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Letter from the Editor In Chief

Bruce Gundersen, DC, FACO

Editor-In-Chief, *Academy of Chiropractic Orthopedists eJournal*

As we continue to publish in our 6th year, we have made considerable advances to help our profession and our readers. As you may know, we have been indexed by two major databases now and our articles are available on many searches. Publications are linked to our eJournal and we are referenced by several authors. This has been a gradual work with very little progress until this past year. Many of our editorial board members played a significant role in this achievement.

The quality of our items has improved gradually over the past few years and the work of our editorial board has rivaled other journals. We have had a considerable increase in submissions and our editorial process has become quite sophisticated.

The end result of this great work is that we provide our readership with information that helps each practice better, be more knowledgeable and provide better help our patients. This is certainly a major part of our mission. In fact, all that we do is singularly based on the improvement of the health of our fellow men. Nothing could be more satisfying or rewarding.

The addition of some extremely good minds is evidenced on the list of our editorial board. The combination we have now has created a unique perspective for our work. Each has a particularly interesting niche of expertise.

Our goals for the future include more collaboration with the other entities in chiropractic orthopedics as well as the other health care delivery specialties. We intend to lead our profession accordingly by integrating the best from all willing to contribute. So far, we are pleased with the effort and the outcome. We will continue to encourage innovation and improvement in ourselves and those with whom we work.

Call for Papers

James Demetrious, DC, FACO

Editor, *Academy of Chiropractic Orthopedics eJournal*

The Academy of Chiropractic Orthopedists is blessed with some of the finest chiropractic specialists in the world. The work of our dedicated clinicians is reflective of the commitment to advanced training necessary to become a board certified chiropractic orthopedist.

Continued academic and personal advancement occurs with the publication of scholarly works. Personal and professional enrichment can be attained through the publication of peer-reviewed articles.

While chiropractors have many journals to which they can submit their manuscripts, we want them to consider keeping their work here at home. To be more specific, we invite authors to submit their papers to the *eJournal*.

The *eJournal* seeks papers that have relevance to chiropractic orthopedics. An editor reviews all papers received and those of sufficient quality are peer-reviewed. As with any journal of merit, only papers of high quality will be published. Papers printed in the Journal are indexed in the Index for Chiropractic Literature (ICL).

The *eJournal* is published four times a year. It is distributed free of charge as an Open Access journal available through the Academy of Chiropractic Orthopedists web site: www.DCOrthoAcademy.com.

For guidance on manuscript preparation, authors should consult the "Author Guidelines," which can be found at www.DCOrthoAcademy.com.

Thank you.

Academy Current Events

Stephen Capps, DC, FACO, FICC

President, Academy of Chiropractic Orthopedists

Over the past months the committees of the Academy of Chiropractic Orthopedists (ACO) have been tasked to review, improve and redesign the various functions of each Academy department and their web site presentation.

1. Current and future redesign and development of Academy departments and functions will include:
 - a. The Academy board has engaged in a total redesign of the existing web site. The new Academy web site should be on line by the first of July. However, development will continue over the next month. Please visit the site frequently at www.dcorthoacademy.com to view the most recent additions and latest developments.
 - b. The Academy membership committee is currently redefining membership benefits to include an enhanced member web page for each active member.
 - c. The Journal of the Academy of Chiropractic Orthopedists will soon be presented in a PDF format to enhance reading and download capabilities.
 - d. The Academy Delphi Committee is actively engaged in developing updated clinically pertinent multiple choice questions (MCQ) for both the diplomate certification and re-certification exams.
2. The next orthopedic specialty board certification examination is scheduled to occur on 14 November 2009 on the campus of National University of Health Sciences / National College of Chiropractic in Lombard, Illinois.
3. The next re-certification examination for current orthopedic specialty board certified Diplomates will take place concurrently on the same day and location. Please visit the Academy web site as additional information is posted.
4. **NO** additional or annual fee is required for continued use of the Diplomate of the Academy of Chiropractic Orthopedists (DACO) credential earned by the Academy specialty board certification examination. Re-certification and re-credentialing is a **voluntary** process.
5. Re-credentialing continuing education hours as presented by the American College of Chiropractic Orthopedists (ACCO) are approved by the Academy of Chiropractic Orthopedists (ACO).

Case Report

Chondrosarcoma Arising within a Pre-Existing Osteochondroma in a Patient with Spondylolisthesis

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Case Presentation

Patient History

A 31 year old female presented with a chief complaint of pain in her left lower back and her right hip.

Mechanism of Injury

She reported that she had slipped and fallen in her driveway two days ago.

Signs and Symptoms

She had presented to a walk-in clinic a day ago, where she had been told, and “nothing is wrong with you.”

Lower Back Pain

On presentation, she described a stiffening and painful sensation at the left lumbosacral spine and sacrum. Using a visual analogue pain scale, she quantified the pain at 1-2/10 on presentation, and 7/10 two days ago. Aggravators were reported as going from sitting to standing. For relief she reported she took an Ibuprofen tablet before bed.

Hip Pain

She described burning pain at the right lateral hip at the greater trochanter. Using a visual analogue pain

scale, she quantified the pain at 1/10 on presentation, and 6/10 yesterday. Standing was reported as an aggravator. She reports that Ibuprofen gave her some relief.

Clinical Exam Findings

Neurological Examination

Quadriceps and Achilles deep tendon reflexes were 2+. Sensation was normal at L1 through S1 for three modalities (Pain/Light Touch/Vibration). On the Babinski plantar reflex, there was no response bilaterally. First toe strength was 5/5 for dorsiflexion and plantar flexion.

Orthopedic Findings

- Straight Leg Raise:
 - Right 80° - limited by low back pain;
 - Left 90° - no low back pain;
 - SLR was performed on both sides without significant hamstring spasm.
 - Tests for nerve root tension were absent.
- Range for flexion-abduction-external rotation at the left hip was approximately 20% of the range on the right. Of note, the patient reported a pulling sensation in the right buttock when
- FABERE was performed at the left hip.

