

Aaron Williams DC, FSBT(c)
14135 Cedar Ave Suite 400, Apple Valley, MN, 55124
Phone: 952-432-5550
applevalleyoutreach@gmail.com

SELECTED OCCUPATIONAL HISTORY

Clinic Director, Southside Chiropractic and Injury Center, dba Cedar South Chiropractic and Injury Center

EDUCATION AND LICENSURE

Doctorate of Chiropractic, Northwestern College of Chiropractic, Bloomington, Minnesota, 1998

Doctor of Chiropractic, Licensed in the State of Minnesota, License # 3752;
Doctor of Chiropractic, 1998-Present

National Board of Chiropractic Examiners, Part I, 1997

National Board of Chiropractic Examiners, Part II, 1998

National Board of Chiropractic Examiners, Part III, 1998

National Board of Chiropractic Examiners, Part IV, 1998

National Board of Chiropractic Examiners, Physiotherapy, 1997

POST-DOCTORAL EDUCATION CERTIFICATIONS

Fellowship Spinal Biomechanics and Trauma - Cleveland University Kansas City,

College of Chiropractic - Candidate, 2021-present

Interprofessional Hospital Qualified, Cleveland University Kansas City, 2021-present

Trauma Qualified, Cleveland University Kansas City, 2020-present

SELECTED TEACHING/INSTRUCTING/LECTURING/CONSULTING

INSTRUCTOR - Interprofessional Spine Care Review: Enhancing Communication and Patient Navigation

A comprehensive review was conducted on a case involving a patient who experienced a motor vehicle crash, presenting with headache, neck pain, and left wrist pain. The overview included plain film radiographs of the cervical spine, with a specific emphasis on intersegmental motion and alterations in motion segment integrity. Detailed biomechanical analysis was also discussed. The review extended to coronal view MRI utilizing T1 and T2 sequences, with particular focus on the upper cervical region, specifically the alar ligaments. A hyperintense signal was noted laterally and correlated clinically with the patient's presenting symptoms. The discussion included proper diagnosis and management of upper cervical grade 2 ligament injuries, providing a detailed and comprehensive presentation. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

SELECTED POST-GRADUATE EDUCATION, CERTIFICATIONS AND DIPLOMATES

Clinical Grand Rounds: Objective Identification of Cervical Alteration of Motion Segment Integrity (AOMSI) Following Motor Vehicle Collision

Evaluation of a 27-year-old female presenting with delayed-onset cervical pain, headaches, sleep disturbance, and psychosocial symptoms following a motor vehicle collision. Review included quantitative flexion-extension radiographic analysis and SpineCAMP biomechanical assessment demonstrating a C4-C5 translational abnormality measuring 3.7 mm, exceeding the AMA Guides to the Evaluation of Permanent Impairment, 5th Edition threshold for Alteration of Motion Segment Integrity (AOMSI). Discussion focused on objective identification of post-traumatic cervical instability, interpretation of dynamic motion studies, application of AMA Guides impairment criteria, principles of medical causation in whiplash-associated disorders, and the relationship between altered cervical biomechanics and long-term functional outcomes. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2026.

Clinical Grand Rounds: Comparative Analysis of AMA Guides 5th and 6th Edition Cervical Impairment Metrics in Post-Traumatic Spine Injury

Advanced review of cervical spine biomechanics utilizing flexion-extension radiography and SpineCAMP computerized motion analysis in a patient demonstrating objective abnormalities at multiple cervical levels following motor vehicle trauma. Topics included identification of C4-C5 translational instability meeting AMA Guides, 5th Edition AOMSI criteria, evaluation of C2-C3 sagittal offset abnormalities recognized under AMA Guides, 6th Edition methodology, and comparison of impairment rating models between editions. Discussion emphasized the distinction between impairment ratable and clinical significance, interpretation of sagittal alignment abnormalities, application of objective biomechanical findings to causation analysis, and the role of measurable motion abnormalities in long-term prognosis, functional

impairment assessment, and medico-legal decision-making. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2026.

Clinical Grand Rounds: Pseudarthrosis Versus Instability Following Multilevel Cervical Fusion – *Evaluation of a postoperative multilevel cervical fusion patient utilizing quantitative flexion-extension radiographic analysis and SpineCAMP biomechanical assessment software. Review included assessment of residual intersegmental motion within instrumented fusion constructs, differentiation between pseudarthrosis and Alteration of Motion Segment Integrity (AOMSI), interpretation of postoperative motion patterns, and clinical implications of failed arthrodesis. Emphasis was placed on understanding why the absence of AOMSI findings does not exclude fusion failure, recognition of abnormal motion within intended fusion segments, and application of objective biomechanical data to support advanced imaging recommendations and spine surgical consultation. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2026.*

Clinical Grand Rounds: Dynamic Cervical Motion Analysis and Surgical Referral Considerations in Suspected Pseudarthrosis – *Advanced review of postoperative cervical spine biomechanics utilizing dynamic flexion-extension radiography and computerized intersegmental motion analysis. Topics included identification of pseudarthrosis, assessment of fusion integrity, interpretation of measurable motion within fusion constructs, and differentiation between postoperative fusion failure and traditional ligamentous instability models. Discussion emphasized evidence-based clinical decision-making, appropriate referral thresholds for spine surgical consultation, and the role of quantitative motion assessment technologies in the evaluation and management of complex postoperative spine patients. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2026.*

Clinical Grand Rounds: Lumbar Alteration of Motion Segment Integrity and Dynamic Instability Assessment Using SpineCAMP – *Evaluation of a complex lumbar spine injury utilizing quantitative flexion-extension radiographic analysis and SpineCAMP biomechanical assessment software. Review included AMA Guides 5th and 6th Edition criteria for Alteration of Motion Segment Integrity (AOMSI), intersegmental angular motion analysis, translational instability measurements, sagittal offset calculations, and identification of abnormal centers of rotation. Emphasis was placed on the clinical significance of dynamic instability at L4-L5, interpretation of abnormal sagittal translation patterns, correlation with patient symptom presentation, and application of objective biomechanical data in trauma-related spine disorders. Discussion included the role of FDA-cleared artificial intelligence-assisted measurement systems in improving diagnostic reproducibility, causation analysis, and multidisciplinary spine management. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2026*

Clinical Grand Rounds: Correlation of Lumbar MRI Findings with Quantitative Biomechanical Dysfunction Following Motor Vehicle Trauma - *Case-based review of*

lumbar MRI findings demonstrating multilevel disc pathology, including L2-L3 extrusion, L3-L4 foraminal protrusion, L4-L5 foraminal stenosis with Modic endplate changes, and multilevel posterior disc protrusions. Analysis focused on integrating advanced imaging findings with dynamic biomechanical measurements obtained through SpineCAMP motion analysis. Topics included disc degeneration versus traumatic aggravation, nerve root compromise, foraminal encroachment, Modic classification systems, and the relationship between structural pathology and functional spinal instability. Clinical decision-making strategies for diagnosis, treatment planning, patient navigation, and interdisciplinary referral pathways were reviewed. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2026

