



Standard of Care: Costochondritis

Case Type / Diagnosis: Costochondritis

ICD-9: 756.3 (rib-sternum anomaly)
727.2 (unspecified disorder of synovium)

Costochondritis (CC) is a benign inflammatory condition of the costochondral or costosternal joints that causes localized pain.¹ The onset is insidious, though patient may note particular activity that exacerbates it. The etiology is not clear, but it is most likely related to repetitive trauma. Symptoms include intermittent pain at costosternal joints and tenderness to palpation. It most frequently occurs unilaterally at ribs 2-5, but can occur at other levels as well. Symptoms can be exacerbated by trunk movement and deep breathing, but will decrease with quiet breathing and rest.² CC usually responds to conservative treatment, including non-steroidal anti-inflammatory medication.

A review of the relevant anatomy may be helpful in understanding the pathology. The chest wall is made up of the ribs, which connect the vertebrae posteriorly with the sternum anteriorly. Posteriorly, the twelve ribs articulate with the spine through both the costovertebral and costotransverse joints forming the most hypomobile region of the spine. Anteriorly, ribs 1-7 articulate with the costocartilages at the costochondral joints, which are synchondroses without ligamentous support. The costocartilage then attaches directly to the sternum as the costosternal joints, which are synovial joints having a capsule and ligamentous support. Ribs 8-10 attach to the sternum via the cartilage at the rib above, while ribs 11 and 12 are floating ribs, without an anterior articulation.³

There are many causes of musculo-skeletal chest pain arising from the ribs and their articulations, including rib trauma, slipping rib syndrome, costovertebral arthritis and Tietze's syndrome. CC is often misnamed as Tietze's syndrome, which is characterized by swelling at the second and third costosternal junction that is not present in CC.¹ CC is actually more common, usually occurring in people over 40 years of age and in women more than men.⁴

Indications for Treatment:

Pain, inflammation, decreased mobility and function

Contraindications / Precautions for Treatment:

Be sure that pain is not of cardiac origin. This will likely be ruled out at doctor's visit. Symptoms that lead to diagnosis of NON-musculoskeletal chest pain can include: exertional pain, radiation to neck or arms, numbness, fever, chills, cough, dyspnea and pain localized to atypical areas such as the axilla or mid-thoracic spine. CC can also coexist with cardiac disease.^{1,2} Several other systemic illnesses can present with chest pain, such as pulmonary, esophageal, and psychiatric disorders.^{5,6} Also, a patient involved in strenuous or contact sport

Standard of Care: Costochondritis

may be susceptible to rib stress fractures.⁷ If questions regarding the origin of pain exist, discuss with the referring doctor.

Examination:

Medical History: The therapist should review pertinent medical records and LMR Web. The patient should complete medical history questionnaire and the therapist will review this with the patient prior to evaluation. Take note of any thoracic surgeries and cardiac history. Patients will likely have a medical work up for chest pain including electrocardiogram and chest radiograph, however the actual inflammation associated with costochondritis can be demonstrated on gallium scintigraphy.⁸

History of Present Illness: Consider date of onset, length of time symptoms have been present, and aggravating and relieving factors. Also note any change in activity or repetitive activity that occurred at the time symptoms began.

Social History: Consider what patient does for work, their role in the home, and the positions and activities this requires.

Medications: Review current medication lists. Doctors most often prescribed NSAIDS for pain and inflammation.

Examination (Physical / Cognitive / applicable tests and measures / other)

This section is intended to capture the minimum data set and identify specific circumstance(s) that might require additional tests and measures.

Complete a full physical therapy evaluation, with specific attention to the following:

Pain: Rate pain on VAS scale of 0 to 10. Note what causes and relieves pain. Pain can be sharp, nagging, aching or pressure-like.² Pain referred from the thoracic spine or shoulder is described as deep and is regional and asymmetric in distribution. A small number of painful points in an asymmetrical distribution in a small region are considered referred pain, whereas a large number of points in a symmetrical distribution over a large area are associated with fibrositis or fibromyalgia.⁴

Palpation: Pain occurs with palpation of the costochondral junction involved.

Range of Motion: Assess cervical, thoracic and shoulder ROM.

Flexibility: Assess in particular for tightness of the pectoralis, SCM and scalenes

Posture: Assess for poor postures that can exacerbate symptoms.

Standard of Care: Costochondritis

Joint Play Assessment: Assess thoracic spine, costovertebral, costosternal and sternoclavicular mobility, as well as rib mobility. ^{2,9}

Breathing Pattern: Measure chest expansion at the level of the 4th rib space. Normal expansion is greater than 5 cm. Less than 2.5 cm is abnormal. There is often decreased chest expansion as deep breathing can cause pain.

