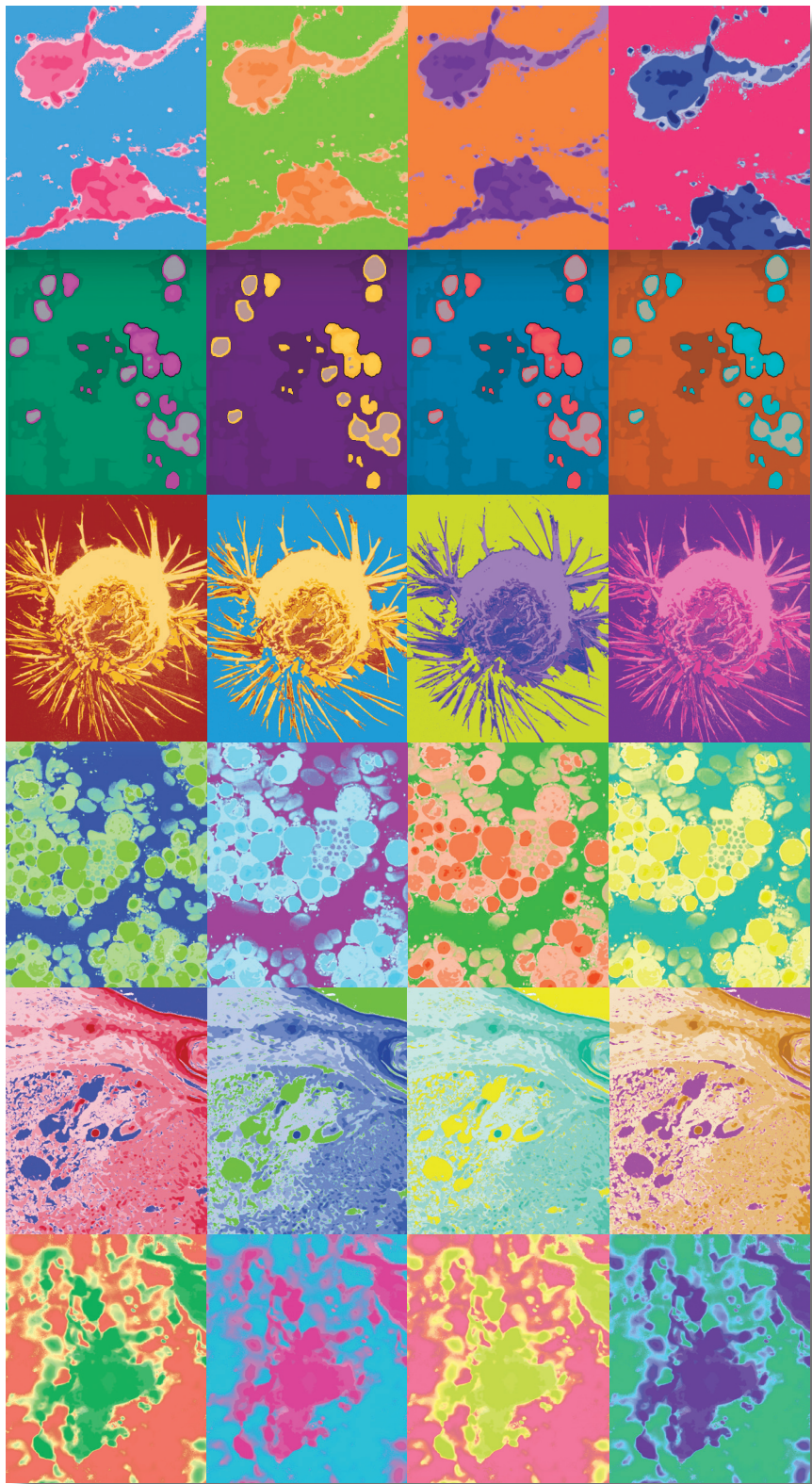


L
|
E
|
C
|
O
|
M



LARC
LECOM RESEARCH COLLECTIVE

Table of Contents

1. Digital Anesthesia; Using the web space as a landmark to identify the bifurcation of the proper digital nerve to improve accuracy of digital blocks: A cadaver study.....	8
David J. Carl, D.O.; Kaitlyn Blackburn	
2. Novel diagnosis of an acute, painful inguinal mass in an eight-year-old female.....	#
Aaron Taylor, D.O.; Justine Schober, M.D.	
3. Effect of neonatal MSG exposure on cerebellar nuclei.....	#
Yujie Li, OMSII; Swati Laroia, D.O.; Jeffery Esper, D.O.; Randy Kulesza, Ph.D.	
4. An analysis of the educational background of the CEOs of the 50 best adult orthopedic hospitals.....	#
Richard P. Goodrich, D.O.	
5. The effects of osteopathic manipulative treatment (OMT) on chronic venous stasis ulcers.....	#
Alyssa Miceli, D.O.	
6. Interprofessional education for unique psychosocial needs of a patient with initial diagnosis of gastric adenocarcinoma.....	#
Michelle Mitchell	
7. Are immunomodulatory therapies effective? A retrospective review of functional ratings prior to and post treatment.....	#
Naveen George	
8. Interprofessional collaboration case study for variant of Cooks syndrome.....	#
Gaurav Patel, M.D.; Wasique Mirza, M.D.; Rajni Khaira, M.D.; Qi Shi, M.D.	
9. Near fatal Torsades de Pointes secondary to concurrent use of high dose methandone and fluoxetine with furosemide induced electrolyte abnormalities.....	#
Sanjay Saxena, M.D.; Qi Shi, M.D.; Nishith Vayada, M.D.; Rachna Saxena, M.D.; Gursukhmandeep Sidhu, M.D.	
10. Pediatric Resuscitation: The global dilemma.....	#
Shane R. Sergent, D.O.; Sophia Johnson, D.O.; John Ashurst, D.O.; Katelyn Phelps, D.O.; Lorenzo Lim, D.O.; R. Kenny Briceno, M.D.; Joe Gorz, D.O.; Gary L. Willyerd, D.O.	
11. Miliary tuberculosis with gastrointestinal manifestations.....	#
Shervin Shahriari, D.O.	
12. Interprofessional collaboration case study for a patient with initial diagnosis of HIV infection during hospitalization.....	#
Ketevan Gvalia, M.D.; Qi Shi, M.D.; Mladen Jecmenica, M.D.; Michael Cortes, M.D.; Hasan Zerfi, M.D.; Erin Gordon, M.D.; Kevin Musto, M.D.; Rajiv Bansal, M.D.	
13. Interprofessional collaboration education case study: Unusual incident of Takotsubo Cardiomyopathy in a middle age male.....	#
Sirish Dharmapuri, M.D.; Jladen Jecmenia, M.D.; Qi Shi, M.D.; Huijun Li, M.D.	
14. DOPAL-quinone and heavy metal toxicity in sh-SY5Y cells.....	#
Kaeli Freeborough, M.S.	
15. Prenatal valproic acid disrupts the morphology and neurochemistry of the medial nucleus of the trapezoid body.....	#
Shruti Konda; Randy Kulesza, Ph.D.	
16. Cerebellar structure and function after repeated exposure to valproic acid.....	#
Stacey Main; Randy Kulesza, Ph.D.	
17. Toxic effects of norepinephrine, epinephrine and dopamine and their oxidase products on sh-sy5y cells with implications to Parkinson's disease.....	#
George Rollins, M.S.	
18. Grown inhibition of gram-positive and gram-negative bacteria by essential plant oils: Implications for novel therapeutic interventions.....	#
Sudha K. Ayala, OMSII; Christopher Haydanek, M.S.; Nancy Carty, Ph.D.; Christopher C. Keller, Ph.D.	
19. Valproic acid exposure on embryonic day 15 results in altered morphology and calbindin expression in cerebellar Purkinje cells.....	#
Kaitlyn Blackburn; Randy Kulesza, Ph.D.	

Table of Contents

20. Prenatal valproic acid exposure disrupts tonotopic c-Fos Expression in the rat brainstem.....#	Amber Dubiel; Shruti Konda; Randy Kulesza, Ph.D.
21. Neonatal exposure to monosodium gluamate results in dysmorphology in oropharyngeal motor neurons.....#	Lindsey Foran
22. Physician awareness of tick-borne disease risk in Erie County.....#	Brian Fuller, OMSII; Nancy Carty, Ph.D.; Christopher C. Keller, Ph.D.
23. The comparative effects of antibiotics and essential plant oils on growth inhibition of pseudomonas aeruginosa.....#	Alex Poulsen, OMSII; Sudha K. Ayala, OMSII; Nancy Carty, Ph.D.; Christopher C. Keller, Ph.D.
24. Pilot study of hippotherapy for constipation and enuresis in children with Ehlers-Danlos syndromes.....#	Alan Auckland, OMSII; Liam Schober; Sue Birkmire, R.N.; Justine Schober, M.D.; Mark Terrell, Ed.D.
25. Pilot study of hippotherapy for enuresis and encopresis in children with spina bifida.....#	Alan Auckland, OMSII; Liam Schober; Sue Birkmire, R.N.; Justine Schober, M.D.; Mark Terrell, Ed.D.
26. Medial patellofemoral ligament differences in males and females: A cadaveric study.....#	Jordan Bonier, D.O.
27. Hyperbaric oxygen in the treatment of ideopathic sudden sensorineural hearing loss.....#	James Bruno, D.O.
28. Correlation and impact of autoimmune thyroid disease and celiac disease.....#	Jennifer Carson, D.O.
29. Treatment of challenging lower extremity wounds with bone and tendon exposure: Using a uniquely viable and intact cryopreserved human placental membrane graft for closure.....#	Anthony Colonna, D.P.M.
30. Foley catheters and erectile dysfunction.....#	Ryan J. Connolly, D.O.
31. The effects of pre-competitive osteopathic manipulative treatment (OMT) on athletic performance, use of analgesics, overall pain levels and attitudes toward OMT in an NCAA Division I men's hockey team.....#	James N. Cornwell, D.O.; Gregory Coppola, D.O.; Jeffery Kim, D.O.; Matthew McElroy, D.O.
32. Platelet monocyte aggregates as markers of inflammation in murine models of cardiovascular injury.....#	Ryan Huttlinger
33. Harvesting guidelines and anatomical morphology of bone-free quadriceps tendon autograft for anterior cruciate ligament reconstruction.....#	Matthew S. Irwin, D.O.; Brian Sneek, OMSII
34. Incidence and clinical correlation of plantar fasciitis with the biomechanical conditions of pes planus and pes cavus.....#	Wade Jespersion, D.O.
35. Consistent technique limits suspension laryngoscopy complications.....#	Sean P. Larner, D.O.; Rick A. Fornelli, M.D.
36. The unicompartmental subchondral magnetic knee prosthesis.....#	Nicholas Loffredo, D.O.; Peter Kuvshnikov, M.Ed.; Steven Habusta, D.O.
37. A cadaveric study to determine the relationship between the radial styloid and the biceps tuberosity.....#	Smith Meads, D.O.
38. The Articularis Genu: An anatomical study.....#	Mark Messemer, D.O.
39. Patient understanding of NAFLD.....#	Dempsie Morrison, D.O.

Table of Contents

40. Bactericidal effects of silver impregnated bandages on escherichia coli, pseudomonas pudita and staphylococcus epidermis.....#	Emily Morrison, D.O.; Liam Schober; Sue Birkmire, R.N.; Justine Schober, M.D.
41. Aqueous silver instillation used to treat and prophylax Amish children with spina bifida performing clean intermittent catheterization.....#	Emily Morrison, D.O.; Liam Schober; Alan Aukland, OMSII; Sue Birkmire, R.N.; Justine Schober, M.D.
42. Radiological features of long bone fractures in young children.....#	Amit Samba; Lukcy Ly; Janet Skrbin, D.O.; John Gallagher, D.O.; Sarah McCarthy, Ph.D.
43. A chronic high fructose diet induces progressive murine NASH with early mitochondrial aging.....#	Kristin S. Bramlage, M.D.; Michelle Kirby, M.S.; Amit Samba; Andriy Myronovych, M.D.; Rosa-Maria Salazar Gonzalez, Ph.D.; Stavra Xanthakos, M.D.; Kevin Bove, M.D.; Rohit Kohli, M.D.
44. Do inpatient psychiatirc units decrease teh numbers of admissions to the South Dakota State Hospital?.....#	Dean Shandy, D.O.
45. Benchmarking an orthopaedic operating room terminal cleaning protocol with an adenosine triphosphate bioluminescence assay.....#	Travis Small, D.O.
45. Survey of human pathogen carrying ticks and possible pathogens from Presque Isle State Park.....#	Kaya Smith; Nicole Lee, D.O.; Nancy Carty, Ph.D.; Christopher C. Keller, Ph.D.
46. Comparing outcomes between operative techniques for BAHA implantation.....#	Mark W. Steehler, D.O.; Sean Lerner, D.O.; Joshua Mintz; Matthew K. Steehler, M.D.; Sidney P. Lipman, M.D.
47. Capillary versus aspiration techniques in fine needle biopsies of thyroid nodules in a community setting.....#	Mark D. Strand, D.O.; Rick A. Fornelli, M.D.
48. Rupture of anterior cruciate ligament with concomitant rupture of the patellar tendon.....#	Timothy G. Volk, D.O.
49. Core body temperature evaluation of various personnel in the operating room.....#	Steven Ward, D.O.
50. Amish patients report better outcomes and return to work sooner compared to worker’s compensation patients after arthroscopic surgery.....#	Stephen Watkins, D.O.
51. Effect of pre-tournament training camp climate on injury patterns in the 2014 FIFA World Cup.....#	Nathan C. Weaver, D.O.; Joseph Temperato, OMSIV; Adam Hoffman, OMSIV
52. Orthostatic tachycardia syndrome (POTS) managed with acupuncture treatment.....#	Bo Xiao, D.O.
53. The need for a health promotion and disease prevention curriculum.....#	Sarah Beeson, D.O.
54. Management of high blood pressure in adults: Report from the panel members appointed to the eighth joint national committee.....#	Sean Beeson, D.O.
55. Effect of SSRI on bone health.....#	Debra Bjork, D.O.
56. OITE Preparation: A survey of multiple orthopedic programs.....#	Eric Brewer, D.O.; Ryan Sadloo

Table of Contents

57. Medication changes during day-shift hours versus night-shift hours.....# Denver Briley, D.O.	
58. Self reported injury patterns in Tough Mudder competitions.....# Nicholas K. Callahan, D.O.	
59. PPI usage and breaththrough GERD symptoms in a community-based office setting: A patient survey.....# Kevin Castillo, D.O.	
60. Simultaneous bilateral quadriceps tendon rupture in young female with chronic renal disease: A case report.....# Daniel Cowley, D.O.	
61. Reverse total shoulder arthroplasty as treatment for chronic hshould dislocation: A case study.....# Nicholas Crossman, D.O.	
62. Obstructive ejaculatory duct calculi in patients with myelomeningocele.....# Vanessa A. Emdadi, D.O.; Emily Morrison, M.S.; Sue Birkmire, R.N. Ronak A. Gor, D.O.; Cristopher R.J. Woodhouse, M.D.; Justine M. Schober, M.D.	
63. Injury underreporting in collegiate and professional athletes.....# Patrick Fessler, D.O.	
64. Impact of medical mission trips on cultural, spiritual and socioeconomic understanding.....# Breanna Goldner; Hanna Lurye; Michael Schmidt, Ph.D.	
65. The prevalence of otolaryngologists' practice location in relation to birth state, medical residency and medical school.....# Shane Griffith, D.O.; Anton Power, OMSIII	
66. A look at agressive play and intent to injure among male junior hockey players of the Ontario Hockey League.....# Matthew L. Hintz, D.O.; Steven Habusta, D.O.; Andrew Kupniewski, A.T.C.; Angela Rood, Ph.D.	
67. Florid reactive periostitis of the right long finger in a 22-year-old female: A case study.....# Bryan Jarvis, D.O.	
68. Osteopoikilosis: Recognizing a rare, benign sclerosing bone dysplasia in the setting of a peritrochanteric femur fracture: A radiographic case study.....# Jeff Jenks, D.O.; Aaron Sop, D.O.; Fred Pollock, M.D.	
69. Perceived value of virtual stimulator training in arthroscopy: An orthopedic surgery resident survey.....# Kevin Keith, D.O.	
70. Case report: Acute onset of necrotizing fasciitis in a 59-year-old male following intra-articular corticosteroid of the knee.....# Sean Kelly, D.O.	
71. Assessment of knowledge and opinions about whole body donation by current medical students experiencing dissection.....# Sean P. Larner, D.O.; Precious Macauley, M.D.; Sanjay Patel, M.D.; Candace Wooten, M.D.	
72. Cholecystoduodenal fistula with inter hernia, intussusception and small bowel perforation: An unusual complication of cholelithiasis.....# Melissa Loveranes, D.O.; Gregory English, M.D.	
73. Isolated Horner's Syndrome: A diagnostic challenge.....# Meredith Marcincin, D.O.; Anthony Sala II, D.O.	
74. The influence Disney stereotypes have on the developing schema of children: The analysis of Disney's "All that is Beautiful" ideology.....# Gianpiero Martone, D.O.; Katarzyna Liwski, OMSIII	
75. Case presentation of T-cell lymphoma in the foot.....# Steven McCarthy, D.P.M.	