Clinical Grand Rounds: Sagittal Plane Biomechanics, Retrolisthesis, and Motion Preservation in the Injured Lumbar Spine - *Advanced review of sagittal plane spinal biomechanics utilizing quantitative radiographic analysis and spinopelvic alignment assessment. Topics included lumbar lordosis distribution, pelvic parameters, Grade I retrolisthesis at L4-L5, abnormal sagittal offset measurements, and assessment of regional lumbar motion patterns. Discussion emphasized the relationship between spinal alignment, segmental instability, disc degeneration, and long-term functional outcomes. Special attention was given to the clinical utility of objective motion analysis technologies, interpretation of normative database comparisons, and incorporation of biomechanical findings into personal injury evaluation, impairment analysis, and evidence-based spine care pathways. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2026*

Spinal Instability in the Complex Surgical Failure Patient: A Case-Based Application of Quantitative Motion Analysis - *Presented a complex workers' compensation case involving multilevel cervical and lumbar surgical history with documented non-union. Discussion focused on the clinical application of quantitative motion analysis (QMA) via AI-assisted SpineCAMP platform for objective assessment of intersegmental instability, center of sagittal rotation analysis, and biomechanical threshold determination. Case demonstrated identification of pathological motion at C2-C3 and L3-L4 with correlation to neurological examination findings including myotomal and dermatomal deficits at C5-C6 (left) and L5-S1 (left). Federation of Chiropractic Licensing Boards PACE | National Spine Management Group 2026*

Permanency Evaluation and AOMSI Assessment in End-Stage Workers' Compensation: Clinical Decision-Making and Medicolegal Documentation - *Presented a case-based examination of permanency rating methodology within the New York workers' compensation system, including evaluation of scheduled loss of use criteria, AMA-threshold biomechanical findings, and the clinical relevance of alteration of motion segment integrity (AOMSI) across patient classifications. Discussion addressed integration of objective spinal biomechanical data into medicolegal documentation, expert witness testimony preparation, and differentiation of surgical versus conservative management thresholds using normative*

database comparison. Federation of Chiropractic Licensing Boards PACE | National Spine Management Group 2026

Multimodal Imaging in the Complex Personal Injury Patient: CT-Based Assessment of Sternum Fracture, Spinal Degeneration, and Biomechanical Motion Analysis in the Presence of MRI Contraindication - *Presented a personal injury case involving a 73-year-old female with acute sternum fracture following a high-impact motor vehicle collision, complicated by MRI contraindication due to a retained legacy pacemaker lead. Discussion focused on the clinical decision-making framework for imaging selection, including CT-based identification of sternal fracture, vacuum sign at multiple lumbar levels, and coronal/sagittal assessment of multilevel degenerative disc disease with thoracolumbar scoliosis. Case demonstrated the application of AI-assisted quantitative motion analysis (QMA) via the SpineCAMP platform to evaluate intersegmental motion, center of sagittal rotation deviation, and global range of motion deficits in the cervical and lumbar spine as a CT-only alternative to MRI-based assessment. Federation of Chiropractic Licensing Boards PACE | National Spine Management Group 2026*

Personal Injury Case Management: From the Clinic to the Courtroom- *A comprehensive 8-lecture clinical and medico-legal training program addressing the full continuum of personal injury case management from initial patient encounter through litigation and expert testimony. Instruction includes tissue-based injury identification, mechanism-of-injury correlation, reproducible examination procedures, imaging integration, structured documentation, impairment considerations, and courtroom communication strategy. Emphasis is placed on defensibility under cross-examination, documentation reviewed by non-clinicians, deposition preparation, and interdisciplinary coordination with attorneys, adjusters, and primary care physicians. Participants develop systematic case frameworks that integrate clinical precision with legal awareness while maintaining evidence-based spine management principles. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2026*

Tissue-Based Injury Classification and Mechanism Correlation in Personal Injury Practice- *Advanced clinical instruction on the identification, differentiation, and documentation of ligamentous, discal, muscular, and osseous injuries in trauma-focused environments. Emphasizes injury pattern recognition, acceleration–deceleration biomechanics, rotational and shear stress mechanisms, compression versus distraction forces, and expected tissue-specific healing timelines. Covers acute versus delayed presentation patterns, instability indicators, fracture identification, annular disruption patterns, and structural compromise. Clinical reporting strategies are aligned with medico-legal scrutiny, focusing on causation analysis, objective reproducibility, and defensible narrative development consistent with high-liability case environments. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2026*

MRI Interpretation in Personal Injury: Acute vs. Chronic Disc Pathology and Degenerative Differentiation- *In-depth analysis of intervertebral disc morphology, displacement patterns, and degenerative grading systems with emphasis on differentiating traumatic herniation from degenerative bulge. Detailed instruction on Modic endplate changes (Types 0–III), Pfirrmann disc grading (I–V), disc desiccation, loss of disc height, vacuum phenomenon, intradiscal fluid, signal intensity interpretation, and migration patterns including protrusion, extrusion, and sequestration. Integrates sagittal and axial plane analysis, zone classification, annular fissure recognition, and correlation of imaging findings with symptom patterns and EMG data. Emphasis on timing of imaging relative to causative event and structured reporting language to support causation analysis in medico-legal review.* National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2026

ACR Technical Standards and MRI Spine Protocol Optimization for Medico-Legal Defensibility- *Comprehensive review of American College of Radiology (ACR) Practice Parameters and Technical Standards for cervical, thoracic, and lumbar MRI. Covers slice thickness requirements, interslice gap limitations, STIR sequence utilization, sagittal and axial planning through superior endplate, mid-disc, and inferior endplate levels, and sequence optimization for annular and endplate evaluation. Emphasis on reproducibility, artifact minimization, patient positioning standards, and imaging consistency necessary for medico-legal defensibility. Instruction highlights the role of proper technical acquisition in preventing misinterpretation, under-reporting, and credibility challenges in litigation environments.* National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2026

Alteration of Motion Segment Integrity (AOMSI) in Cervical and Lumbar Spine Trauma: Biomechanics, Measurement Standards, and Reliability Metrics- *Advanced instruction in the biomechanical and radiographic evaluation of motion segment instability in both the cervical and lumbar spine utilizing AMA Guides (5th and 6th Editions) criteria. Comprehensive coverage includes translational and angular measurement thresholds for the cervical spine (>3.5 mm anterior-posterior translation; >11° segmental angular differential compared to the adjacent inferior segment) and lumbar spine motion integrity assessment through flexion-extension radiography, segmental translation analysis, and angular displacement evaluation. Emphasis is placed on proper imaging acquisition protocols, neutral-flexion-extension positioning, full patient effort validation, elimination of motion artifact, magnification correction, and standardized measurement methodology to ensure reproducibility. Instruction correlates abnormal motion findings with ligamentous injury patterns involving the anterior longitudinal ligament (ALL), posterior longitudinal ligament (PLL), interspinous and supraspinous ligaments, facet capsule disruption, and posterior tension band compromise. Participants analyze instability patterns in acute trauma versus degenerative spondylotic motion changes, differentiating structural incompetence from adaptive hypermobility. Impairment rating implications are reviewed with structured*

integration into medico-legal reporting, including causation analysis, permanency considerations, and courtroom defensibility strategy. The program further incorporates advanced discussion of inter-rater reliability (IRR) and quantitative agreement standards in motion measurement systems. Detailed review of Cohen's Kappa (κ) interpretation thresholds for categorical agreement and Intraclass Correlation Coefficient (ICC) benchmarks for continuous measurement reliability is applied directly to translational and angular motion analysis. The curriculum underscores structured, reproducible measurement systems, inter-reader comparison methodology, and objective documentation strategies that enhance defensibility under deposition and cross-examination while promoting interdisciplinary consistency in spine trauma evaluation. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2026

