



JACO

Journal of the Academy of Chiropractic Orthopedists

**The Open Access, Peer-Reviewed and Indexed Publication
of the Academy of Chiropractic Orthopedists**

September 2009 – Volume 6, Issue 3

Editorial Board

Editor-In-Chief

Bruce Gundersen, DC, FACO

Editor

James Demetrious, DC, FACO

Contributing Editors

Gary Carver, DC, FACO

Wayne Hebert, DC, FACO

Dale Huntington, DC, FACO

Deanna O'Dwyer, DC, FACO

Current Events Editor

Stephen Capps, DC, FACO

Editorial Review Board

James R. Brandt, DC, FACO

Rick Corbett, DC, DACBR, FCCO(C)

Jeffrey R. Cates, DC, FACO

Anthony Vincent D'Antoni, MS, DC, PhD

Ronald C. Evans, DC, FACO

Robert S. Francis, DC

Tony Hamm, DC, FACO

A. Michael Henrie, DO

Charmaine Korporaal, M.Tech: Chiropractic,

CCFC, CCSP, ICSSD

Timothy John Mick, DC, DACBR, FICC

Joyce Miller, DC, FACO

Robert E. Morrow, MD

Joni Owen, DC, FACO

Reed B. Phillips, DC, DACBR, PhD

Gregory C. Priest, DC, FACO

Larry L. Swank, DC, FACO

Michelle A Wessely BSc, DC, DACBR

Michael Wiles, DC, MEd, FCCS(C)

Steve Yeomans, DC, FACO

Articles, abstracts, opinions and comments appearing in this journal are the work of submitting authors, have been reviewed by members of the editorial board and do not reflect the positions, opinions, endorsements or consensus of the Academy in any connotation.

Journal of the Academy of Chiropractic Orthopedists September 2009 – Volume 6, Issue 3

Image Gallery

Letter from the Editor - Call for Papers

Case Reports

- ❖ Failed Back Surgical Syndrome – L1-2 and L5-S1 Disc Herniations Following L4-S1 Spinal Fusion: A Case Report. *JACO*. 2009;6(3).
[FREE Full Text](#) | [PDF](#)

Abstracts & Literature Review

- ❖ Significance of Perianular Enhancement Associated With Anular Tears on Magnetic Resonance Imaging in Diagnosis of Radiculopathy: An Editorial Review. *JACO*. 2009;6(3).
[FREE Full Text](#) | [PDF](#)
- ❖ How Often Is Low Back Pain Not Coming From the Back?: An Editorial Review. *JACO*. 2009;6(3).
[FREE Full Text](#) | [PDF](#)
- ❖ The Effects of Hip and Ankle Stretching on Gait Function of Older People: An Editorial Review. *JACO*. 2009;6(3).
[FREE Full Text](#) | [PDF](#)
- ❖ Complications of Transforaminal Cervical Epidural Steroid Injections: An Editorial Review. *JACO*. 2009;6(3).
[FREE Full Text](#) | [PDF](#)

Book Review

- ❖ Textbook: Fundamental Neuroscience, 3rd Edition. *JACO*. 2009;6(3).
[FREE Full Text](#) | [PDF](#)

Imaging Corner

- ❖ Self Test. *JACO*. 2009;6(3).
[FREE Full Text](#) | [PDF](#)

Announcements

- ❖ American College of Chiropractic Orthopedists Annual Convention
- ❖ Academy of Chiropractic Orthopedists – New Web Site and Membership Benefits Information

Image Gallery

The Image Gallery is dedicated to the artistic contributions of our readership. The *Journal of the Academy of Chiropractic Orthopedists* invites you to submit drawings, illustrations, or photographs, along with appropriate explanatory information, for consideration of publication within this section. Please forward electronic media via the following Articles Submission hyperlink: aco@dcorthoacademy.com.



Artist: Kathleen Marie Holshek Pequignot

Watercolor rendering of Crocus at the Lower Cape Fear Hospice Heritage Garden located in Wilmington, NC.

Submitted by James Demetrious, DC, FACO

Copyright (c) 2009 Holshek Pequignot and the Academy of Chiropractic Orthopedists

Call for Papers

James Demetrious, DC, FACO

Editor, *Journal of the Academy of Chiropractic Orthopedists*

The Academy of Chiropractic Orthopedists has officially launched a completely revamped and new web site (www.DCOrthoAcademy.com) that is certain to benefit patients, chiropractic orthopedists and the chiropractic profession at large.

The *Journal of the Academy of Chiropractic Orthopedists* (formerly named the *eJournal*), has likewise undergone significant progressive change. With a brand new format and style, our free and Open Access journal is dedicated to higher learning and the dissemination of scholarly works.

Completely re-written Author Guidelines, Article Submission protocols, Editor Guidelines and Copyright/Permission protocols have been instituted.

- Author Guidelines: <http://www.dorthoacademy.com/guidelines-authors.php>
- Direct submission of prospective manuscripts can be made directly through the Article Submission page of the new web site at :
<http://www.dorthoacademy.com/submit.php>
- Copyright/Permission: <http://www.dorthoacademy.com/copyright.php>

The impact of a peer-review journal is manifest by a devoted readership, editors and authors. We greatly appreciate your support and encourage you to submit your cases, article/book reviews, images and learned works for publication in our flagship periodical.

Thank you,

James Demetrious, DC, FACO

Editor, *Journal of the Academy of Chiropractic Orthopedists*

Case Report

Failed Back Surgical Syndrome - L1-2 and L5-S1 Disc Herniations Following L4-S1 Spinal Fusion: A Case Report

James M. Cox, DC, DACBR 1, 2, 3

1. Private practice, Chiropractic Medicine, Inc. Fort Wayne, IN, USA
2. Post graduate faculty, National University of Health Sciences, Lombard, IL, USA
3. Corresponding author

* Corresponding author

Address: 12108 Golden Harvest Drive, Fort Wayne, Indiana 46845
Email: jcox200@verizon.net

Published: September, 2009

Journal of the Academy of Chiropractic Orthopedists

June 2009, Volume 6, Issue 3

Received: 18 August 2009

Accepted: 10 September 2009

This article is available from: <http://www.dcorthoacademy.com> © 2009 Cox and the Academy of Chiropractic Orthopedists
This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Purpose

Spinal surgery and fusion procedures for spinal stenosis, disc herniation, and instability increase consistently. Patients are often left with equal or worsening post surgical pain. This case report presents a failed back surgical patient who was successfully treated with specialized flexion distraction and decompression chiropractic manipulation. Such failed back surgical cases are an increasing challenge to chiropractic practitioners due to their increasing number and severity seeking chiropractic care.

Methods

Cox® flexion distraction decompression spinal manipulation, electrical stimulation, back school training and ergonomic exercises were used as the treatment of a large subligamentous and lateral recess L1-L2 disc herniation and an L5-S1 central disc protrusion subsequent to a rod and bolt and intertransverse process fusion from L4-S1 for sciatic radiculopathy. Also following the lumbar spine surgery, the patient developed bilateral radicular arm pain which was confirmed on MRI to show three level cervical disc herniation. This also required flexion distraction and decompression spinal manipulation at the same period of clinical care for the lumbar disc herniations. Visual analogue scale and Oswestry low back disability questionnaire were used as the subjective evaluators of clinical outcome.

Result

Total relief of bilateral sciatic radiculopathy, right upper extremity radiculopathy, and greater than fifty percent relief of low back pain was attained in this failed back surgical case. Only moderate left arm radiculopathy persisted depending upon patient work load and failure to continue spinal manipulation and home exercises.

Conclusion

This failed back surgical patient gained total relief of bilateral lower extremity radiculopathy and over 50% relief of low back pain subsequent to lumbar spine surgical fusion. She also escaped a cervical spine discectomy for bilateral upper extremity radiculopathy due to MRI confirmed three level disc herniations. Flexion distraction decompression spinal adjustment, electrical modalities, back school and exercises were the treatment methods employed.

Background

There has been a 20 fold increase in lumbar surgical fusion rates among Medicare enrollees from 1992-3 to 2002-3, representing the largest coefficient of variation seen with any surgical procedure. [1] Washington State Worker's Compensation reports that lumbar cage fusion rates increased from 3.6% in 1996 to 58% in 2001 and the result was increased complication risk without improving disability or reoperation rates. [2] Long term follow up of surgical and non surgical care of spinal stenosis and disc herniation patients report up to 50% of patients are not benefited and often are worse. [3][4]

The aging population with spinal stenosis in the United States increases the incidence low back pain and radiculopathy leading to spine surgery with fusion devices. The rates of lumbar disc surgery for sciatica patients with and without low back pain in a multidisciplinary spine clinic showed the rate of elective, first-time disc surgeries decreased by approximately two thirds when non surgical treatment care was added. [5] Lumbar spinal stenosis patients improved by 76% and disability improved in 73% in 57 patients treated with Cox® distraction and/or neural mobilization. [6] Spinal manipulation is recommended by the American Pain Society and the American College of Physicians for primary care of low back pain. Epidural steroid injections was reported to give short term but not long term relief of pain; surgery for leg pain (radiculopathy) caused by herniated lumbar disc and symptomatic spinal stenosis is associated with short-term benefits compared to nonsurgical therapy, though benefits diminish with long-term follow-up; and patients with no leg pain (non radicular back pain) due to disc degeneration find that fusion is no more effective than intensive rehabilitation, but associated with small to moderate benefits compared to standard nonsurgical therapy. [7]

This paper is presented to document the potential benefit of chiropractic flexion distraction spinal manipulation in treating the increasing numbers of failed back surgical syndromes. The studies cited above suggest strong need for non surgical and post surgical spinal manipulation procedures to cope with this ever increasing health care problem. The success of this case report encourages further study. Future clinical outcome studies are necessary to document the contribution of spinal manipulation for failed back surgical syndrome as described in this case report.