Table of Contents

76. Effectiveness of a formal curriculum in teaching mass casualty management.....# Barrett McLaughlin, D.O.; Brian L. Risavi, D.O.; Mark Terrell, Ed.D.; Dustin Stuart, D.O.; Donald L. Holsten, B.A.	
77. Trans-oral cervical spine exposure: A survey of the North American Spine Society.....# Erez A. Minkia, D.O.	
78. Cystine nephrolithiasis as a side effect of qsymia: A case study.....# Susan Mullooly, D.O.	
79. Assessing musculoskeletal competency in osteopathic medical students.....# Luke Olson, OMSII; Chun Cheng Andy Chen, Ph.D.; Randy Kulesza, Ph.D.; Jonathan K. Kalmey, Ph.D.; Sarah A. McCarthy, Ph.D.	
80. A very dangerous back pain, success with PVOD.....# Anand Popuri, D.O.	
81. Regenerative biomedicine feasibility survey.....# Farzad Pourarian, D.O.	
82. Treatment of Sever's injury without limiting physical activity: use of heel cup vs. heel wedge.....# Laura Richards, D.P.M.; Adam Long, D.P.M.	
83. A clinical case report: Finding of Joubert Syndrome in two children with congenital oculomotor apraxia.....# Danielle Sarlo; Nicholas Sala, D.O.	
84. Vitamin D and the elderly: A retrospective cohort study.....# Rachel Wilkerson, D.O.	
85. Recurrent dysautonomic symptoms in a female collegiate hockey player.....# Brett R. DeGooyer, D.O.; Patrick F. Leary, D.O.	

1. Digital Anesthesia: Using the web space as a landmark to identify the bifurcation of the proper digital nerve to improve accuracy of digital blocks: A cadaver study

**• David J. Carl, D.O. - Millcreek Community Hospital Resident;
Kaitlyn Blackburn - LECOM Erie Medical Student**

Regional anesthesia of a digit is commonly required in both the emergency room and operating room setting for treatment of fingertip injuries and partial amputations. The goal of this study is to improve the accuracy of digital nerve blocks. My hypothesis is that the web space provides a consistent landmark for measurement to the bifurcation of the digital nerve and that the web space can be utilized for precise placement for injection of anesthetic in a digital block. Twenty cadaver hands were utilized and the distance from the webspace to the bifurcation of the digital nerve was measured and found to average 29.1mm in the second web space, 27.3mm in the third web space, and 24.7mm in the fourth web space. These measurements can be used to help improve accuracy of digital nerve blocks.

2. Novel diagnosis of an acute, painful inguinal mass in an eight-year-old female

**• Aaron Taylor, D.O.;
Justine Schober, M.D. - Shriners Hospital for Children**

Etiology of inguinal/vulvar mass in a pediatric patient is typically evident after physical examination or review of radiologic studies. This case, a child presenting with a painful mass in the vulvo-inguinal area explores an atypical etiology. Case Description: An eight-year-old African American female presented to pediatric urology clinic seven days after sudden development of a painful mass in the right inguinal area. There were no associated symptoms of abdominal pain, fever, nausea, vomiting or signs of bowel obstruction in this otherwise healthy child. Contrast en-

hanced CT scan demonstrated a large cystic mass located along the inguinal canal and tracking into the vulva without evidence of incarcerated pelvic or abdominal organs. Seven days initial presentation to clinic, cause remained unknown, and the patient reported continued, but not increasing pain. Surgical exploration of the mass revealed a taught, cystic lesion filled with brown fluid. After aspiration it was apparent that a cyst with a small nodule - surrounded by a hernia sac - was located within the canal of Nuck. The cyst within the hernia sac contained a vascular, chord-like attachment to the obliterated processus vaginalis. The hernia sac could be followed through the internal ring, but the cyst did not communicate. This describes a rare condition of a cyst of the canal of Nuck known also as a female hydrocele. The hernia sac was partially necrotic and histopathology confirmed an area of infarction. To date, there are no case reports of an infarcted, blood/fluid filled cystic lesion in a hernia sac within the canal of Nuck. An infarcted sac within the canal of Nuck should be considered in the differential diagnosis for patients presenting with inguinal/vulvar mass, the cause of which is not identifiable by typical examination and diagnostic studies.

3. Effect of neonatal MSG exposure on Cerebellar Nuclei

**• Yujie Li, OMSII - LECOM Student;
Swati Laroia, D.O.; Randy Kulesza, Ph.D.**

Monosodium Glutamate (MSG) is a natural occurring sodium salt of glutamic acid used as food enhancer in many processed foods. Glutamate is the most abundant excitatory neurotransmitter in the CNS. Herein, we describe the results of neonatal MSG exposure on cerebellar circuitry in rats. Postnatal Day 4 (P4) male rat pups were divided into two groups: one injected subcutaneously with MSG (4 mg/kg), and handled daily (control) from P4 through P10. They developed normally until P28, then euthanized with pentobarbital, perfused with saline, and fixed with 4% paraformaldehyde. Brains were sectioned at 40mm, mounted onto glass slides from cresyl gelatin, stained for Nissl substance and dendrites with Giemsa and Golgi stain for analysis.

Animals exposed to MSG weighed significantly less than control animals at P28 (t-test, $p = .03$) and had shorter nose-to-tail lengths (t-test, $p = .009$), but there was no difference in brain weights at P28 ($p = .94$). In the cerebellar vermis (CV), PC bodies were significantly smaller in MSG group (Mann-Whitney, $p < .0001$), but no difference in shapes between both groups (MW, $p = .39$). Finally, the density of PC was significantly lower in MSG group (Mann-Whitney, $p < .0001$). We also examined the nuclei of the inferior olive (IO) as these neurons provide excitatory climbing fibers to PC. In the IO complex, the ventral lateral principle olive (POvl), the medial accessory olive (MAO) and the dorsal accessory olive (DAO) all had significantly larger neurons compared to control (MW, each $p < .005$). In the MAO, MSG exposed rats had significantly fewer round neurons and more stellate neurons (Chi-square, $p = .0008$) with signs of hypoplasia in the DAO and MAO. Lastly, lateral extension in the DAO and PO was absent in MSG-exposed rats. The cerebellar vermis maintains postural control over truncal and proximal muscles, with major input from the inferior olive. Dysfunction of PC or the IO could be postulated to cause gait ataxia and disequilibrium.

4. An analysis of the educational background of the CEOs of the 50 best adult orthopedic hospitals

• Richard Goodrich, D.O. - Millcreek Community Hospital Resident

Healthcare System/Hospital CEOs come from a variety of educational backgrounds. There is sparse literature about what educational qualifications make for the best CEOs. Similarly, little is known about what educational qualifications are best to pursue for aspiring healthcare executives. *U.S. News and World Report* annually publishes rankings of the top U.S. hospitals. The educational background of the top 50 adult orthopedic hospital CEOs was analyzed and compared to their respective hospital's *U.S. News and World Report* score. Overall, hospitals led by physician CEOs without a Master's degree had the highest

average score. CEOs with an MBA degree had a worse average overall score compared to CEOs who did not have an MBA. CEOs with a doctoral degree outside of medicine had the lowest overall average hospital score. Discussion is had upon whether the procurement of additional post-graduate degrees outside of medicine by physician CEOs reorients their focus (perhaps towards the business of medicine/profitability) and away from the core-competency of patient care.

5. The effects of osteopathic manipulative treatment on chronic venous stasis ulcers

• Alyssa Miceli, D.O. - University Hospitals; J. Loyd; M. Rowane

Venous stasis ulcers represent the most common type of chronic wounds encountered in clinical practice. Current standard of care treatment of these wounds includes debridement and external compressive dressings to reduce edema and improve circulation. Osteopathic Manipulative Treatment (OMT) aims to restore the body's natural ability to heal and places special focus on the lymphatic system to improve immune function by influencing vascular and lymphatic flow. Studies have demonstrated that various osteopathic lymphatic techniques promote the mobilization of lymph, increase flow through lymphatic drainage, and promote the circulation of immune cells. Though there are several studies showing the effectiveness of OMT on various conditions dependent on the lymphatic system, there have been no studies investigating the effects of OMT on chronic wound healing

Hypothesis: Lymphatic OMT techniques as an adjunctive treatment for chronic venous stasis ulcers will improve the rate of healing compared to standard of care treatment alone.

Methods: Subjects will be randomly assigned to the OMT treatment group ($n > 4$) and to a control group ($n > 4$). Wound measurements, debridement and dressing changes will be performed once a week over the course of a month for all subjects. Subjects assigned to the OMT treatment group will have a series of eight osteopathic lymphatic techniques integrated into their treatment plan.

Each technique will be performed for 1-2 minutes for a total treatment time of 10-15 minutes. Results: Wound surface area will be calculated using the formula for surface area of an ellipse. Rate of healing will be calculated using the difference in surface area found in the first and final weeks of treatment divided by four weeks and will be reported as cm³/week.

Conclusion: The results of this study may demonstrate that OMT is a beneficial non-invasive, cost-effective adjunctive treatment for chronic venous stasis ulcers.

6. Inter-professional education for unique psychosocial needs of a patient with initial diagnosis of gastric adenocarcinoma

• **Michelle Mitchell - The Commonwealth Medical College Student; W. Mirza, M.D.; Q. Shi, M.D.; M. Nagori, M.D.; W. Kahn, M.D.; M. Cortes, M.D.; O.A. Masalmeh, M.D.**

Cancer will affect 1 in 2 men and 1 in 3 women in the U.S., and the number of new cases is set to nearly double by the year 2050. The cancer journey involves different agencies and services working together to provide quality outcomes. Our abstract discusses inter-professional education for medical students/residents with a focus on shared learning of cancer care. A 70-year-old Caucasian male was admitted with generalized weakness, weight loss and dizziness for several months, which he attributed to his poor financial situation. Due to the same concerns, he had not refilled his medications. His medical history included iatrogenic hypothyroidism, diabetes mellitus and pernicious anemia. Examination of the patient included conjunctival pallor and vitiligo on his hands. Lab values included an initial hemoglobin of 6.6 g/dL, hematocrit 20.3%, MCV 86.1 fL, iron 42 µg/dL, ferritin 7.6 ng/mL, and vitamin B12 145 pg/mL. To evaluate combined iron and vitamin B12 deficiency anemia, an upper endoscopy was performed that revealed a 30mm polypoid ulcerative mass in the gastric antrum and a 12mm polyp in the gastric body, consistent with adenocarcinoma and a neuroendocrine tumor respectively. CT scan did not

show any distant metastasis. The patient underwent a distal gastrectomy and was discharged to a nursing facility for rehabilitation. During the patient's hospital course, multiple disciplines provided care and support for the patient. The internal medicine team consisted of an attending physician, residents and a medical student. Several services were consulted to develop a comprehensive, patient-centered plan including gastroenterology, pathology, hematology/oncology and general surgery. Physical/occupational therapy provided rehabilitation services. Social and case management services were vital in addressing his psychosocial needs, including financial assistance. The result was an effective team effort, focused on high value care and patient-centered decision making.

7. Autoimmune encephalitis: Are immunomodulatory therapies effective? A retrospective review of functional ratings prior to and post treatment

• **Naveen George - LECOM Student; Alexander Rae-Grant, M.D.; Jar-Chi Lee, M.S.; Pravin George, D.O.; Sneha Ramesh, Ph.D.**

Autoimmune encephalitis refers to rare, sometimes paraneoplastic, conditions in which the immune system attacks the brain, leading to altered function. Delayed diagnosis and treatment potentially leads to permanent neurological injury or death.

Objectives: The primary objective of this study was to analyze the admission and discharge modified Rankin Scale (mRS) assessments among patients diagnosed with autoimmune encephalitis and to identify any effectiveness of immunosuppressive therapy on a subset of these patients. Methods: Through retrospective chart review we identified patients that met currently accepted clinical and serological criterion for autoimmune encephalitis. Clinical data was obtained on these cases and a modified Rankin Score mRS was assessed on both hospital admission and discharge or subsequent 'best clinical' visit. Assessment of "improvement" from initial therapy was based on

any decrease in mRS score and clinical neurological functional improvement in accordance with physician and patient affirmation by the time of discharge.

Results: Seventy-seven patients met criterion for clinical or serological autoimmune encephalitis. Fifty-seven (74%) patients underwent immunosuppressive therapy with corticosteroids, IVIg, and/or plasma exchange and 30 patients experienced a decrease in mRS score. Improvement from initial treatment was 21%, 71%, 58%, and 80% for admitting mRS scores of 2 through 5 respectively. The p-values for improvement from initial immune therapy based on an mRS of 3, 4, or 5 compared to an mRS of 2 were 0.0014, 0.035, and 0.013 respectively.

Conclusions: Immunosuppressive therapies for patients with an initial mRS score of 3, 4 or 5 may have a higher yield than for those with an mRS of 2. These therapies are generally reserved for those with an mRS of 2 or greater. Further study is needed to assess functional improvement in those with autoimmune mediated encephalitis treated with immunosuppressive therapies.

8. Interprofessional collaboration case study for a variant of Cooks syndrome

• Gaurav Patel, M.D. - The Wright Center Resident; Wasique Mirza, M.D.; Rajni Khaira, M.D.; Qi Shi, M.D.

Cooks syndrome is an autosomal dominant disease characterized by congenital anonychia, absence of terminal phalanges and digitalization of the thumb. There are less than 20 cases reported worldwide. Here we report a case of congenital anonychia of all the digits of both feet and dysplasia of nails of the first, second and third digits of both hands.

Case description: A 54-year-old male with diabetes mellitus comes to the primary care physician (PCP)'s office for follow up. On physical examination, we noticed the absence of nails of all the digits of bilateral feet. Nails of the first, second and third digits of both hands were dysplastic. All of other tests were normal. Family history revealed the similar anomalies in his mother and all four brothers.

Discussion: Congenital anonychia remains of unclear etiology; however, molecular genetics revealed that non-coding of SOX9 gene on chromosome 17q24.3 could result in congenital anonychia. Besides, a frameshift and a missense mutation in exon 2 of the R-spondin 4 gene of the chromosome 20p13 might also result in congenital anonychia. The differential diagnoses of congenital anonychia includes Bradydactyly A: absence of middle phalanges with dysplasia of nails of digit two to five of both hands and feet, Bradydactyly B: amputation-like digits hypo/absent terminal phalanges, hypo/anonychia with thumb sparing in classical type and broad/bifid thumb in severe variant, and Cooks syndrome: congenital anonychia, absent terminal phalanges, and digitalization of thumb. In our case, the subject had familial congenital anonychia of all the digits of feet with dysplasia of nails of the first three digits of hands that is suggestive of a possible variant of Cooks syndrome that has ever been reported. Interprofessional collaboration: Due to higher likelihood of acquiring diabetic foot infections because of anonychia, frequent PCP visits, image study, podiatry and genetic counseling are recommended.

9. Near fatal Torsades de Pointes secondary to concurrent use of high dose methadone and fluoxetine with furosemide induced electrolyte abnormalities

• Sanjay Saxena, M.D. - The Wright Center Resident; Qi Shi, M.D.; Nishith Vayada, M.D.; Rachna Saxena, M.D.; Gursukhmandeep Sidhu, M.D.

Long QT syndrome is associated with increased risk of Torsades de Pointes. Primary symptoms include palpitations, syncope, seizures and sudden cardiac death. It usually results from drug therapy, hypokalemia and/or hypomagnesemia. The abstract stated below demonstrates significance of knowledge about potential drug interactions and the importance of a multidisciplinary team based approach to aggressively management such patients. Case Description: A 55-year-old woman with CAD post CABG,

Hypertension, Hyperlipidemia, Chronic pain syndrome on Methadone, Depression on Fluoxetine, Diastolic Heart Failure on Lasix and COPD reported to the ER following an episode of syncope. She was asymptomatic at presentation. Examination was normal except for bilateral basilar crackles. EKG showed sinus bradycardia, LVH and QTc of 537. Six hours later, the patient developed Torsades de pointes and ventricular fibrillation. She was resuscitated per ACLS protocol with concurrent replacement of magnesium and potassium. Sixteen DC shocks were delivered during resuscitation. An emergency cardiac catheterization was done to exclude an ischemic event. Patent grafts were noted along with spasm of radial artery graft that resolved with locally instilled nitroglycerin. The patient regained consciousness after cardiac catheterization. Mechanical ventilation and supportive therapy were continued along with fluid and electrolyte management. She had an uneventful recovery and was discharged home with appropriate dose adjustment of furosemide and discontinuation of methadone and fluoxetine. Discussion: Acquired LQTS is caused by many drugs. Sensitivity to these medications may be related to genetic causes. It is important to avoid multiple drug combinations known to cause QT prolongation. Our case demonstrates the dangers of concurrent administration of QT prolonging agents with multiple drug therapy. Appropriate medication adjustments are necessary to reduce the risk of SCD.

10. Pediatric resuscitation: The global dilemma

• Shane R. Sergent, D.O. - Millcreek Community Hospital Resident;
Sophia Johnson, D.O.; John Ashurst, D.O.;
Katelyn Phelps, D.O.; Lorenzo Lim, D.O.;
R. Kenny Briceno, M.D.; Joe Gorz, D.O.;
Gary L. Willyerd, D.O.