Inter-Rater Reliability in Quantitative Spine Assessment and Medico- Legal

Measurement Integrity-Advanced discussion of inter-rater reliability metrics including Cohen's Kappa (κ), Intraclass Correlation Coefficient (ICC), and percent agreement standards as applied to segmental motion analysis, disc grading systems, translational and angular measurements, and AOMSI evaluation. Interpretation scales and clinical benchmarks are reviewed with emphasis on thresholds appropriate for clinical use, research integrity, and high-stakes medico-legal environments. Instruction focuses on minimizing provider-dependent variability, enhancing interdisciplinary consistency, and strengthening objective defensibility under deposition and cross-examination. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2026

Legal Frameworks in Personal Injury: No-Fault Systems, Tort Law, and Litigation

Processes- Structured overview of personal injury legal frameworks including No-Fault versus Tort systems, serious injury thresholds, Personal Injury Protection (PIP) requirements, subrogation principles, pre-litigation negotiation processes, and formal litigation procedures. Detailed discussion of depositions, direct examination, contingency fee structures, defense counsel roles, and the strategic importance of early documentation. Emphasis on clinician awareness of how medical records are interpreted by non-clinicians, how inconsistencies weaken credibility, and how structured documentation shapes case boundaries and settlement outcomes. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2026

Regulatory Compliance, FDA Pathways, and Risk Management in Clinical Technology

Utilization- Comprehensive review of FDA medical device regulatory pathways including 510(k) clearance and De Novo classification processes, predicate device requirements, risk classification levels, and submission timelines. Examines professional, civil, and criminal consequences of utilizing non-FDA-approved technologies, including malpractice exposure, insurance reimbursement denial, regulatory enforcement actions, and institutional disciplinary measures. Provides mitigation strategies including verification of clearance status, risk assessment protocols, IRB consultation when appropriate, and structured regulatory strategy planning for innovative or AI-based technologies within chiropractic and

interdisciplinary spine practices. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2026

Welcome and Strategic Orientation of the Program - *An expanded overview establishing the scientific direction and operational philosophy of the meeting, emphasizing the integration of advanced biomechanical analysis, neuro-orthopedic science, and imaging frameworks to elevate spine-care assessment. Addressed the transition from symptom-based evaluation toward measurement-driven methodologies that enhance diagnostic reproducibility and interdisciplinary communication. Reviewed unified terminology, dynamic imaging applications in motion-based pathology, and structural methods for aligning clinical workflows with emerging evidence standards. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025*

Evolution of Quantitative Diagnostic Imaging in Spine Care - *Comprehensive review of technological and scientific advancements transforming quantitative spine imaging, including the maturation of translational and angular displacement metrics, reduction of examiner variability, and development of computational image-processing systems. Discussed reproducibility research, multi-modality dataset integration (MRI, CT, dynamic studies), and structured pathways that enhance surgical planning, objectivity, and medico-legal defensibility through measurable biomechanical data. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025*

Biomechanical Principles of the Spine – Foundations for Modern Functional Assessment - *Detailed analysis of segmental biomechanics including multi-planar motion, viscoelastic ligament behavior, facet-mediated load distribution, and stiffness gradients. Examined translational shear forces, rotational coupling, posterior ligament complex interactions, and collagen microstructure contributions to mechanical signatures. Linked foundational biomechanics to diagnostic interpretation, early instability detection, micro-failure identification, and aberrant movement analysis in traumatic and degenerative states. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025*

Panel: Defining Spinal Instability – Historical Models, Measurable Parameters & Clinical Impact - *Multidisciplinary panel evaluating classic and modern frameworks of spinal instability including displacement thresholds, ligament elongation mechanics, capsular insufficiency, and load-dependent failure patterns. Discussed diagnostic limitations of static imaging and demonstrated how dynamic measurement clarifies ambiguous presentations. Integrated predictive validity, treatment stratification, progression risk, and biomechanical interpretation for both conservative and surgical pathways. National Spine Management*

Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Integrative Interpretation of Functional Spinal Imaging for Clinical Decision-Making -

Exploration of functional imaging modalities—kinematic radiography, motion-sensitive MRI, quantitative movement studies—as unified frameworks across disciplines. Included motion-pattern recognition, segmental stiffness abnormalities, recruitment sequencing, and translation of mechanical findings into conservative, interventional, and surgical decisions. Highlighted structured reporting systems that enhance communication and support defensible documentation. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Panel: Multidisciplinary Coordination in Spine Care – Case-Based Integration Models -

Case-based review of integrated workflows across chiropractic, physical therapy, orthopedics, neurosurgery, and pain management. Demonstrated functional imaging correlations with MRI findings, diagnostic synchronization, reduction of redundancy, and timing optimization for interventions. Highlighted standardized mechanical thresholds as tools for escalation decisions and improved continuity in complex case management. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Optimizing Referral Relationships – Clinical and Communication Strategies -

Scientific analysis of how objective diagnostic data strengthens referral pathways between conservative providers and surgical or interventional specialists. Covered evidence-based justification, documentation standards, predictive indicators, and communication models that enhance interdisciplinary acceptance. Reviewed common hurdles and data-driven solutions that improve referral efficiency and treatment continuity. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Pseudoarthrosis Assessment Using Functional and Radiologic Correlation Techniques -

Review of diagnostic complexities in identifying non-union and failed fusion. Covered micro-motion thresholds, structural bone-integrity assessment, hardware load signatures, functional variability vs true non-union, and implications for revision surgery. Integrated dynamic studies with CT and MRI analysis to improve diagnostic resolution and patient-specific treatment planning. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Facet Capsule Anatomy, Physiology & Role in Segmental Instability -

Detailed discussion of capsular ligament neurophysiology, mechanoreception, nociception, and proprioceptive control. Reviewed elongation injury mechanics, rotational and shear vulnerability,

inflammatory cascades, and chronic capsular laxity leading to segmental instability. Correlated imaging markers such as capsular hypertrophy, fibrosis, and facet spacing alterations with mechanical failure states. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Vertical Instability & Complex Spinal Motion Disorders – Case-Based Analysis - *In-depth analysis of vertical shear instability, altered axial load transfer, annular deformation patterns, endplate mechanics, and multi-level ligamentous compromise. Demonstrated complex motion signatures—segmental recruitment delay, aberrant stiffness ratios, directional preference abnormalities—and integrated findings with neuromusculoskeletal examination, imaging, and treatment pathway determination. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025*

AOMSI – Objective Ligament Injury Assessment in Variable Diagnostic Environments - *Scientific review of Alteration of Motion Segment Integrity criteria, including tensile failure physics, viscoelastic tissue deformation, and posterior ligament complex compromise. Expanded discussion on radiographic variability, gray-zone cases, and advanced imaging correlations that improve repeatability and medico-legal defensibility in ligament-injury assessment. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025*

Personal Injury Case Adjudication – Transition From Narrative to Measurable Biomarkers - *Comprehensive review contrasting subjective symptom-driven assessments with objective mechanical and imaging-derived biomarkers. Discussed recall bias, examiner variability, and the superiority of quantifiable intersegmental motion data, correlated structural findings, and reproducible functional deviations. Highlighted applications for impairment rating, prognosis modeling, and legal defensibility. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025*

Panel: PI Use Cases – Clinical & Subclinical Mechanical Failure Patterns - *Exploration of overt and subtle ligamentous microfailure, segmental coordination abnormalities, compensatory recruitment, and sensitization phenomena. Addressed challenges in correlating symptoms with imaging, detection of hidden dysfunctions, and communication of complex mechanical findings to adjusters, attorneys, and courts. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025*

