The Association between Lower Extremity Tendinopathies and Lumbar Radiculopathy

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Introduction. Lower extremity tendinopathies and lumbar radiculopathy are often observed together in clinical practice, yet their association remains understudied. This study aimed to quantify coexistence of plantar fasciopathy, gluteal tendinopathy, and proximal hamstring tendinopathy with lumbar radiculopathy to enhance physician awareness and improve outcomes through earlier recognition and management.

Methods. A retrospective cohort study was conducted with patients treated at KUMC and KCOA, 2014 to 2024. Data collected included demographics, body mass index, diagnosis of tendinopathy based on clinical history, physical examination, and imaging, as well as presence or absence of lumbar radiculopathy determined by motor and sensory testing, slump and straight leg raise tests, lumbar spine magnetic resonance imaging, and electromyography. Patients with patellofemoral pain syndrome served as control group.

Results. Dataset included 437 patients. Coexistence of lumbar radiculopathy was found in 29% of plantar fasciopathy cases, 38% of proximal hamstring tendinopathy cases, and 51% of gluteal tendinopathy cases. The association between gluteal tendinopathy and lumbar radiculopathy was statistically significant (OR 3.98; 95% CI 1.79-8.85; p = 0.001) and magnitude and confidence limits for association between proximal hamstring tendinopathy (OR 2.41; 95% CI 1.00-5.82; p = 0.056) and lumbar radiculopathy was highly suggestive of a true association. In contrast, the association between plantar fasciopathy (OR 1.60; 95% CI 0.76-3.38; p = 0.291) and lumbar radiculopathy was not significant.

Conclusions. Results support a significant association between lumbar radiculopathy and both gluteal and proximal hamstring tendinopathy. Clinicians should evaluate for radiculopathy in these patients to guide treatment and improve clinical outcomes.

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Patient-Reported Outcomes (PROs) in Prostate Cancer Patients Undergoing IMRT Versus IMRT with Brachytherapy

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Introduction. The ASCENDE-RT trial showed improved cancer control but increased toxicity when brachytherapy (BT) was added to intensity-modulated radiation therapy (IMRT) for high-risk prostate cancer. Real-time BT, unlike pre-planned approach used in ASCENDE-RT, may reduce toxicity by better sparing surrounding organs. This study compares patient-reported outcomes (PROs) between IMRT and IMRT/BT using prospectively collected data.

Methods. International Prostate Symptom Score (IPSS) and Expanded Prostate Cancer Index Composite-Clinical Practice (EPIC-CP) are collected at pre-treatment and then prospectively for all patients. We analyzed patients treated from 2021-2024 and compared outcomes between patients treated with IMRT vs. IMRT/BT at 0-6 months, 6-12 months, and 12-24 months. Minimally important differences (MID) were defined based on published literature as a change of 3 points for IPSS and 1 point for EPIC-CP. Statistical tests were performed using SAS v9.4.

Results. Among 112 patients (IMRT: n = 50; IMRT/BT: n = 62, median age 67), both groups experienced initial IPSS worsening (median +5.0 vs. +7.0, NS). The EPIC-CP measure demonstrated similar findings, with urinary QOL for IMRT patients recovering to baseline, while IMRT/BT patients had persistently elevated urinary incontinence (0.0 vs. +1.0, p = 0.05) and urinary irritation (0.0 vs. +1.0, p = 0.02) at 12-24 months. Bowel function remained stable across groups.

Conclusions. IMRT and IMRT/BT result in post-treatment QOL declines. IMRT patients recover by 6-12 months, while IMRT/BT patients experience persistent but mild declines at 12-24 months. These data inform patient decision-making, balancing disease control benefit vs. mild increased urinary symptoms from adding BT.

Long-Term Outcomes of Hyperbaric Oxygen Pretreatment in Autologous Hematopoietic Stem Cell Transplantation: A Pilot Clinical Trial

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Introduction. Autologous hematopoietic stem cell transplant (aHSCT) is an effective treatment for hematologic malignancies. Hyperbaric oxygen (HBO) pretreatment has demonstrated safety, feasibility, improved neutrophil engraftment and mucositis in patients treated with aHSCT.

Methods. This was a retrospective review of patients treated with HBO before aHSCT in a pilot trial, compared to a historic control cohort. The primary outcome was overall survival (OS), while secondary outcomes included disease-free survival (DFS), post-transplant organ damage, autoimmune disease development, and secondary malignancy occurrence.

Results. Of the 240 patients reviewed, 19 received HBO and 221 did not. Median OS was not reached in the HBO pretreatment group and was 8.9 years for the historical control ($p = 0.5749$). Median DFS was 4.2 years in the HBO group and 3.6 years in historical controls ($p = 0.34$). The incidence of secondary malignancies was significantly lower in the HBO group (5.26% vs. 22.17%, $p = 0.0408$). Rates of cardiac (5.26% vs. 23.9%, $p = 0.03$) and renal (15.7% vs. 43%, $p = 0.010$) end-organ damage were reduced in the HBO group. There was a trend towards fewer developing autoimmune diseases post-HSCT in the HBO group compared to historical controls (0.0% to 7.69%, $p = 0.10$).

Conclusions. HBO therapy before aHSCT significantly reduced secondary malignancy rates compared to historical controls. OS and DFS showed no significant difference. Long-term cardiac and renal damage decreased in the HBO group, likely from reduced inflammation at transplant time. These findings indicate that HBO is well-tolerated and could improve outcomes for aHSCT patients.

Neurophysiological Effects of Spinal Mobilization for Low Back Pain

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Introduction. Spinal mobilization (SM) is a common intervention for low back pain (LBP), but its neurophysiological mechanisms are not fully understood. This pilot study aims to explore the immediate neurophysiological effects of SM in individuals with LBP.

Methods. A randomized crossover design was used to assess the neurophysiological effects of SM in individuals with and without LBP. Participants (ages = 18-70) with no major spinal dysfunction received SM and light touch (sham SM) in random order. Pain intensity was measured on 0-10 Numeric Rating Pain Scale. Pain thresholds were evaluated with quantitative sensory testing (QST), including pressure pain threshold and conditioned pain modulation. Functional Near-Infrared Spectroscopy (fNIRS) was used to measure brain responses. QST and pain data were recorded at baseline and after each intervention.

Results. Nine participants (7 LBP, 54.2±14.5 years old and 2 healthy controls, 43±14.1 years old) were included. In LBP participants, baseline pain score of 2.8±.44 increased to 3.8±1.5 and 3.8±.84 after sham and SM interventions respectively. No significant changes in PPT were observed in both LBP and healthy controls. fNIRS analysis showed significantly ($p < 0.05$) decreased blood flow/activity in right motor, left dorsolateral prefrontal, and right and left posteromedial cortices during SM compared to sham treatment.

Conclusions. While no significant changes were observed in QST, SM led to reduced brain activity in several key regions of pain modulation, suggesting real-time and immediate neurophysiological responses. Unexpected increase in self-reported pain intensity may be due to discomfort with repeated testing or actual increase of pain perception.

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Variation in Spatial Access to Substance Use Disorder Treatment Programs for Older Adults in the United States

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Introduction. The number of adults aged 65 and older is increasing across the United States, and substance use disorder is an important health concern for this population. Treatment programs specifically designed for older adults can improve recovery outcomes. This study examines spatial access to substance use treatment (SUT) programs tailored for older adults.

Methods. Data on SUT facilities were obtained from the 2022 National Directory of Drug and Alcohol Abuse Treatment Facilities. Distances between census tracts and facility locations were measured, and spatial accessibility was assessed using the two-step floating catchment area method to generate a spatial access index (SPAI). Results are displayed as descriptive statistics overall and by rurality, including the number of census tracts, number of affected populations, average distance, and average SPAI. A map also illustrates spatial patterns of access.

Results. Of 12,102 identified SUT facilities, 3,614 (29.9%) offered programs for older adults. Among 84,120 census tracts, 4,323 had no such facility within 50 miles, affecting 2,589,240 adults aged 65 and older. On average, the nearest older adult program was 13 miles away (SD = 19), with small rural tracts averaging 34 miles farther than urban tracts ($p < 0.001$). SPAI values further highlighted disparities in rural areas, even after accounting for service demand.

Conclusions. Few SUT facilities provide specialized programs for older adults. For millions, particularly in rural areas, distance poses a significant barrier to care. Expanding these programs in underserved areas could improve treatment availability and promote healthier aging.

Lasting Relief from Injection of Intra-articular and Intraosseous Bone Marrow Concentrate and Platelet Rich Plasma for Severe Midfoot Osteoarthritis: A Case Study

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Introduction. Osteoarthritis (OA) has been traditionally attributed to normal degeneration with aging and use but recent research suggests changes in subchondral bone architecture and composition play a larger role. This case study aims to describe the effect of intra-articular and intraosseous injections of orthobiologics such as platelet-rich plasma (PRP) and bone marrow aspirate concentrate (BMC) for midfoot OA. Orthobiologics have been studied in larger joints such as the knee, however, no published reports exist for treatment of midfoot OA.

Methods. This is a case study of a 62-year-old female with severe midfoot osteoarthritis who has exhausted conservative treatment options (NSAIDs, custom orthotics, bracing, steroid injections, physical therapy). PRP and BMC are prepared by drawing peripheral blood and bone marrow from the posterior superior iliac spine, processed in a centrifuge, and injected into joints with identified OA clinically and radiographically. Descriptive statistics were calculated for baseline characteristics and outcomes as changes in Foot Functional Index (FFI), the Foot and Ankle Ability Measure (FAAM), and the Visual Analog Scale (VAS) over time.

Results. Our patient noted improvement in subjective pain and decreased functional limitations. Pain relief began as early as 6 to 8 weeks after injection, with more significant relief by the 3-to-6-month mark.

Conclusions. Injection of bone marrow concentrate and PRP both intra-articular and intraosseous provide significant and lasting relief for severe midfoot osteoarthritis. Further research is needed to quantify subchondral bone edema pre- and post-procedure along with determining clear protocols for injection and standardization of treatments.

Negative Psychological Sequelae in Adolescent and Young Adult Survivors of Pediatric Cancer: A Qualitative Analysis

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Introduction. Survivors of pediatric cancer are at risk of developing negative psychological effects including posttraumatic stress symptoms[1,2] which may inhibit engagement in guideline-based care.[3-5] Limited work has examined the relationship between these effects and health behaviors in this population. The present study sought to explore this relationship.

Methods. This study is part of a larger project involving 51 adolescent and young adult survivors of pediatric cancer (mean age 28.6 years, 66.7% female) who received care at a Midwestern children's hospital or adult-focused academic center from 2015 to 2023. Eleven survivors participated in semi-structured interviews asking about their experience. Data were analyzed using Braun and Clarke's six-step framework. Themes related to the negative psychological impacts of survivorship were identified for this study.

Results. Survivors reported significant psychological sequelae of their cancer experience, including post-traumatic stress symptoms (PTSS) of hypervigilance, and avoidance of traumatic reminders (e.g., the hospital). Survivors reported frustration with late effects from cancer, which reduced engagement in health behaviors, such as diet and exercise. A small subset of survivors felt unaffected by their diagnosis over time.

