



UW-Department of Orthopedics and Rehabilitation and UW-Department of Anesthesiology

UW Health Multidisciplinary Pain and PM&R Research Day

Friday May 1, 2020 8:00am-2:00pm

8:00 Introduction, Nalini Sehgal, MD,
Physical Medicine and Rehabilitation, UW Health

8:05 Keynote Speaker,
Timothy McGuine, PhD, TAC
Orthopedics—Sports Medicine, UW Health

8:35 Colin Grove, PT,
Physical Medicine & Rehabilitation, UW Health

8:50 Michael Suer, MD
Physical Medicine & Rehabilitation, UW Health
Leah Gause, Emma Hansen, Kiera Miller,
Lily Jaeger & Draeson Marcoux,
Biomedical Engineering Students, UW-Madison

9:05 Andrew Quanbeck, PhD, Nicholas Schumacher & Bobbie Johnson,
Family Medicine and Community Health, UW Health

9:20 Break

9:30 Keynote Speaker,
Tobias Moeller-Bertram, MD
Desert Clinic Pain Institute

10:00 Hazel Mathes DO,
Physical Medicine & Rehabilitation Resident, UW Health

10:15 Sook Yoon, MD and Leo Varzi, DO
Pain Medicine Fellows, UW Health

10:45 Scott Blaine, DO
Anesthesiology Resident, UW Health

11:00 Break

11:15 Brody Fitzpatrick
Medical Student, UW Madison

11:30 Matthew Cowling, DO
Physical Medicine & Rehabilitation Resident, UW Health

Presentation of basic science and clinical pain research



Dr. Moeller-Bertram is the Chief Medical Officer of Summit Institute and Desert Clinic Pain Institute, focusing on whole patient care through a multidisciplinary approach. Prior to going into private practice, Dr. Moeller-Bertram held an appointment as associate clinical professor of anesthesiology and psychiatry and as the director of clinical pain research at the University of California San Diego. He is triple board certified in Anesthesiology, Pain Management, and Addiction Medicine.

Dr. Moeller-Bertram returned to San Diego 2005 as an assistant clinical professor and enrolled in a master's program for clinical research. He joined the VA San Diego Healthcare System and established his pain clinic there serving the Veteran population. These humbling and rewarding years of serving Veterans profoundly impacted his career and shaped his research efforts. With his strong background in research, Dr. Toby created and implemented a research component directly into his practices for accurate feedback on patient progress and serves as the Director of Research with Vitamed Research, LLC., conducting research projects and trials in the field of pain and neurosciences.

Besides keeping a busy practice, he conducted many experiments to better understand the effects of stress on pain perception. His areas of expertise include PTSD and fibromyalgia and he received funding and support from sources including the "Foundation for Anesthesia Education and Research", the "Center of Excellence for Stress and Mental Health" and industry leaders. During his years at UCSD and the VA, he served as the director for clinical pain research at UCSD, published numerous papers and book chapters and presented his work at many national and international conferences as guest lecturer or visiting professor. Dr. Moeller-Bertram is an associate clinical professor (voluntary) with the University of California Riverside School of Medicine.



Dr. McGuine has taken an active role in developing and facilitating novel research methods to allow for effective prospective data collection and analysis in field (sport) settings. At the University of Wisconsin, he established The Wisconsin Sports Injury Research Network, through which a team of licensed ATCs and coaches collect prospective research data in diverse high school and club sport settings. To date, this program has recruited and enrolled over 16,000 adolescent athletes from 112 different high schools and club sport settings to serve as research subjects for numerous cross sectional, cohort, and randomized control trials.

1:45 Yeng Fransoua Her, MD, PhD
Physical Medicine & Rehabilitation Resident, UW Health

12:00 Lunch

12:30 Kellen Hilton, MD
Physical Medicine & Rehabilitation Resident, UW Health

12:45 Michael Lin, MD
Physical Medicine & Rehabilitation Resident, UW Health

1:00 Christopher Lynch, DO
Physical Medicine & Rehabilitation Resident, UW Health

1:15 Ashley Mohan, MD
Physical Medicine & Rehabilitation Resident, UW Health

1:30 Laura Prince, MD
Physical Medicine & Rehabilitation Resident, UW Health

1:45 Simon Wallace, MD
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2020 UW Health Multidisciplinary Pain and PM&R Research Day

8:00 Introduction, Nalini Sehgal, MD, Physical Medicine and Rehabilitation, UW Health

8:05 Keynote Speaker, Timothy McGuine PhD, TAC, Orthopedics – Sports Medicine, UW Health | Sport Related Concussions in High School Athletes: Incidence, Risks, Outcomes and Prevention?