- Log rolling of the thigh was negative on both sides.
- Spondylolisthesis screening test was positive (“In cases of suspected spondylolysis or spondylolisthesis, one-legged back extension may help localize the pain specifically to one or the other side of the low back. A positive test is aggravation of the symptoms with mainly a unilateral focus.”)

Active Trunk Range of Motion

Active trunk flexion was 40°/60° (i.e. 40° - normal 60°) with lumbosacral pain reported; extension was 20°/25°; left and right lateral flexion was 25°/25°.

Sacroiliac Motion Palpation Tests

There was a fixation found at the right sacroiliac joint on Gillett standing hip flexion test.

Palpation

On palpation, the patient’s right iliac musculature felt more solid, and less mobile than the left.

Initial Imaging

Plain Film Radiography

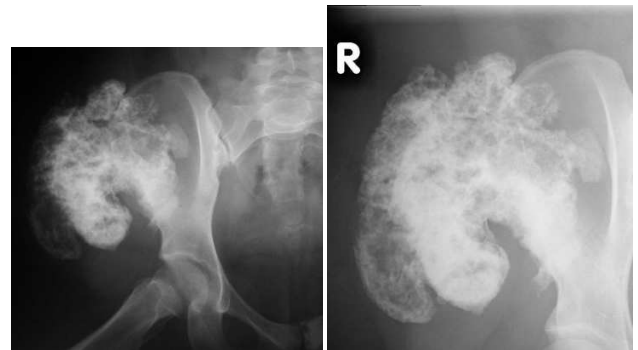
X-rays of the patient were performed:

- Lumbar Spine A/P & Lateral, and; Pelvis A/P & Frog Leg.



Figures 1 and 2. Plain films of the lumbar spine reveal a grade 1 spondylolytic spondylolisthesis of L4 on L5. There is a minor posterior arch anomaly at S2. There is a mild loss of IVD space at L4/5. The L5/S1 IVD space is not well seen due

to overlying tissue. There appears to be amorphous calcification anterior to the iliac crest on the lateral view.



Figures 3 and 4. X-ray of the pelvis revealed a very large cauliflower-shaped bony exostosis arising from the lateral margin of the right iliac crest. This exostosis appears to measure 17 cm x 12.5 cm. No soft tissue calcification separate from the lesion is seen. The rest of the pelvis including the hips appears unremarkable. The cortex and the spongiosa of the pedicle and the iliac crest blend imperceptibly.

Case Management

Referrals

The patient was referred for Chest CT to rule out pulmonary metastasis; an MRI of the Pelvis/Hips:

- to assess: the morphology of the lesion;
- the stalk;
- the peripheral rim;
- for local tissue enhancement suggestive of local ST invasion;
- the cartilaginous cap;
- for extension into and compression of the local musculature; and
- to search for the presence other exostoses.

Advanced Diagnostic Imaging

CT Chest (no contrast)

CT Findings revealed no focal intrapulmonary nodules. No hilar or mediastinal lymphadenopathy, nor evidence of pleural effusion or signs of metastatic disease within the chest.

MRI of Hip/Femur with and without Contrast

An enormous well-circumscribed exophytic, bosselated lesion arising from the posterior aspect of the right lateral iliac wing was visualized.

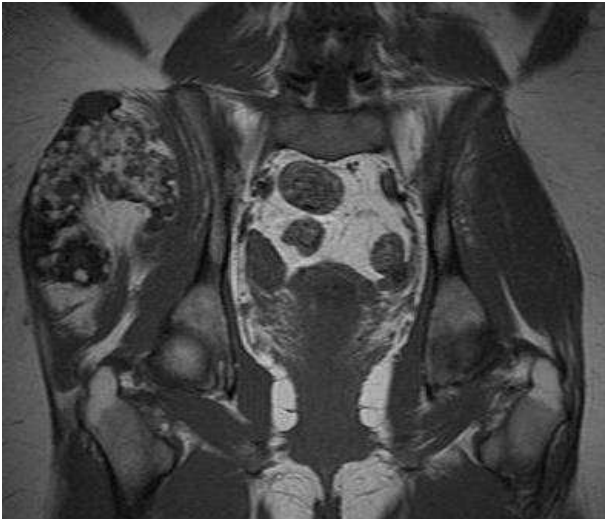


Figure 5. On the Coronal T1 images, the lesion measures 12.4 x 8.7 cm in cross sectional diameter, and 11.4 cm in superior-inferior dimension. The lesion extends into and compresses the gluteal muscles laterally and posteriorly to the iliac wing on the right side.

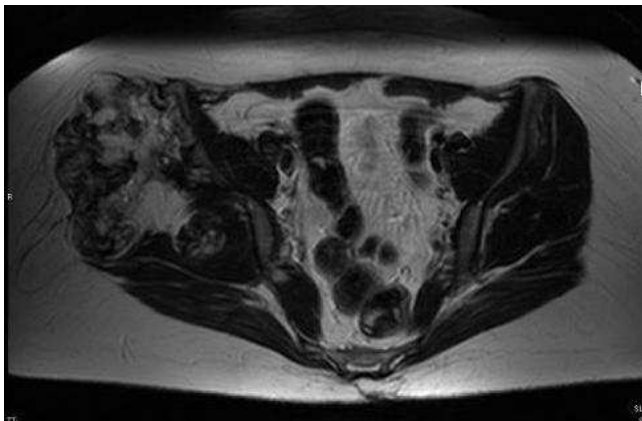


Figure 6. Standard Axial Spin Echo T2 without contrast reveals lesion that compresses the nearby musculature.

