

Metastatic bone disease secondary to breast cancer: an all too common cause of low back pain

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Breast cancer is currently the most common form of cancer in women and will eventually affect 12 percent of the female population. Since 40% of patients with breast cancer develop musculoskeletal symptoms secondary to metastatic bone disease, the likelihood of patients presenting to chiropractic settings with this disorder is relatively high. The need for further imaging is stressed in the patient with a history of breast cancer and whose physical examination and plain film radiographs are inconclusive or suspicious. In these cases metastasis is the diagnosis until proven otherwise. To illustrate the physical examination and radiographic findings of metastatic bone disease secondary to breast cancer the case of a 46-year-old woman presenting to a chiropractic office for examination is presented. A brief discussion highlighting the incidence, prevalence, risk factors and management of the disease follows. A review of the distribution pattern of metastasis, with special emphasis on the major sites of skeletal metastasis, is presented. The need for referral for further imaging, when examination findings and radiographic results are suspicious or inconclusive, is stressed.

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KEY WORDS : breast cancer, metastasis, low back pain, chiropractic, spinal manipulation.

Étant donné que le cancer du sein représente la forme la plus courante de cancer chez la femme, on prévoit que 12 % de la population féminine en sera atteinte. 40 % des patientes atteintes du cancer du sein développent des symptômes musculo-squelettiques secondaires aux métastases osseuses, le risque de voir des patientes se présenter en milieu chiropratique avec cette condition est relativement élevé. Les techniques d'imagerie plus approfondies sont conseillées chez les patientes ayant des antécédents de cancer du sein et présentant des résultats non concluants ou douteux à la suite de l'examen physique et des radiographies. Dans ces cas, la métastase est le diagnostic jusqu'à preuve du contraire. À titre d'exemple afin d'illustrer l'examen physique et les observations radiologiques de métastases osseuses dues à un cancer du sein, nous vous soumettons le cas d'une femme de 46 ans qui s'est présentée à un cabinet de chiropractie pour un examen. Par la suite, une brève discussion soulignant l'incidence, la prévalence, les facteurs de risque et le contrôle de l'état du patient sera élaborée. Un examen du schéma de la distribution des métastases, particulièrement sur les sites majeurs de métastases squelettiques est présenté. Lorsque les résultats des examens et des radiographies sont douteux ou non concluants, il est conseillé de faire appel à un autre spécialiste pour l'obtention d'images radiologiques plus sophistiquées.

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MOTS CLÉS : cancer du sein, métastase, douleur lombaire, manipulation vertébrale chiropratique.

Introduction

Breast cancer is currently the most common form of cancer in women and will ultimately affect 12% of the female population.¹ Of those, half will develop metastasis in distant organs and structures² with 73% of these cases developing metastatic bone disease.³ When combining the incidence of skeletal complications of breast cancer of 4.5% of the total female popula-

tion with the fact that 63% of patients presenting to chiropractors do so for musculoskeletal complaints⁴ the likelihood of female patients presenting with metastatic bone disease secondary to breast cancer in chiropractic settings is relatively high.

To highlight the typical presentation of metastatic bone disease secondary to breast cancer the case of a 46-year-old female is described. The incidence, prevalence and mortality of the disease is briefly discussed. Associated risk factors, treatment and factors affecting the early recognition of bone lesions on plain film radiographs are reviewed. The most common presenting signs and symptoms are highlighted. The need for further imaging when history, physical examination and plain film radiographs are inconclusive or suspicious is stressed.

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Case report

A 46-year-old female presented to a chiropractic office complaining of right-sided low back pain with radiations into the right hip, anterior thigh and medial calf. She related that the pain had developed insidiously three months prior and was now constant and present on a daily basis. Prolonged sitting and standing aggravated her condition while rest decreased her pain. She had noticed an increase in pain at night which often woke her from sleep. Her past health history included mastectomy for breast cancer two years prior. Bone scans to exclude the possibility of asymptomatic metastases had been performed one year prior and had been reported normal. There was no recent history of weight loss or fever and, with the exception of back and leg pain, the patient felt generally well.