Radiology Frontiers – Integrated Imaging, Ligament Evaluation & Computational Interpretation - *Expanded lecture on ligament visualization advancements in MRI, CT*

osseous integrity assessment, dynamic imaging innovations, and computational interpretation tools. Reviewed multi-modality integration, pattern recognition, and challenges in characterizing ligament injury with conventional static imaging alone. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Advanced Neuroimaging & Microstructural Brain Analysis - Comprehensive scientific review of diffusion-based imaging, tract integrity quantification, microstructural signal deviations, and their relevance in traumatic, inflammatory, and metabolic brain injuries. Discussed scanner-variability constraints, white-matter susceptibility to shear injury, and correlations with cognitive and vestibular deficits. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Circulating Biomarkers in Traumatic Brain Injury - *Expanded coverage of GFAP, UCH-L1, neurofilament light chain, tau isoforms, and S-100 proteins. Included diagnostic windows, decay kinetics, assay variability, pathophysiology of biomarker release, and combined multi-marker approaches that enhance differentiation of acute vs residual injury states.* National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Clinical Interpretation of Advanced Neuroimaging – Functional & Medico-Legal Insights - Translation of microstructural imaging findings into functional neurological interpretations. Reviewed region-specific tract disruption, network dysregulation (default-mode, salience, frontoparietal), and integration of neurocognitive testing. Discussed implications for prognosis, treatment selection, and legal documentation. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Digital Software Tools for Clinical Documentation & Diagnostic Enhancement - *Discussion of modern software-enabled documentation, diagnostic templating, automated annotation, dataset integration, and error-reduction strategies. Reviewed clinical workflow optimization, multi-modal information harmonization, and medico-legal implications of precision documentation.* National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Precision Calibration in Radiographic Measurement – Modern Digital Approaches - Detailed review of calibration science, geometric distortion modeling, magnification correction, parallax reduction, and calibration-marker methodology. Discussed measurement accuracy, reproducibility standards, cross-facility consistency, and calibration's role in

biomechanical interpretation and research validity. National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Panel: AI/ML in Spine Care – Emerging Opportunities & Limitations - *Multidisciplinary analysis of supervised/unsupervised learning models, predictive analytics, feature extraction, pattern recognition, dataset bias, and validation requirements. Reviewed clinical applications in triage, outcome prediction, and automated structural abnormality identification, along with regulatory and medico-legal considerations.* National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Consulting Services for Surgical Providers – Interpretation, Reporting & Payer Interactions - *Expanded lecture on advanced imaging correlation, mechanical threshold interpretation, surgical readiness assessment, preauthorization optimization, payer justification frameworks, and structured reporting that improves clarity and reduces denial rates. Highlighted medico-legal defensibility in surgical determinations.* National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Consulting Services for Non-Surgical Providers – Documentation, Trial Preparation & Impairment Review - *Detailed exploration of consulting value for conservative providers, including diagnostic enhancement, documentation precision, deposition preparation, trial communication, impairment rating methodology, and bridging the clinical-legal divide through objective biomechanical analysis.* National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Enhanced Medico-Legal Documentation Through Objective Findings & Coding Standards - *Highly detailed session on ICD/CPT precision, AMA impairment thresholds, anatomical correlation, and high-fidelity documentation structures. Reviewed the impact of incomplete documentation on payer disputes, legal outcomes, and clinical clarity, and provided best-practice strategies for defensible reporting.* National Spine Management Group, Medical Metrics Inc, Federation of Chiropractic Licensing Boards, PACE Program, 2025

Radiographic Detection of AOMSI in the Degenerated Spine: MRI Protocols, Segmental Instability, and Intervertebral Translation - *Advanced application of axial and sagittal MRI imaging protocols specifically aligned to the true disc plane for identification of alteration of motion segment integrity (AOMSI) in patients with degenerative disc disease. This course reviews ACR-compliant imaging sequences and emphasizes quantitative biomechanical analysis through measurements of intervertebral angular motion, anterior-posterior translation, and disc height variation across cervical, thoracic, and lumbar*

segments. Instruction includes threshold values for segmental translation (≥ 3.5 mm lumbar, ≥ 2.5 mm cervical), angular rotation parameters, and their legal-medical relevance. Integration with motion segment evaluation enhances diagnostic accuracy in trauma, degenerative pathology, and medicolegal casework. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025

Modic Endplate Changes as Predictive Markers of Segmental Instability and Biomechanical Dysfunction - *In-depth analysis of vertebral endplate signal alterations (Modic Types 1–3) and their clinical significance in evaluating segmental instability, axial low back pain, and surgical outcomes. Participants study the transformation of marrow composition from inflammatory edema (Type 1) to fatty degeneration (Type 2), and ultimately subchondral sclerosis (Type 3), with corresponding T1/T2 signal changes on MRI. Emphasis is placed on how Modic changes correlate with vertebral motion abnormalities, including sagittal translation, abnormal disc angulation, and spondylolisthesis patterns. The course provides evidence-based criteria for incorporating endplate pathology into differential diagnosis, surgical planning, and long-term spine stability assessment. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025*

Quantitative MRI-Based Grading of Lumbar Disc Degeneration with Integration of Spondylolisthesis and Segmental Alignment Metrics - *Structured instruction on application of the Pfirrmann grading system for lumbar disc degeneration using T2-weighted sagittal MRI. The grading system is contextualized within a framework of clinical radiology that includes assessment of disc hydration, nucleus-annulus distinction, and progressive disc space collapse. Curriculum expands to include analysis of vertebral alignment using Meyerding classification for spondylolisthesis, measurement of intersegmental disc angles, and detection of segmental kyphosis or hyperlordosis. Instruction also includes correlation with adjacent Modic changes, facet tropism, and ligamentous laxity, supporting a comprehensive biomechanical and diagnostic approach to spine pain evaluation. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025*

Advanced Imaging Analysis of Spinal Curvature, Endplate Morphology, and Angular Motion in Degenerative Spinal Disorders - *Comprehensive review of static and dynamic imaging protocols used to evaluate global and regional spinal biomechanics. Participants are trained in measuring cervical and lumbar lordosis using Cobb angle techniques, identifying segmental wedging through disc angle calculations, and recognizing early translational and rotational instability. MRI and radiographic criteria for evaluating vertebral endplate integrity, subchondral marrow changes, and osteophytosis are presented in the context of sagittal balance and degenerative cascade theory. Instruction emphasizes the clinical implications of these measurements in guiding treatment strategy, identifying surgical candidates, and establishing objective documentation in personal injury and chronic pain*

populations. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025

Lumbar Spine Instability and AOMSI: Clinical, Imaging, and Legal Perspectives -

Focused on the evaluation of lumbar spinal instability through the application of Alteration of Motion Segment Integrity (AOMSI). Emphasized biomechanical principles and radiographic criteria for identifying translational (>4.5 mm) and angular motion abnormalities ($>15^{\circ}$ – 25° , depending on segment) using flexion-extension radiographs. Included instruction on the use of these findings in accordance with the AMA Guides to the Evaluation of Permanent Impairment, 5th Edition (Range of Motion model) and 6th Edition (Diagnosis-Based Impairment model), with application to trauma documentation, impairment rating, and surgical triage. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025