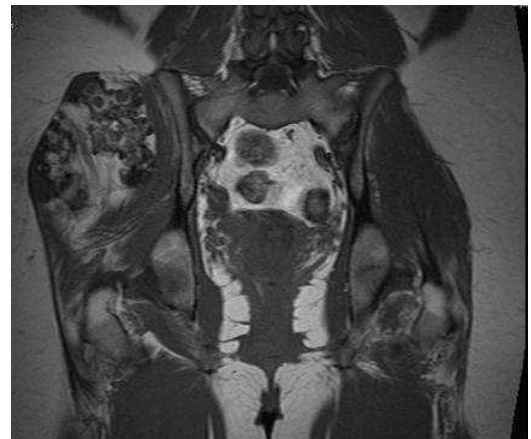


Figure 7. Coronal T1 with TR at 586.00 reveal lesion that compresses the nearby musculature. There is a relatively narrow stalk measuring 4.0 cm in superior-inferior dimension, and 3.3 cm in anterior-posterior dimension along the posterolateral aspect of the iliac wing.



Figure 8. Coronal T1 With TR at 547.00 provides visualization of the stalk.

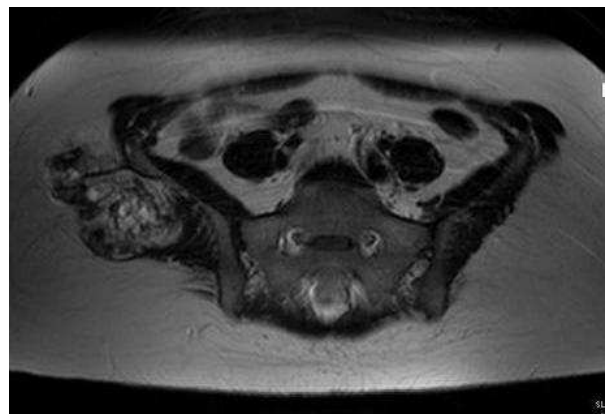


Figure 9. Standard Axial Spin Echo T2 without contrast provides visualization of the stalk.

Sclerotic Stalk

The stalk has low signal on both T1 and T2, suggestive of dense sclerosis. A classic osteochondroma normally presents with homogeneous signal intensity isointense to the bone from which it arises, not a sclerotic stalk. A sclerotic stalk is atypical.

Cartilaginous Cap

This lesion has a very thin cartilaginous cap, measuring less than 6 mm in diameter throughout most of the lesion, but the cartilaginous cap is increased in thickness to approximately 1.8 cm antero-inferiorly.

Resnick states “The precise thickness of this cap correlates with the age of the patient: In children and adolescents, in whom there is active bone growth, the cap may be as thick as 3 cm; In adults, the cap may be entirely absent....This latter finding probably reflects progressive “wear and tear” following cessation of growth of the osteochondroma with a gradual loss of the cartilage cap owing to pressure and movement against adjacent structures....In adults, the occurrence of a cartilage cap that is thicker than 1 cm should raise the possibility of chondrosarcomatous transformation.”

Soft Tissue Enhancement

There is no evidence of soft tissue enhancement to suggest local soft tissue invasion.

MRI Impression

An extremely large osteochondroma is present arising from the right iliac wing. The maximal thickness of the cartilaginous cap is 1.8 cm. A sclerotic stalk is present. There is no evidence of soft tissue enhancement to suggest local soft tissue invasion. No other exostoses are seen in the visualized pelvic bones.

Referral to Orthopedic Surgeon

The patient was referred to an orthopedic surgeon for consult regarding excision.

Surgical Report

The patient underwent a subtotal pelvic resection, involving nearly the entirety of the iliac wing.

Pathology Report

The pathologist identified a chondrosarcoma arising within a pre-existing osteochondroma and affecting the patient’s right ilium. The pathologist reported that the area of thickening of the cartilage cap measured up to 2.8 cm. This was consistent with a grade 1/3 chondrosarcoma. All of the bone and soft tissue margins were widely negative at greater than 2 cm. There was no evidence of vascular invasion or de-differentiation of this chondrosarcoma.

Discussion

This case illustrates the value of plain film radiography:

- when presented with a positive spondylolisthesis screening test, and,
- to clarify an uncertain diagnosis created by abnormal palpatory findings, in this case in the musculature of the right iliac wing.

Conclusion

The presence of pain at an osteochondroma is often associated with malignant transformation. As observed in this case, the large size of this lesion with subsequent compression of adjacent structures may also elicit pain. There is a higher incidence of malignant degeneration of osteochondromas that arise from the pelvis.

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Case Report

Vertebral Compression Fractures Resulting from Hypoglycemic Convulsions in a Patient with Type 1 Diabetes Mellitus: A Case Study

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Abstract

The chiropractic orthopedist often encounters patients who present with either diagnosed or undiagnosed Type 1 Diabetes Mellitus (DM1). This condition may contribute to musculoskeletal conditions. This case study presents a rarely reported case of vertebral compression fractures in a seemingly healthy, physically active, well conditioned male adult, resulting from nocturnal hypoglycemic convulsions. It behooves the chiropractic orthopedist to become familiar with the 'tight' control of glucose levels in patients with DM1 in order to recognize possible symptoms and give proper counsel regarding avoiding hypoglycemic events.

Introduction

Diabetes Mellitus (DM) affects 20 million children and adults in the United States [1]. Persons with DM may present to the chiropractic orthopedist with musculoskeletal complaints [2]. The chiropractic orthopedist should therefore be aware of the array of musculoskeletal symptoms which may be associated with DM. This case presents a rarely reported occurrence of vertebral compression

fractures which resulted from hypoglycemic convulsions, on two occasions in the same patient with Type 1 Diabetes Mellitus (DM1). The purpose of this case presentation is to create awareness of the occurrence of this injury in the population of DM patients, and to encourage chiropractic physicians to further their knowledge of DM1 so that they may appropriately counsel and refer patients when necessary.

Case Study

A 41 year old, well nourished, athletic male presented with a complaint of moderate to severe thoracic pain centered between the shoulder blades. He reported that the onset of pain was the day of his presentation for evaluation, in the morning when he woke up, which was somewhat earlier than usual. He also noted that he had bitten his tongue and there was blood on his sheets and pillow. Earlier that day, he had been seen in a different chiropractic office where x-rays had been taken. The patient was told the x-rays were normal. The doctor applied ice and recommended adjustments to the thoracic spine. The patient opted for another opinion.

