Shadows of the Truth in Patients with Spinal Pain: A Review

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Objective: Spinal pain with or without referred pain is a major and costly health problem that can arise from many anatomical structures. Sophisticated diagnostic imaging devices cannot show some of these structures, and frequently imaging provides only a shadow of the truth. This review illustrates how symptoms may well have an organic cause that is not detectable by current methods of examination, including imaging.

Method: This study reviews some histopathological findings that can be associated with spinal pain with or without referred pain but cannot be seen on imaging.

Result: Some histopathological changes illustrate imaging device limitations.

Conclusion: Awareness of the considerable limitations of even sophisticated imaging devices is necessary when managing patients with acute or chronic spinal pain with or without referred pain. Symptoms may well be genuine and not of psychogenic origin: a diagnosis of malingering, therefore, should not be made lightly.

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Spinal pain may originate from different spinal tissues, such as muscles, ligaments, dura mater, intervertebral discs, zygapophysial (facet) joints, and other spine-related joints such as sacroiliac joints (1,2). It is second only to the common cold in its frequency (3) and affects up to 80% of the population at some time during adult life (4), beginning in adolescence (5). Spinal pain is a main cause of absence from work (6,7) and places enormous economic burdens upon many world communities: the cost to the Australian community is thought to be approximately $10 billion per annum and in the United States of America it costs about $100 billion per annum (8). The cost is skyrocketing (9), and it is known that the epidemic increase of sickness in low back pain syndromes is actually threatening the social welfare system in societies with socialized medicine (10,11).

It has been known for many years that back pain of mechanical origin is far more prevalent than back pain due to frank pathology (12). Traumatic, inflammatory, or other pathological processes can be ascribed to only 19% of patients (13). Nonetheless, patients are often incorrectly diagnosed as having a “compensation neurosis” or other psychosocial behavioural problem (14,15) when a causative factor cannot be determined.

Furthermore, over the years there has been a tendency in the literature to portray a negative image of industrial workers who are on compensation (16,17), although some more recent studies comparing compensation and noncompensation patients show no difference (18–21) and the stereotype describing migrant workers as malingers cannot be supported (22). In spite of these findings, Resnick (23) states that it must be assumed that everyone is ready to use illness for illegitimate purposes. Psychosocial factors involved in back pain need to be taken into account as important components of the...
illness (24), however, Waddell and others (25) state that psychological factors are involved in all cases of back pain.

This paper looks into some of the possible issues associated with an incorrect diagnosis being made when undue emphasis is placed on imaging procedures.

**Diagnostic Problems**

Two major difficulties involved in evaluating a patient with spinal pain of mechanical origin, with or without root symptoms, are that multifactorial etiologies are possible (26) and that the painful structure or structures are not amenable to direct scrutiny. A tentative diagnosis is therefore usually arrived at for an individual case by taking a careful case history, conducting a routine physical examination and, when necessary, employing imaging and laboratory procedures. In spite of following routine examination procedures, however, one often merely eliminates frank pathologies, and the cause of spinal pain with or without referred pain of mechanical origin often remains obscure. Thus, in severe cases, injections of anesthetic, with or without steroid suspension, are sometimes used to augment the clinical evaluation (27), for example, to determine whether pain originates in the zygaphysical or sacroiliac joints. Specifically, diagnostic problems relate to 1) inadequacies in the precise anatomical knowledge of the spine, 2) the possibility of multiple causes of pain at a given level of the spine, and 3) limitations of the diagnostic yield of many imaging procedures such as plain film radiography, myelography, computerized tomography (CT), magnetic resonance imaging (MRI), and bone scans.

The resolution available with spinal imaging studies has developed exponentially in recent years from plain film radiography to MRI and radionuclide scanning. These improvements in the resolution of imaging studies, most recently MRI, have meant that more and smaller abnormalities are detected (28), although others cannot be seen.

Some diagnostic and therapeutic chemical agents may be harmful; for example, chemicals injected into intervertebral discs may extravasate into the epidural space (29), causing complications due to contact between them and neural structures (30,31). The potential complications from discography include exacerbation of pain, contrast allergy, nerve root injury, and chemical or bacterial discitis (32).

In many cases of acute low back pain with sciatica, intervertebral disc prolapse has been described as being the pathological cause (33,34), but according to Wiesel and others (35) and Jensen and others (36), herniated lumbar intervertebral discs are often asymptomatic, especially when the spinal canal is not narrow (37). Some authorities believe that disc herniation has been overemphasized as the principle source of back pain, and they do not, therefore, advocate early surgery (38).

When one considers that most patients with herniated discs improve without surgery (28,39) and that imaging studies only weakly predict either the need for surgery or its outcome, the overreliance on this part of the assessment of the back is problematic. For example, “black disc disease” seen on MRI may be an example of clinically irrelevant pathology being increasingly treated (40).

The ligaments and muscles associated with zygaphysical joints are supplied by the posterior primary rami (41,42), and some authors have focused particular attention on these joints (43–48), but our understanding of their pathology, as well as its relation to painful syndromes, is limited (49). It is likely, however, that zygaphysical joint pain is a common condition which is frequently overlooked (50,51). In patients presenting with local tenderness in the low back, muscle spasm, and low back pain referred to the back of the thigh, the midcalf, or the ankle, it is often thought that the pain arises from the zygaphysical joints (52). Alleviation of the pain by injection of local anesthetic, with or without steroid suspension, into the joints under fluoroscopic control supports this diagnosis (27,53,54).

