



## William Beaumont Army Medical Center Annual Research Day

### WHY DO THEY WANT TO QUIT SMOKING THIS TIME?

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** Multiple studies have addressed the reasons that smokers desire to quit. However, no studies have analyzed this question in a military population since the recent increase in cigarette taxes.

**Method:** Smokers at an Army Medical Center and surrounding clinics were invited to participate in a smoking cessation study through general advertisements and notification of providers. The study provided varenicline for all participants;  $\frac{3}{4}$  were randomized to online counseling and  $\frac{1}{4}$  were randomized to in person counseling. Those that gave informed consent to enroll completed an initial questionnaire containing questions regarding demographics, attitudes, and current smoking habits. One section asked about the reason for quitting, both most important and up to 5 other reasons from a list.

**Conclusion:** One hundred and nine (171) participants completed the initial survey. The mean age was 41 years, 56% were men, and 83% were Caucasian. The group had smoked for a mean of 22 years and tried to quit 4 previous times. For the most important reason to quit, three items (risk of lung cancer ( $n=44$ , 26%), risk of heart disease (27, 16%), and cost (21, 12%)) were cited by 54% of the group. Overall, 90% of participants cited health consequences (lung cancer, heart disease, emphysema, or other) or cost as one of their top 6 reasons to quit. Those older than age 40 were more likely to cite at least one health consequence than those 40 or less (90% vs. 73%,  $p=0.007$ ). "My doctor told me to quit" was a reason for 10%. Of the participants that had at least one child <17 in their household (84, 49%), very few cited their child's health as the top reason to quit (32, 19%). Nearly all participants cited health consequences or cost of cigarettes as a reason to quit smoking. Surprisingly, less than half of parents cited their child's health as a reason. U.S. Army based smoking cessation programs may benefit from emphasizing health consequences and cost to entice more smokers to quit. Further research is needed to confirm our findings of the priority of parental smoking on the health consequences of their children.

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### EFFECT OF NUMBER OF LYMPH NODES EXAMINED ON COLON CANCER STAGING AND SURVIVAL IN THE DEPARTMENT OF DEFENSE AUTOMATED CENTRAL TUMOR REGISTRY

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** The most important prognostic factor in colon cancer survival is nodal involvement. We studied the effect on colon cancer staging and survival of number of lymph nodes examined.

**Methods:** We queried the Department of Defense Automated Central Tumor Registry database for stage I–III colon cancer patients. Patients were divided into quartiles by the number of nodes examined (0–6, 7–11, 12–17, and 18 or more). The effect of number of nodes examined on colon cancer staging and survival were studied by Kaplan–Meier analysis and multivariate analysis.

In stage II colon cancer, examining more nodes improved overall survival; the 5-year overall survival was 69%, 69%, 73%, and 80% for 0–6, 7–11, 12–17, and 18 or more nodes examined, respectively (log-rank  $p=0.005$ ). Examining more nodes did not improve survival in stages I and III. Metastatic node detection rate was significantly lower when fewer than seven nodes were examined than when 18 or more nodes were examined (26.5% vs. 41.6%, chi-square  $p<0.001$ ).

**Conclusion:** We conclude that examining more nodes is associated with improved overall survival in stage II colon cancer. Examination of fewer than seven lymph nodes may lead to significant under-staging of colon cancer patients.

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### **LiDCO DOES NOT ACCURATELY GUIDE FLUID RESUSCITATION AND TAKES LONGER TO USE THAN THE ESOPHAGEAL DOPPLER**

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** Patients in shock, with sepsis, and those undergoing major surgery require variable volumes of fluid to restore and optimize perfusion. Bedside clinical exam is insufficient to guide fluid administration, yet the PAC has not improved outcomes and has fallen out of favor. Of the alternative devices, arterial pressure waveform based cardiac output (APCO) monitors have proliferated. The manufacturers of these devices recommend their use as fluid optimization tools in the OR and ICU, but there are few studies to support this. The use of esophageal Doppler (ED) is well studied and has been associated with improved outcomes in several studies, but it is perceived as harder to use than the arterial pressure based devices. In this study, we determined if one of the arterial pressure based devices, the LiDCO, could accurately guide fluid administration compared to the esophageal Doppler.