The patient's score on the Visual Analogue Scale [3] was 10. The patient reported that he had been very busy working a desk job for 50 – 60 hours per week. He reported that he had still managed to exercise regularly, lifting weights, swimming, and running, for a total average of 4-5 days per week. He also played ice hockey on occasion. He denied any history of epilepsy or other seizure disorders. He had been diagnosed four years earlier with DM1. He had been monitoring his blood sugar level 4 or 5 times per day. He reported that he was taking Humalog (fast acting insulin analog) with meals. He denied any other medications. Previous medical history also included left latissimus dorsi strain several years earlier.

Inspection revealed a guarded posture of the trunk, and stiffness with motion. Gait was otherwise normal. He was afebrile. Palpation revealed spasm in the thoracic paravertebral musculature, with pain on palpation from T5-9. Cervical flexion created increased pain in the middle thoracic region at 30 degrees. Other cervical motions were normal and did not increase pain in the thoracic region. Pain was significantly increased at 5 degrees of thoracic flexion. Thoracic extension was 0 degrees with noticeably less pain than with flexion. Thoracic rotation was minimal and painful. Soto Hall maneuver was positive, causing increased middle thoracic pain. No neurological deficits were detected upon evaluation of motor strength, sensation to pinprick, and deep tendon reflexes in the C5-T2, and L4-S1 spinal levels bilaterally. No abnormality was detected upon evaluation of sensation to pinprick in the thoracic dermatomes. Abdominal reflex was normal in all quadrants.

An initial working diagnosis of thoracic disc herniation was described to the patient, and an MRI of the thoracic spine was obtained. The study demonstrated wedging of T4 and T5 vertebral bodies (Fig.1) with abnormal marrow signals on T1 and T2 weighted images, consistent with

compression fractures. Ten percent loss of height of the T4 vertebral body, and twenty percent loss of height of the T5 vertebral body was noted. No evidence of pre-existing bony pathology was present. The initial X-ray studies were later obtained from the first chiropractic office which the patient had sought care. It was found that cervical and lumbar films were taken, but not thoracic films.



Figure 1. Sagittal image showing compression of T4 and T5.

A diagnosis of compression of bi-level thoracic compression fracture secondary to nocturnal hypoglycemic convulsion was made. Conservative treatment consisting of cryotherapy, interferential current at a submuscular threshold, and effleurage was applied to the thoracic region, with the patient's consent, in order to decrease pain and spasm. He was treated on 5 occasions over 6 weeks, with the goal of decreasing pain and spasm and educating on home care. At the 6 week follow-up he was not yet able to run because of the pain, but he had ice skated. He was seen the following year for an unrelated complaint, and reported no sequelae.

Six years later, the patient returned with a similar complaint, however on this occasion, he did not

injure his tongue. Again, he woke up with mid back pain which he rated at a 10 on a Numerical Rating Scale (NRS) [3], and did not recall any unusual event. He reported that he had been undergoing an extended period of physical activity, specifically several 10-12 hour days of performing finish carpentry. His mealtime and sleep schedules had been deviating from his usual routine, and he reported that he was exhausted during the day before this second event occurred. Examination findings were very similar to the first event. There was pain and limitation with all thoracic motions, especially flexion. Palpation was positive for pain and tenderness in the middle thoracic levels over the paraspinal muscles. Percussion of the spinous processes was painful at T6 and 7. No neurological deficits were noted in the upper or lower extremities, or over the abdominal region. MRI revealed vertebral body compression fractures at T6 and T7 (Fig. 2), with increased signal on the STIR sequence, indicating an acute process. The loss of vertebral body height at T4 and T5 was evident, present from the previous injury.

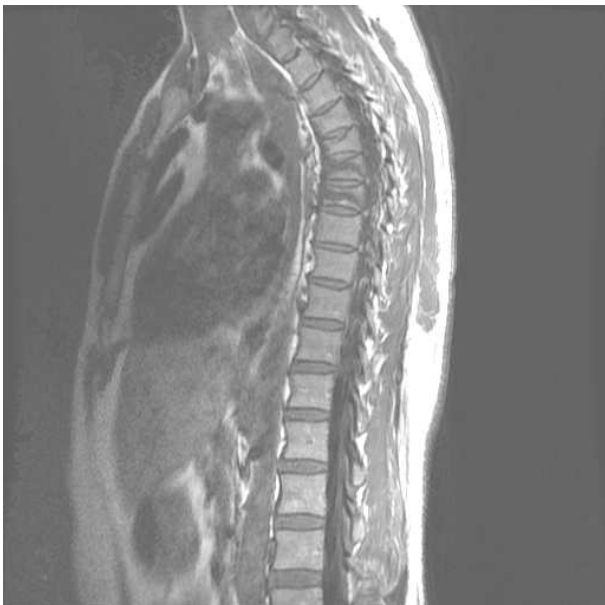


Figure 2. T1 sagittal image demonstrating compression of T6 and T7 as well as old compression of T4 and T5.

The patient had indicated that after the first episode his medication was changed to NPH insulin, which is similar to Humalog, but longer acting. He was currently taking Lantus, a 24 hour ‘background’ insulin, which is designed to mimic the low level of insulin that is present in non-diabetic individuals. He reported that he had been trying to keep his blood glucose levels as close to normal as possible and indicated that, other than fatigue, he had not experienced any symptoms associated with hypoglycemia, such as dizziness or confusion. He reported that his HbA_{1c}, a measure of mean glycosylated hemoglobin, had been in the target rate of under seven.

The patient was treated nine times over a twelve week period, with treatment consisting of therapeutic modalities, and manual and instrument assisted soft tissue mobilization to the paraspinal musculature in order to decrease pain and spasm. The patient had expressed concern over developing a forward stooped posture because of the multiple levels of anterior wedging. Beginning with the fourth treatment, which was four weeks post injury, the patient was instructed on performing postural exercises, including: pectoral, scalene, SCM, and suboccipital stretching exercises; scapular retraction and paraspinal extensor strengthening exercises. These were demonstrated and performed in the office and as home exercises. The patient was compliant throughout because he was very motivated to get back to his usual activities, which included working as a contractor, running, weight lifting, and playing ice hockey.

