Imaging Considerations for Compression Fractures

I. Use of Imaging in relation to evaluation and management of Vertebral Compression Fracture (VCF)
   A. In those younger than 50 yo trauma is the most common etiology
   B. Undiagnosed and untreated fractures (and underlying reason) = greater risk of additional fractures

II. Plain Film Radiography (x-ray):
   1) Benefits, Limitations, Considerations
   2) Hallmark Xray findings of VCF

III. CT scan of the spine:
   A. Benefits, Limitations
   B. Future Considerations

IV. MRI of the spine:
   A. MRI performed to evaluate VCF's and for evidence of underlying disease
      1) ole in evaluation/management
      2) Acute fractures= decreased T1- weighted signal (darker),
      3) T2 = high signal, reflecting edema, which normalizes over time
   B. Malignant vs Benign MRI characteristics
   C. Other Differential Diagnoses to rule out
   D. MRI limitations: limited availability, cost, interpretation

V. Bone scan (scintigraphy w/ Technitium99)

VI. Notes:
   A. Can also have MRI and bone scan findings, with no vertebral collapse and have a pain finding.
   B. Weeks, or months later it is difficult to tell if the fractureis the source of pain and still 'active'.
   C. Persistent radio findings (bone scan uptake, MRI edema, presence of clefts, CT vacuum changes) are often predictive of ongoing pain.

Imaging in the Identification and Management of Spondylolysis

I. Lumbar anatomy review
II. Spondylolysis: defect in the pars interarticularis

III. Spondylolysis
    A. acute
    B. chronic
    C. congenital
IV. Mechanism of Injury
    A. trauma: hockey, football, acute hyperextensions
    B. chronic hyperextension: gymnastics, cheerleading, tumbling
V. Spondylolisthesis: anterior slippage of one vertebra on top of another
    A. Pars defects= most common at L5
    B. Degenerative
        most common at L4
    C. Facet joints change in orientation
        Grading 1-5

VI. Imaging
    A. Plain Film X-ray
        1. Obliques visualize the pars
        2. Additional x-ray view options
    B. CT Scan
        1. gives the best bony detail
        2. CT of the lumbar spine sensitive vs specific

    C. MRI
        1. Able to detect early stages of spondylolysis: marrow edema and microtrabecular fracture
        2. Bony detail may not be as good as CT, and so the pars defect, ie fracture line, may be more difficult to see in some cases with MRI
        3. MRI likely stays the imaging choice for most as it gives more soft tissue detail
        4. this allows for subsequent follow up and comparison to previous studies for evaluation of acuteness, via bone marrow edema.
    IV. SPECT bone scintigraphy
    V. Case Studies:
        A. 41 yo female w/ 2 yr history of severe LBP post DC adjustment
        B. 48 yo male w/ 30+ yrs of LBP on and off, known spondylolysis w/ listhesis
        C. 15 yo male hockey player

Imaging Modalities in Daily Chiropractic Practice

I. Use of Plain Film Radiographs (X-rays)
    A. Indications
    B. Radiographic signs of fracture
    C. Flexion/Extension X-rays
    D. Condition specific Films

1. Suspected IVF encroachment
    a. Cervical
    b. Lumbar
2. Suspected Pars defect
    a. cervical
    b. lumbar

E. Collimate and shield to reduce dose
F. Don't be afraid to re-x-ray for quality

II. Review of MRI indications
A. patient is not improving with conservative care
B. suspect pathology
C. questionable finding on x-ray that may change management of patient
D. neurologic findings

III. MRI options
A. High field
B. Open MRI
C. 3T
D. Whiplash protocol
E. Positional
F. Condition Specific
1. MS
2. TOS
3. Shoulder
G. Soft tissue: the choice for most soft tissues
1. knee: ligaments and mensicus
2. tendons: hip, elbow, etc
3. disc herniations

IV. Uses of CT
A. Common use for DC's
B. Outside of our practices

V. Ultrasound: When and where

VI. Additional Imaging
A. HIDA GB scan
B. DEXA scan for osteoporosis
C. Abdominal Imaging
D. Vascular Imaging

VII. Limitations of all Imaging