Conclusions. Similar to previous studies, this study showed that pediatric cancer survivors exhibit negative psychological late effects of cancer treatment, including PTSS. The current study found that these symptoms may inhibit survivors from engaging in positive health behaviors. Survivors may benefit from trauma-informed healthcare to improve long-term outcomes. Future research may further investigate the connection between PTSS and health behaviors.

Incidence of Metamizole-Induced Agranulocytosis: A Systematic Review of Post-2015 Publications

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Introduction. Metamizole is preferred as a nonopioid analgesic due to its efficacy as an antipyretic and spasmolytic. There is concern over metamizole's safety profile, emphasizing agranulocytosis as a rare, yet serious, adverse effect. This study aims to update the current understanding of metamizole-induced agranulocytosis (MiA) using literature published after 2015, quantifying MiA incidence.

Methods. This systematic review examines literature from January 2015 through December 2023 that quantifies MiA. Literature was gathered in adherence to Preferred Reporting Items for Systematic Reviews and Meta-Analysis standards from PubMed, Cochrane Library, Embase, OVID, and Web of Science. Studies published before 2015, originally in a non-English language, or not quantifying metamizole incidence, were excluded. Incidence rates, metamizole dosages, study design, use (in person-days), and fatalities were extracted.

Results. This study yielded 5,816 abstracts and 31 publications for full-text analysis. There were 1,619 cases of MiA and 60 reported fatalities. MiA incidence ranged from 0 to 166,667 cases per million person-days. The highest rates of MiA were observed in pharmacovigilance studies and case series. However, 7 of the 31 included studies included cancer patients in their populations.

Conclusions. MiA remains a rare but serious adverse effect of metamizole use. This study presents varied results, probably due to differences in study design and the inclusion of higher-risk patients. Compared to other medications that list agranulocytosis as an adverse effect, like clozapine and methimazole, MiA incidence may be comparable. The risk of MiA should be weighed against the impact of opioids in post-operative pain tolerance.

Impact of a High-Fiber Dietary Intervention on Added Sugars Intake and its Association with Gestational Weight Gain: Findings from a Pilot Study

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Introduction. Excessive gestational weight gain (GWG) is associated with poor maternal and infant health outcomes. In non-pregnant populations, dietary interventions targeting a single nutrient often lead to collateral dietary improvements not part of intervention messaging. Added sugars (AS) intake in these populations is related to weight gain, whereas high fiber (HFib) intake is related to weight loss. This study aimed to determine whether HFib intervention influenced AS intake and explore the relationship between AS intake and GWG.

Methods. Secondary analysis of the SPROUT pilot study was completed. Participants were randomized into an HFib dietary intervention (n = 21) or usual care (UC; n = 22). For 18 weeks, women in the HFib group were provided HFib snacks (10-12 g/day) and educated to increase daily fiber intake to ≥30 g/day. RMANCOVA and linear regression were completed.

Results. There was a non-significant group by time interaction for AS intake (p = 0.156). From baseline to end of pregnancy, the UC group increased AS intake from 9.7% to 11.7% total calories/day, whereas AS intake for HFib remained stable (7.6% to 7.7%). Higher AS intake was positively associated with greater GWG (β = 0.183; p = 0.185), however, this relationship did not reach statistical significance.

Conclusions. The UC group increased AS intake, while AS intake in the HFib group remained stable. A potential relationship between AS intake and GWG was observed, though not significant. These pilot findings suggest HFib intervention may have benefits outside targeted intervention messaging that may reduce AS intake and GWG.

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Surgical Speed Dating: A Faculty and Resident Networking Event for Pre-Clinical Students

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Introduction. Impactful mentorship early in medical school is paramount to sparking student interest in surgical subspecialties. With Step I now pass/fail, students are driven to find ways to distinguish themselves and establish meaningful mentorship earlier in their careers. We sought to evaluate how providing low-risk engagement with residents, faculty, and upperclassmen influenced medical student perception of surgical careers and mentorship.

Methods. First and second-year students were invited to an after-hours event at an academic institution in 2022 and 2023. Students spent 12 minutes with nine different surgical subspecialties. Each subspecialty provided a brief overview of their specialty and answered student questions. Pre- and post-surveys were administered to assess student confidence in seeking mentorship and perception of surgical careers.

Results. One event was hosted each academic year for a total of 120 students. Following the event, 70% of students answered 'slightly' to 'strongly confident' about pursuing a surgical career ($p < 0.016$). Eighty percent reported successfully identifying an upperclassman student mentor ($p < 0.005$). Although confidence in developing relationships with residents and faculty increased to 77% from 58% and 52%, these were not statistically significant ($p < 0.09$ and $p < 0.19$, respectively).

Conclusions. Low-stress, low-cost events such as 'Surgical Speed Dating' allow students to gain confidence in pursuing a surgical career and identifying early mentorship. With improved confidence, we predict future success distinguishing oneself among surgical residency applicants. Future studies on sustainability of these mentorships and outcome of shadowing and research opportunities culminating in application to surgical subspecialties are needed.

Cellular and Structural Analyses of Intervertebral Disc Degeneration in NFAT1 Deficient Mice

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Introduction. The intervertebral disc (IVD) has three components: nucleus pulposus (NP), annulus fibrosis (AF), and cartilaginous end plate (CEP). NFAT1 is a member of the nuclear factor of activated T cells (NFAT) transcription factor family. While previous studies linked NFAT1 deficiency with osteoarthritis, the role of NFAT1 in IVD homeostasis remains unknown. Our hypothesis is NFAT1 is essential for maintaining IVD homeostasis and attenuating IVD degeneration.

Methods. Safranin-O stained histologic images of lumbar IVDs of mice (both sexes) were used for quantitative cellular and tissue analysis using ImageJ. The IVD images of NFAT1-deficient ($Nfat1^{-/-}$) mice were analyzed at 2, 6, and 12 months of age; age-matched wild-type (WT) IVD images served as controls. Six $Nfat1^{-/-}$ IVDs and six WT IVDs were analyzed at each age point. Data from three independent researchers were statistically analyzed using unpaired t-tests and ANOVA.

Results. ImageJ-assisted cell counting showed $Nfat1^{-/-}$ IVDs had a significant decrease in cell density at 6 months ($p = 0.001$) and 12 months ($p = 0.011$), compared to the age-matched WT IVDs. An age-dependent decrease in CEP cell density ($p = 0.018$) was detected in $Nfat1^{-/-}$ IVDs, but not in WT IVDs. No significant sex difference in IVD cell counting or structural changes in $Nfat1^{-/-}$ IVDs for the ratio of AF/total IVD area or NP/total IVD area were detected at any timepoint.

Conclusions. These findings suggest that NFAT1 is essential for cellular homeostasis in mouse IVDs. NFAT1 deficiency causes decreased cellular density in the IVD, a cellular feature of IVD degeneration.

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Perceived Comfortability of Medical Students Providing Prenatal Care at a Free Clinic

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Introduction. Increased resources and knowledge help support medical students in new clinical experiences. There are limited studies assessing the actual effectiveness of education tools to change perceived comfortability amongst medical students. In our study, perceived comfortability was assessed amongst medical students volunteering at a free clinic using pre and post surveys after implementing an educational video.

Methods. An educational video was distributed to medical student volunteers at JayDoc, a student run free clinic, alongside a pre and post survey assessing comfortability providing prenatal care. A Likert scale was used for students to scale their perceived comfortability through a series of survey questions designed to be answered before and after watching the video. Responses were scaled from 1-5 to quantify and assign value to the responses, with 5 being the most comfortable and 1 being the least. An average "difference score" from before to after amongst respondents for each category was calculated. A Shapiro-Wilk normality test was used followed by a Wilcoxon rank test or 2-sided paired T-test for statistical significance.

Results. The study yielded 30 complete responses and 1 incomplete response. A statistically significant increase in medical students' perceived comfortability was demonstrated in all categories when considering the full respondent group.

Conclusions. This educational video focused on the basics of prenatal care significantly increased the perceived comfortability of medical students providing prenatal care at a free clinic.

Similarities in Firearm Fatality in Urban and Rural Counties in Missouri

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Introduction. Firearm injuries are a public health issue. Between 2018 and 2022, Missouri's firearm-related fatality rate was 22.5 deaths per 100,000 people, compared to a national average of 13.2. Gun violence is not exclusively an urban issue; firearm injuries occur across all communities. This study explored firearm-related mortality rates for urban and rural counties in Missouri.

Methods. Five-year firearm-related mortality rates (2018-2022) were calculated by county using data from CDC WISQARS (Accessed January 28, 2025). Missouri counties were classified as rural or urban using the definition outlined in Health in Rural Missouri Biennial Report, 2022-2023 (Missouri Department of Health and Senior Services). Ninty-nine counties were rural and 16 were urban (including St. Louis City). Thirty rural counties were excluded due to either low firearm fatality counts or missing data. The aggregate mean mortality rate was calculated for urban and rural counties. Data were analyzed with a Wilcoxon rank sum test to evaluate differences between the two groups.

Results. Five-year firearm-related mortality rates ranged from 10.6 to 55.4 per 100,000 people in urban counties and 10.2 to 45.2 in rural counties. Overall, mean firearm mortality rates per 100,000 people were 20.7 (SD = 11.1) and 20.5 (SD = 7.2) for urban and rural counties, respectively ($p > 0.05$).

Conclusions. The similarities between rural and urban firearm-related mortality rates in Missouri highlight the ubiquitous nature of firearm injuries. Policies preventing firearm mortality may benefit all Missouri residents, regardless of county rurality.

Investigating the Effects of Doxorubicin on Mesenchymal Versus Basal Triple Negative Breast Cancer Survival in 3D Culture

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Introduction. Breast cancer is the most diagnosed cancer in women in the United States, and the second leading cause of cancer-related mortality behind only lung cancer. Triple negative breast cancers (TNBC) present unique treatment challenges in that they are resistant to endocrine therapy, leaving chemotherapeutic and surgical interventions as the standard of care. Mesenchymal TNBC displays stem-like characteristics with a higher potential to metastasize, necessitating investigation of novel treatment modalities for this phenotype specifically. Our lab and others have previously shown that breast cancer cells cultured in a biologically relevant extracellular matrix respond differently to treatment. The current study aimed to determine whether doxorubicin chemotherapy has different effects on cell survival of the TNBC mesenchymal cell line MDA-MB-157 grown in 3D, compared to less aggressive basal TNBC cell line MDA-MB-468.

Methods. Cells were plated in Matrigel and serum-starved overnight prior to treatment with doxorubicin (10^{-12} - 10^{-6} M). Cells were fixed and imaged on a confocal microscope after six days of treatment.

Results. Treatment of MDA-MB-157 with doxorubicin yielded an EC_{50} of 110.3 nM, a more than 3-fold increase when compared to MDA-MB-468 (EC_{50} = 30.3 nM). Interestingly, this is more than 10-fold the reported EC_{50} for 2D culture of MDA-MB-157.

