Thoracic Pain in a Collegiate Runner
Sweeney C, Rothbard M, Morin G: Southern Connecticut State University, New Haven, CT

Background: A 22 year-old female runner presented with chronic respiratory difficulty, unremitting lateral right dorsal thorax pain, fingertip pallor, and numbness in the upper extremities. Pain quotient was described as 5/10 at rest, 7/10 with inspiration, and 8/10 during and after activity. Physical examination revealed a right hump of the thoracic cage in the flexed position, palpable tenderness between ribs 3-6, sensory and motor deficits of the left lateral upper arm, and a weak radial pulse. ROM testing revealed full trunk flexion, but limited extension, left and right rotation and side bending. The patient’s medical history was significant for structural scoliosis and hypermobility that was diagnosed at the age of 13 with a 36° thoracic and 33° lumbar curve. Later radiographs taken at the age of 20 revealed an increase in the thoracic (40°) and lumbar (43°) curves. Previous treatment consisted of 3••• years of rehabilitation starting at age 18 focusing on strengthening and manual therapy including mobilizations and traction to alleviate symptoms. Differential Diagnosis: Rheumatoid arthritis, asthma, pulmonary embolism, thoracic outlet syndrome, Raynaud’s disease, and restrictive lung disease. Treatment: After the initial evaluation, the patient was referred to her PCP. The PCP ordered an MRI that revealed degenerative discs at C2-C3 and C5-C6, and minimal bulging at L2-L3; however, results were inconclusive to the chief complaint. The patient was referred to an orthopedic spine specialist who prescribed an NSAID, ordered blood tests that ruled out rheumatoid pathology, and referral to a pulmonologist. The pulmonologist ordered a chest x-ray and a pulmonary function test. Radiographs were unremarkable; however, the pulmonary function test revealed consistent reduction in forced vital capacity and total lung capacity implying restriction. The patient was diagnosed with restricted right lung disease and referred back to the orthopedist. Status posts two months; plain film radiographs were taken and identified an increase in the thoracic (51°) with no changes to the lumbar (43°) curve. The orthopedist definitively diagnosed the patient with restrictive right lung disease, thoracic outlet syndrome, and Raynaud’s disease secondary to her progressive structural scoliosis and concluded that her condition would continue to deteriorate without surgical intervention. A posterior T5-L1 interbody vertebral fusion was performed. A post-operative right lung pleural effusion developed resulting in further dyspnea. An ultrasound-guided thoracentesis removed 1.4 L of fluid. Three months post-operative pulmonary function test demonstrated an increase of 1 L in total lung capacity. Five months post-operative the patient continues to progress with full body and respiratory rehabilitation and is expected to make a full recovery. Uniqueness: This case is unique because the patient’s increasing thoracic scoliotic curve was the underlying cause of her chronic respiratory difficulty. The progression of scoliosis characteristically discontinues when growth is completed; however, in this case further increases were due to inherent spinal instability. As the vertebral bodies involved in the scoliosis rotated, the spinous processes deviated toward the concave side of the curve, and the ribs followed the rotation of the vertebrae. This rotation placed a 30% restriction on the right lung and as the thoracic curve gradually increased, the pulmonary restriction would have as well. Conclusions: Restrictive lung disease is caused by a deformity of the chest wall. Changes to the thoracic cavity associated with significant scoliosis can dramatically affect respiratory function. Due to the rarity of this condition, clinicians must be aware of a patient’s medical history and its potential to affect a patient’s future health. Proper evaluation, management, and intervention of scoliosis have the capacity to limit the debilitating nature of the condition to facilitate the continuation of a physically active lifestyle. Word Count: 590