On examination range of motion was normal and pain free in all directions. Postural assessment was unremarkable. Motion palpation of the thoracic and lumbar spine demonstrated localized tenderness of L1, L2 and L3 vertebrae on rotation. Static, digital palpation and spinous percussion at the L2 and L3 levels elicited localized pain. Deep tendon reflexes were normal (+/+). Muscle strength testing revealed reduced strength in the dorsiflexors of the right foot (4/5). No sensory deficits were evident. Right straight leg raising was painful and limited at 60 degrees; left straight leg raising was 90 degrees and pain free. Radiographic examination of the lumbar spine demonstrated patchy sclerosis of the vertebral body and pedicles of L2 (Figure 1, 2, and 3). Because of the past history of breast cancer and radiographic examination findings a provisional diagnosis of metastatic bone disease was made. The patient was referred to her oncologist for further diagnostic imaging and treatment.

Discussion

Even though more women die of lung cancer, breast cancer remains the most common form of cancer in women.¹ In the U.S. the annual incidence of breast cancer is thought to be 175,000 cases, with metastatic complications claiming 44,500 lives per year.¹ It is currently estimated that one in nine North American women will develop breast cancer during their lifetime.¹

While the etiology of breast cancer remains unclear, a wide variety of factors have been associated with increases and decreased risks. In western countries the incidence of breast cancer increased with age and is more common in unmarried women and those in higher socio-economic levels.¹ Lifestyle factors such as high dietary fat intake and increased alcohol use⁶ as well as exposure to diethylstilbestrol (DES)⁷ have been associated with an increased incidence of breast cancer. Although early menstruation, late menopause and/or irregularity of the menstrual cycle can increase a woman's risk of developing breast cancer,⁷ a greater number of pregnancies and a longer duration of breast feeding appears to decrease the risk.¹ A strong familial tendency has also been observed.⁷ Significant to chiropractors is the additional risk for those women who are exposed to ionizing radiation during adolescence. The radiographic

monitoring of adolescent idiopathic scoliosis is thought to play a considerable role in the subsequent development of breast cancer.⁸ To date, no correlation between the use of oral contraceptives and breast cancer has been established.¹

Local management of breast cancer has traditionally involved radical mastectomy including removal of the pectoralis muscles and associated lymphatic chains. Because breast cancer is now considered to be localized only for a short duration before disseminating through the circulatory and lymphatic systems, the surgical approach now emphasizes, when appropriate, only partial removal of the breast in an attempt to limit disfigurement.⁷ Radiation, estrogen therapy and chemotherapy are then employed to limit the potential for metastasis. While this adjuvant therapy has been shown to improve the quality of life it does not significantly alter long-term survival rates.⁷ When the primary tumour is removed and a lymph node biopsy fails to demonstrate cancer cells, the five year survival rate is 80%; when cancer cells are present the survival rate decreases to 40%.⁷

Mortality associated with breast cancer is almost always the result of metastasis. Fifty percent of women with breast cancer will develop metastasis to the bone, lungs, liver, brain and other organs^{2,3} (Table 1). Multiple organ metastasis is generally the rule; Abrams et al. found 60% of all cases of metastasis involved five organs.³ When metastasis does occur it involves the bone 73% of the time. Only the lung is more frequently involved, in 77% of all cases.³ Metastasis to the skeletal system most commonly affects the axial skeleton. Krishnamurthy found the axial skeleton to be involved in 72% of cases while the appendicular skeleton was involved in 28% of cases.⁹ A list of percent

TABLE 1
Common Sites of Metastases
of Carcinoma of the Breast³

Site	%
Lung	77.2
Bone	73.1
Mediastinal nodes	66.5
Pleura	64.7
Liver	61.1
Adrenal glands	53.9
Brain (cerebral)	28.8
(dural)	33.3