CASE REPORT

HISTORY

The patient is a 48-year-old white, single female seen in January, 2009 for the following chief complaints:

1. Low back pain, extending to the right lower extremity to the foot, with a visual analogue scale (VAS) pain scale of 10 (0 = no pain and 10 = worst pain of the patient's life). Her low back pain started several years ago due to a fall from a horse. Following lumbar spine surgical fusion in 2006, the low back and leg pain recurred and exacerbated in 2008.
2. Left thigh pain and pelvic pain, again at a VAS of 10.
3. Cervical spine pain, extending to the right upper extremity to the right middle digit, again at a VAS of 10. Left upper extremity pain started in March, 2009. Surgical cervical discectomy is recommended by the surgeon who performed the low back surgery.
4. Headaches at a VAS pain score of 10.

Past surgeries:

1. A surgical fusion with plate and bolt fusion, as well as intertransverse process fusion from the L4 through S1 segments was performed in January 2006. The ligamentum flavum had been removed at the L4-L5 level. See figures 1, 2 and 3.
2. A transforaminal epidural steroid injection at the L5-S1 level was given in November 2005, and this was followed with left lower extremity pain. She also had a C6-C7 transforaminal epidural steroid injection for right arm pain at the C6-C7 level in May 2005.
3. Carpal tunnel syndrome was performed in January 2005 on the right wrist.
4. In August 2006, left carpal tunnel syndrome surgery was performed.
5. Repair of a right rotator cuff tear repair was performed in September 1999.
6. Left ankle surgery was done in December 1999

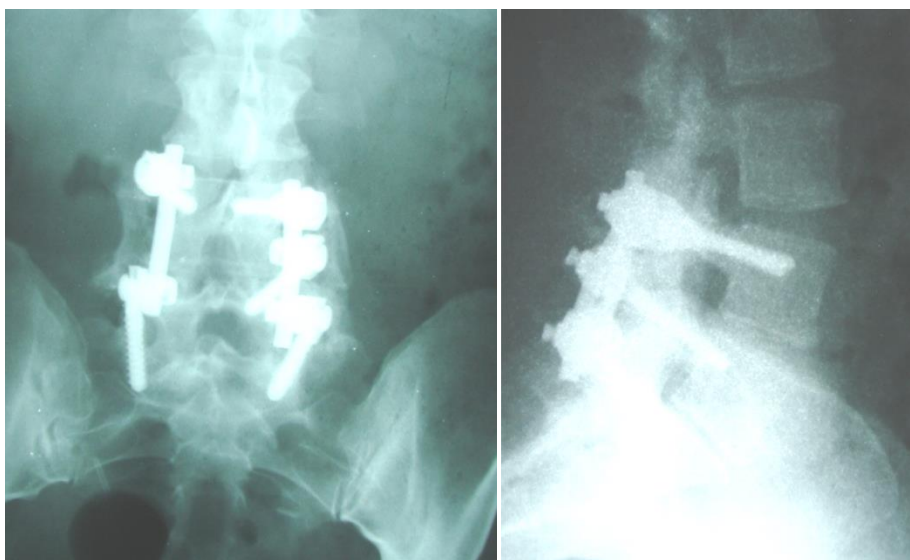


Figure 1 and 2 . Surgical rod and bolt fusion from L4 to sacrum with intertransverse process bone fusion.

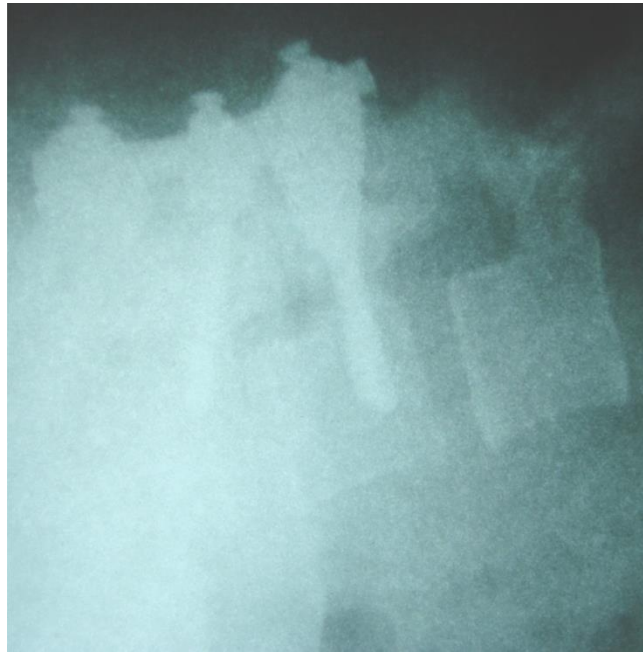


Figure 3. Flexion study. The L3 vertebral body shows stability on flexion movement.

Return of Pre-Surgical Pain:

Following her spinal fusion in January 2006, she had relief of her low back and lower extremity pain for approximately 2 years, at which time the right lower extremity pain returned. She takes Naprosyn and Vicodin for pain relief. She also swims 4-5 times a week and performs gentle spinal exercises for relief. In the past year, she has had an increase in her neck pain, headaches, and right and left arm pain. All of these pains have been increasing in intensity over the past year. She does not wish to have further low back surgery nor the recommended cervical spine discectomy surgery. She has been referred to our clinic by her gynecologist following a hysterectomy for a fibroid tumor, and persistent low back and lower extremity pain following the surgery.

Examination:

The patient's vital signs are normal. She is oriented times three. She appears to be in much distress and pain as she ambulates and talks. She is particularly distressed that upon revisiting her spinal surgeon, he offered no further help for her recurrent low back and right lower extremity pain, which now also involves the left lower extremity, but rather offered to do spinal surgery for disc herniation at the C6-C7 level which was diagnosed as the cause of her upper extremity pain.

Cervical spine examination revealed the range of motion at 40 degrees flexion, 35 degrees extension with pain, and 20 degrees right and left lateral bending, Range of motion of the thoraco-lumbar spine is 40 degrees flexion with marked pain and pulling in the low back, 15 degrees extension, and 10 degrees right and left bilateral lateral bending. Cervical compression intensifies the cervical spine and arm pain, most marked in the right arm, but also into the left upper extremity. The Soto-Hall test is positive for pain in the upper thoracic spine

bilaterally. The deep tendon reflexes of the upper extremities at the biceps, brachioradialis, and triceps are grade 2/2. The patella, hamstring, and Achilles reflexes are grade 2/2. No sensory changes are noted. The muscle strengths of the upper extremities at the deltoid, biceps, and triceps are 5/5 and of the lower extremities at the foot, ankle and toes are also grade 5/5. The pain distribution into the right lower extremity is the S1 dermatome and the upper extremities C5, 6, and 7 dermatomes, most marked on the left side.

Diagnostic Imaging

The following figures are an MRI study performed in 2008 prior to starting flexion distraction decompression manipulation in January, 2009. Figure 4 is an axial MRI showing the large left subligamentous and lateral recess L1-L2 disc herniation. Figure 5 is a sagittal image showing the L1-L2 disc herniation. Also, note the L5-S1 degenerative disc disease with endplate sclerosis. Figure 6 is an axial image showing the L5-S1 central disc hernia, which barely contacts the cauda equina and spares the nerve roots.

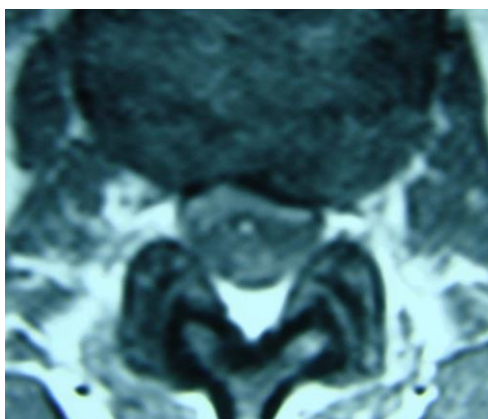


Figure 4. Axial T1 weighted MRI image shows a large left subligamentous and lateral recess disc herniation at the L1-L2 disc level before flexion distraction and decompression adjustment is given.

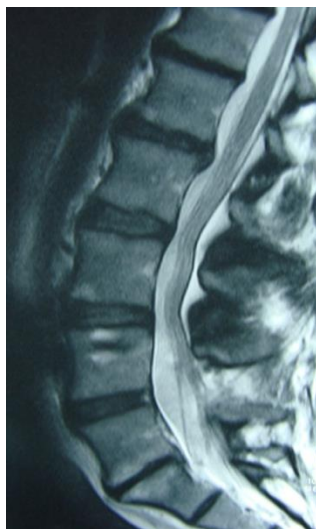


Figure 5. Sagittal MRI image shows the L1-L2 disc protrusion both anteriorly and posteriorly and L5-S1 Modic Type I disc degeneration. This is imaging prior to flexion distraction decompression adjusting being performed.

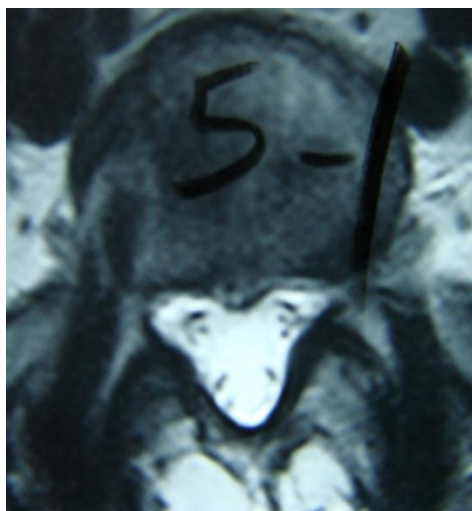


Figure 6. Axial L5-S1 image shows a central L5-S1 disc protrusion with a high intensity zone. This image is prior to beginning flexion distraction decompression adjusting.