**Method:** 8 anesthetized, mechanically ventilated, Yorkshire pigs. Shock was induced by removing 2 ml/kg/min of blood for 10 minutes. The randomized device (LiDCO or ED) was used to guide fluid resuscitation. The hemorrhage was repeated and the alternate device was then used to guide resuscitation. Following the second hemorrhage, the animals were given a large bolus to induce a hypervolemic state, the LiDCO was recalibrated and measurements were taken. The time for each device to produce useful information was the primary outcome measure. Pre-determined secondary outcomes were: the sensitivity, specificity and accuracy of the LiDCO in determining fluid responsiveness and in guiding the overall resuscitation after each hemorrhage; the accuracy of the CO measurement over time; and the safety of the device in hypervolemic conditions. The LiDCO took on average 5.1 minutes longer to yield information. The LiDCO was sensitive (80%) but not specific (19%) or accurate (54%) in determining fluid responsiveness. The LiDCO falsely indicated a fluid responsive state despite hypervolemia in more than half of animals, and its use led to an optimal resuscitation in only 2 of 16 trials.

**Conclusion:** The LiDCO is inaccurate and lacks diagnostic and therapeutic value in guiding resuscitation. It takes longer to use than ED, and its safety in patients that could be hypervolemic is questionable. At present, APCO monitoring should not be used in clinical practice.

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### **NERVE TRANSFERS FOR TIBIALIS ANTERIOR MUSCLE PARALYSIS (FOOT DROP) - A HUMAN CADAVER-BASED FEASIBILITY STUDY**

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** This study explored the anatomic feasibility of using an interosseous nerve transfer to restore motor function to the tibialis anterior muscle following injury to the common peroneal nerve (resulting in foot drop). Potential nerve donors, including the nerve branches to the medial gastrocnemius, the lateral gastrocnemius, and to the soleus, were compared for the number of axons, the cross-sectional area, and the proximity of the nerve repair to the tibialis anterior muscle.

**Method:** Eight fresh frozen cadaveric lower extremities were studied. Two fibular osteotomies to mobilize a fibular segment (referred to as a fibular window) facilitated the exposure and identification of the nerve branch to the tibialis anterior muscle and the development of an interosseous pathway for the nerve transfer. Each of the respective donor nerves were dissected out and then aligned with the nerve branch to the tibialis anterior to simulate a nerve repair. The distance from the nerve repair to the tibialis anterior muscle was measured for each respective donor nerve. Histological specimens were collected from each nerve for comparison of axonal counts and measurement of the cross sectional areas.

**Conclusion:** All nerve transfers were accomplished using a direct interosseous route and a direct repair (one medial gastrocnemius transfer did require interpositional grafting). Compared to the nerve branch to the tibialis anterior, the medial and lateral gastrocnemius nerve branches had significantly smaller axonal counts ( $p=0.0050$ ,  $p=0.0011$  respectively) and cross-sectional areas ( $p=0.0011$ ,  $p<0.0001$  respectively). The nerve to the soleus, however, was not significantly different from the nerve branch to the tibialis anterior for axonal count ( $p=0.9356$ ) or for cross-sectional area ( $p=0.9996$ ). The nerve repair site for the nerve to the soleus was statistically closer than either the lateral ( $p=0.0122$ ) or the medial ( $p=0.0010$ ) gastrocnemius nerve branches. Of the three donor nerves considered, the nerve branch to the soleus was found to be the best donor nerve with respect to axonal count, cross-sectional area and proximity of nerve repair. A two incision surgical approach and interosseous routing, with the utility of a fibular window to facilitate the transfer, is proposed as a practical method for transferring donor nerves to the tibialis anterior muscle.