Countries lacking dedicated emergency and trauma critical care services have unprecedented rates of mortality and morbidity. Childhood deaths in low- and middle-income countries account

for nearly 99% of childhood deaths worldwide. In pediatric resuscitations, it is prudent to have accurate weight estimations for dosing given that most adverse effects and outcomes are related to improper dosing. The Broselow tape has become the accepted standard in the United States for weight in emergent situations given its strong positive relationship with measured weight. With the global emergence of emergency medicine, this study sought to determine the advantage of the Broselow tape's utility as a weight estimation device to improve pediatric resuscitations in international communities. Cross sectional anthropometric studies were conducted on the pediatric population of various regions in Peru from August 2010-14. Height was measured using a field anthropometer. Measurements were recorded within 0.3 cm of each other for height, using the average between two independent measurements. Weight was measured to the nearest 0.1 kg. Height and weight were assessed according to standard procedures. The main outcome measure was deviation from the standardized Broselow tape. Total patient enrollment was 956, which comprised of 491 boys (51.4%) and 465 girls (48.8%). Overall, there was a 51.4% agreement in measured and predicted weights. The estimated mean difference (TW-MW) was -3.24 kg, range of -7.00 to -1.83 kg. Based upon these results the Broselow tape is not predictive of actual weights of children in Peru. Efforts should be dedicated to improving or deriving new methods for weight estimation that perform better in this vulnerable population. A remodeled Broselow tape using our extrapolated data may predict weights with higher accuracy in the Peru pediatric population. This model should be applied to other international populations as demonstrated by literature review.

11. Miliary tuberculosis with gastrointestinal manifestations

• Qi Shi, M.D. - The Wright Center;
Ketevan Gvalia, M.D.;
Mladen Jecmenica, M.D.;
Michael Cortes, M.D.; Hasan Zerti, M.D.;
Erin Gordon, M.D.; Kevin Musto, M.D.;
Rajiv Bansal, M.D.

Miliary tuberculosis (TB) is a form of TB that results from massive lymphohematogenous dissemination of mycobacterium tuberculosis. Diagnosing TB can be challenging due to the complexity of the disease presentation. It remains an uncommon disease in developed countries such as the United States. This is a case report of an immunocompromised 87-year-old Caucasian male with a history of chronic lymphocytic leukemia who was hospitalized for worsening abdominal pain. The pathology report of the surgically removed mass-like lesion from the gastrointestinal tract suggested miliary tuberculosis. Serial sputum cultures showed acid fast bacilli confirming the diagnosis and upper cuts of an abdominal CT demonstrated miliary TB lesions in the lungs. Various modes of treatments for miliary TB and its challenges for the patient are presented.

10. Interprofessional collaboration education case study: Unusual incident of Takotsubo cardiomyopathy in a middle age male

• Qi Shi, M.D. - The Wright Center;
Sirish Dharmapuri, M.D.;
Mladen Jecmenia, M.D.; Huijun Li, M.D.

Takotsubo Cardiomyopathy (TTC) is a rare reversible stress induced left ventricular dysfunction seen in about 0.02% of all hospitalizations in the U.S. as a result of massive catecholamine surge. It is more commonly seen in postmenopausal women with a history of smoking, alcohol abuse and anxiety. TTC is clinically indistinguishable from ACS, in which makes it a diagnostic challenge. The prevalence of TTC in the US is not yet known. Case presentation A 59-year-old male presented to the ER for suicidal ideation and alcohol intoxication. He reported that his wife has passed away in the recent past and he had been trying to kill himself by consuming large amounts of alcohol ever since. Psychiatry was consulted. He also reported chest tightness and shortness of breath. EKG, troponins and chest X-ray at this point were all within normal limits. The following day, patient reported worsening chest tightness at rest and

not relieved by nitroglycerin associated with SOB. Repeat EKG showed new nonspecific T wave changes. Repeat troponins remained WNL. ECHO showed apical hypokinesia. Patient was treated as an NSTEMI and started on a heparin drip. He underwent cardiac catheterization, which showed essentially normal coronary arteries but showed apical hypokinesia without apical ballooning. Patient was thus diagnosed with TTC. Eventually, his chest tightness improved and he was discharged to inpatient psychiatry for further management. Interprofessional Education Collaborative practice Studies show that depression is associated with an increased morbidity and mortality among cardiovascular patients. Thus, early detection of depression among cardiovascular patients can reduce cardiovascular morbidity and mortality, and save health care costs. Our case suggests that is quite important to understand the mental health issues, social, cultural and economic factors contribute to the risk of depression and its management among cardiovascular patients.

11. DOPAL-quinone and heavy metal toxicity in sh-SY5Y cells

• Kaeli Freeborough, M.S. - LECOM Erie Student

The purpose of this research was to determine if DOPAL-quinone is more toxic to SH-SY5Y cells than DOPAL and how this compared to dopamine or DOPAL in the presence of manganese, a metal ion known to increase oxidative changes. DOPAL and the DOPAL-quinone were synthesized enzymatically using plasma amine oxidase (which converts amine carbons to aldehydes) and polyphenol oxidase (which converts catechols to quinones). The progress of these reactions was monitored using HPLC with electrochemical and ultraviolet detectors. Cell viability was quantified following an incubation period with varying concentrations of these reagents and products. At a concentration of 1000 μ M, DOPAL showed a statistically significant toxicity compared to control. The DOPAL-quinone at this same concentration was less toxic than DOPAL and the DOPAL-quinone was not statistically different from the

control or DOPAL. A concentration of 15 μ M manganese was not significantly toxic, but the combination of 15 μ M manganese with 1000 μ M dopamine was significantly more toxic than 1000 μ M dopamine or 1000 μ M DOPAL. 1000 μ M DOPAL with 15 μ M manganese showed toxicity but was not statistically different than 15 μ M manganese with 1000 μ M dopamine, 1000 μ M dopamine alone or control. The combination of dopamine and manganese and also the combination of DOPAL and manganese caused the greatest changes in cell viability compared to control cells. This may be because dopamine, DOPAL and manganese are easily transported into the cell. Dopamine or DOPAL may bind with manganese oxidizing to a quinone inside the cell thus causing decreased cell viability.

12. Prenatal valproic acid disrupts the morphology and neurochemistry of the medial nucleus of the trapezoid body

• **Shruit Konda - LECOM Erie Student; Randy Kulesza, Ph.D.**

Valproic acid (VPA) is an anti-epileptic and mood-stabilizing drug and has been observed to increase the risk of autism in human populations. In this study, we examine the impact of prenatal exposure to VPA on the rat auditory brainstem. Previous studies have indicated that VPA exposure to animals significantly reduces the number of neurons in the auditory brainstem and also changes their morphology. We attempt to extend this VPA-induced dysmorphology and specifically focus on the neurons of the medial nucleus of the trapezoid body (MNTB), the major afferent axonal projections to this nucleus and the major efferent glycinergic projections of this nucleus within the superior olivary complex (SOC). We hypothesize that prenatal VPA exposure on embryonic day 15 will impact afferent innervation, neuronal morphology, and axonal projections of MNTB neurons. Using 16 control and 16 VPA-exposed rats, we characterize the afferent projections of the MNTB using calretinin and confocal microscopy. Morphology of MNTB neurons is observed by their cell body size and

shape and the distribution of the calcium-binding protein calbindin (normally expressed in MNTB neurons). Finally, we quantify the density and distribution of glycinergic terminals arising from the MNTB within the auditory brainstem with immunofluorescence for glycine receptors. This study should provide insight into the developmental changes that occur in autism—specifically with the auditory system— from a prenatal etiology.

13. Cerebellar structure and function after repeated prenatal exposure to valproic acid

• **Stacey Main - LECOM Erie Student; Randy Kulesza, Ph.D.**

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by difficulties with communication and social interactions, restricted, repetitive behaviors and sensory abnormalities. Additionally, cerebellar hypoplasia with a reduced number of Purkinje cells has long been considered a hallmark of ASD. Valproic acid (VPA) is an anti-seizure medication and is indicated in the treatment of epilepsy, manic episodes and migraines. Prenatal exposure to VPA significantly increases the risk of an ASD diagnosis in humans and prenatal VPA-exposure is used as an animal model of ASD. Notably, exposure to VPA on embryonic (E) day 12.5 is known to impact cerebellar circuits and function in rodents. Purkinje cells are one of the main neuronal cell types in the cerebellar cortex and these neurons are born as early as E12, with a peak on E15. These neurons then migrate into the cerebellar cortex until E22. We hypothesized that repeated VPA exposure on E10 and E12, would impact Purkinje cell morphology, neurochemistry and motor coordination. To test this hypothesis, we exposed pregnant female rats to VPA on E10 and E12. We tested motor coordination in a behavioral cohort of animals on postnatal (P) days 26 – 30 and we examined Purkinje cell morphology and neurochemistry in an anatomical cohort on P28. Our preliminary results suggest that repeated exposure to VPA results in Purkinje cell dysmorphology and difficulty with motor tasks requiring coordination.

14. Toxic effects of norepinephrine and dopamine and their polyphenol oxidase products on sh-SY5Y cells with implications to Parkinson's disease

• **George Rollins, M.S. - LECOM Student**

Parkinson disease (PD) is a neurodegenerative movement disorder that primarily affects dopaminergic neurons in the substantia nigra pars compacta (SNpc) and to a lesser extent the norepinephrine (NE) neurons of the locus ceruleus (LC). The oxidative metabolites of dopamine (DA), 3,4-dihydroxyphenylacetaldehyde (DOPAL) and its adrenergic analog, 3,4-dihydroxyphenylglycolaldehyde (DOPEGAL), are considered toxic and contribute to the accumulation of α -synuclein aggregates which lead to the formation of Lewy bodies. Lewy bodies build up inside the neuron and displace other parts of the cell, leading to cell death in PD. This series of experiments examined the effect the products of norepinephrine (NE), epinephrine (Epi), and dopamine (DA) with polyphenol oxidase (PPO) had on SH-SY5Y (5Y) cell viability. In this study, DOPEGAL was successfully created from NE and the enzyme plasma amine oxidase (PAO), however the DOPEGAL synthesis progressed too slowly to be practical for additional experiments, so the focus shifted to the quinone formation. It was found that both NE and Epi were substrates for polyphenol oxidase (PPO), a known enzyme for converting catechols into ortho-quinones, and that these substrates were nearly completely consumed within 20 minutes. This study resulted in significantly reduced cell viability of 5Y cells when exposed to the products of NE + PPO, Epi + PPO, or DA + PPO.

15. Growth inhibition of gram-positive and gram-negative bacteria by essential plant oils: Implications for novel therapeutic interventions

• **Sudha K. Ayala, OMSII - LECOM Student; Christopher Haydanek, M.S.; Nancy Carty, Ph.D.; Christopher C. Keller, Ph.D.**

Introduction & Objectives: *Pseudomonas aeruginosa* is a prominent Gram-negative pathogen implicated in a variety of infections including nosocomial and opportunistic infections. Recent emergence of antibiotic resistance in *P. aeruginosa* isolates has necessitated the search for alternative therapeutic interventions to treat these infections. Our previous studies have shown that cinnamon cassia, lemongrass, oregano, and tea tree oils inhibit the growth of *Staphylococcus aureus* a Gram-positive organism. Since the cell membrane differs between Gram-positive and Gram-negative bacteria, and essential oils are known to interact with the bacterial cell membrane, the current study was performed to determine if essential plant oils have an inhibitory effect on *P. aeruginosa* and whether there is a commonality in the oils that inhibit both *P. aeruginosa* and *S. aureus*.

Methods: Disk diffusion assays were used to screen 15 essential oils against *P. aeruginosa* reference strains (n=3). The four most effective oils for *P. aeruginosa* (n=3) and for *S. aureus* (n=4) were compared respectively.

Results: Of the 15 essential oils tested, cinnamon cassia oil was the most effective against *P. aeruginosa*, followed by tea tree, clove, and rosemary oils. The remaining oils tested had little to no effect on the inhibition of *P. aeruginosa* growth. These results were found to be significant by Kruskal-Wallis test followed by post-hoc pairwise comparisons. Our previous studies showed that the four most effective oils against *S. aureus* were oregano, cinnamon cassia, tea tree, and lemongrass oils. In this study, cinnamon cassia oil was found to be the most effective oil tested in inhibiting growth of both *P. aeruginosa* and *S. aureus*, followed by tea tree oil. While rosemary effectively inhibited *P. aeruginosa* growth, it did not inhibit *S. aureus* growth. Oregano and lemongrass oils inhibited growth of *S. aureus*, but did not significantly affect the growth of *P. aeruginosa*.

16. Valproic acid exposure on embryonic Day 15 results in altered morphology and calbindin expression in cerebellar Purkinje cells

• **Kaitlyn Blackburn - LECOM Student;**
Randy Kulesza, Ph.D.

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by difficulties with communication and social interactions, restricted, repetitive behaviors and sensory abnormalities. Additionally, cerebellar hypoplasia with fewer Purkinje cells has long been considered a hallmark of ASD. Valproic acid (VPA) is an anti-seizure medication and is indicated in the treatment of epilepsy, manic episodes and migraines. Prenatal exposure to VPA significantly increases the risk of an ASD diagnosis in humans and prenatal VPA-exposure is used as an animal model of ASD. Notably, exposure to VPA on embryonic (E) day 12.5 is known to impact cerebellar circuits and function. Purkinje cells are one of the main neuronal cell types in the cerebellar cortex and these neurons are born as early as E10 and then migrate into the cerebellar cortex until E13-14. We hypothesized that VPA exposure on E15, when Purkinje cells are settling in the primordial cerebellum, would impact morphology and neurochemistry. To test this hypothesis, we exposed rats to VPA on E15 and examined Purkinje cell morphology and expression of the calcium binding protein, calbindin (CB) at postnatal day 28 (P28). In control animals, nearly all Purkinje cells express CB, in the cell body, dendritic tree and axon. In animals exposed to VPA on E15, we found that only about 30% of Purkinje cells express CB. Further, we found significant Purkinje cell body dysmorphology in animals exposed to VPA. These observations may correlate with Purkinje cell dysfunction, resulting in uncoordinated movements and ataxia.

17. Prenatal valproic acid exposure disrupts tonotopic c-Fos expression in the rat brainstem

• **Amber Dubiel - LECOM Student;**
Shruti Konda; Randy Kulesza, Ph.D.

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by difficulties with communication and social interactions,

restricted, repetitive behaviors and sensory abnormalities. Additionally, the vast majority of subjects with ASD suffer some degree of auditory dysfunction and we have previously identified significant hypoplasia and dysmorphology in auditory brainstem centers in individuals with ASD. Prenatal exposure to the antiepileptic drug valproic acid (VPA) is associated with an increased risk of ASD. In rodents, prenatal exposure to VPA is utilized as an animal model of ASD and is associated with a number of anatomical, physiological and behavioral deficits, including hypoplasia and dysmorphology in the auditory brainstem. Based on these observations, we hypothesized that such dysmorphology in VPA-exposed animals would translate into abnormal activity in brainstem circuits and irregular tonotopic maps. Herein, we have subjected control and VPA-exposed animals to 4 or 16 kHz tones and examined neuronal activation with immunohistochemistry for c-Fos. After these sound exposures, we found significantly more c-Fos-positive neurons in the auditory brainstem of VPA-exposed animals. Further, we found a larger dispersion of c-Fos-positive neurons and shifted tonotopic bands in VPA-exposed rats. We interpret these findings to suggest hyper-responsiveness to sounds and disrupted mapping of sound frequencies after prenatal VPA exposure. Based on these findings, we suggest that such abnormal patterns of activation may play a role in auditory processing deficits in ASD.

18. Neonatal exposure to monosodium glutamate results in dysmorphology in oropharyngeal motor neurons

• **Lindsey Foran - LECOM Student;**
Chloe Kupelian; S. Lori; J. Esper;
Randy Kulesza, Ph.D.

Monosodium Glutamate (MSG) is a naturally occurring sodium salt of glutamic acid that is used as a flavor enhancer in many processed foods. Glutamate, the most prevalent excitatory neurotransmitter in the central nervous system, is stored and released by both neurons and astrocytes. Excessive extracellular glutamate results in

excitotoxicity and apoptosis; such excitotoxic events may have catastrophic effects in neonates. Previous studies have shown that MSG administration during the early postnatal period results in neurodegeneration in several forebrain regions, characterized by neuronal loss and neuroendocrine abnormalities. We hypothesized that MSG exposure during the early postnatal period would similarly impact brainstem lower motor neurons involved in feeding behavior. We therefore investigated the effects of neonatal MSG exposure on neurons in the nucleus ambiguus, the trigeminal, facial, and hypoglossal nuclei. The nucleus ambiguus maintains neuronal circuits involved in the swallowing reflex; the trigeminal nucleus innervates the muscles of mastication; the facial nucleus controls movement of the whiskers for spatial perception; and the hypoglossal nucleus controls movements of the tongue. We found that exposure to MSG from postnatal days 4 through 10 resulted in significantly lower body weights, nose-to-tail length and brain weight by postnatal day 28. Neonatal MSG exposure had no impact on the total number of neurons in the nuclei examined. MSG-exposure was associated with a significant increase in the number of round somata in both the trigeminal and facial nuclei. Furthermore, MSG-exposure resulted in significantly smaller neurons in the trigeminal, facial and hypoglossal nuclei and the nucleus ambiguus. These results suggest that neonatal exposure to MSG may impact development of brainstem lower motor neurons and may impact feeding and swallowing behaviors.

19. Physician awareness of tick-borne disease risk in Erie County

• **Brian Fuller, OMSII - LECOM Student;**
Nancy Carty, Ph.D.;
Christopher C. Keller, Ph.D.