Lumbar Spine Diagnosis:

The lumbar spine diagnosis based upon the above examination and imaging was:

1. L5-S1 central focal disc herniation with advanced disc degeneration
2. L1-L2 left central subligamentous and lateral disc herniation that does contact the spinal cord.
3. T11 through L2 degenerative disc disease.
4. Surgical fusion L4-S1

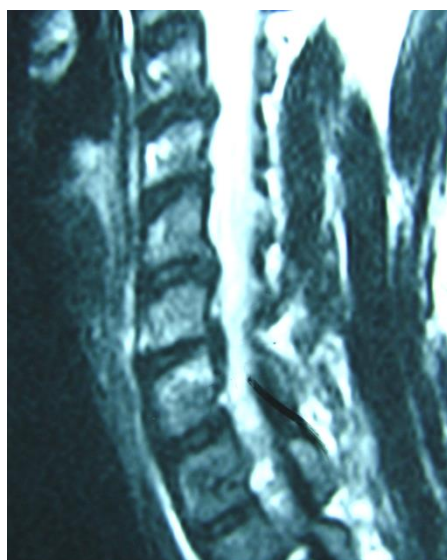


Figure 7. This is the sagittal MRI of the cervical spine showing C3-C4 and C5-C6 disc protrusions.



Figure 8. The C6-C7 disc protrusion is seen on sagittal image.

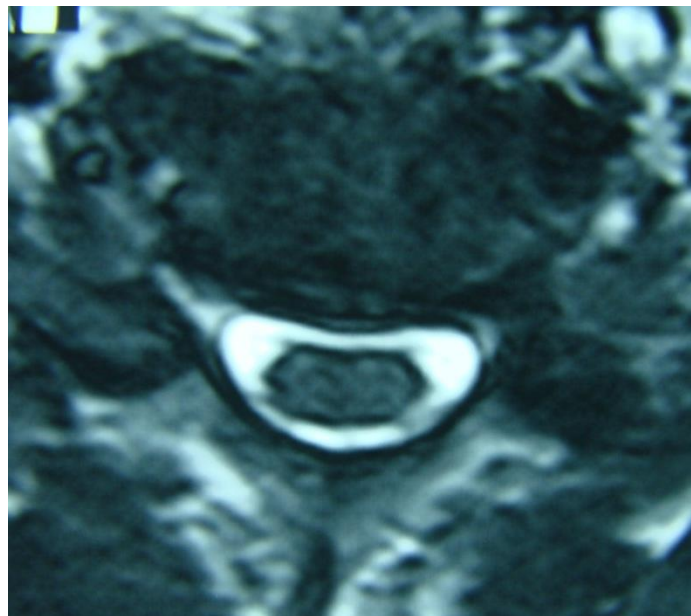


Figure 9. This is the axial C6-C7 disc showing minimal disc bulging not contacting the spinal cord.

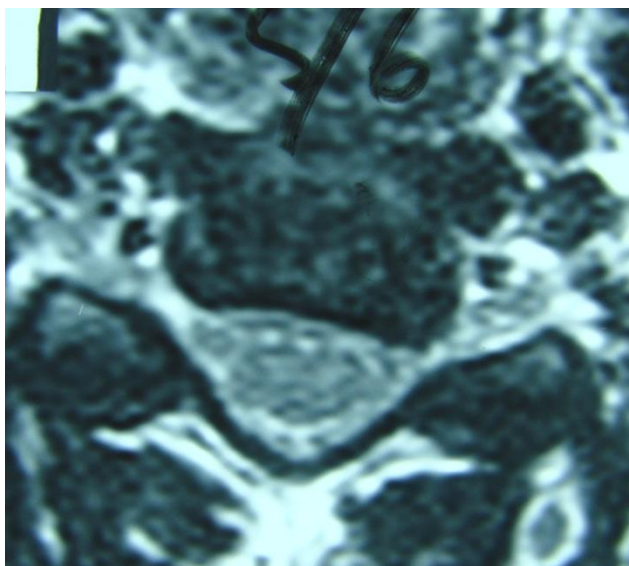


Figure 10. This is the axial image showing the C5-C6 far lateral disc herniation into the left osseoligamentous canal producing foraminal stenosis.

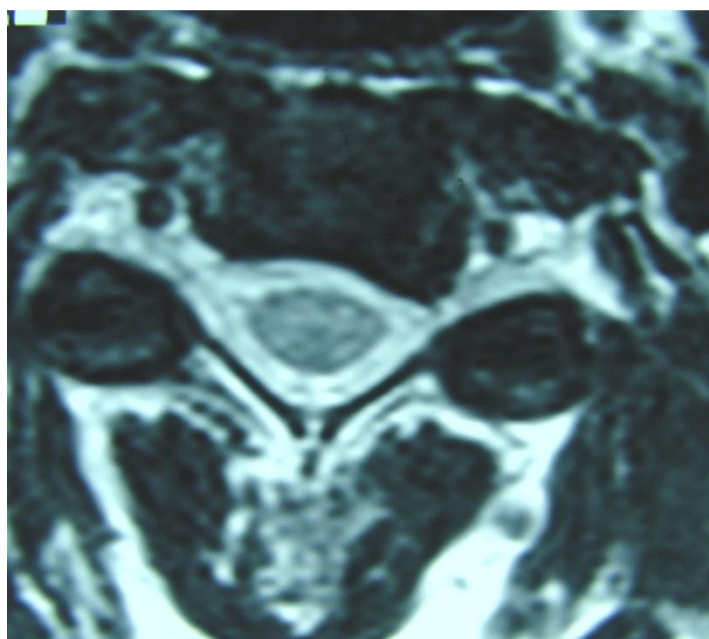


Figure 11. This shows the C3-C4 disc herniation into the left osseoligamentous canal producing foraminal stenosis.

Cervical Spine Diagnosis:

1. C3-C4 and C5-C6 left far lateral osseoligamentous disc herniation creating foraminal stenosis.
2. C6-C7 central disc bulge that does not contact the spinal cord or create foraminal stenosis.

TREATMENT PLAN:

Flexion distraction and decompression manipulation was administered to the L1-L2 level under careful tolerance testing. At the onset, this treatment was isolated to the L1-L2 level. Following patient evidence of pain relief, flexion distraction and decompression at the L3-L4 and L5-S1 levels was carefully tolerance tested and administered per tolerance. Discussion of this treatment methodology will be discussed later in this paper.

Flexion distraction and decompression spinal manipulation was administered to the C6-C7, C3-C4 and C5-C6 disc levels. Electrical stimulation in the form of positive galvanism, followed by tetanizing currents, was administered to the C5-C6 and C6-C7 levels and right and left upper extremities as well as the L1-L2 level and L5-S1 central disc. The patient was instructed to apply ice to her neck and low back for 30 minutes duration, twice a day. She was instructed to wear a lumbo-sacral brace at her work which involved lifting tires. If the work was causing further pain, the decision would be made to take her off her job duties. Our goal was to attain 50% relief within 4-6 weeks of treatment administered at least 3 times per week.

Treatment Outcome:

Following the above treatment plan, following two visits, the right lower extremity pain had centralized to the knee joint with a drop in the VAS pain from 10 to 7. The right upper extremity pain decreased to a VAS of 7 and the neck pain to 8 from 10. At that time, the patient missed 3 weeks of treatment and upon returning had now included left lower extremity pain as a chief complaint. On the fifth visit, the right lower extremity pain was isolated to the buttock and upper thigh, as well as the left lower extremity pain. On the tenth visit, the headaches were absent, and there was no right lower extremity pain. There was left buttock and upper thigh pain. The right arm pain continued at a VAS of 7. On the twelfth visit, the left lower extremity pain was 75% diminished, the right lower extremity pain was 100% absent, the headaches were totally relieved and the right upper extremity pain was 25% reduced. On the seventeenth visit, there was no lower extremity pain, no headaches, and the low back pain was at a VAS of 6. Following 20 visits, the patient had no headaches, no lower extremity pain nor upper extremity pain, and her low back pain was rated at a VAS of 5 and neck pain at a VAS of 7. Re-examination on August 4, 2009 showed The Oswestry low back disability questionnaire was scored at 14 while in January, 2009 it was 25. The VAS for the low back and leg pain in January, 2009 was 8 and in March, 2009 there was no leg pain and the low back VAS pain score was reported at 3. The cervical spine VAS rating for neck pain and upper bilateral arm pain was 10 in January, 2009 and in August, 2009 the VAS was zero for right arm pain, and 7 for neck and left arm pain.

In summation of the treatment outcome, the patient was able to receive total relief of the lower extremity pain, greater than fifty percent relief of her low back pain, total relief of right upper extremity pain and fifty percent relief of the left upper extremity and neck pain when treated with Cox® flexion distraction and decompression spinal manipulation of the lumbar and cervical spines. At the time of preparation of this paper, August, 2009, her only complaint is left upper extremity numbness in the distribution of the C6 and C7 nerve roots, depending on her activity level. Her cervical spine pain, headaches, and left arm pain return upon work and failure to undergo cervical spine long y axis decompression spinal manipulation. When she is treated at approximately 2-week intervals, these pains are tolerated well; meaning there is no lower extremity pain, low back pain is at a

VAS level of 3, neck pain and left upper extremity pain being the most pain at a maximum VAS of 7, no headache or right arm pain, The entering chief complaint in January, 2009 was low back and right leg pain at a VAS pain score of 10. This recurred following surgical fusion of the L4-S1 lumbar segments. Flexion distraction and decompression spinal manipulation totally relieved the lower extremity pain and only mild low back remained depending upon use. As stated in this paper, fifty percent relief for cases such as this can be a good clinical outcome. Ongoing home exercise, proper ergonomic use of the spine, and supportive chiropractic spinal flexion distraction manipulation are required to maintain the accomplished relief. The patient is very happy with her pain relief and adapts her life style to complement her ability to perform her activities of daily living. This is the type of case that is increasingly seen in chiropractic offices. It demands exact diagnosis and specialized spinal manipulation as part of interdisciplinary care. It is a condition that is controlled, but not cured and flexion distraction spinal adjusting, as described in this paper, has exacting tolerance testing performed prior to spinal manipulation to prevent iatrogenesis. Further clinical studies are needed to exactly align this form of spinal manipulation into interdisciplinary care of spinal stenosis and failed back surgery syndromes and to compare its clinical outcomes to other forms of spinal manipulation.