Advanced Imaging and Biomechanical Principles of Lumbar AOMSI - *Addressed radiographic protocols for flexion-extension motion studies, measurement reproducibility, and standardization of lumbar instability thresholds. Included comprehensive review of key lumbar stabilizing ligaments (ALL, PLL, interspinous, supraspinous, ligamentum flavum, facet capsules) and their role in post-traumatic motion segment failure. Emphasized detection of overt instability and early translational micro-movements (≥ 1 mm), integrating clinical biomechanics with AMA Guides to the Evaluation of Permanent Impairment, 5th and 6th Editions. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025*

Medical-Legal Application of Lumbar AOMSI in Disability and Causation Analysis -

Provided training in interpretation and documentation of lumbar segmental instability for personal injury, workers' compensation, and disability claims. Included objective validation of motion abnormalities and application of radiographic findings to causation analysis, permanency evaluations, and impairment ratings under the AMA Guides to the Evaluation of Permanent Impairment, 5th and 6th Editions. Emphasized preparation of records and testimony meeting Frye and Daubert evidentiary standards. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025

Impairment Rating and Radiologic Interpretation of Lumbar Segmental Instability -

Provided instruction in the interpretation of functional radiographs and their integration into the impairment evaluation process. Emphasized application of translational and angular thresholds established in the AMA Guides to the Evaluation of Permanent Impairment, including the 5th Edition's Range of Motion model and the 6th Edition's Diagnosis-Based Impairment framework. Included literature review of cadaveric biomechanical studies by Yoganandan, Ivancic, and Chazal, and use of AOMSI findings in permanent impairment documentation, clinical triage, and medico-legal reporting. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025

Interprofessional Care Coordination of Concussion - *A comprehensive presentation integrating multidisciplinary insights was successfully completed, combining advanced scientific concepts with clinical applications in concussion diagnosis and management. Educational experience synthesized data from circulating biomarkers, genetic markers, and laboratory validation processes to foster a holistic understanding of the neurophysiological and molecular underpinnings of concussion. Curriculum utilized scientific rigor to delineate contributions of each component to evidence-based clinical decision-making and personalized patient care. Overall, the course enriched proficiency in incorporating sophisticated diagnostic strategies into clinical practice, thereby enhancing capacity to deliver optimized, patient-centered care.* National Spine Management Group 2025, Federation of Chiropractic Licensing Boards, PACE Program 2025.

Advanced Analysis of Circulating Biomarkers of Concussion - *Detailed outline providing a comprehensive review of circulating biomarkers in concussion. The course examined critical markers—including Glial Fibrillary Acidic Protein (GFAP), Ubiquitin C-terminal Hydrolase-L1 (UCH-L1), S100B, Tau Protein, and Neurofilament Light Chain (NFL)—with emphasis on cellular localization and roles in neuronal and glial injury. Training detailed temporal dynamics of biomarker release, analytical validity, and clinical utility in early diagnosis and patient monitoring. The program further explored integration of biomarker data into multimodal diagnostic frameworks to enhance precision in concussion management.* National Spine Management Group 2025, Federation of Chiropractic Licensing Boards, PACE Program 2025.

Genetic Profiles and Concussion Severity - *A comprehensive review focusing on genetic determinants influencing concussion outcomes, specifically examining APOE and MTHFR genes, was attended. Extensive review provided insight regarding APOE's function in lipid transport, neuronal repair, and synaptic plasticity, with emphasis on clinical implications of the $\epsilon 4$ allele in exacerbating neuroinflammatory responses. Seminar content also addressed MTHFR function in folate metabolism, impact on homocysteine regulation, and consequences of common polymorphisms on vascular and neural health. The genetic-focused curriculum underscored the importance of personalized medicine for optimizing therapeutic strategies in concussion care.* National Spine Management Group 2025, Federation of Chiropractic Licensing Boards, PACE Program 2025.

Laboratory Certifications and Testing Validity - *A detailed presentation on the validity of laboratory testing was completed, critically analyzing regulatory frameworks that ensure high-quality diagnostic assays. Extensive overview of the Clinical Laboratory Improvement Amendments (CLIA; 42 CFR 493) elucidated how federal standards guarantee accuracy, reliability, and timeliness of laboratory results. Additional oversight provided by the State of Texas was examined, emphasizing the complementarity of state-specific regulations with federal mandates. Rigorous accreditation processes administered by the College of American Pathologists (CAP) for Laboratory Developed Tests were detailed, ensuring that assays meet*

stringent analytical and clinical performance criteria. National Spine Management Group 2025, Federation of Chiropractic Licensing Boards, PACE Program 2025.

Cervical Impairment Rating – AMA Guides to the Evaluation of Permanent Impairment, 5th and 6th Editions – Spring 2025 - *Completed expert-level training in the diagnostic evaluation of Alteration of Motion Segment Integrity (AOMSI) in the cervical spine using AMA Guides (5th and 6th Editions). Emphasis was placed on the application of objective criteria including >3.5 mm of translational motion and >11° of angular rotation to identify functional segmental instability. The program detailed the biomechanical rationale for these thresholds and instructed on standardized methods for identifying ligamentous damage based on motion segment behavior. Proficiency was demonstrated in integrating radiographic findings into the impairment rating process and using motion analysis to support clinical and legal documentation. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025*

Cervical Impairment Rating – AMA Guides to the Evaluation of Permanent Impairment, 5th and 6th Editions – Spring 2025 - *Received advanced clinical instruction on cervical spine ligament biomechanics, with particular focus on diagnostic interpretation of motion-based instability. Training included radiographic recognition of ALL, PLL, interspinous, supraspinous, ligamentum flavum, and facet capsular ligament injury based on observed translation and angular abnormalities. Coursework emphasized differential diagnosis between structural instability and degenerative changes, and trained participants to correlate imaging findings with symptomatology and patient history. Gained working knowledge of using segmental instability findings to inform rehabilitation, surgical referral, and medico-legal reporting. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025*

Cervical Impairment Rating – AMA Guides to the Evaluation of Permanent Impairment, 5th and 6th Editions – Spring 2025 - *Participated in an intensive educational module addressing the legal, regulatory, and procedural implications of AOMSI analysis in trauma care. Learned how to apply objective measurements to support causation, permanency, and impairment in personal injury and workers' compensation cases. Instruction included strategies for achieving Frye admissibility of digital motion analysis tools, the legal standards for expert witness qualification, and the use of calibrated systems for forensic-level imaging evaluation. Participants were trained to construct defensible reports and testify to clinical findings with biomechanical validity, reinforcing their credibility in litigation settings. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025*

Cervical Impairment Rating – AMA Guides to the Evaluation of Permanent Impairment, 5th and 6th Editions – Spring 2025 - *Completed advanced instruction in the technical and clinical components of flexion-extension radiograph acquisition for AOMSI assessment. Focused on the avoidance of common errors such as poor patient effort, non-*

neutral positioning, and improper sagittal plane alignment. Emphasized the impact of these variables on the validity of diagnostic motion measurements and provided structured protocols for improving reproducibility and clarity in radiographic imaging. Gained hands-on guidance in instructing imaging facilities, refining standard operating procedures, and improving diagnostic yield for motion-based cervical spine pathology. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025

National Spine Management Conference - Spring 2025 - *an advanced course in Personal Injury Case Management, emphasizing patient intake standardization, lien negotiation strategies, billing compliance under PIP/MedPay frameworks, and risk management protocols. The training focused on optimizing communication with legal representatives, understanding state-specific prompt pay laws, and utilizing lien and letter of protection agreements to secure payment for services. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025.*