Conclusions. 3D cell culture displays significant differences in treatment response between mesenchymal and basal TNBC. These findings highlight the role of 3D models in the *in vitro* investigation of breast cancer treatment, as cell line-specific treatment response may be altered in the presence of a 3D extracellular matrix.

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Fracture Risk Association with Vitamin D Levels in Pediatric Patients: A Systematic Review

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Introduction. A question often asked by physicians or caregivers when children sustain fractures is "Why did this happen?". They are searching for an intervention they can make, so that the child does not sustain additional injuries. This systematic review considers the potential for vitamin D deficiency to increase the risk of fractures in children, the global incidence of which is increasing.

Methods. PubMed and Embase were systematically searched by two independent reviewers for case-control studies comparing the vitamin D levels of children (aged 0-18) with fractures to those of controls without fracture. Included articles were systematically reviewed and their conclusions synthesized according to a defined composite outcome measure and by structured summary.

Results. Twenty studies were included in the review. Eleven studies, including significantly more subjects (4,101) met the composite outcome measure, indicating a relationship between low vitamin D and fracture. Nine studies, including significantly fewer subjects (2,639), failed to meet the composite measure ($p < 0.001$). Secondary analysis included significantly more subjects in studies demonstrating a difference in mean vitamin D between fracture patients and control than those finding no mean difference ($p < 0.001$).

Conclusions. There is potentially a relationship between lower vitamin D and increased risk of fracture in children. The mean serum vitamin D of fracture patients may be lower than that of children without fracture. The review is limited by heterogeneity of the available data and the low level of evidence provided by case-control studies. Additional prospective studies are required to validate findings.

Herpes Simplex Virus 1 Protein ICP0 through Host Protein CIN85 Evades Antiviral Responses

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Introduction. HSV-1 has infected 70% of the world population. The virus establishes lifelong reservoirs in neurons but occasionally is reactivated causing a variety of diseases. HSV-1 has evolved strategies to counteract antiviral responses, and the Infected Cell Protein 0 (ICP0) plays a fundamental role in this process. Early in infection, ICP0 localizes to the nucleus where it enables viral gene expression. Virus replication triggers translocation of ICP0 to the cytoplasm where its function remains unknown. ICP0 interacts with the adaptor protein CIN85, which has a major role in surface receptor endocytosis, and protein sorting.

Methods. To investigate the ICP0/CIN85 interaction we developed a virus, lacking the 244-277 aa of ICP0 that mediates binding to CIN85. We analyzed ICP0/CIN85 colocalization by immunofluorescence. Using a targeted approach, we identified other cargo localizing to the ICP0/CIN85 structures. We determined the fate of this cargo by analyzing the content of extracellular vesicles. Finally, we evaluated the ability of this virus to evade antiviral responses.

Results. As opposed to wild type virus, in ICP0 delta244-277 infections, ICP0 did not colocalize with CIN85 in vesicles. ICP0/CIN85 vesicles are chimeric composed of early and late endosomal markers, as well as autophagosome, and innate immunity components. Cargo associated with the CIN85 vesicles is exocytosed, in an ICP0-dependent manner. ICP0 delta244-277 virus failed to evade antiviral responses and displayed reduced virus yields.

Conclusions. Cytoplasmic ICP0 associates with CIN85 and determines endosome and EV proteome content. Exocytosis of the ICP0/CIN85 vesicle content likely represents a novel immunoevasion mechanism of HSV-1.

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Subclavicular and Suprascapular Placement of Response Neurostimulator Generator: Two Unique Cases

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Introduction. The Response Neurostimulation (RNS) system is a treatment modality for medical refractory epilepsy that monitors and responds to electrical signals that may indicate the onset of seizure activity. The RNS system consists of the depth electrode and/or cortical strip electrode in the seizure focus connected to a neurostimulator. The neurostimulator is placed within the skull to minimize system noise. However, there are cases in which placing the neurostimulator in the skull may not be ideal due to obstruction of future treatment/imaging or wound healing issues with the scalp.

Methods. Two patients underwent trials for neurostimulator placement at different sites. The first patient required further treatment for a high-grade glioma, and the initial placement interfered with both radiation treatment and imaging quality. As a result, the generator was repositioned to the subclavicular area. The second patient experienced wound healing issues due to a thin scalp, which led to erosion and eventual device explantation. After discussion, the neurostimulator was successfully placed in the suprascapular/trapezius region.

Results. Neurostimulator placement in non-traditional locations such as the subclavicular and suprascapular/trapezius positions provided electrocorticography with great signal and minimal noise contrary to previous assumptions.

Conclusions. These encouraging findings highlight the potential for neurostimulators to be placed in unconventional locations for patients who benefit from the RNS system but face complications with cranial placement. In these two cases, the generators were ultimately placed in the subclavicular and suprascapular/trapezius regions, respectively. Both patients maintained excellent electrocorticography and continued to benefit from the RNS system.

Conflicts: *Dr. Kinsman consulted for Neuropace in 2023.*

How is the Rate of Total Knee Arthroplasty Influenced by ACL Injury Treated by ACL Reconstruction Versus Non-Operative Treatment and How Does Prior ACL Reconstruction Compromise Outcomes: A Systematic Review

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Introduction. Anterior cruciate ligament (ACL) injuries are common among athletes and are primarily managed with operative reconstruction, though non-operative management is sometimes appropriate. ACL injuries are associated with a substantial risk of developing post-traumatic osteoarthritis (PTOA), which can result in the need for subsequent total knee arthroplasty (TKA). The rate of TKA following ACL reconstruction (ACLR) versus non-operative management remains poorly defined.

Methods. A systematic review was conducted in PubMed, Cochrane, and Embase databases following PRISMA 2020 guidelines. Broad search terms related to ACL injury management and TKA captured studies focused on patients who underwent ACL injury treatment and were analyzed for conversion to TKA.

Results. A total of 15 studies were included in this review. Eleven of the 15 studies explicitly stated a conversion rate to TKA following ACLR, with an average of 2.07% of patients converting to TKA. Only two studies explicitly stated a conversion rate to TKA following non-operative management, with an average of 6.95% of patients converting to TKA. However, vastly different time frames of follow-up and study designs make direct comparison amongst the studies in this review difficult.

Conclusions. It remains unknown whether there is a significant difference in the conversion to TKA following ACLR compared to non-operative management of ACL injuries. This review highlights the need for more robust comparative studies on TKA rates following different ACL treatment strategies that could guide evidence-based management of ACL injuries, with the goal of preventing the development of PTOA and the need for subsequent TKA.

Gender Differences in Oral Cavity Cancers

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Introduction. Oral cavity and oropharyngeal cancer combined is the 6th most common malignancy globally causing over 150,000 deaths in 2020. Oral cavity cancer affects males with a 3:1 prevalence. An increased incidence was observed in women in regions of India, the United States, and the Asia-Pacific, without association with traditional tobacco or alcohol risk factors. This has not been described yet in Kansas.

Methods. The dataset included patients treated for head and neck cancer at The University of Kansas Department of Radiation Oncology from 2019-2024. Variables included gender, subsite, alcohol/tobacco use, race, and age at diagnosis. Data were collected through Epic and stored in REDCap®.

Results. 426 of the 591 (72.0%) head and neck cancers were in males. 45% of subsites in females were in the oral cavity while 51% in males were in the oropharynx. The female:male ratio at the oral cavity subsite was 3.30:1 and at the oropharynx subsite was 0.45:1. Variables of race, alcohol, and tobacco were statistically insignificant.

Conclusions. Head and neck cancers were more common in males. The oral cavity subsite had a female predominance, and the oropharynx subsite had a male predominance. The most common subsite in females was the oral cavity and in males was the oropharynx. No differences within race or risk factors were seen. Limitations include an incomplete data set and only using patients undergoing radiation treatment. Future studies could include patients undergoing non-radiation treatment, a more complete data set, and target specific factors such as HPV or PD-L1 expression.

Characterizing Social Determinants of Health Among Prenatal Patients at a Student Run Free Clinic

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Introduction. The purpose of this project is to assess the social determinants of health among patients receiving prenatal care at the JayDoc Student Run Free Clinic to provide early interventions and ultimately improve pregnancy outcomes. The JayDoc Student Run Free Clinic serves uninsured, low socioeconomic status, and generally underserved populations. Additional investigation and characterization of social determinants of health among this population is important to provide comprehensive prenatal care and population-specific interventions.

Methods. This study is a retrospective chart review of patient responses to a Prenatal Intake Questionnaire and a Demographic Questionnaire at the time of the initial prenatal appointment between 2023-2025.

Results. Review of 43 patient responses revealed 46.3% job instability, 36.6% housing instability, 22% unstable access to transportation services, 17.1% food insecurity, 14.6% tobacco use in household, 12.2% prior substance abuse, and 4.9% physical abuse in the past year. Among those surveyed 94.4% do not have health insurance, 5% receive SNAP assistance, and 20% receive WIC assistance.

Conclusions. Early assessment of social determinants of health and connection to social work and community resources are important aspects of prenatal care and can be realistically assessed as early as the first prenatal visit to promote early intervention and potentially improve patient outcomes. Availability of social work services and connection to community resources regarding housing, transportation, nutrition, domestic abuse, and substance abuse should be utilized among the patient population receiving prenatal care from the JayDoc Student Run Free Clinic.

Treatment of Complex Pilon Fractures: Pilot Study Comparing Primary Arthrodesis (PA) to Open Reduction and Internal Fixation (ORIF)

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Introduction. ORIF is preferred to PA for treating acute pilon fractures despite high complication rates, including the need for secondary arthrodesis. This study investigates patient-reported outcomes, physical functionality, and complication rates in patients who underwent PA versus ORIF following a complex pilon fracture.

Methods. The study included 15 patients treated for pilon fracture (12 ORIF and 3 PA). PA was performed via a novel surgical technique, and the ORIF group served as the control. Patient-reported outcomes were assessed using the Foot and Ankle Outcome Score (FAOS) and 12-Item Short Form Survey score (SF-12). Patient physical functionality via Opal sensors recorded timed-up-and-go (TUG) time, manual ROM (dorsiflexion-plantarflexion and inversion-eversion), walking cadence, walking speed, double support, stride length, and walking ankle ROM. Complication rates were determined upon reviewing medical records.

Results. Demographic data were comparable between ORIF and PA patients except for sex ($p = 0.044$). ORIF patients exhibited significantly decreased treated versus untreated ankle dorsiflexion-plantarflexion while standing compared to PA patients ($p = 0.007$). All other physical functionality measures and patient-reported outcomes were similar between groups. One PA patient (33%) had a complication of cellulitis, and 6 out of 12 ORIF patients (50%) had complications including dehiscence, malunion, osteomyelitis, and the need for secondary surgery (5 patients, 42%).

Conclusions. Minimal physical functionality and no patient-reported differences exist between pilon fracture patients treated with ORIF versus PA; however, patients who underwent ORIF had higher complication rates. This pilot study serves as a basis for future investigations and improving treatment recommendations.