Approximately 7.2 million high school students participate in interscholastic sports each year in the United States. The incidence and impact of sport related concussion (SRC) injuries in this population are a growing concern to athletes, parents, school officials and medical providers. This presentation will provide an overview of the incidence, risk factors, impact and prevention initiatives for SRCs in high school athletes. Emphasis on recent SRC related research conducted at UW-Madison will be included. Learning objectives for this presentation are: 1. Recognize the impact (incidence, health care utilization and medical costs) of SRCs. 2. Describe intrinsic and extrinsic factors associated with an increased risk for concussion. 3. Appraise the effectiveness of various interventions to prevent SRCs.

8:35 Colin Grove, PT, Physical Medicine & Rehabilitation, UW Health | The Reliability and Validity of a New Virtual-reality-based Balance Test

Dizziness and/or imbalance affects an estimated 33 million American adults annually and a 12-fold increase in falls risk has been observed when these problems are co-occurring. This is a public health concern given that falls result in significant morbidity for both younger and older adults and falls are a leading cause of accidental or unintentional mortality. Thus, the National Institute for Deafness and Other Communication Disorders has established as one of its top priorities improving diagnosis, treatment, and prevention of imbalance and dizziness. To that end, we assessed the psychometric properties of a new, virtual-reality-based, balance test in adults with and without vestibular dysfunction. Overall, we found that this test has excellent reliability and validity. Providers and rehabilitation therapists may confidently utilize the results of this test to augment their clinical decision making regarding the management of persons with imbalance and dizziness.

8:50 Michael Suer, MD, Physical Medicine & Rehabilitation, UW Health, Leah Gause, Emma Hansen, Kiera Miller, Lily Jaeger, Draeson Marcoux, Biomedical Engineering Students, UW-Madison | The Lumbar Spine Procedure Model

The medical field currently lacks sufficient technology necessary for properly training residents and fellows on how to perform interventional lumbar spine procedures; many residents and fellows learn by performing procedures on actual patients without prior practice in a simulated environment. This lumbar spine procedure model aims to alleviate these concerns and allow trainees to build confidence before executing procedures on patients. The prospective function of the model is to provide a three-dimensional anatomical representation enabling trainees to learn how to execute interventional spine procedures on various vertebral pathologies. Additionally, the model will need to express the tissue densities accurately, be X-ray compatible, and provide needle feedback confirming favorable placement within the desired area and/or tissue.

9:05 Andrew Quanbeck, PhD, Nicholas Schumacher & Bobbie Johnson, Family Medicine and Community Health, UW Health | Systems engineering concepts to address high-dose opioid prescribing and support patients with chronic pain

Using systems engineering concepts and strategies, the Implementation Science and Engineering Lab aims to speed the implementation of evidence-based interventions for managing chronic diseases in primary care. One of the lab's current study uses a novel implementation strategy, systems consultation, to help primary care prescribers and patients balance the benefits and risks of using opioids for chronic pain. While reducing a patient's opioid dose lowers the risk of overdosing, the patient is often left to cope with the pain unsupported. Using a modified version of a smartphone app now used to reduce alcohol consumption, we plan to create a support system to help patients manage their chronic pain while reducing their use of prescription opioids.

9:20 Break

9:30 Keynote Speaker, Tobias Moeller-Bertram, MD Desert Clinic Pain Institute | Introduction to Unitized Transdisciplinary Care for Complex Pain Patients

The presentation will introduce an efficient and effective efficient, scalable solution to treating complex populations. Our program structure is Patient Centered, Cost sensitive and outcome driven. Care is concentrated into delivery units that optimally combine patients, providers, support personnel, services and clinics. Utilizing SCRUM (systemic case review) and Unit block scheduling, multiple group and/or individual transdisciplinary services are arranged and provided in real time to each patient based on patient needs and service availability.

10:00 Hazel Mathes, DO, Physical Medicine & Rehabilitation Resident, UW Health | Elective amputation for an equinovarus deformity in a patient with Multiple Sclerosis

A 58-year-old female with a history of progressive Multiple Sclerosis, dependent on a wheelchair for mobility, presented to clinic with mild hip and knee flexion contractures and an equinovarus foot deformity, limiting her ability to stand and transfer, as well as putting her at increased risk for a pressure ulcers. After undergoing a multitude of treatments, the patient did not improve. An elective BKA was performed. Patient's function and mobility improved after surgery compared.