Figure 12. This is a post treatment sagittal lumbar MRI following flexion distraction decompression reduction of the L1-L2 left subligamentous and lateral recess disc herniation. Note the reduction in the L1-L2 disc herniation posteriorly at the conus medullaris region of the spinal cord compared to the same sagittal view seen in Figure 5. The reading radiologist reported on May 13, 2009 that the MRI shown here is now small and minimal compared to the previous study shown in figure 5 which was reported as moderate to large in size.

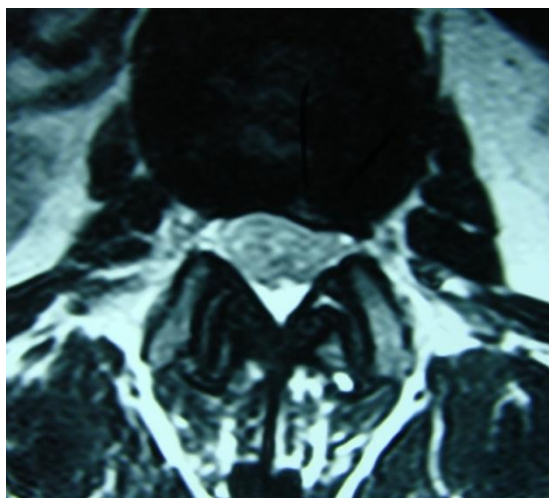


Figure 13. This is the post treatment axial MRI study of the L1-L2 left subligamentous and lateral recess disc herniation. The reading radiologist states that the moderate to large disc herniation originally seen in figure 4 is now smaller in this MRI taken post treatment. The radiologist did not know of our treatment. Compare figure 13 to figure 4 taken prior to flexion distraction adjusting.

MRI Studies Following Flexion Distraction Spinal Manipulation

With the absence of both upper and lower extremity pain and headache following 22 visits over a 3 month period, the patient returned to her orthopedic surgeon on May 13, 2009. He ordered new MRI studies of the cervical and lumbar spine. The new images for comparison with those taken prior to flexion distraction decompression adjusting are shown. Figure 12 is a gadolinium enhanced sagittal image showing reduction of the L1-L2 disc herniation and figure 13 is the axial image, which again shows reduction of the L1-L2 disc herniation size. Compare to figures 4 and 5 which are MRI's of the same level prior to flexion distraction manipulation. The radiologist report of this May 13, 2009 lumbar MRI states that the left lateral recess partial subligamentous L1-L2 disc protrusion is now small and minimal compared to the previous study where it was moderate to large in size.

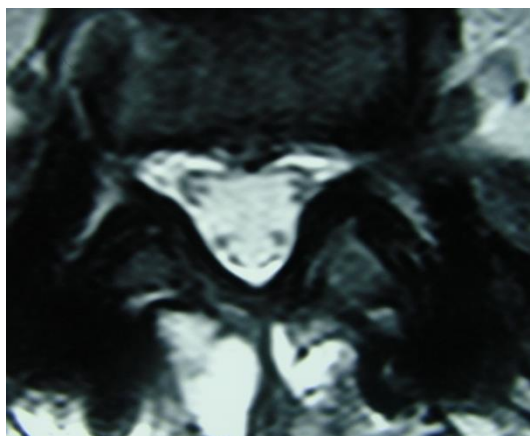


Figure 14. This is the axial image of the L5-S1 central disc herniation after flexion distraction manipulation.

Figure 14 is the axial image of the L5-S1 disc level in May, 2009 following flexion distraction decompression and absence of right and left leg first sacral nerve sciatic radiculopathy. There may be reduced disc size compared to Figure 6 taken prior to flexion distraction decompression manipulation but the central disc hernia is still present even though the patient is free of lower extremity S1 dermatome pain.



Figure 15. Illustrates the application of flexion distraction and decompression adjusting to the lumbar spine



Figure 16. The application of flexion distraction and decompression adjusting to the cervical spine.

Detailed Treatment Application Protocol of Flexion Distraction

This is a case demanding strict tolerance testing prior to and during flexion distraction and decompression spinal manipulation. Review of these protocols will be discussed here and referenced for the reader's study. Figure 15 shows flexion distraction and decompression adjusting being delivered to the lumbar spine. The algorithm outlining patient history and examination to arrive at the protocol of a radiculopathy or non radiculopathy patient to be treated with flexion distraction manipulation is discussed first. Co-management of cases, surgical referral, frequency of spinal manipulation, clinical expected outcomes, the transfer of passive to active care with patient improvement, patient placement and tolerance testing prior to applying flexion distraction and decompression spinal manipulation is thoroughly outlined at this reference. [8] In the case presented here, the tolerance testing for central, lateral, and cuff placement is most thoroughly applied. This patient is treated as a protocol I patient which is a radiculopathy patient. This patient showed no pain on tolerance testing. Treatment was applied without ankle restraints so as to apply low amplitude, carefully controlled long y axis decompression with flexion distraction. At no point in her care did she ever feel any iatrogenic pain from the manipulation given. Certainly with the bolt and rod fusion as well as the intertransverse fusion, tolerance testing is very important.

Flexion distraction long y axis decompression was first applied at the L1-L2 level where the large left subligamentous and lateral recess disc herniation was seen on MRI study. As no pain was produced, on the third spinal manipulation delivery, contact on the L3 and L5 spinous processes was made and again the same careful tolerance testing was performed. With no iatrogenic instance, and again with no ankle restraints, very gentle flexion distraction decompression was applied to the L3-L4 and L5-S1 segment. The patient tolerated this well with the comment that it felt relieving of her pain. As pain decreased from a VAS 10 to VAS 6 in the lower extremities, the force application of long y axis decompression was slowly increased with careful tolerance testing.

Localization of the distraction was also isolated to the thoracolumbar spine via a thoracic restraint so as to concentrate the distraction to the low thoracic and upper lumbar spine. This was tolerance tested and found to relieve pain for the patient. Her home exercise program was increased. Physiological therapeutic use of positive galvanism was applied over the L5-S1 central disc herniation and the left L1-L2 left disc herniation. This was followed by low intensity paravertebral muscle stimulation only to the degree to cause minimal muscle contraction. This was actually a feeling to the patient of mild skin stimulation.

Of course, the purpose and need of such careful tolerance testing and initial very slow and mild application of force was to prevent any adverse side effect in this surgically fused spine. No adverse effects were ever felt by the patient and the result of care was described earlier and will again be summarized at the conclusion of this paper. This author has treated many surgically fused spines such as presented here and has encountered no iatrogenic problem as long as the protocol outlined here is followed.

Figure 16 illustrates the cervical spine long y axis decompression application in this case. Tolerance testing is carried out as in the lumbar spine and is described in the textbook cited as reference 9. [9] The protocol for treating radicular and non radicular patients is shown in this textbook and the reader is referred to it for in-depth study of technique application. A certification course in the diagnosis and treatment of the spine as described

here is offered through the accreditation of the National University of Health Sciences. It involves a written and practical examination for certification.

Discussion

This is a case handled with flexion distraction of the L1-L2, L3-L4 and L5-S1 disc levels. The L5-S1 disc herniation would best explain this patient's lower extremity radiating S1 radicular pain. No femoral nerve distribution of pain or paresthesias was present. The altered motion and weight bearing arising from such a fused spine and the resultant disc degeneration above the fused segments is probable. Chiropractors are called on, with increasing frequency, to see these cases. Two points about this: 1. full relief is not realistic in many such cases and fifty percent relief can be a good clinical outcome; 2. limited spinal adjustments are available to the chiropractor in this type case because high velocity side posture adjusting nor postero-anterior thrust technique are well tolerated. It is important to fully explain the stenosis condition to the patient, offer them their options of care, and inform them that it is unrealistic to gain 100% relief of such chronic and debilitating conditions. We do not cure such conditions, but rather control them through spinal manipulation and patient active home care and ergonomic life style changes.