Phytochemicals for Periprosthetic Joint Infection Prophylaxis against *Staphylococcus aureus*

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Introduction. Infection, especially from *Staphylococcus aureus (s. aureus),* is a leading cause of total joint arthroplasty failure. Surgeons often incorporate prophylactic antibiotics into orthopedic biomaterials, such as calcium phosphate spacers or acrylic bone cement. However, antibiotic resistance necessitates alternative antibiotics. This project evaluates antimicrobial efficacy of three phytochemicals – thymoquinone, magnolol, and usnic acid – against *S. aureus.*

Methods. We evaluated each compound's solubility in multiple solvents. In accordance with the Beer-Lambert law, absorbance and concentration are linearly related within the solubility limit. To identify the minimum inhibitory concentration (MIC) that prevents bacterial growth, we exposed *S. aureus* inoculums to dilutions of each phytochemical. We performed MIC assays in triplicate for each combination of phytochemical, solvent, and bacterial strain.

Results. Thymoquinone's solubility in phosphate buffered saline (177 µg/mL) is approximately one-third of its solubility in acetone (500 µg/mL). Similarly, the other phytochemicals are more soluble in hydrophobic solvents. Usnic acid is potent against *S. aureus* with an MIC of 3 µg/mL. Both magnolol (MIC = 8 µg/mL) and thymoquinone (MIC = 8 µg/mL) are effective against methicillin-resistant *S. aureus* strains. Thymoquinone has the most robust activity, with activity in multiple solvents against four *S. aureus* strains.

Conclusions. Magnolol, thymoquinone, and usnic acid are similarly efficacious as conventional antibiotics are against *S. aureus.* We are currently investigating potential synergism between these phytochemicals and conventional antibiotics. Synergistic pairings could further stave off antibiotic resistance. Future studies will investigate whether the relatively low solubility of these compounds prolongs the timeframe of elution from orthopedic biomaterials.

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The Utility of Lactate Dehydrogenase as a Prognostic Indicator for Primary Myelofibrosis

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Introduction. Myelofibrosis (MF) is characterized by bone marrow fibrosis driven by megakaryocyte-derived growth factors such as TGF-β and PDGF, with a median survival of 3-7 years. While Lactate Dehydrogenase (LDH) is routinely measured in other cancers, its prognostic value in MF remains unclear. This study aimed to evaluate LDH as an independent prognostic marker and predictor of clinical outcomes.

Methods. A retrospective cohort of patients diagnosed between 2012 and 2022 at The University of Kansas Medical Center was analyzed. Baseline and serial LDH levels were reviewed alongside clinical, molecular, and cytogenetic data, including anemia severity, circulating blasts, WBC count, driver mutations (JAK2, MPL, CALR), high-risk mutations, and treatment history.

Results The study identified 120 Myelofibrosis patients who met inclusion and exclusion criteria. LDH increases showed a low-to-moderate positive correlation with spleen size, suggesting potential utility of LDH as a non-imaging biomarker for splenic burden in Myelofibrosis. However, a weak correlation ($R^2 = 0.028$) between changes in LDH and platelet count indicated limited predictive value of platelet trends. Similarly, minimal correlation ($R^2 = 0.017$) between baseline JAK2 V617F allele frequency and changes in LDH suggests variability in LDH response to this clonal mutation. Among the cohort, 44 patients had a mean survival of 1,081 days.

Conclusions. Group segmentation based on LDH changes (Decrease vs. Increase) showed a weak association with survival length. Additionally, linear regression analyses did not reveal significant predictive outcomes related to LDH changes. These findings raise questions about reliability of LDH as a prognostic biomarker for Myelofibrosis progression.

Analyzing the Diagnostic Capabilities of Claude 3.5 Sonnet on Complex Clinical Cases

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Introduction. Despite increased healthcare spending, the United States faces significant challenges in healthcare delivery and outcomes. Large language models (LLMs) have shown promise in medical applications, but their clinical diagnostic capabilities require further investigation. This study evaluates the diagnostic performance of Claude 3.5 Sonnet, a new large language model (LLM), in complex medical cases compared to traditional medical journal readers.

Methods. We analyzed 20 case challenges from the New England Journal of Medicine. Each case was presented to Claude 3.5 Sonnet with full text and corresponding images. Diagnostic accuracy was measured and compared between Claude 3.5 Sonnet and medical journal readers.

Results. Claude 3.5 Sonnet achieved an overall diagnostic accuracy of 49.5%, significantly higher than medical journal readers at 27.4% ($p = 0.042$). The AI model showed perfect accuracy (100%) in 9 cases and no accuracy (0%) in 10 cases, with one case at 90% accuracy. Reader accuracy ranged from 9% to 63% across cases.

Conclusions. Claude 3.5 Sonnet demonstrated significantly higher diagnostic accuracy compared to medical journal readers, though with notable variability in performance. These findings suggest potential utility for AI assistance in medical diagnosis, however further research comparing consistency and reliability of AI diagnostic capabilities to that of physicians is required.

The Incidence of Pre-operative Bladder Testing Prior to Prolapse Surgery

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Introduction. Surgery to correct pelvic organ prolapse (POP) elevates the anterior vagina and can unmask occult stress urinary incontinence (SUI). Pre-operative bladder testing (PBT) evaluates for occult SUI, which may be concurrently treated in the same operation to avoid symptoms after surgery or need for a second procedure. The objective of this study is to investigate incidence of PBT prior to POP surgery at KUMC.

Methods. Eligible patients for this retrospective cohort study were identified by querying the HERON database for ICD and CPT codes. Demographic and clinical data were compared between patients with and without PBT using student's t-test and Chi-square tests. Multivariable logistic regression analysis will be performed to explore factors associated with PBT.

Results. 1,757 women underwent surgery for POP. The mean age was 60 (SD = 13.3) and most were overweight or obese (n = 1,248, 71.0%). Most POP surgeries were performed vaginally (n = 1,153, 65.7%), by urogynecologists (n = 1,353, 77.1%), and 758 (43.3%) patients underwent a concomitant incontinence procedure. 78.0% (n = 1,371) had PBT; urodynamics testing was more common than simple cystometrics (n = 1,355, 98.8% vs n = 16, 1.2%). Differences in route of surgery, surgeon type, inclusion of concomitant incontinence procedure, complications, and length of stay were noted between patients with and without PBT.

Conclusions. Approximately 78% of POP surgeries involved PBT between 2010 and 2023. There is a role for ongoing education for surgeons who perform POP surgeries to appropriately evaluate for occult SUI and potentially avoid future surgery.

Implementation of the First Available Long-Acting HIV Medication (Cabotegravir/Rilpivirine) Into Routine Clinical Care

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Introduction. Cabotegravir/Rilpivirine (CAB/RPV) is the first long-acting HIV-injectable medication that maintains HIV suppression using bi-monthly injection. Long-acting injections (LAI) may improve medication adherence and perception of well-being but require coordinated care with a professional team. We evaluated LAI CAB/RPV effectiveness, tolerability, patient's perceived satisfaction and implementation practices in a real-world clinical practice.

Methods. Retrospective chart review of patients receiving CAB/RPV in an outpatient HIV clinic between July 2020 and July 2024. Descriptive data including baseline characteristics, CAB/RPV treatment response and tolerance were collected. A patient survey ascertaining patient satisfaction and experience was administered. Pharmacy implementation strategies were assessed.

Results. Among 51 individuals interested in CAB/RPV, 45 (88%) received insurance approval and 34 (67%) switched to CAB/RPV. All had baseline HIV VL <20 copies/mL. Median duration of CAB/RPV was 21 months (range 2-42 months). Only 4 (13%) individuals missed one injection. Thirty-three (97%) maintained HIV VL <50 copies/mL during treatment. On patient survey, satisfaction with CAB/RPV was rated as excellent (87%) or good (13%). Most noted improvement (76%) in emotional well-being after switching to CAB/RPV. All noted injection-site reactions described as minimal (45%) or moderate (36%). Only 12% experienced additional side effects. Ability to adhere to CAB/RPV was rated as excellent (68%) or good (29%). Half of respondents (50%) acknowledged being worried others would learn about their HIV diagnosis and 57% of those indicated worrying less after transitioning to CAB/RPV.

Conclusions. CAB/RPV excelled in maintaining HIV viral suppression, was well-tolerated, and met-or-exceeded expectations for the majority of patients.

Management of Intertrochanteric Fractures: An International Comparison

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Introduction. Annually there are more than 250,000 hip fractures in the United States, most of which are associated with significant issues or morbidity and mortality. Of these, approximately half are intertrochanteric fractures of the hip. Intertrochanteric fractures are particularly burdensome as they frequently result in significant blood loss, high rates of post-operative complications, and approximately a 33% 1-year mortality in addition to high rates of patient morbidity. While it is understood that intertrochanteric fractures are to be treated surgically unless otherwise contraindicated, the approach to surgery and perioperative care varies greatly throughout the world.

Methods. Charts of 13 patients that underwent ORIF of intertrochanteric fractures, May 2023 to June 2024 at Mavromati Hospital in Botoșani, Romania were analyzed and compared to the average demographic data in the United States. Analysis comparing surgical techniques, post-operative management, and short-term outcomes of patients between Botoșani, Romania and the United States were observed and reported.

Results. Patient demographics and surgical approaches are similar between surgical site in Botoșani, Romania and the United States, but differing perioperative practices including intraoperative anesthesia, post-operative analgesia, and post-operative follow up may contribute to differences in outcomes between the two nations.

Conclusions. Healthcare shortcomings that take place in the United States are analogous to those faced at Mavromati Hospital in Botoșani, Romania. Collaborating to address issues such as poor surgical outcomes in settings which vary in terms of resources and culture will benefit individuals on both sides of the collaboration to provide more holistic and effective care to patients.

Conflicts: *The investigators of this project are involved in the non-profit organization the International Orthopedic Trauma Collaborative (IOTC). Involvement in this organization should not cause conflicts with the findings of this study.*

Assessing the Impact of Interpretation Experience and Training on Patient Satisfaction Levels at JayDoc Free Health Clinic –A QI Needs Assessment

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Introduction. Effective communication between patients and interpreters is crucial for ensuring high-quality, patient-centered healthcare. This research explores how different levels of interpreter experience and language fluency influence the satisfaction of patients at the Jaydoc Free Health Clinic (JFHC), a volunteer-run clinic that primarily serves a Spanish-speaking, underserved demographic in Kansas City.

Methods. This study utilized a descriptive, qualitative design conducted from August to November 2023. Data were gathered through surveys completed by both interpreters (n = 10) and patients (n = 40). The interpreter survey focused on their background, fluency levels (measured using the ALTA scale), and professional training. The patient survey assessed factors such as communication comfort, understanding of medical instructions, and overall satisfaction with the encounter.

Results. Most interpreters (60%) had accumulated over 100 hours of experience, and 50% achieved a score of at least 11/12 on the ALTA Fluency Scale. However, no direct link was observed between interpreter experience and patient satisfaction. Notably, interpreters with higher fluency levels (11/12) were associated with higher patient comfort and better understanding of their treatment plans. In terms of patient feedback, 92.5% reported satisfaction with how comfortable they felt during the encounter, and 80% indicated confidence in understanding their prescribed treatment.