10:15 Sook Yoon, MD and Leo Varzi, DO, Pain Medicine Fellows, UW Health | Inter-Rater Reliability of Colored Pain Drawings for Neuropathic Pain Assessment

Neuropathic pain (NP), unlike nociceptive pain (NoP), follows the territory of the affected somatosensory nervous system structure, and is accompanied by specific sensory symptoms and signs. The spatial distribution of these symptoms can be depicted by a simple pain drawing. By adding colors to convey the quality and spatial characteristics of pain and sensory symptoms in colored pain drawings (CPD), it may become possible to identify patterns that indicate presence of NP on the basis of neuroanatomical knowledge. The practical utility of pain diagrams in this case would be to screen for NP in patients with pain and better target clinicians' history and physical exam. Previous study by Sehgal et al. 2012 has found CPD to be a very useful tool to point to the likely presence of NP or alternatively NoP with strong inter-rater reliability between two very experienced physicians.

10:45 Scott Blaine, DO Anesthesiology Resident, UW Health | Stress-Induced (Takotsubo) Cardiomyopathy After Radiofrequency Ablation

Radiofrequency ablation (RFA) is a common procedure employed in the management of patients with chronic pain syndromes. Although the procedure is generally well tolerated, no procedure is without risks. Case Description: A 65-year-old female with a past medical history of chronic neck pain presented to the emergency department with squeezing, substernal chest pain an hour after RFA of the left 3rd occipital nerve and left C3/4 medial branches. Her vitals were normal, and an ECG initially showed no signs of ischemia. However, a troponin drawn 4 hours after the procedure began was elevated to 0.29 ng/mL (reference <0.04). Repeat ECG an hour later showed evolving ischemia with T-wave inversions in the lateral precordial leads. Repeat troponin 6 hours after the first draw was 2.19 ng/mL (reference <0.04). She was taken for coronary angiography given the presence of ongoing ischemia. Angiography showed patent coronary arteries with no evidence of obstructive coronary artery disease or artery spasm. Transthoracic echocardiogram done shortly after the procedure demonstrated an ejection fraction of 25% with akinesis extending from apex midway up the walls of the left ventricle (i.e., not in the distribution of a coronary artery). The base of the heart and the right ventricle

11:00 Break

11:15 Brody Fitzpatrick, Medical Student, UW-Madison | Genicular Nerve Radiofrequency Ablation as an Alternative to TKA in Patients Being Followed in a Non-operative Knee Osteoarthritis Clinic

Osteoarthritis (OA) is a leading cause of disability in the United States, and effective treatment strategies for patients who are deemed poor surgical candidates are generally limited. In 2017, UW implemented a multidisciplinary non-operative hip and knee OA clinic to identify effective management strategies for this population. In the last decade, one treatment option that has gained popularity is the genicular nerve block and radiofrequency ablation. Studies evaluating these procedures have shown that they improve pain and function in patients with primary knee OA. Therefore, we aimed to evaluate the efficacy of these procedures in non-surgical candidates being followed in our clinic and to identify functional measures and patient factors that predicted treatment outcomes.

11:30 Matthew Cowling, DO Physical Medicine & Rehabilitation Resident, UW Health | Characterizing the role of Haloperidol for analgesia in the emergency department

The purpose of this study was to characterize emergency department (ED) physicians' beliefs and current practices regarding the use of haloperidol for the management of acute and acute on chronic pain. Methods: A survey regarding haloperidol use was distributed by email to attending physicians, resident physicians, nurse practitioners, and physician assistants at emergency medicine departments in the Indiana University Health System and at St Joseph Mercy Ann Arbor. Results: Of the 129 responses received, the majority (89.1%) of providers had used haloperidol for control of pain in the ED. The most common reason that respondents used haloperidol to treat pain was that they did not want to use an opioid or other agent (91.3%). The majority of providers (73.9%) believed that haloperidol was effective because there is a psychiatric component to pain, while over half of respondents (58.3%) chose haloperidol as they believed it to have analgesic properties. When haloperidol was used as a first line medication, providers felt that it was effective in controlling pain about 69.0% of the time without the need for further medication. The most common presentations for use were for unspecified abdominal pain, headache, and gastroparesis. Conclusion: ED providers reported using haloperidol most often as a second line treatment to manage both acute and acute on chronic pain. When haloperidol was used as a first line agent, providers claimed that additional medicines were not usually required. Haloperidol may provide an effective alternative to opioids in treatment of acute pain and acute exacerbations of chronic pain in the ED.