Introduction & Objectives: There are greater than 27,000 reported cases of Lyme disease (caused by *Borrelia burgdorferi*) every year in the United States, with Pennsylvania having the highest number of annual cases. Babesiosis (caused by *Babesia microti*) is another tick-borne disease

that is transmitted by the same species of tick, *Ixodes scapularis*, that transmits *B. burgdorferi* and can be acquired as a co-infection with Lyme disease. While the medical literature had put much emphasis on diagnosis and management of Lyme disease in human patients, less effort has been made to address other tick-borne diseases. Our previous studies have shown that *I. scapularis* ticks can be found throughout Erie County, and that greater than 50% of these ticks carry *B. burgdorferi*. In addition, our studies have found that these ticks carry *B. microti*, albeit at a lower rate. Therefore, it is crucial for primary care physicians to be aware of, and recognize symptoms of tick-borne infections. The purpose of this study is to determine Erie County physicians' perceived risk for their patients contracting tick-borne infections, and recognition of the varying symptoms of tick-borne co-infections.

Methods & Results: A questionnaire was distributed by mail to local primary care physicians practicing in Erie County. A total of 153 surveys were sent out, with 9 being returned, for a response rate of 6%. Of all the returned surveys, all respondents were aware of at least some risk for patients to become infected with tick-borne diseases in Erie County. Only two on the nine surveys returned indicated knowledge of the potential risk of Babesiosis transmission to their patients in Erie County. Four physicians noted patients who, after beginning treatment for Lyme disease, returned to the office with possible symptoms of human Babesiosis, including headache, general weakness, fever, and GI symptoms.

Conclusions: These results demonstrate that physicians practicing in Erie County are aware of the potential risk of Lyme disease for their patients, but may not be aware of the risk for potential co-infections such as Babesiosis. A second survey will be sent out in the hopes of obtaining more data for more accurate representation of physicians' perceived risks of tick borne co-infections in Erie County.

20. The comparative effects of antibiotics and essential plant oils on growth inhibition of *Pseudomonas aeruginosa*

• **Brian Fuller, OMSII - LECOM Student;**
Sudha K. Ayala, OMSII;
Nancy Carty, Ph.D.;
Christopher C. Keller, Ph.D.

Introduction & Objectives: *Pseudomonas aeruginosa* is a common nosocomial pathogen, causing between 10-20% of infections in most hospitals. The rates of *P. aeruginosa* clinical isolates resistant to one or more antibiotics are increasing worldwide and this has necessitated the discovery and implementation of novel therapeutic agents to combat these infections. The goal of this study is to determine the effects of essential plant oils on growth inhibition of *P. aeruginosa* strains in comparison to commonly administered antibiotics for *P. aeruginosa* infections.

Methods: The zone of inhibition (ZOI) for nine antibiotics and 15 essential plant oils was determined for three laboratory strains of *P. aeruginosa* using disk diffusion assays. ZOI produced by *P. aeruginosa* exposed to antibiotics were classified as resistant (R), intermediate (I), or susceptible (S) based on Clinical & Laboratory Scientific Institute breakpoints. The ZOI for the most effective essential plant oil was then compared to the ZOI for the antibiotics to determine if there was a significant difference between the ZOI.

Results: The three *P. aeruginosa* isolates tested were sensitive to aztreonam, ciprofloxacin, gentamicin, imipenem, levofloxacin, piperacillin/tazobactam, and tobramycin, intermediate to ticarcillin/clavulanate, and resistant to chloramphenicol. Of the essential oils tested, cinnamon cassia oil had the largest ZOI. There was no significant difference in the ZOI between cinnamon oil and the seven antibiotics that inhibited *P. aeruginosa* growth using a Kruskal-Wallis test followed by pair-wise comparisons.

Conclusions: Results presented here demonstrate that cinnamon cassia oil can inhibit in vitro growth of *P. aeruginosa* similar to effective antibiotics. Further studies should be conducted to determine the synergistic effects of antibiotics and essential oils.

21. Pilot study of hippotherapy for constipation and enuresis in children with Ehlers-Danlos syndromes

• **Alan Auckland, OMSII - LECOM student;**
Liam Schober; Sue Birkmire, R.N.;
Justine Schober, M.D.; Mark Terrell, Ed.D.

Introduction: Gastrointestinal symptoms including chronic constipation are typical in patients with Ehlers-Danlos syndromes. Hippotherapy (equine assisted riding therapy) has been shown to improve posture and core strengthening in several patient populations, including pelvic floor and abdominal muscles involved in stooling. The strengthening of these muscles has been shown to improve constipation symptoms in patients. Chronic bouts of constipation and stool impaction have been suggested to increase long-term risk of bowel rupture, a known complication of Ehlers-Danlos syndromes. The safety of supervised hippotherapy and its lack of adverse effects make it desirable in the core strengthening of children with Ehlers-Danlos syndromes. Subsequent impact of core and pelvic floor strengthening may also reduce enuresis and encopresis in these patient populations.

Materials and Methods: Three children under 10 years old were included in a several-months long trial of weekly hippotherapy sessions, with documentation by parents, of unique parameters. These included total time required for defecation, numbers of bowel movements daily, and episodes of enuresis and encopresis daily. Children were also followed with KUB x-ray imaging.

Results: Patient sample size was small, and consistency of documentation was limited. On a patient by patient basis, charting showed increased frequency of stooling, with a decreased stooling time, but no improvement in urinary continence. Qualitative results yielded anecdotal improvement in the incidence of constipation and abdominal pain. Increases in the daily frequency and regularity of stooling were also seen, as well as patient self-reported perceptions that muscle tone was improved. Requirements for laxatives were also decreased in one patient. Finally, urinary incontinence episodes were not improved in one patient. Because of the small number of patients and the inconsistency of data entry, no statistical significance could be determined.

Conclusion: The role of hippotherapy to improve quality of life measures in patients with

Ehlers-Danlos is unknown, however this trial suggests that improvements in time to stool, stooling frequency, and decreased requirement for laxatives may accompany hippotherapy. Future trials with improved data collection methods could yield promising information about a novel therapy that may improve quality of life measures in a patient population with lifelong implications.

22. Pilot study of hippotherapy for enuresis and encopresis in children with Spina bifida

• Alan Auckland, OMSII - LECOM student; Liam Schober; Sue Birkmire, R.N.; Justine Schober, M.D.; Mark Terrell, Ed.D.

Introduction: Neurogenic bowel and bladder are common to patients with spina bifida. Hippotherapy (equine assisted riding therapy) has been shown to improve posture and core strengthening in several patient populations with neurologic deficit. The subsequent impact of improved posture and core strengthening with regard to incontinence has been said to be beneficial, though no studies have been conducted to show this. Its impact on patients with spina bifida, specifically with regard to urinary continence, has not yet been investigated. The safety of supervised hippotherapy and its lack of adverse effects make it a desirable method of physical therapy to potentially improve posture and core strength for downstream effect of improved incontinence. Speculations on control over enuresis and encopresis via improved postural tone and core strength suggests that the positive results from this trial stem from muscular adaptations imparted by hippotherapy training. Further investigation reveals that trunk stabilization has shown to improve sphincter dyssynergia in patients with enuresis and encopresis.

Methods and Materials: Four children under 10 years old were included in a several-months long trial of weekly hippotherapy sessions, with documentation by parents, of incontinence episodes between catheterizations. For two patients, catheterization volumes are included. Qualitative reports of patient mood, milestones, and medica-

tions are included for discussion.

Results: Although sample size was small, patients and their parents reported decreased frequencies of incontinence, improved self-confidence, and reduced reliance on pharmaceutical therapies. Consistency of documentation was poor, so graphs generated reflect available data. In patient 2, we saw a 93% decrease in average weekly incontinence by weight of diapers (from 182.5g to 25.7g). Qualitative reflections by parents and patients on the experience yielded promising results of improvement dependent on hippotherapy sessions.

Conclusion: The role of hippotherapy in children with spina bifida to improve bowel and bladder continence issues shows promise in this initial pilot study, meriting further investigation. Future trials with careful data collection and standardization could yield more information about a novel therapy that may improve the quality of life in a patient population with lifelong implications.

23. Medial patellofemoral ligament differences in males and females: A cadaveric study

• Jordan Bonier, D.O. - Millcreek Community Hospital Resident

The medial patellofemoral ligament (MPFL) is the primary static medial stabilizer of the patella. Rupture of the ligament has been associated with acute lateral patellar dislocation in 90% of cases. The risk of patellar dislocation is increased in females, as is the measure of the quadriceps angle (Q-angle). The purpose of this study is to determine if the measure of the Q-angle is correlated with the dimensions of the MPFL, and if the dimensions of the MPFL are different in males and females. 14 cadavers (6 female, 8 male) were used to determine the Q-angle and dimensions of the MPFL. The Q-angle was not shown to be correlated with mid-substance width, length, or thickness of the Q-angle. In addition, the dimensions of the MPFL were not statistically different in males and females. This suggests that anatomic variation in the MPFL does not contribute to increased risk of patellar dislocation in females.

24. Hyperbaric oxygen in the treatment of ideopathic sudden sensorineural hearing loss

• **James Bruno, D.O. - Millcreek Community Hospital Resident**

Ideopathic sudden sensorineural hearing loss (ISSNHL) involves hearing loss developing over a 3 day duration pertaining to aberrations from the cochlea to the auditory cortex and leads to a ≥ 30 dB loss of three consecutive frequencies without a known etiology. ISSNHL accounts for anywhere from 85-90% of all sudden sensorineural hearing loss (SSNHL) cases with an incidence of 4000 in the US. Current treatment options include intra-tympanic or oral steroids with studies reporting the route used yielding equivocal results. Thus far the evidence on the efficacy of HBO remains limited. That being said, the consensus for the use of HBO suggests initiating treatment within 3 months of the onset of hearing loss and the use of systemic steroids at the start of treatment.

25. Correlation and impact of autoimmune thyroid disease and celiac disease

• **Jennifer Carson, D.O. - Millcreek Community Hospital Resident**

Celiac disease (CD) has become one of the most prevalent autoimmune diseases, affecting approximately 1% of the US population. As other autoimmune diseases, individuals with celiac disease suffer from a misguided attack on their own healthy cells. In response to this attack, antibodies are created to protect the healthy cells. As the immune system creates these antibodies, multiple organs can be affected. About twenty-five percent of patients diagnosed with autoimmune diseases have more than one type [2]. Current literature suggests a positive correlation between CD and autoimmune thyroid disease (ATD), but the pathogenesis is unknown. The identification and diagnosis of CD and ATD is important in

the treatment and long term prognosis. Early identification and treatment of CD may aid in the treatment for ATD and improve a patient's overall health.

26. Treatment of challenging lower extremity wounds with bone and tendon exposure: Using a uniquely viable and intact cryopreserved human placental membrane graft for closure

• **Anthony Colonna, D.P.M. - Millcreek Community Hospital Resident**

Wound Closure of Chronic Foot Ulcers using Cryopreserved Human Amniotic Membrane (cHAM)* Authors: Anthony Colonna, DPM, Angela M. Miele, DPM, AAPWH Background Complete wound closure as defined by 100% re-epithelialization using SOC has been shown to be effective in 24% of patients within a 12 week period 1. The remainder are considered chronic and create high morbidity including limb loss and increased risk of mortality.2 It is therefore imperative to recognize as early as possible when SOC treatment has failed so that advanced therapy such as cHAM* can be instituted. The use of placental membrane for the treatment of cutaneous wounds has been recorded as early as 1913.3,4 However, availability and disease transmission were a barrier to its widespread use. The recent development of the BioSmart® platform eliminates these barriers while maintaining functional integrity which renders a placental membrane commercially available as cHAM. This process maintains preservation.

27. Foley catheters and erectile dysfunction

• **Ryan J. Connolly, D.O. - Millcreek Community Hospital Resident**

Abstract Objective: To determine the average time to return of sexual function, in a male with a prolonged foley catheterization during

an inpatient hospital stay. Design: Male patients who were catheterized for 24 hours took a survey during hospital admission and 30 days following discharge. Primary outcome: Quantity of patients able to achieve and maintain an erection 30 days after catheterization. Results: Out of 8 subjects who attempted to achieve an erection 30 days after catheterization, all 8 were able to achieve the erection. Conclusion: There does not appear to be a link between inability to achieve or painful erection after being catheterized for greater than 24 hours in the inpatient situation.

28. The effects of pre-competitive osteopathic manipulative treatment on athletic performance, use of analgesics, overall pain levels and attitudes to OMT in an NCAA Division I men's hockey team

• **James N. Cornwell, D.O. - Millcreek Community Hospital Resident; Gregory Coppola, D.O.; Jeffrey Kim, D.O.; Matthew McElroy, D.O.**

The use of manual manipulative techniques within the sports medicine realm is broad and well accepted. While Chiropractic therapies are the most visible and researched within sports medicine, Osteopathic Manual Medicine (OMM) has recently emerged in popularity. Very little significant Osteopathic research has been completed outlining the facility of Osteopathic Manipulative Treatment (OMT) in the sports setting. The purpose of this report is twofold: (1) to discuss OMT in the sports medicine arena and the lack of significant research data presented, & (2) bring to light previously unpublished data concerning OMT of Division I hockey athletes during the season of 2005-6. Drs. Coppola, Kim & McElroy arranged to perform OMT on 23 male athletes of an NCAA Div. I hockey team prior to their 14 total home games. OMT was directed at any dysfunction found in the cervical, thoracic, lumbar, & sacral regions as appropriate. Each athlete completed a pre- & post-season survey. Post-season data showed all 23 athletes admitted to improved performance for that particular game (50%), for that week (6%) & even through-

out the season (44%). 56% of the surveyed athletes reported less pain medication use by at least half (25%) if not at all (31%) during the season. An unpaired t test was performed on the pre- & post-season survey data, but showed no statistically significant difference concerning the percent of visits that would be dedicated to pain management, performance enhancement or pain control for improved game time performance. This pilot study, while not showing statistical significance, showed Div. I collegiate athletes responding favorably to pre-competition OMT, reporting that it helped in management of pain, improved game performance as well as decreased overall pain medication use during the course of the season. This particular study provides an excellent springboard for future well-designed studies to document and establish the utility of OMM in the sports domain.

29. Platelet monocyte aggregates as markers of inflammation in murine models of cardiovascular injury

• **Ryan M. Huttinger, OMSII - LECOM Student; Roman Covarrubias; Elena Chepurko; Tatiana Novitskaya; Richard J. Gumina.**

Background: Diabetes is associated with the presence of a proinflammatory state that has been hypothesized to be critical driver of cardiovascular disease. Several factors that play a role in the diabetic inflammatory burden include inflammatory cytokines, platelet activation, adhesion molecules and chemokines. In humans, platelet-monocyte aggregates (PMAs) are found in circulation during early stages of diabetes. Platelet activation is predicted to precede aggregation to monocytes; therefore PMAs have been described to be a pro-thrombotic component of inflammation. While PMAs have also been reported following myocardial infarction in humans, they have not been described in relevant animal models. Objective: Determine if PMA are present in relevant murine models. Methods: Our plan was to perform myocardial ischemia-reperfusion studies in wild type (WT), low density lipoprotein receptor

knockout (LDLr^{-/-}) mice and diabetic mice (db/db). In brief, mice were subjected to either sham surgery or 20 minutes of left coronary artery ischemia and 20 minutes of reperfusion. At 20 minutes of reperfusion, whole blood was isolated and PMA identified using FACS analysis for platelet and monocyte markers. Results: Following myocardial ischemia-reperfusion injury, PMAs are significantly increased in WT and LDLr^{-/-} mice. Studies are ongoing to examine basal and post-myocardial I-R levels of PMA in db/db mice. Conclusions: We have described for the first time the presence of PMA in a murine model of myocardial ischemia-reperfusion injury. The techniques established provide the base to examine the presence of PMA in db/db mice as well as future studies examining mice with high-fat induced metabolic syndrome.

30. Harvesting guidelines and anatomical morphology of bone-free quadriceps tendon autograft for anterior cruciate ligament reconstruction

• **Matthew S. Irwin, D.O. - Millcreek Community Hospital Resident;**
Matthew Sneck, OMSI

Introduction: The purpose of this study was to examine and define the structural and morphological anatomy of the extensor mechanism of the knee, specifically the quadriceps tendon, as a reference for optimal autograft harvesting for ACL reconstruction.

Methods: This study utilized 25 cadaveric specimens for anatomic dissection. The mean age of the specimen was 73.12 years old, consisting of 15 female and 10 male knees. Known demographics including age, gender, and laterality were recorded for each specimen. Measurements were then obtained using calipers in length, width and bifurcation distance from the medial border. All measurements and anatomic dissection were performed by one individual to ensure accuracy of technique.

Results: A “bifurcation” of the tendon was 10.38 mm +/- 2.04 mm from the medial edge of the tendon (57.10 % +/- 3.34 %). The male cadaveric specimens measured 12.05 mm +/- 1.44 mm

from the medial edge (59.95 % +/- 3.57). The average midline tendon length to the “bifurcation” was 78.10 mm +/- 4.14 mm (range, 72.0 – 84.0 mm). The female cadaveric specimens measured 9.90 mm +/- 1.26 mm from the medial edge (57.39 % +/- 3.28 %). The average midline tendon length to the “bifurcation” was 70.90 mm +/- 4.20 mm (range, 65.0 – 76.0 mm).