The literature is very supportive of spinal manipulation for the treatment of spinal stenosis. Three groups of low back pain patients are classified: non-specific LBP, back pain with radiculopathy or spinal stenosis, and back pain with other specific causes. [10] Diagnostic imaging should be performed on patients with progressive neurologic deficits or serious factors and MRI only if surgery or epidural steroid injections are considered. Patients need to be given evidence based options and spinal manipulation, acupuncture, exercise, massage, yoga are recommended. The source of this information is the American Pain Society and the American College of Physicians for primary care of low back pain. Prolotherapy, facet joint injection, intradiscal steroid injection, and percutaneous intradiscal radiofrequency thermocoagulation are not effective, and epidural steroid injections give short term but not long term relief of pain. Spinal cord stimulation is moderately effective for failed back surgery syndrome with persistent radiculopathy, though device-related complications are common. Surgery for leg pain (radiculopathy) with herniated lumbar disc and symptomatic spinal stenosis is associated with short-term benefits compared to nonsurgical therapy, though benefits diminish with long-term follow-up. For patients with no leg pain (non radicular back pain) with disc degeneration, fusion is no more effective than intensive rehabilitation, but associated with small to moderate benefits compared to standard nonsurgical therapy. [10] New surgical implant devices have increased lumbar fusion rates dramatically in Medicare patients according to a study of 306 US hospitals. There was a 20-fold increase in surgical rates among Medicare enrollees from 1992-3 to 2002-3 in lumbar fusion, representing the largest coefficient of variation seen with any surgical procedure. Medicare spending for inpatient back surgery more than doubled over the decade and spending for lumbar fusion increased more than 500%, from \$75 million to \$482 million. In 1992, lumbar fusion represented 14% of total spending for back surgery; by 2003, lumbar fusion accounted for 47% of spending. [1] Lumbar cage fusion rates increased from 3.6% in 1996 to 58% in 2001. The result was increased complication risk without improving disability or reoperation rates. Two years after fusion 64% of the cases were disabled, 22% had reoperation, and 12% had other complications. Lumbar fusion devices compared with exercise and cognitive intervention are no better in randomized clinical trials. The use of cages or instrumentation was associated with increased complication risk compared with bone-only fusions without improving disability or reoperation rates. In conclusion, use of intervertebral fusion devices rose rapidly after their introduction in 1996

and this increased use was associated with an increased complication risk without improving disability or reoperation rates. [2]

In a study of 600 single-operated Workers Compensation low back patients, 71% did not return to work 4 years later and of 400 multiple-operated backs 95% did not return to work 4 years later. [11] After being off work for 6 months, 50% of patients return to work, 20% return to work after 1 year off and none return to work after 2 years off. [12] Factors predicting poor outcomes in low back pain are: presence of a belief that back pain is harmful or has the potential to be severely disabling, fear-avoidance behavior and reduced activity levels, tendency to low mood and withdrawal from social interaction, and expectation that passive treatment rather than active participation will help. [13]

A study in Maine involved 400 patients with sciatica resulting from a lumbar disc herniation treated surgically or non-surgically who were followed over a 10 year period. By 10 years, 25% of surgical patients had undergone at least one additional lumbar spine operation, and 25% of non surgical patients had at least one lumbar spine surgery. At 10 year follow-up, 69% of surgically treated patients and 61% of those treated non-surgically reported improvement in their predominant symptom of back or leg pain. [3] In a similar study, 97 patients with low back and leg pain due to spinal stenosis were treated surgically or non-surgically. After 8 - 10 years, 53% of surgically treated and 50% of non-surgically treated patients reported that their predominant symptom of low back pain was improved. [4] It is interesting to note that improvement does not mean one hundred percent improvement, but rather some degree of improvement, but also from this study emerges the statistic that from 30 to 50 percent of these patients were the same or worse after surgical or non surgical treatment. The conclusion is that there is room for further research and improved procedures for low back pain, spinal stenosis, and disc herniation.

Katz reported that lumbar disc disorders cost in excess of 100 billion dollars a year to treat and 5% of the patients absorb 75% of the cost. [14] Fairbanks [15] reported on 349 18-55 y/o chronic low back patients with comparison of surgical stabilization with intense rehabilitation. There was no evidence that surgery was any more beneficial than intensive rehabilitation although surgery costs more, shows potential risk and is not cost effective.

With the awareness that cases such as the one reported here are the most costly in human suffering and dollars treated in the United States today, and the reported value of spinal manipulation as conservative care for them, the chiropractic profession has the responsibility and obligation to formulate the best spinal manipulation techniques for their care. It is with these concepts in mind that this paper is presented.

Conclusion

A case is presented of recurring low back and bilateral lower extremity radiculopathy following lumbar spine fusion surgery. When first seen for this complaint, the patient also complained of neck and upper extremity pain due to MRI confirmed three level cervical spine disc herniations and resultant spinal stenosis. Flexion distraction decompression adjusting was the form of spinal manipulation employed in treating the case. Excellent relief of bilateral lower extremity radicular pain was achieved and good relief of the low back pain. Total headache and right upper extremity pain relief was attained with recurrent neck and left arm pain if home exercises, ergonomic practice and bi weekly spinal flexion distraction and decompression manipulation is not followed. This case is a condition that is controlled, but not cured. Specialized chiropractic distraction spinal adjusting, designed with exacting tolerance testing to prevent iatrogenesis and specific treatment protocol application as described in this paper was the care. Physiological therapeutic modalities were also used. Further clinical studies are needed to exactly align this form of spinal manipulation into interdisciplinary care of spinal stenosis and failed back surgery syndromes and to compare its clinical outcomes to other forms of spinal manipulation.

Competing interests

The author is the developer of the technique and instrument used in this case report. He holds a patent on the cervical headpiece, has no ownership in the company manufacturing the instrument and is compensated for his input to its development.

Acknowledgements

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

References

1. Weinstein J, Lurie JD, Olson PR, Bronner K, Fisher ES: **United states' trends and regional variations in lumbar spine surgery: 1992-2003.** *Spine* 2006, **31**:2707-2714 .
2. Juratli S, Maghout MD, Franklin GM, Mirza S, Wickizer TM, Fulton-Kehoe D: **Lumbar Fusion Outcomes in Washington State Workers' Compensation.** *Spine* 2006; **31**(23):2715-2723.
3. Atlas S, Keller RB, Wu YA, Deyo RA, Singer DE: **Long term outcomes of surgical and non surgical management of sciatica secondary to lumbar disc herniation: 10 year results from the Maine lumbar spine study.** *Spine* 2005, **30**:927-35.
4. Atlas SJ, Keller RB, Su YA, Deyo RA, Singer DE: **Long term outcomes of surgical and nonsurgical management of lumbar spinal stenosis: 8 to 10 year results from the Maine lumbar spine study.** *Spine* 2005, **30**:936.
5. Rasmussen RA, Nielsen C, Hansen VK, Jensen OK, Schioettz-Christensen B, **Rates of lumbar disc surgery before and after implementation of multidisciplinary nonsurgical spine clinics.** *Spine* 2005, **30**:2469-73.

6. Murphy DR, Hurwitz EL, Gregory AA, Clary R.: **A non-surgical approach to the management of lumbar spinal stenosis: a prospective observational cohort study.** *BMC Musculoskeletal Disorders* 2006,7:p.nil_1-nil_8.
7. Chou, R et al: **Interventional Therapies, Surgery, and Interdisciplinary Rehabilitation for Low Back Pain An Evidence-Based Clinical Practice Guideline From the American Pain Society.** *Spine* 2009,34: 990.
8. Cox, JM: **Low Back Pain: Mechanism, Diagnosis, Treatment.** 6th edition. *Williams & Wilkins*, 1999.
9. Cox, JM: **Neck, shoulder, arm pain: Mechanism, Diagnosis, Treatment.** 3rd edition. 2004. private publication by author.
10. Chou R: **Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society.** *Ann Intern Med* 2007, **147**:478.
11. Berger E: Late **postoperative results in 1000 work related lumbar spine conditions.** *Surgical Neurolog* 2000, **54**:101-6.
12. McGill S.: **Industrial back problems.** *J Occup Med* 10:4.
13. Kendall N: **Low back pain: treatment and prevention.** *J of Manual and Manipulative Therapy* 1997,5:3.
14. Katz JN: **Lumbar disc disorders and low back pain: socioeconomic factors and consequences.** *JBJS AM* 2006, **88A(suppl)**:10-14.
15. Fairbank, J et al: **Randomized controlled trial to compare surgical stabilization of the lumbar spine with an intensive rehabilitation program for patients with chronic low back pain. The MRC stabilization trial.** *British Med J* , 2005,330:1233-39.

Imaging Corner

Imaging Case Self-Test

Michelle A Wessely, DC, DACBR (1) and Timothy J Mick, DC, DACBR (2)

(1) Director of Radiology
Institut Franco-Europeen de Chiropratique (IFEC),
24 Boulevard Paul Vaillant Couturier, 94200 Ivry Sur Seine,
France
mwessely@ifec.net

(2) Imaging Consultants, Inc.
565 Arlington Avenue West,
55117, St. Paul. Minnesota, USA
mickici@msn.com

Published: September, 2009
Journal of the Academy of Chiropractic Orthopedists
June 2009, Volume 6, Issue 3
Received: 16 August 2009
Accepted: 18 September 2009

This review is available from: <http://www.dorthoacademy.com> © 2009 Wessely, Mick and the Academy of Chiropractic Orthopedists
This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Case presentation

A 27 year old male patient presented to the chiropractor in France, with low back pain which extended in to the left buttock region. On questioning, the patient felt that the pain had started during the rugby season and was gradually worsening. The pain travelled down his leg to his toes initially on occasion and now more constantly. His father, a medical doctor, ordered imaging and having consulted an orthopedic surgeon, is recommending surgery. The patient, a medical student wishes not to have surgery and presented to the clinic for a second opinion.

Imaging had previously been performed, which is presented for analysis – see figures 1 through 3.

- 1) What are the imaging findings?
- 2) What is the imaging diagnosis?
- 3) What are the management options available for this patients' treatment?

**Academy of Chiropractic
Orthopedists**

www.DCOrthoAcademy.com



Image 1.



Image 2.



Image 3.

Case Discussion

A 27 year old male patient presented to the chiropractor in France, with low back pain which extended in to the left buttock region. On questioning, the patient felt that the pain had started during the rugby season and was gradually worsening. The pain travelled down his leg to his toes initially on occasion and now more constantly. His father, a medical doctor, ordered imaging and having consulted an orthopedic surgeon, is recommending surgery. The patient, a medical student wishes not to have surgery and presented to the clinic for a second opinion. Imaging had previously been performed, which is presented for analysis.

1) What are the imaging findings?