The continuing interest in back pain syndromes shown in recent years by epidemiologists, pathologists, rheumatologists, bioengineers, and other biomedical researchers and other clinicians reflects both the magnitude of the problem and the lack of definitive solutions (55). In spite of this multidisciplinary interest, it is still only rarely possible to validate a diagnosis in cases where pain arises from the spine (56) and, because it is not possible to establish the pathological basis of back pain in 80% to 85% of cases (57), this leads to diagnostic uncertainty and suspicion that some patients have a compensation neurosis or other psychological problem.

**Limitations of Investigative Methods**

It is well known that plain film radiographs of joints can be informative but have limitations (58), and there is sometimes a discrepancy between the degree of pain and the severity of radiographic changes (59). Disabling zygaphysical joint “facet” syndromes can be associated with normal or nearly normal plain film radiographs (48) and, while CT scans give additional information (60), they are not applicable to all cases of back pain (61) and do not generally reveal soft tissue pathology. Even a sophisticated imaging instrument such as MRI has diagnostic limitations because no imaging device shows early histopathological changes within tissues. Some normal soft tissue structures, such as synovial folds (62,63) and transforaminal ligaments (64), cannot be identified in vivo by any imaging procedure; their possible role in the pathogenesis of mechanical spinal pain with or without referred pain, therefore, can be overlooked. These structures have been demonstrated only in MRI studies of blocks of cervical (65) and lumbar spine specimens (66). In fact, the various imaging procedures are capable of showing only a shadow of the truth. An example to highlight the possible discrepancy in findings between a plain film

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radiograph and actual histopathological changes in a cadaver is shown in Figure 1. Furthermore, not even MRI can show the large, highly vascular intracapsular synovial folds that contain small-diameter, free-ending nerves which are thought to have a putative function of nociception in view of their peptide-immunoreactive nerves (68–71) (Figure 2). These structures are vulnerable to “nipping” between the joint surfaces, with the resulting synovitis and hemarthrosis causing pain (69,72).

In addition, there are many other possible, and yet undemonstrable, causes of spinal pain, for example, adhesions within the zygapophysial joint capsule (74), traction and deformation of blood vessels within the spinal and intervertebral canals by osteophytes (67), vertebral body osteophytes tractioning or compressing autonomic nerves and ganglia (75–77), and sacroiliac joint dysfunction or degenerative changes (1).

In order to avoid inappropriate treatment and the development of chronic spinal pain syndromes, early management should include the consideration of mechanical or functional spinal lesions (78) in the differential diagnosis.

Conclusion

Patients who complain of spinal pain, with or without referred pain, without definite radiculopathy present unusual diagnostic difficulties, and in most cases, it is impossible to
make a precise anatomical and pathological diagnosis (79) because the anatomical source of pain cannot be identified. As shown in Figures 1 and 2, multifactorial structures may result in pain arising from a synovial joint. It is not possible, however, to show definitive lesions in vivo when some soft tissues are injured, for example “nipping” of a synovial fold between articular facet surfaces resulting in traumatic synovitis and reflex muscle spasm (72).

Failure to diagnose spinal pain correctly may result in inappropriate referral and intervention. When it is acknowledged that an unidentifiable tissue may genuinely be causing pain (80), however, addressing psychosocial factors early could be a very important strategy in the prevention of chronic spinal pain.

It is imperative that, in the absence of a compelling reason to do so, physicians do not label patients as neurotic or malingering when it is not possible to demonstrate objectively with imaging that they are, in fact, not fabricating symptoms.

### Clinical Implications

- Sophisticated diagnostic imaging methods cannot show subtle histopathological changes. Therefore, be careful not to arbitrarily label spinal pain syndrome patients as malingers.
- Nondemonstrable pathology can exist and cause spinal pain syndromes that become chronic. This can cause psychological overlays as a result.

### Limitations

- Some patients may magnify their complaints. Is this to stress their sincerity or is it merely an attention-seeking manoeuvre?
- In the absence of objective signs, a diagnosis may be impossible. This should not preclude early psychological intervention in acute or chronic spinal pain syndromes.

### References


Résumé

Objectif : Des douleurs à la colonne vertébrale avec ou sans des douleurs irradiées constituent un grand problème onéreux de santé qui peut provenir de nombreuses structures anatomiques. Certaines de ces structures ne sont pas révélées par des techniques de visualisation diagnostique de fine pointe. Souvent, la visualisation ne donne que l’ombre de la vérité. La présente analyse montre que certains symptômes peuvent bien avoir une origine organique sans être repérés par les méthodes actuelles d’examens, y compris la visualisation.

Méthode : La présente étude passe en revue certaines constatations histopathologiques qui peuvent être associées à des douleurs de colonne vertébrale avec ou sans des douleurs irradiées, sans toutefois se voir à la visualisation.

Résultat : Certains changements histopathologiques illustrent la faiblesse d’appareils de visualisation.

Conclusion : En soignant des malades qui présentent des douleurs aiguës ou chroniques à la colonne vertébrale, avec ou sans douleurs irradiées, on doit prendre conscience de la faiblesse des appareils de visualisation, même perfectionnés. Les symptômes pourraient bien être authentiques et non psychogènes. Par conséquent, on ne devrait pas conclure trop vite qu’il s’agit de simulation.