CURRICULUM VITAE

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Education:

Doctorate of Chiropractic	Cleveland Chiropractic College, Kansas City, MO. 2003
Bachelor of Arts	Ottawa University

Licenses and Certifications:

Fellowship in Spinal Biomechanics and Trauma

Course work and rotations approved through State University of New York, Jacobs School of Medicine and Biomedical Sciences 2021.

Fellowship Acupuncture Society of America F.A.S.A.

Learning 3 levels of treatment: pain control, formula, and traditional acupuncture. 12 main meridians: Lung, Large Intestine, Stomach, Spleen, Heart, Small Intestine, Bladder, Kidney, Circulation Sex, Triple Warmer, Gall Bladder, Liver. 2 Extra vessels; Conception Vessel, Governing Vessel. 12 kinds of points; tonification, sedation, source, alarm, associated, connecting, entry, exit, accumulation, Horary, antique, and intersection. Methods for stimulation: Japanese needles, Chinese needles, electrical stimulation, teishin, finger pressure, heat, cold, moxibustion, laser, Qi Gong, cupping, stapling. 1997

Diplomate Certification and Advanced Acupuncture Techniques

The premise of Acupuncture. Introduction into microsystems: Auriculo-therapy, Face, Scalp, Hand therapy. Five element theory, Eight extraordinary points and their use and Ghost points. Commonly used points. Advanced needling techniques. Use of the Eight confluent points. Discussion and workshop on acupuncture points for structural correction, sprain/strain, fibromyalgia, joint disorders, traumatic arthritis, gout, whiplash, TMJ, and rib subluxation. Diagnosis and treatment by Akabane points. Graphing, graph interpretation, and preparing an effective treatment plan. Forbidden point review. Intra-Dermal needling. The use of Scalp Acupuncture, 12 Divergent Channels, 15 Connecting Channels, Summary of research concerning channels and points. Eight miscellaneous channels. Thermal Reflex areas to diagnose excess or deficiency. 2000.

National Board of Chiropractic Examiners Acupuncture Examination

National Board examination, 2011.

Diplomate American Board of Chiropractic Acupuncture DABCA

Diplomate ACA Council of Chiropractic Acupuncture. Currently the highest level of testing in the Chiropractic profession. The only national recognized credential by major health insurance companies, 2011.

Trauma Team Member of the Academy of Chiropractic 2018

January 2004	Kansas State Board of Healing Arts
February 2004	Missouri State Board of Chiropractic Examiners
2003	The National Board of Chiropractic Examiners Part 1,2,3, and 4.
2003	The National Board of Chiropractic Examiners Physiotherapy

Post Graduate Education:

Advanced Imaging Certification

CV Entries 2022-2023

Advanced Imaging Certification – MRI Mastery Series – General Spine Disorders – Case and evidence-based detail review of neuromyelitis optica, pseudo-herniation, arthritis, and osteogenesis imperfecta tarda was presented. Focus was on the progression of reading MRI images pertaining to disorders of the human spine and their relationship to clinical findings. Focus was on the cervicocranial region was presented with detailed analysis of over vigorous decompression effects on regional anatomy. Analysis of the etiology, pathogenesis and treatments associated with ankylosing spondylitis, a common seronegative spondyloarthropathy and chronic inflammatory autoimmune disease was presented. Details of immune cells, innate cytokines, and human leukocyte antigen (HLA-B27) was outlined. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – General Spine Disorders – overview and discussion of spinal tuberculosis pathology, post-surgical abscess and dural leak was presented. Relevant anatomy and clinical correlation were emphasized and reviewed. Details related to T1, T2 and STIR images was presented and compared. Attention was paid to the diagnosis of spinal arteriovenous fistula and post-surgical complications visible on MRI studies. Details related to the long term outcomes and prognostic factors in patients with arteriovenous fistulas was outlined. Post-surgical extradural seroma/hematoma was reviewed and presented in detail. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – General Spine Disorders – detailed analysis of failed back surgery syndrome, post-operative dural tear/leak and cervical radiculopathy with neck pain was presented and outlined. Review of post and pre-operative arachnoiditis, loculated arachnoid arthritis and synovial cysts and the subsequent influence on spinal anatomy was presented. MRI as the gold standard in the diagnosis of arachnoiditis with attention to its specificity and sensitivity was discussed. Overview of symptoms such as paraparesis and other risk factors were outlined. Specific attention was paid to spin echo sequences and transverse relaxation times with focus on contrast of different tissue types. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – General Spine Disorders – analysis of anatomical landmarks in the spine on MRI was presented and reviewed. Counting of vertebral levels was demonstrated and explained with particular attention on wrong level surgery. Cadence of orientation during review of MRI films was emphasized. Anatomical review of spinal transition zones with detailed discussion on the morphological nuances of vertebral and other anatomical landmarks was discussed and presented. Overview of the historical progression of MRI science related. to MRI physics, instrumentation, basic sequences, artifacts, safety and contrast agents was presented. Additional overview of post-operative complications such as post-operative osteomyelitis, post-operative cervicalgia, and post-operative mycobacterium abscessus was demonstrated and correlated to post-operative pain. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – General Spine Disorders – presentation of the vascular anatomy of the spinal column as visualized on MRI studies was detailed. Specific focus was on the normal description of the arterial and venous drainage of the spinal cord. Review of the utilization of MR angiography and its ability to depict the vascular anatomy of the spinal cord was presented. The arterial vascular tree was presented including basilar artery, vertebral artery, subclavian, aorta and surrounding anterior and posterior spinal arteries. Venous vascular tree presentation included anterior and posterior spinal veins, vertebral vein, subclavian vein and other venous plexi associated with the spinal cord. Analysis and comparison of anatomical models and MR angiography with detailed imaging studies was presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Degenerative Diseases of the Spine – overview and introduction to degenerative spinal diseases as determined by magnetic resonance imaging. Details related to MRI physics and pulse sequences related to degenerative spinal disease were presented and explained for the cervical, thoracic, and lumbar spines.

Grading parameters of spondylolisthesis was discussed and detailed with specific focus on etiology and its influence on spinal stenosis. Common causes of acquired spinal stenosis were presented in the context of both acute and degenerative conditions. Changes to anatomical landmarks were outlined and its correlation to claudication. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Degenerative Diseases of the Spine – specific details related to the anatomy of the intervertebral disc was presented. Specific discussion related to intervertebral disc nomenclature and morphological presentation on MRI was presented. Detailed analysis of intervertebral disc protrusion versus intervertebral disc extrusion was outlined and compared. Parameters relating to the diagnosis of intervertebral disc sequestration along with clinical sequala were detailed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Degenerative Diseases of the Spine – analysis of appropriate reporting parameters in degenerative spinal disease was presented with specific examples provided. Anatomical features and location related to morphological changes in the intervertebral disc and surrounding joints were discussed and presented. Review of anatomical zones relating to intervertebral disc morphology including central and foraminal locations with their anatomical landmarks was detailed. Detailed analysis of uncovertebral degenerative disease, foraminal narrowing and ossification of the posterior longitudinal ligament was provided. Diffuse Idiopathic Skeletal Hyperostosis (DISH) was presented and outlined and discussed in terms of association between ossification of the posterior longitudinal ligament and ossification of the ligamentum flavum. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Degenerative Diseases of the Spine – Anatomy of the intervertebral disc was reviewed and correlated to annular fissures. Analysis between degenerative pre-existing fissures and acute injury were presented and outlined. Terminology related to transverse, circumferential and radial tears was presented and discussed. Clinical importance of posteriorly projecting synovial cysts was explained and demonstrated. Additional comparison to degenerative joint disease related to intervertebral disc changes was discussed. Particular focus on the three-dimensional measurement of the facet joint in normal individuals and those with intervertebral disc herniations was presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Degenerative Diseases of the Spine – degenerative changes related to the vertebral endplates were presented and detailed. Modic classification of degenerative bone marrow changes were outlined with specific attention paid

to Modic I and Modic II endplate changes. Comparison between T1, T2 and STIR images were compared and contrasted. Correlation between gene expression and MRI STIR signals in patients with chronic low back pain and modic changes was discussed in detail. Symptomatic versus asymptomatic spinal disease was presented with clinical correlation to advanced imaging images. Recurrence of lumbar intervertebral disc herniation after open spine surgery was reviewed and presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Intramedullary Spinal Lesions – review of spinal cord anatomy and localization of spinal cord lesions on MRI with a particular focus on intradural intramedullary spinal cord lesions. Overview and general outline of spondylomyelopathy with correlation to specific findings on MRI studies was presented. Discussion on the etiology of the disease process from ossification of the posterior longitudinal ligament. Presentation on disease progression to include spinal cord atrophy and downstream sequalae was outlined. Details of MRI pulse sequences for spine imaging relating to visualization of the spinal cord were outlined and presented including sagittal T1, sagittal T2, sagittal STIR, axial GRE in the cervical spine, axial T2W. Additional special sequences including diffusion weighted imaging (DWI), diffusion tensor imaging (DTI) and apparent diffusion coefficient (ADC) were presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Intramedullary Spinal Lesions – analysis of neoplasms of the spinal in the intradural intramedullary space of the spine. Detailed review of ependymoma associated/ non-associated with neurofibromatosis 2 myxopapillary ependymoma was presented and discussed. Presentation on the evaluation of cervical spinal cord astrocytoma and glioblastoma was outlined with correlation to case discussions. Hemangioblastoma of the spinal cord and conus medullaris was explained in detail with specific review of imaging acquisition and analysis. Overview and presentation of the neurological and spinal cord manifestations of Von Hippel Lindau Disease was provided along with outline of imaging presentations of cervical spinal cord ganglioglioma and a rare case of spinal cord lipoma. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Intramedullary Spinal Lesions – detailed presentation and review of the demyelinating diseases of the spine including multiple sclerosis of the spinal cord, idiopathic acquired transverse myelitis and vacuolar myelopathy. Review and discussion of acquired metabolic disorders of the spinal cord including subacute combined degeneration from copper deficiency and spinocerebellar ataxia. Additional discussion and outline of machine learning applications in spinal MRI. Contextual presentation relating to the study of the demography, incidence, symptoms, histopathology, postoperative complications, and recovery in spinal cord tumor patients. National Spine Management Group,

Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Intramedullary Spinal Lesions – details of infection and inflammation disorders of the spine. Review of imaging presentation of acute disseminated encephalomyelitis of the spinal cord with emphasis being placed on case presentations. Presentation on Chiari 1 with syringohydromyelia was detailed and reviewed. Congenital lesions of the spinal cord with specific focus on the intradural intramedullary space was given. Both cysticercosis and sarcoidosis of the spinal cord were outlined and discussed with specific case study presentations. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Intramedullary Spinal Lesions – overview of traumatic and vascular disorders of the spinal cord including hemorrhage of the spinal cord, cavernoma and dural arteriovenous fistula was presented. Focused detail on Type II dural arteriovenous fistula and potential clinical consequences was given. Intramedullary arteriovenous malformations in the setting of type II dural arteriovenous fistula and its clinical correlation on magnetic resonance angiography was presented along with common causes and imaging sequences of spinal cord ischemia/infarction. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Extramedullary Spinal Tumors - Detailed exploration of Chronic Inflammatory Demyelinating Polyradiculoneuropathy (CIDP), concentrating on diagnostic complexities and treatment methodologies. Underscoring the importance of accurate clinical and electrodiagnostic interpretations to prevent misdiagnosis. An extensive review of current treatments like intravenous immunoglobulin, corticosteroids, and plasma exchange, with discussion of management strategies for treatment-resistant cases. Emphasis was placed on the importance of using objective outcome measures for treatment efficacy evaluation. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Extramedullary Spinal Tumors - A comprehensive examination of various spinal tumors located within the dura but outside the spinal cord. Emphasis is placed on the radiologic and pathologic features of these tumors, with a specific focus on diagnostic imaging appearances. Key tumors discussed include meningiomas, schwannomas, neurofibromas, and malignant peripheral nerve sheath tumors. Details of common and uncommon manifestations, insights into their clinical presentations, imaging characteristics, and treatment implications. Highlights of the crucial role of imaging in diagnosis and management, underscoring the importance of correlating radiologic findings with pathologic features for accurate interpretation and treatment planning was presented. National

Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Extramedullary Spinal Tumors - A critical analysis of using 3D MRI in diagnosing disc sequestration cases that resemble tumors was presented. Highlights of two specific instances where conventional MRI techniques led to a neurinoma suspicion, but 3D MRI revealed clear boundaries between the mass and nerve root, ruling out neurinoma. The effectiveness of 3D MRI in distinguishing between disc-related issues and tumors, potentially reducing the need for invasive surgery was reviewed and discussed. Emphasis was placed on the importance of accurate diagnostic tools in spinal health, showcasing 3D MRI's potential in enhancing patient outcomes. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Extramedullary Spinal Tumors - Focus was on MRI as the primary diagnostic tool for spinal tumors, categorizing them into extradural, intradural extramedullary, and intramedullary. Highlights of MRI's effectiveness in identifying tumor location, shape, extent, and enhancement patterns, aiding in differential diagnosis was outlined and presented. Demonstration that spinal tumors are more prevalent in men and adults, with a significant occurrence in the 41-50 age group was discussed. Emphasis was placed on MRI's role in improving anatomic delineation, early diagnosis, and monitoring treatment responses in spinal tumor cases. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Extramedullary Spinal Tumors - Investigation of spinal hemangioblastomas, focus was on surgical outcomes and factors influencing prognosis. Cases treated over 35 years were reviewed, with analysis of the impact of surgery type, intraoperative neuromonitoring (IONM), and preoperative conditions on patient outcomes. Key findings included a better outcome with laminotomy compared to laminectomy, with a trend towards improved outcomes with IONM use. The study emphasized the importance of surgical approach and preoperative neurological condition in predicting patient recovery and managing spinal hemangioblastomas effectively. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Extramedullary Spinal Tumors - A retrospective analysis of MRI features of 199 patients distinguishing between two specific tumor types, schwannoma and meningioma. Discussions related to schwannomas significantly exhibiting cystic changes and lumbar location, while meningiomas commonly showing dural tail signs, thoracic location, and were smaller in size were presented. Review that cystic changes and dural tail signs are key differentiators, and that MRI is an effective tool for

accurately diagnosing these spinal tumors was outlined and presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Extramedullary Spinal Tumors - Examination of the diagnostic use of signal intensity (SI) ratios in differentiating schwannomas from meningiomas was outlined. Demonstration that schwannomas typically have higher SI ratios compared to meningiomas on T2-weighted MRI images was outlined. Improved accuracy in preoperative diagnoses, crucial for determining appropriate surgical approaches was presented. Findings contributing significantly to the understanding and management of these spinal tumors, highlighting the utility of SI ratios in MRI as a diagnostic tool was reviewed and discussed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Intradural Extramedullary Spinal Tumors - Extensive review of MRI protocols for spinal imaging was presented. Coverage of various MRI sequences and their applications in assessing different spinal structures, including white matter, gray matter, vessels, and bone was detailed. Emphasis was placed on the importance of sequence selection based on clinical scenarios and pathology. Practical tips for overcoming imaging challenges was reviewed and discussed. The study is significant for its detailed guidance on optimizing MRI techniques for accurate diagnosis and management of spinal conditions. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions -
An extensive review of spinal tumors based on the WHO's 5th Edition classification. Identification of 92 out of 163 bone and soft-tissue tumor entities with spinal manifestations. Emphasis placed on the importance of precise preoperative tissue diagnosis and interdisciplinary discussions for effective surgical planning. Discussion of tailoring surgical approaches to the unique biological behavior of each tumor, highlighting the significance of understanding tumor growth patterns, metastatic potential, and age incidence for optimal treatment strategies was presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions - A report and review of the literature examining a rare case of spontaneous spinal subdural hematoma (SSDH) concurrent with idiopathic intracranial subarachnoid hemorrhage. Exploration of the diagnostic challenges, emphasis on the necessity of prompt surgical intervention for SSDH, and discussion of the potential etiologies and clinical presentations of this unusual condition. Contribution to the understanding of SSDH's pathogenesis and highlighting of the importance

of considering it in differential diagnoses of acute spinal emergencies was detailed and presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions– Review and discussion of a sequestered disc herniation mimicking psoas abscess was presented. Details of a unique case of sequestered disc herniation initially misdiagnosed as a psoas abscess was outlined. Underscoring the diagnostic complexity of such cases, emphasis was placed the importance of differential diagnosis in spinal pathology. Highlights of the necessity of considering sequestered disc herniation in the differential diagnosis of psoas abscess, particularly when clinical and imaging findings are atypical. Overview of the understanding of spinal pathologies and the need for careful evaluation to avoid misdiagnosis and inappropriate treatment was reviewed along with appropriate images. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions- Detailed examination of primary osseous chondrosarcoma in the lumbar spine. Discussion of the complexities and challenges in diagnosis and treatment, emphasis was placed on the effectiveness of two-stage surgery for total tumor removal and spinal stabilization. Comparison of one-stage and two-stage surgical approaches, highlights of the importance of en bloc resection in the management of such cases to reduce recurrence and ensure better outcomes was correlated to patient symptoms and imaging findings in the sagittal and coronal planes. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions – Outline of the differentiation between benign and malignant vertebral compression fractures using qualitative and quantitative analysis of a single fast spin echo T2-weighted Dixon sequence was presented. Emphasis was aimed to enhance diagnostic proficiency in distinguishing between benign and malignant vertebral compression fractures. Focus was on improving the accuracy and reliability of MRI assessments using a novel imaging technique. Learning objectives centered on the evaluation of the diagnostic performance of this imaging method, both qualitatively and quantitatively, facilitating a more precise and efficient approach to spinal fracture assessment in clinical practice. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions – Outline provided comprehensive learning objectives on the diagnosis and management of primary and secondary spinal cord tumors. Focus was on interpreting advanced MRI sequences, specifically T2-weighted, diffusion-weighted, and fluid-attenuated inversion recovery (FLAIR) imaging.

Learning objectives included understanding neuroanatomical compartmentalization of these tumors and their genetic and histological profiles. Emphasis was placed on the application of targeted therapies, the role of surgical interventions, and the significance of genetic markers in prognosis and treatment strategies. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions – Outline of the computational analysis of vertebral body for compression fracture using texture and shape features was presented and enhanced the diagnostic accuracy of vertebral body (VB) compression fractures using MRI. Emphasis was placed on the utilization of T1-weighted median sagittal MRI slices for computational analysis. Learning objectives revolved around developing proficiency in analyzing VBs through automated machine learning techniques, focusing on texture and shape feature extraction. The approach improved differentiation between normal, benign, and malignant vertebral bodies, highlighting the potential of advanced computational methods in spinal imaging diagnostics. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions - Presentation aimed to refine the diagnostic approach to spinal tuberculosis (TB) using MRI. The learning objectives included mastering the interpretation of T1-weighted, T2-weighted, and STIR (Short Tau Inversion Recovery) sequences, as well as understanding the utility of gadolinium-enhanced imaging. Emphasis was placed on identifying characteristic MRI features of spinal TB, such as vertebral body involvement, disc changes, and paraspinal abscess formation, to differentiate it from other spinal pathologies and enhance clinical decision-making in TB management. diagnostics. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions - Focus was on diastematomyelia, presenting minimal neurologic deficits. The learning objectives included understanding the imaging features of diastematomyelia using specific MRI sequences. These comprised T2-weighted images for spinal cord and nerve root visualization, T1-weighted images for vertebral body assessment, and STIR sequences for evaluating associated soft tissue changes. The emphasis was on recognizing these MRI patterns in atypical presentations, particularly in adults, and integrating them into clinical assessments to improve diagnostic accuracy and inform treatment strategies for this rare spinal anomaly. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions - Outline on evaluating the diagnostic yield of culture in native vertebral osteomyelitis, emphasizing the

importance of image-guided vertebral biopsy. The learning objectives included analyzing the sensitivity and specificity of bone and disc cultures, using MRI and CT imaging techniques for targeted biopsies. The study reinforced the necessity of histopathologic examinations in culture-negative cases and the potential benefits of repeat biopsies. This comprehensive approach aimed to enhance diagnostic accuracy in vertebral osteomyelitis, improving patient management through more targeted and effective treatment strategies. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions – Emphasis was on distinguishing spinal infections from other spinal disorders using MRI imaging techniques. The learning objectives included interpreting various MRI sequences, such as T1-weighted, T2-weighted, STIR (Short Tau Inversion Recovery), and DWI (Diffusion Weighted Imaging), to identify specific characteristics of spinal disorders. The importance of recognizing the signal intensity changes in different spinal conditions, highlighting the role of advanced imaging techniques in accurate diagnosis and effective treatment planning for spinal disorders was detailed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions – The analysis of solitary osteochondroma affecting both the rib and the adjacent vertebral body was presented. The learning objectives included interpreting MRI sequences for accurate diagnosis, specifically employing axial T1-weighted, axial contrast-enhanced fat-saturated T1-weighted, and coronal fat-saturated T2-weighted magnetic resonance images. These sequences were crucial in identifying the characteristic features of the osteochondroma, such as the cartilage cap and the involvement of the rib and vertebral body, guiding towards a precise preoperative assessment and effective treatment planning. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions – Details of the diagnosis and management of thoracic spinal extradural arachnoid cysts was presented. The learning objectives included mastering the interpretation of specific MRI sequences, particularly T2-weighted imaging (WI) in sagittal and axial planes, sagittal STIR, and gadolinium-enhanced T1-WI. These sequences were essential in identifying CSF-like signal abnormalities and assessing spinal cord compression. Emphasis was placed on the surgical treatment and postoperative MRI evaluation to ensure successful resolution of the cyst and spinal decompression. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Extradural Lesions – An in-depth analysis of thoracic spinal extradural arachnoid cysts. The learning objectives included mastering the interpretation of key MRI sequences: T2-weighted imaging for detailed visualization of cysts and surrounding structures, STIR sequences to evaluate associated edema, and gadolinium-enhanced T1-weighted imaging for enhanced contrast and detail. The emphasis was on accurate diagnosis, understanding the cyst's impact on surrounding structures, and evaluating surgical outcomes through postoperative MRI assessments. These objectives aimed at improving the management and treatment of spinal extradural arachnoid cysts. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – The Carotid Space -
Presentation of on the comprehensive evaluation of carotid space pathology using various MRI sequences. The learning objectives included detailed interpretation of T1-weighted, T2-weighted, and post-contrast fat-saturated T1-weighted MRI images. These sequences were crucial in differentiating between various pathologies within the carotid space, such as paragangliomas, nerve sheath tumors, and carotid artery pathology. Emphasis was placed on understanding the unique signal characteristics and enhancement patterns of these lesions to aid in accurate diagnosis and effective treatment planning. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – The Carotid Space -
Detailed analysis of Lemierre syndrome’s high risk of thromboembolic complications and mortality was presented. The learning objectives centered on understanding the pathophysiology of Lemierre syndrome, its clinical presentation, and the risks associated with it. Emphasis was placed on the use of imaging techniques, specifically MRI, to detect thrombosis and abscesses in these patients, aiding in the diagnosis and management of this serious condition. The importance of early recognition and appropriate treatment to improve patient outcomes was emphasized. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – The Carotid Space -
Review of common carotid artery trifurcation was presented; it detailed the significance of recognizing the common carotid artery trifurcation as a potentially dangerous anatomical variant. The learning objectives included understanding the implications of this variant on surgical and interventional procedures. The study emphasized the importance of preoperative imaging, particularly using MRI, to identify these anatomical variations, which are crucial for avoiding complications during head and neck surgeries and endovascular interventions. The focus was on enhancing patient safety by integrating advanced imaging into surgical planning. Detailed review of MRI sequences was presented. National Spine Management Group,

Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – The Carotid Space -
Review of aberrant common and internal carotid arteries aimed to enhance understanding of their surgical implications was presented. The learning objectives included mastering the interpretation of specific MRI sequences, such as T1-weighted, T2-weighted, and MR angiography, to identify anatomical variations and potential complications in carotid artery pathologies. This focus was crucial in preoperative planning and in reducing surgical risks associated with these anomalies. Emphasis was placed on the need for comprehensive vascular imaging in patients undergoing head and neck surgeries to ensure accurate diagnosis and effective intervention strategies. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – The Carotid Space -
Outline of nonatheromatous carotid artery disease aimed to enhance understanding of various nonatheromatous pathologies affecting the carotid arteries was discussed. The learning objectives centered around the effective use of different imaging modalities, including ultrasound, computed tomography angiography (CTA), magnetic resonance angiography (MRA), and digital subtraction angiography, for accurate diagnosis. Special emphasis was placed on recognizing the unique imaging characteristics of nonatheromatous diseases, such as carotid dissection and congenital anomalies, to differentiate them from more common atheromatous conditions. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – The Carotid Space -
An academic synopsis focusing on the pathology and cardiovascular management of Loeys–Dietz syndrome (LDS), an autosomal dominant genetic disorder was presented. Current evidence regarding the pathophysiology, diagnosis, and management strategies for LDS, emphasizing the syndrome's vascular manifestations, particularly aortic aneurysms was outlined. Discussion of the genetic underpinnings of LDS, including mutations in TGFBR1 and TGFBR2 genes and their clinical implications was provided. Emphasis was on the importance of regular surveillance and prophylactic interventions for life-threatening aortic emergencies in LDS patients. The challenges in managing LDS, advocating for a multidisciplinary approach involving cardiovascular surgeons, radiologists, and genetic counselors was presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – The Carotid Space -
An evidence-based review of the diagnosis and management of Ludwig's Angina, with a focus on emergency medicine was presented. It discusses the pathophysiology, clinical presentation,

and diagnostic approach, including the utilization of imaging modalities like Computed Tomography (CT) of the neck with intravenous contrast. Detailed imaging sequences were reviewed. The review emphasizes the importance of rapid airway management, the use of point-of-care ultrasound, and the application of broad-spectrum antibiotics for treatment. The objective is to equip clinicians with the necessary knowledge for rapid recognition and effective management of this potentially life-threatening condition. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – The Carotid Space -
Focus on Carotidynia, presenting its etiology, evaluation, and management options. Identification of Carotidynia as a rare vascular disorder characterized by atypical neck and facial pain, often associated with tenderness over the carotid artery bifurcation. Review of the importance of imaging in diagnosis, particularly neck ultrasound showing hypoechoic thickening and mild luminal narrowing at the site of tenderness. MRI sequences, specifically T1-weighted images enhanced with gadolinium, are noted for their ability to suggest Carotidynia through increased uptake or enhancement involving the distal common carotid artery and carotid bulb. Emphasis was placed the role of an interprofessional team in managing Carotidynia and improving patient outcomes. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - A comprehensive analysis of traumatic injuries to the spinal cord and peripheral nervous system was presented. The pathophysiology, clinical manifestations, and diagnostic approaches, emphasizing the use of MRI for detailed visualization of spinal cord and nerve root injuries was detailed. Specific MRI sequences, such as T2-weighted and STIR images, are highlighted for their effectiveness in identifying edema and nerve root avulsion. Discussion of management strategies, including surgical and non-surgical options was presented, underscoring the importance of interdisciplinary collaboration in the treatment and rehabilitation of these injuries. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - Presentation of traumatic injuries to the petrous part of the temporal bone was discussed. It covers the anatomy, mechanisms of injury, and classification systems of fractures, focusing on radiological findings. The use of computed tomography (CT) in identifying fracture lines and associated complications is emphasized. Discussion of various fracture types, such as longitudinal, transverse, and otic capsule-violating, their clinical implications, and the importance of accurate radiographic reporting to guide treatment. MRI sequences, particularly high-resolution CT and MR angiography are mentioned for evaluating complex cases and vascular injuries. National Spine Management Group, Cleveland University Kansas City, College

of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - Review of identifying older emergency patients at risk of intracranial bleeding post-fall was presented. Outline of a protocol to derive a clinical decision rule, emphasizing the evaluation of patients aged 65 and above after a fall. Key elements include assessing risk factors, utilizing CT imaging of the head, and identifying indicators predictive of intracranial bleeding. The aim is to improve decision-making in emergency departments, reducing unnecessary imaging while ensuring prompt diagnosis and treatment for those at risk. Specific examples of advanced imaging protocols were presented and reviewed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - Review of the effectiveness of neuroimaging in patients with isolated neuro-ophthalmological complaints in the emergency department. The predictive value of presenting symptoms and physical examination findings for positive neuroimaging outcomes was presented. Emphasis was on the use of CT and MRI, noting their diagnostic yields in various neuro-ophthalmological scenarios. Specific symptoms and exam results that could guide emergency physicians in deciding when to utilize neuroimaging, aiming to optimize patient care and resource utilization. Focus was on detailed neuroimaging sequences in the diagnosis and management of this pathological condition. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - Evaluation of the prognostic role of MRI biomarkers in mild traumatic brain injury (TBI) was presented. Highlights of the use of diffusion tensor imaging (DTI) for detecting white matter changes and their correlation with symptom persistence was as detailed. Demonstration of changes in cerebral white matter and cerebrospinal fluid volumes, detectable via advanced MRI methods post-injury, where shown to be linked with the evolution of symptoms. Review underscored the potential of early imaging, particularly DTI, in predicting outcomes in mild TBI, providing valuable insights for clinical management and prognosis. Specific DTI metrics mentioned include mean diffusivity (MD) and fractional anisotropy (FA) were discussed to detect changes in white matter tracts, correlating with the evolution of symptoms post-injury. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - Outline of a pediatric fast magnetic resonance imaging (fbMRI) protocol for traumatic brain injury surveillance was presented. The imaging protocol includes T2-weighted half-Fourier

acquisition single-shot turbo spin echo (HASTE) in axial, sagittal, and coronal planes; diffusion-weighted imaging (DWI); apparent diffusion coefficient (ADC) in the axial plane; T2-weighted FLAIR in the axial plane; and gradient echo (GRE) in the axial plane. This protocol serves as an alternative to computed tomography (CT), offering rapid, non-ionizing surveillance imaging for pediatric traumatic brain injuries. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - Review of orbital myositis mimicking status migrainosus was presented. Discussion of the importance of neuroimaging in differentiating between the two conditions was detailed. Brain magnetic resonance imaging (MRI) with a focus on high signal intensity in the left medial rectus muscle on T2-weighted images was presented. Further investigation with orbital MRI showed high signal intensity and thickening in the left medial rectus muscle, including the tendon, on fat-saturated T2-weighted images, and gadolinium enhancement on T1-weighted images. These findings were indicative of myositis, leading to a diagnosis of idiopathic orbital myositis. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - Presentation of multi-modal analysis of resting-state fMRI data in mild traumatic brain injury (mTBI) patients, focusing on the association with neuropsychological outcomes was detailed. It employs resting-state fMRI techniques, specifically Amplitude of Low-Frequency Fluctuations (ALFF) and Regional Homogeneity (ReHo), integrated with graph theory methods. Focus is to explore and identify dysfunctional brain regions in acute mTBI, correlating these findings with neuropsychological assessments. The approach offers insights into the brain's compensatory mechanisms following mTBI, highlighting the potential of rs-fMRI in evaluating brain function post-injury. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - An extensive review of neuroimaging techniques in the assessment of acute and chronic neurotrauma was presented. Discussing various imaging modalities, including CT and MRI, focusing on their application in traumatic brain injury (TBI) and spinal cord injury (SCI). Key imaging sequences highlighted include T2-weighted FLAIR, diffusion-weighted imaging (DWI), gradient-recalled echo (GRE), and susceptibility-weighted imaging (SWI) for identifying traumatic injuries and their sequelae. Emphasis was placed on the role of neuroimaging in diagnosing, managing, and understanding the pathophysiology of neurotrauma, highlighting the advancement of imaging technologies in this field. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - Discussion and presentation of acute myelopathy in children, focusing on differential diagnosis and management. Emphasizing the importance of neuroimaging, particularly MRI, in diagnosing conditions like transverse myelitis, spinal cord ischemia, and spinal cord injury without radiographic abnormality (SCIWORA). MRI sequences used include T2-weighted images to identify spinal cord hyperintensities and diffusion-weighted imaging for ischemic conditions was reviewed in detail. The role of a comprehensive clinical evaluation, aided by advanced imaging techniques, in accurately diagnosing and managing pediatric acute myelopathy was emphasized. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - The presentation focused on imaging signs of spontaneous and traumatic cervical artery dissection (CAD), comparing the efficacy of CT angiography (CTA) in detecting these conditions. It highlights the use of 128-slice dual-source CT scanners and specific imaging signs like intimal flaps, intramural hematoma, and vessel stenosis or occlusion. Emphasis was to guide neuroradiologists in differentiating between spontaneous and traumatic CAD using CTA, emphasizing the importance of imaging in the diagnosis and management of these conditions. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Neuroimaging of the Head, Neck and Spine - Exploration of the use of functional magnetic resonance imaging (fMRI) in predicting post-traumatic stress disorder (PTSD) symptom trajectories in trauma survivors. Review of resting-state and task-based fMRI data, analyzing them with a novel deep learning model was detailed. Modeling using per-region encoding and pairwise attention to create a co-activation map for multi-label classification was reviewed. Enhancing understanding of the neurobiological underpinnings of PTSD, aiding in early intervention and treatment strategies was outlined and emphasized. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023

Advanced Imaging Certification – MRI Mastery Series – Demyelinating Disease - Focus on the advances and challenges of using ultra-high field (UHF) MRI for spinal cord imaging in multiple sclerosis (MS). The potential benefits of UHF MRI, such as improved lesion detection and characterization, and advanced imaging techniques like functional MRI and MR spectroscopy was outlined and described. Discussion of technical challenges including field inhomogeneities, physiological motion, and sequence optimization was provided. Emphasis was placed on the need for further research to maximize the clinical utility of UHF MRI in MS. Specific MRI sequences and their applications in spinal cord imaging are detailed, providing a comprehensive overview of current capabilities and future directions in this field. National Spine Management

Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Demyelinating Disease - Investigation of the differentiation of multiple sclerosis (MS) plaques using diffusion-weighted MRI was presented. Specific examination of whether the orientationally averaged water diffusion coefficient (⟨D⟩) can distinguish between plaques of varying severity in MS patients, and explores correlations between ⟨D⟩ values, disease duration, Expanded Disability Status Scale (EDSS) scores, and signal intensity on T1-weighted MR images was detailed and explained. Focus on patients with relapsing-remitting and secondary-progressive MS, using diffusion-weighted echo-planar imaging sequences to obtain ⟨D⟩ measurements, providing insights into the pathological differences between MS subtypes was provided. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Demyelinating Disease - Analysis of the assessment of myelin imaging in the spinal cord using quantitative MRI techniques was presented. Utilization of a 7T MRI scanner with a multicomponent-driven equilibrium single-pulse observation of T1 and T2 protocol, generating detailed maps of apparent proton density, T1, T2, myelin water, intracellular water, and free-water fraction was outlined and discussed. Correlation of these MRI findings with histological markers, providing valuable insights into the microstructural changes in MS lesions was detailed. Research demonstrating the potential of high-resolution quantitative MRI in understanding and diagnosing multiple sclerosis was reviewed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Demyelinating Disease - Focus on utilizing magnetic resonance imaging (MRI) features to cluster multiple sclerosis (MS) patients was detailed. Analysis of 103 MS patients using a 3T GE scanner with various sequences, including 3D T1W BRAVO, 2D T2W Fast Spin Echo (FSE), 3D T2W FLAIR CUBE, and 3D FAST-T2 for Myelin Water Fraction (MWF) mapping. Classification of patients based on lesion-level MRI features evaluating the clinical significance of these clusters was presented. Demonstration of the potential of MRI features, especially lesion MWF and volume, in distinguishing patient groups with different levels of disability was outlined and presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Demyelinating Disease - Examination of the role of artificial intelligence (AI) in optimizing MRI protocols to minimize gadolinium use in multiple sclerosis (MS) patients was outlined. Exploration of the development and implementation of AI and machine learning techniques, particularly focusing on enhancing image quality and diagnostic accuracy while reducing gadolinium dosage was detailed and

explained. Review of various AI-driven methods, including deep learning algorithms, for efficient and safer MRI imaging, suggesting a potential shift in radiological practices for MS diagnosis and monitoring was discussed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Demyelinating Disease - An in-depth analysis of the neuropsychiatric symptoms associated with Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy (CADASIL). Discussion into the cognitive and psychiatric symptoms observed in patients, discussing the patterns of MRI lesions, particularly in T2-weighted images, and their correlation with clinical manifestations was provided. Emphasis on the role of MRI in diagnosing CADASIL and explores the relationship between cerebral tissue lesions and cognitive as well as psychiatric symptoms, highlighting the need for further research in this area with detailed review of case images was provided. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Investigation of the impact of routine preoperative carotid Doppler ultrasound screening for asymptomatic carotid stenosis in patients undergoing coronary artery bypass grafting (CABG) was presented. Assessment of the prevalence of carotid stenosis, the relationship between carotid stenosis and postoperative stroke, and the value of routine screening in this patient population was presented. Overview of the use of Doppler ultrasound to evaluate carotid stenosis and employs statistical analysis to understand its correlation with postoperative stroke risk, providing insights into the efficacy of routine carotid screening before CABG was discussed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Exploration of the application of various deep learning models for forecasting patient flows in emergency departments (EDs) was presented. Evaluation of seven deep learning models, including Deep Belief Networks (DBN), Restricted Boltzmann Machines (RBM), and hybrid models like GRU-CNN and LSTM-CNN, using patient flow data from Lille Hospital, France was outlined. Overview of the model's effectiveness in predicting daily patient visits, providing insights for better resource allocation and management in emergency departments was presented. Detailed review of brain MRI images was presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Outline of guidelines for evaluating vascular function and structure in isolated arteries and veins was presented. Detailed methodologies for assessing contraction, relaxation, and

endothelial function in both large and small vessels were discussed. Emphasis was placed on the importance of consistent methodological approaches to ensure reproducible results in brain imaging. Review and discussion of the challenges and best practices in measuring vascular function, including considerations for the type of vessel, vascular bed, and the presence of endothelium were given. Specifics into standardize practices in vascular physiology research, enhancing the reliability and scientific validity of experimental findings were studied and presented including specific MRI images. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Evaluation of the effectiveness of various diagnostic strategies for assessing non-traumatic sudden onset severe headaches in the emergency department was presented. A review and analysis of multiple diagnostic methods, including clinical decision rules, computed tomography (CT) scans performed within different time intervals after headache onset, lumbar puncture procedures, and CT angiography. Comprehensive insights into the accuracy, benefits, and limitations of these techniques in diagnosing conditions like subarachnoid hemorrhage were presented with specific case examples provided. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Focus on the prognostic value of non-contrast computed tomography (NCCT) and CT perfusion (CTP) imaging in patients with acute ischemic stroke treated with thrombolysis was presented. Detailed review comparing automated and manual interpretations of the Alberta Stroke Program Early CT Score (ASPECTS) and the hyperdense vessel sign (HDVS) on baseline NCCT. Examination of the roles of NCCT and CTP in prognosis, emphasizing their utility in improving the accuracy of stroke assessments and treatment decisions was outlined and presented with a focus on specific imaging case evaluations. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Details of diagnostic strategies for ruling out subarachnoid hemorrhage with a critical evaluation of the diagnostic approaches for patients with sudden severe headaches in emergency settings, focusing on ruling out subarachnoid hemorrhage was given. Various diagnostic strategies, including the Ottawa SAH Clinical Decision Rule and the efficacy of CT scans and lumbar puncture procedures were presented. Emphasis on the importance of timely and accurate diagnosis to mitigate the risks associated with subarachnoid hemorrhage, providing valuable insights for clinical decision-making in emergency medicine was stressed and outlined. Specific case images were reviewed and integrated into the decision-making process. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
An extensive overview of the anatomical variations and clinical significance of the middle cerebral artery (MCA) in the context of ischemic stroke was provided. Details of MCA's phylogenetic development, branching patterns, and implications for thrombectomy procedures were correlated with advanced imaging films. Emphasis on the variability in MCA anatomy and its impact on stroke treatment, underscoring the importance of understanding these variations for effective stroke management and intervention strategies was detailed and discussed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Investigation into the efficacy of AI-driven software for detecting the Hyperdense Artery Sign (HAS) in non-contrast CT (NCCT) scans of acute ischemic stroke patients was presented. Comparison of the performance of the software against trained physicians in identifying HAS, using NCCT scans from 154 patients, with and without large vessel occlusion (LVO) proven by CT angiography was provided with specific correlation to MRI scans. Evaluation of the sensitivity and specificity of both the software and human readers, demonstrating the potential of AI in assisting rapid stroke diagnosis in the context of MRI image interpretation. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Review of the efficacy of thin slice non-enhanced CT (NECT) scans for detecting intracranial aneurysms was given. Utilization of reconstructed thin slice maximum intensity projections (MIP) of NECT scans from patients with and without aneurysms was detailed and discussed. Evaluation of the sensitivity of detecting aneurysms based on their size, discussing that NECT can effectively identify a significant proportion of intracranial aneurysms larger than 7 mm was outlined. Review of research suggesting that patients with detected aneurysms should receive further vascular imaging for accurate diagnosis and treatment planning was given. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Assessment of the impact of preoperative noncontrast CT (NCCT) screening for aortic calcifications on stroke rates in cardiac surgery patients was given. Comparison of the effectiveness of standard care with and without the addition of preoperative NCCT in reducing perioperative stroke was discussed. The utilization of noncontrast CT scans to identify aortic calcifications, aiming to evaluate whether this method can influence surgical approach and reduce stroke incidence in cardiac surgery was given and correlated to specific imaging examples. National Spine Management Group, Cleveland University Kansas City, College of

Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Examination of patient selection methods for mechanical thrombectomy in stroke cases was presented. Comparison of clinical outcomes in patients chosen through noncontrast computed tomography (CT) against those selected by computed tomography perfusion (CTP) or magnetic resonance imaging (MRI) in an extended time window was reviewed and discussed. The evaluation of the effectiveness of each imaging modality in predicting patient outcomes post-thrombectomy, highlighting the potential of simpler and more accessible imaging methods in stroke treatment was outlined. Specific imaging films were presented and reviewed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Detailed review of the anatomical variants of the anterior cerebral artery (ACA) and their clinical implications was given. Examination of the embryological development and different anatomical variations, including aberrant origins and associations with the ophthalmic artery, azygous ACA, and triplicated ACA was detailed and presented. Exploration of the formation of aneurysms in relation to these variants, emphasizing their importance in clinical practice for preventing patient injury during surgical interventions and aneurysm treatment was expressed. MRI and angiographic techniques used to identify these variants are discussed, showcasing their significance in neurovascular diagnostics. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Imaging -
Investigation of the role of computed tomography angiography (CTA) in the rapid diagnosis and management of acute ischemic stroke (AIS) in children was discussed. Highlights of the clinical presentations of AIS, such as acute sustained hemiparesis and atypical symptoms like seizures and headaches were presented. Emphasis on the diagnostic utility of CTA in identifying arterial abnormalities and guiding thrombectomy and thrombolysis treatments was presented. Comparison of the effectiveness of CTA with magnetic resonance imaging/angiography (MRI/MRA) with emphasis the impact of initial imaging choice on the speed of diagnosis and treatment in pediatric stroke cases was detailed. Overview of readily available CTA can expedite the diagnosis and treatment of AIS, especially in patients with large vessel occlusion was given. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Entrapment Neuropathies -
Overview and examination of various compressive neuropathies affecting the median, ulnar, and radial nerves in the upper extremity was presented. Discussion into the etiologies,

diagnosis, and treatment options for Carpal Tunnel Syndrome, Pronator Syndrome, Cubital Tunnel Syndrome, Guyon's Canal Syndrome, and Radial Tunnel Syndrome was detailed. Presentation into diagnostic techniques like EMG and MRI, emphasizing their relevance in differentiating these conditions was emphasized. Treatment strategies, ranging from conservative to surgical approaches, are discussed, highlighting the importance of early diagnosis and individualized management plans for each neuropathy. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Entrapment Neuropathies - Review of the diagnosis and management of suprascapular nerve entrapment, a condition causing shoulder pain and weakness was presented. Discussion of the importance of a comprehensive diagnosis involving physical exams, imaging, and nerve conduction studies was emphasized. Imaging techniques highlighting MRI for visualizing nerve pathologies and ultrasound for evaluating peripheral neuropathies and ganglion cysts were outlined. Discussion of various treatment options, ranging from conservative management to surgical interventions like arthroscopic and open decompression, and evaluates their effectiveness in relieving symptoms and improving shoulder function were detailed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Entrapment Neuropathies - Focus on enhancing nerve visibility in MRI scans was presented. Employment of T2-weighted two-point Dixon fast-spin-echo sequences, supplemented by principal component analysis (PCA) denoising and water-weighting (WW) techniques was reviewed. Methods aimed to reduce fat fraction error and improve fat suppression, thereby enhancing nerve conspicuity was detailed. Demonstration of techniques which significantly improved overall image quality, with particular effectiveness in enhancing nerve visibility in MR neurography was correlated with specific imaging examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Entrapment Neuropathies - Analysis of the effectiveness of 3-Tesla MRI in identifying denervation edema in the multifidus muscles for diagnosing cervical radiculopathy was presented. Employment of Short-Tau Inversion Recovery (STIR) MRI sequences to detect signal abnormalities indicative of denervation was given. Assessment of the correlation between MRI findings and clinical and electrophysiological data, emphasized the MRI's diagnostic value in differentiating cervical radiculopathy from other neuropathies, and evaluating the severity of muscle denervation. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Entrapment Neuropathies -
A comprehensive overview of peripheral nerve sheath tumors (PNSTs), discussing their diagnostic and pathologic features was given. A range of PNSTs, including schwannomas, neurofibromas, perineuriomas, and malignant peripheral nerve sheath tumors (MPNSTs), and their genetic and molecular aspects was detailed. Review of the association of these tumors with genetic syndromes like neurofibromatosis and schwannomatosis was presented. Emphasis was placed on morphological criteria, immunohistochemical profiles, and genetic alterations that are key to the diagnosis and understanding of these tumors. These details were correlated with review of MRI films and images with specific case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Entrapment Neuropathies -
Highlights of the diagnostic capability of MRI in cases of Parsonage-Turner Syndrome, a form of immune-mediated brachial plexopathy was presented. Emphasis was on the use of Short Tau Inversion Recovery (STIR) MRI sequences in detecting pathological changes in the brachial plexus with detailed anatomy review. The importance of MRN in conjunction with clinical and electrophysiological assessments for a comprehensive diagnosis, showcasing its effectiveness in identifying nerve root inflammation, aiding in timely and accurate diagnosis, and guiding appropriate therapeutic interventions was detailed and correlated to specific MRI films. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Tumors -
Analysis of the interaction between meningiomas and the brain parenchyma was reviewed with imaging correlation to anatomical mapping. The role of microglia/macrophages and astrocytes in meningioma development and the potential for tumor-brain crosstalk through cytokines and chemokines was detailed. The impact of the interaction on meningioma growth and behavior, identifying gaps in current research and suggesting directions for future studies was discussed. The importance of understanding the tumor microenvironment (TME) in meningiomas for developing targeted therapies was underscored with specific MRI case examples provided. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Tumors -
Review of primary extracranial meningiomas (PEMs), focusing on their rare occurrence and clinical presentation was presented. Discussion of histopathological features, with emphasis on their benign nature despite occasional aggressive behavior, and the importance of immunohistochemical analysis for accurate diagnosis was given. Advocation for surgical removal as the primary treatment, highlighting the role of neuroimaging and histological investigation in diagnosing these rare tumors was emphasized. Comparison into the differentiation of PEMs from other neoplasms underscoring the generally favorable prognosis

of these tumors was detailed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Tumors -
Presentation of the application of radiomics and machine learning (ML) in diagnosing and grading meningiomas using MRI was given. Evaluation of methodological quality and performance of a meta-analysis of relevant studies was discussed. Focus on assessment of the accuracy of ML models in predicting meningioma grading from pre-operative brain MRI images, highlighting the integration of ML with conventional and contrast-enhanced T1-weighted MRI sequences for improved diagnostic performance was outlined. Emphasis was placed on the need for standardization and rigorous methodological quality in future studies for clinical implementation with specific MRI case studies reviewed and correlated. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Tumors -
Review of cervical spine hemangiopericytoma/solitary fibrous tumor was presented. The use of magnetic resonance imaging (MRI) for diagnosis, focusing on T2-weighted imaging (T2WI) and T1-weighted imaging (T1WI) to identify the lesion's characteristics was highlighted. Exhibition of a slightly hyperintense signal on T2WI and a low signal on T1WI without enhancement was showcased. The importance of MRI in diagnosing spinal tumors, emphasizing the role of specific imaging sequences in clinical assessment and treatment planning was presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Tumors -
A comprehensive overview of meningiomas, including their epidemiology, etiology, pathology, and treatment options was presented. Discussion of the latest updates in grading, diagnostic imaging techniques, and molecular characteristics of meningiomas was given and detailed. Clinical features, various treatment strategies, and future research directions in the field of meningioma, highlighting the importance of personalized medicine and the potential role of molecular diagnostics and therapies was reviewed in detail with specific MRI cases studies correlated. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Tumors -
Exploration of the genetic characteristics and clinical outcomes of rhabdomyosarcoma (RMS), a common childhood soft tissue sarcoma was presented. Identification of genomic markers for risk stratification beyond PAX-FOXO1 fusion status was discussed. Analysis of tumor samples from international cohorts, significant genetic alterations, including mutations in TP53 and

