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CASE REPORT

Lower thoracic syndrome — A differential screen for back pain following vertical compression injury: A case report

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Summary A 36-year-old male experienced left sided back and radiating flank pain, following a fall on his buttock. A detailed medical evaluation ruled out the presence of red flags. Initial examination revealed positive findings of comparable local tenderness over the left T11, T12 and left paraspinal area, and a 2 cm shortening of the left leg. 8 treatment visits for a period of 4 weeks addressed mechanical dysfunction at the T11, T12, lumbar and pelvic region, comprising manual therapy, therapeutic exercise and pain relieving modalities. Reduction of local tenderness, back and radiating flank pain was observed. Additionally, resolution of the persistent apparent shortening of his left leg was observed, following a high velocity thrust (HVT) manipulation of the T11, T12 segments. The vertebral motion segment of T11, T12, the thoracoabdominal nerves, the 12th rib, the quadratus lumborum and the serratus posterior inferior are speculated to be potential symptom mediators. The findings in the case report suggest the lower thoracic region to be included during the evaluation process of back pain, especially when the mechanism of injury is a vertical compression.

Introduction

Back pain, being a universal experience among the adult population, can have a spondylogenic, neurogenic, viscerogenic or psychogenic source. The spondylogenic source is considered to be primarily related to biomechanical challenges in the lumbar vertebrae and the structures supporting the intervertebral motion segment, namely the disc, nerve root, facet joint, ligaments and muscles (Jinkins, 2004). This model also includes the pelvic complex and the hip joint as contributing factors (Simopoulos et al., 2012). The junction formed between the twelfth thoracic vertebrae and the first lumbar vertebrae, has also been

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described as a potential source (Maigne, 1980; Sebastian, 2006).

The lower thoracic region, unlike the upper and mid thoracic region, is infrequently described as a source of musculoskeletal pain and dysfunction. The clinical musculoskeletal entities described to cause pain and dysfunction in this region are thoracic disc herniations (Angevine and McCormick, 2012), thoracolumbar junction syndrome (Maigne, 1980; Sebastian, 2006) and the twelfth rib syndrome (Keoghane et al., 2009; Cranfield et al., 1997). The T11, T12 vertebrae have been described to be vulnerable for injury, the mechanisms which include vertical compression and flexion compression (Weninger et al., 2009). These, however, are described to cause stable or unstable fractures of the vertebrae. Traumatic vertical compression injuries that do not result in a fracture are poorly documented as a source of pain. A single impact fall on the buttock can transmit forces that are 6.4—9.0 times body weight (Sran and Robinovitch, 2008) with the added risk of burst fractures of the lower thoracic and upper lumbar vertebrae (Wilcox et al., 2003). Researchers describe the thoraco-lumbar junction to be vulnerable for compression injuries even with a minor slip and fall on the buttock (Weber et al., 2002). Hence, the inadequacy of supporting literature, of this clinically relevant mechanism of injury, directs clinicians to be aware of it. This is especially important when anecdotal patient histories suggest a slip and fall on the buttock on slippery floors, icy sidewalks, while skating or roller-blading, or a fall off a horse. We speculate that when bony disruption does not occur in a single or sustained traumatic event, the structures of the vertebral motion segment (the facet joint, exiting nerve root, supporting muscles and ligaments) are subjected to stress, consequently resulting in dysfunction (Quinn et al., 2010; Cavanaugh et al., 1996; Solomonow, 2012; Alexander, 1985). While literature suggests vertical compression to cause lower thoracic fractures, the possibility of dysfunction in the absence of a fracture needs consideration. This case report aims to offer an insight to this speculation. It suggests that several structures in the lower thoracic region are susceptible, when the mechanism of injury is a vertical compression. These structures are the vertebral motion segments of the lower thoracic spine, the 12th rib, the quadratus lumborum (QL), the serratus posterior inferior (SPI) and the thoracoabdominal nerves.

Case description

History and clinical findings

A 36-year-old male who experienced symptoms of left sided lower thoracic and back pain with pain radiating into the left flank, is presented (Fig. 1). The pain was reported to have started following a direct vertical compression on the buttocks, when the patient jumped into a mud pit with his hips and knee flexed. This incident had occurred 8 months ago. He reported that the mud pit was harder than expected in consistency and felt like he was landing on a semi hard surface. He experienced a sharp pain immediately which lingered for a few minutes and subsided to a marked soreness in the lower thoracic and thoracolumbar area. He

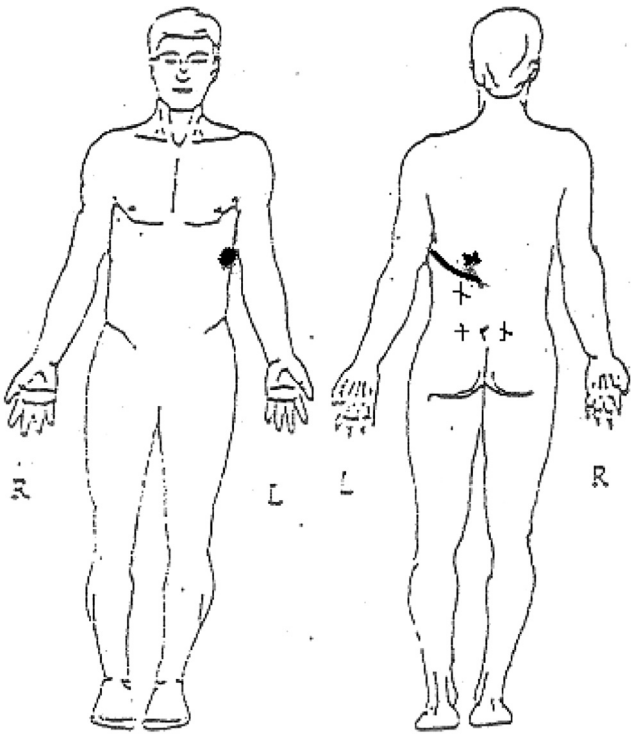

Figure 1 Reported pain locations.

did not seek immediate medical help as the pain had subsided to a tolerable intensity. He works as a graphics engineer and reports spending long hours sitting in front of a computer at work. His discomfort would gradually progress in sitting and would surge if he attempted to slouch. Moving around would help relieve some of the symptoms but would return in any one position sustained for too long. He reported occasional sharp and shooting pain into the left flank area. He rated this pain as 8 on a scale of 10 using the Numerical Pain Rating Scale (NPRS) (Chapman et al., 2011). His pain was partially relieved by heat and resting. He reported of the pain disturbing his sleep, very occasionally. The pain gradually progressed to the lower lumbar and pelvic regions on the left, which he described as a nagging aching pain. Owing to the persistence of pain and discomfort he consulted his physician 6 months later and underwent a detailed examination of his spine and kidneys, which included X-rays and an MRI. He was ruled out for vertebral fracture and kidney disease and referred to physical therapy with a diagnosis of 'back pain'.

Testing

Observation revealed the patient to be in minimal distress on movement. In standing, a minor curvature with concavity on the left was observed in the lower thoracic and thoraco-lumbar region. Lumbar flexion in sitting revealed reversal of lordosis with terminal restriction at 60°. Additionally, reproduction of local discomfort in the lower thoracic and thoracolumbar area was observed. This was further aggravated in a slump or slouch sitting position. Lumbar flexion in standing measured 60° with minimal discomfort in the lumbar region and a mild stretch in the