Discussion: This study concluded the “bifurcation” occurs 57.10 % from the medial edge of the tendon at this proximal aspect, however there was noted variability in males (59.95 %) compared to females (57.39%). More importantly the length varied as well between genders with the males average midline length of 78.10 mm compared to just 70.90 mm in females. The male specimens had a minimum tendon length of 72 mm, however the minimum female length was 65 mm (length to the variable bifurcation). This study demonstrates the importance of graft selection and harvesting guidelines in regards to bone-free quadriceps tendon autograft, specifically in regards to gender and location of harvesting.

31. Incidence and clinical correlation of plantar fasciitis with the biomechanical conditions of pes planus and pes cavus

• **Wade Jespersen, D.P.M. - Millcreek Community Hospital Resident**

Plantar fasciitis remains one of the most commonly diagnosed and treated conditions in the clinical practice of podiatry. As such, the condition has received much attention in the research literature. Associations have been made between the condition and obesity, middle age and biomechanical abnormalities of the foot¹. The focus of this study will be on the biomechanical associations between plantar fasciitis and pes planus (flat foot) and pes cavus (high arch foot). While there is ample literature documenting the association between these two biomechanical conditions and a diagnosis of plantar fasciitis, a literature review failed to produce any documentation of the incidence of plantar fasciitis with either of these two conditions.

32. Consistent technique limits suspension laryngoscopy complications

• Sean Larner, D.O. - Millcreek Community Hospital Resident; Rick A. Fornelli, M.D.

Objective: To evaluate the post-operative complications of suspension laryngoscopy (SL), and determine if protection of dentition and oral mucosa and limiting suspension times decreases the overall incidence of oral cavity and pharyngeal complications of SL. Study Design: Retrospective case series review Setting: Community-based otolaryngology practice Subjects and Methods: All cases of suspension laryngoscopy (SL) performed by one surgeon from November 2008 through September 2014 were retrospectively reviewed. A novel technique for dental and mucosal protection was utilized, and suspension times were limited to 30 consecutive minutes. The incidence of postoperative complications was calculated and analyzed with respect to gender, smoking status, dentition, laryngoscope type, and suspension system. Results: 213 consecutive SL cases were reviewed including 174 patients (94 male, 80 female). The overall postoperative complication rate was 3.8%. Four patients experienced tongue-related complications, two experienced oral mucosal alterations, one had a dental injury, and one experienced a facial burn. The complication incidence was greater with the Zeitels system (12.5%) compared to the Lewy suspension system (3.3%), though was not significant ($p = 0.15$). Likewise, the association of complications with other patient factors was not statistically significant. Conclusion: Until recently, little was known about the complications of SL, and variable rates have been reported. Only 8 out of 213 cases in this series experienced complications, which is significantly less than other reports. Consistent protection of dentition and oral mucosa, and limiting suspension times to 30 minutes are factors unique to our series and bear significance in reducing complications in endolaryngeal surgery.

33. The unicompartmental subchondral magnetic knee prosthesis

• Nicholas Loffredo, D.O. - Millcreek Community Hospital Resident; Peter Kuvshnikov; Steven Habusta

Objective: The purpose of this study was to develop a procedure that would allow opposing magnets to unload the osteoarthritic compartments of a knee. This procedure would benefit young and active patients are not yet candidates for a total knee replacement.

Method: The tibial and femoral magnetic components were placed into bone windows of the composite bones seen in Figure 2. The push force of the prototype magnets was measured with varying distances of separation at the knee joint. The universal testing machine was used to measure the resistance force of the two magnets seen in Figure 3. The magnets were analyzed within their respective femoral and tibial bones at 1 inch apart then slowly brought together until joint surface contact was achieved. This allowed the calculation of the amount of force in lbs that each magnet repelled another while inside the composite bones.

Results: The data analysis of the universal testing machine measured the amount of force each magnetic was able to exert on the opposing magnetic while implanted in the composite bone of the knee. The force generated by the magnets opposing each other was recorded in Figure 5. The maximum amount of force generated by the magnets was measured to be 5.5 lbs of force. The experiment was run for a series of 3 with nearly identical trials which signifies the reliability of the experiment. The force between the two magnets and distance between the magnets was a reciprocal relationship as expected.

Conclusion: The unicompartmental subchondral magnetic knee has been shown to mimic a cushioning force to the knee. The final design of this concept will require increasingly sophisticated technology which was not within the means of this project. The initial concept of opposing magnets in a single condyle of the knee was demonstrated in the laboratory. Further research is required to understand the implications of this concept in the moving knee.

34. A cadaveric study to determine the relationship between the radial styloid and the biceps tuberosity

• **Smith Meads, D.O. - Millcreek Community Hospital Resident**

It is widely accepted in the orthopedic community that the biceps tuberosity and the radial styloid can be used to determine rotational deformity in a fracture of the radius. On x-ray these two structures are 180 degrees from each other in terms of rotation (orthobullets). However, no studies were found which verified these findings. This study's purpose is to determine if the anatomical relationship of these two landmarks matches those commonly cited when reading x-rays. Methods: Eight cadavers from the LECOM cadaver lab were utilized. Bilateral arms of each cadaver were studied to determine the rotational relationship of the radial styloid and the biceps tuberosity. Dissections were performed by the LECOM medical students prior to beginning of study. After which, the radii from all the cadavers were removed. Since this was an osteology study the soft tissue dissection was not as imperative. The measurement was from the center of the biceps tuberosity to the center of the distal end of the radial styloid. All of the limbs were then be averaged together to distinguish the rotational arc from the biceps tuberosity to the radial styloid. Measurements were done by photographing the radii in an axial view which can be seen in the first image provided. Markers were placed on the biceps tuberosity and radial styloid to better find them on the photograph. A protractor was then used to determine rotational arc. The radii were also photographed in a coronal view which can be seen in the second image provided. This view is more comparable to the x-ray view in question. Measurements of the radial tuberosity length and width as well as the radius length were also obtained. The eight cadavers were used to compare right to left. The biceps tuberosity length and width as well as the length of each radii were averaged, and then paired T-tests were ran.

35. The articularis genu: An anatomical study

• **Mark Messmer, D.O. - Millcreek Community Hospital Resident**

Question: Is there a correlation between length and width of the articularis genu? Is there a correlation between the width of the muscle and the number of muscle bellies? Is there a correlation between the length of the articularis genu and the number of muscle bellies? Is there an obvious distinction from the vastus intermedius?

Hypothesis: There is a statistically significant correlation in length and width of the articularis genu. There is a statistically significant difference in the width and the number of muscle bellies.

There is no statistical significance in the length and the number of muscle bellies. There is an obvious distinction from the vastus intermedius.

Materials/Method: Using the LECOM cadaver lab, 9 prosected bodies and 12 knees were examined. Careful measurements were taken of the widths and lengths of the articularis genu muscle. The number of muscle bellies were identified with careful dissection. The origin and insertions were identified and measurements were taken from specific points on the femur and patella. Procedure: T tests were performed comparing width to length, length to the number of muscle bellies and width to number of muscle bellies. The number of muscles that were distinct from the vastus intermedius were compared to those that were not to determine if this was statistically significant.

Conclusion: There was no statistically significant difference in the length versus the width of the muscle bellies. There was no statistically significant difference in the number of muscle bellies compared to the width and length of the muscle bellies as a whole. There was no statistically significant difference in the distinction of the muscle from the vastus intermedius. The primary role of the articularis genu muscles is to elevate the superior capsule and the suprapatellar fat pad of the knee to prevent impingement. This is a probable cause of anterior knee pain in an arthritic knee with osteophyte impingement.

36. Patient understanding of NAFLD

• Dempsie Morrison, D.O.

Problem: Non-alcoholic fatty liver disease is becoming the leading cause of chronic liver disease in the United States. The purpose of this research project was to seek to understand what patients at risk for the disease would understand about the disease process, consequences, and treatment. **Design:** A survey was submitted to both primary care patients and those seen in a gastroenterology clinic. Patients were asked various questions about predisposing conditions, treatments, and consequences of NAFLD.

Results: A total of 26 surveys were completed and returned. Patients did reasonably well at knowing that diabetes and hyperlipidemia were associated with NAFLD. However they did poorly on knowledge that other conditions could predispose to the disease. They also had poor knowledge and treatment options. Most patients did not know that a possible consequence of the disease was cirrhosis and possible liver transplantation.

Discussion: Given that NAFLD is becoming and increasing burden on the healthcare system and is poised to be the most common reason for liver transplantation these results show that overall knowledge by patient is lacking. Given that the primary treatment currently involves prevention and lifestyle choices, this knowledge gap needs to be addressed.

37. Bactericidal effects of silver impregnated bandages on escherichia coli, pseudomonas pudita and staphylococcus epidermis

• Emily Morrison, D.O. - UPMC Hamot Resident; Liam Schober; Sue Birkmire, R.N; Justine Schober, M.D.

Purpose: Silver has been widely used to control bacterial infection in skin wounds, dental work, burns, and urethral catheters. However, silver's bactericidal effectiveness is still yet not clearly de-

finied due to the lack of well-established evidence. The purpose of this study was to determine the bactericidal effects of silver impregnated bandages on three bacterial species known to commonly infect wounds and impede healing: *Pseudomonas pudita* (PP), *Staphylococcus epidermidis* (SE), and *Escherichia coli* (EC).

Methods: PP, SE and EC were separately plated at variable concentrations for both the control and experimental groups. The experimental group had a silver bandage square applied to the center of each plate. Colony counts were recorded for both groups at 24 hour intervals and the zone of inhibition (ZOI) was measured and recorded in the experimental group.

Results: Colony counts remained the same throughout all time points for both groups, however silver did exhibit a bactericidal effect on all 3 species tested as demonstrated by ZOI measurements. For EC the maximum ZOI observed was 2 mm at 72 hours and the maximum ZOI for PP was 3 mm observed at 48 hours. Both EC and PP had a 0 mm ZOI by 120 hours. For SE there was a 2 mm ZOI at all interval recordings and an increased ZOI to 3 mm at 120 hours.

Conclusion: While silver bandages appear to have bactericidal activity on all three bacteria within 48 hours, the loss of ZOI in the PP and EC groups by 120 hours indicates loss of bactericidal activity. Due to the extended length of a maintained ZOI and increased activity observed at 120 hours, silver appears to exhibit a prolonged bactericidal effect on SE compared with EC and PP. Although these studies were all performed in vitro, the observed bactericidal activity of silver bandages provides evidence that silver could display similar activity in vivo, and wound cultures taken prior to the application of silver bandages might allow for a treatment plan which is multimodal and/or organism specific. Further work is needed in this area before recommendations can be made on the use of silver bandages for bacterial infection prevention or therapy.

38. Aqueous silver instillation used to treat and prophylax amish children with spina bifida performing clean intermittent catheterization

• **Emily Morrison, D.O. - UPMC Hamot Resident; Liam Schober; Alan Aukland, OMSII; Sue Birkmire, R.N.; Justine Schober, M.D.**

Purpose: Sanitization methods for urinary catheters typically employed by westernized societies, such as washing with clean running water, and microwave sterilization, are not available (or not allowed) in some Amish communities. Contamination, insufficient cleaning, or development of a biofilm of bacteria, may occur after reuse. Establishing a sanitizing practice in this group of patients can become challenging. Parents in an Amish community, reluctant to use antibiotics, began a practice of aqueous silver instillation, through catheters at the end of urinary drainage. Silver solution was obtained from homeopathic sources. Bactericidal actions of silver ions in aqueous suspensions may be effective against a broad spectrum of bacteria, including common and resistant strains.

Methods: Six Amish children (age 3-25y) diagnosed with spina bifida and neurogenic bladder, utilized clean intermittent catheterization for bladder emptying. All had symptomatic, difficult to clear, or recurrent UTI (range 4-8 per year). Parents chose to stop antibiotics and used a homeopathic treatment as a post catheterization instillation of approximately 5-15cc of aqueous silver solution. Administration frequency is nightly, follow up ranged from 24-96 months.

Results: There was a distinct decrease in recurrence of symptomatic UTIs in this small case series of Amish children treated with clean intermittent catheterization. Intervals of sterile urine culture ranged from 21-78 months. No side effects from the aqueous silver were observed.

Conclusion: Silver irrigation has decreased the recurrence of UTIs in this limited population of Amish children with spina bifida, who perform intermittent catheterization.

Key Words: clean intermittent catheterization, silver, spina bifida, urinary tract infection

39. Radiological features of long bone fractures in young children

• **Amit Samba - LECOM Student; Lucky Ly; Jane Skrbn, D.O.; John Gallagher, D.O.; Sarah McCarthy, Ph.D.**

The majority of children suffering from non-accidental fractures are less than 3 years old and 50% of fractures occur in children less than 1 year old. This demonstrates the need to develop standard criteria for dating of fractures in young children using radiological features of healing in order to confirm that the patient history given by a caregiver correlates with injuries observed. Objectives: Our study examined radiographs in children between the ages of 0-16 years of age (0-192 months) to determine if there were significant differences in the appearance of healing features based on age, sex, and location of fracture.

Methods: To evaluate these differences we examined 648 digital radiographs from 253 patients that had fractures of the femur or humerus between 2010 and 2015. A minimum of 2 radiographs per patient were analyzed and the presence of radiological signs of healing (soft callus, hard callus, and remodeling) and days since injury were recorded.

Results: Soft callus in humeral fractures was visualized an average of 8 days earlier in children between 0-36 months and 36-84 months old when compared with children 85-192 months old. Hard callus formation in humeral fractures was seen an average of 68 and 40 days sooner in children 0-36 and 37-84 months old when compared to children 85-192 months old, respectively. Remodeling in humeral fractures was seen about 77 days earlier in children between 0-84 months old when compared to children 85-192 months old. Similar results were observed in the femur with radiological signs of healing appearing earlier in younger children compared to older children. Soft callus, hard callus, and remodeling were all found to appear significantly earlier in healing fractures of the humerus when compared to fractures of the femur. Females were found to develop radiological signs of hard callus

formation and remodeling an average of 13 and 59 days earlier than males, respectively. Conclusions: Our data suggests fractures in younger female children may heal more quickly than those in older male children and humeral fractures heal faster than femur fractures.

40. A chronic high fructose diet includes progressive murine NASH with early mitochondrial aging

• **Amit Samba - LECOM Student;**
Kritin S. Bramlage, M.D.;
Michelle Kirby, M.S.;
Andriy Myronovych, M.D.;
Rosa-Maria Salazar Gonzalez, Ph.D.;
Stavra Xanthakos, M.D.;
Kevin Boone, M.D.; Rohit Kohli, M.D.

Background: Non-alcoholic fatty liver disease (NAFLD) and non-alcoholic steatohepatitis (NASH), have quickly become recognized as one of the most common causes of liver disease in both adults and children in the world. Diets high in saturated fat and fructose are factors leading to obesity and NASH in humans. Case reports demonstrate mitochondria ultra-structural changes obtained from humans with histological NASH with progressing development to uncover mechanisms in development of NASH, diagnostic tools to differentiate the severity and progression of the disease, and ultimately treatment options.

Hypothesis/Aims: The objective is to outline the progression of ultra-structural changes in mice on a NASH-inducing diet, corroborate the findings through mtDNA quantification, and investigate interplay endoplasmic reticulum stress markers.

Methods: C57Bl/6 mice were randomized to a Chow or high-fat, high-fructose diet for 8, 16, or 32 weeks. Body weights were monitored until time of sacrifice at which time liver was collected to evaluate electron microscopy, DNA content and gene expression by RNaseq and RT-PCR were evaluated.

Results: HF2 mice gained more weight, had higher plasma ALT levels and hepatic triglycerides at all time points. HF2 mice mitochondria

first became smaller and then larger than their C fed counterparts. On the other hand mitochondrial DNA content decreased over time. ER Stress markers, PERK and CHOP, were significantly increased with our HF2 diet.

Conclusions: Our NASH-inducing diet in mice led to progressive decrease in DNA content, supporting a role for mitochondria in the development of NAFLD and NASH. We observed an early decrease in mitochondria size similar to that seen with normal aging. This disconnect may be secondary to small sample size and follow-up studies employing more subjects is warranted. More evaluation through metabolic studies to suggest a specific biochemical dysfunction would be beneficial as well.

41. Do inpatient psychiatric units decrease the numbers of admissions to the South Dakota State Hospital?

• **Dean Shandy, D.O. - Millcreek Community Hospital Resident**

There is a growing need for psychiatrist. The demand for psychiatrists is growing for several reasons. First, there is increase in awareness of psychiatric illnesses that can be treated with medications. Second is the increasingly complex medication regimes that patients are being prescribed. Third, in budget moves, many hospitals have closed their inpatient psychiatric units or have refused to open an inpatient unit despite the increasing demand. Finally, historically low reimbursement for mental health issues has deterred many physicians from pursuing a career in psychiatry. Combine these facts together and we can see why there is a growing demand for psychiatrists. This fact is even more apparent when we look at rural areas. One of the most rural states in the country is South Dakota. Methods: I contacted the North Dakota state hospital and obtained a list of the number of admission per county for the 2012 year. I combined that with the most recent census data and did a t squared test to determine if there was a statistically significant difference between the counties that had small psychiatric units to those that did not have

a small psychiatric unit.