MYOD1, which were associated with worse outcomes were identified. Review of findings contributing to the refinement of risk stratification and suggest potential targets for personalized therapies was detailed and correlated to specific MRI imaging sequences with case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Tumors -
Focus on distinguishing between intracranial hemangiopericytoma and angiomatous meningioma using a CLIN radiomic model based on multiparametric MRI was presented. Review of research involving the selection and analysis of significant radiomic features extracted from T2-weighted imaging (T2WI) and contrast-enhanced T1-weighted imaging (CE-T1WI). Presentation of modeling showcasing high accuracy and utility in the preoperative differential diagnosis, contributing to better clinical decision-making and treatment planning was detailed. Key MRI sequences highlighted include T2WI and CE-T1WI were discussed and correlated with real world MRI case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Tumors -
A comprehensive overview of meningiomas, emphasizing their diverse histopathological grades and variable prognosis was given. Highlights of the pivotal role of MRI in diagnosis, particularly T2-weighted (T2W), T2 Fluid-Attenuated Inversion Recovery (FLAIR), and T1-weighted post-contrast (T1W+C) imaging for identifying characteristic features like a dural tail and homogeneous enhancement was detailed and emphasized. Review and discussion of advances in surgical techniques, radiotherapy, and emerging systemic treatments, along with the potential of molecular and genetic profiling in guiding therapy was presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Tumors -
Outline of the screening and diagnostic protocols for Endolymphatic Sac Tumors (ELSTs) in von Hippel-Lindau (VHL) disease was presented. Emphasis was placed on the use of MRI, particularly high-resolution (1mm slice thickness) MRI of the internal auditory canal, for baseline screening and diagnosis. Presentation supporting this MRI as crucial in identifying ELSTs, with particular attention to post-contrast T1-weighted imaging for contrast-enhancing lesions in the temporal bone was given. The significance of CT imaging, especially thin-slice imaging of the temporal bone, as a complementary diagnostic tool in equivocal MRI cases was underscored. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Tumors -
Presentation into the impact of meningioma treatment on cognitive functions was given. Highlights of the diversity in cognitive assessment tools and the lack of standardized methods, making the comparison of outcomes challenging was emphasized. The identification of memory, attention, executive functioning, language, and cognitive flexibility as key affected domains was outlined. Emphasis on the need for standardized cognitive assessment tools and longer follow-up periods to better understand and manage cognitive impairment in meningioma patients post-treatment. This information was presented alongside specific examples of MRI case studies showcasing the importance of interprofessional assessment. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Anatomy - An academic exploration into the complexities and methodologies of segmenting MRI images of the human brain. Focus was on the identification and delineation of brain structures using various MRI sequences and techniques. Key topics include the basic concepts of MRI segmentation, the challenges posed by the brain's intricate anatomy, and the application of advanced computational methods. Elaboration on the importance of preprocessing steps like image registration, bias field correction, and the removal of non-brain tissue. Discussion of the nuances of different MRI sequences such as T1-weighted and T2-weighted images, and how these impact segmentation quality. Emphasis was placed on understanding tissue-specific intensity distributions and the integration of spatial context modeling, highlighting the use of Markov Random Fields and other statistical approaches for enhanced accuracy. Analysis of various MRI segmentation methods and their applications in clinical and research settings was provided with specific examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Anatomy -
A comprehensive historical overview of the development and understanding of cranial nerves. Review of the evolution of knowledge from the early works of Galen, through significant contributions in the Renaissance, to contemporary understanding. Various classification systems and the identification of cranial nerve nuclei was described. Highlights of the significant milestones in the anatomical and physiological understanding of the cranial nerves, reflecting on the influences of technology, such as microscopy, on these advancements was detailed and presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Anatomy -
Presentation of the dynamic network organization of the brain. Challenges to the traditional view of localized brain function, proposing a meta-networking model where complex cognitions and behaviors emerge from distributed, specialized networks was presented. Discussion of

various neuroimaging techniques, particularly focusing on the use of functional magnetic resonance imaging (fMRI), both task-based and resting-state, to explore these networks. Key techniques include diffusion tensor imaging (DTI) for structural connectivity analysis and voxel-based lesion-symptom mapping, enhancing understanding of brain connectome and its implications in cognitive neuroscience and clinical applications. Specific case examples of alteration of brain function and anatomy were presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Anatomy -
Review of MRI techniques to measure natural brain tissue pulsations. Detailed review of five main MRI methods: Phase-contrast MRI, Complementary Spatial Modulation of Magnetization (CSPAMM), Displacement Encoding with Stimulated Echoes (DENSE), anatomical landmark motion tracking, and amplified MRI (aMRI) was presented. Emphasis on variations in brain tissue displacement across different regions, discussing studies on healthy brains and pathological conditions like tumors, idiopathic intracranial hypertension, and Chiari malformation. Highlights of the potential of MRI to provide insights into brain mechanics and pathophysiology was presented along with specific case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Anatomy -
Examination of the influence of T1-weighted MRI quality on morphometric brain measures. Utilization of the Computational Anatomy Toolbox (CAT12) for assessing MRI quality and employs the Freesurfer software for brain morphology analysis was outlined. Discussion of the significant correlations between MRI quality and various metrics, including cortical thickness, surface area, and subcortical volumes was presented. The necessity of considering image quality in MRI studies to ensure accurate interpretations, particularly in research involving neurodevelopment and clinical applications was discussed citing specific case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Anatomy -
A comprehensive examination of educational systems for virtual human anatomy, emphasizing the integration of visualization and interaction techniques was presented. Various aspects of anatomy education, including the educational background, datasets like cadaver and clinical image data, visualization techniques such as surface and volume visualization, and knowledge representation and labeling in anatomy education systems was presented. Discussion of the use of stereoscopic and virtual reality systems in anatomy education, evaluating the effectiveness of various virtual anatomy systems with the support of MRI imaging was detailed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Anatomy -
Focus on the advanced MRI techniques for cranial nerve imaging. Emphasis was placed on the use of heavily T2-weighted three-dimensional steady-state free precession (SSFP) sequences for high spatial resolution and contrast-enhanced T1-weighted sequences for detailed nerve visualization. Review of congenital, traumatic, and vascular diseases affecting cranial nerves, demonstrating the value of MRI in diagnosing these conditions was detailed. Discussion on the use of computed tomography (CT) scans, particularly with bone window settings, for detecting related pathologies was presented and demonstrated using real world MRI studies and cases. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Anatomy -
Detailed discussion on enhancing deep brain stimulation (DBS) surgical planning through ultra-high field 7T MRI was provided. Comparison of different 7T MRI sequences, such as FGATIR and T2-weighted sequences, assessing their effectiveness in visualizing small subcortical areas, crucial for accurate DBS targeting was provided. Demonstration that FGATIR offers high contrast-to-noise ratio and better fiducial marker detection with fewer artifacts, while T2-weighted sequences provide high image quality with minimal errors in local distortion was given. Overview of research representing a significant advancement in neuronavigation, potentially improving surgical outcomes in functional neurosurgery was given with specific MRI brain study case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Brain Anatomy -
An in-depth analysis of deep learning techniques for MRI segmentation was presented. Discussion of the use of convolutional neural networks (CNNs) in the segmentation of both normal brain structures and brain lesions was detailed. Emphasis is placed on the importance of image preprocessing, network architecture styles, and training-validation strategies for effective segmentation. Review of the challenges and future directions in deep learning applications for brain MRI segmentation, addressing the need for improved accuracy and efficiency in diagnostic imaging was provided. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Neurovascular Imaging -
A comprehensive overview of diffusion MRI techniques used to image brain microstructure was presented. Review of various diffusion-weighted MRI measurements and the evolution of computational models that link MRI signals to brain tissue microstructure was outlined. Focus on the practical aspects of implementing and using these techniques in biomedical studies, highlighting their growing transition from research to widespread application was given. Discussion of the design and validation of microstructure imaging techniques and concludes

with future perspectives and potential advancements in this field was detailed using MRI case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Neurovascular Imaging -
Focus on a novel anomaly detection method using neural network architecture to identify chronic brain infarcts in MRI images was provided. Highlights of the use of T1-weighted gradient-echo and T2-weighted fluid-attenuated inversion recovery (FLAIR) sequences for brain imaging were provided. Demonstration that this method can detect a significant portion of chronic brain infarcts, including those previously overlooked, thereby enhancing diagnostic accuracy, and potentially improving radiological workflow efficiency was reviewed and emphasized using real world case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Neurovascular Imaging -
An in-depth examination of phase-contrast MRI, a technique that utilizes the phase data inherent in all MRI signals for velocity measurement was presented. Discussion of the basic physics underlying this method, the technical factors involved, and the various clinical applications such as cardiac valvular flow imaging, CSF flow analysis, MR angiography, MR venography, and elastography was given. Overview of the importance of understanding the principles of phase-contrast imaging for accurate image acquisition and interpretation in diagnostic imaging was provided and supported by case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Neurovascular Imaging -
Discussion of Magnetic Particle Imaging (MPI), an emerging biomedical imaging technique was presented. Focus was on the use of superparamagnetic iron oxide nanoparticles (SPIOs) for imaging, offering clear contrasts due to zero signal from background tissues. Exploration of MPI's potential in vascular imaging and cell tracking, highlighting its advantages over traditional methods in terms of sensitivity, contrast, and depth of imaging was provided. Discussion underscored MPI's impact on the medical field, particularly in diagnosing and tracking various diseases was provided. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Neurovascular Imaging -
Presentation of a comprehensive analysis of various MRI methods for diagnosing neurovascular compression (NVC) in patients with trigeminal neuralgia (TN) and hemifacial spasm (HFS) was given. Details included a network meta-analysis comparing the diagnostic efficacy of different MRI techniques: 3D Time-of-Flight Magnetic Resonance Angiography (3D TOF MRA), High Resolution T2-Weighted Imaging (HR T2WI), a combination of 3D TOF MRA and HR T2WI, and

3D Multimodal Image Fusion (MIF) based on 3D TOF MRA and HR T2WI. Analysis that 3D MIF, based on the combination of 3D TOF MRA and HR T2WI, shows superior diagnostic performance in detecting NVC. Real case examples of neurovascular imaging were provided and discussed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Neurovascular Imaging - Presentation on the impact of four MRI markers of covert vascular brain injury (VBI) - white matter hyperintensities (WMHs), MRI-defined brain infarcts (BIs), cerebral microbleeds (CMBs), and perivascular spaces (PVSs) - on the risk of stroke, dementia, and death was provided. A comprehensive analysis of these markers through a meta-analysis of 94 prospective studies was given. Emphasis on extensive WMHs, BIs, and CMBs are significant predictors of stroke and death, while extensive WMHs are also linked to an increased risk of dementia. Review of findings underscore the clinical importance of these MRI markers in predicting and managing vascular brain injuries. Details were provided with case study examples and imaging review. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Neurovascular Imaging - Investigation of the anatomical characteristics of the petrous ridge and trigeminal nerve in trigeminal neuralgia (TN) patients without neurovascular compression (NVC) was outlined. Utilization of high-resolution three-dimensional T2 MRI sequences, demonstrated the angles of the petrous ridge (APR) and trigeminal nerve (ATN) in 66 TN patients and 57 controls. Details showing that APR and ATN were significantly smaller in TN patients, suggesting these anatomical differences could contribute to the etiology of TN without NVC. Discussion provided insight into potential diagnostic markers for TN in the absence of NVC using specific case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Neurovascular Imaging - Discussion of the role of brain perivascular spaces (PVS) as biomarkers of vascular risk in a diverse, stroke-free population was outlined. Demonstration of specific brain MRI imaging, particularly FLAIR (Fluid Attenuated Inversion Recovery) and T1-weighted sequences, assessment of the association of small and large PVS with vascular events, including stroke and myocardial infarction was shown. Demonstration that a higher burden of small PVS, especially in conjunction with elevated pulse pressure or systolic blood pressure, increased the risk of vascular events in patients was presented. Emphasis placed on the understanding of PVS as potential indicators of vascular risk with specific case examples was given. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Hip -
Evaluation of the diagnostic accuracy of 3.0 T MRI and MR Arthrography (MRA) for detecting acetabular labral tears (ALT) was presented. Demonstration that 3.0 T MRI exhibited comparable sensitivity and superior specificity to MRA, indicating its efficacy in diagnosing ALT. Highlight of 3.0 T MRI as a non-invasive, fast, and convenient option, preferable over MRA for detecting suspicious ALT cases in clinical settings was given. Overview emphasized optimizing imaging strategies in diagnosing hip joint pathologies. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Hip -
An extensive review of MRI techniques for assessing hip anatomy and pathologies was presented. Discussion of various MRI sequences, such as T1-weighted, T2-weighted, Proton Density (PD), and Short Tau Inversion Recovery (STIR), highlighting their roles in evaluating different aspects of hip anatomy, including bone, cartilage, labrum, ligaments, and surrounding soft tissues was given. Valuable insight into the application of MRI in diagnosing and managing hip disorders, as a significant resource for professionals in musculoskeletal radiology and orthopedics was offered. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Hip -
Detailed outline of optimal imaging approaches for assessing femoroacetabular impingement (FAI) was provided. Specific use of radiography for initial assessment, emphasizing the need for pelvic and hip radiographs was discussed. MRI protocols were reviewed for detailed evaluation of intraarticular hip pathology, including the use of small field-of-view (FOV) imaging with oblique axial and radial sequences. The importance of CT imaging for complex surgical planning and femoral torsion assessment, highlighting the role of multiplanar radiography and MRI in comprehensive FAI diagnosis and management was detailed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Hip -
Evaluation of the role of MRI in diagnosing avascular necrosis (AVN) of the hip was discussed and detailed. Utilizing a 1.5 tesla MRI machine, MRI sequences included T1 and T2 weighted axial, coronal, sagittal, and short-tau inversion recovery (STIR) sequences. Identification of common MRI findings in AVN, such as subchondral signal abnormalities and hip joint effusion, and focused on the staging of AVN using Mitchelles and Ficat and Arlet classifications was presented and discussed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Hip -
Focus was on diagnosing and treating sports hernia and athletic pubalgia. Emphasis was placed on the complexity of these conditions, often associated with femoroacetabular impingement (FAI), and details the various imaging modalities used in evaluation. MRI sequences discussed include coronal, oblique, and axial sequences through the rectus insertion and pubic symphysis, in addition to standard sagittal, coronal, and axial sequences. Overview of how these MRI techniques are crucial in identifying the specific pathologies associated with sports hernias and athletic pubalgia, aiding in effective management and treatment planning was presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Hip -
Extensive examination of hip labral tears, emphasizing their etiology, clinical presentation, and treatment options was presented. Use of Magnetic Resonance Arthrography (MRA) as the preferred diagnostic tool due to its superior imaging capabilities in identifying labral tears was detailed. Discussion of the use of MRI, though noting its limitations compared to MRA was outlined. Treatment approaches for labral tears, including conservative management and arthroscopic intervention, were detailed, underscoring the importance of tailored treatment strategies based on the severity and nature of the tear. Clinical correlation to symptoms, mechanism of injury and MRI studies was emphasized using real world case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
Analysis of shoulder MR arthrography (MRA) for SLAP lesion detection was presented. Focus was on comparing the diagnostic performance of MRA in neutral, internal rotation (IR), and external rotation (ER) positions. Discussion of higher sensitivity and diagnostic accuracy in the ER position, with ER also showing a significant increase in labral diastasis length. Emphasis was placed on MRA in the ER position enhances SLAP lesion diagnosis, recommending ER and IR scans in standard shoulder MRA protocols. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
A comprehensive overview of SLAP lesions, covering their etiology, classification, and management was presented. Discussion of the pathophysiology of SLAP lesions, highlighting their occurrence in different populations, including athletes and laborers was provided. Review of diagnostic methods, primarily focusing on MRI and MR arthrography techniques was outlined. Emphasis was placed on the importance of recognizing labral variations and other shoulder pathologies in MRI assessments. Treatment approaches, both non-operative and surgical, were explored in detail, with focus on tailoring management to individual patient needs and lesion types. Presentation emphasized the need for an interprofessional team

approach for optimal outcomes. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
Presentation on using T2 mapping at 3-Tesla MRI to assess the glenoid labrum and differentiate between healthy labral substances and SLAP lesions was provided. Review of specific MRI sequences such as Proton Density-weighted fat-saturated sequences (PD fs TSE) and T2-weighted sequences (T2 TSE), with T2 MapIt as the primary study sequence was outlined. Demonstration that T2 mapping could effectively distinguish between normal and damaged labral substances, demonstrating potential for non-invasive diagnosis of SLAP lesions. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
Review focused on the use of magnetic resonance (MR) arthrography to investigate the relationship between anatomical variants of the long head of the biceps tendon and the occurrence of SLAP lesions. A 1.5-Tesla MR imaging system with a dedicated shoulder array coil, utilizing T1-weighted spin-echo and fat-saturated PD/T2-weighted sequences was discussed. Correlation between certain anatomical variants and the presence of specific types of SLAP lesions, suggesting the influence of biceps tendon variants on shoulder pathology was discussed and correlated to real world case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
Characterization of the intraarticular anatomy of the long head of the biceps tendon using magnetic resonance (MR) arthrography was presented. Investigation into the correlation between anatomical variants of the intraarticular long head biceps tendon and Superior Labral Anterior to Posterior (SLAP) lesions was presented. Utilization of Fisher's exact test and logistic regression for statistical analysis, the association of specific anatomical variants with the increased risk of developing SLAP lesions was highlighted. Emphasis was placed the importance of MR arthrography in identifying these anatomical variants and their relation to SLAP lesions. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
A comprehensive analysis of the cost-effectiveness of various MRI strategies for diagnosing Superior Labrum Anterior and Posterior (SLAP) tears was provided. Utilization of decision analytic models to compare the cost-effectiveness of different MRI protocols, including 1.5-T and 3-T MR arthrography (MRA) and unenhanced MRI, for a hypothetical population of 25-year-olds with a previous diagnosis of SLAP tear was provided. Focus was that unenhanced 3-T

MRI is the most cost-effective strategy for suspected SLAP tear patients, and when 3-T imaging is not available, 1.5-T MRA is more cost-effective than 1.5-T MRI. Outline of the higher specificity of these tests, leading to fewer false positives and unnecessary surgeries was given. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
An in-depth analysis of the characteristics, diagnosis, and treatment outcomes of delaminated rotator cuff tears were provided. Emphasis on the use of magnetic resonance (MR) arthrography, particularly indirect MR arthrography, for accurate identification and classification of these tears was presented. Categorization of delaminated tears based on their appearance in MR images, including features like horizontal splitting and the degree of retraction in the bursal and articular layers was discussed in detail. The importance of recognizing these tears preoperatively for tailored surgical repair, highlighting various MRI sequences such as fat-suppressed T2-weighted images for effective diagnosis was highlighted. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
Exploration of the advancements and applications of three-dimensional (3D) magnetic resonance imaging (MRI) in evaluating shoulder pathologies was presented. Details of the superiority of 3D MRI over traditional two-dimensional (2D) imaging in terms of detail and diagnostic accuracy, particularly in assessing glenoid bone loss and rotator cuff tears was provided. Focus on specific MRI sequences such as the 3D Gradient Echo (GRE) sequence with two-point Dixon water-fat separation and Volumetric Interpolated Breath-hold Examination (VIBE) was provided. Review of sequences enhancing the visualization of osseous and soft tissue structures, proving crucial in preoperative planning and clinical decision-making was presented and correlated to case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
Presentation of a detailed exploration of the anatomical distribution and function of sensory nerve branches in the human shoulder joint was given. Emphasis was placed on the critical role of these nerve branches in the perception of shoulder pain, identifying key sensory nerves like the suprascapular, axillary, and lateral pectoral nerves. The complex patterns of innervation and the concentration of nociceptors in specific areas, providing valuable insights for clinical approaches in managing shoulder pain was highlighted. The findings have significant implications for surgical interventions and pain management strategies. Correlation with MRI images and specific case studies was given. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
Discussion of the efficacy of Magnetic Resonance Arthrography (MRA) in identifying and classifying chronic anteroinferior labrum lesions was provided. Analysis of 80 patients using MRA with 1.5T magnet, using standard spin echo T1-weighted sequences with fat-suppressed images in neutral and abduction external rotation (ABER) positions was outlined. Findings were compared against arthroscopic results to assess the accuracy and reliability of MRA in diagnosing specific labral lesions like Bankart, Perthes, and anterior labrum periosteal sleeve avulsion (ALPSA) lesions. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
Examination of the identification of ligaments attached to the coracoid process using 3T MRI without contrast was presented. Focused on coracohumeral (CHL), coracoclavicular (CCL), coracoacromial (CAL), and coracoglenoid (CGL) ligaments, the employment of Proton Density Fat Saturated (PDFS) and non-fat saturated T1 and T2 sequences was reviewed. Key findings include the identification of these ligaments in various MRI sequences, with a particular emphasis on the sagittal T1 and PDFS sequences for substantial interobserver agreement and better visualization of the CGL ligament. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
A detailed and comprehensive review of the shoulder's structural and functional anatomy, focusing on the scapulothoracic mechanism, sternoclavicular, and acromioclavicular joints was provided. Insights into the resting position of the scapula, effects of aging and spinal posture on its position, and detailed analysis of the glenohumeral joint were presented. Emphasis was placed on the interplay of articular, periarticular, and muscular mechanisms in maintaining shoulder stability and concludes with a discussion on the integrated function of the scapulothoracic and glenohumeral articulations in upper extremity elevation. Anatomical structures were reviewed and compared to MRI images and specific clinical case studies. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Shoulder -
Discussion of the diagnostic efficacy of MRI and ultrasonography for adhesive capsulitis (frozen shoulder) was presented. Review of the use of fat-suppressed T2-weighted MRI and ultrasonography for detecting capsular thickening, particularly in the rotator cuff interval and axillary recess was detailed. The importance of these imaging techniques in the accurate diagnosis and effective management of adhesive capsulitis, contributing to better patient outcomes was emphasized. National Spine Management Group, Cleveland University Kansas