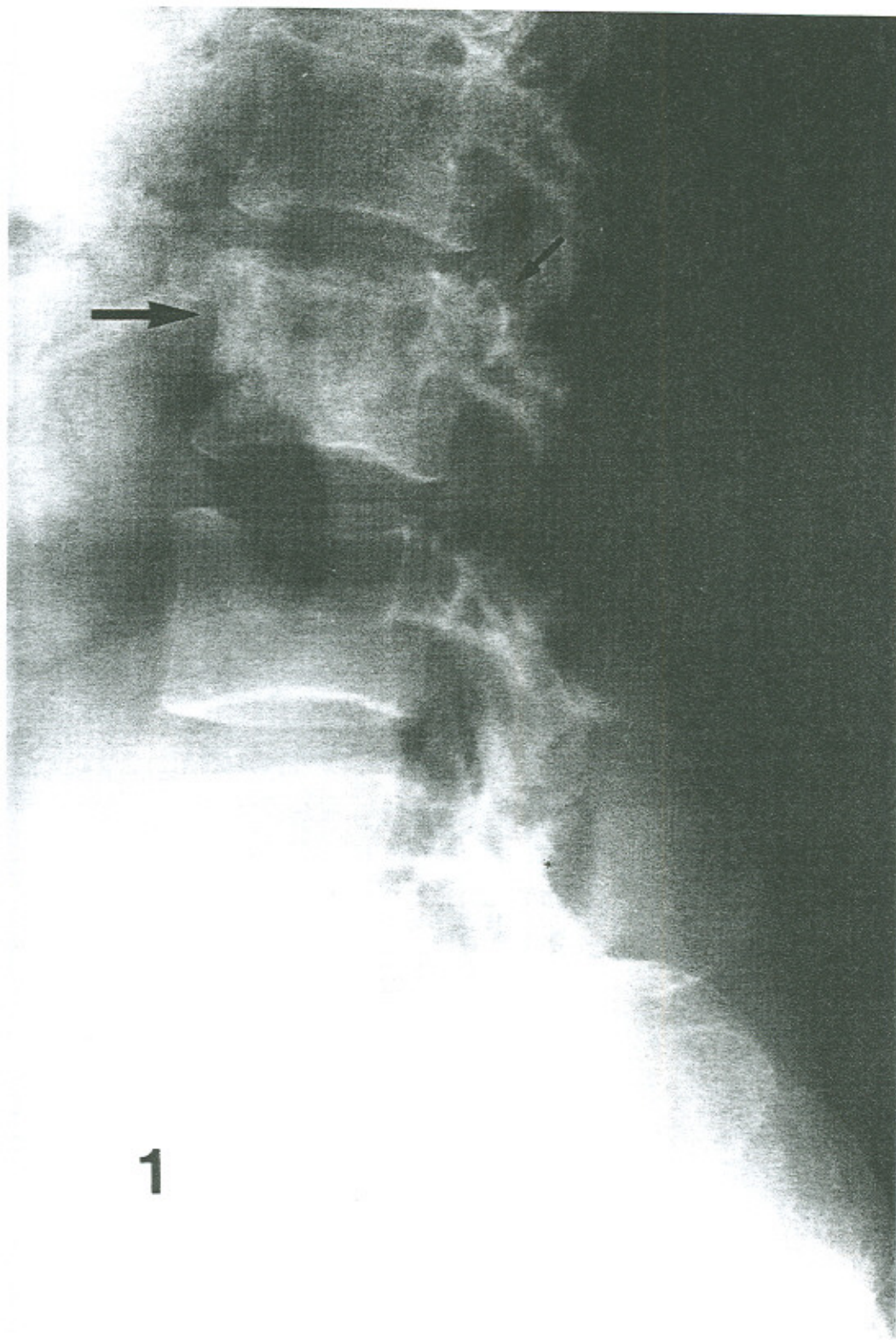


Figure 1 Lateral radiograph of the lumbar spine displaying patchy sclerosis of the body (large arrow) and pedicles (small arrow) of L2.