Conclusions. The findings suggest that while overall interpreter experience does not guarantee improved patient satisfaction, fluency plays a more significant role in enhancing patient comfort and understanding. These results advocate for targeted interpreter training to improve patient outcomes, particularly in free clinic environments like JFHC, where resource limitations often exist.

The Effect of Partial Glossectomies on Patient Occupation

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Introduction. 25% of all cancer patients experience major disability post-surgery. A partial glossectomy (PG) is the current standard of care for malignant/precancerous oral cavity lesions of the tongue, however, little literature exists exploring its effects on patient perceptions and occupation. The current study explored the influence of PG surgery on patient workforce return, employment opportunities, and job security.

Methods. Patients who had received a PG within the past two years were recruited. Eligible patients (N = 8, *M* age = 48, 62.5% Female) were employed at time of diagnosis and had no other tongue-impacting pathologies. Surveys and semi-structured interviews assessed occupational changes and quality of life. Interview recordings were transcribed; principles of thematic analysis were used to analyze qualitative data. Inductive coding method was used to identify emergent patterns and salient themes.

Results. 75% reported needing to take extended time off work for recovery. 50% reported having flexibility and support from their employers. All patients experienced a change in skill or ability to use their mouth. 62.5% have mild vocal impairment or greater. 75% focus on issues with their speech regularly. While health-related quality of life decreased, the majority reported no significant changes in work. 12.5% of patients experienced a decrease in job quality. 25% required role change due to surgery.

Conclusions. Although patients were worried about the effect PG would have on their jobs, surgery did not significantly impact occupational quality. Future public health messaging should reinforce to patients and employers that PG's impact on occupational performance is minimal.

Gender-Affirming Hormone Therapy and Impacts on Quality of Life: A Narrative Review

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Introduction. Transgender and gender-nonconforming (TGNC) people often face significant disparities in health education and access to quality medical management. This narrative literature review examines the relationship between TGNC patients seeking gender-affirming hormone therapy and resulting improved quality of life outcomes.

Methods. Our search identified papers through the databases PubMed, PsycINFO, CINAHL, Embase, and Web of Science including search terms relating to gender-affirming hormone therapy (GAHT), transgender identities, and patient healthcare experiences and outcomes. Further inclusion criteria required papers published after 1979 with a majority of participants located in the United States. Data extraction and quality assessment of the selected papers were completed using the JBI Manual for Evidence Synthesis, a quality assessment tool created based on the Mixed Methods Appraisal Tool, and Covidence software. Common themes were narratively reviewed.

Results. The search yielded 19,482 results across five databases and 51 papers were included in data extraction and quality assessment. Most papers were published between 2020-2024 and enrolled young adults in cross-sectional studies. Recurrent themes observed from data synthesis include improved mental health and quality of life outcomes associated with GAHT use. Distance to clinics, cost of care, insurance coverage, and governmental policies were commonly identified barriers to obtaining gender-affirming care.

Conclusions. The identified gaps in information reflect the importance of additional research in TGNC health-related disparities including diverse participant populations and rigorous longitudinal methods. With these changes, we expect improved quality of care, patient satisfaction, and health outcomes for these individuals.

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The Progression of Post Concussion Symptom Scores in Early vs Late Presenters

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Introduction. Premature return to play puts athletes at high risk for additional concussions and sequelae, but one also recovers more slowly when put on strict cognitive rest. Cognitive and physical activities that engage neuronal pathways but do not exacerbate symptoms allow for the most efficient recovery of neuronal structure and neurotransmitter homeostasis. We assessed whether early diagnosis and therapeutic intervention helped reduce symptom progression amongst patients with concussion.

Methods. This retrospective chart review compared the Post Concussion Symptom Scores (PCSS) between early presenters, seen by a neurologist within the first seven days post-concussion injury, and late presenters, seen between days 8-28 post injury. Selection criteria found 70 total male and female patients between the ages of 19 to 81 with concussions presenting to The University of Kansas Concussion Clinic and tracked their PCSS, an assessment designed to cover the full spectrum of concussion related symptoms.

Results. Patients presenting in the first seven days post-concussion had fewer and less severe symptoms at the initial appointment and reduced their PCSS by more than half at the four- and six-week marks, to ultimately improve by 80%. The patients that waited longer to seek medical attention and a therapeutic recovery plan were initially diagnosed with a worse/higher PCSS that slightly improved at the four-week appointment but then regressed at six-weeks.

Conclusions. Patients presenting within seven days of a concussion had fewer and less severe symptoms at initial presentation. These patients also experienced a more robust decline in symptoms at four- and six-week follow-up.

Exploring the Role of a Lifestyle Intervention on Peri-Prostatic Adipose Tissue and Fat Metabolism in Men with Prostate Cancer

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Introduction. Excess visceral fat and altered lipid metabolism are linked to prostate cancer progression. We assessed whether weight loss intervention using diet and exercise modifies dietary fatty acid intake, PPAT fatty acid composition and signaling, and the plasma sphingolipid signature in men with prostate cancer.

Methods. In a phase II trial, 40 men scheduled for prostatectomy were randomized to an intervention (n = 20) or control (n = 20). The intervention group followed a diet and exercise regimen for 4-16 weeks pre-surgery and six months post-surgery, while controls received standard care and educational materials. Blood samples, dietary records, and health metrics were collected at baseline (4-16 weeks pre-surgery), one week pre-surgery, and six months post-surgery. PPAT biopsies were obtained at surgery. Fatty acid profiles were measured using flame-ionization gas chromatography. RNA from third-passage adipose stromal cells was analyzed with the nCounter® PanCancer Immune Panel, and plasma sphingolipids were quantified via quadrupole time-of-flight mass spectrometry.

Results. The intervention resulted in a 5.5% body weight loss. Although dietary fatty acid intake changed relative to controls, these alterations did not correlate with changes in PPAT fatty acid composition. ASC transcriptomic analysis revealed decreased COLEC12 and increased IL-17F expression; Ingenuity Pathway Analysis predicted inhibited leptin and IL-6 signaling in the intervention group. Plasma sphingolipid score significantly decreased in the intervention arm.

Conclusions. Weight loss induced significant dietary, transcriptomic, and metabolic alterations, downregulating pathways associated with prostate cancer progression. The improved plasma sphingolipid signature suggests that lipid metabolism changes may protect against prostate cancer progression.

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Exploring Proteasome Subunit RPN11 Acetylation in *Saccharomyces cerevisiae*

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Introduction. Protein N-terminal acetylation is a post-translational modification found in up to 90% of human proteins, yet its function remains poorly understood. In yeast, where orthologous enzymes facilitate acetylation of proteins, the proteasome subunit Rpn11 is acetylated by the NatB complex. A deletion of NatB reduces Rpn11's stability and function.

Methods. To determine how critical NatB-dependent acetylation is for Rpn11, we engineered yeast cell lines using CRISPR-Cas9 where Rpn11 became a substrate for different N-terminal acetylases (Nat) or no acetylase at all. Next, we deleted the different Nat complexes in these backgrounds and analyzed strains for the presence and stability of Rpn11 and proteasomes (by immunoblotting and activity assays), as well as their cellular fitness (by various growth and stress assays).

Results. Western blot analysis revealed no change in proteasome subunit presence under optimal growth conditions when Rpn11 was mutated. However, the NatC knockout was detrimental when Rpn11 was altered to become a NatC-compatible substrate in protein folding stress conditions (canavanine). Furthermore, growth assays, western blots, and proteasome activity assays indicated that Rpn11 lacking any form of acetylation was less stable under heat stress (37°C for yeast).

Conclusions. N-terminal acetylation of Rpn11 is critical for maintaining protein stability under specific stress conditions. These findings suggest that the cellular role of N-terminal acetylation, though widespread, may be context-dependent and especially important during proteotoxic/protein-folding stress. Understanding how acetylation modulates proteasome function could shed light on the broader physiological significance of this conserved post-translational modification.

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SPLUNC1 (BIPFA1) Expression in Airway Tissue Compartments and Regulation by IL-13 Exposure of hBEC Obtained from the Severe Asthma Research Protocol (SARPIII)

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Introduction. Asthmatics express less SPLUNC1 (innate defense protein) compared to healthy participants. We hypothesize expression/secretion of SPLUNC1 within airway epithelia will decrease, in an IL-13-dependent mechanism, while SPLUNC1 expression in submucosal glands and tissue will increase in individuals with increased asthma severity when compared to individuals without asthma.

Methods. SARP3 participants (763) underwent sputum induction, bronchoscopy and BAL collection. Airway epithelial cells differentiated at ALI then exposed to IL-13 with basal supernatants collected. SPLUNC1 was quantitated in sputum (N = 4 healthy, N = 20 asthmatic) and hBEC basal supernatants (N = 1 healthy[repeated], N = 3 asthmatic) via ELISA and in endobronchial biopsies (N = 10 healthy, N = 17 asthmatic) via immunofluorescent analysis. Statistics by Student's Test and/or Spearman correlations ($p < 0.05$ significance).

Results. SPLUNC1 secretion in asthmatics wasn't significantly different in sputum (779±590ng/mL to 938±1020ng/mL, $p = 0.56$) yet increased in differentiated hBECs versus healthy (46.5±28.6ng/mL to 17.5±15.3ng/mL, $p < 0.01$). SPLUNC1 overall expression in asthmatics was decreased (29.0±48.70lum/μm^2 to 62.07±99.96lum/μm^2; $p < 0.05$) without difference in submucosal glands versus healthy (977.75±1990.40lum/μm^2 to 572.43±1127.40lum/μm^2; $p = 0.22$). IL-13 (10ng/mL) to asthmatic hBECs decreased SPLUNC1 secretion over time ("No-IL-13": 59.77±50.67ng/mL, Δ-34.44±22.62ng/mL[24hr], $p < 0.05$; Δ-37.78±29.90ng/mL, $p = 0.05$[48hr]; Δ+38.07±1.54ng/mL, $p = 0.1$[72hr]; Δ-8.76+/-41.74ng/mL, $p = 0.7$[96hr]). Healthy SPLUNC1 secretion transiently decreased after IL-13 exposure: at 24hrs, secretion decreased 4.22±0.28ng/mL ($p < 0.01$).

Conclusions. SPLUNC1 expression in airway epithelium, not submucosal glands, nor sputum, was decreased in asthmatics, although N was small in sputum. Asthmatic and healthy hBECs SPLUNC1 secretion was inhibited by IL-13.

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The Follow-up Pattern of Appendectomy Patients

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Introduction. While post-operative appendectomy complications have been reported as high as 25%, there is little research on association between appendectomy follow-up patterns and complication rates. This study examined follow-up patterns of appendectomy patients, modifiable factors impacting follow-up, and their relationship with post-operative complications.

Methods. This retrospective study included patients who underwent appendectomy July 2022-December 2023. Patients treated non-operatively with antibiotics were excluded. Patient follow-up status was defined as either in-person with Emergency General Surgery (EGS) Department or no-follow-up. Modifiable factors included having a social work consult, primary care provider (PCP) or gastroenterologist (GI) specialist involvement, and follow-up with another provider if EGS follow-up was missed. Demographic factors included insurance status and zip code. AAST Grade and Charleston Comorbidity Index Score were analyzed for their association with complications and follow-up pattern.