City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Knee -
Details on the management of a patellar sleeve avulsion fracture in a 12-year-old male athlete previously diagnosed with Sinding-Larsen-Johansson syndrome was presented with a detailed review of imaging sequences. Emphasis on the rarity of such injuries and the challenges in diagnosis, often overlooked in plain radiographs was given. Key imaging techniques included MRI sequences like T2-weighted MRI, helping in diagnosing and differentiating between Sinding-Larsen-Johansson syndrome and patellar sleeve avulsion. Analysis of surgical intervention involved the use of double transosseous ultra-high strength tapes, with postoperative MRI confirming healing with specific images being reviewed. The importance of early clinical suspicion and the use of specific MRI sequences in managing complex knee injuries in young athletes was discussed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Knee -
Comprehensive examination of the popliteal hiatus, focusing on its anatomy, magnetic resonance imaging (MRI), and arthroscopic views was presented. Emphasis was placed the complexity of the popliteal hiatus and its significance in knee stability and pathology. Key MRI sequences discussed included sagittal and coronal views, which are crucial for evaluating the popliteal hiatus and associated structures like the popliteomeniscal fascicles and the meniscofibular fascicle. Challenges in diagnosing popliteal hiatus-related pathologies due to the intricate anatomy and the limitations of standard MRI techniques was highlighted using real world case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Knee -
Exploration of the anatomic characteristics of the anterolateral ligament (ALL) in the knee was provided. Detailed review of 53 studies, highlighting the ligament's presence in various populations and detailing its morphological features was given. Emphasis was placed on the effectiveness of MRI, particularly in the coronal plane and using T2-weighted images, in visualizing the ALL anatomy. Demonstration of the ligament’s trajectory, insertions, and dimensions offered valuable insights for clinical applications in orthopedics and sports medicine. Detailed case examples were provided. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Knee -
Focus was on validating an MRI-based automated method for quantifying knee-extensor muscle volume and hypertrophy. Utilization of a two-point Dixon sequence for fat-water separation, compared automated and manual segmentation of the quadriceps muscle, examining their

sensitivity in detecting volume changes due to resistance training. Confirmation of the automated method's strong correlation with manual segmentation and its ability to detect exercise-induced muscle hypertrophy, highlighting its potential application in sports science and clinical settings for accurate muscle mass measurement. MRI sequences included T2-weighted Turbo Spin Echo and T1-weighted gradient echo with a 2-point Dixon reconstruction. Application of this information to real world MRI cases was detailed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Knee -
An in-depth analysis of MRI techniques used for evaluating knee cartilage repair was presented. Comparison of the effectiveness of various MRI sequences, including 2D and 3D Fast Spin Echo (FSE) and Gradient Recalled Echo (GRE) sequences, in assessing the morphology and composition of cartilage repair tissues was detailed. Discussion on the use of advanced MRI sequences like Dual-Echo Steady-State (DESS) and Balanced Steady-State Free Precession (bSSFP) for more detailed cartilage evaluation was outlined and reviewed in detail. Information was correlated to real world case examples providing crucial insights for clinical applications in orthopedics and sports medicine. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Knee -
Discussion and review of how coronal alignment impacts distal femoral anatomy, focusing on varus and valgus knees was presented. Assessment of the relationship between the epicondylar axis (EA) and the posterior condylar axis (PCA) in relation to coronal deformity was provided. Demonstration of a heterogeneous relationship between PCA and EA, not significantly altered by valgus deformity was presented. Emphasis was placed on the need for careful rotational alignment in total knee arthroplasty to avoid malrotation of the femoral component, particularly in valgus knees. MRI sequences used included T2-weighted imaging, crucial for detailed knee evaluations with correlation to MRI case studies. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Knee -
Examination of Morel-Lavallee lesions, focusing on their pathophysiology, clinical and imaging findings, and management strategies. Emphasis of MRI as the ideal modality for diagnosing and characterizing these lesions, highlighting its superiority in revealing the detailed anatomy and composition of these injuries was detailed. Discussion of MRI sequences such as T1-weighted, T2-weighted, and Short Tau Inversion Recovery (STIR) images was provided, noting their effectiveness in differentiating acute from chronic lesions and in identifying key features like hematomas, fluid collections, and fibrous capsules, crucial for accurate diagnosis and treatment planning. National Spine Management Group, Cleveland University Kansas City, College of

Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Knee -
A comprehensive overview of MRI techniques for knee imaging, covering both conventional and advanced methods was provided. Emphasis was placed on the role of MRI in diagnosing knee pathology, focusing on meniscal and cruciate ligament tears. Review of various MRI protocols and sequences, including T2-weighted, Proton Density (PD), and Short Tau Inversion Recovery (STIR), highlighting their specific applications in detecting soft tissue and bone injuries was given. Exploration of advances in MRI technology, such as 3D isotropic and ultrashort echo time sequences, offered insights into their clinical implications in knee imaging. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Pediatric Imaging -
Presentation on developing a fully automated, computer-based method for age estimation using 3D knee MRI was presented. Machine learning, specifically convolutional neural networks (CNNs) and tree-based algorithms, applied to a dataset of coronal and sagittal MR volumes was reviewed. Discussion of the high level of accuracy in age estimation, highlighting the potential of deep learning in medical imaging was provided. Details of the methods, including image pre-processing, bone segmentation, and the machine learning framework used for accurate age assessment were provided. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Pediatric Imaging -
Investigation of a near-silent, distortion-free diffusion-weighted imaging (DW-SD) sequence in pediatric musculoskeletal MRI was presented. This technique was comparted with standard echo-planar diffusion-weighted imaging (DW-EPI), focusing on image quality and apparent diffusion coefficient (ADC) values. Review of the utilization of DW-SD based on a rotating ultrafast sequence modified with sinusoidal diffusion preparation gradients at 3T was outlined and detailed. DW-SD offers similar ADC values, but improved image quality compared to DW-EPI, highlighting its potential for pediatric musculoskeletal imaging. Review and discussion of real-world cases was provided. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Pediatric Imaging -
Focus on the increasing incidence of meniscal tears in children, emphasizing the importance of accurate diagnosis and treatment was provided. Extensive discussion of MRI's role in detecting meniscal tears, highlighting specific MRI sequences such as sagittal and coronal projections. The uniqueness of pediatric meniscal anatomy and the implications for treatment, underscoring the preference for meniscal repair over partial meniscectomy due to better healing outcomes in

children was emphasized. Various tear patterns identifiable through MRI, including longitudinal, horizontal, radial, root, and complex tears, and their respective treatment approaches were outlined and presented. Challenges and intricacies in interpreting pediatric knee MRIs due to the higher vascularity in children's menisci was discussed. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Pediatric Imaging -
Discussion on real-time imaging techniques discussing the development and application of highly under sampled radial gradient echo sequences combined with nonlinear inverse image reconstruction. The advancement allows for rapid image acquisition (20 ms) and high frame rates (up to 50 fps), enabling real-time MRI videos with spin density T1 and T2-type contrast. The use of a 180° inversion pulse for accurate T1 mapping within 4 seconds, offering significant benefits in pediatric radiology by reducing the need for sedation or anesthesia was highlighted. Practical applications include dynamic studies of speech, swallowing, and body movements, as well as rapid volumetric assessments and real-time cardiac MRI without ECG gating, all contributing to enhanced diagnostic capabilities in early childhood. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Pediatric Imaging -
A comprehensive overview of imaging techniques used in the diagnosis of pediatric musculoskeletal injuries. The critical role of ultrasound (US) and Magnetic Resonance Imaging (MRI) in identifying and characterizing a wide range of injuries was highlighted. Discussion into specific injury types across various body parts, including upper and lower limbs, detailing the utility of different MRI sequences, such as T1-weighted, T2-weighted, and STIR (Short Tau Inversion Recovery), in revealing pertinent details like bone marrow edema and ligament tears. Emphasis was placed on the advantages of MRI, notably its high spatial and contrast resolution, which is crucial in the diagnosis of soft tissue, cartilaginous, and osteochondral injuries. Continued discussion of the importance of MRI in post-traumatic follow-ups, particularly in young athletes, due to its non-ionizing nature was outlined. Overview underscores the indispensable role of advanced imaging in the accurate diagnosis and management of pediatric musculoskeletal injuries. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Pediatric Imaging -
Discussion of the application of MRI in diagnosing musculoskeletal conditions in children. The analysis of MRI utilization, focusing on the distribution of MRI examinations by sex, age, and body segment was covered. Emphasis is placed on creating an atlas and database for normal pediatric MRI exams across different age groups, as well as imaging findings of various musculoskeletal diseases. The development of specific MRI protocols for different body segments and frequently encountered conditions was encouraged. Details and insights into

MRI's role in pediatric musculoskeletal evaluation and serves as a benchmark for future research and resource allocation was provided using real work MRI case examples. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Pediatric Imaging -
Analysis of growth plate changes in children over a six-month period was discussed. 3D MRI was used to measure the diameter, thickness, and volume of femoral and tibial growth plates in children with growth retardation concerns. The MRI sequences used included sagittal and coronal T1-weighted volume-interpolated breath-hold examination (VIBE) images. Significant increases in the mean diameter and volume of the femoral and tibial growth plates after six months was found, but no significant change in their thickness. This work contributes to understanding growth plate dynamics in pediatric populations. Clinical correlation to real world pediatric MRI cases was presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Advanced Imaging Certification – MRI Mastery Series – Pediatric Imaging -
Discussion of advanced MRI techniques for pediatric patients was presented. Focus on optimizing MRI protocols and sequence selection to reduce scan times and improve patient cooperation was detailed. Key sequences include turbo spin-echo (TSE) with proton density (PD) and T2-weighted imaging, and advanced methods like simultaneous multi-slice (SMS) TSE and 3D TSE volumetric SPACE (Sampling Perfection with Application optimized Contrasts using different flip angle Evolution). Emphasis was placed on efficient imaging in children while maintaining diagnostic quality, crucial in musculoskeletal and body imaging. Showcase of techniques like CAIPIRINHA (Controlled Aliasing in Parallel Imaging Results in Higher Acceleration) for faster, high-quality imaging was presented. National Spine Management Group, Cleveland University Kansas City, College of Chiropractic, Federation of Chiropractic Licensing Boards, Accreditation Council on Continuing Medical Education (ACCME) 2023.

Grand Rounds – Chiropractic Management – Spinal Ligament Injury – review and detailed presentation of the frequency of traumatic ligament injuries in the cervical spine was outlined. Imaging modalities such as dynamic plain film radiographs and MRI were discussed with emphasis on stability and presence of acute injuries. Threshold for medical specialty referral was presented within the context of conservative vs surgical management. Outline of patient presentation, physical examination findings including orthopedic and neurological findings was presented. Application of AMA Guidelines to the rating of injury severity using both the 5th and 6th edition of the Guides to the Evaluation of Permanent Impairment was reviewed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards – PACE, State University of New York at Buffalo Jacobs School of Medicine, and Biomedical Sciences – 2023

Clinical Instructor – Medical Legal Series 01 - Acute versus Chronic Disc Herniation – a detailed review of disc nomenclature including intervertebral disc bulge, herniation, and extrusion.

Analysis of degenerative disc disease using the Pfirrmann grading system was presented. Application of pre-existing conditions vs acute injury in the context of the medical-legal system was outlined. Signs of acute injury on MRI was presented including signal intensity changes on T1, T2 and STIR sagittal and axial images was presented. Clinical correlation to plain film radiographs, physical examination and mechanism of injury was detailed. Overview of degenerative changes including desiccation of the intervertebral disc, loss of disc height and osteophyte formation was presented. National Spine Management Group, LLC 2023.

Specialty Research Rotation - Innervation and Blood Supply of the Intervertebral Disc – discussion of the distribution of nociceptive nerve fibers in the cervical intervertebral discs. Correlation of chronic neck pain patients and the relationship to nociceptive nerve fibers and discogenic neck pain. The role of nociceptive nerve fibers in the pathogenesis of neck pain of cervical disc origin was discussed and outlined. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2022.

Specialty Research Rotation - Innervation and Blood Supply of the Intervertebral Disc – Pathological mechanisms of discogenic low back pain including sensory nerve in growth into inner layers of the intervertebral disc, upregulation of neurotrophic factors and cytokines, and instability. Outline of the inhibition of these mechanisms and the treatment of discogenic low back pain. Understanding the innervation and instabilities of diseased intervertebral discs and the role of inflammatory mediators was compared with healthy intervertebral disc anatomy. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2022.

Specialty Research Rotation - Innervation and Blood Supply of the Intervertebral Disc – discussion of chronic low back pain and its socioeconomic burden was presented. MRI findings and the diagnosis of MRI was outlined. Assessment of the sensory innervation of the vertebral endplate and degenerative intervertebral discs was outlined. Specific features highlighting the difference between healthy and degenerative intervertebral discs such as cartilage degeneration and subchondral bone defects was discussed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2022.

Specialty Research Rotation - Innervation and Blood Supply of the Intervertebral Disc – Investigation of effects of inflammatory cytokines, IL-1b, and TNF-a, on the expression of an angiogenic factor, vascular endothelial growth factor (VEGF), and neurotrophic factors, nerve growth factor (NGF) and brain-derived neurotrophic factor (BDNF), in human IVD degeneration was presented. Outline of Neurotrophins role in the survival, growth, differentiation, and function of neurons inside and outside of the intervertebral disc. Further discussion was outlined relating to the process of IL-1B being generated during IVD degeneration and may stimulate the upregulation of VEGF, NGF, and BDNF expression, resulting in angiogenesis and nerve in-growth during intervertebral disc degeneration. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2022.

Council of Chiropractic Acupuncture Symposium 2022 – *You Shake it- You Break it* – Detailed look into the neurological and metabolic consequences of head trauma from a motor vehicle accident, sports concussion, or a bump on the head that can have life altering consequences. Discussion of examination and management protocols for conservative approaches for head trauma. Discussion of acupuncture treatment strategy to assist the recovery of the neurological and metabolic sequelae of head trauma. American Chiropractic Association, Federation of Chiropractic Licensing Boards, Kansas City, MO. 2022.

National Spine Management West Conference 2022 – *Communicating with the Spine Surgeon* - Detailed review of the scientific literature supporting interprofessional collaboration between the spine surgeon and the Doctor of Chiropractic was presented. Emphasis on updated needs of the spine surgeon with focus on the understanding of pre and post-surgical chiropractic care. Literature updates and documentation requirements were discussed. Specific talking points are provided for telecommunication with the spine surgeon. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Communicating with the Pain Management Physician* - Review of the scientific literature supporting interprofessional collaboration with the interventional pain management physician was outlined. Updates and review of the chiropractic scientific literature in relation to pain management mechanisms of the chiropractic adjustment were presented. Documentation and interprofessional referral, communication and telecommunication talking points for daily practice was outlined. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Communicating with the Primary Care Physician* - Review of literature supporting interprofessional communication at the primary care level was presented. Literature outlining interprofessional communication and the needs of the primary care physician was discussed. Efficient reporting and communication points were reviewed. Chiropractic interaction with primary care physicians from a clinical perspective were outlined with an emphasis on supportive relationships. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Communication with Physical Therapy* – the untapped potential - Discussion on developing a collaborative relationship with physical therapy and its effect on outcomes and community-based care was outlined. Supportive scientific literature presenting the interaction between spinal biomechanics and supervised rehabilitative techniques was reviewed. Outcomes and interprofessional communication techniques were discussed with an emphasis on interprofessional referral and support of both professions. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Interprofessional referral and pathways* - Review and outline of complete workflows for patient evaluation, documentation and triage when clinically indicated were detailed. Efficiency and accuracy of interprofessional communication was presented in terms of the needs of the patient, pain management physician, spine surgeon, physical therapist, and primary care physician. Evidence based triage workflows were discussed and detailed with emphasis on preventing unnecessary escalation of care in spine pain patients was presented. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Communicating with the Lawyer – Disc Injuries* - Discussion of the medical-legal implications of injuries to the intervertebral disc was presented. Clinical correlation to mechanism of injury, objective physical examination findings, results of advanced imaging and persistent functional loss were reviewed. Medical legal discussion of anatomy of intervertebral disc herniation, degenerative bulge, annular tear, and their relationship to nerve supply in terms the legal community can understand was detailed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Communicating with the Lawyer – AOMSI* - Discussion of the medical-legal implications of injuries to the ligaments of the human spine was presented. Clinical correlation to mechanism of injury, objective physical examination findings, results of advanced imaging and persistent functional loss were reviewed. Medical legal discussion of the anatomy of spinal ligaments in the normal, degenerative, and traumatically injured spine was presented. Details of nerve supply to ligaments and the mechanism of scar tissue formation through the wound repair process was provided. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Communicating with the Lawyer – Low Speed Collisions* - Discussion of the medical-legal implications of injuries sustained as a result of a low speed/impact collision resulting in minimal property damage was outlined. Clinical correlation to the low-speed mechanism of injury, objective physical examination findings, results of advanced imaging and persistent functional loss was reviewed. Medical legal discussion related to the correlation between impact forces and human spinal tolerance with particular attention being given to pre-existing degenerative spinal conditions was presented. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Anatomy of a Narrative Report* – departing from gimmicks - Presentation on the flow of clinical information into the medical-legal format used by adjusters, attorneys, judges, jurors, and law clerks was provided. Key indicators of persistent functional loss such as physical examination findings, global and segmental range of motion, advanced imaging findings and results of electrodiagnostic testing

were outlined. Direct discussion on where in a narrative report these findings are to be written with an emphasis on patient assessment and expert opinion. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Advanced Imaging Protocols* – update of the science of MRI - Detailed review of common MRI sequences for spine imaging will be presented including T1, T2 and STIR in the sagittal and axial planes was presented. Additional sequences such as Proton Density, Diffusion Weighted and Dixon was detailed and reviewed. Particular attention were given to ordering contrast medium in a spine care practice. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Spine Care Leadership* – educating the medical community - Overview of spine care leadership and the processes of creating an Evidence-Based, Patient Centered reputation in your community was discussed. Focus on structuring a medical community outreach program, what topics to include and the process of building support was detailed. This section outlined the differences between the various stakeholders in the medical community including nurses, physician assistants, physicians, and administrative support staff was discussed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Spine Care Leadership* - educating the legal community - Overview of spine leadership and the process of creating a positive medical-legal provider reputation in your community was presented. Focus on structuring a legal community outreach program, what topics to include and the process of building support was detailed. This section outlined the differences between the various stakeholders in the legal community including adjusters, paralegals, lawyers, law clerks and judges was detailed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Compliance and Documentation* – practice pitfalls 101 - Detailed review of compliance parameters within clinical documentation with emphasis on detailed efficient processes was presented. Pitfalls common to clinical practice was demonstrated with practical, office ready solutions to ensure proper workflows, compliance, and efficiency were outlined. Whole practice documentation modeling was discussed including the use of a scribe. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Updated Chiropractic Science Research* - Review and discussion of 2021/2022 research supporting the chiropractic profession and the doctor of chiropractor as a spine care manager was outlined. Specific papers were presented related to the pain management, corrective, and health maintenance phases of chiropractic care. Overview of current and future research trends were demonstrated

in relation to the pain management phase, corrective care phase and health maintenance phase of chiropractic management. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 - *Preparing for Litigation* – it starts with your documentation – outline of updated compliant reporting of the patient encounter within E/M evaluations, daily progress notes, goal setting and interprofessional management/referral was presented. Medical legal hurdles were explained and the impact of documentation on court room presentations was demonstrated. Overview of objective evidence in the diagnosis and management of traumatically injured patients was presented. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 - *How Jurors Determine Damage Awards*- the importance of Anchors - discussion and review of litigation award Anchors and their influence on the chiropractic practice and documentation of functional losses due to spinal injury was outlined. Courtroom processes and review of testimony was presented. Consensus driven diagnosis and case management was emphasized. Objectification of bodily injury and its relation to short and long-term functional losses was presented. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 - *The Future of Spinal Biomechanics* - Review of essential biomechanical parameters in the human spine was presented. Emphasis was placed on their clinical application, patient outcomes and communication with the spine surgeon when applicable. Pre and post-surgical case management was reviewed in the context of peer-reviewed medically indexed literature. A look to the future of interprofessional spine care between the chiropractor and the surgeon was presented. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Spine Management and the Future of Spine Care* - Discussion of the role of a spine manager in the daily treatment of spine patients was presented. Emphasis was placed on the understanding of the roles of other providers in the care paradigm including interventional pain management, spine surgery and rehabilitation professionals. Interprofessional communication techniques were presented with a focus on diagnosis and management in a patient centered environment. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

National Spine Management West Conference 2022 – *Fellowship Training and the Chiropractic Literature* - Overview of current literature-based examples of the evolution of chiropractic graduate education was presented. The need for clinical rotations, interprofessional communication and patient advocacy was detailed. Future training modules

including learner outcome assessments and educational pathways were also outlined. Detailed review of the medical model of graduate education was detailed and explained with a pathway for chiropractic academic growth outlined. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City College of Chiropractic, 2022.

Clinical Grand Rounds – *Chiropractic Management of Surgical Disc Herniation* – outline of inter and intra-rater reliability was presented and discussed in relation to radiological interpretation of spine MRI films. Short Tau Inversion Recovery (STIR) imaging was presented and contrasted to FLARE, T1 and T2 weighted imaging on MRI. Signal intensity relating to MRI documented Modic changes was presented in both T1, T2 and STIR images. Physical examination for spine pain was discussed with pre and post-surgical triage protocols identified and outlined. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards – PACE, State University of New York at Buffalo Jacobs School of Medicine, and Biomedical Sciences – 2022

Clinical Grand Rounds – *Chiropractic Spine Management and Pain Categorization* – review of published categorization of pain generation by the International Association for the Study of Pain including nociceptive, neuropathic and nociplastic sources. Discussion on the history and relevance of the Delphi process of conducting consensus-based research was presented. Origins of nociceptive, neuropathy and nociplastic sources of pain was outlined including non-neural tissue, the somatosensory nervous system as well as the categorization of pain syndromes with non-specific findings on physical examination and imaging studies. Review of the importance of quantitative testing, clinical examination and clinical correlation was presented and related to the academic approach to the categorization of pain. Spine Management Group, LLC, Federation of Chiropractic Licensing Boards – PACE, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2022

Clinical Grand Rounds – *Atlanto-axial Pannus with and without rheumatoid arthritis* – detailed overview of the anatomy and mechanics of the Atlanto-axial space in both diagrams and MRI studies. Overview of the clinical and laboratory diagnosis of rheumatoid arthritis and MRI as the imaging modality of choice for pannus formation in the upper cervical spine. Discussion on pannus formation being more common in non-rheumatoid arthritis patients. Overview of theories relating pannus formation to spinal instability at the C1-2 joint and identification of pannus as a common trait in the elderly. Spine Management Group, LLC, Federation of Chiropractic Licensing Boards – PACE, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2022.

Clinical Grand Rounds – *Chiropractic Management of Head and Neck Trauma* – review of types of tissue injured in head and neck trauma including muscle, nerve, intervertebral disc, ligament, spinal cord, vertebral body, artery, or vein was presented. Clinical correlation of mechanism of injury, patient history, subjective complaint, physical examination, advanced imaging findings and electrodiagnostic testing was emphasized. Interprofessional communication and review of any diagnostic dilemmas was reviewed. Spinal compressive radiculopathy versus acute nerve injury without prolonged compression was

presented. Differential diagnosis between ligament, intervertebral disc and nerve pathology was outlined in depth and presented. Emphasis was presented on spinal nerve manifestations of ligament injury in the cervical spine. Spine Management Group, LLC, Federation of Chiropractic Licensing Boards – PACE, State University of New York at Buffalo Jacobs School of Medicine, and Biomedical Sciences – 2022.

