presentation.
- No off label or non FDA approved treatments
- I am full time faculty at UNTHSC-TCOM and an employee of the Great State of Texas 

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Glasgow, Scotland



UNT HEALTH
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Osteopathic Surgeon



- Board certified by the American Osteopathic Board of Surgery
 - General Surgery
 - Cardiothoracic Vascular Surgery

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Other Osteopathic Credentials



- ***Not recognized by the AOA or the AAO***



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Osteo-Breakers



Osteo-Breakers TCOM Class of 1986

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Iatrogenic Osteopathic Lesions

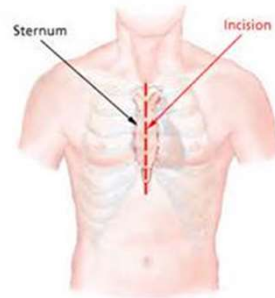


- Median Sternotomy
- Internal Mammary Artery Harvest
- Rib cage distraction

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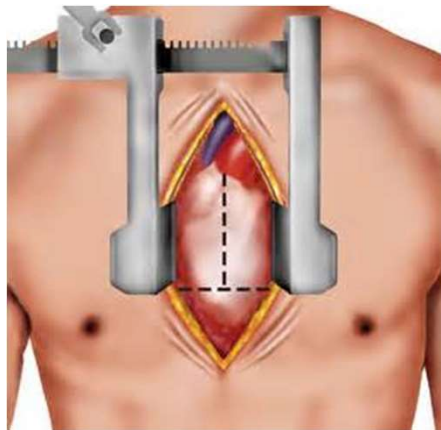


STERNOTOMY



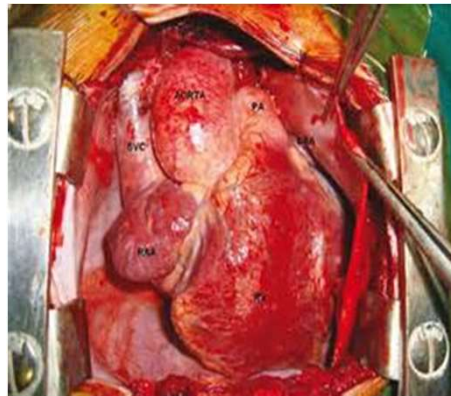
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STERNOTOMY



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STERNOTOMY



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PATHOPHYSIOLOGY



- Surgeons tend to spread the ribs most in the lower sternal region. The costal margin is more flexible and facilitates spreading
- Upper ribs tend to break if you move them laterally very much.

STERNOTOMY



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The rib spreader moves the ribs in the direction of inhalation
diffusely throughout the thorax



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Somatic Dysfunction



- Exhalation dysfunction: the ribs do not rise with inhalation but move easily with exhalation
- Inhalation dysfunction: the ribs rise easily with inhalation but do not lower with exhalation