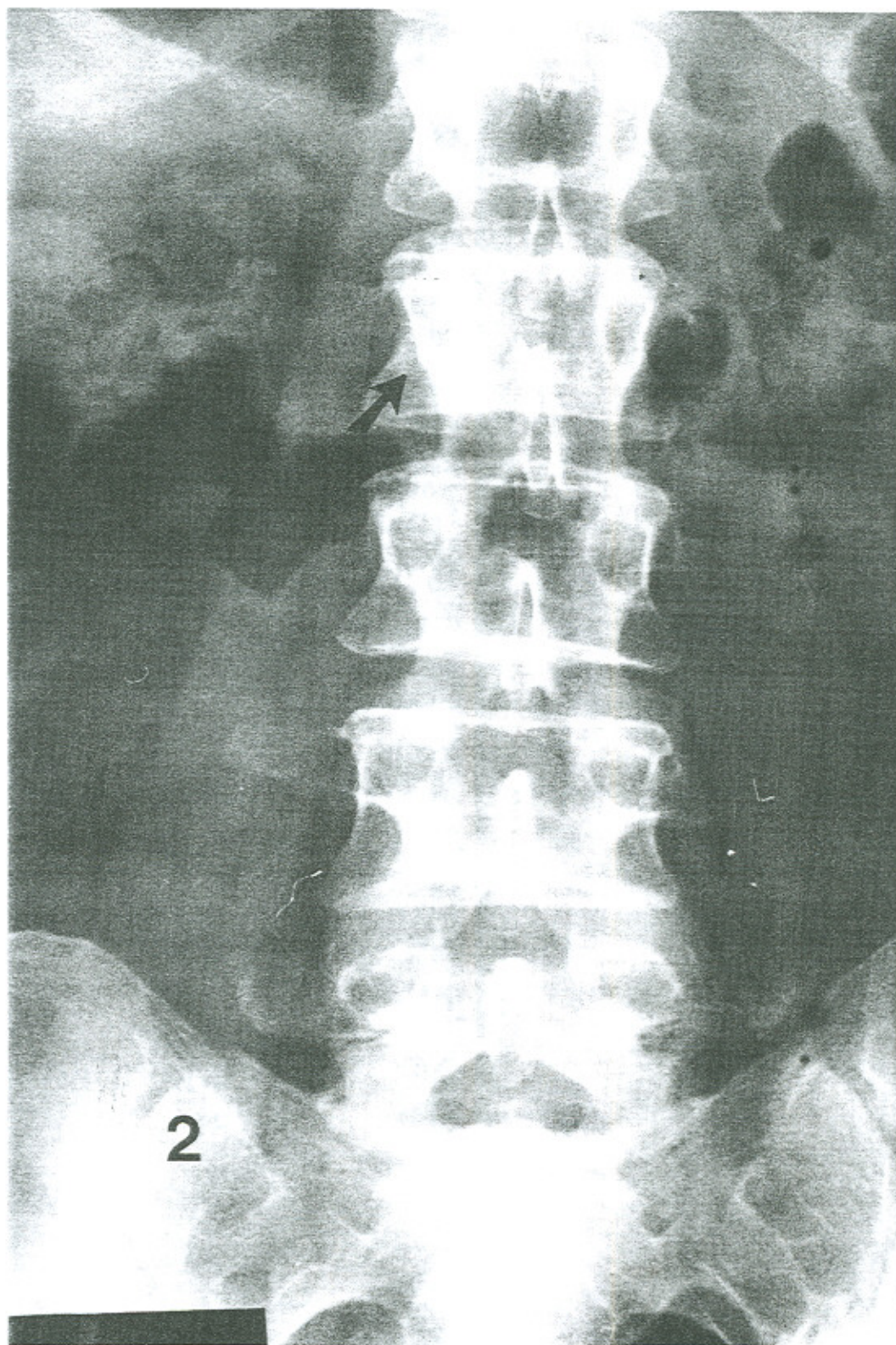


Figure 2 Increased density of the right pedicle (arrow) is visualized on the AP radiograph.

