PAIN & DISABILITY℠
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Site of Pain

Since faulty action of the functional vertebral unit can result in pain, it is necessary to elicit the tissues within the unit which, when irritated, can initiate the sensation of pain. Within the functional unit, the following should be noted.

1. The anterolongitudinal ligament is sparsely innervated, but chemical, electrical, or mechanical irritation of this ligament does *not* evoke any significant pain sensation.

2. Vertebral bodies are a site of pain as is evidenced in fracture, metabolic disorder, or metastatic disease. The pain from the bodies themselves is dull, vague, usually nonradiating, and not significantly related to motion or position. Nocturnal pain in the reclining position is a symptom that alerts the examiner to suspect disease of malignancy or metabolic origin and initiates appropriate studies.

3. The young undamaged intervertebral disk with no evidence of degenerative changes is Vascular, aneural, and, therefore, insensitive. No pain is elicited when performing a diskogram, which requires penetration of the pulpy nucleus with a needle. Injection of a small quantity of material without undue pressure causes no discomfort other than a mild low backache. In jection of an anesthetic agent such as Novocaine does not alter a residual low backache; therefore, intradiskal innervation is verified and altered dynamics must be assumed. Injection of material into an abnormal disk causes severe low back pain with radiation of leg pain.

4. The posterolongitudinal ligament has copious innervation of unmyelinated nerves with sympathetic fibers. The nerve supply has been firmly established to be the recurrent meningeal nerve of Luschka. Pain can occur from irritation of these innervated tissues.

5. The nerve of Luschka also innervates the aural sheath of the nerve root as it emerges through the intervertebral foremen. The nerve root and its aura are another source of pain within the functional unit. The intrinsic nerve supply from the meningeal ramus has several branches that run through the foremen: one towards the posterior longitudinal ligament, one to the aura mater, and one within the epidural tissue. There are numerous fibers that run longitudinally on the dorsal surface or within the dorsal aura but none are found on the ventral surface or intradurally. The lack of nerve supply to the ventral aspect of the aura possibly explains Falconer and associates] in their claim that the aura was insensitive.

6. The yellow ligament is exclusively yellow elastic connective tissue and is devoid of any innervation; therefore it is insensitive.

7. The interspinous ligaments are also innervated and can, when inflamed, cause local as well as referred pain. Kellgren injected irritating substance alongside of the spinous process of the first sacral vertebra and caused pain of a sciatica nature radiating down the leg. His injections apparently were into the ligament, partially into the muscle and may have been into the periosteum.

8. Stimulation of deep muscles around a spinal joint has been confirmed to cause referred pain. The multifid muscles contract in an attempt to splint the lumbosacral spine in painful low back syndromes. The basis of deep muscle contraction may well result from irritation of the recurrent nerve of Luschka, from the facet joints, from the posterior longitudinal ligament, or even from the protrusion of a damaged disk. If excessive muscular tension can cause symptoms of low back and referred leg pain it can, in part, explain aggravation of symptoms from anxiety, anger, tension, and even chilling as well as faulty use of the back.

9. The posterior articulations (facets) are synovial joints and are a site of pain from injury, inflammation, or misuse. The facets are innervated by the articular branch ofthe posterior primary division ofthe nerve root.

In summarization, the tissues capable of causing pain are the posterior longitudinal ligament, the nerve root and its aura, the posterior articulations (facets), the ligaments, and the musculature of the vertebral column.

The examiner should appreciate and determine which of these tissues is the site of pain and the mechanism by which these tissues are being irritated, thus initiating the pain cycle. Assuming that pain mediates through peripheral nerves and ascends the cord, then the mechanism of chemical, electrical, thermal, or mechanical nociceptive stimuli, which is ultimately interpreted as pain from these sites of painful stimuli, form the basis of clinical evaluation of the patient complaining of low back pain.

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