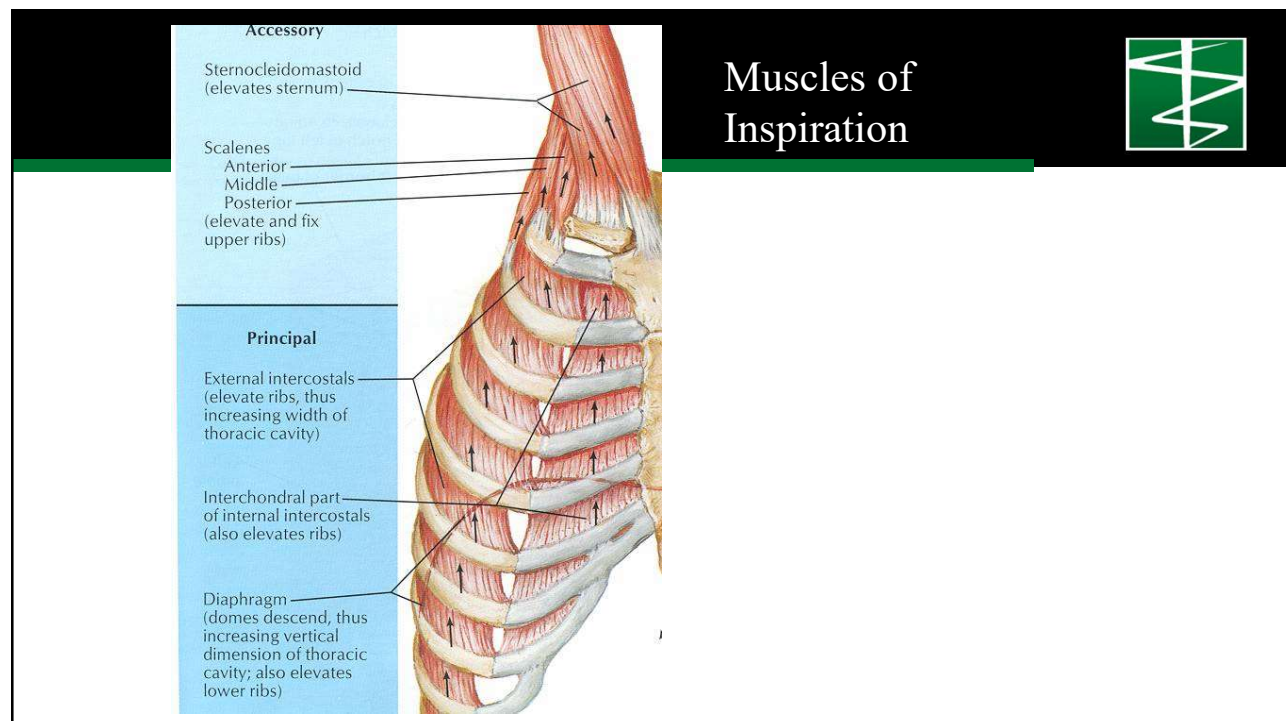
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Goals of Treatment?

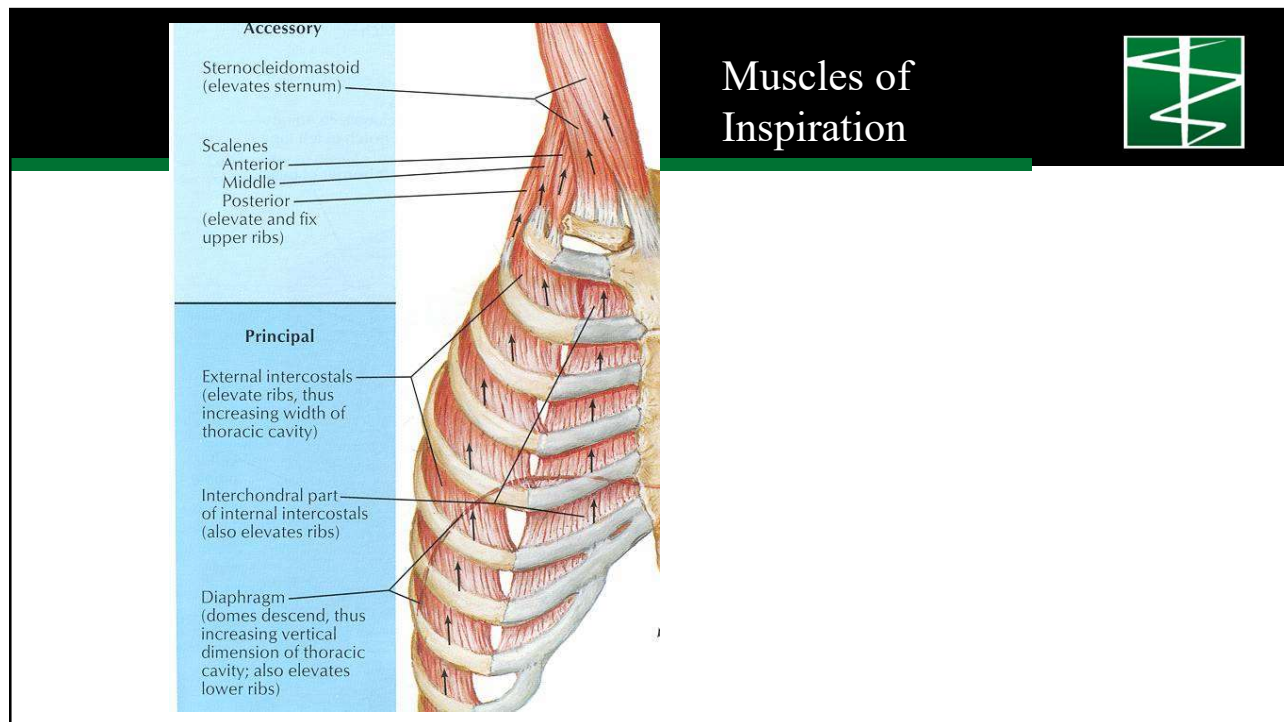


- Increase rib motion
- Enable greater air intake
- Decrease pain
- Decrease parasympathetic tone while promoting sympathetic tone
- Improve lymphatic drainage for the thorax and lungs