Clinical Grand Rounds – *Chiropractic Management and the Carotid Space* – outline and discussion of the anatomical boundaries of the carotid space was presented. Review of the aortic arch, brachiocephalic trunk, common carotid, carotid bifurcation, internal carotid, external carotid, Circle of Willis, and vertebral artery pathways was demonstrated. Review of correlation of patient history, physical examination and findings on advanced imaging was presented. Clinical review of dysphagia and odynophagia were presented and discussed clinically in the context of the physical examination and patient pain patterns. Vascular anomalies and their general asymptomatic presentation were emphasized. Etiology of arterial dissections was outlined with emphasis on differentiating spontaneous versus traumatic characterization. Advanced imaging of carotid space pathology was presented with catheter angiography demonstrated as the gold standard. Spine Management Group, LLC, Federation of Chiropractic Licensing Boards – PACE, State University of New York at Buffalo Jacobs School of Medicine, and Biomedical Sciences – 2022.

Diagnosis and Management of Persistent Spine Pain – *overview and discussion of spinal anatomy including intervertebral discs, ligaments, spinal nerves, spinal cord, and facet capsule was presented.* Emphasis was placed on differential diagnosis, physical examination and clinical correlation of injury mechanism and patient complaint. Specific outline of facet joint injury and joint effusion was demonstrated and discussed using T1, T2 and STIR weighted MRI scans of the lumbar spine with specific attention paid to the right L3 facet joint. Interprofessional communication in documentation and referral for interventional pain management consulting was presented with emphasis on facet or medial branch block injections. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards – PACE, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2022.

Spinal Biomechanical Engineering and Sagittal Balance of the Spine – *discussion of spine care in terms of engineering principles was presented.* Biomechanical parameters such as pelvic incidence, sacral slope, pelvic tilt, and sagittal balance were outlined and presented. Spinal curvature and load distribution was presented mathematically and outlined using full spine plain film radiography. Comparative anatomy between primates and humans as well as humans of different ages was presented as examples of spinal compensation. Spinal rehabilitative principles was provided in group discussion. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards – PACE, State University of New York at Buffalo Jacobs School of Medicine, and Biomedical Sciences – 2022.

Diagnosis and Management of Vertebral Osteomyelitis – *review of the causes of vertebral osteomyelitis was presented including findings on patient subjective complaint and objective findings on physical examination*. Differentiation between plain film radiographs, T1, T2, Flair

and STIR weighted imaging was presented and discussed. Associated clinical findings including infections in adjacent areas including intervertebral discitis areas was presented. Causes of osteomyelitis including past surgical procedure, frequent injections, infection in an adjacent tissue, IV drug use and long-term corticosteroid use were presented. Anterior elements of the functional motor unit were outlined as the primary location of osteomyelitis. Correlation clinically to difficulties in identifying this clinical entity in its early stages was reviewed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards - PACE. State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2022.

Diagnosis and Management of Post-Surgical Cervical Facet Syndrome – *a case of persistent and worsening neck and left shoulder pain post-surgical fusion was presented*. Pre and post plain film and advanced imaging slides were reviewed and correlated clinically to left sided mid-scapular pain. Physical examination including orthopedic and neurological testing was discussed in correlation to presenting symptoms. Differential diagnosis of radiculopathy, radiculitis, discogenic pain, scapular myofascial syndrome and thoracic intersegmental dysfunction was presented. Cervical facet joint referral patterns were reviewed and outline of referral for diagnostic facet joint block was discussed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards - PACE. State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Diagnosis and Management of Lumbar Arachnoiditis – *outline of the causes of arachnoiditis in the human spine was presented.* Specific focus was on a case of lumbar arachnoiditis involving the cauda equina evidenced on T1, T2 sagittal and axial MRI. Treatment options and lack of curative interventions was presented. Relevant anatomy of the lumbar spine including cauda equina, conus medullaris, filum terminale, dura mater, pia mater and arachnoid mater were reviewed in detail. Review of arachnoiditis and chiropractic adjustment were discussed as well as interprofessional coordination of care with interventional pain management and surgical consultation. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards - PACE. State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2022.

Diagnosis and Management of Anterior Sacral Contusion – *overview and discussion of contusion of the anterior sacral ala in an elite college cross-country runner*. Physical examination outlining range of motion, neurological and orthopedic examination was reviewed and correlated to the subjective complaint of right sided lower back pain. Misdiagnosis was presented and long-standing symptoms resulting in possible cessation of play for this athlete. Discussion of interprofessional communication with the neuroradiologist and subsequent MRI order with slices through the anterior sacrum was reviewed and presented. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards - PACE. State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2022.

Chiropractic Diagnosis and Management of Vertebral Compression Fracture – *review of the influence of osteoporosis on development of vertebral compression fracture was reviewed and detailed in comparison to neoplasm.* Utilization of MRI as the gold standard for evaluating the

age of and pathophysiology was discussed and presented. Absorptiometry was outlined and presented in relation to monitoring bone density. Interprofessional communication of absolute versus relative contraindications to conservative care and spinal manipulation was outlined and reviewed. Review of the three columns of vertebral architecture was detailed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards - PACE. State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Clinical Grand Rounds-*Chiropractic Diagnosis and Management of Lumbar Ligament Laxity* – detailed outline of injury thresholds of the anterior longitudinal, posterior longitudinal and ligamentum flavum was presented in the lumbar spine. Review of structural and physiological properties relating to stress/strain curve of the above ligaments. Outline of the toe region, linear region and failure region was demonstrated. Transversely isotropic material properties of spinal ligaments was included and correlated to chiropractic care and impairment rating using the AMA Guides to the Evaluation and Management 5th and 6th editions. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards - PACE. State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Clinical Grand Rounds – *Chiropractic Diagnosis and Management of Cervical Ligament* Laxity – detailed outline of injury thresholds of the anterior longitudinal, posterior longitudinal and ligamentum flavum was presented. Review of structural and physiological properties relating to stress/strain curve of the above ligaments. Outline of the toe region, linear region and failure region was demonstrated. Transversely isotropic material properties of spinal ligaments was included and correlated to chiropractic care and impairment rating using the AMA Guides to the Evaluation and Management 5th and 6th editions. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards - PACE. State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Clinical Grand Rounds – *Chiropractic Management of Cervical Myelopathy* – review of all relevant spinal anatomy in the cervical and lumbar spine including vertebral bodies, central canal, neuroforamen, ligamentum flavum, anterior and posterior longitudinal ligaments, facet capsule, interspinous ligament, supraspinous ligament and spinal cord anatomy. Review of spinal cord anatomy included white and gray matter, ventral and dorsal nerve roots, spinal nerve including the dura mater, arachnoid mater and pia mater. Specific review of patient history, mechanism of injury, physical examination including neurological and orthopedic evaluation as well as criteria for ordering and reading advanced imaging such as MRI and CT were presented in relation to cervical myelopathy, spinal cord compression and myelomalacia. Patient centered; consensus driven clinical diagnosis including interprofessional communication was presented, specific presentation relating to diagnostic outcomes and management. Attention was given to MRI and CT myelogram in both the uncomplicated and complicated patient. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards - PACE. State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Clinical Grand Rounds – *Chiropractic Management of Cervical Facet Syndrome* – review of the

pathogenesis and morphological presentation of cervical facet syndrome. Outline of patient history, physical examination including neurological and orthopedic evaluation as well as criteria for ordering and reading advanced imaging such as MRI and CT were presented. Discussion involving ligamentous structures such as interspinous ligament, supraspinous ligament and facet capsules was presented. Plain film static and dynamic radiographic studies were reviewed as well as specific sclerotogenous referrals patterns of facet mediated pain. Patient centered; consensus driven clinical diagnosis including interprofessional communication was presented, specific presentation relating to diagnostic medial branch blocks and pain management referral was emphasized. . National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards - PACE. State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Clinical Grand Rounds – *Chiropractic Management of Cervical Radiculopathy* – characterization of cervical radiculopathy in terms of neurological dysfunction including compression and inflammation of the spinal nerves was reviewed. Cervical spondylosis and intervertebral disc herniation as causative factors were presented and discussed. Conservative care as well as surgical intervention were presented and correlated to response to care and clinical findings. Outline of patient history, physical examination including neurological and orthopedic evaluation as well as criteria for ordering and reading advanced imaging such as MRI and CT were presented. Plain film static and dynamic radiographic studies were reviewed. Patient centered; consensus driven clinical diagnosis including interprofessional communication was presented. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Clinical Grand Rounds – *Chiropractic Management of Cervical Disc Herniation* – clinical differences between etiology and morphology were reviewed and presented. Outline of patient history, physical examination including neurological and orthopedic evaluation as well as criteria for ordering and reading advanced imaging such as MRI and CT were presented. Plain film static and dynamic radiographic studies were reviewed. Patient centered; consensus driven clinical diagnosis including interprofessional communication was presented. Specific anatomical location of cervical intervertebral disc herniation was presented and correlated to neurological findings on physical examination. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

PAIN MANAGEMENT ROTATION

pecialty Research in Pain Management – Clinical and Procedural – *Growth of Interventional Pain Management Techniques and Current Trends in Pharmacological Management of Neuropathic Pain. ESI comparison to gabapentin in lumbosacral radicular pain* – current trends and future progress of pain management interventions. Mode of action, required dosage, advantages and side effects profiles of currently available pharmacological approaches. ACCME

Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020.

Specialty Research in Pain Management – Clinical and Procedural – *Therapeutic Effects of Spinal Injection Therapy* - Facet, medial branch blocks, prolotherapy and epidural interventions utilization within the Medicare population, effectiveness on lumbar central canal stenosis with and without steroids and effect on prevention of spinal surgery, herniated disc, fibromyalgia and chronic musculoskeletal pain. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020.

Specialty Research in Pain Management – Clinical and Procedural – *Adverse Events Associated with Injection Therapy* – transforaminal and interlaminar epidural steroid injections, anesthesia technical considerations, effects on cervical radiculopathy midline versus paramedian approaches and perineurial injection of autologous conditioned serum. Review of FDA risk assessment.
Academy of Chiropractic, Recognized by the PACE Program of the Federation of Chiropractic Licensing Boards, ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020.

Specialty Research in Pain Management – Clinical and Procedural – *Correlation of MRI Findings and Injection Outcomes* - MODIC Changes on MRI and effectiveness of facet injection, facet joint signal change on MRI with fat suppression comparison with SPECT/CT. Discussion of Modic 1, 2 and 3 with correlation of clinical outcomes and patient selection criteria. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020.

Specialty Research in Pain Management – Clinical and Procedural – *Therapeutic Effects of Botulinum Toxin and Dry-Needling in Myofascial Pain Syndrome* – cost effectiveness, patient response and triage of therapeutic interventions. Physiological review of trigger point etiology and clinical presentation of acute and chronic pain. Functional response of intervention including relief and recurrence. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020.

Specialty Research in Pain Management – Clinical and Procedural – *Systematic Review Technical Considerations in Cervical Epidural Analgesia* - Chemical blockage of cervical nerve roots, review of anatomical structures and correlation with MRI imaging. Blockage effects on the respiratory, circulatory and neurological systems. Review of cervical epidural space (CES) borders and variants in patient population. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020.

Specialty Research in Pain Management – Clinical and Procedural – *Trends in opioid analgesic abuse and mortality in the USA, Evaluation of Opioid Pain Management in Injured Children, assessment of opioid reporting in Veteran Affairs* – Emergency visitation in pediatric injury, pain management and adoption of best practices. Trends in use of prescription opioid medication

using RADARS (Research Abuse, Diversion and Addiction Related Surveillance System), comparison between legitimate pharmacy channels and diversion and abuse. Opioid use prevalence and incidents in Veteran Affairs, new prescriptions or long-term conversion and relationship to persistent growth in opioid use. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Pain Management – Clinical and Procedural – *Electrodiagnostic Testing, Transforaminal Epidural Steroid Injection, Intra-articular Facet Joint Injection, Spinal Manipulation Post-Epidural Injection*– Needle EMG, active versus chronic denervation in lumbar, cervical spinal pathologies and differential diagnosis of spinal stenosis and intervertebral disc herniation. Systematic review of facet joint injections, clinical trials and conservative therapy in lower back pain. Results of spinal manipulation post-epidural injection in the cervical spine. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Pain Management – Clinical and Procedural – *Radiofrequency Ablation and outcome measures* - medication, function and pain in relation to pain of spinal origin. Medial Branch Block as prognostic tool prior to lumbar facet radiofrequency denervation. Clinical comparison disc herniation, disc bulge, cervical and lumbar radiculopathy. Diagnosis and patient triage correlation to anatomical spine structures. Long, short term risk factors and outcomes in radiofrequency ablation. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Pain Management – Clinical and Procedural – *Role of Cannabinoids in Pain Management* – review of pharmacological, botanical or synthetic origins of cannabinoids. Mechanism of action in alleviation of pain including analgesic, anti-inflammatory effects, modular actions on neurotransmitters and interactions with prescribed or endogenous opioids. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

MRI PHYSICS ROTATION

Specialty Research in MRI Physics – *The Hardware* – magnet types including permanent, resistive and superconducting magnets. Volume RF, surface, quadrature and phase array coils and other hardware necessary for the generation of MRI imaging. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in MRI Physics – *Physics of Image Generation 1* – magnetization, excitation, relaxion, acquisition, computing and display. T1 relaxion and relaxation curves, T2 relaxation, phase and phase coherence, T2 relaxion curves. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in MRI Physics – *Physics of Image Generation 2* – gradient coils, signal coding including slice encoding gradient, phase encoding gradient, Frequency encoding

gradient. Gradient specifications and slice thickness. Filling k-space, k-space symmetry and k-space filling technique. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in MRI Physics – *Physics of Image Generation* 3 – pulse sequences, spine echo sequences including multi-slicing and multi-echo sequencing. T1, T2, proton density contrast and their applications. Turbo spine echo, fast advanced spine echo (HASTE) sequence and gradient echo sequence. Inversion recovery sequence including STIR and FLAIR sequence. Choosing the right sequence pros and cons, T1, T2 and PD parameters. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in MRI Physics – *Physics of Image Generation* – technical parameters and artifacts – repetition time, echo time, flip angle, inversion time, number of acquisitions, matric and field of view. Slice thickness, slice gap, phase encoding direction 1 and direction 2 and relation to bandwidth. Motion artifact, para-magnetic artifact, phase wrap artifact, susceptibility artifact, clipping artifact, spine and zebra artifacts. Effects on image quality and acquisition. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

NEURORADIOLOGY ROTATION

Specialty Research in Neuroradiology – *radiographic evolution of a Schmorl's* node – acute Schmorl's node and progression to chronic stage comparison to serial MRI. Endplate fracture and acute presentation and correlation to clinical findings and pain patterns. Presentation in plain film radiograph and MRI images were compared and contrasted in both acute and chronic stages. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Neuroradiology – *syringomyelia, fluid dynamics and spinal cord motion* – scoliosis curve patters and syrinx characteristics versus Chiari I malformation. Normal MRI appearance and motion artifacts related to cerebral spinal fluid motion related phenomena and common appearances on MRI imaging. Syrinx wall and fluid motion and correlation to cardiac cycle with comparison between systolic and diastolic presentations. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Neuroradiology – *Spinal Biomechanics, Thoracolumbar Deformity and Surgical Outcomes* – full spine analysis, adjacent spinal biomechanics and its impact on surgical outcomes. Sagittal alignment pelvis to cervical spine and association with kyphosis and lordosis mechanical positioning. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Neuroradiology – *MRI and EMG comparison in denervated muscle diagnosis* – lumbar spine pathology and age in relation to paraspinal muscle size and fatty infiltration. Fatty degeneration of paraspinal muscle in degenerative lumbar kyphosis and CT

versus MRI digital analysis. Positive correlations with edema on MRI and fibrillations, positive sharp waves, denervation and the level of reduced recruitment pattern. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Neuroradiology – *association between annular tear and disc degeneration* – high intensity zone (HIZ) in lumbar disc and association to annular fissure on MRI. Identification of duel HIZ and its relationship to acute inflammation and calcified tissue and its association with discogenic pain patterns. Influence of phenotype, population size and inclusion sequence. T1, T2 and STIR imaging comparison and correlation. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Neuroradiology – *degenerative cervical myelopathy* – paraspinal muscle morphology, clinical symptoms and functional status. Review of fatty infiltration, asymmetry findings and correlation with clinical symptoms and functional scores. Review of complex anatomical arrangement of superficial and deep muscle layers in the cervical spine, correlation to MRI findings. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Neuroradiology – *MRI Neurography, Diffuse Tensor Imaging (DTI)* – diagnostic accuracy and fiber tracking in spinal cord compression. Review of spinal cord structural integrity, peripheral neuropathy and correlation to diffuse tensor imaging findings. Comparison in combining DTI with T2 and T2 alone and its value in magnetic resonance neurography. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Neuroradiology – *Nomenclature and Classification of Lumbar Disc Pathology* – modified Pfirrmann grading system and lumbar disc degeneration. Consensus driven description of intervertebral disc nomenclature including intervertebral disc bulge, herniation, protrusion, broad based disc herniation, extrusion and sequestration. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Neuroradiology – *MRI evaluation of intradural tumor* – neuroimaging of spinal tumors and correlation to histological study. Determining method of choice for evaluation, review of numerous types of intradural-extramedullary masses including meningioma and schwannoma. Signal intensities, contrast enhancement patterns, presence of cysts and other key differentiation findings of spinal cord tumors. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Neuroradiology – *Spinal Cord Compression, Myelomalacia, MRI Imaging and Clinical Correlation* – positional cervical spinal cord compression and fibromyalgia. T1 and T2 weighted images, comparison of hypo and hyperintense signals and extent of intramedullary changes on MRI. Review of MRI findings associated with myelomalacia and discussion of correlation with clinical findings. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Neuroradiology – *MRI Characteristics of Lumbar Facet Synovial Cyst* – formation characteristics of synovial cyst, relation to degenerative changes in spinal facet joints as demonstrated on MRI. Pre and post-surgical procedural MRI were reviewed and compared. Surgical management and subsequent resection were demonstrated. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

Specialty Research in Neuroradiology – *Variability in MRI Diagnostic Error Rates* – in depth review of quality of MRI imaging and comparison to consistent MRI diagnosis between facilities. Errors of interpretation in the study examinations were considered and presented. Impact of radiological diagnosis, location of MRI study and reading radiologist and impact on treatment choice and clinical outcomes. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

ORTHOPEDIC SURGERY – EXTREMITY ROTATION

Specialty Research in Orthopedic Extremity Surgery – *Wrist Anatomy and Osseous Kinematics* – normal kinematics using biplanar radiographic model were reviewed. Discussion of extensive database of carpal bone anatomy and kinematics from a large number of healthy subjects. 3-D motion of each bone was calculated for each wrist position and discussed. Database constructed including high-resolution surface models, measures of bone volume and shape, and the 3-D kinematics of each segmented bone. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Extremity Surgery – *Normal Motion of the Shoulder and Glenohumeral Instability* – normal motion of the shoulder joint compared with clinical implications of glenohumeral joint instability including surgical recommendations. Review and overview of the anatomy of the glenohumeral joint, emphasis on instability based on the current literature. Description of detailed anatomy and anatomical variants of the glenohumeral joint associated with anterior and posterior shoulder instability. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Extremity Surgery – *Orthopedic Testing and Shoulder Pathology Diagnosis* - use of orthopedic special tests (OSTs) to diagnose shoulder pathology and clinical examination. Review OST clusters, examination of methodology and illustration of their use in arriving at a pathology-based diagnosis. Discussion of examination of the biceps tendon and clinical relevance. Review of SLAP lesion and shoulder impingement syndrome were reviewed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Extremity Surgery – *Electrodiagnostic Testing and Carpal Tunnel Syndrome* – Review of the most common mononeuropathy in the human body. Relationship between clinical findings, neurological examination and electrodiagnostic testing in the diagnosis of carpal tunnel syndrome. Acute and chronic symptoms including progression

of the disorder were reviewed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Extremity Surgery – *Current Concepts in Elbow Disorders* – Detailed anatomy of osseus, ligamentous and muscular structure of the elbow was reviewed. Common disease of elbow disorders and their treatment was discussed. Lateral epicondylitis and medial collateral ligament injury of the elbow were outlined. Rheumatoid arthritis, posttraumatic osteoarthritis, and elderly patients with comminuted distal humeral fractures. Surgical design and technique were outlined. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Extremity Surgery – *Differentiating Cervical Spine from Shoulder Pathology* – anatomical review of cervical spine and glenohumeral joint focus on similarities and differences. Cervical disorders masking shoulder pain, cervical radiculopathy, cervical spondylotic myelopathy, facet and discogenic pain patterns were outlined. Details of shoulder pathology parsonage-tuner syndrome, subscapular neuropathy and thoracic outlet were presented. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Extremity Surgery – *MRI of the Shoulder and Shoulder Girdle* – review of MRI analysis of scapular fracture. Detailed review of scapular function rehabilitation and training on chronic pain syndromes. Reliability of magnetic resonance imaging versus arthroscopy for the diagnosis and classification of superior glenoid labrum anterior to posterior lesions. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Extremity Surgery -*Cataloging Movements of the Ankle, Hip and Spine* - Review Standardization and Terminology Committee (STC) of the International Society of Biomechanics (ISB) and classification of joint kinematics. Standard for the local axis system in each articulating bone is generated and presented. Rationale for international standards among researchers was presented. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Extremity Surgery -*Cataloging Movements of the Shoulder, Elbow, Wrist and Hand* - Review Standardization and Terminology Committee (STC) of the International Society of Biomechanics (ISB) and classification of joint kinematics. Standard for the local axis system in each articulating bone is generated and presented. Rationale for international standards among researchers was presented. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Extremity Surgery – *MRI and Diagnosis of Shoulder Disorders* – normal and abnormal shoulder anatomy as viewed on MRI was presented. Review and presentation of MRI in the diagnosis and treatment of brachial plexus injury. Discussion of preganglionic avulsions and muscular denervation. Comparison of CT myelography to MRI

myelography were outlined. Enhanced three dimensional T1 high-resolution isotropic volume excitation MR in the evaluation of shoulder pathology. Comparison with two-dimensional enhanced T1 fat saturation MRI were discussed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Extremity Surgery – *Clinical Evaluation of Upper and Lower Extremity Pathology* – review of relevant anatomy in shoulder, elbow, wrist, hip, knee and ankle was presented. Physical examination including orthopedic, neurological and range of motion testing was presented and compared with findings on MRI results. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

ORTHOPEDIC SPINE SURGERY ROTATION

Specialty Research in Orthopedic Spine Surgery – *Fusion Surgery and Lumbar Stenosis* – efficacy of fusion and decompression surgery in patients with lumbar spinal stenosis. Review of degenerative spondylolisthesis and patient selection criteria. Discussion of correlation of MRI, CT findings and clinical evaluation. Review of sedimentation sign on MRI and indications of prognostic factors. Surgery versus nonsurgical treatment outlined and outcomes discussed. Compensation for lumbar spinal stenosis and clinical sagittal plane deformity was presented. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Spine Surgery – *Posterior Lumbar Interbody Fusion and Adjacent Segment Degeneration (ASD*) – adjacent segment degeneration as major consequence of spinal fusion. Review of occurrence and location with correlation between surgical outcomes were discussed. Discussion of age, BMI and pre-existing stenosis in cranial adjacent segment as risk factors. ASD prevalence in radiographic evidence between cranial and caudal segments were reviewed. Presentation of risk factors and pre-operative radiological features. Facet sagittalization and tropism were discussed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Spine Surgery – *Morbidity and Mortality Predictions in Spinal Surgery* – Review of the Charlson Comorbidity Index (CCI) and the American Society of Anesthesiologist (ASA) Physical Status Classification System. Review of index outcomes and relation to costs of care. Discussion of index rating and likelihood of complications. Review of classification system in cerebral spinal fluid (CSF) leaks. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Spine Surgery – *Spondylolisthesis, clinical and radiographic classifications* - classification system that considers disc space height, sagittal alignment and translation, and the absence or presence of unilateral or bilateral leg pain was discussed. Detailed review of spondylolisthesis etiology, clinical presentation and imaging findings was reviewed. Review of inter and interobserver reliabilities of radiographic and clinical criteria. Review of consensus driven treatment options for degenerative spondylolisthesis presented.

