

# Mid Back Pain

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## Acute Thoracic Joint Dysfunction

Thoracic joint dysfunction is not thought to be as prevalent as it is in the neck and lumbar spine. Yet it is a surprisingly common cause of acute mid-back pain and disability. Rib joints, like any others in the body, are moving parts, and so are subject to mechanical stresses that sometimes exceed the elastic limits of the connective tissues. Acute rib joint dysfunction is a very common cause of unilateral back &/or chest pain. The culprit is the costotransverse or costovertebral joint.

### Revision of anatomy:

The 1<sup>st</sup> to 10<sup>th</sup> ribs (or 2<sup>nd</sup> to 9<sup>th</sup> depending on which anatomy source you read) form two joints with the vertebral column:

1. The costovertebral joint is formed between the most medial facets of the rib and the facet on the posterolateral vertebral body. Capsular ligaments for this joint attach to the vertebral body & intervertebral disc.
2. The costotransverse joint is formed by the articulation of the tubercle of the rib with the anterolateral facet of the transverse process.

The first seven ribs attach through their costal cartilage directly to the sternum. In this region, the

ribs are lower posteriorly than anteriorly. Breathing thus results in a 'pump action' elevation of the anterior ribs & sternum, pivoting on the costovertebral joints. This leads to an increased anterior expansion of the chest.

Ribs 8 to 10 attach indirectly, with the 11<sup>th</sup> & 12<sup>th</sup> being the 'floating' ribs. As the vertebral & costosternal attachments in the region are quite superior to the lateral aspect of the ribs, breathing results in raising of the lateral chest around an anteroposterior axis. This is the 'bucket handle' movement of the lower ribs, resulting in an increased lateral expansion of the chest.

### Dysfunction:

Thoracic movements, particularly rotation, will necessitate motion at these joints, and potential stress. A joint 'sprain' may arise, for instance, from a twisting injury or postural stress. The patient will not usually recall the precipitating event. They will notice an insidious onset of unilateral pain. The pain will be aggravated by specific rib movements, usually rotation and deep breathing.

Virtually any level in the thoracic spine can be affected. The pain may span several levels, and be difficult for the patient to localize. This is because there

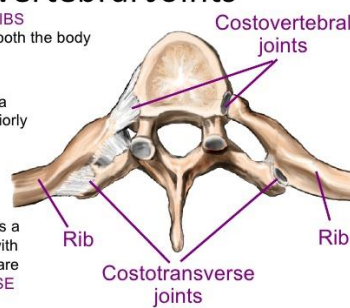
## Costovertebral Joints

In the thoracic spine, the RIBS articulate with the vertebrae at both the body and the transverse processes.

The T2-T9 thoracic vertebra have facets superiorly and inferiorly at the posterior aspect of the vertebral body that form the COSTOVERTEBRAL joints.

At all thoracic levels there is a facet where the rib articulates with the transverse process. These are called the COSTOTRANSVERSE joints.

The T1 and T10-T12 vertebral bodies have only one costal facet.



Axial View

will often be erector spinae spasm. However palpation will usually isolate the cause to one (or occasionally two) symptomatic levels.

The actual pathology is open to conjecture. One possibility is that mild joint sprain results in muscle spasm which further restricts movement and leads to the often widespread symptoms. The thoracic zygoapophyseal (ZA) & costotransverse joints contain fibro-adipose folds or meniscoids, which in the cervical spine are theorized to become occasionally trapped & lead to the classic *acute wry neck*. It is possible a similar mechanism occurs in the thoracic spine. While the thoracic ZA joints are a possible source of pain & dysfunction, in my experience they are rarely the main culprit in unilateral thoracic dysfunction.

The costovertebral joint cannot be directly palpated. So when rib joint dysfunction is present, it is speculative which of the two joints is symptomatic. However a medially directed force at the angle of the rib (lateral to the transverse process) will induce a more direct medial force onto the costovertebral joint, and may reproduce symptoms. More commonly, however, a direct posterior-to-anterior (PA) force at the costotransverse joint will reproduce the patients pain.

### **Management**

Once the symptomatic joint is localized it will usually respond very quickly to treatment. Direct PA mobilisation will help to free-up the joint and settle the muscle spasm. Massage and a form of rotation mobilisation may add further benefit. Most cases will settle after one to two treatments, and the patient will often be sent away with stretches, sometimes strengthening, and postural correction exercises. As with the acute wry neck, recurrences are rarely frequent, and the condition may only occur once or twice in the patients lifetime.

For information for doctors on physiotherapy management of all types of injuries visit:

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