11:45 Yeng Fransoua Her, MD, PhD, Physical Medicine & Rehabilitation Resident, UW Health | Topical lidocaine application and sensory thresholds in hypermobile Ehlers-Danlos syndrome: A double-blinded, placebo-controlled investigation

Objective: This study aims to investigate thermal detection threshold (TDT), thermal pain threshold (TPT), pressure pain threshold (PPT), vibration threshold (VT), pinprick detection (PD) in patients with hypermobile Ehlers-Danlos syndrome (hEDS) compared to healthy matched control subjects in the setting of lidocaine application. Our hypothesis is hEDS patients have less cutaneous anesthesia than healthy controls when exposed to transdermal lidocaine, resulting in decreased PPT, TDT, TPT, VT, and PD compared to healthy matched control subjects. Methods: This study is the first prospective, case-controlled, compared to healthy controls (age, sex, and BMI-matched control group), and double blinded study to investigate the effects of cutaneous anesthesia in hEDS patients compared to control subjects. We will recruit twenty hEDS patients meeting criteria for hEDS and twenty healthy subjects from the Pain Clinic and primary care clinics at the University of Wisconsin Hospitals and Clinics. Significance: The rationale underlying this study is to provide objective evidence so that modifications to anesthetic planning can be made to prevent hEDS patients from unnecessary pain during medical procedures. How it relates to the goal of providing better understanding of EDS and/or improving treatment/diagnosis: The outcomes of this study will have a positive impact on pain management in hEDS patients. A lack of response to local anesthetics may have profound clinical implications. It clearly would affect anesthetic planning for procedures in people with hEDS. The utility of topical local anesthetics may be reduced. Treatment modification might also be necessary when using lidocaine or its oral congener mexiletine as anti-arrhythmics.

12:00 Lunch

12:30 Kellen Hilton, MD, Physical Medicine & Rehabilitation Resident, UW Health | Assorted Research Projects

I am currently working on a case presentation of three patients with different causes of upper level (C1-C2) cervical myelopathy. Upper cervical myelopathy has lesser incidence than lower levels of cervical myelopathy and has a varied presentation without findings specific to the disease and can have subtle imaging findings making it easy to miss the diagnosis. The aim of this presentation is to increase providers level of awareness and ability to diagnose upper level myelopathy. I am also part of a group working on a chart review of new UWRH amputee patients, identifying risk factors for failed progression to prosthesis fitting and community ambulation. This project is currently in the literature review phase looking at success factors in rehabilitation of amputees. The goal of this project is translation of data into a prospective quality improvement initiative aimed at identifying new amputees at risk for poor progression and instituting interventions aimed at improved rates of successful prosthesis fitment to increase quality of life and functional measures in this population. Lastly, I am working in a group on a feasibility study looking at the role of Botulinum toxin injection in treating patients with chronic exertional compartment syndrome (CECS) and monitoring their strength at time of intervention and 2 months post intervention. We are currently revising our research protocol for submission to the IRB.

12:45 Michael Lin, MD, Physical Medicine & Rehabilitation Resident, UW Health | Retrospective Chart Review Study Evaluating Mexiletine Use in Chronic Pain Management

Objective: To evaluate clinical use of mexiletine by exploring the indications, dosing, tolerability, side effects, and efficacy in patients with chronic pain diagnoses. Design: This retrospective cohort study included patients who had been prescribed the oral lidocaine analog, mexiletine, at a chronic pain management clinic between April 2016 and April 2019. Study data accessed in the electronic medical record were collected and managed using REDCap electronic data capture tools. Demographic and clinical variables recorded for patients who were prescribed mexiletine for chronic pain included a previous intravenous (IV) lidocaine trial, chronic pain diagnoses, percent pain relief and change in numerical rating scale at follow-up visits, as well as side effects and duration of use. Results: Among the 91 patients (62.6% female) included in the analysis, the most common pain diagnosis was neuropathy (48.4%). Eighty-seven percent of patients in the study had a trial of IV lidocaine prior to starting mexiletine; 72% of these patients citing short duration of pain relief on IV lidocaine as a reason for their oral mexiletine trial. Pain was improved by greater than 30% in 33% of patients started on mexiletine who had quantitative pain relief data (N=36) available in the medical chart, however 60% of the study population discontinued mexiletine, largely due to mild-moderate gastrointestinal side effects. Conclusions: Mexiletine is an oral lidocaine analog that has variable efficacy as a third line analgesic agent for neuropathic pain, and which may occasionally offer clinical benefit to those with non-neurogenic pain diagnoses. However, tolerability of this agent is often limited by the high incidence of side effects. Additional studies are needed to better characterize the efficacy of mexiletine for neuropathic and non-neuropathic pain syndromes