In Figure 1a and b, a focal region of abnormality is noted about the left Ischia tuberosity, which has separated from the parent bone. Mild irregularity is noted about the avulsed segment, which is likely due to degenerative enthesopathy. On the false oblique view of Lesquene (Figure 1b) a closer evaluation of the region is possible, demonstrating a subchondral bony margin along the proximal aspect of the avulsed bony fragment, suggestive of being long –standing and of possible pseudoarticulation.



Figure 1a.

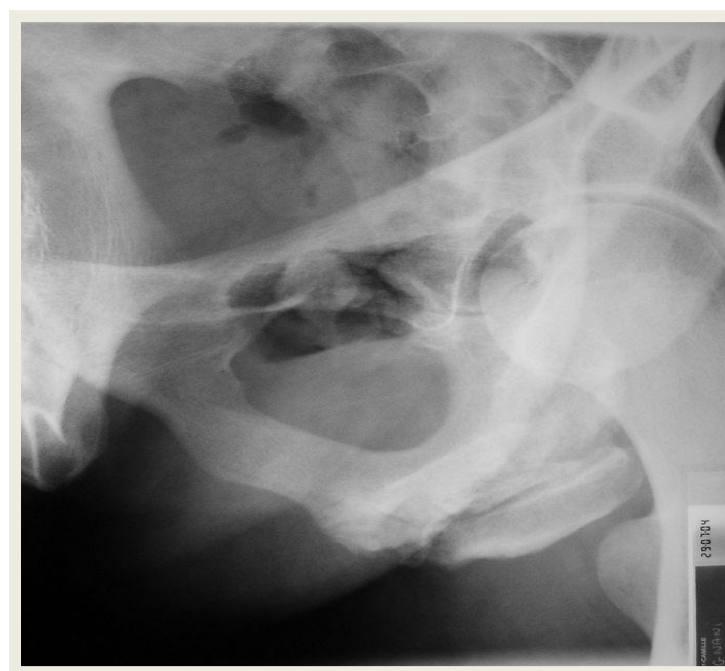


Figure 1b.

In figures 2a through c, CT imaging was performed, figure 2a demonstrating coronal pelvic bone window sections, noting the avulsed fragment with overgrowth of the avulsed fragment as well as evidence of a 3 mm radiolucent gap between the avulsed fragment and parent bone. Similarly in figure 2b, an axial bone window

CT section of the pelvis, similar features can be identified, and again in figure 2c, a sagittal bone window CT slice through the left ischium demonstrating the avulsed fragment.

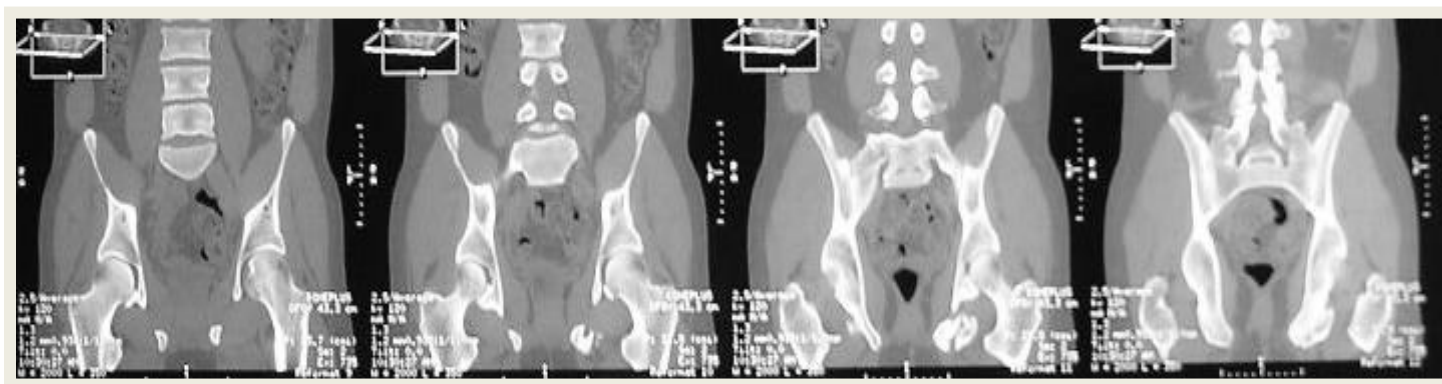


Figure 2a.

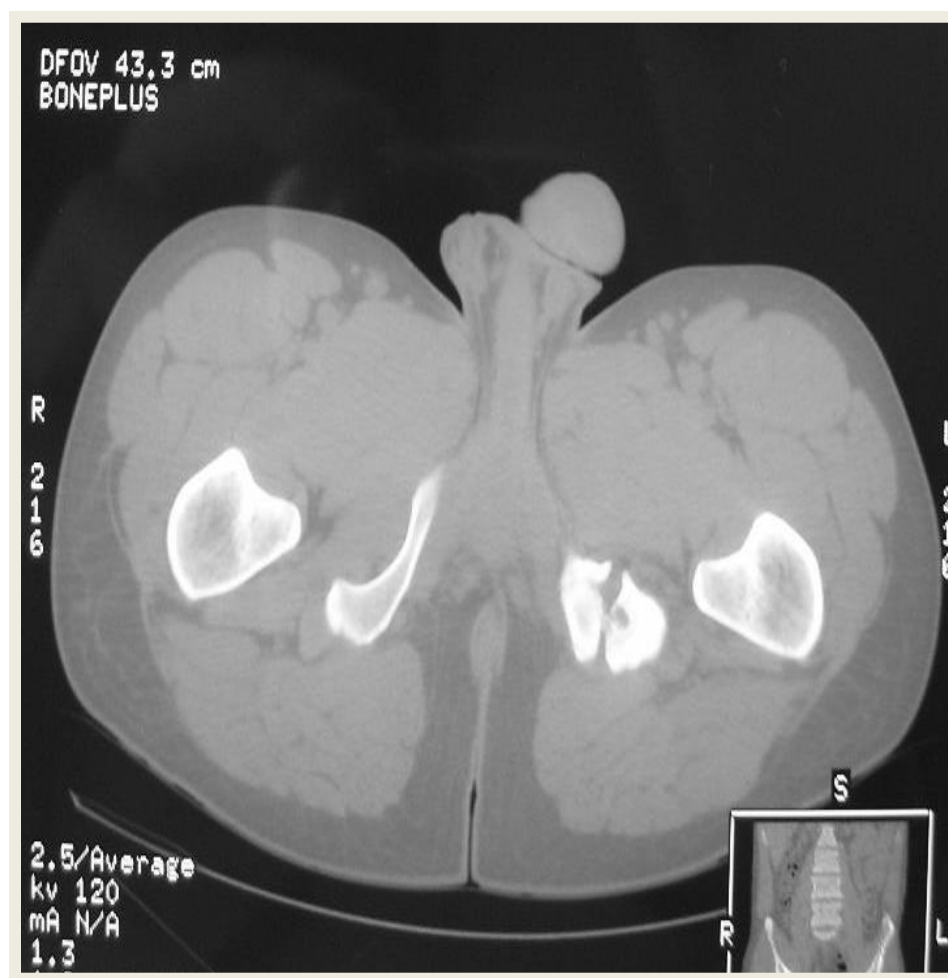


Figure 2b.



Figure 2c.

In figures 3, MR imaging was performed, in figure 3a, a T1-weighted sequence in the coronal or frontal plane of the pelvis demonstrating the displaced avulsed fragment superolaterally, with an additional smaller fragment medially which is less obviously appreciated on the radiographs and also noted on the CT imaging. STIR coronal (figure 3b) and axial (figure 3c) imaging demonstrates an increase in signal intensity within the avulsed fragment and also in the region between the avulsed segment and parent bone, suggestive of a pseudoarticulation. On the axial image in particular, an image slice performed at the level of the ischial tuberosity, the lateral displacement of the ischial tuberosity fragment is noted which is likely displacing the sciatic nerve (white circle) which may be the cause of the sciatic neuropathy suffered by the patient. At the site of the chronic avulsion is evidence of callus and bony hypertrophy with proliferation of the bone in this region, particularly anteriorly.



Figure 3a.



Figure 3b.

2) What is the imaging diagnosis?

Chronic avulsion injury to the left ischial tuberosity, with the likely development of a pseudoarticulation and compression of the sciatic nerve at the level of the ischial tuberosity.

3) What are the management options available for this patients' treatment?

The management of chronic avulsion injuries of the ischial tuberosity/apophysis depends on a number of factors, discussed in the text below. However options include conservative management, in particular spinal manipulative therapy and rehabilitative exercises about the pelvic musculature, therapeutic injection in to the region, or more interventional procedures including removal of the avulsed fragment.

Discussion:

Avulsion injuries occur either in the acute or less commonly in the chronic setting. The mechanism of injury is that of a forceful muscular contraction, which results in the pulling off of a fragment of bone, or periosteum, which may be associated with injury to the tendon of the muscle involved. Avulsion fractures about the pelvis are relatively common, particularly in the adolescent population involved in sports activities, during the development, ossification and then eventual fusion of the apophysis with the parent bone, hence the term traumatic apophysiolytic being applied to these types of injuries (1). In the case of the ischial apophysis, the fusion of the apophysis occurs from the age of 16 through to 18, but may be up to 25 years old, being one of the last about the pelvis to fuse. Depending on the type of sports activity, different regions of avulsion will be involved but in the adolescent age group generally involve the newly formed ossification centre or apophysis. Different activities and thus muscular contractions may result in different sites of avulsion injury, though about

the pelvis the ischial tuberosity is the most common region, followed by the anterior inferior iliac spine (related to the direct head of the rectus femoris) and then the anterior superior iliac spine (related to sartorius and/or tensor fascia lata). A more uncommon site of avulsion about the pelvis is the iliac apophysis. Avulsion injuries involving the ischial tuberosity, such as in the case illustrated here are particularly common in sports involving kicking, including rugby and soccer, both sports demanding that the player kick and run, athletes who are involved in sprinting and gymnasts involved in performing the “splits” (2).