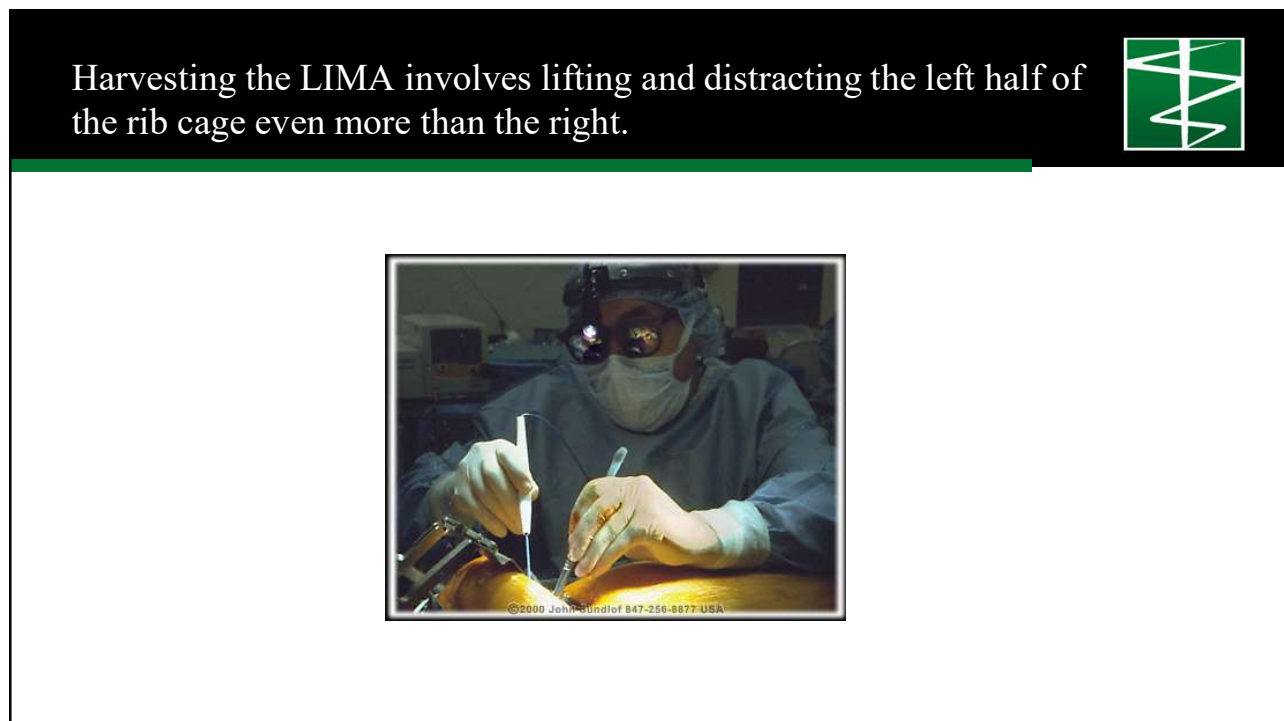
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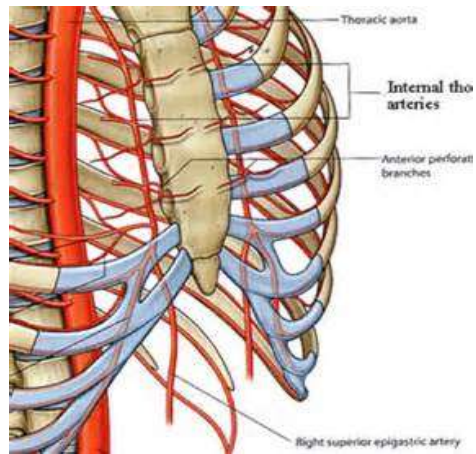
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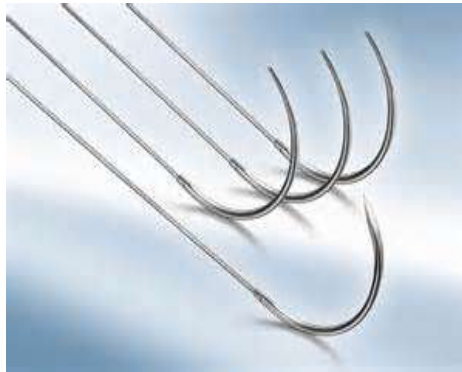