Transforaminal Lumbar Interbody Fusion (TLIF) in degenerative disc disease with associated spondylolisthesis grade I was reviewed and correlated. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Spine Surgery – *Sagittal Alignment and Spinal Surgery, Clinical Outcomes and Follow up* – discussion of outcomes and sagittal alignment in single unilateral transforaminal lumbar interbody fusion (TLIF). Detailed review of surgical TLIF procedure and associated mid and long-term clinical outcomes. Discussion and presentation of influence of pelvic incidents and lumbar lordosis mismatch and post-operative residual symptoms. Analysis of adjacent segment disease following fusion. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Spine Surgery – *Complications and Outcomes in Adult Spinal Deformity Surgery* – review of surgical approaches and complications in correction of adult spinal deformity. Relevance of age, comorbidities, blood loss, osteoporosis and smoking were discussed. Discussion of Cobb Angle, Sagittal Vertical Axis, Pelvic Tilt, Thoracic Kyphosis were reviewed and examined in relation to transpsoas lateral interbody fusion (LIF), percutaneous pedicle screw (PPS), transforaminal lumbar interbody fusion (TLIF). Comparison between minimally invasive and traditionally open procedures was provided and reviewed. Discussion of minimally invasive surgery options were emphasized and outcomes reviewed with correlation to diagnosis and procedural coding. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Spine Surgery – *Surgical Interventions in Lumbar Disc Herniation* – review of differences in surgical treatment of recurrent lumbar disc herniation. Clinical correlation between plain film radiography, MRI studies and clinical presentation were reviewed. Data on frequency in management of recurrent lumbar intervertebral disc herniations presented. Duration of symptoms and influence of patient outcomes in sciatica patients undergoing micro-discectomy and decompressions. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Spine Surgery – *Length of Stay in Lumbar Spinal Surgery* – discussion on epidemiology of lumbar surgery outcomes and hospital stay. Correlation to clinical presentation and comorbidities were reviewed. Outline of decompression and instrumental fusion in the lumbar spine. Review of costs of lumbar surgery, trends in hospital stay and costs both on a cumulative and daily basis. Comparison of the nationwide inpatient sample and national surgical quality improvement program databases for lumbar spine fusion procedures was reviewed and presented. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Spine Surgery – *Pre-Surgical Planning and Implant Design* – 3-D printing and surgical planning discussion a variety of historical materials in the creation of patient specific implants based on unique individual anatomy. Historical trends in the creation of prosthetics with 3-D modeling software using neuroimaging data. Review of treatment

complex spinal pathologies and surgical planning was discussed. Outline of current and future barriers to global implementation and commercialization was reviewed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Spine Surgery – *Spine Surgery Procedures in Medical Specialty Training* – discussion of current spine surgery training including fellowship programming in the United States. Accreditation Council for Graduate Medical Education (ACGME) cases logs were reviewed and discussed. Variability of procedures within programs and between medical specialty programs were outlined. Differential utilization between orthopedic and neurosurgical fellows was reviewed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Orthopedic Spine Surgery – *Cerebral Spinal Fluid Dynamics, Central Nervous System Pathology and Intracranial Hypotension* – pathophysiology and various craniospinal disorders. Directional phase contrast MRI (4D Flow) was reviewed along with the anatomical and physiological properties of cerebral spinal fluid. Specific disorders such as Alzheimer's disease, hydrocephalus, Chiari Malformation and syringomyelia. Clinical correlation of CSF dynamics to understanding disease process was reviewed including normal and abnormal flow patterns. Recent advancements in fluid flow studies were outlined and presented. Signal intensity changes on MRI study in cervical spondylotic myelopathy was discussed and compared to normal parameters. Fluid dynamics patterns within syringomyelia and Chiari malformation was discussed and correlated to MRI findings and clinical presentations. Spinal microsurgical exploration surgery and resultant CSF leak and spontaneous intractable intracranial hypotension was reviewed and its pathoanatomical presentation outlined. Review of the natural and surgical history of Chiari malformation Type I in pediatric population and clinical correlation with MRI studies. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

NEUROSURGERY ROTATION

Specialty Research in Neurosurgery – *Anatomy and Physiology of the Blood Brain Barrier* – Review of consequences of alterations in homeostatic control of the neuronal environment. Discussion of blood flow alterations and altered vessel permeability as determinants in the pathophysiology of brain injury. Review present day literature on the anatomy, development and physiological mechanisms of the blood–brain barrier. The blood brain barrier's role in the maintenance of the extracellular environment. Vascular anatomy of the spinal cord was review in relation to the physiology of the neural environment. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Neurosurgery – *Spinal Cord Anatomy, Physiology and Vascular Reactivity* – detailed review of the blood supply of the spinal cord, anatomy of the vascular system and physiology of blood flow. Pathophysiology of various conditions including Thoracic Aortic Occlusion and Spinal Cord Injury were discussed with specific relation to risk of neurological deficit. Severity and duration as an effect was reviewed and correlated clinically. Cerebral

circulation and aging, discussion of effects on cognitive functioning and cerebrovascular disease in aging. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Neurosurgery – *Upper Cervical Spine Anatomy and Cerebral Spinal Fluid Flow* – MRI flow imaging and computational fluid dynamics in healthy patients with Chiari Malformations. Review of abnormal cerebral spinal fluid flow oscillations and their effects on healthy patients. Discussion of nonlaminar complex spatial and temporal variations with associated pressure waves and pressure gradients causing syringomyelia, headaches and other clinical manifestations in Chiari I malformation. Microsurgical anatomy and internal architecture of brainstem in 3D images and surgical considerations. CSF hydrodynamic changes, spinal cord injury and development of post traumatic syringomyelia (PTSM). Impact of spinal cord nerve roots and denticulate ligaments on cerebral fluid dynamics in the cervical spine was reviewed and discussed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Neurosurgery – *Compression and Degeneration in Chronic Nerve Root Entrapment* – differentiation between peripheral nerves and spinal nerve roots and effects of electrostimulation. Discussion of various stimulating or recording neurosurgical implants and success vs failure rates. Review of the nerve root compression and its relation to consequences of disc herniation and acute compression during surgery. Maximum pressure level a spinal nerve root can sustain is reviewed. Discussion of microsurgical anatomy of lumbosacral nerve rootlets, Rhizotomy and chronic spinal cord injury. Review of qualitative grading of severity of lumbar spinal stenosis on morphology of dural sac on MRI studies, review of classification systems and the consideration of impingement of neural tissue. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Neurosurgery – *Anatomy of Circle of Willis, Cerebral Arteries and Stroke Etiology* – discussion of stroke by embolism, source and cause in diagnosis and long-term treatment. Review of complex nature of embolus transport and its relation to etiology. Image based hemodynamics with discrete particle dynamics in relation to the distribution of emboli across the various cerebral arteries. Detailed anatomy of Circle of Willis reviewed and discussed with particular focus on size/inertia dependent trends in embolus distribution to the brain, distribution of cardiogenic versus aortogenic emboli among anterior, middle and posterior cerebral arteries, left versus right brain preference in cardio-embolus and aortic emboli transport and source-destination relationship for embolisms affecting the brain. Detailed review of the microsurgical anatomy of the posterior cerebral artery in three dimensional images. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Neurosurgery – *Stroke Therapy, Implementation and Cost-Effectiveness* – review of endovascular therapy in addition to standard care in acute ischemic vessel occlusion stroke. Comparison in National Institutes of Health Stroke Score (NIHSS) score, symptom onset, Alberta Stroke Program Early CT Score (ASPECTS) and occlusion location. Considerations in

acute management and revascularization of tandem occlusions in acute ischemic stroke with literature review. Discussion of Transcirculation Pipeline embolization device deployment as a rescue technique. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Neurosurgery – *Surgical Approaches and Outcomes in Spine Surgery 1* – review of historical interventions, multilevel decompression and instrumented fusion in reduction of neural compression and spinal column stabilization. Discussion of morbidity and mortality in relation to surgical procedures. The use of the modified fragility index to predict 30-day morbidity and mortality from spine surgery. Differences in patient selection for minimally invasive versus open surgical procedures, and review of post-surgical outcomes. Morbidity, mortality and health care costs for patients undergoing spine surgery following ACGME resident duty-reform. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Neurosurgery – *Surgical Approaches and Outcomes in Spine Surgery 2* Predisposing factors for dural tears in lumbar spine surgery including degenerative conditions, prior surgery and age related indicators were reviewed. Discussion and review of re-admission rages in spine surgery through metanalysis and systematic review. Bibliometric study of the most important minimally invasive (MIS) spine surgery papers including Level III and IV studies with focus on moving toward Level I and Level II. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

EMERGENCY MEDICINE ROTATION

Specialty Research in Emergency Medicine – *Emergency Medicine and Spine Pain* – review of lack of guidelines for the management of lower back pain in the ED. Frequency of lower back pain visitation in the emergency department including environmental/sociocultural dimensions and physical/psychospiritual dimensions were reviewed. Discussion of utilization of significant healthcare resources with complete description of lower back pain characteristics, health services use in non-urgent lower back pain patients presenting to the ED. Managing spine pain in the ED using usual and customary medical intervention. Extent of appropriate CT and MRI scans in the hospital setting, accessibility reviewed in conjunction with presented national data. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *Medication Usage and Motor Vehicle Accidents* – review of ADHD medication utilization and motor vehicle accident data and frequency of motor vehicle accident sin this specific patient population. Review of the prevalent and preventable cause of morbidity and mortality among patients and concepts of restricting based on prognostic factors. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *Emergency Department Imaging Perspectives* – review of imaging protocols among a spectrum of clinical indications, perspective on aging

populations and clinical complexity. Review of CT, MRI, plain film imaging and ultrasound and their relationships to internal medicine and musculoskeletal disorders examined on an emergency basis through patient generated national survey data. Details of specific contexts in which imaging has become concentrated and targeted efforts for optimization of utilization. considerations of utilization of CT in the emergency department and evaluation to increasing trends. Review of quality improvements in imaging utilization. Comparison between pediatric and adult imaging protocols and trends. Discussion and analysis of "Choose Wisely" recommendations and creating of guideline/policy/clinical pathways in New England EDs. MRI utilization in pediatric ED reviewed and analyzed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *Cauda Equina Syndrome and Other Emergent Conditions* – traumatic injuries to the thoracolumbar spine and overall impact on emergency services. Discussion of exact definitions of Conus Medullaris Syndrome (CMS) and Cauda Equina Syndrome (CES). Diagnosis in acute phase and radiological findings clinically correlating with physical examination findings. Parameters for spinal regions of traumatic injury were presented and reviewed. Case presentations for neck and spine were included and reviewed with particular focus on differential diagnosis and case uniqueness. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *Emergency Medicine Residency Curriculum* – review of Ohio State University Emergency Medicine Residency Program Musculoskeletal Emergencies Curriculum. Outline of the significant nature of musculoskeletal emergency presentations to ED. Details in the training required to master clinical experience, self-directed learning and small group didactics. Case study reviews and discussion was presented with particular focus on infection vs non-infections and traumatic vs non-traumatic presentations in ED. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *Opioid vs Non-Opioid Medications in the Emergency Department* – discussion of limited evidence of long-term outcomes of opioids with non-opioid medication for chronic pain. Literature review on effectiveness for opioid interventions. Discussion of alternative recommendations, evidence demonstrating lack of benefit and poor long term outcomes. Variation in physician opioid prescriptions discussed. Patterns of opioid initiation at first visits for pain in the ED in the United States including frequency and dosage. Emergency Department data concerning the persistent pain after motor vehicle accidents and comparison between opioid and NSAID prescribed in the ED. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *Concussion and Repeat ED visits* – review of patients presenting to ED with concussion with re-visitation within 72 hours. Mechanism of injury including closed head injury, assault, fall and motor vehicle accidents discussed. Epidemiological evidence presented regarding number of visitations, characteristics and care

paths reviewed. Discussion of adoption of a more comprehensive discharge plan to further prevent repeat visits was outlined. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *CDC Epidemiology of ED Visits in the United States, Adults Over 65 and Motor Vehicle Accidents* – Evaluation of data from the National Hospital Ambulatory Medical Care Survey and frequency of ED visitation. Percentage of visits requiring hospital admission was reviewed along with patterns of need for critical care. Review of imaging ordering statistics and clinical diagnosis was discussed. Details of primary and secondary ED diagnosis presented in relation to sprain/strain, contusion and spinal pathology including herniated intervertebral disc, facture and spinal cord compression. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *National Hospital Ambulatory Medical Care Survey* – a review of the current representative data on ambulatory care visits to hospital emergency departments in the United States. Demographics, residence, insurance class, chief complaint with focus on traumatic injury, diseases of the nervous and musculoskeletal systems were outlined. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *Lower Back Pain and Emergency Room Visits* – detailed analysis of impact of lower back pain on ED globally. First systematic review of the trends in the literature including lower back pain as significant complaint and the variables in its definition. Discussion of the proper diagnosis and triage of lower back pain and its current impact on ED management was reviewed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *Spinal Cord Injury without Radiographic Abnormality (SCIWORA) in* Adults – case reports – detailed review of Spinal Cord Injury without Radiographic Abnormality was presented. Syndrome of post traumatic myelopathy demonstrable on MRI with no evidence of osseous injury on plain film or CT scan. Reporting of incidence was included with detailed discussion of case presentations, accurate diagnoses and triage was reviewed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *CDC Traumatic Brain Injury Data* – Related Emergency Department Visits, Hospitalizations, Deaths – United States, 2007 and 2013 – traumatic brain injury, short and long term adverse clinical outcomes, death and disability reviewed and compared based on CDC data over a 7 year period. Mechanism of causation including motor vehicle accidents, falls and assault. Public health recommendations and interpretation of data was presented. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *CDC Data, Trends in Emergency Department Visits for Ischemic Stroke and Transient Ischemic Attack* – relationship between stroke and statistical cause of death, type of stroke and prognosis related to recurrence was discussed. Specific definitions of ischemic stroke, transient ischemic attack with etiology and relationship to emergency visits were outlined and presented. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Emergency Medicine – *US Emergency Department Use by Children* – pediatric utilization of emergency medicine resources, description of trends on a national basis. Detailed analysis of specific demographics including race and resident status were reported and reviewed. Discussion in allocation of resources including insurance class and coverage were reviewed. Anticipated expansion of Medicaid was considered and reviewed. Estimates of nonurgent ED visits by children were presented and discussed. Academy of Chiropractic, State University of New York at Buffalo, Jacobs School of Medicine, 2021

PRIMARY CARE/INTERNAL MEDICINE ROTATION

Specialty Research in Primary Care and Internal Medicine – *Supply of Chiropractic Care and Visits to Primary Care Physicians for Neck and Back Pain* – discussion of primary care visits and lower back pain. Expenditures and contributions to disability data. Discussion of supply of chiropractic care in context of visits for lower back pain and primary care physicians. Estimated national impact of primary care visits and expenditures was outlined with a focus on chiropractic's assistance in managing lower back pain. Defining an "episode" of lower back pain and relationship to collection of epidemiological data. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Primary Care and Internal Medicine – *Safety of Chiropractic Care in Lower Back Pain and Migraine Headaches* – review of adverse events associated with chiropractic care in the treatment of migraine. Outline of a prospective 3-armed, single-blinded, placebo RCT. Discussion of transient and mild events following chiropractic intervention. Randomized clinical trials and meta-analysis reviewed and discussed relating to the diagnosis and management of lower back pain including adverse event reporting. Risk of injury to the head, neck or trunk following an office visit for chiropractic spinal manipulation, as compared to office visit for evaluation by primary care physician. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Primary Care and Internal Medicine – *Chiropractic and Pain Management in Primary Care* – evaluation of the analgesic effects of spinal manipulation on both healthy and pain inflicted patients. Discussion of evidence of increased in pressure pain thresholds in musculoskeletal pain at both local and remote sites. Detailed knowledge of patient population regarding demographics and socioeconomic factors as well as disease-specific characteristics. Suggestion that lower back pain should not be seen as benign and self-limiting with focus on management. Describe the communication system surrounding the management of chronic pain from the perspectives of allopathic providers, acupuncture and

chiropractor providers, and chronic musculoskeletal pain patients. Chiropractic manipulative treatment (CMT) association with lower healthcare costs among multiply-comorbid Medicare beneficiaries with an episode of chronic low back pain was reviewed. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Primary Care and Internal Medicine – *Perceptions of Chiropractic Care* – demographic review of data on the perceptions of chiropractic care. Review of patient interest, trustworthiness, costs and frequency of visits was discussed. Nationally representative survey to compare characteristics and use of survey respondents with positive and negative perceptions of DCs and chiropractic care. Positive perceptions of DCs were more common than those for chiropractic care. US adults generally perceive DCs in a positive manner. Describe the preferences of older adults for low back pain co-management by MDs and DCs and identify their concerns for receiving care under such a treatment model. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Primary Care and Internal Medicine – *Chiropractic and Post-Surgical Care and Care for Veterans* – discussion of persistent post-surgical lower back and radicular pain response to chiropractic care. Relevant anatomy related to lower back pain and intervertebral disc injury was outlined and presented. Discussion and development of an integrated care pathway for doctors of chiropractic, primary care providers, and mental health professionals who manage veterans with low back pain, with or without mental health comorbidity, within Department of Veterans Affairs health care facilities. Support for the inclusion of chiropractic care as a component of multidisciplinary health care for low back pain, as currently recommended in existing guidelines with a focus on US Service Members. Discussion of availability of chiropractic care to military healthcare systems, referral and interprofessional communication models. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Primary Care and Internal Medicine – *Effects of Chiropractic Care Combined with Medical Care, First Contact and Provider Type* – differences in outcomes, patient satisfaction, and related healthcare costs in spinal, hip, and shoulder pain patients who initiated care with medical doctors (MDs) vs those who initiated care with doctors of chiropractic (DCs). Pain of muscuoloskeletal origin and epidemiology of reduced productivity. Comparison of data on health outcomes, patient satisfaction, and related healthcare costs in patients consulting differing first-contact care providers for musculoskeletal pain. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Primary Care and Internal Medicine – *Integrating Chiropractic Care into Primary Care and Private Sector Healthcare Facilities* – suggestion of a diverse role for chiropractors within conventional health care facilities. Discussion of chiropractic's effectiveness for managing musculoskeletal disorders, particularly spine-related pain and disability. Descriptions of doctors of chiropractic who work in nongovernmental, private sector health care settings in the United States. Shared electronic health records, face-to-face informal

consultations methods for interprofessional communication. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2021

Specialty Research in Primary Care and Internal Medicine – *American College of Physicians – Guideline Recommendations* – Non-Invasive and Non-Pharmacological - American College of Physicians (ACP) developed this guideline to present the evidence and provide clinical recommendations on noninvasive treatment of low back pain. Systematically review the current evidence on non-pharmacologic therapies for acute or chronic non-radicular or radicular low back pain. Comparative benefits of non-pharmacological therapies in acute/subacute low back pain including exercise, spinal manipulation, lumbar supports, acupuncture, laser, ultrasound and traction. Discussion of first and second line therapies with reduction in opioid prescription. ACCME Joint Sponsorship with the State University of New York at Buffalo, Jacobs School of Medicine, 2020

2021 Spine Management Conference – West – The Spine Management Physician
Discussion of the Spine Management Physician concept utilizing supportive evidence was presented. Outline of trends in spinal pain management versus a curative model was discussed. Credentials, training, and triage methods were demonstrated for the Doctor of Chiropractic to increase proficiency in spine management. Scientific evidence supporting the need for a portal of entry physician dedicated to spine management oversight was outlined. Key differences between Spine Management Physician and Primary Spine Care were discussed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City 2021.

2021 Spine Management Conference – West – Chiropractic Evidence – Pain Management Care
Outline of neurological mechanisms of central nervous system modulation of pain in the human body was demonstrated. Specific peer-reviewed, medically indexed evidence was presented starting with 2012 Systematic Review outlining spinal manipulation's effectiveness in pain management. Current evidence as well as future trends were discussed and presented. Neurological downregulation was discussed including afferent and efferent neurological pathways regulated by the dorsal horn of the spinal cord. Interprofessional communication and compliant documentation of the pain management phase of care was emphasized. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City 2021.