1:00 Christopher Lynch, DO, Physical Medicine & Rehabilitation Resident, UW Health | Assorted Research Projects

Pediatric Cerebral Palsy: Over the past 10 years the framework for the diagnosis of cerebral palsy has changed significantly (there was previously a paradigm where diagnosis wasn't really officially made until nearer to age 2 years) - now the goal is for early diagnosis to maximize function (motor and cognitive plasticity) with early intervention. With this in mind, the goal of the project is to look at children who have been seen in newborn follow-up clinic over the past 10 years and look at how they were diagnosed (criteria/factors) and the age they were diagnosed to evaluate how this has evolved. This is an ongoing, IRB approved, retrospective chart review with Dr. Villegas and Dr. Legare. Botulinum Toxin for CECS: Spearheaded by Dr. Suer, I've submitted a case report of a 60-year-old gentleman who was successfully treated with botulinum toxin injections to his bilateral lower extremities for chronic exertional compartment syndrome (CECS). This case is unique in that this is the first reported case to our knowledge to use

botulinum toxin to treat CECS specifically in the posterior compartment of the lower leg as well as in a patient who has had previous surgical release – prior patients were all excluded if they had surgical release. Obesity Project in Amputees: ongoing discussion, talking with Dr. Caldera and Dr. Kim. In the works right now with literature review and feasibility to address if obesity is limiting our ability to fit amputees with prosthetics. Further research question if we can reject null hypothesis would be centered around if there is an intervention regarding obesity medical/surgical management to increase amount of amputees being successfully fit for prosthesis. Would be retrospective chart review over several years, from time of amputation to 1-2 years post amputation/prosthesis fit or no fit. Inclusion criteria is new, nontraumatic first-time amputees with BMI > 30, will clarify level of amp. Based on chart review, could consider prospective trial regarding management of obesity with multispecialty/disciplinary team and potential medical/surgical management.

1:15 Ashley Mohan, MD, Physical Medicine & Rehabilitation Resident, UW Health | Effects of lumbar medial branch radiofrequency neurotomy on low back and hip kinematics

Low back pain is one of the most prevalent and disabling musculoskeletal disorders. Among the various treatments that currently exist, medial branch radiofrequency neurotomy (RFN) is an effective therapy used for lumbar zygapophyseal joint pain. To date, there is little information available on the objective outcomes of RFN on the spine. Therefore, the overall goal of this study is to determine the effects of RFN on spine and hip kinematics. We hypothesize that patients with facet arthropathy will have improved spine and hip kinematics after radiofrequency neurotomy. We will test this central hypothesis by focusing on the following specific aim: compare lumbar and hip motion in patients before and after lumbar medial branch RFN.

1:30 Laura Prince, MD, Physical Medicine & Rehabilitation Resident, UW Health | Intrathecal Chemotherapy: A Case Report of a Rare Cause of Spinal Cord Toxicity in a Pediatric Patient

This is a case of a teenage girl with DLBCL who underwent chemotherapy and developed symptoms of weakness and paresthesias in her legs with associated bowel and bladder dysfunction. Extensive work up determined etiology of symptoms related to spinal cord dysfunction from intrathecal chemotherapy, a rare cause of SCI in oncology patients.

1:45 Simon Wallace, MD, Physical Medicine & Rehabilitation Resident, UW Health | Interpreting Fluctuating Inflammatory Markers in an Adult with Cerebral Palsy and Lennox-Gastaut Syndrome After Treatment for Post-Operative Aspiration Pneumonia: A Case Report

Patient: 18-year-old male with Lennox-Gastaut Syndrome and cerebral palsy status post spinal fusion complicated by aspiration pneumonia. Case Description: Antibiotic therapy for pneumonia was completed shortly after admission for post-operative multidisciplinary care. Labs demonstrated labile WBC counts, mildly elevated CRP, normal erythrocyte sedimentation rate. Vital signs remained within normal limits. No clear source of infection was identified, and seizure activity was deemed to be the cause of abnormal inflammatory markers. Discussion/Conclusion: Seizures can produce systemic changes that mimic an inflammatory response to infection. In patients with known seizure disorders, monitoring inflammatory markers after a recently treated infection requires astute clinical correlation and distinction between an inflammatory-like response secondary to seizures versus concurrent infection.

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