National Spine Management Conference - Spring 2025 - *coursework in MRI and disc pathology analysis in personal injury, covering the historical evolution of MRI, quality standards for imaging, application of Fardon classification for disc injuries, and causation documentation strategies. Evaluated acute versus chronic pathology on imaging and were trained in correlating MRI findings with clinical examination for legal defensibility. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025.*

National Spine Management Conference - Spring 2025 - *completed training on ligamentous injury assessment and impairment ratings based on the AMA Guides to the Evaluation of Permanent Impairment. Focus was placed on Alteration of Motion Segment Integrity (AOMSI) diagnosis through flexion-extension radiographs, validation of measurements via inter-rater reliability, reproducibility standards, and automation to ensure legal defensibility. The curriculum prepared providers to identify and document ligament instability with high evidentiary standards. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025.*

National Spine Management Conference - Spring 2025 - *advanced instruction in Biomarker and Genetic Profiling in Traumatic Brain Injury (TBI) assessment, including the clinical application of circulating protein biomarkers (GFAP, S-100B, UCH-L1, NF-H) and genetic risk profiling (ApoE, MTHFR). The course emphasized integrating biomarker results with clinical findings and neuroimaging to improve TBI diagnosis and prognosis, with a focus on medico-legal application. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025.*

National Spine Management Conference - Spring 2025 - *Completed technical course work on Deposition and Trial Testimony Preparation, addressing pre-litigation procedures,*

deposition defense strategies, and courtroom testimony practices for chiropractors. Emphasis was placed on narrative clarity, record review, understanding fact versus expert witness roles, and the strategic use of visuals to enhance testimony credibility. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025.

National Spine Management Conference - Spring 2025 - *Successfully completed coursework in Introduction to MRI Hardware and Imaging Physics, detailing the operation of B0 main magnetic fields, RF coils, gradient systems, and the Fourier transform's role in image reconstruction. Providers gained an understanding of MRI signal formation, the importance of field homogeneity, and the impact of imaging parameters on diagnostic accuracy. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025.*

National Spine Management Conference - Spring 2025 - *Completed detailed training in CT Imaging Principles for Spine Management, focusing on the Lambert-Beer Law, Radon transform, filtered back projection techniques, and Hounsfield Unit calibration. Instruction covered diagnostic applications in fracture and disc injury identification, artifact management, and strategies for minimizing radiation exposure under ALARA principles. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025.*

National Spine Management Conference - Spring 2025 - *Completed a specialized program in Clinical Documentation Strategies for Personal Injury Cases, including structured E/M SOAP notes, narrative report construction, impairment rating documentation, and causality statements. Providers were trained to align subjective complaints with objective findings and treatment plans, enhancing both clinical management and legal defensibility. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025.*

National Spine Management Conference - Spring 2025 - *Completed advanced coursework in Concussion Diagnosis and Management, with a focus on clinical symptom classification, Rivermead Post-Concussion Symptoms Questionnaire scoring, and integration of biomarkers for objective injury confirmation. Participants learned strategies for early identification and management of post-concussion syndrome and traumatic brain injuries. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025.*

National Spine Management Conference - Spring 2025 - *Successfully completed training on the Use of Circulating Biomarkers and Diffusion Tensor Imaging (DTI) in the Assessment of Mild Traumatic Brain Injury (mTBI), covering the interpretation of UCH-L1, GFAP, and S-100B results, and the application of DTI for microstructural brain injury visualization. Emphasis was placed on integrating blood biomarker analysis with neuroimaging findings for legal and clinical documentation. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025.*

National Spine Management Conference - Spring 2025 - Completed focused instruction on Concussion Subtypes, Clinical Categorization, and Personalized Care Pathway Development. Participants were trained to identify cognitive, vestibular, ocular, cervical, and mood/anxiety-related concussion presentations and design targeted treatment strategies based on symptomatology. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program 2025.

Courtroom Preparation: Communication and Professionalism in Testimony - Attended a targeted lecture on the importance of effective communication and professionalism during legal proceedings. The program focused on presenting complex medical information clearly, handling objections with composure, and aligning testimony with legal standards. Practical examples included cross-examination preparation, transcript review for consistency, and collaboration with attorneys to frame evidence effectively. This training emphasized the integration of medical knowledge with legal processes to enhance the impact and reliability of expert testimony. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2025.

Presentation Development: Effective CV Strategies in Legal Testimony - Participated in an intensive training on creating impactful CVs for medical-legal applications. The session highlighted essential elements of a strong CV, such as education, certifications, and prior testimony, ensuring alignment with legal standards like Rule 702 of the Federal Rules of Evidence. Instruction covered practical methods for streamlining direct examinations and addressing objections through pre-prepared documentation. The training underscored the importance of maintaining updated, organized CVs to showcase qualifications and strengthen courtroom credibility. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2025.

Advanced Training in Legal Testimony and Expert Qualifications - Completed specialized training on integrating advanced spinal diagnostics with legal testimony requirements. Emphasis was placed on bridging the gap between clinical care and expert analysis, including causation, prognosis, and future medical needs. Participants were instructed on meeting Rule 702 standards and ensuring credibility through clear communication and comprehensive documentation. This training has been instrumental in providing expert testimony with confidence and precision in complex legal settings. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2025.

Expert Testimony Training: Key Legal Concepts for Physicians in Personal Injury Cases - Completed a comprehensive course focusing on the roles and qualifications of medical professionals in personal injury litigation. This course emphasized the distinctions between treating physicians and medical experts, strategies for establishing expertise, and

overcoming legal objections to credibility. Detailed exploration of courtroom dynamics, jury evaluation, and the effective use of CVs to demonstrate professional qualifications was included. Practical applications for managing objections and leveraging transcripts to maintain consistency in testimony were also discussed. This training provided advanced strategies to enhance credibility and professionalism in medical-legal contexts. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2025.

Foundations of Clinical Judgment and Gestalt Reasoning- Participated in academic instruction on the principles of clinical gestalt, exploring how experienced clinicians synthesize intuition, pattern recognition, and patient context to make real-time decisions. Gained insight into how tacit knowledge and experiential learning contribute to rapid diagnostic formulation, especially in emergency and outpatient care environments. National Spine Management Group, Federation of Chiropractic Licensing Boards PACE, 2025.

Application of Diagnostic Sensitivity and Specificity- Completed coursework emphasizing the interpretation and application of diagnostic test characteristics, including sensitivity and specificity. Developed an understanding of how these metrics are used to guide screening and confirmatory strategies, and how to apply them in selecting appropriate diagnostic tools in various clinical scenarios. National Spine Management Group, Federation of Chiropractic Licensing Boards PACE, 2025.

Introduction to TBI Biomarkers and Advanced Neuroimaging- Studied the clinical utility of traumatic brain injury biomarkers (UCH-L1, GFAP, Neurofilaments, and S-100B) and their temporal profiles. Reviewed imaging techniques such as Diffusion Tensor Imaging (DTI) and their application in diagnosing and monitoring brain injury. Engaged in discussions based on content from the National Academies of Sciences Workshop proceedings on biomarker integration in TBI care. National Spine Management Group, Federation of Chiropractic Licensing Boards PACE, 2025.