At this time spinal manipulation was performed to the levels above and below the area of injury, as tolerated by the patient. At 12 weeks, the patient continued to have a complaint of ache and stiffness in the mid thoracic region which he rated at a 3-4 on a scale of 0-10. Motion palpation revealed restriction from T4 – T9. The patient was adjusted using an anterior to posterior and inferior to

superior line of drive in a supine position, with arms crossed, with the doctor contact of one hand under the T9 vertebrae, acting as a fulcrum, and the other forearm on the patient's crossed forearms. This adjustment was only performed after a pre-manipulative stress test was tolerated by the patient. This pre-manipulative test consisted of placing the patient in the same position as described, and applying light pressure to determine if pain or discomfort was noted by the patient. The patient reported that the pain subsided immediately after the adjustment. He was advised to continue with home exercises and to gradually increase his activity level, to his tolerance. He was advised to return as needed.

Discussion

Chiropractic orthopedists evaluate and treat many patients for musculoskeletal complaints. Several musculoskeletal complaints have been associated with DM [4, 5, 2]. In the United States, 14.6 million persons have been diagnosed with DM and a suspected 6.2 million have the condition but have yet to be diagnosed. With this considerable number, there is a strong likelihood of a diabetic patient presenting to a chiropractic orthopedic practice with musculoskeletal complaints. DM patients, whether Type 1 or Type 2, have a greater incidence than the general population of several musculoskeletal conditions. These include muscle cramps, muscle infarction, loss of deep tendon reflexes, peripheral neuropathy, complex regional pain syndrome, stiff hands syndrome, neuropathic joints, carpal tunnel syndrome, adhesive capsulitis of the glenohumeral joint, tenosynovitis, diffuse idiopathic skeletal hyperostosis, and Dupuytren's contracture [2]. This case study reports two incidents of bi-level vertebral compression fractures in the same patient which occurred slightly greater than six years apart. There have been few reports of vertebral compression fracture resulting from hypoglycemic convulsions in the English language [4,5]. These

have been attributed to inappropriate self management. Of the six cases of musculoskeletal injuries from hypoglycemic convulsions reported by Hepburn et al, two sustained vertebral compression fractures, one suffered a tibial and fibular fracture from a fall when she became unconscious, one sustained bilateral humeral neck fractures, and two suffered glenohumeral dislocation. In four of the six cases intervention of either intravenous dextrose or intramuscular glucagon was necessary to restore consciousness. Nabarro reported on four cases of vertebral compression fracture resulting from hypoglycemic convulsions. He suggested that the greater emphasis on 'good control' may be an etiological factor in these events.

Tight control of glucose levels in DM1 patients has been advocated in order to delay and minimize complications, especially microvascular complications such as retinopathy, neuropathy, and nephropathy. The effect of this disease on the microvasculature may also be a contributing factor to some of the musculoskeletal conditions previously discussed. However, along with the benefits of maintaining 'tight' control, there is also a risk of becoming hypoglycemic. For this reason, it is important for healthcare practitioners to be aware of and to ensure the patient realizes the importance of monitoring their blood glucose levels several times throughout the day, and before bedtime. It is equally important for the patient to understand the hazard of hypoglycemia occurring at night, while the patient is asleep and not able to recognize symptoms, possibly leading to convulsions or coma. For this reason, if a bedtime glucose reading is low or borderline, an appropriately sized snack should be eaten.

Optimal blood glucose control is defined by a target HbA_{1c}, the mean glycosylated hemoglobin level over the previous two to three month period, of less than 7 percent, and meter readings of preprandial glucose level of 80 to 120 mg per dL and a bedtime

glucose level of 100 to 140 mg per dL [6]. Havas reports that clinical trials have provided a strong scientific basis in support of the potential benefits of tight glucose control. Frequent monitoring is necessary in order to maintain the target zone and to avoid the onset of hypoglycemic events.

In this case, the patient had been taking measures to maintain tight control of glucose levels, including proper nutrition, glucose monitoring, and regular exercise. On both occasions leading to hypoglycemic convulsions, his stress level and number of hours at work had increased for an extended period. Although he had reported not having any symptoms associated with hypoglycemia, in retrospect, the extreme fatigue he had experienced was most likely a symptom. Failure to recognize this as a symptom led to excessively low blood glucose and convulsions. The occurrence of compression fractures is attributed to the strength of the thoracic extensors being less than the cervical and lumbar extensors, and the mechanical advantage of the trunk flexors, which work from the pelvis and the rib cage [5]

Because of the growing number of persons affected by DM, the chiropractic orthopedist should be aware of the possibility of a patient presenting with spinal pain that may be associated with a hypoglycemic event. As promoters of wellness and as musculoskeletal specialists, chiropractic orthopedists should be aware of testing procedures used to monitor blood glucose levels, and target levels for those tests (Table 1). With adequate knowledge of this condition, the chiropractic orthopedist will be able to ask pertinent questions to determine if the patient is properly managing their condition, and realize when a referral to their primary care physician or endocrinologist is appropriate. Additional information about testing

and management of diabetes is available on the American Diabetes Association web site www.diabetes.org.

Consent

Written informed consent was obtained from the patient for publication of this Case Report, and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Competing interests

The author declares that he has no competing interests.

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Table 1.

American Diabetes Association Target levels for “Tight Control”	
HbA1c	7%
Pre-Prandial glucose	80-120 mg/DL
Bedtime Glucose	100-140 mg/dL

**American College of
Chiropractic Orthopedists**

www.ACCOweb.org

Abstracts & Literature Review

Acute Treatment of Inversion Ankle Sprains : Immobilisation versus Functional Treatment

Jones MH and Amendola AS.

Clinical Orthopaedics and Related Research 2007;(455):169-172.