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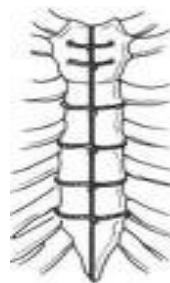
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Sternal Closure

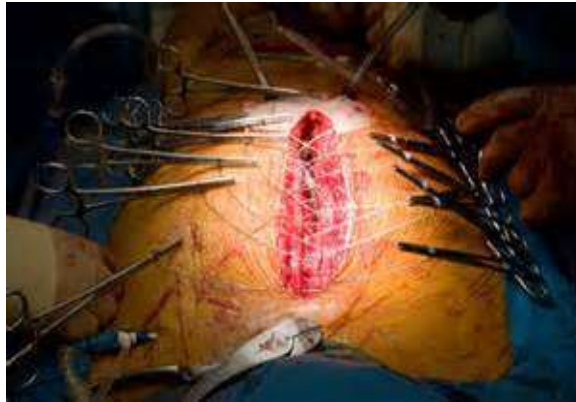


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Sternal Closure

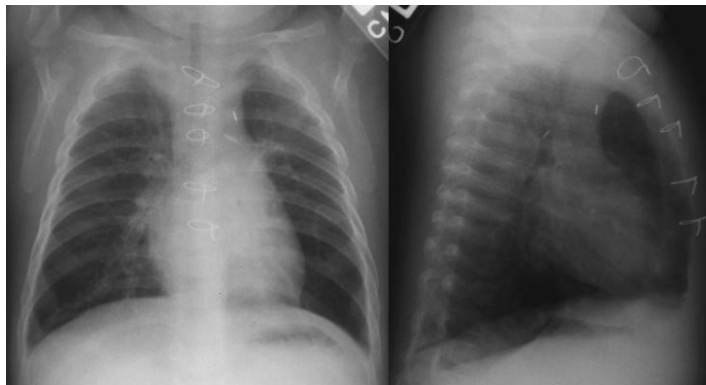


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Post Op CXR



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Somatic Dysfunction



- Exhalation dysfunction: the ribs do not rise with inhalation but move easily with exhalation
- Inhalation dysfunction: the ribs rise easily with inhalation but do not lower with exhalation

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OMT



- Exhalation dysfunction: treat the upper rib in the group (frees up all ribs below it)

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OMT



- Inhalation dysfunction: treat the lower rib of the group (this rib is holding all ribs above it in an inhaled position)

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What about Muscle Energy?



- Pectoralis minor muscle for upper ribs (3-5)

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What about Muscle Energy?



- Serratus anterior muscle for middle ribs (4-9)

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What about Muscle Energy?



- Latissimus dorsi muscle for lower ribs (7-12)

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Harvesting the LIMA involves lifting and distracting the left half of the rib cage even more than the right.



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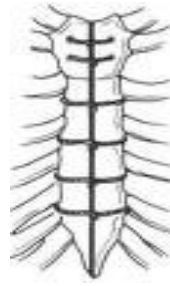
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Sternal Closure