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### PERICARDITIS: A RARE CASE OF DISSEMINATED COCCIDIOIDOMYCOSIS

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** Coccidioidal pericarditis is rare and associated with increased morbidity and mortality. Patients present with rapid effusive constrictive pericarditis or a chronic constrictive process. Usually pericardial involvement is discovered postmortem

**Methods:** We describe the case of a 23 year old African American male with no significant prior medical history who presented to the ER with pleuritic chest pain, worsening dyspnea on exertion, fevers, cough, night sweats, weight loss and chills. He had prior treatment for community acquired pneumonia but his symptoms had continued to worsen. Physical examination was remarkable for tachycardia, JVD to level of mandible, HTN, pulsus paradoxus, distant heart sounds, bilateral pleural effusions and widened cardiac silhouette on chest radiography. EKG showed PR interval depression limb and precordial leads. Bacterial, viral, autoimmune and fungal causes of pericarditis were considered. Pericardial fluid, Bronchoscopy washings and pleural fluid all were positive for coccidioidomycosis.

**Conclusion:** Patient was treated with fluconazole and declined lumbar puncture during hospitalization.

**Comment from Author:** Coccidioidomycosis is a fungal infection endemic to the southwestern United States. It is primarily caused by the inhalation of arthroconidia produced by the dimorphic fungi. The infection is usually asymptomatic or presents with mild flu like illness, disseminated disease may occur in 1% of cases. Coccidioidal pericarditis is rare and associated with increased morbidity and mortality. Coccidiomycosis is a well known infection in the southwestern United States, however less than 3% of patients develop disseminated infections and less than 1% pericarditis. Our case is an example of how a common infection can present atypically.

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### INSTENT RESTENOSIS AFTER DRUG ELUTING STENT OF AN ANOMALOUS CORONARY ARTERY

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** The anomalous origin of the right coronary artery (RCA) from the left sinus of valsalva is a rare congenital abnormality. When the anomalous RCA courses between the aorta and pulmonary artery, it is considered a potentially malignant abnormality. In symptomatic patients, surgical revascularization is generally recommended. We report a case of a patient with symptomatic anomalous RCA without atherosclerotic disease treated with a drug eluting stent (DES).

**Methods:** A 53 year-old Hispanic male with hypertension, hyperlipidemia, diabetes mellitus type 2 and progressive exertional dyspnea over the past 5 years presented to emergency department with left chest pain. The pain was rated as 7/10, radiated to left arm, had no relief with resting, and was associated with dyspnea and diaphoresis. His chest pain was reduced with sublingual nitroglycerin. He was admitted for evaluation, which showed normal cardiac enzymes, echocardiogram, and adenosine perfusion studies. Coronary angiography revealed an anomalous RCA from the left sinus without atherosclerotic disease. CT angiogram confirmed the RCA coursed between aorta and pulmonary arteries. He was referred for revascularization, and subsequently received a DES at the origin/proximal anomalous RCA with reproduction of symptoms during balloon inflation.

**Conclusion:** His symptoms resolved after the stenting only to return 3 months later. Repeat angiography at 11 months showed significant instent restenosis. He was referred for coronary artery bypass grafting.

**Comment from Author:** RCA from the left sinus of valsalva is a rare congenital abnormality. It has been associated with angina pectoris, myocardial infarction, syncope, and sudden death. In patients with this anomaly who have cardiac complaints related to this anomaly, revascularization is recommended as a potential therapy. Although stenting of this anomaly has been reported and may represent a viable option, instent restenosis can occur and should be considered a potential complication of this procedure. Further study is needed to determine the optimal revascularization strategy for this anomaly.

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### NOVEL SURGICAL TECHNIQUE FOR TREATMENT OF UNSTABLE UPPER LUMBAR BURST FRACTURES THROUGH A SINGLE APPROACH

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** Lumbar burst fractures are common in the trauma setting. Upper lumbar fractures can be particularly challenging to treat. Many techniques have been described to treat unstable upper lumbar burst fractures but none incorporate a reduction of the deformity through a single approach and fixation of the pedicles at the level of the burst fracture. We describe a successful technique which can be employed to treat these challenging injuries.