2021 Spine Management Conference – West – Chiropractic Evidence – Corrective Care
Specific trends in the biomechanical assessment of the human spine were provided and discussed. Emphasis was placed on the transfer of laboratory based biomechanical science and clinical utilization of biomechanical parameters in the diagnosis and correction of spinal biomechanical pathology. Peer reviewed medically indexed publications defining symptomatic vs asymptomatic were presented and discussed. Sagittal alignment and its relation to pelvic incidence was reviewed in relation to asymptomatic parameters. Interprofessional communication relating to biomechanical stabilization and spinal rehabilitation was outlined and reviewed. Review of a regional versus whole spine model of spine management was

presented emphasizing the needs of the patient, primary care physician, pain management physician and spine surgeon. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City 2021

2021 Spine Management Conference – West – Physical Examination Workflows – Cervical Spine

Detailed review of cervical spinal physical examination with emphasis on clinical triage between anatomical and biomechanical sources of spine pain. Neurological evaluation of the neck and surrounding structures was reviewed including pathological reflexes, assessment of vascular compromise and myelopathic findings. Detailed patient screening was stressed and its correlation to physical examination, red flags and relative vs absolute contraindications to chiropractic care was presented. Patient positioning and efficient processes were reviewed and demonstrated. Details relating to cervical spine and orthopedic testing was discussed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City 2021

2021 Spine Management Conference – West – Physical Examination Workflows – Thoracic and Lumbar Spine and Pelvis

Outlines of thoracic, lumbar and pelvis physical examination were presented. Neurological evaluation of the lumbar spine and surrounding structures was
reviewed including pathological reflexes, assessment of cauda equina syndrome and triage processes for neurologically compromised patients. Detailed screening was stressed and its correlation to physical examination, red flags and relative vs absolute contraindications to chiropractic care was reviewed. Patient positioning and efficient processes was reviewed and demonstrated. Details relating to lumbar spine and pelvic orthopedic testing was discussed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City 2021

2021 Spine Management Conference – West – Interprofessional Communication and Reporting

Review of electronic health record workflows were presented and discussed with emphasis on CPT compliant and efficient reporting. The importance of communication with the patient's other healthcare providers was outlined and discussed. Specific needs of the primary care physician, pain management physician and spine surgeon were outlined and reviewed. Details of simplified vocabulary and necessity of thoroughness were emphasized. Administrative workflows ensuring regular and continued communication of clinical documentation was provided. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City 2021

2021 Spine Management Conference – West – Patient Communication

Communication techniques were discussed with emphasis on patient comprehension to increase compliance and reduce patient anxiety. Details were presented on simplification of complex medicalterminology to ensure understanding at the initial visitation as well as

throughout the patient's care plan. Conversational interaction and dissemination of health information at the appropriate comprehension level was provided. Proper reporting and interprofessional communication were emphasized in a wholistic approach to supporting the patient's needs. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City 2021

2021 Spine Management Conference – West – Intervertebral Disc Morphology
Detailed discussion of the morphological descriptions of intervertebral disc pathology in the cervical, thoracic, and lumbar spine was presented. Differential diagnosis of disc bulge, herniation, protrusion, extrusion, and sequestration were presented. Attention was given to the five grades of annular fissure associating circumferential, radial, and transverse morphology. High intensity zone (HIZ) was discussed in detail as well as its correlation to acute inflammatory fluid. Specific MRI images were presented and correlated to consensus driven definitions of intervertebral disc pathology. Pre-existing degenerative changes in the human spine such as disc osteophyte complex, spondylosis, increased innervation of the intervertebral disc and endplate changes were discussed and correlated to acute findings on MRI. In depth discussion of the difference between morphology and etiology of intervertebral disc pathology was outlined. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City 2021

2021 Spine Management Conference – West – Ligamentous Response to Traumatic Injury
Anatomical review of spinal ligaments including nerve supply and formation of scar tissue post injury was presented. Function and histological composition were detailed and clinically correlated to physiological thresholds. Injury thresholds were also outlined and compared to the AMA Guides to the Evaluation of Permanent Impairment 5th and 6th edition. Detailed review of radiographic findings in the cervical and lumbar spine in the presence of ligamentous injury was reviewed and presented. Clinical criteria supporting the diagnosis of ligament injury and ligament laxity including patient history, physical examination, radiographic findings, and advanced imaging was presented. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City 2021

2021 Spine Management Conference – West – Causality and Spinal Ligamentous Injury
Detailed outline of acute versus chronic spine injury findings were presented. Reliable grading systems for phases of spinal degeneration was reviewed and discussed. Scientifically validated measuring process for intervertebral disc height and the 5 Grades of spinal degeneration proposed by Kettler were outlined. Specific discussion was presented in the differential diagnosis of ligament laxity due to degenerative process and acute ligamentous injury in the functional spinal unit with specific examples of radiographic and advanced imaging findings. Clinical correlation with Modic I, Modic II and Modic III endplate changes including cadaver specimens was presented. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City

2021

2021 Spine Management Conference – West – Differential Spinal Tissue and Spinal Injury Triage

Review of spinal tissue types and their response to physical stress and injury was presented. Prognostic factors in patient management were presented in relation to injury to spinal musculature, nerve tissue, ligamentous tissue, intervertebral disc, and bone. Tissue based triage, patient and interprofessional communication was emphasized and stressed. Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City 2021

2021 Spine Management Conference – West – Innervation of Spinal Structures

Specific reviewed of the anatomical innervation of pain generating structures in the human spine was presented. Scientific chronology of nerve supply discovery was presented and discussed. Increased innervation of the degenerating interverbal disc was presented and supported with contemporary scientific evidence. Spinal ligamentous structures as pain generating entities were also reviewed including anterior longitudinal ligament, posterior longitudinal ligament, supraspinous ligament, interspinous ligament and facet capsule. Clinical correlation to patient history, physical examination and imaging findings was emphasized with specific discussion on interprofessional triage and patient management. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University of Health Sciences, College of Chiropractic, Kansas City 2021

Clinical Grand Rounds – Diagnosis of Ossification of Anterior Longitudinal Ligament – discussion of the different types of Ossification of Anterior Longitudinal Ligament (OALL) including Segmental, Continuous and Mixed in the sagittal plane. Review of axial classification including Flat, Nodular and Globular was presented. Anatomy of spinal ligaments including the anterior and posterior longitudinal ligament and their attachments was outlined. Context of dysphagia, its progression, symptoms and need for referral was reviewed and outlined. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Clinical Grand Rounds – Chiropractic Management of Chronic Spine Pain – Discussion of chronic spine pain as a Public Health issue and Chiropractic's role in its diagnosis and management. Epidemiological statistics of chronic pain sufferers consulting Doctors of Chiropractic in the United States was presented. Outline of a spinal function and preventative model as opposed to a curative process was presented and reviewed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Clinical Grand Rounds – Types of Annular Fissures on Advanced and Plain Film Imaging – detailed review of the structure and function of the human intervertebral disc was presented including annulus fibrosis, nucleus pulposus, cartilaginous endplate and sharpey's

fibers. Diagrams as well as MRI images were outlined and reviewed in both the cervical and the lumbar spines with particular focus on the difference between degenerative and traumatically induced changes. High intensity zone (HIZ) as a characteristic of injury to the posterior aspect of the annulus fibrosis best visualized on T1 sagittal MRI images. Detailed comparison of axial and sagittal T1, T2 and STIR images was outlined, discussed, and reviewed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021

Clinical Grand Rounds – *Prevalence of Spinal Degeneration* – discussion of the clinical occurrence of spinal degenerative conditions such as Diffuse Skeletal Hyperostosis (DISH), central stenosis, foraminal stenosis, degenerative disc disease and osteoporosis was presented. Advanced imaging and plain film radiological utilization in the diagnosis of spinal degermation was outlined and reviewed. Acute versus degenerative conditions in the spine were reviewed and detailed in relation to traumatic and non-traumatic events. Consensus driven parameters in the identification and rating of degenerative change severity was discussed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Clinical Grand Rounds – *Chiropractic Professional Liability Litigation* – Discussion of thirty years of jury verdict data was reviewed and presented. Focus was on the rationale for claims against Doctor of Chiropractic and overall decisions rendered by jury pools. Outlining the risk factors associated with overly aggressive treatment, failure to diagnose and lack of interprofessional referral when medical necessary was presented with statistics. Comparison between chiropractic management and surgical management were outlined and detailed. Detailed analysis of causality versus correlation was presented and discussed. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021

Clinical Grand Rounds – *Mechanical Response of Damaged Human Cervical Spine Ligaments* – discussion of the biomechanical properties of cervical spinal ligaments under sub-failure loads. Ligaments discussed were the Anterior Longitudinal Ligament, Posterior Longitudinal ligament and the Ligamentum Flavum. Deformations exceeding physiological limitations were presented and reviewed. Grade I and Grade II injuries were outlined and discussed. Presentation included observed ligamentous injury significantly compromising ligament ability to give tensile support within physiological spinal motion. Findings were clinically correlated to long term sequalae in Alteration of Motion Segment Integrity and the AMA Guides to the Evaluation of Permanent Impairment 5th and 6th Editions. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Clinical Grand Rounds – *Classification of Degenerative Cervical Degenerative Disc Disease* – review of a radiographic rating system for objective assessment of intervertebral disc degeneration in the cervical spine. The degree of degeneration was organized based on loss of disc height, formation of osteophytes and the presence of diffuse sclerosis of adjacent vertebral bodies. Specific details of assessment were outlined and presented. Comparison of plain film radiographs to cadaver specimens was demonstrated and discussed. Review of interobserver validity of the grading system between observers was presented. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

Clinical Grand Rounds – *Differentiating Degenerative vs Traumatic Cervical Spondylolisthesis* – outline of spondylolisthesis clinical work up in the presence of spine pain including plain film dynamic radiographs, regional MRI study and assessment of alteration of motion segment integrity of specific spinal segments. Review of the correlation of present segmental degenerative changes such as loss of disc height, osteophyte formation, ligament ossification and facet joint hypertrophy and its association to pre-existing spondylosis was presented. Detailed discussion of past and present medical history including past traumatic events was emphasized. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences – 2021.

National Spine Conference – East Coast – 2021 Spine Management Clinical Workflows
in-depth review and discussion of the Doctor of Chiropractic as a Spine Management Physician with specific focus on the diagnosis and management of spine pain of mechanical origin. Details were outlined in relation to triage of anatomical causes of spine pain such as fracture, tumor, infection. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Pain Management and the Chiropractic Adjustment
Current peer reviewed indexed research demonstrating the chiropractic adjustment's effect on the central nervous system and pain threshold was outlined and reviewed. Anatomical review and contemporary supportive research were discussed. Details of central nervous system response to the chiropractic adjustment was reviewed and demonstrated. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Corrective Spinal Care and Chiropractic Case Management
Current peer reviewed indexed research demonstrating the chiropractic adjustment's effect on the biomechanical structure of the human spine during the corrective/rehabilitative phase of care. Basic outline of biomechanical parameters in symptomatic and asymptomatic patients was reviewed with particular focus on pathobiomechanics in chiropractic practice. National

Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Health Maintenance Care and Chiropractic Case Management

Current peer reviewed indexed research demonstrating the chiropractic adjustment's effect on the maintenance of the human spine. Details of indexed research reviewing Chiropractic's role in the reduction of narcotic utilization and decreased absenteeism from work due to disability. Communicating Health Maintenance Care to the medical profession and the public was emphasized. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Evidence Based Clinical Reporting

Overview of current CPT and ICD-10 coding guidelines pertaining to the evaluation and management of spine pain patients was presented. Timed codes, relevant diagnosis related to injured tissue was presented. Specific discussion of proper format of the Assessment portion of clinical documentation was presented. Review of the difference between daily progress notes and Evaluation and Management [E/M] reporting was provided. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Cervical Spine Clinical Workflows

Detailed review of workflows of a thorough patient history and identification of clinical red flags related to relative and absolute contraindications to chiropractic care was presented. Outline of neurological examination including pathological reflexes present during spinal cord compression, cervical stenosis and cervical myelomalacia was discussed. Normal vs abnormal measurement of range of motion objectifying spinal dysfunction was presented. Specific orthopedic testing related to specific muscle, nerve or intervertebral disc injury was discussed. Review of interprofessional triage and imaging decision tree was outlined with specific focus on the pain management physician and spinal surgeon. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Lumbar Spine Clinical Workflows

Detailed review of workflows of a thorough patient history and identification of clinical red flags related to relative and absolute contraindications to chiropractic care was presented. Outline of neurological examination including pathological reflexes present during cervical and lumbar stenosis was discussed. Normal vs abnormal measurement of range of motion objectifying spinal dysfunction was presented. Specific orthopedic testing related to muscle, nerve or intervertebral disc injury was discussed. Review of interprofessional triage and imaging decision tree was outlined with specific focus on the pain management physician and spinal surgeon. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Interprofessional Clinical Documentation for the Primary Care Physician

Ccontemporary techniques to best communicate chiropractic care to the Primary Care Physician was discussed and presented. Analysis of the depth and scope of communication was emphasized with direct focus on the proper documentation management system including demographic sheet, imaging reports, most recent evaluation and management reports. Discussion of appropriate timing for phone consultation was presented. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Clinical Documentation for the Spine Surgeon

Contemporary techniques to best communicate chiropractic care to the spine surgeon was discussed and presented. Analysis of the depth and scope of communication was emphasized with direct focus on the proper documentation management system including demographic sheet, imaging reports, most recent evaluation and management reports. Discussion of appropriate timing for phone consultation was presented. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Clinical Documentation for the Pain Management Physician

Contemporary techniques to best communicate chiropractic care to the pain management physician was discussed and presented. Analysis of the depth and scope of communication was emphasized with direct focus on the proper documentation management system including demographic sheet, imaging reports, most recent evaluation and management reports. Discussion of appropriate timing for phone consultation was presented. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Clinical Documentation for Attorney

Contemporary techniques to best communicate chiropractic care and permanent injury to the personal injury attorney was discussed and presented. Analysis of the depth and scope of communication was emphasized with direct focus on the proper documentation management system including diagnosis, response to treatment, causality and persistent functional loss was outlined. Discussion of appropriate timing for phone consultation was presented. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Spinal Biomechanical Engineering

Detailed presentation of the progression of laboratory-based biomechanics into the clinical realm was outlined. Evidence based review of Pelvic Incidence and other sagittal balance parameters was presented. Regional sagittal balance and communication with the spine

surgeon in the spine management practice was reviewed. Specific discussions were related to spinal sagittal balance and the non-surgical spine pain patient and correlated to the Corrective Care Phase of Chiropractic Care. Outline of the future of full spine biomechanical modeling was presented in relation to symptomatic and asymptomatic patients. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

National Spine Conference – East Coast – 2021 Objectifying the Biomechanical Spine
Lesion – review of ligament laxity and alternation of motion segment integrity was presented with specific correlation to the AMA Guides to the Evaluation of Permanent Impairment 5th and 6th Education. Correlation to bodily injury, causality and persistent functional losses in the personal injury patient and communication with the attorney was outlined. Attention was paid to the differences between vertebral body translation and angular motion deficits between adjacent motor units was presented. Specific details on measurement tools and analysis of the injured cervical and lumbar spines were discussed. National Spine Management Group, Cleveland University Kansas City, Chiropractic and Health Sciences, Federation of Chiropractic Licensing Boards, Buffalo, NY, Lehi, UT 2021.

ACA Acupuncture Symposium 2019
I Ching Acupuncture & Master Tung Extraordinary Acupuncture. Integration of the correspondence in meridian, time of the opposite channel, meridian clock, Shu points, Master Tung's Extraordinary points, 8 confluent points, Zang Fu connection, external meridian channel, and internal meridian channel. American Chiropractic Association, Council of Chiropractic Acupuncture, Painesville, OH. 2020.

Primary Spine Care 8-Trends in Spinal Treatment
Migration of spinal care for mechanical spine issues from hospitals and medical specialists to trauma qualified chiropractors based upon published outcomes.
Utilizing imaging studies in spinal biomechanics, pain models and clinical outcomes to determine a conclusive diagnosis, prognosis and treatment plan for triaging in a collaborative environment. Cleveland University Kansas City, Chiropractic and Health Sciences, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2019.

Primary Spine Care 8-*Neurology of Spinal Biomechanics*
Understanding the normal of spinal biomechanics and the neurotransmitters required for homeostasis. The interconnected role of Pacinian Corpuscles, Ruffini Corpuscles, Golgi Organ Receptors, Nociceptors, Proprioreceptors and Mechanoreceptors in maintaining sagittal and axial alignment in the presence of mechanical pathology. Cleveland University Kansas City, Chiropractic and Health Sciences, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2019.

Primary Spine Care 8-*MRI Age-Dating of Herniated Discs*

The literature, academic and clinical standards to age-date herniated discs.
The clinical correlation the pain patters with advanced imaging finings of bone edema, spurs based upon the Piezoelectric effect of remodeling, high signal on T2 weighted images, Vacuum Discs and disc heights in determining the time frames of the etiology of the spinal disc pathology. Cleveland University Kansas City, Chiropractic and Health Sciences, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2019.

Primary Spine Care 8-*Creating Ethical Collaborative and Medical-Legal Relationships*

Understanding the timely triage necessities based upon clinical and imaging outcomes and the documentation required for collaborative physicians to continue care.
Ensuring that the documentation is complete, reflective of services rendered and clear for third party consideration in an admissible format to considered in a medical-legal environment. Cleveland University Kansas City, Chiropractic and Health Sciences, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2019.

Primary Spine Care 8-Central Innervation of Spinal Biomechanical Engineering

Understanding the lateral and ventral horn's innovations of Pacinian Corpuscles, Ruffini Corpuscles, Golgi Organ Receptors, Nociceptors, Proprioreceptors and Mechanoreceptors and the pathways through the spinal thalamic tracts through the periaqueductal region, the Thalamus into the Occipital, pre-frontal, sensory and motor cortexes and the efferently back through the Thalamus to disparate regions in creating spinal homeostasis, Pacinian Corpuscles, Ruffini Corpuscles, Golgi Organ Receptors, Nociceptors, Proprioreceptors and Mechanoreceptors. Cleveland University Kansas City, Chiropractic and Health Sciences, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2019.

Primary Spine Care 8-Identifying Spinal Pathology of MRI

Utilizing T1, T2, STIR and Gradient studies in determining myelomalacia, intra and extra-dural tumors and systemic disease patterns affecting the spinal cord. When to use contrast post-operatively in identifying discal structures vs. adhesions on postoperative advanced imaging. MRI Interpretation of herniated, circumferential bulges, focal bulges, protruded, extruded, comminuted, sequestered and fragmented discs. When to consider a neurosurgical consultation based upon the correlation of imaging and clinical findings. Cleveland University Kansas City, Chiropractic and Health Sciences, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2019.

Medical-Legal Ethical Relationships, Documentation and Legal Testimony

Report writing for legal cases, the 4 corners of a narrative and documenting damages with understanding defense medical documentation and consistent reporting of bodily injuries, Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2018.

Medical-Legal Ethical Relationships, Documentation and Legal Testimony, Part 2
*Understanding report writing and the types of medical reports required for court inclusive of diagnosis, prognosis and treatment plans with requirements of reporting causality and permanency***,** Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2018.

Medical-Legal Ethical Relationships, Documentation and Direct Testimony
Organizing your documentation and understanding all collaborative documentation and how it fits into your diagnosis, prognosis and treatment plan, Understanding the nuances of the functional losses of your patients related to their bodily injuries, Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2018.

Medical-Legal Ethical Relationships, Documentation and Direct Testimony Part 2
Utilizing demonstrative documentation in direct examination and communicating the results of your care concurrently with the written documentation and reporting an accurate diagnosis for all images, Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2018.

Medical-Legal Ethical Relationships, Documentation and Direct Testimony Part 3
*The evaluation, interpretation and reporting of collaborative medical specialists results and concluding an accurate diagnosis inclusive of all findings and reviewing all images to ensure an accurate diagnosis***,** Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2018.

Medical-Legal Ethical Relationships, Documentation and Direct Testimony Part 4
*Determining and documenting disabilities and impairments inclusive of loss of enjoyment of life and duties under duress and the evaluation and validation of pain and suffering***,** Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2018.

Medical-Legal Ethical Relationships, Documentation and Cross Examination Testimony
Reporting your documentation factually and staying within the 4 corners of your medical report and scope of practice inclusive of understanding how your credentials allow you to report your documentation, Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2018.

Medical-Legal Ethical Relationships, A Documentation Relationship Between the Doctor and Lawyer
The level of organization required in a medical-legal case that accurately reflects the bodily injuries of your patients and the time constraints in rendering an accurate report, Academy of

Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2018.

Medical-Legal Ethical Relationships, Report Writing and Preparing for a Legal Case
*Reviewing the facts of the case inclusive of your documentation, the defense medical examiner, medical specialists and the attorney to ensure accurate and consistent reporting***,** Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2018.

Medical-Legal Ethical Relationships, Report Writing and Preparing for a Legal Case
Creating demonstrative evidence, visuals of your patient's bodily injuries inclusive of x-rays, MRI's, CAT Scans and electrodiagnostic findings, the spinal biomechanics of herniated disc with ipsilateral findings and contralateral symptomatology, Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2018.

Primary Spine Care Qualified
This qualification includes graduate chiropractic education in healthy and traumatically altered spinal morphology inclusive of osseous, connective tissue and neurological structure, function and pathology. This certifies you are qualified in assessing predictive models in spinal biomechanics and devising engineering paradigms for treatment plans to maximize spinal homeostasis in an evidenced based conclusion. In addition, this qualification acknowledges your expertise in triaging the injured and coordinating collaborative care from the trauma through conclusion of rehabilitation, Academy of Chiropractic Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island NY, 2018.

Neuroradiology Mini-Fellowship
MRI Spine Interpretation, Robert Peyster MD, Neuroradiologist, Professor of Radiology and Neurology, Chief Division of Neuroradiology, State University of New York at Stony Brook, School of Medicine, PACE Recognized by The Federation of Chiropractic Licensing Boards, Stony Brook NY, 2018**..**

Primary Spine Care 1 - Credentials and Knowledge Base
The credentials and knowledge based from an academia perspective when cooperatively treating in a collaborative environment inclusive of understanding pathology and mechanical spine issues. Cleveland University Kansas City, Chiropractic and Health Sciences, PACE Recognized by The Federation of Chiropractic Licensing Boards,, Academy of Chiropractic Post - Doctoral Division, Setauket, NY, 2018.

Primary Spine Care 1- Spinal Biomechanical Engineering and MRI Spine Interpretation
Integrating Spinal Biomechanical Engineering and MRI Spine Interpretation into a primary spine care model, inclusive of necessity and acquisition protocols. A comprehensive review the latest evidence in documenting mechanical issues. Cleveland University Kansas City, Chiropractic and Health Sciences, PACE Recognized by The Federation of Chiropractic Licensing Boards,, Academy of Chiropractic Post -Doctoral Division, Setauket, NY, 2018.

Primary Spine Care 1- Hospital Administration, Triage, Clinical Requirements and Collaborative Relationships with Medical Specialists

Understanding hospital and medical specialist's care paths for mechanical spine pathology and integrating the doctor of chiropractic in the hospital and allopathic treatment protocol., Cleveland University Kansas City, Chiropractic and Health Sciences, PACE Recognized by The Federation of Chiropractic Licensing Boards,, Academy of Chiropractic Post -Doctoral Division, Setauket, NY, 2018.

Primary Spine Care 1- Contemporary Spine Research and Documentation

Central nervous system connection and the thalamus, hypothalamus connection in both ascending and descending central pathways with neuro-endocrine implications that have the mechanisms to be a component of Schizophrenia, Dementia and Alzheimer's with a linear relationship to the chiropractic spinal adjustment and chronic pain. Cleveland University Kansas City, Chiropractic and Health Sciences, PACE Recognized by The Federation of Chiropractic Licensing Boards,, Academy of Chiropractic Post -Doctoral Division, Setauket, NY, 2018.

Primary Spine Care 2: Spinal Trauma Pathology

Morphology of healthy and traumatized connective tissue and the permanency implication of adhesions, spinal disc morphology in the healthy and pathological patient as sequella to trauma in relationship to bulges, herniations, protrusions, extrusions and sequestrations. Aberrant spinal biomechanics and negative sequella to trauma. Cleveland University Kansas City, Chiropractic and Health Sciences, PACE Recognized by The Federation of Chiropractic Licensing Boards,, Academy of Chiropractic Post -Doctoral Division, Setauket, NY, 2018.

Primary Spine Care 2: Utilizing Research in Trauma

The ability of your electronic health records to convey tissue pathology while documenting case studies, field experiments, randomized trials and systematic literature reviews, Introducing evidence based macros in documentation to support the literature and necessity of care. Cleveland University Kansas City, Chiropractic and Health Sciences, PACE Recognized by The Federation of Chiropractic Licensing Boards,, Academy of Chiropractic Post -Doctoral Division Setauket, , NY, 2018.

Primary Spine Care 2: Chiropractic Evidence

Analyzing segmental pathology, adjusting vs. mobilization with cervicogenic headaches, Opioid alternatives and case management of mechanical spine pain based upon outcome studies. Cleveland University Kansas City, Chiropractic and Health Sciences, PACE Recognized by The Federation of Chiropractic Licensing Boards,, Academy of Chiropractic Post -Doctoral Division, Setauket, NY, 2018.

Primary Spine Care 2: Chiropractic Spinal Adjustment Central Nervous System Processing

Literature reviews of mechanoreceptor, proprioceptor and nociceptor stimulation of later horn gray matter with periaqueductal stimulation affecting the thalamus and cortical regions with efferent distribution in disparate regions of the body in both pain and systemic stimulation.