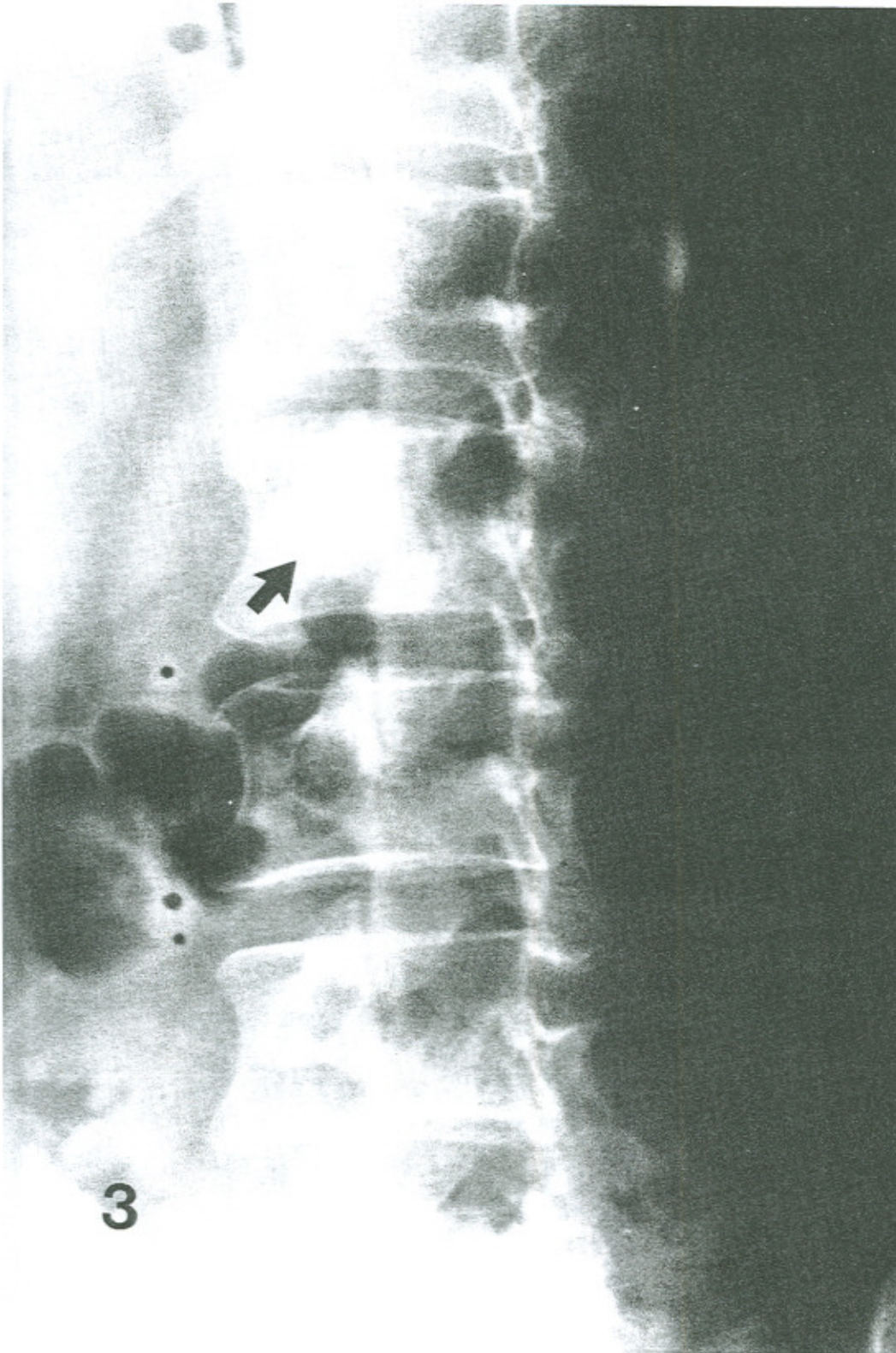


Figure 3 Oblique radiograph of the lumbar spine demonstrating increased density of the right pedicle of L2 and altered cortical margins.