**Methods:** A consecutive series of 25 patients were treated at Thomason Hospital who sustained upper lumbar burst fractures. All surgeries were performed by a single surgeon. Surgery was performed through a single posterior approach. Reduction of the deformity was performed indirectly during the surgery under the guidance of fluoroscopy. After reduction of the spine fracture was performed fixation of the burst fracture was obtained with pedicle screws at the level of the burst fracture. Post operatively patients were allowed to immediately weight bear without any bracing.

**Conclusion:** No patient required a second procedure. Post operative CT imaging demonstrated reduction of retro-pulsed fragments out of the canal. At the level of the burst vertebra restoration of vertebral height was also obtained. At follow up, imaging demonstrated maintained reduction. Patients with unstable lumbar fractures can be treated with a single approach surgery and through posterior stabilization. Pedicle screws can be placed in the level of the burst fracture and stabilization achieved without post operative bracing. This technique combines reduction of the fracture with pedicle fixation at the level of the burst fracture with success.

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### THE EFFECT OF OPERATION IRAQI FREEDOM (OIF) ON TRAUMA CARE AT A MILITARY TREATMENT FACILITY

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** Operation Iraqi Freedom is the most significant challenge to the Army Medical Department's ability to deliver medical care in the past 15 years. The sequential deployments of the 745<sup>th</sup> Forward Surgical Team (FST) and 31<sup>st</sup> Combat Support Hospital (CSH) from Jan 2003 to Sept 2005 significantly affected the staffing at William Beaumont Army Medical Center (WBAMC). Intuitively this high operation tempo adversely affected the ability of WBAMC to provide care for trauma patients in the Western Texas-Southern New Mexico region.

**Methods:** We performed a retrospective review of patients entered in WBAMC's prospective trauma registry from 2000-2005. We divided data into two groups, Jan 1 2000 to Dec 31 2002 and Jan 1 2003 to Dec 31 2005; representing trauma patients treated before and after the beginning of OIF.

**Conclusion:** The volume of patients decreased from 2000-2002 to 2003-2005 (1148 vs 838), however the mortality rate (4.81 vs 5.14,  $p=0.740$ ), injury severity score (7.96 vs 8.57,  $p=0.135$ ), hospital stay (6.0 days vs 5.4 days,  $p=0.199$ ), ICU stay (1.96 days vs 1.54 days,  $p=0.090$ ), and ventilator time (0.95 days vs 0.62 days,  $p=0.200$ ) were unchanged. The amount of time WBAMC was closed to trauma increased from 32.8 minutes per day in 2000-2002 to 289.2 minutes per day in 2003-2005. Since the beginning of Operation Iraqi Freedom, William Beaumont Army Medical Center has been limited in its volume of trauma patients, but this has not affected outcomes.

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## TWO-STAGE RECONSTRUCTION OF A DUPLICATED THUMB USING DISTRACTION LENGTHENING

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** Our patient was a well-developed male infant with preaxial polydactyly of the right hand. His radial thumb was thinner than his ulnar thumb but demonstrated active flexion, extension, and opposition. The patient used the radial thumb to grasp objects at home. The ulnar thumb, although shorter, had more girth and a well-developed nail, but lacked function and was floppy. The left-hand thenar eminence displayed decreased bulk due to hypoplasia of the thenar muscles.

**Methods:** Radiographs of the right hand demonstrated a triphalangeal ulnar thumb and a radial thumb with a metacarpal and proximal phalanx. Based on radiographs, the patient was classified as having a Type VII variant of the floating thumb, a previously described addition to the Wassel classification.

The first stage of the reconstruction consisted of releasing the cartilage anlage at the base of the proximal phalanx and applying a micro distraction external fixator (Stryker Orthopaedics; Mahwah, New Jersey) to the digit. After a total of eight weeks of lengthening, two centimeters of length were achieved in the ulnar thumb. The second stage of the reconstruction was an on-top plasty including the preservation of each thumb's neurovascular bundle.

**Conclusion:** After a total of eight weeks of lengthening, two centimeters of length were achieved in the ulnar thumb. The second stage of the reconstruction was an on-top plasty including the preservation of each thumb's neurovascular bundle.