Cleveland University Kansas City, Chiropractic and Health Sciences, PACE Recognized by The Federation of Chiropractic Licensing Boards,, Academy of Chiropractic Post -Doctoral Division, Setauket, NY, 2018

Primary Spine Care Symposium 3 – Interprofessional Spine Care, **Clinical Analysis of Anatomic versus Biomechanical Spine Pain and Clinical Triage Protocols**

Relating current research trends in the Whole Spine Model of patient including normal versus abnormal sagittal curvature in the adolescent and adult spine, pelvic incidence as a parameter for sagittal balance in the human spine and current methods of assessment. Patient centered approach to Evidenced Based Spine care with a focus on diagnosis, prognosis and triage of the spine pain patient. Texas Chiropractic College Post-Doctoral Division, Academy of Chiropractic Post-Doctoral Division, Melville NY 2017

Primary Spine Care Symposium 3 – Epidemiology of Spine Pain

Review of the current Centers for Disease Control [CDC} data on the frequency of musculoskeletal pain in the United States population with emphasis on pain of spinal origin. CDC guidelines on opioid medication were discussed and correlated to persistent pain syndromes. Research was reviewed showing the importance of managing the spine pain patient properly from the entry point of care with a concentration on maintenance of spinal biomechanics. Texas Chiropractic College Post-Doctoral Division, Academy of Chiropractic Post-Doctoral Division, Melville NY 2017

Primary Spine Care Symposium 3- Connective Tissue and Spinal Disc Pathology

The morphology and pathology of connective tissue, inclusive of spinal disc disorders and prognosticating wound repair with permanency implications. Disc bulge, herniation, protrusion and extrusion classifications based upon contemporary literature and how-to age-date disc pathology. Texas Chiropractic College Post-Doctoral Division, Academy of Chiropractic Post-Doctoral Division, Melville NY 2017

Primary Spine Care Symposium 3- Physiology and Anatomy of Spinal Manual Adjusting

Understanding the role of mechanoreceptors, proprioceptors and nociceptors with facets, ligaments, tendons and muscles in aberrant spinal biomechanics. MRI and imaging studies of decompressing via a chiropractic spinal adjustment of the bio-neuro-mechanical lesion and its effects on the central nervous system both reflexively and supratentorally. Texas Chiropractic College Post-Doctoral Division, Academy of Chiropractic Post-Doctoral Division, Melville NY 2017

Primary Spine Care Symposium 3- Medical-Legal Documentation

The contemporary documentation required in a medical-legal environment that is evidenced based and meets the standards of the courts and academia. Utilizing the scientific data to support a diagnosis, prognosis and treatment plan while meeting the admissibility standards based upon a professional's credentials. Texas Chiropractic College Post-Doctoral Division, Academy of Chiropractic Post-Doctoral Division, Melville NY 2017

Neurodiagnostics, Imaging Protocols and Pathology of the Trauma Patient

An in-depth understanding of the protocols in triaging and reporting the clinical findings of the trauma patient. Maintaining ethical relationships with the medical-legal community. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, Academy of Chiropractic Post -Doctoral Division, Long Island, NY, 2017

Diagnostics, Risk Factors, Clinical Presentation and Triaging the Trauma Patient

An extensive understanding of the injured with clinically coordinating the history, physical findings and when to integrate neurodiagnostics. An understanding on how to utilize emergency room records in creating an accurate diagnosis and the significance of "risk factors" in spinal injury. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, Academy of Chiropractic Post -Doctoral Division, Long Island, NY, 2017

Crash Dynamics and Its Relationship to Causality

An extensive understanding of the physics involved in the transference of energy from the bullet car to the target car. This includes G's of force, newtons, gravity, energy, skid marks, crumple zones, spring factors, event data recorder and the graphing of the movement of the vehicle before, during and after the crash. Determining the clinical correlation of forces and bodily injury. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, Academy of Chiropractic Post -Doctoral Division, Long Island, NY, 2017

MRI, Bone Scan and X-Ray Protocols, Physiology and Indications for the Trauma Patient

MRI interpretation, physiology, history and clinical indications, bone scan interpretation, physiology and clinical indications, x-ray clinical indications for the trauma patient. Certification in MRI, Bone Scan and X-Ray Protocols, Physiology and Indications for the Trauma Patient. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, Academy of Chiropractic Post -Doctoral Division, Long Island, NY, 2017

Neurodiagnostics Testing: EMG/NCV, VEP, BAER, V-ENG and SSEP

Clinical Indications and Interpretation, Electromyography (EMG), Nerve Conduction Velocity (NCV), Somato Sensory Evoked Potential (SSEP), Visual Evoked Potential (VEP), Brain Stem Auditory Evoked Potential (BAER) and Visual-Electronystagmosgraphy (V-ENG) interpretation, protocols and clinical indications for the trauma patient. Certification in Neurodiagnostics Testing: EMG/NCV, VEP, BAER, V-ENG and SSEP, Clinical Indications and Interpretation. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, Academy of Chiropractic Post -Doctoral Division, Long Island, NY, 2017

Documentation and Reporting for the Trauma Victim

Understanding the necessity for accurate documentation and diagnosis utilizing the ICD-9 and the CPT to accurately describe the injury through diagnosis. Understanding and utilizing state regulations on reimbursement issues pertaining to healthcare. Certification in Documentation and Reporting for the Trauma Victim. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, Academy of Chiropractic Post -Doctoral Division, Long Island, NY, 2017

Documenting Clinically Correlated Bodily Injury to Causality

Understanding the necessity for accurate documentation, diagnosis and clinical correlation to the injury when reporting injuries in the medical-legal community. Documenting the kinesiopathology, myopathology, neuropathology, and pathophysiology in both a functional and structural paradigm. Certification in Documenting Clinically Correlated Bodily Injury to Causality. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, Academy of Chiropractic Post -Doctoral Division, Long Island, NY, 2017

MRI History and Physics, MRI History and Physics

Magnetic fields, T1 and T2 relaxations, nuclear spins, phase encoding, spin echo, T1 and T2 contrast, magnetic properties of metals and the historical perspective of the creation of NMR and MRI. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, Buffalo, NY, 2017

MRI Spinal Anatomy and Protocols

Normal anatomy of axial and sagittal views utilizing T1, T2, 3D gradient and STIR sequences of imaging. Standardized and desired protocols in views and sequencing of MRI examination to create an accurate diagnosis in MRI. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017

MRI Disc Pathology and Spinal Stenosis

MRI interpretation of bulged, herniated, protruded, extruded, sequestered and fragmented disc pathologies in etiology and neurological sequelae in relationship to the spinal cord and spinal nerve roots. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017

MRI Spinal Pathology

MRI interpretation of bone, intradural, extradural, cord and neural sleeve lesions. Tuberculosis, drop lesions, metastasis, ependymoma, schwanoma and numerous other spinal related tumors and lesions. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017

MRI Methodology of Analysis

MRI interpretation sequencing of the cervical, thoracic and lumbar spine inclusive of T1, T2, STIR and 3D gradient studies to ensure the accurate diagnosis of the region visualized. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards,

New York Chiropractic Council, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017

MRI Clinical Application

The clinical application of the results of space occupying lesions. Disc and tumor pathologies and the clinical indications of manual and adjustive therapies in the patient with spinal nerve root and spinal cord insult as sequelae. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, Buffalo, NY, 2017

MRI Disc Overview & Imaging Protocols

MRI slices, views, T1, T2, STIR axial, stacking, FFE, FSE and sagittal images. Clinical indication for the utilization of MRI and pathologies of disc in both trauma and non-trauma sequellae, including bulge, herniation, protrusion, extrusion and sequestration. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017

MRI Interpretation of Lumbar Bulges/Degenerative Disc Disease

MRI slices, views, T1, T2, STIR axial, stacking, FFE, FSE and sagittal images in the interpretation of lumbar degeneration. With the co-morbidities and complications of stenosis, pseudo-protrusions, cantilevered vertebrate, Schmorl's nodes and herniations. Central canal and cauda equina compromise interpretation with management. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017

MRI Interpretation of Lumbar Herniated Discs

MRI Interpretation of Lumbar Herniations, MRI slices, views, T1, T2, STIR axial, stacking, FFE, FSE and sagittal images in the interpretation of lumbar herniations. With the co-morbities and complications of stenosis, pseudo-protrusions, cantilevered vertebrate, Schmorl's nodes and herniations. Morphology of lumbar disc pathologies of central and lateral herniations, protrusions, extrusions, sequestration, focal and broad based herniations are defined and illustrated. Central canal and cauda equina compromise interpretation with management. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017

MRI Interpretation of Cervical Bulges/Degenerative Disc Disease

MRI Interpretation of Cervical Degeneration/Bulges, MRI slices, views, T1, T2, STIR axial, stacking, FFE, FSE and sagittal images in the interpretation of cervical degeneration. With the co-morbidities and complications of stenosis, pseudo-protrusions, cantilevered vertebrate, Schmorl's nodes and herniations. Spinal cord and canal compromise interpretation with management. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017

MRI Interpretation of Cervical Herniated Discs

MRI Interpretation of Cervical Herniations, MRI slices, views, T1, T2, STIR Axial, FFE, FSE and sagittal images in the interpretation of lumbar herniations. With the co-morbidities and complications of stenosis, pseudo-protrusions, cantilevered vertebrate, Schmorl's nodes and herniations. morphology of lumbar disc pathologies of central and lateral herniations, protrusions, extrusions, sequestration, focal and broad based herniations are defined and illustrated. Spinal cord and canal compromise interpretation with management. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017

Virtual Grand Rounds

MRI Interpretation of Degenerative Spine and Disc Disease with Overlapping Traumatic Insult to Both Spine and Disc, MRI slices, views, T1, T2, STIR Axial, FFE, FSE and sagittal images in the interpretation of degenerative spondylolesthesis, spinal canal stenosis, Modic type 3 changes, central herniations, extrusions, compressions, nerve root compressions, advanced spurring and thecal sac involvement from an orthopedic, emergency room, chiropractic, neurological, neurosurgical, physical medicine perspective. Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017.

Spinal Biomechanical Engineering: Cartesian System

The Cartesian Coordinate System from the history to the application in the human body. Explanation of the x, y and z axes in both translation and rotations (thetas) and how they are applicable to human biomechanics. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Spinal Biomechanical Engineering: Cervical Pathobiomechanics

Spinal biomechanical engineering of the cervical and upper thoracic spine. This includes the normal and pathobiomechanical movement of both the anterior and posterior motor units and normal function and relationship of the intrinsic musculature to those motor units. Nomenclature in reporting normal and pathobiomechanical findings of the spine. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Spinal Biomechanical Engineering: Lumbar Pathobiomechanics

Spinal biomechanical engineering of the lumbar spine. This includes the normal and pathobiomechanical movement of both the anterior and posterior motor units and normal function and relationship of the intrinsic musculature to those motor units. Nomenclature in reporting normal and pathobiomechanical findings of the spine. Diplomate, Academy of Chiropractic Post -Doctoral Division, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Spinal Biomechanics in Trauma

To utilize whiplash associated disorders in various vectors of impact and whiplash mechanisms in determining pathobiomechanics. To clinically correlate annular tears, disc herniations, fractures, ligament pathology and spinal segmental instability as sequellae to pathobiomechanics from trauma. The utilization of digital motion x-ray in diagnosing normal versus abnormal facet motion along with case studies to understand the clinical application. Diplomate, Academy of Chiropractic Post -Doctoral Division, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Spinal Biomechanical Engineering & Organizational Analysis

Integrating spinal biomechanics and pathobiomechanics through digitized analysis. The comparison of organized versus disorganized compensation with regional and global compensation. Correlation of the vestibular, occular and proprioceptive neurological integration in the righting reflex as evidenced in imaging. Digital and numerical algorithm in analyzing a spine. Diplomate, Academy of Chiropractic Post -Doctoral Division, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Spinal Biomechanical Engineering: Cervical Digital Analysis

Digitizing and analyzing the cervical spine in neutral, flexion and extension views to diagnose pathobiomechanics. This includes alteration of motion segment integrity (AMOSI) in both angular and translational movement. Ligament instability/failure/pathology are identified all using numerical values and models. Review of case studies to analyze pathobiomechanics using a computerized/numerical algorithm. Diplomate, Academy of Chiropractic Post -Doctoral Division, ACCME Joint Providership with the State University of New York at Buffalo Jacobs

School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017.

Spinal Biomechanical Engineering: Lumbar Digital Analysis

Digitalizing and analyzing the lumbar spine images to diagnose pathobiomechanics. This includes anterior and posterior vertebral body elements in rotational analysis with neutral, left and right lateral bending in conjunction with gate analysis. Ligament instability/failure/pathology is identified all using numerical values and models. Review of case studies for analysis of pathobiomechanics using a computerized/numerical algorithm along with corrective guidelines. Diplomate, Academy of Chiropractic Post -Doctoral Division, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Spinal Biomechanical Engineering: Full Spine Digital Analysis

Digitalizing and analyzing the full spine images to diagnose pathobiomechanics as sequellae to trauma in relation to ligamentous failure and disc and vertebral pathology as sequellae. This includes anterior and posterior vertebral body elements in rotational analysis with neutral, left and right lateral bending in conjunction with gate analysis. Ligament instability/failure/pathology is identified all using numerical values and models. Review of case studies for analysis of pathobiomechanics using a computerized/numerical algorithm along with corrective guidelines. Diplomate, Academy of Chiropractic Post -Doctoral Division, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017

Spinal Trauma Pathology, Triage and Connective Tissue Injuries and Wound Repair

Triaging the injured and differentially diagnosing both the primary and secondary complaints. Connective tissue injuries and wound repair morphology focusing on the aberrant tissue replacement and permanency prognosis potential. Diplomate, Academy of Chiropractic Post - Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, Buffalo, NY, 2017

Spinal Trauma Pathology: Ligament Anatomy and Injury Research and Spinal Kinematics

Spinal ligamentous anatomy and research focusing on wound repair, future negative sequelae of abnormal tissue replacement and the resultant aberrant kinematics and spinal biomechanics of the spine. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017.

Spinal Trauma Pathology: Spinal Biomechanics, Central Nervous System and Spinal Disc Nomenclature

The application of spinal biomechanical engineering models in trauma and the negative sequelae it has on the central nervous system inclusive of the lateral horn, periaqueductal gray

matter, thalamus and cortices involvement. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Spinal Trauma Pathology: Biomechanics of Traumatic Disc Bulge and Age Dating Herniated Disc Pathology

The biomechanics of traumatic disc bulges as sequella from trauma and the comorbidity of ligamentous pathology. Age-dating spinal disc pathology in accordance with Wolff's Law. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Spinal Trauma Pathology: Clinical Grand Rounds

The review of case histories of mechanical spine pathology and biomechanical failures inclusive of case histories, clinical findings and x-ray and advanced imaging studies. Assessing comorbidities in the triage and prognosis of the injured. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Spinal Trauma Pathology: Research Perspectives

The review of current literature standards in spinal trauma pathology and documentation review of biomechanical failure, ligamentous failure and age-dating disc pathology. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Accident Reconstruction: Terms, Concepts and Definitions

The forces in physics that prevail in accidents to cause bodily injury. Quantifying the force coefficients of vehicle mass and force vectors that can be translated to the occupant and subsequently cause serious injury. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Accident Reconstruction: Causality, Bodily Injury, Negative Acceleration Forces, Crumple Zones and Critical Documentation

Factors that cause negative acceleration to zero and the subsequent forces created for the vehicle that get translated to the occupant. Understanding critical documentation of hospitals, ambulance reports, doctors and the legal profession in reconstructing an accident. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Accident Reconstruction: Skid Marks, Time, Distance, Velocity, Speed Formulas and Road Surfaces

The mathematical calculations necessary utilizing time, distance, speed, coefficients of friction and acceleration in reconstructing an accident. The application of the critical documentation acquired from an accident site. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Accident Reconstruction: Research, Causality and Bodily Injury

Delta V issues correlated to injury and mortality, side impact crashes and severity of injuries, event data recorder reports correlated to injury, frontal impact kinematics, crash injury metrics with many variables and inquiries related to head restraints. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Mild Traumatic Brain Injury/Traumatic Brain Injury/Concussion

Differentially diagnosing mild traumatic brain injury vs. traumatic brain injury and the clinical and imaging protocols required to conclude an accurate diagnosis for head trauma. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Impairment Rating

The understanding and utilization of the protocols and parameters of the AMA Guide to the Evaluation of Permanent Impairment 6th Edition. Spine, neurological sequelae, migraine, sexual dysfunction, sleep and arousal disorders, station and gait disorders and consciousness are detailed for impairment rating. Herniated discs, radiculopathy, fracture, dislocation and functional loss are also detailed in relation to impairment ratings. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University

of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Orthopedic Testing: Principles, Clinical Application and Triage

Integration of orthopedic testing in the clinical setting to develop a differential diagnosis. Utilizing radiographic and advanced imaging inclusive of MRI and CAT scan findings to verify tissue pathology suspected by orthopedic testing conclusions and developing a treatment plan as sequelae. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017.

Orthopedic Testing: Cervical Spine

Integration of cervical orthopedic testing in the clinical setting to develop a differential diagnosis. Utilizing radiographic and advanced imaging inclusive of MRI and CAT scan findings to verify tissue pathology suspected by orthopedic testing conclusions and developing a treatment plan as sequelae. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Orthopedic Testing: Lumbar Spine

Integration of lumbar orthopedic testing in the clinical setting to develop a differential diagnosis. Utilizing radiographic and advanced imaging inclusive of MRI and CAT scan findings to verify tissue pathology suspected by orthopedic testing conclusions and developing a treatment plan as sequelae. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017.

Orthopedic Testing: Clinical Grand Rounds

Integration of orthopedic testing in the clinical setting utilizing both simple and complex patient scenarios. It includes potential stroke, or vertebrobasilar insufficient patients and understanding the nuances in a clinical evaluation with orthopedic testing as a critical part of the evaluation and screening process. How to integrate orthopedic testing in the clinical setting utilizing both simple and complex patient scenarios. It includes potential stroke, or vertebrobasilar insufficient patients and understanding the nuances in a clinical evaluation with orthopedic testing as a critical part of the evaluation and screening process. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York

at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Stroke Anatomy and Physiology: Brain Vascular Anatomy

The anatomy and physiology of the brain and how blood perfusion effects brain function. A detailed analysis of the blood supply to the brain and the physiology of ischemia. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Stroke Anatomy and Physiology: Stroke Types and Blood Flow

Various types of stroke identifying ischemia, hypoperfusion, infarct and penumbra zones and emboli. Cardiac etiologies and clinical features as precursor to stroke with associated paradoxical emboli and thrombotic etiologies. Historical and co-morbidities that have etiology instroke inclusive of diabetes, coagulopathy, acquired and hereditary deficiencies. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Stroke Principles of Treatment an Overview for the Primary Care Provider

Stroke type and treatments performed by vascular specialists. The goals of treatment with the physiology of the infarct and penumbra zones and the role of immediate triage in the primary care setting. Detailing the complications of stroke and future care in the chiropractic, primary care or manual medicine clinical setting. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Clinical Evaluation and Protocols for Identifying Stroke Risk

The neurological history and examination for identifying stroke risks with a focus on supra and infratentorial regions, upper and lower motor lesions, cranial nerve signs, spinal cord pathology, motor and sensory pathology and gait abnormalities. Examining genetic and family histories along with dissection risk factors. Stroke orthopedic testing and clinical guidelines pertaining to triage for the primary care provider. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Medical-Legal-Insurance Documentation

Accurate and compliant documentation of history and clinical findings inclusive of functional losses, loss of activities of daily living, duties under duress and permanent loss of enjoyment of life. Prognosing static vs. stable care, gaps in care both in the onset and in the middle of passive care with a focus on detailed diagnosing. The integration of chiropractic academia, the court system and the insurance reimbursors' requirements for complete documentation. Diplomate, Academy of Chiropractic Post -Doctoral Division, Texas Chiropractic College or PACE Recognized by The Federation of Chiropractic Licensing Boards, ACCME Joint Providership with the State University of New York at Buffalo Jacobs School of Medicine and Biomedical Sciences, Academy of Chiropractic Post-Doctoral Division, Buffalo, NY, 2017, Buffalo, NY, 2017

Croft Module 1: Whiplash Advanced Topics: The Fundamental Science

Requisite and comprehensive biomechanics knowledge for forensic experts, the minimal property damage myth exposed. A cutting-edge analysis of brain, neck, and other soft tissue injuries that occur secondary to cervical acceleration deceleration syndrome and whiplash associated disorder. Risk assessment: the fundamental key to modern forensic practice. Certification in Whiplash and Brain Injury Traumatology, Spine Research Institute of San Diego, Denver Colorado 2016.

Croft Module 2: Management Principles in Personal Injury and Forensic Documentation

Auto crash reconstruction in low speed crashes: critical knowledge for today's forensic practitioners. Comprehensive physical examination of whiplash and traumatic brain injury cases and the correct way to document these injuries. The latest radiographic examination methods and analysis techniques. CT and MRI examination of brain and soft tissue injuries. How and when to use special diagnostic imaging modalities (SPECT, PET, functional MRI, VF, etc.) How and when to use electrodiagnostics (EMG, sEMG, SSEP, VEP, etc.) Special considerations for the proper management of personal injury cases. Certification in Whiplash and Brain Injury Traumatology, Spine Research Institute of San Diego, Denver Colorado 2016.

Croft Module 3: Principles of Impairment Rating and Forensic Reporting

Critical documentation from day 1; What every personal injury and forensic expert needs to know. Incorporating outcomes assessment and disability instruments into your reports (SCL-90-R. Oswestry, Roland-Morris, Rivermead PCS, and more). The application of AMA guidelines in personal injury and forensic practice. Critical rebuttal methods and strategies in today's modern forensic practice. Certification in Whiplash and Brain Traumatology, Spine Research Institute of San Diego, 2017

Croft Module 4: Medicolegal Fundamentals for Practitioners and Forensic Experts

Essentials of documentation and record keeping in medicolegal cases. When and how to incorporate medical photography. Preparing for depositions arbitrations, cross-examination and testifying in court. Critical differences between chiropractic and medical approaches that make or break a case. Using evidence effectively; models, charts, diagrams, photos, movies, and more. Daubert and Frey rules; how they affect your testimony and how they can exclude opposing experts. Disabusing the MIST myth; Colossus. Learned treatises and reliable authorities; other

federal rules of evidence experts should know. Certification in Whiplash and Brain Traumatology, Spine Research Institute of San Diego, 2016

Experience

March 2004 – Present **Choice of Health Chiropractic & Acupuncture (Overland Park, KS)**
Owner and President of Choice of Health Chiropractic & Acupuncture. Solo practitioner, using techniques of Prone Specific, Diversified, Extremity Adjusting and Activator. Providing therapies such as intersegmental traction, manual massage, rehabilitation, trigger point therapy and acupuncture. Proficient in taking and reading onsite digital w-ray. Use of DME includes: Cervical supports, cervical pillows, lumbar supports, tens units, lumbar chair support and other rehab devices. This is a family practice with emphasis on motor vehicle collision injury treatment. Conditions most commonly treated include: motor vehicle collision injuries, asthma, allergies, migraines, headaches, sinus problems, neck and back pain, sciatica, infertility, infant child care, sports injuries, and geriatrics.

2000 – 2004 **Internship at the Acupuncture Society of America (Kansas City, Mo)**
Assisted Instructors with necessary materials for teaching beginning and advanced acupuncture curriculum. Apprenticed under Dr. Richard D. Yennie for acupuncture instructor. Set up classrooms and prepared materials for enrolled students. Collected payments for classes and any books and supplies. Assisted students with questions regarding course instruction.

2008- 2013 **Assistant Instructor at the Acupuncture Society of America (Kansas City, Mo.)**

2013- 2015 **Head Instructor at the Acupuncture Society of America (Kansas City, Mo.)**

2015- Present **Guest Instructor at the American Society of Acupuncture (Overland Park, Ks.)**

Publications

Witt Sherman PhD, APRN, ANP-BC, ACHPN, FAAN, D., Matzo PhD, APRN-CNP, FPCN, FAAN, M. (2018). Palliative Care Nursing, 5th Edition. Chapter (24), 67 - 65.

Professional Affiliations

American Chiropractic Association (ACA)
Kansas Chiropractic Association (KCA)
Missouri State Chiropractic Association (MSCA)
Cleveland Chiropractic College Lifetime Alumni Membership
American board of chiropractic Acupuncture
Council of Chiropractic Acupuncture