The patient usually presents acutely following an injury during the sports activity. In the case of the ischial apophysis, tendons of muscles potentially implicated are the adductor magnus, quadratus femoris, and the hamstring group of muscles. Often the patient has to pull up early due to severe pain in the region of the origin of the tendinous attachment to bone referred to the involved ischial tuberosity. The patient is often seen to limp and lack the normal muscular strength of the involved muscle group and indeed on muscle testing, weakness and pain is noted, along with possible soft tissue swelling in the region.

Following clinical examination, a variety of imaging tools are available to assist in confirming the diagnosis. Although radiography would be considered to be the most logical, due to the bony injury, it may not provide the final diagnosis in those cases of subtle avulsion or predominantly periosteal involvement (3). However it remains the benchmark initial imaging tool of choice. It is however important to assess not only the extent of bony avulsion, but the consequences of the avulsion on the tendinous insertion points, and therefore special imaging, particularly MR imaging is very useful to determine this as well as the relationship of the injury to additional structures such as the sciatic nerve. More recently, diagnostic ultrasound has been advocated to determine the bony injury, tendinous and neural involvement but this still remains a challenge form of imaging for general use.

Radiography therefore may demonstrate slight irregularity about the ischial apophysis. Displacement of small flecks of ossification may be noted due to the nature of the avulsion injury. Soft tissue swelling is in general not appreciated on radiography even with the use of digital imaging in this region. Radiography may be used to follow the patients’ recovery in which case, it may be possible to note the progressive ossification of the avulsed fragment, separated from the parent bone. Depending on the age that the injury occurred, if there is a potential for further growth, the avulsed fragment may become sizeable, and has been termed a “Rider’s bone” or “Prussian’s bone”. If the fragment is noted to be separated either at the time of the acute injury or in the recovery or chronic stage, the golden measurement is that of 2 cms., over which orthopedic intervention is recommended, depending on the literature source. Diagnostic ultrasound may also be used in the initial diagnostic phase or as follow up during the following 1 to 2 months to determine the gradual resolution of the inflammatory response associated with the injury as well as in the evaluation of the tendons and associated neural components. MR imaging however is the gold standard in the evaluation of potential sources of complications, particularly the somewhat unusual sciatic nerve impingement (4), as seen with the patient presented in this radiology corner. In addition, as in this patient, evidence of a pseudoarticulation can be appreciated by evidencing fluid signal in either or both the avulsed fragment and parent bone, as well as in the intervening anatomic space. The development of a pseudoarticulation may be an additional source of pain which may be treated conservatively or with therapeutic injection.

The management of ischial apophysis avulsion injuries depends on several factors (5). The degree of displacement of the avulsed fragment is noted, and as commented, if there is more than 2 cms. displacement the

literature suggests orthopedic consultation with a view to potentially surgically fixing the fragment. If there is injury to the tendinous structures, for example to the conjoined tendon, intervention may be considered necessary depending on the degree of disruption and the level of sports activity performed habitually by the patient. If the clinical scenario is one of avulsion injury which is seen to be contributing to sciatic symptoms and signs by virtue of anatomic position and relation to the sciatic nerve, surgery may be considered to relieve the compression. It is useful to perform nerve conduction tests prior to such intervention, following MR imaging to establish the level of compression to assist the surgeon in the surgical approach. Several reports are present in the literature regarding surgery to relieve sciatic symptoms and signs related to a large avulsive fragment although neural recovery was not always complete, even following 2 year follow up. However the pain was reduced for the patient.

Chiropractic management literature is rather limited but an article published in 2006, illustrates a chiropractic management plan to treat a patient with a chronic avulsion of the ischial apophysis suffering with sciatic pain, 6 months following a football injury, a recurrent injury from 3 years previously (6). In the patient presented in the radiology corner, the symptoms reduced to 30% of the original complaint, and the patient was satisfied with this. A combination of spinal manipulative therapy directed to the lumbar spine and pelvic region, especially the sacro-iliac joints as well as rehabilitative exercises that are well illustrated in the accompanying article. The patient was symptom free 5 months post-initial treatment, having had treatment using spinal manipulative therapy to the sacro-iliac joints, lumbosacral junction and lumbar spine and soft tissue work to the pelvic muscles. The patient refused surgery that had been offered, and continues to improve particularly with the use of stretching exercises about the pelvis.

Conclusions:

Ischial apophyseal injuries initially occur during adolescence, more commonly in male patients, but this depends on the sport activity that induces the injury. Though the patient may develop immediate pain, in a smaller subgroup symptoms and signs may not manifest until months or years later. Imaging is useful to determine the injury and the potential associated injuries. MR imaging of the pelvis would be recommended, indicating the region of interest, to extend the field of view distally enough in order to capture the region of interest. Alternatively MR imaging of the hip can be performed with similar instructions. Treatment may be conservative, using chiropractic manipulative therapy, soft tissue techniques, or depending on the complaint, therapeutic injection. Only in a selective few patients is surgery anticipated, and this currently tends towards repairing the involved soft tissue structures, particularly the tendinous attachments.

Clinical Pearls:

- The ischial apophysis is the most common location of avulsion injury about the pelvis.
- Symptoms usually relate to sports activity or forceful sudden muscular contraction.
- Diagnosis is made with the clinical history and examination, supported by the use of imaging, usually radiography and if available MR imaging.

References:

- 1) Freyschmidt's "Koehler/Zimmer" (2003) Chapter 6. Pelvis. Borderlands of Normal and Early Pathological Findings in Skeletal Radiography. Fifth edition, Thieme, USA, 789-798.
- 2) Resnick D Chapter 62 Physical injury: Concepts and Terminology. Diagnosis of Bone and Joint disorders, 2002, 4th edition, Volume 3, WB Saunders, USA, 2627-2782
- 3) Gidwani S, Jagiello J and Bircher M: **Avulsion fracture of the ischial tuberosity in adolescents – an easily missed diagnosis.** BMJ, **329**, 2004, 99-100
- 4) Miller A, Stedman GH, Beisaw NE and Gross PT: **Sciatic caused by an avulsion fracture of the ischial tuberosity. A case report.** J Bone Joint Surg Am. 1987;**69**:143-145.
- 5) Salvi AE, Metelli GP, Corona M and Donani MT: **Spontaneous healing of an avulsed ischial tuberosity in a young football player.** A case report. Acta Orthop. Belg., 2006, **72**, 223-225
- 6) Mayrand N, Forgin J, Descarreaux M and Normand M: **Diagnosis and management of posttraumatic piriformis syndrome.** JMPT,**26**(6), 2006 486-491

Useful resources:

<http://www.learningradiology.com/archives06/COW%20205-Ischial%20Avulsion%20Fx/avulseischiumcorrect.htm>

<http://www.radsources.us/clinic/0702>

American College of
Chiropractic Orthopedists

www.ACCOWeb.org

Abstracts & Literature Review

Significance of Perianular Enhancement Associated With Annular Tears on Magnetic Resonance Imaging in Diagnosis of Radiculopathy

Woo Mok Byun, MD, Sang Ho Ahn, MD and Myun-Whan Ahn, MD
Spine Volume 33, Number 22, pp 2440–2443 ©2008, Lippincott Williams & Wilkins

JACO Editorial Reviewer: Reed Phillips, DC, DACBR

Published: September, 2009
Journal of the Academy of Chiropractic Orthopedists
June 2009, Volume 6, Issue 3
Received: 1 August May 2009
Accepted: 15 August 2009

The original article copyright belongs to the original publisher. This review is available from: <http://www.dcothoacademy.com> © 2009 Reed and the Academy of Chiropractic Orthopedists. This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

JACO Editorial Summary

- The findings of perianular enhancement on MRI studies of 12 patients, believed to be the result of chemical radiculitis associated with annular tears was tested for further evidence of correlation by doing provocative discography (n=2) or transforaminal epidural injections (n=6).
- Further support for correlation was based on the clinical findings of all twelve cases. While the number of subjects is small on which to establish correlational relationships, the intuitiveness of the relationships is obvious.
- The value of this study to the practicing doctor of chiropractic is to be sensitive to perianular enhancement changes on MRI studies as an indicator that leg pain may be the result of chemical changes associated with disc degeneration as well as or even in place of the usual suspect of mechanical changes.

**Council of Chiropractic
Orthopedics**

www.ccodc.org

Abstracts & Literature Review

How Often Is Low Back Pain Not Coming From the Back?

Jonathan N. Sembrano, MD, and David W. Polly, Jr., MD
Spine. Volume 34, Number 1, pp E27-E32.
©2008, Lippincott Williams & Wilkins

JACO Editorial Reviewer: Larry L. Swank, DC, MS, FACO

Published: September, 2009
Journal of the Academy of Chiropractic Orthopedists
June 2009, Volume 6, Issue 3
Received: 15 August 2009
Accepted: 25 August 2009

The original article copyright belongs to the original publisher. This review is available from: <http://www.dcorthoacademy.com> © 2009 Swank and the Academy of Chiropractic Orthopedists. This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

JACO Editorial Summary:

- Title of the article and the question “What are the relative frequencies of the spine, the sacroiliac joint, and the hip joint being the main pain generator among patients who present with low back pain, at a spine surgeon’s clinic?” is relative to chiropractic practice.
- Low back pain is a very common complaint that a chiropractic orthopedist would see in their practices. The results of this article showed that a high percentage of patients in the study had pain relating to the spine, sacroiliac joint and hip joint. Having evidence based information is important in the decision making process for examination and treatment of low back cases.
- This study also had objectives to determine the relative frequencies of the anatomical sites in question as being the major source of pain as well as overlapping syndromes.
- In reading this article, the reader was left with limitations of the study. Such as, no follow up beyond the initial diagnosis to see if that initial diagnosis was correct or accurate. So, the relative frequency chart may be based on inaccurate diagnosis thus providing false data.
- Each physician used their own method to arrive at a diagnosis (which may or may not be accurate). There was no algorithm used in working up a patient to arrive at a diagnosis.
- The above limitations were mentioned in the article so that the reader was able to consider them into their final impression of the study.
- This article was very well referenced.