Overview of FDA Regulatory Pathways and Laboratory Certification- Received instruction on FDA approval processes for medical devices, including 510(k), De Novo, and PMA pathways. Reviewed classification of medical devices by risk and studied key laboratory certification standards such as CLIA and ISO 13485. Developed foundational knowledge in the regulatory framework supporting safe and effective clinical innovation. National Spine Management Group, Federation of Chiropractic Licensing Boards PACE, 2025.

Developmental Spinal Stenosis and Spinal Trauma – Delivered a one-hour educational course examining the anatomical, clinical, and medicolegal implications of developmental spinal stenosis in the cervical spine, with a focus on its significance in personal injury litigation. The presentation provided an in-depth review of normal spinal canal dimensions, the anatomical boundaries of the cervical canal, and the pathophysiology of central canal

narrowing. Special attention was given to cases where intervertebral disc herniation contributes to symptomatic stenosis, particularly in individuals with pre-existing developmental narrowing. Discussed the role of advanced imaging modalities in assessing canal diameter, differentiating congenital predisposition from trauma-induced exacerbation, and supporting causation analysis in legal cases. Emphasized the importance of objective documentation in establishing the impact of spinal injuries on long-term function and prognosis, as well as its relevance in determining case valuation and settlement considerations. National Spine Management Group 2025, Federation of Chiropractic Licensing Boards, PACE Program 2025.

Advanced Diagnostic Interpretation: Thyroid Pathology and Empty Sella in MRI Spinal Imaging -*This course provided an in-depth review of incidental thyroid pathology identified on MRI, focusing on the appropriate follow-up for an enlarged thyroid. Participants analyzed the pathophysiology of thyroid enlargement, including benign and malignant differentials, and reviewed best practices for interdisciplinary communication. The course emphasized the role of ultrasound as the primary diagnostic modality, the indications for fine needle aspiration biopsy, and the interpretation of thyroid function tests. Through case-based discussions, attendees enhanced their ability to integrate incidental findings into comprehensive patient management, improving their diagnostic acumen and referral strategies in clinical practice. National Spine Management Group, Federation of Chiropractic Licensing Boards–2025.*

Interprofessional Spine Management Grand Rounds –Acute and Chronic Spinal Injury Superimposed on One Another - *This course provided healthcare providers with advanced imaging interpretation skills to differentiate traumatic from degenerative spinal injuries, particularly in motor vehicle collision cases. Participants developed expertise in utilizing imaging biomarkers, such as Modic changes and STIR sequences, to assess acute and chronic spinal pathology. The curriculum covered key distinctions between traumatic disc herniations and degenerative disc bulges, emphasizing the role of inflammation and tissue morphology in diagnostic accuracy. Clinicians gained proficiency in causation analysis by integrating imaging findings with clinical presentations, enhancing their ability to support injury claims with objective evidence. The course also included case-based learning to apply these principles in real-world scenarios. Completion of this program demonstrated a provider's commitment to evidence-based spinal injury assessment and improved patient outcomes through precise diagnostic differentiation. National Spine Management Group 2025, Federation of Chiropractic Licensing Boards, PACE Program 2025.*

Interprofessional Spine Management Grand Rounds –Thoracic Adjustment and Cervical Radiculopathy – *received advanced educational materials on cervical spine anatomy, neuroanatomy, and radiculopathy to practicing healthcare providers, focusing on the motor and sensory functions of cervical spinal nerves. Was presented with comprehensive white papers, quizzes, and instructional content that emphasized the clinical relevance of cervical nerve exit patterns, muscular innervation, and dermatomal sensory distributions in*

the upper extremities. Provided evidence-based insights on cervical radiculopathy, integrating pathophysiology, diagnostic strategies, and management approaches to enhance interprofessional understanding and patient outcomes. Discussed collaboration with multidisciplinary teams to ensure alignment of educational content with current best practices and emerging trends in spinal biomechanics and trauma management. Demonstrated expertise in translating complex anatomical and neurological concepts into actionable knowledge for improving patient care in the clinical setting. National Spine Management Group 2025, Federation of Chiropractic Licensing Boards, PACE Program 2025.

Biomechanical Analysis and Management of a Post-Motor Vehicle Collision Patient:

Participated in a case study focused on the evaluation and management of a patient involved in a motor vehicle collision on September 1, 2024. The patient, a belted driver, was rear-ended on the I-290 West, experiencing a rapid acceleration-deceleration mechanism that caused hyperextension and flexion of the cervical spine. Immediately following the impact, the patient reported neck, mid-back, and lower back pain. Initial management included over-the-counter medications, rest, and ice, with a follow-up appointment with their primary care physician on September 5, 2024. The patient presented with a prior posterior laminectomy and fusion C4-C7. The case incorporated advanced biomechanical principles and finite element modeling (FEM) to assess the cervical spine's response to whiplash forces, as described in the provided research. FEM simulations quantified spinal stress distribution and highlighted potential areas of adjacent segment degeneration (ASD) due to the sudden impact. Emphasis was placed on restoring proper biomechanics through a combination of spinal adjustments, postural correction, and rehabilitative exercises, leveraging insights from finite element analysis to guide care. Management strategies focused on addressing persistent symptoms through targeted interventions, including neuromuscular re-education, to reduce biomechanical stress on the cervical spine and adjacent structures. The integration of patient-specific modeling, derived from imaging data, supported personalized care planning and highlighted the value of finite element analysis in predicting long-term outcomes for whiplash-associated disorders. National Spine Management Group 2025, Federation of Chiropractic Licensing Boards, PACE Program 2025.

Interprofessional Spine Management Grand Rounds – L4-5 Synovial Cyst and Failure to be Aspirated -

Interprofessional Spine Care Review focused on lumbar synovial cysts, encompassing etiology, diagnosis, and management strategies. Acquired advanced knowledge of imaging modalities, particularly the use of MRI for diagnosing spinal pathologies such as synovial and ganglion cysts, and their differentiation based on histological and clinical criteria using T1, T2 and STIR imaging sequences in both the sagittal and axial plane. Gained expertise in conservative and surgical treatment options for lumbar spine conditions, emphasizing the role of facet joint degeneration and mechanical instability in cyst development. Enhanced understanding of biomechanical instability and its implications in degenerative spinal disorders through review of clinical case studies and white papers. Applied insights into clinical decision-making for non-surgical interventions, including the utility and limitations of epidural steroid injections and cyst aspirations within the context of both the Pfirrmann scale for intervertebral disc degeneration and the Fujiwara scale for facet degeneration. Strengthened collaborative

skills for multidisciplinary patient management, integrating knowledge from chiropractic care, radiology, and surgical perspectives to optimize outcomes for individuals with complex spine conditions. National Spine Management Group 2025, Federation of Chiropractic Licensing Boards, PACE Program 2025.

MRI Sequences for Acute Spinal Fractures: A Reference for Chiropractic Physicians

- highlighting optimal imaging protocols for accurate diagnosis and management of spinal injuries. Presented an in-depth case study involving a missed T2 spinal compression fracture in a patient with complex medical history, including a rear-end motor vehicle collision on October 17, 2024. The patient presented with severe spinal pain, persistent head and neck symptoms, and an unrelated diagnosis of hydrocephalus. The study emphasized the critical role of advanced imaging sequences, including T2-Weighted, STIR, and post-contrast imaging, in detecting acute spinal fractures and guiding interprofessional care pathways. National Spine Management Group 2025, Federation of Chiropractic Licensing Boards, PACE Program 2025.