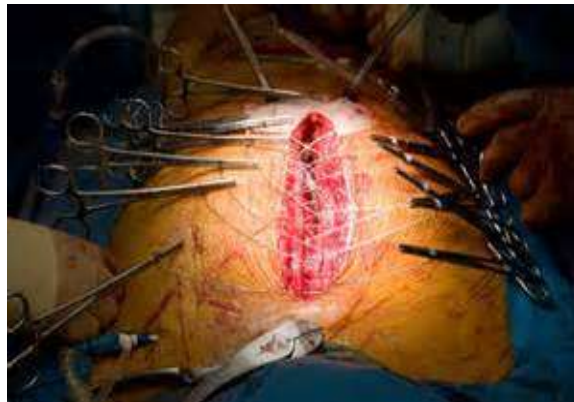


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Sternal Closure

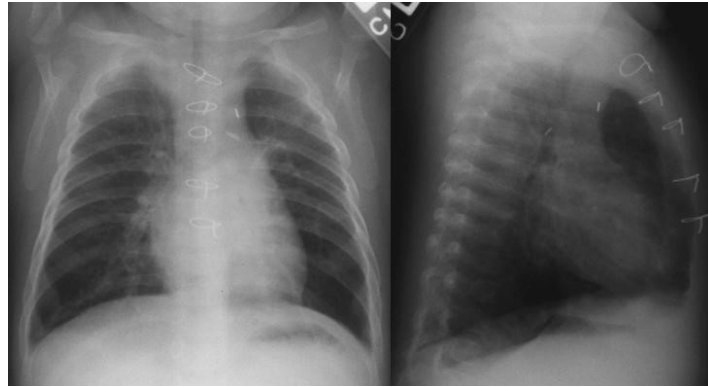


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Post Op CXR



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Physiologic Changes



- What physiologic changes occur with Cardiopulmonary bypass?



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Hemodynamic Effects of Osteopathic Manipulative Treatment Immediately After Coronary Artery Bypass Graft Surgery

Yurvati, Carnes, Stoll Clearfield, McConathy



Objective: To determine the effects of OMT on cardiac hemodynamics post-CABG surgery.

Design: Pilot prospective clinical study (N=29).

Setting and Patients: Treatment subjects (n=10) undergoing CABG surgery were recruited for postoperative OMT. The primary assessment compared, pre-OMT versus post-OMT, measurements of thoracic impedance, mixed venous oxygen saturation (SvO₂), and cardiac index. Records of control subjects (n=19) who underwent CABG surgery—but who did not receive OMT—were assessed for SvO₂ and cardiac index at 1 hour and 2 hours postsurgery.

Intervention: Immediately following CABG surgery (≤2 h), OMT was provided to subjects to alleviate anatomic dysfunction of the rib cage caused by median sternotomy and to improve respiratory function. This adjunctive treatment occurred while subjects were completely anesthetized.

Results: A post-OMT increase in thoracic impedance ($P \leq .02$) in OMT subjects demonstrated that central blood volume was reduced after OMT, suggesting an improved peripheral circulation. Mixed venous oxygen saturation also increased ($P \leq .005$) after OMT. These increases were accompanied by an improvement in cardiac index ($P \leq .01$). Comparisons of postoperative measurements in OMT subjects versus those in control subjects revealed statistically significant differences for SvO₂ ($P \leq .005$) and cardiac index ($P \leq .02$) between the two groups.

JAOA 2005; 105: 475-481

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OMT and CABG



Variable	Treatment Group (n=10)	Control Group (n=19)
	No. (%)	
■ Sex		
□ Men	8 (80)	13 (68)
□ Women	2 (20)	6 (32)
■ Age, Mean (Range), y	64 (56–74)	68 (56–79)
■ Comorbid Condition		
□ Diabetes mellitus	3 (30)	9 (47)
□ Recent myocardial infarction	4 (40)	2 (11)
□ Chronic obstructive pulmonary disease	2 (20)	4 (21)
■ Duration of Surgical Procedure, Mean ± SD, min		
□ Cardiopulmonary bypass	98 ± 16	86 ± 24
□ Aortic cross-clamping	61 ± 12	51 ± 12

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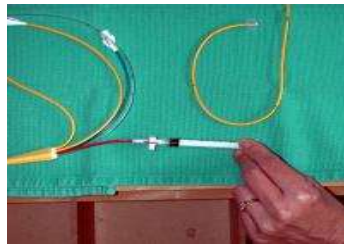
Instrumentation



- Continuous cardiac output Swan-Ganz catheter
- Thoracic Impedance Monitor

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Swan-Ganz Catheter



In Memoriam

H.J.C. (Jeremy) Swan

1922–2005

Jeremy Swan, internationally renowned cardiologist, scientist, researcher, innovator, teacher, and mentor to many, died—ironically of heart failure—on February 7, 2005. Born in Sligo, Ireland, of physician parents, Jeremy earned his medical degree and doctorate from the University of London. Service in the Royal Air Force found him serving as medical director of a hospital in central Iraq. He went to the Mayo Clinic in Rochester, Minnesota, in 1951 and by 1959 was named director of the cardiac catheterization laboratory.