TABLE 2
Distribution Pattern of Metastatic Bone Disease Secondary to Breast Cancer⁹

Appendicular		Axial	
Site	%	Site	%
Clavicle/Scapula	13.0	Skull	20.3
Sternum	2.9	Cervical Spine	4.0
Humerus	3.0	Ribs	22.0
Forearm	0.0	Lumbar Spine	14.8
Femur	0.0	Sacrum	2.7
Leg/Foot	9.4	Iliac	8.1
Total	28.3%		71.9%

regional involvement is highlighted in Table 2. Solitary bone lesions are rare and are found in only 9% of cases.¹⁰ When metastasis to the spine occurs it is most frequently found in the bodies of L2, L3 and L4.¹¹

The demonstration of metastatic bone disease on plain film radiographs depends on a number of important factors. To be adequately visualized on radiographs 30% of focal region bone destruction must occur. Additionally, the size of the lesion, location within the bone, the localized effect of the lesion on the cortex and surrounding trabeculae, as well as the technical quality of the film, affect the clinician's ability to distinguish metastatic bone lesions on plain film radiographs.¹² These highly variable factors can make the detection of bone metastasis difficult in its early stages. When lesions are present, 80% will demonstrate an osteoblastic/osteolytic appearance. Only 20% will appear as osteolytic.¹² When suspected metastatic lesions are not visualized on plain film radiographs a referral for bone scans is mandatory. Since scintigraphy can detect bone destruction when demineralization is as low as 3–5%, the presence of bone lesions can be identified up to 18 months earlier.¹²

A review of the case presented typifies the presenting signs and symptoms of patients with metastatic bone lesions secondary to breast cancer. The onset of pain is usually insidious, recurrent and progressive and usually develops without a history of trauma. On occasion patients may present with pathological fracture. Eventually the pain develops a characteristic nocturnal cycle and sleep patterns are affected. When patients present in later stages they may have experienced weight loss, fever, anaemia and appear cachectic. Unless the metastatic process is

in close proximity to the articular structures or compromises the neurologic components, orthopaedic and neurologic examination may be inconclusive. In the case presented the diminished straight leg raising and motor weakness may have been indicative of extradural involvement. In this case, the metastatic lesion was well visualized on plain film radiographs and a provisional diagnosis was easily determined.

While this case is typical of the classical presentation of metastatic bone disease, chiropractors should remember that the diagnosis is based primarily on radiologic findings. The presence of diminished lower limb muscle strength and painful, limited straight leg raising are physical findings consistent with other types of less ominous musculoskeletal complaints. The past history of breast cancer was the primary criteria for performing the radiologic assessment.

In the case presented the onset of metastatic bone disease occurred two years after the diagnosis of breast cancer was made. Survival rates associated with cancer are often quoted as a percentage of survival over five years. Practitioners should not be lulled into a sense of false confidence in those patients who have ten or fifteen year survival rates. It is not unusual, especially in breast cancer, for patients to develop metastatic bone disease ten to fifteen years after preliminary diagnosis and treatment.¹²

When patients present with a history of breast cancer, insidious onset of pain, and inconclusive examination and radiographic findings, a referral for further evaluation and imaging is mandatory. In these cases metastasis is the diagnosis until proven otherwise.

Summary

Insidious onset of right sided low back pain with radiations into the right hip, anterior thigh and medial calf aggravated by sitting or standing and relieved by rest, paints a very typical clinical presentation of patients presenting to a chiropractic office. As in the case illustrated, orthopaedic and neurologic examination may be inconclusive. When patients present with a history of breast cancer, insidious onset of pain and inconclusive examination and x-ray findings, referral for further evaluation and imaging is mandatory. The consequences of spinal manipulation on bone tumour can be devastating. In these cases metastasis is the diagnosis until proven otherwise.

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