**Comment from Author:** Initial treatment of thumb duplication is very important as residual deformities and joint instability may worsen with growth and require secondary surgery. An emphasis is therefore placed on addressing soft tissue abnormalities during initial surgery, including the over-tightening of ligaments.

We believe that our procedure showed successful lengthening of the ulnar thumb to create a more normal length after completion of the second surgical reconstruction. By using the on-top plasty, we were able to preserve the integrity of the soft-tissue envelope on the radial side, including the neurovascular bundle, collateral ligaments, and the muscles that were attached to the patient's radial thumb. Our goal was to develop a procedure that could use elements from each thumb to give the patient the most functional and cosmetically acceptable thumb.

Based on this case report, we are proposing an expansion to the current Wassel classification system. In the initial Wassel study all seventy hands demonstrated duplication of the tendons matching the bone duplication. Soft tissue duplication is not seen in all types of thumb duplication and therefore we are suggesting the addition of subclasses to the Type VII thumb duplication to represent thumb duplications involving a floating radial thumb. This is a new procedure that attempts to preserve the native structures from both digits in the thumb duplicated and only after continue patient follow-up and procedure repetition, can the full long-term outcomes be evaluated.

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## SHOULDER INSTABILITY IN THE UNITED STATES POPULATION INCIDENCE AND CHARACTERISTICS BASED ON THE NEISS DATABASE

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** There is a paucity of information regarding the incidence and characteristics of shoulder dislocation injuries in the United States. A better understanding of epidemiology and identification of at-risk populations will aid in the development of injury prevention strategies.

**Method:** The National Electronic Injury Surveillance System (NEISS) is a probability sample of injuries in the U.S. presenting to emergency rooms. The NEISS model was queried for all injuries classified as shoulder dislocation from 2002 to 2005 yielding 10,701 NEISS records. Diagnoses other than shoulder dislocations were excluded, yielding 8,940 records. Descriptive characteristics were analyzed with respect to patient demographics, dislocation directionality, location, patient disposition, mechanism, and sports/recreation participation at the time of injury. Based on the NEISS sample design, SAS statistical software and U.S. census data were used to calculate estimated incidence rates for the U.S. population and variable-delimited subpopulations.

**Conclusion:** A total of 8,940 shoulder instability injuries were recorded during the defined period. The estimated incidence rate (IR) in the U.S. population during this period was 23.9 / 100,000 person-years [95% CI 20.8-27.0]. Males accounted for 71.6% of injuries, and estimated IR was significantly higher in males (34.9 [30.1-39.7] v. 13.3 [11.6-15.0],  $p < 0.05$ ). The mean age at presentation was 34.6 years [range <1 – 104], and median age was 28. When calculated by decade, IR's demonstrated a bimodal distribution, peaking in the third and ninth decade (20-29 yo=47.8 [41.0-54.5], 80-89 yo= 31.3 [25.0-37.6]). Male IR peaked in the third decade (79.2 [67.4-90.9]) while female IR peaked in the ninth decade (38.8 [30.8-46.7]). Injuries between the ages of 15 and 30 accounted for 47.4% of cases. When race was known, 69.3% of patients were white, 21.3% were black, 5.8% Hispanic, 2.0% Asian, 0.5% Native American, and 0.09% Indian. IR in black (23.8 [14.7-32.9]) and white (19.0 [14.3-23.6]) populations were significantly higher than all others (7.9 [4.2-11.6]). For cases with known direction, anterior dislocations accounted for 94.7%, while posterior (3.6%) and inferior (1.7%) were less common. Injuries most frequently occurred at home (48.3%) or at sites of recreation or sports (33.6%). Falls accounted for the majority of injuries with known mechanisms (58.8%, n=4046). A total of 4,303 injuries (48.1%) occurred during sports or recreation activities, most commonly during football (n=814) and basketball (n=780). The dataset utilized represents the largest single sample population for shoulder instability epidemiology in the medical literature. The estimated incidence of shoulder instability is higher in the U.S. than those reported for other countries. Males and young patients account for the majority of all cases. Young males (10-29 years) and elderly females (80-89 years) are at highest risk. Most injuries demonstrate anterior instability, occur at home or sites of sports or recreation, and are due to falls. Sports and recreation activities account for nearly half of all injuries. Consideration of these factors may aid in future prevention strategies.