Results. Of the 158 patients, insurance status was significantly associated with follow-up rates ($p = 0.047$), but AAST appendicitis grade was not ($p = 0.888$). Complications were not significantly associated with poverty rate ($p = 0.799$) or insurance status ($p = 0.243$). There was a higher mean poverty rate for those that did not follow-up (14.8) compared to those that did (12.6). Factors not significantly associated with complications or follow-up status included having a PCP, GI, or other provider (all $p > 0.05$).

Conclusions. Lack of follow-up does not appear to be associated with post-operative complications. Insurance status was significantly associated with follow-up. Most patients who did not follow-up had shorter hospital stays and would be expected to follow-up less.

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Patient Factors Associated with the Use of Lidocaine for Mohs Micrographic Surgery: A Single-Institution Retrospective Study

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Introduction. Mohs micrographic surgery (MMS) is often carried out in stages that require spaced injection of local infiltrative lidocaine for anesthesia. This study seeks to define what patient factors may predict the amount of lidocaine that a patient may require during MMS.

Methods. The authors analyzed O2 charts from patients who underwent MMS while using lidocaine as the anesthetic at KUMC from July 2022 through June 2023. Using t-test, ANOVA, and regression analyses to assess statistically significant differences in amounts of anesthesia, we assessed what patient factors had a significant impact on the lidocaine quantity.

Results. The dataset included charts for 149 patients, 21 of whom underwent MMS for two separate lesions on the same day. Weight, surgeon assigned to the case, number of surgical sites treated in one day, and size of the lesion had statistically significant impacts ($p < 0.05$) on the amount of lidocaine. Melanoma was observed to require more lidocaine on average than either Basal Cell Carcinoma or Squamous Cell Carcinoma ($p < 0.001$).

Conclusions. Type of skin cancer, surgeon, patient weight, number of surgical sites, and size of the affected area are variables that may influence lidocaine quantity during MMS. Additional studies are needed to further understand the relationship between these variables and MMS.

Core Muscle Injury Repair: Does Sex Impact Outcomes? A Systematic Review

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Introduction. Core muscle injuries have had significant development and literature supporting identification and treatment for the specific injury, and they are becoming more specific and detectable with imaging and physical testing. Identifying whether there are sex-based outcomes will help with patient specific care and better outcomes.

Methods. The authors of this study conducted a systematic review using five databases with certain inclusion and exclusion criteria which included a PRISMA flow sheet. The five databases provided the most comprehensive review for the literature search. Every result was reviewed for surgery type, sex-based outcomes, and selected based on the inclusion/exclusion criteria.

Results. In total, there were seven studies that met inclusion and exclusion criteria and were included in analysis. Five of these studies included patient populations of all males while one provided a male and female subgroup analysis, and one investigated all females. Measurements of outcome were recorded based on the studies that met criteria and included revisions, complication rates, return to play, functional tests, and pain scoring.

Conclusions. Although core muscle injuries are more common in males who are playing competitive sports, there was very little data available to compare outcomes between males and females. The limited data available suggest females may benefit less than their male counterparts from existing surgical procedures and additional investigation into this relationship is warranted.

Medical Student Research Outcomes at The University of Kansas

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Introduction. With the increased demand for medical students in research, many medical schools have implemented programs to bolster student involvement in research. The few previous studies evaluating these programs are institution-specific and have not considered residency matching outcomes. This study is the first to do so at The University of Kansas School of Medicine.

Methods. The authors analyzed 1979-2024 Summer Research Training Program (SRTP) data, along with 2018-2023 Student Research Forum (SRF) and residency match data.

Results. The data included 1,761 SRTP students and 357 SRF students which subsequently matched into a residency program. SRTP participation increased 6-fold from 1979-2024, while SRF participation doubled from 2017-2022. Both were driven by an increase in clinical research projects, compared to basic science. Of the 428 SRF projects, over 21 medical specialty topics were represented, the most being done in internal medicine (92), non-clinical medicine (e.g. medical education (59)), and orthopedic surgery (33). Of those that eventually matched into a competitive specialty (interventional radiology, neurosurgery, orthopedic surgery, otolaryngology, or plastic surgery) 50.5% on average did research in their eventual specialty, compared to an average of 23.0% of those that matched into less-competitive specialties.

Conclusions. The results reveal an overall increase in medical student research participation over time, driven by more clinical research projects. Despite this growth, there was not a significant difference between the number of competitive and less-competitive specialty topics presented at SRF. However, those who matched into competitive specialties were significantly more likely to have conducted research in their match specialty.

Rural Primary Care: Examining Rural Provider Knowledge Regarding Accountable and Value-Based Care

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Introduction. For rural communities, access to quality healthcare continues to be a significant challenge due to a variety of barriers, including limited facilities and socioeconomic factors. Organizations like Value-Based Care (VBC) models and Accountable Care Organizations (ACOs) could offer solutions. This study examines rural providers' demographics, practice backgrounds, and thoughts regarding ACOs and VBC.

Methods. A cross-sectional survey assessed rural Kansas healthcare providers' opinions and knowledge of ACOs and VBC. KUMC students in the Summer Training Option in Rural Medicine distributed the survey via a secure REDCap® database, collecting data on gender, race, years in practice, and community size.

Results. Fifty-eight providers participated with the majority of participants being physicians and others being physician assistants and nurse practitioners. While most were aware of ACOs, very few reported feeling knowledgeable. Most providers have heard of VBC, but only 8.6% reported being very familiar. ACO participation was low with the majority (56.25%) having only been involved for two to five years. Thoughts on effectiveness varied. 30% believed ACOs improve healthcare quality, while the majority were neutral. Similarly, only 36.4% viewed ACOs as slightly effective in cost control. Regarding VBC, less than half agreed it enhances outcomes, while others remained neutral.

Conclusions. While rural providers are aware of ACO and VBCs, many continue to have unanswered questions and hesitations. Low participation rates suggest barriers to engagement, while many remain neutral due to a lack of proper education. Closing these gaps may help rural communities embrace these models more widely.

Bridging Gaps in Rural Healthcare: Patient and Provider Readiness to Integrate Mobile Health and Artificial Intelligence Technologies into Remote Care

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Introduction. Digital health (DH) technologies hold immense potential to enhance access to care for rural populations; however, many barriers to adoption exist. To better understand implementation of DH across Kansas, this study explored patient and provider readiness for integrating mobile devices (video otoscopes, digital stethoscopes) and artificial intelligence (AI) into remote healthcare.

Methods. Mixed-methods study was conducted including adult patients and physicians from Kansas. Surveys (N = 20 items, 1-5 Likert scale) assessed attitudes/beliefs. Interviews (N = 18 questions) captured deeper feedback on perceived barriers to utilizing DH. Descriptive statistics were used to analyze survey data. Interviews were transcribed and inductive thematic analysis was used to identify salient themes in qualitative data.

Results. Patients (N = 5; *M* age = 41.8) and physicians (N = 4; *M* age = 27) exhibited differing perspectives. 80% of patients "strongly agreed" they: would use DH for remote appointments; trust AI efficacy; felt little pressure to adopt. In contrast, 75% of physicians "strongly disagreed" with integrating mobile devices into practice and trusting AI; 75% "strongly agreed" to organizational pressure to adopt AI. In both groups, qualitative analyses indicated perceptions of safety, usability, and skepticism about reliability, as barriers to adoption.

Conclusions. Patients are enthusiastic about using mobile devices and AI as part of care, while providers remain cautious. As DH utilization grows, to ensure effective uptake of DH at scale, patient marketing in rural areas should focus on device safety/ease of use; provider marketing of DH should focus on diagnostic reliability and high patient acceptance.

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Assessing Factors Driving High Utilization of Inpatient Services in Diabetes Patients

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Introduction. There is a cohort of patients in The University of Kansas Health System (TUKHS) that are high-utilizers of inpatient services due to diabetes-related conditions. The purpose of this project is to identify these patients and qualitatively determine common variables between them. These variables may shed light on factors that cause higher inpatient services utilization and lead to potential interventions to address this issue.

Methods. A retrospective descriptive chart review of high-utilizing patients was conducted. Subjects were stratified into groups of high and low utilization over the previous year, then by normal or elevated most recent HbA1c. High utilization was defined as >3 inpatient hospital discharges within the previous year and elevated HbA1c was defined as >7.0%. Data included number and cause of hospitalizations over the previous year, number of outpatient visits, most recent HbA1c, diagnosed comorbidities, diabetes medication use, and other variables.

Results. Charts were reviewed for 102 low-utilizing and 108 high-utilizing diabetic patients. Regression analyses were performed and showed obstructive sleep apnea (OSA) and being prescribed 10 or more medications have a significant positive association with high inpatient utilization while GLP-1 agonist and statin use have a significant negative association. All statistics are preliminary.

Conclusions. High-utilizing patients are more likely to have OSA, less likely to be prescribed GLP-1 agonists or statins, and more likely to be prescribed 10 or more medications. These findings may guide future interventions to decrease hospitalizations in this cohort.

Enhancing Surgical Training Through Coaching: A Systematic Review of Self-Determination Theory in Surgical Education

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Introduction. Surgical coaching is an emerging teaching method that promotes professional development. However, few interventions are grounded in educational theory. This systematic review evaluated how surgical coaching aligns with Self-Determination Theory (SDT), a framework emphasizing autonomy, competence, and relatedness, and whether SDT alignment is associated with improved educational outcomes.

Methods. A systematic review was conducted in November 2024 across multiple databases using PRISMA guidelines. Eligible studies evaluated surgical coaching interventions in the U.S. or Canada, included residents or attendings, and reported educational outcomes. Study quality, educational impact, and SDT alignment were assessed using the MERSQI, Kirkpatrick's framework, and Gillison et al.'s coding framework, respectively.

Results. Fifteen studies met inclusion criteria. Coaching models included faculty-led (n = 10), peer-led (n = 6), and hybrid (n = 1) formats. SDT strategies were coded 87 times: competence-supportive strategies were most common (n = 43), followed by autonomy (n = 31) and relatedness (n = 13). Interventions using video review or validated skill assessments (e.g., OSATS, GOALS) had significantly higher MERSQI scores ($p < 0.05$). Six randomized controlled trials demonstrated improved technical performance. Peer-led and hybrid models showed greater SDT alignment.

Conclusions. SDT-aligned coaching programs, particularly those using structured curricula, validated tools, and milestone-based feedback, may enhance surgical education by fostering motivation and skill development. Peer-led and video-based models showed promise for supporting autonomy and relatedness. SDT may serve not only as a theoretical foundation, but as a practical framework to improve coaching design, reinforce psychological safety, and promote individualized, competency-based growth.

Metabolic Dysregulation and Memory Cognition: Baseline Findings Using a Delayed Recall Test

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Introduction. Cognitive impairment has been associated with metabolic risk factors, such as a body mass index (BMI) over 30. Memory, critical for daily functioning, may serve as an indicator of early cognitive decline in individuals with metabolic risk factors. Existing research focuses on older adults, leaving a gap in mid-life populations where interventions may be more effective. This study investigates the relationship between metabolic risk factors and memory in mid-life adults.