Results: I found that there was a statistically significant difference between the counties that had a small psychiatric unit and those that did not. However, I found that it appears that a small psychiatric unit actually increases the chance that a patient will be admitted to the state hospital. Discussion: However, my data shows that having a psychiatric unit actually increases the number of admissions to the state psychiatric hospitals. Why is that? I have several hypotheses. First, there may have been an error in my statistical analysis. Second, there may have been an error in my data collection. Finally, perhaps my hypothesis is incorrect, and the data is correct. In that small psychiatric units may increase the rate of admission to the state hospital.

42. Benchmarking an orthopaedic operating room terminal cleaning protocol with an adenosine triphosphate bioluminescence assay

• **Travis Small, D.O. - Cleveland Clinic**

Background: Environmental cleaning of the operating room (OR) is essential for optimizing safe patient care during operative procedures. Currently no universally accepted standards exist to monitor environmental surfaces following decontamination processes. Our study is the first to attempt to quantify the cleanliness of OR surfaces with a bioluminescence monitor following a standardized decontamination process.

Methods: We examined 6 total joint arthroplasty rooms after the final procedure of the day. All rooms studied were primary total knee or hip arthroplasty procedures. We examined 12 different OR surfaces before and after a traditional decontamination protocol by the environmental services staff (ESS), then again by the research staff following a modified decontamination protocol.

Results: ATP values after cleaning were significantly improved using the modified cleaning protocol with 60 (83.3%) surfaces below or equal to 250 relative light units (RLUs), while the traditional protocol had 39 (54.2%) surfaces below

or equal to 250 RLUs ($p=0.0002$). The modified decontamination protocol reduced the levels of organic contamination by 98%, while the traditional decontamination protocol reduced the RLUs by 28% ($p < 0.0001$). Conclusions: While traditional decontamination reduces OR surface contamination, there is margin for improvement as illustrated by the results of our modified cleaning protocol. We found a greater quantitative reduction following surface decontamination as measured by RLU values with our modified cleaning protocol.

43. Survey of human pathogen carrying ticks and possible pathogens from Presque Isle State Park

• **Kaya Smith - LECOM Student;**
Nicole Lee, M.S.; Nancy Carty, Ph.D.;
Christopher C. Keller, Ph.D.

Objectives: Black-legged ticks (*Ixodes scapularis*) and dog ticks (*Dermacentor variabilis*) transmit disease-causing pathogens to humans, including *Borrelia burgdorferi*, *Babesia microti*, and *Rickettsia rickettsii*. Current studies have shown an increase in the number of tick-borne infections diagnosed in the northeastern United States. Our previous studies have shown both *I. scapularis* and *D. variabilis* ticks to be present throughout Erie County with the highest prevalence in Presque Isle State Park. Therefore, the current study was undertaken to determine the tick distribution and pathogen carriage rate of ticks found on Presque Isle.

Methods: Adult *I. scapularis* ticks ($n=660$) and adult *D. variabilis* ticks ($n=64$) were collected in 2013-2015 by flagging multiple trails on Presque Isle. After collection, tick DNA was extracted and the presence of PCR-quality DNA was determined by a tick mitochondrial 16S PCR. Samples were then tested for the presence of pathogen DNA via PCR, including *B. burgdorferi* flagellin and *B. microti* 16S ribosomal genes. Positive samples were verified using gene sequencing.

Results: In the two-year collection period, 660 deer, 64 dog, and 3 Lonestar ticks were found on

Presque Isle. Black-legged ticks were evenly distributed among trail areas, while dog and Lone-star ticks were mainly found in the central Sidewalk, Fox, Marsh, and Dead Pond Trails. All ticks were positive for the tick 16S PCR. Of the deer ticks found on Presque Isle in 2013-2014, 33.8% (223/660) were positive for *B. burgdorferi*, 3.0% (20/660) were positive for *B. microti*, and 1.36% (9/660) were positive for both *B. burgdorferi* and *B. microti*. None of the dog ticks were positive for *B. burgdorferi*, further testing is being done on the carriage rate of *R. rickettsii*.

44. Comparing outcomes between operative techniques for BAHA implantation

• **Mark W. Steehler, D.O. - Millcreek Community Hospital Resident;**
Sean Larner, D.O.; Joshua Mintz, M.D.;
Matthew K. Steehler, M.D.;
Sidney P. Lipman, M.D.

Bone-anchored hearing aids (BAHAs) play an important role treating patients with hearing loss who are not suitable candidates for surgery or conventional hearing aids. Multiple techniques have been developed throughout the years in an attempt to decrease operative time and minimize complication rates. A retrospective review was conducted, analyzing six different techniques over a six year time period. Ninety patients underwent BAHA implantation over that time period. It was discovered that although the punch through technique was the fastest to perform in the operative room, it carried the highest post-operative complication rate. While the BAHA Attract implant took longer than most techniques, its postoperative complication rate was significantly less than other techniques. Also, the BAHA Attract had the least number of days from implant to fitting of the BAHA processor than any other technique.

45. Capillary versus aspiration techniques in fine needle biopsies of thyroid nodules in a community setting

• **Mark D. Strand, D.O. - Millcreek Community Hospital Resident;**
Rick A. Fornelli, M.D.

Abstract Importance: This study provides clinicians with relevant information regarding the variety of techniques used when performing thyroid needle biopsies and their diagnostic rates. **Objective:** To compare the cytologic adequacy rates of obtaining a diagnostic specimen by comparing ultrasound-guided fine-needle aspiration (FNA), fine-needle capillary (FNC), and a combination of both (FNAC) techniques. **Design:** Retrospective cohort study from July 2013 to August 2014 **Setting:** Two regional referral centers **Participants:** 259 consecutive fine needle thyroid biopsies were performed in a 13 month period. The sonographic, pathologic, and biopsy procedure reports were reviewed to determine nodule size, adequacy of specimen, pathologic diagnosis, number of needle passes, slides prepared and technique used. The significance of difference in cytologic adequacy between techniques was assessed using ANOVA and student t-tests. **Main Outcomes and Measures:** Diagnostic rates for FNA, FNC, FNAC were determined. **Results:** A total of 259 fine needle thyroid biopsies were performed with an overall diagnostic rate of 81%. FNA, FNC, and FNAC biopsies were performed on 68, 155, 36 nodules respectively. The non-diagnostic rate in FNA sampling was 51%, 6% in FNC, and 19% in FNAC sampling. **Conclusion and Relevance:** Our results find that FNC was superior to FNA and FNAC in obtaining a diagnostic specimen. Incorporation of capillary techniques into a clinician's armamentarium may help increase their diagnostic rates. Also, this study gives a unique perspective on the challenges of needle thyroid biopsies in a community setting with a variety of specialists performing and interpreting thyroid needle biopsies. Future studies are needed to evaluate the impact of non-diagnostic specimens on patient discomfort and health care costs.

46. Rupture of anterior cruciate ligament with concomitant rupture of the patellar tendon

• **Timothy G. Volk, D.O. - Millcreek Community Hospital Resident**

Injuries to the knee are very common. These injuries is even more common in the athletic population. Injuries the anterior cruciate ligament are common in this setting with a reported incidence of 30-60/100,000 per year in the general population. (9).The common nature of ACL injury is an isolated event at times occurring with associated meniscal injury. The rate of patellar tendon rupture during athletic events is much less common. In general the peak age for patellar tendon rupture occurs during the 3rd -4th decade of life (5). There is available literature and reported events of combined rupture to the ACL and patellar tendon, however these are encountered on rare occasion. With the combination of injuries it would lead to a possibility of missing the diagnosis of a combined injury to the ACL and patellar tendon. Simultaneous rupture of the ACL and patellar tendon is an uncommon injury with few cases reported in the literature. This combined injury pattern can lead easily to misdiagnosis on the initial physical exam. In the acute setting physical exam can be limited by patient guarding and hemarthrosis. Physical exam along with radiographic imaging can in most cases easily identify the patellar tendon rupture and there is no need for MRI to obtain the diagnosis.

47. Core body temperature evaluation of various personnel in the operating room

• **Steven Ward, D.O. - Millcreek Community Hospital Resident**

The temperature within the operating room (OR) has long been debated between the various personnel that work there with the base of the argument being about comfort level, but other factors should also be included in the argument as will be shown below. Those that are typically working in the OR include the surgeon, surgical

tech, nurse, and anesthesiologist and on occasion a surgical resident. Each person has a very different role within the OR but ultimately work together in a very organized way to accomplish the goal of performing the surgery and keeping the patient as safe as possible (Epstein, 2014). These roles require different levels of physical activity, position within the OR, and interaction with heat generating devices. All these variables play a role in the perceived and actual core body temperature. there is not a linear temperature increase of the body compared with the ambient room temperature, there is a statically significant change in body temperature during surgery. There were a few variables that were calculated in the research although there were many that could not be due to the limited resources and consistency of the surgical setting. Eliminating some of these variables may help distinguishing a more direct comparison of the room temperature and how it affects the core body temperature of the surgical members during surgery.

48. Workers' compensation patients after arthroscopic shoulder surgery

• **Stephen Watkins, D.O. - Millcreek Community Hospital Resident**

Amish Patients Report Better Outcomes and Return to Work Sooner Compared to Workers' Compensation Patients after Arthroscopic Shoulder Surgery. Stephen Watkins, DO Background: Work-related injury shoulder injuries are a common cause of debility in otherwise healthy patients of working age. These injuries are often a claim for Workers' Compensation. There are conflicted views on the potential predictive value of compensation status and patient reported outcomes in the current orthopedic literature. Purpose: To compare the clinical and functional outcomes after shoulder arthroscopy in Amish patients and non-Amish patients with Workers' Compensation claims. Study Design: Retrospective cohort, Level IV Methods: Patients were identified using the different CPT codes for common arthroscopic procedures and further identified as being Amish or Workers' Compensation

(WC). A retrospective chart review was carried out to determine post-operative outcomes in regard to functionality, pain, satisfaction, and return to work status. Results: There were 28 Amish patients who met the inclusion criteria and 31 WC patients. The mean time for return to work was 9.38 weeks for Amish patients compared to 13.33 for WC ($P < 0.05$). Amish patients reported pain as minimal to none at an average of 4.07 weeks compared to 8.63 weeks in WC patients ($P < 0.05$). Full range of motion was achieved at an average of 7.25 weeks in Amish patients and 8.57 weeks in WC ($P = 0.21$). Amish patients reported satisfaction at a mean of 6.35 weeks compared to 12.46 in WC ($P < 0.05$). Conclusions: The results of this study suggest that WC patients report less favorable post-surgical outcomes compared to Amish patients after arthroscopic shoulder surgery.

49. Effect of pre-tournament training camp climate on injury patterns at the 2014 FIFA World Cup

• **Nathan C. Weaver, D.O. - Millcreek Community Hospital Resident;**
Joseph Temperato, OMSIV;
Adam Hoffman, OMSIV

Objectives: To investigate the correlation between pre-tournament training camp climate and injury patterns during the 2014 FIFA World Cup. Methods: A review and analysis of the data obtained on the FIFA website was performed. Training camp location for each team was recorded followed by the ambient temperature and humidity level on the day of each teams' last pretournament friendly soccer match. The same was documented for each game played during the tournament. The number of injuries each team sustained, requiring the player to miss the successive match, was documented. We also documented the totals for each player for minutes played, distance covered in meters, and the number of sprints per game. Results: There were 29 injuries in 20 different players which resulted in loss of game time during the tournament. There was no correlation between actual World

Cup temperature or humidity and incidence of injury, with correlation coefficients of 0.1859 and -0.1435 with P-values of 0.3084 and 0.4333 respectively. Correlation coefficient for pretournament temperature and injuries was, however, a different story, with a correlation coefficient of -0.304 and a P-value of 0.0453. Pretournament humidity vs. injuries was insignificant, with a correlation coefficient of 0.0714 and a P-value of 0.6978. When comparing minutes played and injury incidence the correlation coefficient was 0.3713 with a P-value of 0.0364, indicating a positive correlation. A comparison between distance covered and injuries had a correlation coefficient of 0.311 and a P-value of 0.0416. There was no statistically significant correlation between number of sprints and injuries, with a correlation coefficient of 0.1208 and a P-value of 0.5102. Conclusions: Pre-tournament training camp climate did not have any impact on injury patterns throughout the 2014 FIFA World Cup. There was, however, a positive correlation between minutes played and distance covered with injury incidence.

50. Orthostatic tachycardia syndrome (POTS) managed with acupuncture treatment

• **Bo Xiao, D.O. - Millcreek Community Hospital Resident**

Postural Orthostatic Tachycardia Syndrome (POTS) is a condition in which a change from the supine position to an upright position causes an abnormally large increase in heart rate. Other symptoms of an orthostatic nature occurring in response to upright posture may accompany the tachycardia. The etiology of POTS is poorly understood, and it is likely that several distinct underlying problems can lead to the symptoms of POTS. A variety of treatments, including exercise and medications, can improve symptoms for the majority of people with POTS. There has no cure for this condition. Evaluating this condition from a different perspective and treating it with some alternative therapies, combining current available therapy may be beneficial. In this case

report, I will discuss my experience treating a 37 year-old Caucasian female patient with 6 months history of POTS. To support the argument of the positive effect of acupuncture, the patient filled out a functionality form called SF-36 with before and after treatment conditions. The overall result showed positive impact on her daily functions and quality of life. To further prove the positive effect of acupuncture treatment scientifically with quantities data, a before-and-after venous pooling study is needed.

51. The need for a health promotion and disease prevention curriculum

• Sarah Beeson, D.O. - Millcreek Community Hospital Resident

Primary care medicine centers on preventative medicine. Key determinants in preventative medicine involves availability and affordability.³ To ensure appropriate health care promotion and disease prevention (HPDP), physicians must be trained at some point in their career. Though physicians can readily access key recommendations via the U.S. Preventative Services Task Force (USPSTF) and American Academy of Family Physicians (AAFP) websites, formal training is often overlooked. The purpose of this study was to investigate resident physician compliance of health promotion and disease prevention. Given that Millcreek Community Hospital (MCH) lacks a formal HPDP curriculum, this study investigated the compliance of HPDP strategies and need for implementation of a formal HPDP course. The study was performed via a survey, which was distributed to approximately 81 MCH residents. Of those residents, only 17 completed the survey. The results, though limited, indicated that though most residents were compliant with HPDP strategies, they did indicate benefiting from a formal HPDP curriculum. Future studies will need to address the necessity of a formal HPDP curriculum for specific residency program and training year.

52. Management of high blood pressure in adults: Report from the panel members appointed to the eighth joint national committee

• Sean Beeson, D.O. - Millcreek Community Hospital Resident

Hypertension guidelines continue to change and the most recent of these revisions released by the committee for JNC-8 have relaxed our previous standards. Due to the committee not being certified by the National Heart Lung and Blood Institute (NHLBI), many physicians are cautious to adjust to these new guidelines, especially in their patients that are well-controlled. Secondary to this uneasiness, a survey was distributed to all residents (excluding those completing a fellowship or podiatry residency) at a small, community hospital to determine if their respective attending physicians were teaching these new guidelines in the ambulatory setting. If this was not occurring, questions were posed if the resident would feel as though it would be beneficial to have the guidelines explained and taught—and how to implement them in the ambulatory setting. This study is a nonrandomized prospective study. Thirty-two of eighty-one distributed surveys were completed and returned anonymously to author's mailbox at the community hospital. Approximately 65.63% do recognize where to access the JNC-8 guidelines but have not implemented them. Interestingly, resident physicians are familiar with the previously published JNC-7 guidelines. This data suggests that a hypertension curriculum would benefit resident physicians. The responses indicate that residents are familiar with JNC-7 guidelines though data is inconclusive about JNC-8 guidelines. Nonetheless, more information and data analysis is needed to supplement the support and subsequent implementation of such a curriculum.

53. Effects of SSRI on bone health

• Debra Ann Bjork, D.O. - Millcreek Community Hospital Resident

SSRIs can affect bone health.³⁻⁸ Ducey and

Karsenty⁹ report that serotonin produced peripherally “acts as a hormone to inhibit bone formation (p. 7).” What is happening in the bone is disruption of the “microarchitecture and bone mechanical properties (p. 115)” not necessarily bone density.¹⁰ Herbert et. al.⁴ report there are serotonin receptors 5-HT_{2A}, 5-HT_{2B}, and 5-HT_{2C} in bone and SSRIs may be concentrated in bone, impacting fibroblast and osteoblast activity. Fluoxetine concentrations can be as high as 100 times that of serum in the bone marrow and remain as long as three months after discontinuation, and can interfere with osteoblast formation disrupting the bone matrix. Wu et. al.⁸ reports that, in several studies, “Overall, SSRI use was associated with a significantly increased risk of fracture (p. 365).” According to Kerbage, et. al.,⁵ who looked at several current studies, it has been shown in mice with a genetic disruption of the 5-HT transporter, “a bone phenotype of decreased bone mass, altered architecture, and decreased mechanical properties (p. 61).” Garfield et.al.¹¹ goes on to say, “genetic variation in the serotonin receptors predicts changes in bone metabolism during SSRI use.” Vijay et.al.¹⁴ looked at the LDL-receptor related protein 5 (LRP5), “One of the most intensively studied regulators of bone remodeling” and concluded that, “Loss- and gain-of-function mutations in the broadly expressed gene *Lrp5* affect bone formation, causing osteoporosis and high bone mass, respectively (p. 825).” According to the National Center for Biotechnology Information, the LRP5 is involved in endocytosis and very important in bone homeostasis.¹⁴ Furthermore, Vijay et.al.¹⁴ reported that mice with a mutation in this gene, that have high serum levels of Serotonin, have demonstrated low bone mass and a decrease in bone formation. The study indicated that bone formation relies on the inhibition of serotonin synthesis in the gut.