Editorial Reviewer: Charmaine Korporaal, DC, M.Tech:Chiropractic, CCFC, CCSP, ICSSD

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Authors' Abstract

Inversion ankle sprains are one of the most common injuries in sports. Although these injuries are often considered minor, they can lead to persistent disability in athletes. We conducted a systemic review of the literature to evaluate the effect of immobilisation versus early functional treatment on time to return to pre-injury activity after inversion ankle sprain. Residual subjective instability, recurrent injury and patient satisfaction were secondary outcomes. A systemic review identified 9 randomised clinical controlled trials. Return to pre-injury activity was less with early functional treatment in 4 of 5 studies that evaluated this outcome. Subjective instability was less in 3 of 5 studies. Similarly, re-injury rate was less in 5 of 6 studies. Patient satisfaction was not substantially different in the two studies that evaluated this outcome. Limitations of the identified trials included small sample size, heterogeneity of the treatment methods and lack of standardized outcome measures. However, based on our review the current best evidence suggests a trend favouring early functional treatment over immobilisation for the treatment of acute lateral ankle sprains. Level of evidence: Level II, therapeutic study. See

guidelines for authors for a complete description of the levels of evidence.

Editorial summary

- Literature utilised in this review of data was limited to that which was available on PubMed from inception to 2005 and was limited to studies that incorporated both immobilisation and functional treatments in their analysis. This implies the exclusion of other studies that may not have met these criteria, therefore the application of the outcome of this review in clinical practice needs to be based within the limitations of this review.
- Notwithstanding the limitations identified, it is important to consider that early functional improvement seems to support early return to pre-injury levels.
- It would also seem prudent in practice to educate patients on the possible benefits of early improvement in function, its role in return to activity and the role that they as patients have in this process. In addition patients favouring a less active involvement and preferring an immobilisation

intervention as compared to early functional improvement should be educated in terms of the perceived detrimental effects that this might have on their clinical and rehabilitative progress.

- It is suggested that future studies evaluate various methods of functional treatment with the aims of decreasing the time to return to activity, decreasing re-injury, decreasing subjective instability and thus increasing overall patient satisfaction.

**Texas Chiropractic Council
of Orthopedics**

<http://www.texascouncilofchiropracticorthopedist.org/>

Abstracts & Literature Review

Risk Factors, Prevention, and Treatment of Corticosteroid-induced Osteoporosis in Adults

Kathryn M. Ruf, BS; Nicole K. Johnson, PharmD; Timothy Clifford, PharmD, BCPS; Kelly M. Smith, PharmD, BCPS, FASHP

Orthopedics. Aug. 2008 Volume 31 • Number 8.

Editorial Reviewer: Gary Carver, DC, FACO

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Editorial Summary:

- This article addresses issues relating to corticosteroid-induced osteoporosis and how it relates to pathophysiology, risk of fracture, prevention, and treatment in adult patients.
- An orthopedist can play a critical role in corticosteroid induced osteoporosis management by identifying at-risk patients and selecting appropriate prophylactic measures.
- Corticosteroids are the cornerstone of therapy for many common chronic conditions including asthma, inflammatory bowel disease, and autoimmune disorders. Hyperglycemia hypothalamic pituitary axis suppression and electrolyte disturbances are well-recognized adverse effects associated with corticosteroid use. Osteoporosis can be a devastating manifestation of corticosteroid therapy that is frequently not adequately prevented.
- Corticosteroids induce necrotic changes especially in trabecular rich bone.
- A T-score threshold of <-2.5 , which is appropriate to diagnose postmenopausal osteoporosis, is not appropriate to evaluate fracture risk in a patient undergoing corticosteroid therapy. In these patients, the risk of fracture increases when the T-score is <-1.5 . Goals of therapy are aimed to either prevent bone loss for patients who have T-scores >-2.5 , or to treat osteoporosis by restoring bone mass and preventing further loss for patients with T-scores <-2.5 .
- When evaluating the influence of total daily corticosteroid dose on the risk of fracture, low-dose regimens must be distinguished from those that are considered high-dose. Low-dose regimens can be defined as total daily doses of <10 mg of prednisone or equivalent, while high-dose regimens are those in which the daily dose exceeds 10 mg. Both high- and low-dose corticosteroid regimens increase the risk of vertebral and hip fractures, but high-dose regimens can be associated with higher risks of fracture. When compared to patients not receiving corticosteroids, patients using low-dose regimens have a 2.73-fold increased risk of vertebral fracture and 1.73-fold increased

risk of hip fracture. An increased risk of fracture is evident in patients receiving daily doses of <5 mg. Similarly, patients undergoing high-dose corticosteroid regimens have a 3.15-fold increased risk of vertebral fracture and 2.04- fold increased risk of hip fracture compared to patients not using corticosteroids. Although the relationship between total daily dose and fracture risk is clear, identifying a similar relationship with duration of corticosteroid use is difficult.

- Inhaled corticosteroids for treatment of conditions such as asthma and chronic obstructive pulmonary disease currently appear to be of a minimal concern as it relates to bone metabolism, however further exploration appears warranted.

Preventative measures may include attention to calcium, vitamin D supplementation, bisphosphonates, calcitonin, parathyroid hormone and cessation of smoking, reduction of alcohol consumption and employing weight bearing activities.

**Council of Chiropractic
Orthopedics**

www.ccodc.org

Abstracts & Literature Review

Prevention of Nonvertebral Fractures with Oral Vitamin D and Dose Dependency A Meta-Analysis of Randomized Controlled Trials

Heike A. Bischoff-Ferrari, Walter C. Willett, John B. Wong, Andreas E. Stuck, Hannes B. Staehelin, E. John Orav, Anna Thoma, Douglas P. Kiel, Jana Henschkowski

Arch Intern Med. 2009;169(6):551-561.

Editorial Reviewer: James Demetrious, DC, FACO

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Authors' Abstract

Background: Antifracture efficacy with supplemental vitamin D has been questioned by recent trials.