Methods. Forty adults (ages 45-65) were recruited for a six-week exercise intervention. Baseline assessments included BMI and cognitive assessments. Memory was evaluated using the NIH Toolbox Rey Auditory Verbal Learning Test, which measures memory recall approximately 15 minutes following learning a list of words. The relationship between BMI and memory were analyzed with a Pearson correlation.

Results. A negative correlation trend was observed between BMI and memory ($r = -0.314$, $p = 0.06$). Over 55% of participants had a BMI over 30, indicating an elevated risk for developing metabolic syndrome.

Conclusions. Findings suggest a relationship between BMI and poorer memory recall, underscoring the potential role of metabolic risk factors contributing to cognitive decline. These results emphasize the importance of addressing metabolic risk factors in strategies aimed at mitigating cognitive impairment. Future research will include other metabolic risk factors: hypertension, dyslipidemia, diabetes, and arterial stiffness, to determine their individual and combined contributions to memory and overall cognitive function.

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Age Related Differences in Neck Muscle Mechanics and its Implications on Head Impact During Falls

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Introduction. Previous studies have shown that older adults are more likely to experience head impact when they fall and thus are at greater risk for Traumatic Brain Injury (TBI). We hypothesized older adults would exhibit reduced Sternocleidomastoid (SCM) muscle cross-sectional area (CSA), weaker neck flexor strength, and higher frequency of head impacts during falls.

Methods. This study analyzed data from 8 young adults (YA, 18-30 years) and 10 older adults (OA, 65+ years), consisting of qualitative head impact videos and quantitative muscle strength measurements. ANOVA analysis of YA + Low Risk, YA + High Risk, OA + Low Risk, OA + High Risk groups was used to evaluate possible differences among groups.

Results. 6/10 tested older adults experienced head impact during falls, compared to 1/8 young adults, indicating a significantly higher rate in OA. Ultrasound imaging showed an age-related increase in SCM echogenicity, suggesting muscular degeneration. Older adults in the low-risk group had significantly decreased anterior neck flexion force, while lateral flexion remained unchanged across all groups. Flexion in the left and right directions remained the same.

Conclusions. This study confirms that older adults are more likely to experience head impact during falls. Decreased SCM echogenicity in older adults suggested age-related degeneration of muscular properties, which potentially relates to this increased head impact. However, neck flexion strength differences were inconsistent, as significant reductions were seen only in low-risk older adult group. Future research is needed to clarify findings and implications for fall prevention and TBI risk reduction in aging populations.

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Fluoxetine Response Associated with Enantiomer Abundance in Adolescents

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Introduction. Only 3-in-5 adolescents respond to antidepressants the first time. Identifying individual factors that influence response can guide treatment and expedite recovery. FLX is administered in racemic form (S and R). The S-enantiomer of norFLX is 20 times more active than R-enantiomer and thought to contribute meaningfully to drug response.

Methods. Youth (12-21yr) on FLX at steady state had plasma FLX and norFLX S/R measured by UPLC-MSMS and CYP2D6 genotyped by Illumina array with ddPCR copy number confirmation. Participant PHQ9 scores ≥11 or Promis Anxiety t-scores ≥60 were considered non-responders.

Results. In 56 youth (16±1.9yr (12-21yr), 70% female), average norFLX S/R was higher in responders compared to non-responders (depression: 1.34±0.84 vs 0.84±0.45, p = 0.001, Cohen's d = 0.73; anxiety: 1.56±0.98 vs 0.97±0.55, p = 0.006, Cohen's d = 0.74). Participant symptom scores were negatively correlated with norFLX S/R (depression r_s = -0.28; anxiety r_s = -0.34), while FLX S/R was not associated with depression or anxiety response. Mean norFLX S/R was similar across CYP2D6 phenotypes (PM n = 2, IM n = 11, NM n = 36, UM n = 3).

Conclusions. In adolescents on FLX, norFLX S/R was significantly higher in responders compared to non-responders. No difference was detected in norFLX S/R across CYP2D6 phenotypes, a finding limited by small sample size and likely related to autoinhibition of CYP2D6 activity resulting in FLX-associated phenoconversion to poor metabolizer status in all participants. Further research is needed to evaluate the role of norFLX S/R as a predictor of FLX response.

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Elevated Peripheral Blood Mononuclear Cell-derived Superoxide Production in Middle-age/Older Women with Obesity and Hypertension

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Introduction. Obesity and hypertension among middle age/older women are associated with elevated sympathetic nerve activity and oxidative stress. However, the sources of oxidative stress in this population remain unclear. We hypothesized that peripheral blood mononuclear cell (PBMC)-derived superoxide production via norepinephrine stimulation would be augmented in middle-age/older women with obesity and hypertension compared with middle-age/older women with obesity and normal blood pressure.

Methods. Hypertension status was determined via 24-hour ambulatory blood pressure monitoring (Systolic: Obese, 115 ± 6 mmHg vs. Obese with hypertension: 137 ± 6 mmHg, $p < 0.01$; Diastolic: Obese, 68 ± 4 mmHg vs. Obese with hypertension: 78 ± 7 mmHg, $p < 0.01$). PBMCs were freshly isolated from whole blood in women with obesity and hypertension (n = 8, 55 ± 8) and in women with obesity without hypertension (n = 10, 53 ± 8 years of age) and incubated for 12 hours with norepinephrine. Intracellular superoxide production in PBMCs was measured using dihydroethidium fluorescence.

Results. Women with obesity and hypertension showed elevated superoxide production following norepinephrine incubation compared to women with obesity (+42±42 % vs. +1±16%, $p = 0.01$). Among a larger cohort of individuals with overweight and obesity (n = 32), 24-hour ambulatory blood pressure was positively correlated with superoxide production following incubation with norepinephrine while controlling for age (Systolic: $R = 0.49$, $p < 0.01$; Diastolic: $R = 0.48$, $p = 0.01$).

Conclusions. These findings suggest that adrenergic receptor-mediated superoxide production from peripheral blood mononuclear cells is augmented in hypertension among middle-age/older women with obesity.

Evaluating the Relationship Between Redlining and Food Allergy for The University of Kansas Medical Center Pediatric Patients

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Introduction. Recent studies show a positive correlation among various atopic conditions and redlining in U.S. cities, but there is a paucity of research in food allergy. By approaching food allergy from a systemic, historical context, our single-center study examines redlining as a proxy for factors that might drive the incidence of food allergies.

Methods. A retrospective chart review evaluated 554 pediatric patients with IgE-mediated allergy to one of the top eight food allergens. Food allergy patients were matched with non-allergic controls. Logistic regression investigated the effect of a historical neighborhood ranking system by the Home Owners Loan Corporation (HOLC) on food allergy occurrence. Secondary analyses examined social health factors.

Results. In our cohort, food allergy patients were described as non-white (55.4%), on Medicaid (37.5%), uninsured (7%), food insecure (6.2%), needing emergency services for severe reactions (27%), and having a co-morbid diet-related chronic condition (10%). Interestingly, only 176 of the 1,108 eligible patients lived within the districts outlined in the historic HOLC map. Due to this limitation, there was no significant difference in the odds of food allergies across HOLC grades.

Conclusions. We suspect that our study was unable to find statistically significant outcomes for our hypothesis due to the low number of eligible patients. The relationship between food allergies and grade D areas surprisingly does not support larger reports for other atopic conditions. Further investigation needs to be done with a larger, more robust population to assess socioeconomic factors contributing to food allergy.

Conflicts: *Allergy Therapeutics (UK) Ltd. Love (PI) 5/2023 – Present A Phase I clinical trial to evaluate the safety and tolerability of VLP Peanut in healthy subjects and subjects with peanut allergy and to explore preliminary signals of its efficacy (PROTECT) Role: Investigator Community Advisory Council Member for FARE Neighborhoods Initiative – Marissa Love, M.D., 2025 to present*

Exploring the Link Between Cerebral Perfusion during Sit-to-Stand and Cognitive Function in People After Stroke

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Introduction. People post-stroke have an increased risk of cognitive impairment, potentially linked to cerebral blood flow (CBF) dysregulation. While CBF impairment is associated with dementia, its response to physiologic challenges like sit-to-stand transitions and its relationship to cognitive function remains unexplored in chronic stroke. We hypothesized that people post-stroke would show a decreased CBF response during a sit-to-stand transition and would show a positive correlation between CBF during sit-to-stand and cognition.

Methods. We conducted a retrospective analysis from existing data. We assessed CBF as the mean middle cerebral artery velocity (MCAv) during sit-to-stand. Montreal Cognitive Assessment (MoCA) assessed cognition.

Results. Forty-eight individuals with chronic stroke and 27 age-similar healthy adults were included. Participants with chronic stroke showed significantly lower MoCA scores than healthy controls ($p < 0.0001$). No between group differences existed for the drop or minimum value in MCAv after standing. Controls showed a moderate positive correlation between minimum MCAv and MoCA ($p = 0.013$), while individuals with chronic stroke showed no correlation between minimum MCAv and MoCA.

Conclusions. In healthy adults, a moderate positive correlation was observed between minimum MCAv and MoCA, suggesting a potential link between cerebral blood flow regulation and cognition. However, this relationship was absent in individuals with chronic stroke, indicating that cerebrovascular responses to orthostatic stress may not contribute to cognitive function in this population. These findings highlight potential differences in cerebrovascular regulation post-stroke and its relevance to cognitive impairment.

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Unmasking Lupus: Analysis of Diagnosis Trends and Demographics at The University of Kansas Medical Center

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Introduction. Systemic lupus erythematosus (SLE) is a chronic autoimmune disease that can affect many body systems. This study examines diagnosis patterns at The University of Kansas Medical Center (KUMC). As part of a community initiative project, we aimed to identify disparities in lupus diagnoses and symptom presentation.

Methods. Data from the HERON database were analyzed, focusing on lupus ICD-10 diagnosis codes and their subsets over the past five years and the most recent year. Patient demographics-including age, race, and gender-were assessed to identify disparities. Symptom presentation was cross-referenced to determine the most commonly diagnosed features of lupus in affected populations.

Results. The dataset included 2,319 patients diagnosed with SLE, 2,105 (90.8%) were female and 1,519 (65.5%) were white. Women of color were disproportionately diagnosed with severe SLE subsets, including tubulo-interstitial nephropathy (44.4%) and pericarditis (56.52%). When analyzing the most associated lupus symptoms, white women had higher rates of unspecified joint pain (64%), fibromyalgia (70%), fatigue (62%), and thrombocytopenia (51%), compared to 36%, 30%, 38%, and 33% in women of color, respectively. Despite these findings, women of color comprised only 20.8% of the total SLE patient population at KUMC, highlighting potential disparities in diagnosis and disease recognition.

Conclusions. Although women of color represent only 20.8% of total SLE cases at KUMC, they experience more severe disease manifestations and exhibit common lupus symptoms at higher rates than their diagnosis suggests. Further studies could determine why women of color are frequently presenting with SLE symptoms yet remain significantly underdiagnosed.

