Focus On
Non-surgical management
(insufficiency fractures of the spine)

Assessment
Care of the patient with insufficiency fractures of the axial and appendicular skeleton is an important and evolving component of an orthopaedic surgeon’s practice. Any assessment of the patient with a high or low energy spine fracture requires a careful analysis of specific patient factors, spinal stability and the neurological status of the patient.

Patient factors
Insufficiency fractures of the spine are often a sign of frailty. There is a reported 23% to 34% increase in mortality over eight years. The vertebral fracture may only be one of many active medical issues and the treatment plan should be patient-specific. Pre-existing spinal deformity, comorbidities or generalised frailty may preclude effective use of bracing. Similarly, judicious use of analgesics and medications may be challenging in patients already prone to polypharmacy. As such, the assistance of a geriatrician or an internist can be invaluable. Conversely, a younger patient may sustain an insufficiency fracture in the setting of secondary osteoporosis or a metabolic bone disorder and the patient’s longer life expectancy must be considered in the treatment plan.

Spinal stability
Insufficiency fractures of the spine are generally limited to the anterior and middle columns of the spine. Using current classification systems for traumatic vertebral fractures, most insufficiency fractures would be considered stable. However, due to the degree of osteoporosis and depending on the region of the spine involved, some ‘stable’ fractures are prone to progressive collapse, painful kyphosis or rarely, insidious neurological deficits. In the spondylotic spine there may already be some inherent laxity of the posterior tension band.

Neurology
Neurological deficits are uncommon in the setting of vertebral insufficiency fractures. Still, they may occur acutely or insidiously as the result of progressive collapse or kyphosis. Strong consideration may be given to surgical decompression and stabilisation in this setting but patient factors may preclude surgical intervention.

Imaging
Current classification systems pertaining to vertebral insufficiency fractures have not been validated. Most fractures are characterised as wedge, crush or biconcave. Determining the chronicity of insufficiency fractures can be difficult on plain radiographs. Furthermore, pain may not be localised to the fracture. Advanced imaging with CT, bone scans and MRI can be helpful. MRI can be particularly useful for differentiating osteoporotic vertebral fractures from pathological fractures associated with malignancy. The concepts of dynamic fracture mobility and the presence of intravertebral clefts may be important in predicting response to treatment but their significance has not been entirely defined.

Non-surgical management
The primary goals of management are pain control and return to function. Secondary goals of treatment include prevention of further insufficiency fractures and progressive deformity. Activity modification, analgesics and bracing are the mainstays of non-surgical treatment. Up to 30% of patients may not respond to non-surgical treatment.

Activity
A short period of bed rest may be appropriate followed by gradual mobilisation. A weight-bearing exercise program is an important component of management as pain improves. Extension exercises are preferable and fall prevention programs should be emphasised.

Medical management
Initial pain management consists of acetaminophen and nonsteroidal anti-inflammatories. Narcotics should be reserved for patients with inadequate pain relief from first-line medications. Medical management begins with vitamin D and calcium. The recommended dose is 1500 mg of supplemental calcium and 400 IU of vitamin D daily for postmenopausal women. Bisphosphonates can reduce the incidence of new vertebral fractures by almost 50%. Calcitonin and parathormone have also been shown to reduce the risk of subsequent vertebral fractures. Calcitonin and intravenous pamidronate are reported to have analgesic effects.

Bracing
There is a lack of evidence to support bracing for vertebral insufficiency fractures. However, strong consideration should be given to bracing acute and subacute lumbar or junctional insufficiency fractures of the spine. In the thoracic and lumbar spine, a hyperextension brace may be used for at least six to eight weeks.

Summary
Non-surgical management is effective in most patients with insufficiency fractures of the spine. Activity modification, analgesics and bracing may all be appropriate. The treatment plan should be patient-specific. All patients require medical and functional optimisation of their osteoporosis.
This article was originally published in the Canadian Orthopaedic Association’s COA Bulletin #92, Spring 2011 edition

S. Kingwell M.D., FRCSC

The Ottawa Hospital
Civic Campus
1053 Carling Ave, Room B-327.
Ottawa, ON

skingwell@toh.on.ca

References

Fig. 1. Sagittal CT reconstruction demonstrating L2 osteoporotic burst fracture with retropulsion, severe collapse and kyphosis. There was no neurological deficit and the patient had multiple medical comorbidities.

Fig. 2. Sagittal CT reconstructions three months apart, demonstrating an L5 insufficiency fracture with progressive collapse. The patient developed severe spinal stenosis and a unilateral foot drop.