Methods: We performed a meta-analysis on the efficacy of oral supplemental vitamin D in preventing nonvertebral and hip fractures among older individuals (≥ 65 years). We included 12 double-blind randomized controlled trials (RCTs) for nonvertebral fractures ($n=42\,279$) and 8 RCTs for hip fractures ($n=40\,886$) comparing oral vitamin D, with or without calcium, with calcium or placebo. To incorporate adherence to treatment, we multiplied the dose by the percentage of adherence to estimate the mean received dose (dose $\times$ adherence) for each trial.

Results: The pooled relative risk (RR) was 0.86 (95% confidence interval [CI], 0.77-0.96) for prevention of nonvertebral fractures and 0.91 (95% CI, 0.78-1.05) for the prevention of hip fractures, but with significant heterogeneity for both end points. Including all trials, antifracture efficacy increased significantly with a higher dose and higher achieved blood 25-hydroxyvitamin D levels

for both end points. Consistently, pooling trials with a higher received dose of more than 400 IU/d resolved heterogeneity. For the higher dose, the pooled RR was 0.80 (95% CI, 0.72-0.89; $n=33\,265$ subjects from 9 trials) for nonvertebral fractures and 0.82 (95% CI, 0.69-0.97; $n=31\,872$ subjects from 5 trials) for hip fractures. The higher dose reduced nonvertebral fractures in community dwelling individuals (-29%) and institutionalized older individuals (-15%), and its effect was independent of additional [pm : calcium supplementation.

Conclusion: Nonvertebral fracture prevention with vitamin D is dose dependent, and a higher dose should reduce fractures by at least 20% for individuals aged.

Editorial Summary:

- The antifracture benefits of vitamin D have been questioned by several recent trials, leading to uncertainty among patients and physicians regarding recommendations for vitamin D supplementation.
- By performing a systematic review of the literature and meta-analysis of high-quality, double-blinded

RCTs, the authors report nonvertebral fracture prevention with vitamin D is dose dependent, and a higher dose should reduce fractures by at least 20% for individuals aged 65 years or older.

**American Chiropractic
Association**

www.acatoday.org/

Abstracts & Literature Review

Mortality after Lumbar Fusion Surgery

Sham Maghout Juratli, MD, MPH, Sohail K. Mirza, MD, MPH, Deborah Fulton-Kehoe, PhD, MPH, Thomas M. Wickizer, PhD, and Gary M. Franklin, MD, MPH

Spine 2009;34:740–747.

Editorial Reviewer: James Demetrious, DC, FACO

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Authors' Abstract

Study Design: Retrospective population-based cohort study.

Objective: To describe mortality after lumbar fusion surgery in Washington State workers' compensation claimants in the perioperative period and beyond.

Summary of Background Data: Although lumbar fusion surgery can be associated with serious complications, perioperative mortality is generally considered rare. Population-based mortality estimates have been limited to surgery in older adults.

Methods: We identified all Washington State workers' compensation claimants who underwent fusion between January 1994 and December 2001 ($n = 2378$) and assessed the frequency, timing, and causes of death. Mortality follow-up was concluded in 2004. Death was ascertained from Washington State vital statistics records and from the workers' compensation claims database. Poisson regression was used to obtain age- and gender-adjusted mortality rates. Years of potential life lost, percent of potential life lost, and mean potential life lost were calculated for the leading 5 causes of death

and we calculated the risk of death associated with selected predictors.

Results: Among the 2378 lumbar fusion subjects in the study cohort, 103 were deceased by 2004. The 3-year cumulative mortality rate was 1.93% (95% confidence interval, 1.41%–2.57%). The 90-day perioperative mortality rate was 0.29% (95% confidence interval, 0.11%–0.60%). The risk of perioperative mortality was positively associated with repeat fusions. The age- and gender-adjusted all-cause mortality rate was 3.1 deaths per 1000 worker years (95% confidence interval, 0.9–9.8). Analgesic-related deaths were responsible for 21% of all deaths and 31.4% of all potential life lost. The risk of analgesic-related death was higher among workers who received instrumentation or intervertebral cage devices compared with recipients of bone-only fusions (1.1% vs. 0.0%; $P = 0.03$) and among workers with degenerative disc disease (age and gender-adjusted mortality rate ratio, 2.71) (95% confidence interval, 1.17–6.28). The burden was especially high among subjects between 45 and 54 years old with degenerative disc disease (rate ratio, 7.45).

Conclusion: Analgesic-related deaths are responsible for more deaths and more potential life lost among workers who underwent lumbar fusion

than any other cause. Risk of analgesic-related death was especially high among young and middle-aged workers with degenerative disc disease.

Editorial Summary:

- This study describes mortality after lumbar fusion surgery in a large cohort of workers after an average follow-up of 6.6 years.
 - Analgesic-related deaths are responsible for more deaths and more potential life lost among workers who underwent lumbar fusion than any other cause.
 - Risk of analgesic-related death was especially high among young and middle-aged workers with degenerative disc disease.
-

Abstracts & Literature Review

MRI vs. Clinical Examination for Diagnosing Meniscus Tears: A Review

Ryzewicz M, Peterson B, Siparsky PN, Bartz RL. The diagnosis of meniscus tears: the role of MRI and clinical examination. Clin Orthop. 2007;123–133.

Editorial Reviewer: Rick Corbett DC, FCCR(C), FCCO(C)

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Authors' Abstract

Objective: To determine whether a MRI should be routinely ordered before arthroscopy for clinically diagnosed meniscus tears, by means of a systematic review of the literature.

Data sources: PubMed and the Cochrane database were searched for studies in English that evaluated physical examination maneuvers and/or imaging studies for the diagnosis of meniscus tears in humans (1264 references).

Editorial Summary:

For clinically diagnosed meniscal lesions:

- McMurray, Apley, Thessaly at 5° knee flexion, Ege test were of high specificity but low sensitivity;
- Joint line tenderness had lower specificity but higher sensitivity;
- Thessaly test at 20° flexion had both high specificity and sensitivity;
- Accuracy of clinical examination was reduced in presence of ligament injury or degenerative lesions;
- Experienced clinicians identified meniscus lesions requiring arthroscopic repair at least as well as MRI;
- An MRI should be considered prior to arthroscopic intervention for clinically

diagnosed meniscal lesions only in the event that the clinical exam is equivocal.