Street Medicine: Expanding the Frontiers of Primary Care

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Introduction. Homelessness is a growing problem in the United States. As the number of those experiencing homelessness continues to rise, so do their healthcare needs. Free health clinics and Street Medicine teams, such as Care Beyond the Boulevard (CBB) in Kansas City, are a perfect example of community resources that help address the health concerns of this population. This study examines the work of CBB as a sample of Street Medicine teams to better understand the needs of the population it serves and the medical conditions for which they are most commonly treated.

Methods. A retrospective chart review was conducted from patient encounters beginning on January 1, 2022, and ending on December 31, 2024, for patients receiving care from CBB. The following information was collected: race, sex, homelessness status, encounter date, appointment type, and visit diagnoses. Inclusion criteria were any encounter with an appointment type of New Patient, Established Patient, or Medication Refill.

Results. In total, 15,911 encounters from 4,125 patients were reviewed. From these findings, the most commonly treated diagnosis was hypertension. Other frequently treated diagnoses included diabetes mellitus (types 1 and 2), obstructive lung disease (COPD/asthma), and mental health disorders.

Conclusions. This data set provides evidence to support the practice of Street Medicine as a subset of primary care, replacing the traditional healthcare system for individuals who are low-income and/or experiencing homelessness. More teams like CBB are needed to help this population gain access to both preventative and mental healthcare services.

Case Report: Direct Comparison of Bilateral Knee Arthrocentesis – Visually and Microscopically Dissimilar Results

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Introduction. Arthrocentesis is a procedure performed both for diagnostic and therapeutic reasons. Arthrocentesis can be utilized to differentiate among crystal arthropathies, such as gout and pseudogout, as well as evaluated inflammatory and noninflammatory effusions. Traditionally, pseudogout flares tend to affect a single joint. However, pseudogout can affect multiple joints at one time. There have been several documented cases of coexisting etiologies for knee swelling. However, there is a lack of literature covering simultaneous acute bilateral effusions with differing etiologies.

Methods. Information was gathered from chart review and directly from patient and family members with their consent.

Results. The patient underwent bilateral knee arthrocentesis in the ED. On collection, the synovial fluid was noted to be markedly dissimilar in appearance. The right knee microscopy yielded pseudogout (17304 white blood cells [WBC], 4605 red blood cells [RBC], negative gram stain, positive for rare calcium pyrophosphate deposition [CPPD] crystals); the left knee yielded inflammatory arthritis without crystals (417 WBCs, 1085 RBCs, negative gram stain, negative for crystals).

Conclusions. This is one of the first documented cases of a bilateral knee arthrocentesis with differing etiologies. Furthermore, following these findings, the patient was admitted to the Internal Medicine service for pain control, physical and occupational therapy, and further evaluation. Synovial fluid culture was ultimately negative ruling out septic arthritis. The patient was discharged with instructions to follow-up with Rheumatology outpatient for future CPPD treatment, including initiation of Plaquenil.

Exploring the Relationship Between Antidepressant Treatment, Neurochemicals in the Brain and Anxiety/Depression Symptoms in Youth

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Introduction. Pediatric mental health disorders are associated with significant morbidity and mortality. Investigating factors influencing symptoms and treatment response aids in optimizing therapies. Neurochemicals can serve as proxies for neurobiological processes altered in these disorders. The impact of antidepressant treatment on brain metabolism is limited in pediatrics; this study aims to evaluate relationships between neurochemicals and anxiety and depressive symptoms in fluoxetine-treated youth.

Methods. Adolescents aged 12-21yr, on steady-state fluoxetine, underwent 1H-MRS, measuring glutamate (Glu), glutamine (Gln), myoinositol (mI), choline (Cho), N-acetylaspartate (NAA) and creatine (Cr), reported as ratios to Cr. Depressive and anxiety symptoms were assessed using PHQ-9 and PROMIS Anxiety scales, respectively. Participants with PHQ-9 scores ≥11 or PROMIS Anxiety t-scores ≥60 were considered non-responders. Statistical analyses included Student's t-test and Spearman's rho, using JMP Pro v17.

Results. In 46 youth (mean age 16.1 ± 1.9 years), NAA levels did not correlate with anxiety symptom severity (Spearman's $\rho = -0.146$, $p = 0.333$). When stratified by fluoxetine response, NAA was significantly higher in responders compared to non-responders (NAA mean 1.67±0.09 vs 1.57±0.11, $p = 0.004$, Cohen's $d = 0.94$). Other neurochemicals did not differ between groups, nor correlate with anxiety or depression symptom severity.

Conclusions. In fluoxetine-treated youth, anxiety responders had increased NAA compared to non-responders. NAA, a marker of neuronal integrity, is often lower in psychiatric disorders relative to controls, with some evidence suggesting normalization following treatment in adults. Our findings support the need for further research into NAA as a potential biomarker for fluoxetine response.

Abnormal Umbilical Artery Doppler Studies in Fetal Macrosomia: What do They Mean?

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Introduction. Large for gestational age infants have poorer neonatal outcomes. Umbilical artery Dopplers studies (UADS) assess health of pregnancies complicated by fetal growth restriction, yet their utility in suspected macrosomic fetuses (SMF) is unknown. We aimed to determine the relationship between abnormal UADS and adverse neonatal outcomes in SMFs.

Methods. This was a retrospective cohort study of pregnancies with SMF ≥36-week gestation. Exclusion criteria included multiple gestations, fetal congenital anomalies, intrauterine fetal demise, and maternal age of <18. Abnormal UADS were systolic/diastolic ratio or pulsatility index ≥95th percentile. Adverse neonatal outcomes were evaluated. Differences in neonatal outcomes between normal and abnormal UADS cohorts were analyzed using Chi-Square/Fisher Exact Tests and t-tests.

Results. Of 447 patients with SMF, 14 (3.1%) had abnormal UADS. More than 70% (n = 10, 71.4%) of patients with abnormal UADS experienced any adverse neonatal outcome compared to 45.3% (n = 433) of patients with normal UADS (p = 0.05). In individual adverse neonatal outcomes, hyperbilirubinemia (50.0% versus 11.0%, p = 0.0005), hypoglycemia (28.6% versus 8.6%, p = 0.03), and mean cord gas base deficit (5.8± 3.3 versus 4.0± 3.0, p = 0.04) differed to statistical significance between abnormal and normal UADS patients. The rate of respiratory distress was higher in abnormal UADS group (28.6% versus 15.8%, p = 0.26), but this difference was not statistically significant.

Conclusions. Abnormal UADS in SMF increased risk of adverse neonatal outcome by 26%. Antenatal surveillance in SMF could be utilized to prepare for adverse events but further research is needed.

The Effect of Surface Roughness of Poly(Methyl Methacrylate) on Bacterial Attachment

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Introduction. Polymethyl methacrylate (PMMA) bone cement is widely used for fixation of joint prostheses. Previous studies have established a connection between surface roughness and bacterial adhesion on many surfaces. This project evaluates the effect of surface roughness on bacterial attachment to bone cement.

Methods. PMMA was mixed under vacuum, flattened to 3 mm, and cut into 1 cm x 1 cm disks using a band saw. One group was sanded to achieve a smooth surface, another was sanded smooth, then grooved to make a controlled roughness, and another was left untreated to have natural roughness of bone cement (N = 10 for each group). Roughness of all disks was measured via optical profilometry. Disks were then incubated with bioluminescent *S. aureus* for 24 hours. After rinsing with phosphate-buffered saline, the disks were plated, and luminescence was measured via plate reader.

Results. The sanded group showed an average luminescence of 431.2 relative light units (RLU), the natural group showed 1102.2 RLU, and the grooved group showed 739.2 RLU. The average roughness (Ra) was 3.27 µm for the sanded group, 18.03 µm for the natural group, and 9.307 µm for the grooved group. A linear regression of roughness of each disk vs luminescence measured for each disk gave an R^2 value of 0.273 with a P-value of 0.0159.

Conclusions. Increased individual specimen roughness of PMMA disks correlated with increased bacterial attachment. The innate surface of bone cement allows for substantially more bacterial attachment than the modified surfaces of the other two groups.

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Evaluating the Evidence for Genetics/Genomics in Chronic Pain: An Integrative Literature Review

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Introduction. Differences in DNA sequence and/or genomics account for an estimated 70% of the individual differences in pain sensitivity. While it is accepted that genetics/genomics play a role in determining pain burden, the present study was designed to identify the presence of clinical evidence for genetic factors as a determinant of chronic pain severity. This study seeks to fill that gap in knowledge and provide a systematic review of various genes for which evidence is available.

Methods. The Scale for the Assessment of Narrative Review Articles (SANRA) criteria guided this review. We employed PubMed/Medline to identify relevant articles using the primary database and search terms encompassing combinations of chronic pain, genetics/genomics, pharmacogenomics, opioid side effects in human subjects. After review by two independent reviewers for inclusion, 27 articles ultimately met the inclusion criteria.

Results. While only a small number of articles provided level II (randomized clinical trial) evidence for specific genes involved in chronic pain susceptibility and severity, we were able to identify level III evidence for genetics of chronic pain. Studies identified genes in several broad categories: opioid related genes, genes implicated in the development of pain, proteins, genes modulating inflammatory markers, genes affecting disease processes.

Conclusions. Evidence implicating genetic/genomic variation in the individual differences in chronic pain risk and severity, but that information is not being used to guide evidence-based medicine decision making. We found that this may be due to a lack of published evidence with the highest levels of science supporting their integration into practice.

Fenestrated Endovascular Repair of a Thoracoabdominal Aortic Aneurysm and Splenorenal Bypass in a Patient with Prior Dissection History

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Introduction. Thoracoabdominal aneurysms are rare and highly complex in their pathophysiology. Although surgical open repair was the historical mainstay, no standardized repair approach exists, and treatment requires an individualized strategy.

Methods. We present a 57-year-old male who underwent a staged fenestrated endovascular aortic repair (FEVAR), which included a splenorenal bypass for left kidney salvage. The patient had an extensive cardiovascular procedural history, including coronary artery bypass grafting (CABG), pacemaker implantation, type B thoracic aortic dissection repaired with thoracic endovascular aortic repair (TEVAR) six years prior, and a recent open aortic root and arch reconstruction for type A dissection. A surveillance computed tomography (CT) scan revealed degeneration of the type B dissection into a primarily infrarenal aneurysm and extension into the left common iliac artery. First, a splenorenal bypass was performed between the splenic and left renal arteries. Three months later, a fenestrated endograft was deployed, incorporating a celiac branch and fenestrations for the superior mesenteric artery (SMA) and right renal artery.

Results. Post-operative computed tomography angiography (CTA) revealed a type II endoleak from a lumbar artery and a nonflow-limiting dissection distal to the celiac artery stent graft. Follow-up imaging confirmed a patent repair with no significant aneurysm progression or left common iliac artery changes. The patient remains stable and continues surveillance with six-month CTAs.

Conclusions. This case highlights the complexity of thoracoabdominal aneurysms and the importance of individualized surgical planning. While endovascular techniques continue to evolve, careful patient selection and close postoperative surveillance remain critical to optimizing outcomes.