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### ANKLE SPRAINS AT THE UNITED STATES MILITARY ACADEMY: A DESCRIPTIVE EPIDEMIOLOGY STUDY

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** Ankle sprains account for as much as 40% of all athletic injuries and result in significant time lost to injury, delayed return to duty, and long term sequelae in up to 40-50% of patients. Multiple associated risk factors have been described in the literature, although many of these are controversial. These risk factors are traditionally organized into intrinsic and extrinsic factors. Intrinsic factors include sex, height, weight, limb dominance, anatomic alignment, muscle strength, muscle reaction time, previous ankle sprain, generalized joint laxity, and postural sway. Extrinsic factors include use of bracing or taping, shoe type, exposure to sport, player position, and duration and/or intensity of competition. More research is required to better evaluate characteristics of and risk factors for ankle sprain.

**Method:** We retrospectively evaluated all ankle injuries at the United States Military Academy between December 1, 2005 and July 1, 2007 using the CIITS database. Throughout this period, all cadets with new ankle sprains were evaluated with physical examination by an orthopaedic surgeon, physician assistant, or physical trainer. Results were entered into the database, as well as other patient characteristics and demographics for future comparison. Ankle sprains were analyzed based on sex, laterality, affected ligament, mechanism of injury, exposure to sport, and year in school. Body Mass Index (BMI) and Army Physical Fitness Test (APFT) scores were also compared between cadets with ankle sprains and all non-injured cadets in attendance during the study period.

**Conclusion:** During the study period, there were 885 new ankle injuries and 1631 related clinic encounters at the United States Military Academy. Of these injuries, 699 patients had ankle sprains, 79 had ankle tendonitis, 40 had ankle strains, and 25 had ankle fractures. Of new ankle sprains, more injuries occurred in males than females, although a greater percentage of females sustained injury (540 males and 159 females, 10.4 and 17.4%, respectively). Right ankles were affected slightly more than left ankles (338 and 325). Lateral ankle sprains were more common than medial ankle sprains (553 and 24 ankles; 79.1% and 3.4%, respectively) with the anterior talofibular ligament (ATFL) being the most commonly identified ligament (215 ankles). Ankle sprains occurred more frequently during the plebe year and with cadets engaged in intercollegiate or recreational football, basketball, and soccer. BMI values were roughly equivalent among injured and uninjured females (23.12 and 23.18), although injured males showed a slightly increased BMI when compared with non-injured cohorts (25.14 and 24.40). Army Physical Fitness Test (APFT) raw scores previous to injury also demonstrated no significant differences between injured and uninjured males or females. A subset of cadets with ankle sprains (12.2%) experienced additional or recurrent ankle sprain, accounting for approximately 22.9% new sprains in this study. Ankle sprains occur frequently in the cadet population at the United States Military Academy.

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### DISCOID MEDIAL MENISCUS: A CASE REPORT AND REVIEW OF THE LITERATURE

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** Discoid lateral menisci have been described extensively in the literature. However, discoid medial menisci are rare and the epidemiology and characteristics are still unknown.

**Methods:** We present the case of a 16-year-old male with symptomatic discoid medial meniscus. The patient noted onset of pain after sustaining a blunt injury to the left knee during basketball. He subsequently noticed pain, effusion, and locking of his knee. On physical exam, range of motion was from 0 to 130° with discomfort, and medial joint line tenderness was detected. No ligamentous instability was noted. Radiographs revealed no remarkable findings, and MRI of the left knee demonstrated discoid medial meniscus of the left knee.

**Conclusion:** The patient was taken to operating room for diagnostic arthroscopy with debridement and saucerization of complete discoid medial meniscus. Postoperatively, his recovery was uneventful and he denied further symptoms of pain or mechanical locking.