Special Tests: Certain movements are suggestive of CC. These include extension of the cervical spine, traction on the posteriorly extended arm (or “crowning rooster”) and traction on the adducted upper extremity with head rotation to the ipsilateral side. ⁴

Differential Diagnosis: myocardial infarction, blunt abdominal trauma, acromioclavicular injury, sternoclavicular joint injury, anxiety, gout, herpes zoster, and lung neoplasm. ^{2,4}

Evaluation / Assessment:

Establish Diagnosis and Need for Skilled Services

Problem List:

- Pain
- Inflammation
- Decreased ROM in trunk and/or upper extremities
- Decreased flexibility
- Decreased Function
- Impaired patient knowledge

Prognosis: Disla, et al, reports spontaneous resolution of pain within one year. ¹⁰ Physical therapy interventions can be helpful in decreasing the severity of symptoms, mostly through patient education.

Goals:

Time frame will vary on severity of symptoms and effectiveness of medical management. Anticipate PT to be involved for less than one month, with focus on patient education.

- Patient will self-manage symptoms using moist heat and activity modification to decrease stress on the sternocostal region
- Patient will have full cervical, thoracic and UE AROM
- Patient is independent in postural correction
- Patient performs ADLs, IADLs and work tasks with minimal pain
- Patient is independent in home program which should include specific therapeutic exercises to correct dysfunctions found on the examination

Standard of Care: Costochondritis

Age Specific Considerations: Take into consideration normal process of aging and potential musculoskeletal changes that may affect treatment.

Treatment Planning / Interventions

Established Pathway Yes, see attached. No

Established Protocol Yes, see attached. No

Interventions most commonly used for this case type/diagnosis:

There is little specific research into physical therapy intervention for CC, but the following are anecdotal treatments noted in literature reviews.¹

- Patient education in activity modification, proper body mechanics and self-management, as well as waxing and waning course of CC
- Local, moist heat
- Postural correction
- Correction of muscle imbalances through cervical and thoracic region, including pectoralis muscles
- Instruction in home program

Medical treatment of CC may include a local corticosteroid injection.¹

Frequency & Duration: as needed, will likely be less than one month with emphasis on self-management. In many patients one to two visits may be enough to meet goals.

Patient / family education: As noted in treatment section, instruct patient in proper posture, avoidance of aggravating activities and proper ergonomics and body mechanics to reduce aggravation of costochondral junction. Instruct the patient in a home program with therapeutic exercises to correct any muscle imbalances found on the examination.

Recommendations and referrals to other providers: Return to referring MD, especially if you suspect cardiac issues. If chest pain of cardiac origin is suspected and emergent, refer to emergency room or call emergency services.

Standard of Care: Costochondritis

Re-evaluation / assessment

Standard Time Frame: Re-evaluate every 30 days, or earlier if necessary.

Other Possible Triggers: change or worsening of symptoms, failure to respond to treatment or onset of cardiac chest pain.

Discharge Planning

Commonly expected outcomes at discharge: Patient will have met goals noted above with focus on self-management of symptoms through activity modification.

Transfer of Care: Return to referring MD if no improvement for further medical management. Patient may be referred to cardiologist if cardiac origin is suspected.

Patient's discharge instructions: Continue with home exercise program, postural correction, and self-management of pain. Follow up with MD if pain persists.

References

- 1 Wolf E, Stern S. Costosternal Syndrome. Its frequency and importance in differential diagnosis of coronary heart disease. *Arch Intern Med* 1976; 136: 189-191.
- 2 Fam AG, Smythe H. Musculoskeletal chest wall pain. *Can Med Assoc J.* 1985; 133: 379-389.
- 3 Norkin P, Levangie. *Joint Structure and Function: A Comprehensive Analysis.* 2nd ed. Philadelphia, Pa: F.A. Davis Company; 1992.
- 4 Fam AG. Approach to musculoskeletal chest wall pain. *Primary Care.* 1988; 15 (4): 767-781.
- 5 Jones MP. Evaluation of non-cardiac chest Pain: toward a positive diagnosis," *Hospital Physician.* 2000;Apr: 54-69.
- 6 Chambers J, Bass C, Mayou R. Non-cardiac chest pain: assessment and management. *British Medical Journal.* 1999; 82 (6): 656-657.
- 7 Gregory PL, Biswas AC, Batt ME. Musculoskeletal problems of the chest wall in athletes. *Sports Medicine.* 2002; 32: 235-250.
- 8 Ikehira H, Kinjo M, Nagase y, Aoki, T, Ito H. Acute pan-costochondritis demonstrated by gallium scintigraphy. *The British Journal of Radiology.* 1999; 72: 210-211.

Standard of Care: Costochondritis

Copyright © 2007 The Brigham and Women's Hospital, Inc. Department of Rehabilitation Services. All rights reserved.

9 Yelland MJ. Back, chest and abdominal pain. How good are spinal signs at identifying musculoskeletal causes of back, chest or abdominal pain? *Australian Family Physician*. 2001; 30 (9): 908-912.

10 Disla E, Rhim HR, Reddy A, Karten I, Taranta A. Costochondritis. A perspective analysis in an emergency department setting. *Archives of Internal Medicine*. 1994; 154: 2466-2469.

Written: Amy Jennings, PT
April 2005

Reviewed: Marie-Josée Paris, PT
Amy Butler, PT
May 2005