Book Review

Illustrated Orthopedic Physical Assessment

By: Ronald C. Evans, DC, FACO, FICC

Publisher: Mosby Elsevier, 2009, Third Edition, ISBN: 978-0-323-04532-2 (Accompanying DVD)

The Mastery of Investigation – A Superb Orthopedic Text Book Review

Reviewed By: Jonice Owen, DC, FACO

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Illustrated Orthopedic Physical Assessment could be called “A Chiropractic Orthopedists’ Good Friend”. This multi-faceted, comprehensive orthopedic text takes priority as the best text next to the report-writing table and in the examination room. The third edition warrants consideration even if you own other editions.

At first glance, the preface circumvents a great deal of trouble. The well-organized preface outlines the sequence of this book, guiding you to the best use of this book. Dr. Evans then launches you into the subject matter with this introductory instruction:

“Success requires an organized thought process in approaching the patient’s problem. There must be a clear plan to follow and a particular aim in each stage of the investigation.”

The author follows with the delivery of four main guiding points, the first of which states:

“First, it must be determined whether a lesion of musculoskeletal system is present. This determination is accomplished by analysis of the history and physical examination.”

Dr. Evans proceeds with clear, detailed, easily-located informational organization. He aids you by providing complex material, and then he encourages you to think, critically.

Illustrated Orthopedic Physical Assessment packs in useful material that makes sense and saves time due to concise writing, excellent editing, and a palpably profound respect for the material and the reader. The photographs are crisp without being overly cold. The examination photographs display neutral positions along side demonstrations of positive responses, as well as, overlays of direction-enhancing arrows. Be prepared to be delighted by the variety of example selections including: MRI studies; MRA studies; anatomical drawings; surgical photographs; pathology photographs; cross-reference tables; flow charts; X-ray positioning photographs; Questionnaires; and the list goes on.

Thirteen Chapters introduce the principles, and progress through the Axial and Appendicular Musculoskeletal System: Principles in Assessing Musculoskeletal Disorders; Principles in Assessing Cardinal Symptoms and Signs; Cervical Spine; Shoulder; Elbow; Forearm, Wrist, and Hand; Thoracic Spine; Lumbar Spine; Pelvis and Sacroiliac Joint; Hip Joint; Knee; Lower Leg, Ankle, and Foot; and Malingering.

Illustrated Orthopedic Physical Assessment would be an ideal study guide choice for chiropractic students, and doctors undertaking post-graduate diplomate programs (not limited to orthopedics), and a prized clinical companion for chiropractic orthopedists.

I've enjoyed reviewing the tests, anatomy, and diagnostic studies, and I have appreciated the critical thinking which is required. I tested myself with the Critical Thinking questions at the end of each chapter.

An accompanying DVD contains over two hours of demonstration of all 237 tests shown in the text. Dr. Evans' speaks clearly and understandably, and well-paced. The sound quality resonates well. Picture clarity enhances viewing. Dr. Evans' performs easy-to-follow examinations, and the person being examined displays good comprehension of the tests being performed.

I have one difficulty with this book. The book weighs in at 5.5 lbs. The DVD assuaged my concerns.

Orthopedic Resources

FRAX® Osteoporosis Fracture Prediction Tool Developed by the World Health Organization

James Demetrious, DC, FACO
Editor, *Academy of Chiropractic Orthopedists eJournal*

The FRAX® tool has been developed by the World Health Organization Collaborating Centre for Metabolic Bone Diseases, at the University of Sheffield, UK to evaluate fracture risk of patients. It is based on individual patient models that integrate the risks associated with clinical risk factors as well as bone mineral density (BMD) at the femoral neck.

The International Osteoporosis Foundation (IOF), registered as a not-for-profit, non-governmental foundation in Switzerland, functions as a global alliance of patient, medical and research societies, scientists, health care professionals, and international companies concerned about bone health. The IOF manages requests for utilization of FRAX®.

Patrice Mckenney, CEO of the IOF reports that her organization is very pleased to have the Academy of Chiropractic Orthopedists link to FRAX® from the Academy web site. Ms. McKenney stated, "Your eJournal seems to be of very high quality and a great service to your constituents. We would be very happy to be associated with you."

The FRAX® models have been developed from studying population-based cohorts from Europe, North America, Asia and Australia. In their most sophisticated form, the FRAX® tool is computer-driven and is available on this site. Several simplified paper versions, based on the number of risk factors are also available, and can be downloaded for office use.

The FRAX® algorithms give the 10-year probability of fracture. The output is a 10-year probability of hip fracture and the 10-year probability of a major

osteoporotic fracture (clinical spine, forearm, hip or shoulder fracture).

The FRAX® tool can be accessed online at:
<http://www.shef.ac.uk/FRAX/index.htm>.

More information related to osteoporosis is available from the IOF at:
<http://www.iofbonehealth.org/home.html>.

FRAX® is a sophisticated risk assessment instrument, developed by the University of Sheffield in association with the World Health Organization. It uses risk factors in addition to DXA measurements for improved fracture risk estimation. It is a useful tool to aid clinical decision making about the use of pharmacologic therapies in patients with low bone mass. The International Osteoporosis Foundation supports the maintenance and development of FRAX®.



Announcing the new Date for the 2010 ACCO Convention

The 2010 ACCO Convention has been rescheduled April 23-25, 2010. The convention will be held at Harvey's Resort in Lake Tahoe (www.harveystahoe.com).

If you have not attended an ACCO Convention, plan to do so in 2010: for the educational experience; to share in the comradery of fellow like minded practitioners who strive to offer the highest quality of care for their patients; to break away to breathtaking Lake Tahoe.

Refer a colleague and share the wealth of knowledge you gain from the speakers at our convention.



Event Info:

April 23-25, 2010 – Registration - \$425.00

Harvey's Resort, Lake Tahoe
www.harveystahoe.com with a Special Group
Room Rate of \$129 (reservation code is S04ACCO)



Check in periodically at www.accoweb.org for updated convention information.