I came to know Jeremy more as a contemporary than as a student, first meeting him in early 1959 when I spent a month at the Mayo Clinic to observe at close hand the highly reputed cardiac physiologist Dr. Earl Wood. Mayo Clinic was, at that time, replete with cardiac giants. In addition to Wood, there were Howard B. Burchell, the consummate diagnostician; John Kirklin, outstanding cardiac surgeon; Jesse



Jeremy Swan, MD, PhD taken when he was president of the American College of Cardiology, 1973–76. Reproduced by permission of the ACC.

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Ganz



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Thoracic Impedance Monitor



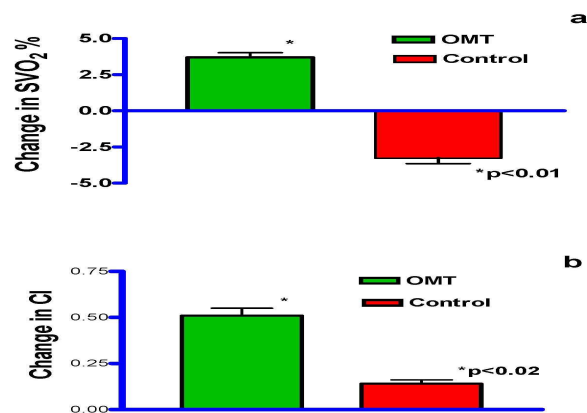
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THORACIC IMPEDANCE



- 4 Electrodes
- 2 anterior and posterior to the mid belly of the sternocleidomastoid muscle
- 2 contralateral midaxillary line of the lower thorax (7th & 8th intercostal)

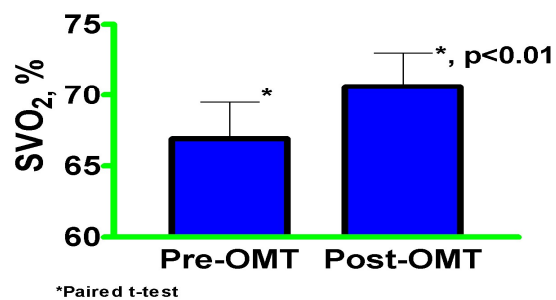
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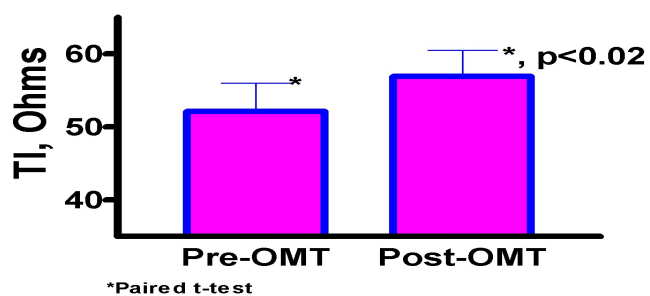
Mixed Venous Oxygen Saturation (SVO₂)



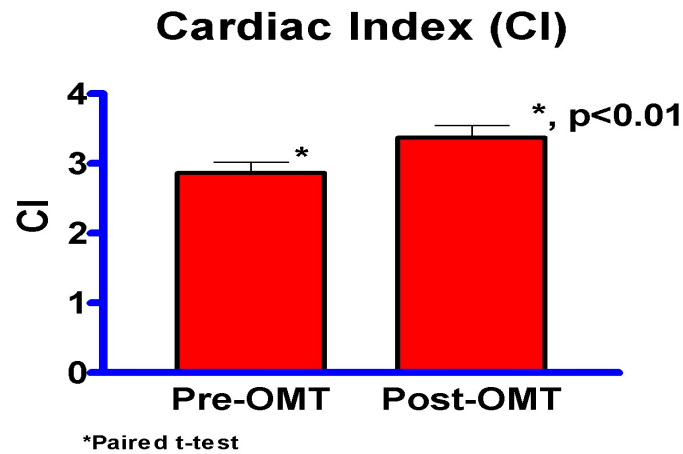
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Thoracic Impedance (TI, Ohms)



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HEMODYNAMIC EFFECTS OF OMT IMMEDIATELY FOLLOWING CABG SURGERY



- OMT Techniques Utilized:
 - Indirect Myofascial Release of the Sternum
 - Indirect release of the Respiratory Diaphragm
 - Rib raising
 - Sibson's Fascia Release
 - Condylar Decompression
 - Myofascial release of lower extremity
 - Extremity-limited lymphatic pump
 - Balanced ligamentous tension to ribs

