

MANUAL THERAPY FOR THE STERNUM

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The sternum is a mobile bone that participates in respiration. During inspiration, it moves superiorly and anteriorly. Motion also occurs in the costal cartilages, ribs, synovial costovertebral joints, and thoracic spine. These movements are described by Kapandji.¹

Trauma can create movement dysfunction as well as pain which can compromise breathing. Pain can be caused by spasm, tension, or compression of the intercostal nerves, joint capsules, ligaments, or inflammation. A review of several contemporary books on manual therapy address rib and vertebral mobilization techniques, but do not discuss the sternum specifically.^{1,2} Empirically, there are times when the sternum must be evaluated and treated along with the ribs. The following discussion concerns two case examples requiring treatment of the sternum.

Case 1

The patient was a 30-year-old female with a healed fracture of the sternum. Diagnosis was costochondritis and back pain. She complained of mild thoracic back pain, and severe sternal and sternocostal pain of 2 years' duration. She could not inspire deeply, had frequent upper respiratory infections, a loss of energy, and depression. She had had multiple unsuccessful consultations which included a trial of physical therapy consisting of transcutaneous electrical nerve stimulation (TENS), superficial and deep heat, and exercise.

The patient suffered from multiple thoracic and rib movement dysfunctions with fixation. These dysfunctions were treated with traditional techniques.² Following

treatment, they appeared to be essential resolved, except for ribs #4 and #5 on the left, and the sternum, which were very painful at rest and with light palpation. Closer evaluation via palpation and subjective feedback indicated that she had a probably depressed sternum. Costochondral segments 4 and 5 were depressed anteriorly, and the same ribs were prominent posteriorly.

Treatment in the direction of dysfunction is an effective technique when the other direction fails, and is referred to as an "indirect technique." Other patients have responded well with the "hoop technique" in the direction opposite of the dysfunction.

The patient was positioned supine, with a towel roll along the entire thoracic spine to encourage inspiration and chestwall expansion. The sternocleidomastoids were palpated, with the neck placed in slight extension and axial extension to the point of passive tension. The anterolateral rib cage was progressively resisted (except ribs 4 and 5) manually, by a modified muscle energy technique,² to increase intrathoracic pressure. Inhalation was followed with light manual pressure on all ribs laterally on the left, except ribs 4 and 5. Exhalation was progressively resisted with manual pressure, using the same hand placement. The purpose was to increase intrathoracic pressure and encourage ribs 4 and 5 to return to normal position and function. After several efforts, the patient felt relief of pain and described the sternum as "floating forward." She was able to inspire fully, and pain-free, for the first time since injury 2 years ago. Pain decreased immediately from a subjective rating of 8 out of 10 to 4 out of 10 on a pain scale of 0 to 10.

The patient was seen 20 times over the next 11 months. She also performed self treatment at home with similar positioning, except that she resisted rib cage expansion with her own hands. Self-treatment was performed at least once every 2 weeks. The technique was repeated through 5-10 respiratory cycles per treatment.

The patient became much more active and resumed long walks, stacking up to four chords of wood, driving a tractor, setting gopher traps, etc. These activities were not tolerated at all previously, and certainly contributed to repeat symptoms, but the patient had been un-

willing to reduce her activity level. She and her family noted much less pain, depression, and introversion.

Phone follow-up 1 year after her last treatment revealed continued progress. Her pain now seldom exceeds 4 out of 10, and she is able to reduce it to 2 out of 10 with self care. She reported that over the previous 2 years she had experienced upper respiratory infection lasting from October to May, but that she has not had any respiratory infections during the past year.

Case 2

This patient presented with anterior chestwall pain, difficulty with deep inspiration, and a twisted rib cage. With the patient supine, the entire left half of the sternum was prominent (anterior), as well as the left costochondral region. X-rays were negative. Bedside incentive spirometry averaged 2400 ml (three trials). A "hoop technique" was utilized to reduce the strain pattern.

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With an open hand placed firmly on each side of the rib cage (patient supine), the ribs were gently and progressively twisted to the left as though the rib cage were a hoop and the therapist were inducing a circular motion. Because this direction of treatment aggravated her pain, as well as increased difficulty with breathing, she was treated in the direction of the dysfunction, as movement in this direction decreased symptoms. Symmetry was restored and pain was relieved. Incentive spirometry increased to 3250 ml, (three trials). Treatment in the direction of dysfunction is

an effective technique when the other direction fails, and is referred to as an indirect technique.² Two other patients have been encountered who responded well with the "hoop technique" in the direction opposite that of the dysfunction.

The sternum is an important bone that participates in respiration and, along with ribs, can participate in movement dysfunction. It should be evaluated when one presents with thoracic, costovertebral, rib, and costochondral pain, as well as breathing difficulty of a mechanical nature. Spirometry can be used to give some objective measure of progress.

REFERENCES

1. Kapandji IA: The Physiology of the Joints, volume 3: The Trunk and the Vertebral Column, 2nd edition. New York, Churchill-Livingstone, 1974.
2. Mitchell FL Jr, Moran P, Pruzzo N: An Evaluation and Treatment Manual of Osteopathic Muscle Energy Procedures. Valley Park, MO, Mitchell, Moran and Pruzzo Associates, 1979. ■