The Orthopedic In-Training Examination (OITE) is an exam taken by every orthopedic resident in the country. This test is an important as a barometer of resident advancement, as well as their progress compared their peers throughout the country. There has been increasing stress placed on those taking the exam due to the competitive nature of the field. This study/survey was used to assess different aspects of preparation for the exam, which sheds light on which study materials give the resident the best chance to succeed on the exam and possibly influence their future on the final board exams. We surveyed multiple different orthopedic programs to evaluate their opinion on the exam and how they prepared. When analyzing the results, it was clear that there was a fairly even distribution of residents from each year, which helps the data be more representative, getting data from new residents and residents who have had multiple years of preparation. From the data that was returned, it was obvious that Orthobullets was the clear leader as a study resource. It was also interesting on the spread of time that the residents began their study prep for the test. Most residents begin studying 4 months or less prior to the exam. This was common, and coincides with the new academic year. When analyzing the responses from the different PGYs it became clear that the upper level residents chose journal articles and orthobullets, along with questions over the less experienced residents chose CORR along with using questions for OITE preparation. This survey provided insight into the preparation that must take place in order to do well on the OITE. It is a very comprehensive examination that tests every sub specialty that an orthopedist would have to see and evaluate during their career. This test is very important to measure a resident’s progress.

54. OITE preparation: A survey of multiple orthopedic programs

• Denver Briley, D.O. - Millcreek Community Hospital Resident;
Ryan Sadloo

55. Medication changes during day shift hours versus night shift hours

• Denver Briley, D.O. - Millcreek Community Hospital Resident

Much is known about medication errors during

time of admission and at the time of discharge. Very little literature is available that has discussed the frequency of medication changes during normal business hours versus evening hours when most businesses, especially smaller private pharmacies, are closed. Specifically, little research exists of medication changes in an inpatient rehab unit. In addition, while most hospitals advocate a pharmacist intervention, some literature suggests that said intervention does not significantly reduce medication errors at discharge. The design of this study involved a retrospective analysis involving a three month period in the Inpatient Rehab Unit at Millcreek Community Hospital. From July 1, 2014- September 30, 2014, 83 patients were admitted during this timeframe. The time period in discussion is the day shift hours (7AM-5PM) versus the night shift hours (5:01PM-6:59AM). The research was conducted for a period of 3 months. It involved 83 patients admitted to the IRU at Millcreek Community Hospital. The data was analyzed using a student's t-test. A t-test was conducted to compare daytime medication changes to nighttime medication changes. The test involved a two-sample equal variance analysis with a two-tailed distribution. The results showed that there was a significant difference in medication changes during daytime ($M=7.41$, $SD=6.80$) vs. nighttime ($M=1.04$, $SD=1.41$); $t(2)=2.58E-14$, $p < 0.05$. After conducting the data analysis, there does appear to be a significant difference in medication changes during the two shift hours. The day shift appeared to have more medication changes than the night shift hours. This study highlights the need for more research to be conducted concerning whether the medication changes during the day are perhaps errors that are corrected from the previous shift or if they are modifications of the patients medication list by the pharmacist.

56. Self reported injury patterns in Tough Mudder competitors

• **Nicholas K. Callahan, D.O. - Millcreek Community Hospital Resident**

Background: Tough Mudder© events are becoming

increasingly popular and are held throughout the United States as well as some events internationally in Australia, New Zealand, Germany, and Europe. Since 2010 over 100 events have been held with over a million participants. These events center around obstacle-related courses with the focus being on team completion, rather than individual times. With the intense 10-12 obstacle course, however, there has been a lack of current literature focusing on the common injury profiles at the Tough Mudder© events. There are a few case reports of significant injuries i.e. myocardial infarction, electrical burns, cerebral vascular accidents, etc. but these studies are skewed towards serious and significant injuries. The goal of this study was to establish what types of injuries are occurring commonly. Methods: 52 individuals responded to an online questionnaire disseminated through social media asking for demographics, physical activity levels and training prior to competition, injury profiles, treatment received including any surgeries, and satisfaction of individuals who participated in any Tough Mudder© event(s). Results: 27% of participants reported being injured in this event. The knee, leg, shoulder, arm, and chest/abdomen were the most frequently injured regions in descending order. The most common injuries were in descending order bruise(s) (33%), Cut(s) (23%), sprain/strain(s) (12%). Conclusions: Despite the case reports of serious injuries, the majority of participants in this survey reported that they were either uninjured or that the injuries they sustained while competing in such an event did not require treatment. Of those that were injured the vast majority were bruises or cuts. While the presence of case reports of serious injuries should provide caution, this study suggests that more commonly injuries are minor or self-limited in nature.

57. PPI usage and breakthrough GERD symptoms in a community-based office setting: A patient survey

• **Kevin Castillo, D.O. - Millcreek Community Hospital Resident**

One hundred sixteen adults who were receiving (PPIs) proton pump inhibitors were interviewed with questionnaires regarding their medication usage patterns, breakthrough heartburn symptoms, treatment, and the persons responsible for providing drug administration instructions. The majority of the respondents (59%) reported that a physician was the primary person responsible for providing medication usage instructions, whereas up to 30% of respondents reported no one provided instructions for medication use. 72% of daily PPI users experienced breakthrough symptoms that limited daily activity to some degree. 50% of survey respondents reported that gastroesophageal reflux disease symptoms led to nighttime awakenings from sleep. 44% of respondents reported taking PPIs improperly. Breakthrough symptoms appear to be commonplace despite widespread use of PPIs and it seems likely that the evaluation of symptoms with our patients might lead to further refinement of our therapeutic interventions and improved quality of life.

58. Simultaneous bilateral quadriceps tendon rupture in young female with chronic renal disease: A case report

• **Daniel Cowley, D.O. - Millcreek Community Hospital Resident**

Simultaneous, bilateral quadriceps tendon rupture represents a rare entity. The delay in establishing the correct diagnosis is not uncommon and can often lead to severe disability. The first reported case was in 1949 and most atraumatic cases since have been associated with chronic underlying medical conditions. This article presents a case of bilateral, simultaneous quadriceps rupture in a 24-year-old female with underlying chronic renal failure. One quadriceps tendon rupture was diagnosed acutely in the emergency room, with a delay in the other being correctly diagnosed by the orthopedic surgeon at the first follow up appointment. The patient underwent surgical repair of bilateral quadriceps tendons using bone tunnels and non-absorbable suture and had a good functional outcome.

59. Reverse total shoulder arthroplasty as treatment for chronic shoulder dislocation: A case study

• **Nicholas Crossman, D.O. - Millcreek Community Hospital Resident**

Chronic dislocated shoulders are not only difficult to treat; they are debilitating to the patients themselves. Past treatment has included open reduction and repairs of various lesions. The reverse total shoulder has been indicated for patients with degenerative arthritis who also have rotator cuff tears. This case study found improved function and quality of life for a patient with a chronically dislocated shoulder treated with a reverse total shoulder arthroplasty. The patient's pain level decreased while his or her range of motion function was improved.

60. Obstructive ejaculatory duct calculi in patients with myelomeningocele

• **Vanessa A. Emdadi, D.O. - Millcreek Community Hospital Resident;**
Emily Morrison, M.S.; Sue Birkmire, R.N.;
Rona A. Gor, D.O.;
Christopher R. J. Woodhouse, M.D.;
Justine Schober, M.D.

Abstract: Symptomatic ejaculatory duct (ED) calculi, typically composed of uric acid, carbonate apatite and calcium phosphate, or calcium phosphate in the form of hydroxyapatite are rare occurrences. In the past, ED calculi have been attributed to peno-bulbar urethral stricture and ED obstruction. Other causes of ED calculi may possibly include urine reflux into the ED's, as is the case in resection of the ejaculatory ducts. We report two cases of large bilateral, ED calculi in two patients with spina bifida (myelomeningocele), one with an augmented bladder, the other with tethered cord, both with demonstrable ED reflux, and no urethral stricture, but likely sphincter dyssynergia and open bladder neck. Case Report #1: A 25-year-old Caucasian male, not compliant with his urological management,

presented with abdominal pain, difficulty in self-catheterization, nausea and vomiting. Two of eight large struvite calculi that blocked the urethra, were identified at the right ED. Cystogram demonstrated open bladder neck and spastic external sphincter. After endoscopic calculi removal, further management included bladder irrigation and infection control modalities, but the calculi recurred several times. Urinary tract infection and copious mucous production with stone formation continue to complicate his therapy.

Case Report #2

A 15-year-old Amish male presented with 1 week of fevers, malaise, RLQ abdominal pain, and cloudy malodorous urine. Two large struvite calculi were identified bilaterally in the ED's. The bladder was also found to be heavily trabeculated, progressively worse from previous images, with an open bladder neck and spastic external sphincter. An attempt was made to remove the stones and was unsuccessful. During cystoscopy, reflux was evident and visualized in real time at the ED's bilaterally. Two calculi later extruded into the urethra and were surgically removed by incision into the penile urethra. The ejaculatory ducts became so dilated that intermittent catheterization is now impossible. One large ejaculatory duct calculus is inaccessible. Symptomatic ED calculi are rare. This is the first case series report, to our knowledge, describing the presence of ED calculi in young men with myelomeningocele. Given the prevalence of bladder dysfunction and sphincter dyssynergia in patients with myelomeningocele, ED calculi may be a more common complication in this particular patient population than previously recognized, warranting the need for further research.

61. Injury underreporting in collegiate and professional athletes

• Patrick Fessler, D.O. - Millcreek Community Hospital Resident

The NCAA cites 420,000 student athlete participants for the 2013-2014 academic years at over 1,200 institutions. When correlating injury rates

with level of competition, injury rates increased as level of competition increased. I.E. Injury rates increased from Division III to Division I (Hootman, PhD, ATC, FACSM & Dick, MA, FACSM, 2007). Based upon previous research, it was hypothesized that there would be a statistical difference in the views and experiences with injury underreporting by athletes in different levels of competition. Collegiate and professional basketball and football players were surveyed using an online survey on their views and experiences with injury underreporting during the 2014-2015 season. Chi Square tests were utilized with a p-value of 0.05. It was concluded that there was no statistical significance in experiences with injury underreporting amongst the college and professional athletes surveyed. However when comparing athletes at different levels unique to basketball or football statistical differences were seen.

62. Impact of medical mission trips on cultural, spiritual and socioeconomic understanding

• Breanna Goldner - LECOM Student; Hanna Lurye; Michael Schmidt

Hypothesis: Medical students will gain a better understanding of cultural, spiritual, and socioeconomic differences through participation in medical mission trips. They will further understand how such aspects impact a patient's medical care and will gain confidence in addressing these factors in future practice. Materials and Methods: 45 medical students traveled to Vietnam, Peru, Uganda, or Costa Rica for 1-2 weeks. Students were asked to complete anonymous online pre- and post-surveys to assess their understanding of cultural, spiritual, and socioeconomic issues that are present in the medical field. Confidence in taking history and physical skills was also assessed. There were 28 pre-survey responses and 30 post-survey responses. Results: Over 63% of respondents had never participated in an international medical mission. In assessing patient interactions, 96% of responders felt mildly to very comfortable discussing different treatment options and concerns with a patient of

different cultural or spiritual background, which increased from 83% pre-trip. More specifically, there was a 31% increase post-trip in students that felt very comfortable performing these actions. There was a 29% post-trip increase in students' confidence in building trust and mutual respect with a non-English speaking patient, and a 15% increase post-trip of students that felt mildly to very comfortable accommodating families with different gender roles than their own. After the trip, 60% of responders felt very capable identifying valid reasons for medical non-adherence due to a patient's socioeconomic status, a rise from 22% pre-trip. Approximately 43% of students felt they completely understood the limitations a patient's socioeconomic status can have on his/her healthcare, which grew from 11% pre-trip.

63. The prevalence of otolaryngologists' practice locations in relation to birth state, medical residency and medical school

• **Shane Griffith, D.O. - Millcreek Community Hospital Resident; Anton Power, OMSIII**

Objective: This workforce study examines the geographic distribution of practicing otolaryngologists in relation to the residency, medical school and state of birth from which these physicians came Study Design: Descriptive cross sectional study Subjects and Methods: Using the American Medical Association (AMA) master physician file, current otolaryngologist practice locations were analyzed for the distance from previous medical training sites and birth state. Results: Of the 6648 otolaryngologists for which practice location, training locations, and birth state could be obtained, approximately 25.7% and 30.7% practice within 100 miles of their graduating medical school and residency, respectively. 31.6% of otolaryngologists currently practice within the same state as birth. These rates were variable by state with New Jersey, New York, and California residents having higher than national average rates of regional retention. Conclusion: Approximately 1/3 of otolaryngologists practice

within regions of previous medical training. While future studies are needed to determine causal relationships, by acknowledging these current trends we can adapt future graduate training decisions to support the geographic diversification of otolaryngologists.

64. A look at aggressive play and intent to injure among male junior hockey players of the Ontario Hockey League (OHL).

• **Matthew L. Hintz, D.O. - Millcreek Community Hospital Resident; Steven Habusta, D.O.; Andrew Kupniewski, A.T.C.; Angela Rood, Ph.D.**

Introduction: Ice hockey combines high-speed competitive play and physical contact leading to numerous yearly injuries. Previous studies demonstrated injury rates of approximately 30 injuries per 100 athletes per season and suggested an increase with the level of competition. Our research examined the root of these high rates of injury and the hypothesis that they are motivated by strategic advantage over pure hostility. Methods: A descriptive epidemiological study evaluated perceived motivation for, and incidence of intentional hockey injuries via anonymous Likert-type questionnaires. Surveys were sent to the teams of the OHL via their athletic trainers to be filled out voluntarily by the athletes over age 18. The local hockey team was our point of contact as our medical groups work closely with them. Per the 2014-2015 rosters, 301 athletes qualified by age and 51 surveys were completed and returned. Numerical values of 1 through 5 were subsequently assigned to the ordinal values of strongly disagree through strongly agree respectively to calculate a mean and mode for each question. Results: While the majority agreed that intentional injuries occur in male junior hockey, most respondents did not feel they had been targets of intentionally injurious acts. Respondents also agreed that athletes justify injurious acts and aggressive play if it leads to game success but the majority felt such acts should not be acceptable game strategy. Finally, the majority agreed

intentional injuries resulted from personal grudges and often target influential opponents. Conclusion: Non-accidental injuries are common in the sport of hockey. This survey has provided us with a better understanding of potential influences and motivations behind intentional injuries at the junior level within the model of the OHL. Further studies can be undertaken in an attempt to develop interventions to protect athletes and transform the violent game strategies common in the sport.

65. Florid reactive periostitis of the right long finger in a 22-year-old female:

A case study

• **Bryan Jarvis, D.O. - Millcreek Community Hospital Resident**

A review of the literature for florid reactive periostitis yielded no level 1 research studies. There were some case reports of the disease process found, but no cause for the disease process has been identified. In the literature it has been noted that florid reactive periostitis does seem to show a predilection towards the long bones in the hands and feet in individuals aged 25-45 years old. What this case study aims to demonstrate is a slow growing lesion that was discovered to be florid reactive periostitis in a 22-year-old female. In one report it discusses that the lesion can grow significantly in a matter of days or weeks. While in this case it was a matter of years with no inciting event.

66. Osteopoikilosis: Recognizing a rare, benign sclerosing bone dysplasia in the setting of a petrochanteric femur fracture: A radiographic case study

• **Jeffrey Jenks, D.O. - Millcreek Community Hospital Resident;**
Aaron Sop, D.O.; Fred Pollock, M.D.

Osteopoikilosis is a rare inherited sclerosing bone dysplasia. The hallmark feature of osteopoikilosis

is well-defined ovoid or circular sclerotic bone lesions within the metaphyseal and epiphyseal of long tubular bones which are benign in nature. Although usually asymptomatic, patients may occasionally have mild articular pain and slight joint effusions. Being able to recognize the classic appearance of osteopoikilosis on plain radiographs is key in diagnosing this benign disorder and could potentially prevent a patient from further imaging or diagnostic procedures. In our case study, and consistent with previously reported cases, osteopoikilosis does not seem to inhibit or delay bony healing in the setting of petrochanteric femur fractures.

67. Perceived value of virtual simulator training in arthroscopy: An orthopedic surgery resident survey

• **Kevin Keith, D.O. - Millcreek Community Hospital Resident**

Background: Arthroscopy is one of the most common procedures performed by orthopedic surgeons. The use of virtual simulation in the field of general surgery residency training has been increasing over the past decade, with very little use in the field of orthopedics. The purpose of this study was to survey osteopathic orthopedic surgery residents to determine their perceived value of having access to a virtual simulation prior to performing an arthroscopic procedure on a live patient.

68. Case report: Acute onset of necrotizing fasciitis in a 59-year-old male following intra-articular corticosteroid of the knee

• **Sean Kelly, D.O. - Millcreek Community Hospital Resident**

Abstract: This is a case report involving a 59 year-old Caucasian male that presented to a community hospital emergency room with manifestations of necrotizing fasciitis three days after receiving an intra-articular corticosteroid

injection in the right knee. The patient underwent immediate emergent above knee amputation with subsequent debridement and primary closure two days later. Necrotizing fasciitis is a life-threatening soft-tissue infection primarily involving the superficial fascia. The present case report describes the clinical presentation and microbiological characteristics of this condition, as well as the determinants of mortality associated with this uncommon surgical emergency.