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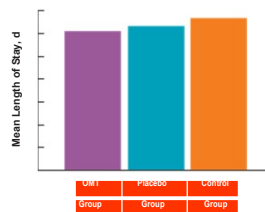
MSUCOM Study



- The Effect of Osteopathic Manipulative Treatment on Postoperative Medical and Functional Recovery of Coronary Artery Bypass Graft Patients
- J. Michael Wieting, DO; Christopher Beal, DO; Gary L. Roth, DO; Sherman Gorbis, DO; Lori Dillard, DO; Dennis Gilliland, PhD; and Jacob Rowan, DO
- J Am Osteopath Assoc. 2013;113(5):384-393

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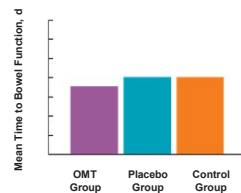
MSUCOM Study



Length of postoperative hospital stay for patients undergoing coronary arterial bypass graft surgical procedures. Abbreviation: OMT, osteopathic manipulative treatment.

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MSCUCOM Study



Time to first postoperative bowel movement for patients undergoing coronary arterial bypass graft surgical procedures. Abbreviation: OMT, osteopathic manipulative treatment.

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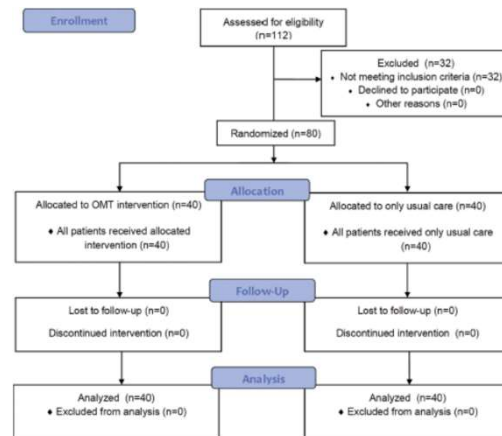
Italian Study



- Osteopathic Manipulative Treatment Improves Heart Surgery Outcomes: A Randomized Controlled Trial
- Vittorio Racca, MD, Bruno Bordoni, MS, Paolo Castiglioni, PhD, Maddalena Modica, MS, and Maurizio Ferratini, MD
- Ann Thorac Surg 2017;104:145–52

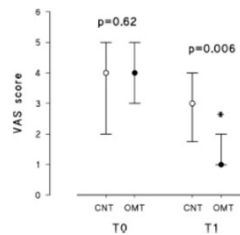
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Italian Study



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Italian Study



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Italian Study



- HOSPITALIZATION. Hospitalization (Fig 5) was significantly shorter in the OMT group than in the control group (19.1 +/- 4.8 versus 21.7 +/- 6.3 days; $p = 0.04$).

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Results



- this is the first randomized controlled trial evaluating the effect of OMT on both pain perception and functional outcomes after heart surgery. The main results of the study are that OMT treatment decreases dramatically the level of perceived pain, and substantially improves the functional capacity in terms of inspiratory volumes. The favorable effects of OMT were observed also at the stage of the interim analysis, at 75% of recruitment. Interestingly, observed a reduced hospitalization, on average by more than **2 days**, in the OMT-treated group, that could be consequence of the improved functional capacity.

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Complications of Wrong Techniques!!



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Sternal /Rib Complications



Poststernotomy Fractures and Pain Management in Open Cardiac Surgery

Robert Moore, MD; David M. Follette, MD; and

Herbert A. Berkoff, MD

CHEST 1994;106: 1339-1342

Results: Of 288 consecutive median sternotomies, there were a total of 24 sternal fractures. IMA harvesting was associated with a significantly greater incidence of sternal fractures. In the 94 patients in whom IMA mobilization was used, there were 16 fractures; in the remaining 194 cases, there were 8 fractures ($p < 0.007$). Twenty-one of 24 patients were not seriously affected by their sternal fractures, whereas 3 patients suffered **major respiratory compromise due to postoperative pain.**

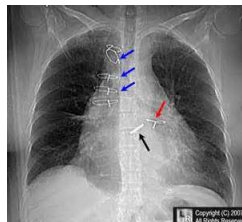
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Rib Fractures