**Comment from Author:** Discoid lateral menisci are not uncommon. However, the incidence of discoid medial meniscus is exceedingly rare, accounting for only 0.12 to 0.4%. Discoid menisci are more common in Asians than Caucasians, and most studies show greater preponderance of affected males, especially with bilateral involvement (0.012% incidence). Symptomatic discoid menisci can occur equally in children, adolescents, and young adults, and trauma has been listed as the inciting cause in 38 to 66% of patients. In contrast to lateral involvement, the clinical presentation of discoid medial menisci is usually less specific and more suggestive of a medial meniscal tear. In addition to classic MRI findings consistent with discoid meniscus, several additional radiographic abnormalities may also be detected: anterior or posterior cyst formation, anomalous attachment to the ACL, proximal mediotibial collapse, widening of the medial joint space, and discoid lateral meniscus of the same knee. Management of symptomatic discoid medial meniscus includes meniscal debridement, saucerization, and meniscal repair when possible.

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### EFFECT OF METASTATIC TO EXAMINED LYMPH NODES RATIO ON COLON CANCER SURVIVAL

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** The number of lymph nodes examined in colon cancer surgery varies widely. Current staging system is based on the number of metastatic lymph node (N1; metastatic lymph node =3, N2=4), and does not consider this variation. Therefore, the ratio based staging system has been proposed. The aim of this study is to evaluate the metastatic to examined lymph node ratio (LNR) as a prognostic factor in stage III colon cancer.

**Method:** Retrospective review of the Automated Central Tumor Registry of the Department of Defense was performed. There were 1286 stage III colon cancer patients who underwent curative surgical resections. Cases were divided into quartiles by LNR (0.01-0.11 vs. 0.12-0.22 vs. 0.23-0.45 v. 0.46-1.00). Effect of the metastatic to examined lymph node ratio on colon cancer survival was analyzed using a Kaplan Meier survival curve and Cox proportional hazard model. Decreasing metastatic to examined lymph nodes ratio is associated with improved survival in colon cancer patients. Five year overall survival was 68%, 65%, 56% and 39% for the lowest to the highest quartiles ( $p < 0.001$ ). Multivariate analysis identified age, tumor grade, tumor T stage, and LNR as prognostic factors.

**Conclusion:** The metastatic to examined lymph node ratio is an excellent prognostic indicator in stage III colon cancer patients. This ratio based staging system may provide more comparable prognostic information to colon cancer patients.

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### RADIOGRAPHIC PREVALENCE OF FEMOROACETABULAR IMPINGEMENT IN AN ACTIVE DUTY POPULATION WITH HIP COMPLAINTS

The following abstract was presented at William Beaumont Army Medical Center's Research Day in May 2008.

**Purpose:** The concept of hip arthrosis has changed from static to dynamic. Femoroacetabular impingement (FAI) is a pre-arthritis condition which can progress if the underlying cause of impingement is not addressed. FAI as a cause of hip pain is a relatively new concept in orthopaedics. Prevalence of this condition has not been defined in the military population. Our hypothesis is radiographic FAI is a common finding in Active Duty patients with hip complaints.

**Method:** A database search was conducted at William Beaumont Army Medical Center. Primary care clinics and the orthopaedic clinic patient populations were included. The database was searched from 2001, when the electronic radiographic system was established at the institution, until March of 2007. Inclusion criteria were Active Duty Soldiers, ages 18-50, adequate radiographs of the pelvis, and ICD-9 codes of hip complaints. Radiographic findings evaluated included: pistol grip deformity, acetabular cross-over, herniation pits, coxa profunda, protrusio, center edge angle,  $\alpha$ -angle, and tonnis. Presence of radiologist report of diagnosis of FAI or signs of FAI was also reviewed.

**Conclusion:** One hundred fifty seven patients were identified. Fifty percent were female (78/155) and fifty percent (79/155) male. The average age was 32.5 years. Five hundred and twenty radiographs were reviewed. At least one radiographic finding of FAI was present in 83.1% of radiographs reviewed. Over 90% of the radiographs were read as normal. One of the radiographs was read as FAI. Radiographic FAI is a common finding in Active Duty patients with hip complaints. Our results mirror those of civilian populations. This is one of the largest radiographic reviews of FAI. Increased awareness and further research in this area are warranted.

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