69. Assessment of knowledge and opinions about whole body donation by current medical students experiencing dissection

• **Sean P. Larner, D.O. - Millcreek Community Hospital Resident;**
Precious Macauley, M.D.;
Sanjay Patel, M.D.; Candace Wooten, M.D.

Introduction: Medical students experiencing dissection may have a different attitude concerning body donation to science education programs. Their experience may modify their personal feelings about the value of human cadavers and their own willingness to donate. We assessed medical students' understanding of the process of whole body donation, whether dissection experience modifies medical student willingness to donate their own body, and their opinions regarding importance.

Methods: Our study population included first year medical students currently studying anatomy at St. George's University Medical School of Grenada, West Indies. Data was collected utilizing survey monkey online by questionnaire designed to measure participants' knowledge and opinions about whole body donation. Sociodemographic characteristics were assessed.

Results: A total of 277 (144 male, 133 female) medical students completed the survey. We found that the majority of the medical student population surveyed was not interested in becoming whole body donors (137 responded no, 30 yes, and 101 maybe). Although 65% felt there was a shortage of cadavers and nearly half of the medical students felt medical schools treated cadavers with the utmost dignity and respect, most medi-

cal students preferred their body to be buried after death (45%), while 22% preferred cremation, and only 13% favored whole body donation. In addition, 65% of the respondents reported they did not have enough information to make an informed decision, 18% lacked knowledge about the process for getting involved and 82% did not know how to register for the donation. Most medical students (71%) support the idea of requiring all adults to make an informed decision about whether they want to become a whole body donor and 55% support the idea of adding whole body donation status similar to organ donor status on drivers' license cards.

Conclusions: Although medical students recognize that there is a shortage of donated bodies, the majority were not in favor of donating their own body. Many felt they did not have enough information to make an informed choice. Making information more readily available about the concept of whole body donation, its importance, and the registration process, might have a significant impact on increasing whole body donations.

70. Cholecystoduodenal fistula with internal hernia, intussusception and small bowel perforation: An unusual complication of cholelithiasis

• **Melissa Loveranes, D.O. - UPMC Horizon General Surgery Resident;**
Gregory English, M.D.

Introduction. Gallstone ileus is a rarely reported complication of cholelithiasis and is associated with bilioenteric fistulas. Cholecystoduodenal fistulas are most common and are an uncommon cause of mechanical small bowel obstruction. Cholecystoenteric fistulas may be clinically silent, but are likely to cause obstruction with stones greater than 2 cm. Surgical intervention is the mainstay of treatment. We present an unusual case of a 67 year old female with cholecystoduodenal fistula, internal hernia, intussusception, and small bowel perforation and a brief review of current literature.

Case Description. A 67 year old female with history of umbilical hernia repair with mesh,

diabetes mellitus and hypertension presented with malaise, nausea, vomiting, diarrhea, epigastric and bilateral lower abdominal pain. Physical exam demonstrated diffuse tenderness to palpation, most prominent in the right lower quadrant. CT abdomen pelvis demonstrated pneumobilia, cholecystoduodenal fistula, small bowel intussusception, and pneumoperitoneum. The patient was taken emergently to the operating room for exploratory laparotomy, lysis of adhesions, small bowel resection x 2, appendectomy, and application open abdominal wound vac.

Outcomes: Operative findings included evidence of internal hernia with perforation. Jejunal resection was performed; ischemic distal ileum with impacted gallstone was resected. Incidental appendectomy was performed. Extensive adhesions were encountered throughout the abdomen. Omentum was densely adherent to the gallbladder fossa which was not easily accessed. Open abdominal wound vac was placed. Fascia was closed on second look laparotomy performed 48 hours later. Pathology was consistent with impacted mixed type gallstone within a portion of ischemic ileum. The patient was discharged home on post operative day #11.

Conclusion: Gallstone ileus is considered a surgical emergency with a high mortality rate. Incidence of cholecystoenteric fistula is < 2%. Treatment consists of surgical intervention including enterolithotomy alone, one stage enterolithotomy with cholecystectomy and fistula takedown, or two stage enterolithotomy with delayed cholecystectomy.

71. Isolated Horner's syndrome: A diagnostic challenge

• **Meredith Marcincin, D.O. - Millcreek Community Hospital Resident;**
Anthony Sala II, D.O.

Introduction: The presentation of an isolated Horner's syndrome poses a diagnostic challenge to the clinician. The causative lesion can exist at several different locations along the three-neuron oculosympathetic pathway. Horner's syndrome has been well characterized in the setting of

brainstem ischemia, brain masses, spinal cord trauma, carotid dissections, aortic aneurysms as well as a variety of malignant neoplasms.

This case study reports a rare presentation of an isolated Horner's syndrome in the setting of an atrial myxoma. The aim of the study is to explore the rare etiologies of Horner's syndrome and aid clinicians in developing differential diagnoses in the setting of an isolated presentation.

Case Presentation: A 49-year-old Caucasian male with a past medical history significant for coronary artery disease, hypertension, hyperlipidemia and chronic tobacco abuse presented to the emergency department with a ten day history of right eyelid swelling and anisocoria. On physical examination, the patient was discovered to have a right Horner's syndrome in the absence of any accompanying neurologic signs or symptoms. An extensive workup was initiated to locate the causative lesion, and a thoracic CT scan identified a filling defect in the left atrium. The patient was found to have an intracardiac mass along the posterolateral wall of the left atrium, and the mass was subsequently resected. The diagnosis of atrial myxoma was confirmed by histopathological study. No other evidence of acute pathology was identified on radiographs or laboratory investigations.

Conclusion: The differential diagnosis of Horner's syndrome is broad, and the clinical presentation of an isolated syndrome adds further complexity to localizing the causative lesion. In this case report, we describe a number of rare etiologies of Horner's syndrome that should be explored in the setting of an isolated presentation.

72. The influence Disney stereotypes may have on the developing schema of children: The analysis of Disney's "All that is beautiful" ideology

• **Gianpiero Martone, D.O. - Millcreek Community Hospital Intern;**
Katarzyna Liwski, OMSIII

The purpose of this literature review is to determine whether the media most consider "healthy" and "innocuous" can in fact be harmful to a

developmentally young and naïve mind. The review focuses on the stereotypes- primarily the “all that is beautiful is good and right” ideology created by child-friendly corporations like Disney and Nickelodeon. By incorporating various Disney storylines with comprehensive research, a parent/teacher/guardian will have a better idea as to how the biased, sexist, and stereotypical behaviors of Disney stories can alter the schema and expectations of children.

73. Case presentation of T-Cell lymphoma of the foot

• **Steven McCarthy, D.P.M. - Millcreek Community Hospital Resident**

T-Cell lymphoma does not have a unique presentation that is confined to the lower extremity, and surgical removal is an appropriate first step in treatment of T cell lymphoma followed by radiation treatment or chemotherapy.

74. Effectiveness of a formal curriculum in teaching mass casualty management

• **Brian L. Risavi, D.O. - UPMC Hamot Resident; Mark Terrell, Ed.D.; Brett McLaughlin, D.O.; Dustin Stuart, D.O.; Donald Holsten, B.A.**

Mass casualty incidents (MCI) are becoming more frequent. Irrespective of the source, multiple patients require a change in patient care methods. To balance the limited resources with multiple patients, and to match those limited resources with those patients having the potential for survival, there must be an organized response. The fundamental aspects of MCI management include an appropriate scene size-up, implementation of an incident-specific command structure, and appropriate medical management of the patients to facilitate rapid assessment, triage, treatment, and transport to the appropriate facilities. Unfortunately, there exists no formal course in MCI management. Following 9/11, the need for ICS was clear, yet many still do not understand

the process, and the lack of training is evident. The purpose of this study was to assess the effectiveness of a formal curriculum in teaching mass casualty management to EMS providers.

Methods: IRB approval was obtained. A formal curriculum was designed to teach MCI management. Lectures, interactive computer-based simulation, tabletop exercises, skills stations, and three- and six-month follow-up email surveys. Course evaluation surveys were also used to evaluate the entire curriculum. These provided the participants the opportunity to learn and demonstrate competency in accordance with the formal objectives of the curriculum. Formative feedback was utilized to guide participants following each section. Initial evaluation was based on a computer simulation of an MCI in which participants documented, in essay format, their actions as incident commander with respect to scene size-up, establishing an incident command structure to manage the scene, and the medical management of the incident. This was followed by a lecture on scene size-up, ICS, and medical management, including a video of the START method. Each lecture was followed by a brief written evaluation of the basic principles covered in the presentation. Each participant then entered the skill stations, on size-up, triage, and casualty collection station/medical management.

Results: The formal curriculum resulted in a minimum 20% (one point on a five-point Likert scale) in the areas of: mitigating hazards and communication during scene size-up; incident command structure development, incident charting, staging, command position assignment, and incident action plan development as a function of command structure. Lastly, establishing casualty collection and treatment sectors. Average scores on the written component of the evaluation as well as the knowledge of patient triage were 84 +/-9% and 74 +/- 14% respectively. Validating the assessment, based on kappa statistics from expert responses, varied from 0.031 to 0.416; of these 66% were significant ($p < 0.05$), suggesting agreement in the majority of the evaluation. Based on between 31% and 16% of the original cohort of trainees, knowledge recall at 3 and 6 months was generally unchanged from the time of the educational session. Course and instructor evaluations by participants reflected a high

degree of satisfaction (median scores of 5 on a five-point Likert scale).

Conclusion: A formal curriculum, consisting of a four-hour educational session, utilizing multiple educational modalities, was effective in improving knowledge and performance of mass casualty management. Funding: This research was sponsored by a grant from LECOMT.

75. Trans-oral cervical spine exposure, a survey of the North American Spine Society

• **Erez A. Minka, D.O. - Millcreek Community Hospital Resident**

Through decades of experience with the transoral-transpharyngeal approach to the craniocervical junction, the neurosurgical community has had continuous training and publication in the use of traditional, endoscopic, and microscopic approaches to the upper cervical spine for anterior pathologies. Orthopaedic surgery literature has remained fairly segregated from this approach to the spine, and has been primarily focused upon the use of the anterior and posterior direct approaches to the cervical spine. Given the disparity of its usage, the reported efficacy when performed with proper technique, and the growing public interest in minimal-incision surgery, it remains to be seen whether orthopaedic spine surgeons will begin to regularly train and utilize the transoral approach to the cervical spine. Methods. From January 2015 until March 2015, an anonymous survey was provided on an online forum, available only to registered members of the North American Spine Society. No personal data, including the Internet Protocol address, was saved or recorded anywhere to ensure anonymity. Results. 16 of 26 respondents were orthopaedic in training, while the other 10 were neurosurgical. 80% were spine fellowship trained. Over three-fourths of the surgeons preferred using the posterior approach in instances of single level fracture dislocation. Only 34% of the respondents state that their training exposed them to transoral approaches. Of the 5 surgeons using transoral techniques in their practice, 2 have used

it primarily for trauma, 2 for odontoidectomy, and 1 for congenital malformation. Conclusion. Given the evolving technologies of microsurgical and endoscopic technique in spinal surgery, the transoral approach to the upper cervical spine is a useful tool that should be incorporated more into orthopaedic surgical training.

76. Cystine nephrolithiasis as a side effect of qsymia: A case study

• **Susan Mullooly, D.O. - Millcreek Community Hospital Resident**

Qsymia capsules is a combination of phenteramine, a sympathomimetic amine anorectic and topiramate extended-release, an antiepileptic drug, indicated as an adjunct to a reduced-calorie diet and increased physical activity for chronic weight management in adults with an initial body mass index of:

- 30 kg/m² or greater (obese); or
- 27 kg/m² or greater (overweight) in the presence of at least one weight-related comorbidity such as hypertension, type 2 diabetes mellitus, or dyslipidemia

Use of Qsymia has been associated with kidney stone formation due to development of metabolic acidosis. Conditions that predispose to acidosis (i.e. renal disease) may be additive to the bicarbonate lowering effects of topiramate (qsymia.com). This is a case study of a patient that had long-standing cystinuria that took Qsymia for weight loss, along with a low carbohydrate/high protein diet, and developed increased formation of kidney stones.

77. Assessing musculoskeletal competency in osteopathic medical students

• **Luke Olson, OMSII - LECOM Student;**
Chun Cheng Andy Chen, Ph.D.;
Randy Kulesza, Ph.D.
Jonathan K. Kalmey, Ph.D.;
Sarah A. McCarthy, Ph.D.

Musculoskeletal related conditions are the second

most common reason patients seek medical attention in the primary care setting and the second most costly cause of morbidity behind cardiovascular disease. It is very important that physicians are thoroughly educated, competent, and confident to diagnose and treat musculoskeletal conditions. However, previous research has demonstrated that musculoskeletal knowledge retention, based on a standardized competency exam, is less than optimal. Our study evaluated first-year osteopathic medical students before and after they had taken the Musculoskeletal System course at LECOM by using the same 25-question examination developed by internal medicine and orthopedic residency directors utilized in previous studies. We administered the examination before and after the course to two separate cohorts of first year students, the class of 2014 and the class of 2017. We compared these two cohorts and the results show that the Musculoskeletal System course significantly improved examination performance by 27.8% for the class of 2014 and 28.4% for the class of 2017. Furthermore, the average post-course score of the class of 2017 was significantly higher than the average score of students in the class of 2014 showing 23% more students demonstrating competency. In summary, our Musculoskeletal System course improved musculoskeletal knowledge in students, and our first-year osteopathic medical students did as well or better compared to graduating osteopathic students and allopathic residents, respectively. This study indicates that despite first-year students comparing favorably with more experienced students in musculoskeletal knowledge there is room for improvement within our Musculoskeletal System course. Future changes to the course may include more case study scenarios and a focus on more high impact, high frequency musculoskeletal related presentations and management.

78. A very dangerous back pain, success with PVOD

• **Anand Popuri, D.O. - Millcreek Community Hospital Resident**

Pulmonary and Critical Care Fellow, LECOM Health- Millcreek Community Hospital, New York College of Osteopathic Medicine 2012
Abstract: Patients everyday present at a primary care or pulmonology office for chest discomfort and shortness of breath. It is the keen eye that discerns the information presented to him and perseveres to find an answer to the seemingly unanswerable. Pulmonary veno-occlusive disease is a pathologic state that remains rarely diagnosed. It is estimated the frequency may only be 0.1-0.2 case per million persons in the general population. This is thought to be secondary to a mistake in classification of this specific condition into primary pulmonary hypertension. In addition, this condition can be discovered as a diagnosis in ages as early as 8 weeks and as late as the 7th decade of life. The patient under evaluation, presented with persistent back pain who had undergone general evaluation by her primary care physician and was referred to a specialist for a more in depth evaluation after an abnormal X-ray was discovered. This patient endured extensive testing over the course of 6 months with which finally came to the conclusion she may be presenting with a very uncommon presentation of a rare condition.

79. Regenerative biomedicine feasibility survey

• **Farzad Pourarian, D.O. - Millcreek Community Hospital Resident**

This study is to determine the feasibility of amnion based injection therapy. The goal is to determine if patients are willing to undergo injection therapy involving their own platelets, bone marrow, and adipocytes as well as injection therapy involving regenerative biomedicine and donor amnion tissue and to measure the capability and willingness of patients to want to pay for regenerative biomedicine injections. A feasibility survey was designed for patients who have undergone previous injection therapy and was either successful or not. 68 patients responded to the survey, it was determined that it is not feasible at this time, in this region of the United States. Donor Placental Amnion tissue injections,

Bone Marrow Aspirate Concentrate (BMAC) injections, and adipocyte injections are priced between \$1000 - \$2000 per procedure and must be paid out of pocket with a maximum of two procedures per year. This is difficult for most patients to afford. At this time, Regenerate Biomedicine seems to be more feasible for professional athletes, but as it becomes more commonplace in general practice and insurances absorb some of the payments, this therapy will integrate further into practice and become a mainstay of non-surgical, non-medication therapy.

injury will allow physicians to provide patients with proven treatment plans that allow them to remain active.

80. Treatment of Sever's injury without limiting physical activity: use of heel cup vs. heel wedge

**• Laura Richards, D.P.M. - Millcreek Community Hospital Resident;
Adam Long, D.P.M.**

Sever's injury is characterized by pain located in the posterior heel in children usually around 10 to 12 years old. The pain is provoked by weightbearing physical activity and commonly affects children who are involved in sports which require repetitive heel strikes against the ground, most frequently soccer and running. Patients will typically complain of pain with weightbearing located near the insertion of the Achilles tendon into the calcaneus, and will have pain upon squeezing the medial and lateral sides of the posterior aspect of the calcaneus. There are many treatment options for Sever's injury that have been recommended over the years including rest, cessation of sports, heel lifts, stretching of the triceps surae, orthoses, plantar fascial stretching, heel padding, nonsteroidal anti-inflammatory drugs, steroid injection, casting, and even removal of the apophysis. Treatment of calcaneal apophysitis has historically been based on low level evidence including retrospective studies and anecdotal evidence. The purpose of this literature review is to find high quality, prospective studies evaluating the treatment of Sever's injury without requiring reduction of the physical activity level of patients. Referencing studies that scientifically evaluate the treatment of Sever's