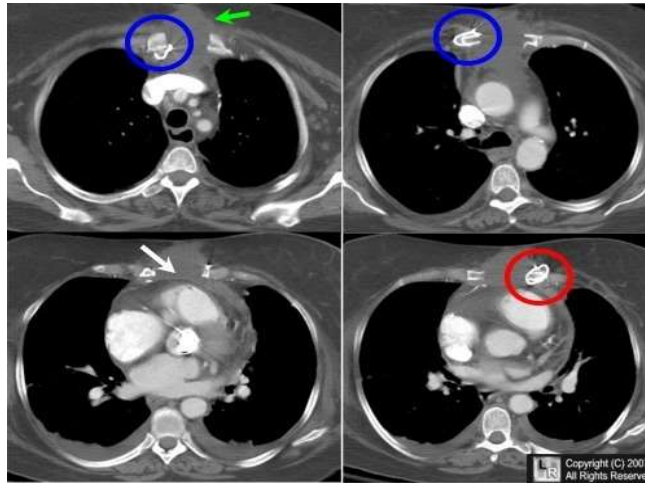
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Sternal Deshiscence



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Sternal Dehiscence



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OMT and Post Op Ileus



Effect of Osteopathic Manipulative Treatment on Incidence of Postoperative Ileus and Hospital Length of Stay in General Surgical Patients

Gerard A. Baltazar, DO; Michael P. Betler, DO; Krishna Akella, BA; Rishi Khatri, MS IV; Regina Asaro, DO; and Akella Chendrasekhar, MD

- *J Am Osteopath Assoc.* 2013;113(3):204-209 [published correction appears in *J Am Osteopath Assoc.* 2013;113(4):271]

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Characteristics and Outcomes in General Surgical Patients Who Did or Did Not Receive Postoperative OMT (n=55)

Mean (SD)

^a Physical status was classified on a scale of 1 to 6, with 1 being healthy and 6 being brain dead.

Abbreviations: ASA, American Society of Anesthesiologists; LOS, length of stay; OMT, osteopathic manipulative treatment; SD, standard deviation.

Characteristic or Outcome	OMT Group (n=17)	Non-OMT Group (n=38)	P Value
Age, y	60.3 (17.7)	62.1 (15.8)	.70
ASA Physical Status Class, ^a	2.5 (0.6)	2.7 (0.7)	.31
Time to Flatus, d	3.1 (0.6)	4.7 (0.4)	.035
Time to Clear Liquid Diet, d	4.6 (3.8)	5.6 (7.0)	.59
Time to Bowel Movement, d	4.8 (2.3)	5.8 (4.9)	.43
Postoperative Hospital LOS, d	6.1 (1.7)	11.5 (1.0)	.006

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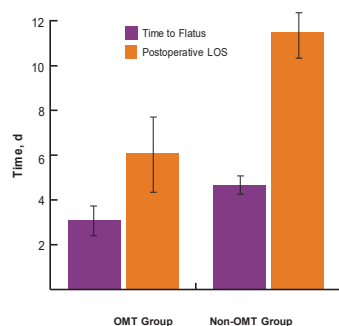


Figure 2.

Mean (standard deviation) postoperative days to flatus and postoperative hospital length of stay (LOS) for general surgical patients who did or did not receive postoperative osteopathic manipulative treatment (OMT).

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PCOM/Kirksville Study



- The effect of osteopathic manipulative treatment on length of stay in posterolateral post thoracotomy patients: A retrospective case note study.
- Regina K. Fleming Karen T. Snider Kent J. Blanke. Jane C. Johnson
- International Journal of Osteopathic medicine 5015;18: 88-96
- <http://dx.doi.org/10.1016/j.ijosm.2014.09.002>

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PCOM/Kirksville Study



- Inpatient medical records of patients who received posterolateral thoracotomies with lung resection between 1998 and 2011 were reviewed for demo-graphic data, LOS, thoracotomy surgery data, consultation data excluding osteopathic manipulative medicine, discharge data, and osteopathic manipulative medicine consultation data

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PCOM/Kirksville Study



- Thirty-eight patients received posterolateral thoracotomies with lung resection; 23 patients received OMT and 15 did not. The mean (standard deviation)LOS was 11.0 (6.8) days (range, 5-29 days) for those who received OMT and 10.4(5.5) days (range, 3-22 days) for those who did not ($P=.90$). Five patients developed postoperative ileus, and all had received OMT. Patients receiving 2 surgical

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License to Heal



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QUESTIONS ?



The Lesion is
the Reason