Abstracts & Literature Review

The Effects of Hip and Ankle Stretching on Gait Function of Older People

Cory L. Christiansen, PT, PhD
Arch Phys Med Rehabil 2008;89:1421-8.
Copyright © 2009 The American Congress of Rehabilitation Medicine.

JACO Editorial Reviewer: Anthony Hamm, DC, FACO

Published: September, 2009
Journal of the Academy of Chiropractic Orthopedists
June 2009, Volume 6, Issue 3
Received: 1 August 2009
Accepted: 15 August 2009

The original article copyright belongs to the original publisher. This review is available from: <http://www.dorthoacademy.com> © 2009 Hamm and the Academy of Chiropractic Orthopedists. This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

JACO Editorial Summary

- This is a randomized controlled trial investigating the effects of a home-based hip and ankle stretching exercise protocol on gait function in the older population (mean age 72.1 years).
- Passive hip extension, ankle dorsiflexion and freely chosen gait speed measurements were evaluated in both the control and intervention groups.
- The intervention group showed increased hip and ankle range of motion and increased gait speed when compared to the control group.
- From a clinical perspective, this study may prove that a simple home-based stretching and flexibility program may prove helpful as a factor in fall prevention in this age group.

**Texas Chiropractic Council
of Orthopedics**

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

Abstracts & Literature Review

Complications of Transforaminal Cervical Epidural Steroid Injections

Malhotra, Gautam MD; Abbasi, Arjang DO; Rhee, Michael MD
SPINE Volume 34, Number 7, pp 731–739
©2009, Lippincott Williams & Wilkins

JACO Editorial Reviewer: Robert S. Francis, D.C.

Published: September, 2009
Journal of the Academy of Chiropractic Orthopedists
June 2009, Volume 6, Issue 3
Received: 1 August 2009
Accepted: 15 August 2009

The original article copyright belongs to the original publisher. This review is available from: <http://www.dcorthoacademy.com> © 2009 Francis and the Academy of Chiropractic Orthopedists. This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

JACO Editorial Summary

- This is comprehensive review article which reviews and critically evaluates the extant literature focusing on incidence and clinical presentation of complications and techniques associated with transforaminal cervical epidural steroid injection (TFCESI).
- This review is designed to guide the direction of future research and improve clinical care by elucidating complications and outlining measures that may be undertaken to increase patient safety.
- TFCESI is a component in the diagnosis and management of cervical radicular syndromes reserved for patients who have failed conservative management.
- Catastrophic complications of TFCESI are rare but include serious neurologic sequelae such as brain and spinal cord infarction due to embolic phenomenon of particulate steroids.

Book Review

Fundamental Neuroscience, Third Edition

By: Larry R. Squire, et al.

Fundamental Neuroscience, Third Edition, by Larry R. Squire, et al.

Hardbound, 1280 pages, publication date: FEB-2008

ISBN-13: 978-0-12-374019-9

ISBN-10: 0-12-374019-3

Reviewed By: Jonice Owen, DC, FACO

Published: September, 2009

Journal of the Academy of Chiropractic Orthopedists

June 2009, Volume 6, Issue 3

Received: 21 August 2009

Accepted: 1 September 2009

This review is available from: <http://www.dorthoacademy.com> © 2009 Owen and the Academy of Chiropractic Orthopedists
This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

As a chiropractic doctor, I wanted to update my understanding of the Nervous System outside of seminars, and on my own time. As a chiropractic orthopedist, I was additionally motivated. With this in mind, I undertook locating a book that would best match my training, and purposes. Fundamental Neuroscience proved to be the best book.

One of the clearing house websites indicated the primary audience for Fundamental Neuroscience was graduate students in neuroscience, neuroanatomy, neurophysiology, and neurobiology, with a secondary market of the related fields of psychology, cell biology, molecular biology, genetics and any other areas of science with cross over into neuroscience research. I added 'chiropractic orthopedist' into this list, and promptly purchased this text.

I was encouraged to read Floyd Bloom's Chapter One, Fundamental of Neuroscience, "This textbook is for anyone interested in neuroscience. In preparing it we focused primarily on graduate students just entering the field, understanding that some of you will have majored in biology, some in psychology, some in mathematics or engineering, and even some, like me, in German literature. ... In many cases, advanced undergraduate students will find this book useful as well."

While reading some of the chapters, I felt I was in-over-my-head. However, I persevered, and I was able to glean so much from the time I put in. Basically, the book offered me a chance to attend a college program in Neuroscience, at home. In reading the text, in the ordered sequence of chapters, I was as excited as if I was attending an extensive series of lectures, taking place in one lecture auditorium after the other. I was impressed by getting it straight from the horse's mouth; leading neuroscientists author each chapter.

Larry Squire heads up the editorial team which includes: Darwin Berg; Floyd Bloom; Sascha du Lac; Anirvan Ghosh; and Nicholas Spitzer. These distinguished professors herald from the University of California, San

Diego, from the Salk Institute or the Scripps Research Institute, La Jolla, California. The contributors (94 in total, and including Floyd Bloom and Anirvan Ghosh), make up a primarily U.S. neuroscience teaching and research consortium, with a diversity of writing styles. This effort results in a finely edited, comprehensive text of great depth.

Fundamental Neuroscience follows a Section layout: Neuroscience; Cellular and Molecular Neuroscience; Nervous System Development; Sensory Systems; Motor Systems; Regulatory Systems; and Behavioral and Cognitive Neuroscience. The 1280 pages contain clear introductory information, 53 chapters, and an Index. Well-placed summaries and conclusions aide in re-capping the exhaustive information presented. Excellent explanatory diagrams, highlight boxes, drawings, and electron microscopic photographs with explanatory diagrams or overlays pepper the text.

Although reading the book, front to back would be best, some readers may prefer to get their feet wet with Chapter 25, The Somatosensory System. This chapter was written by the highly-respected Professors Stewart Hendry and Steven Hsiao of John Hopkins University. They describe muscles spindles, golgi tendon organs, nociception and ascending paths to the thalamus in an easy-to-understand manner. On Page 601, The Human Axis of Pain section describes the use of functional imaging studies of the human brain has revealed the “four areas of cerebral cortex which are active during (and often just prior to) the application of a painful stimulus.” The text offers detailed insight to the identification and pathways of these four areas; the first somatosensory cortex (SI), the second somatosensory area (SII), rostral anterior cingulate, and rostral insula).

If you prefer to delve into specific aspects of neuroscience, you won't be disappointed. For example, Chapter 41, Circadian Timekeeping, page 934 summarizes the suprachiasmatic nuclei (SCN) of the anterior hypothalamus:

“The SCN are the master circadian pacemakers in mammalian brain. The SCN oscillate *in vivo*, and also when placed *in vitro*. More importantly, however, the SCN generate output signals that lead to physiological and behavioral rhythms. Critical to the function of the SCN as the master pacemaker is its position at the interface between the outside world (detected primarily by retinal photoreception) and the light-insensitive tissues that comprise the rest of the body.”

Consciousness, the last chapter of the book, was authored by Christof Koch. Dr. Koch worked with Dr. Francis Crick, from 1976 until Dr. Crick's death in 2004, on the biological nature of consciousness. Eric Kandel's fascinating In Search of Memory, also discusses the neuronal basis of consciousness, in a chapter called Consciousness. I had previously read of Dr. Koch's contributions as described by Dr. Kandel. Therefore, I was very interested to read the last chapter of Fundamental Neuroscience, and to have consciousness “one of the most enigmatic features of the universe” described to me by Dr. Koch:

Page 1223 “People willingly concede that when it comes to nuclear physics or molecular biology, specialist knowledge is essential; but many assume that there are few relevant facts about consciousness and therefore everybody is entitled to their own theory. Nothing could be further from the truth. There is an immense amount of relevant psychological, clinical, and neuroscientific data and observation that needs to be accounted for. Furthermore, the modern focus on the neuronal basis of consciousness in the brain-rather than on interminable philosophical debates-has given brain scientists tools to greatly increase our knowledge of the conscious mind.”

Dr. Koch probes into topics such as the neurobiology of free will and the neuronal basis of perceptual illusions. In addition to variety of writing styles and topics, you can expect some of the chapters to cover more physiology and microscopy, while other chapters weight towards electrochemistry, neurochemistry or neural pathways.

There are downsides to this book. It is hard to lug around a book weighing close to five pounds. It is too cumbersome to scan or copy a few pages to take with you to read. This book contains materials requiring great concentration, and is organized for “background reading” so you don’t come away with information on performing specific tests; I wouldn’t consider this as a desktop, at-a-glance type resource for a chiropractic orthopedist, rather an educational resource and research text. I was not able to locate much along the lines of “web access”, updates, question, discussion which some textbooks offer. I emailed one of the few links cited, and, unfortunately, received no reply. However, the authors are well-represented on the internet through their teaching institutions or through interviews and professional websites.

Although textbooks are frequently considered “outdated” upon their publication, this textbook would not fall in that category. I appreciated having the latest neuroscientific research, in one book, authored by many of the best in the neuroscience field. Through the extensive material made available in Fundamental Neuroscience, I felt my professional knowledge base updated, and my time well spent.

Announcements

Announcing the New Date for the 2010 American College of Chiropractic Orthopedists 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 Information:

April 23-25, 2010 – Registration - \$425.00 @ www.accoweb.org.

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.