Understanding No-Fault vs. Tort Systems in Personal Injury Law *This course provided an overview of the foundational differences between no-fault and tort systems in personal injury law. Learners reviewed the roles of Personal Injury Protection (PIP) and liability insurance in each system and discussed the impact of legal frameworks on claim resolution. The program presented scenarios illustrating the serious injury threshold and limitations on non-economic damage claims. Participants explored comparative examples from states like New York, Florida, and Texas. Key legal principles and practical implications were analyzed to foster deeper comprehension of legal processes and their effects on injured parties. The course concluded with a discussion of litigation risks and strategic considerations for attorneys and insurance adjusters. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2025.*

Advanced Documentation Techniques for Traffic-Related Injuries *This program reviewed medicolegal documentation requirements for injuries caused by traffic accidents. Participants were introduced to the importance of recording both external and internal injuries with precision to support accident reconstruction and legal proceedings. The course discussed methodologies for documenting typical injuries based on their mechanisms and severity, including the use of the Abbreviated Injury Scale (AIS) and AO fracture classifications. Participants analyzed case studies to evaluate documentation practices and their role in litigation outcomes. Additional topics included forensic photography, injury diagrams, and the ethical responsibilities of medical practitioners. The session emphasized the intersection of clinical expertise and legal evidence requirements. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2025.*

Exploring Deposition Strategies in Personal Injury Cases *This course provided a comprehensive overview of depositions as a pivotal element of the discovery process in personal injury litigation. Participants discussed the structure and function of depositions, including their role in fact-finding, preserving testimony, and shaping litigation boundaries. The curriculum reviewed techniques for questioning witnesses, assessing credibility, and uncovering new*

evidence. Real-world examples illustrated how depositions influence settlement strategies and trial preparation. The session highlighted the interplay between deposition records and courtroom testimony, emphasizing the importance of consistency and strategic communication. Practical exercises included drafting deposition questions and analyzing transcripts. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2025.

Personal Injury Protection (PIP): State-Specific Requirements and Legal Implications *This course offered an in-depth review of PIP insurance regulations across various states, focusing on the financial and legal nuances of no-fault systems. Participants explored mandatory and optional coverage levels, subrogation rights, and the interaction between PIP and health insurance. The curriculum highlighted significant differences in coverage requirements between states like Michigan, New York, and Florida. Case studies presented challenges in coordinating benefits and navigating waiver options. Learners reviewed the legal mechanisms of subrogation and discussed how PIP impacts settlement negotiations and claimant recovery strategies. National Spine Management Group, Federation of Chiropractic Licensing Boards, PACE Program, 2025.*

Interprofessional Spine Care Review: Chiropractic Management of Ankylosing Spondylitis – *This comprehensive course provided an in-depth examination of the interprofessional management of Ankylosing Spondylitis (AS), focusing on both diagnostic and therapeutic strategies. The course was structured around a detailed case study of a patient presenting with low back pain (LBP) flare-ups, with radiation, offering practical insights into the complexities of managing AS in a clinical setting. Key components of the course included the interpretation of clinical presentations, such as LBP associated with radiating pain, and the use of specific lab tests to confirm the diagnosis of AS, notably the HLA-B27 test. Participants reviewed the initial treatment plans, which included pharmacological interventions and the timing of advanced imaging modalities like MRI to assess disease progression. The course also covered the importance of early referral to rheumatology for comprehensive management, particularly in cases where standard chiropractic care may need to be supplemented with specialized medical intervention. The course also provided an in-depth review of radiographic findings, specifically the identification of mild bone spurring and narrowed sacroiliac joints on lumbar spine X-rays, which are indicative of AS. Orthopedic evaluations, including the interpretation of positive Straight Leg Raise and FABER tests, were emphasized to correlate clinical findings with radiographic evidence. Emphasis was placed on the ability to work within an interprofessional team to develop and implement evidence-based treatment strategies for patients with AS. This included understanding the nuances of when to transition from conservative care to specialized medical treatment, thereby improving patient outcomes. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.*

Interprofessional Spine Care Review: Objectifying Spinal Ligament Injury - *This course provided an extensive exploration of ligament laxity following traumatic injury, with a focus on objectifying these findings through advanced imaging and clinical evaluation. Through a detailed case study of a 25-year-old female patient involved in a motor vehicle collision (MVC), the course delved into the complexities of diagnosing and managing ligamentous injuries in the*

cervical and lumbar spine. Participants were guided through the initial diagnostic process, which included assessing cervical and lumbar spine integrity through MRI and Clinical Radiographic Measurement Analysis (CRMA). The cervical MRI revealed small disc herniations at multiple levels (C3-C4, C4-C5, and C6-C7), while the lumbar MRI highlighted an often-overlooked finding: prominent fluid at the L4-L5 interspinous region, suggestive of an interspinous ligament tear. The course emphasized the importance of CRMA in detecting significant translational and angular motions in the cervical spine, particularly at C2-C3, and discussed the implications of these findings for diagnosing Alteration of Motion Segment Integrity (AOMSI). The lumbar spine was also evaluated using CRMA, which identified significant translational motion at certain levels that did not meet the thresholds for AOMSI. The focus was on understanding of the biomechanical implications of ligament laxity and the critical role of imaging in objectifying these injuries. The course also reinforced the importance of integrating clinical findings with imaging results to develop comprehensive, evidence-based treatment plans for patients with traumatic spine injuries. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

Interprofessional Spine Care Review: Chiropractic Management Post Hip Surgery - This advanced course provided a thorough exploration of spine management through the detailed examination of two complex clinical cases. The course focused on the diagnosis, treatment, and interprofessional management of patients with significant spinal pathologies, emphasizing the importance of a multidisciplinary approach in optimizing patient outcomes. In the first case, the course covered the evaluation of a patient who sustained an injury from a motor vehicle collision. The course emphasized the diagnostic process, which included identifying a reversal of the usual lordotic curvature on cervical MRI, a key indicator of spinal trauma. Participants were guided through the treatment options, highlighting the role of imaging and clinical correlation in developing an effective management plan. The second case study involved a 75-year-old female patient with chronic low back pain and radicular symptoms following a laminectomy with L4-5 fusion. The course provided a comprehensive review of her long-term management, which included multiple imaging studies, conservative treatments such as medication and aquatic therapy, and surgical interventions. Particular attention was given to the challenges of managing spondylolisthesis and severe stenosis, as well as the right hip replacement that alleviated her lumbar spine pain. Through these case studies, the course reinforced the importance of integrating clinical findings, imaging results, and interprofessional collaboration in the management of complex spine conditions. Participants gained valuable insights into the decision-making process for both conservative and surgical treatments, as well as the critical role of ongoing patient monitoring and adjustment of care plans. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

Interprofessional Spine Care Review: Chiropractic Post Arthroplasty and Upper Cervical Dysfunction - This course provided an in-depth exploration of the diagnosis and management of complex upper cervical dysfunctions in the context of multiple traumas. It focused on a challenging case involving a female patient with a history of multiple traumatic injuries, including three unconscious concussions, left carotid artery dissection, a cerebral aneurysm, and a fractured tailbone, compounded by systemic conditions such as POTS (Postural Orthostatic Tachycardia Syndrome), dysautonomia, Reynaud's phenomenon, and severe allergies. This case

study highlighted the intersection of chronic pain, neurological deficits, and systemic dysregulation. The patient's clinical presentation included significant upper cervical and lumbar spine dysfunctions, characterized by severe limitations in range of motion, positive orthopedic tests, and significant muscle strength deficits. The course also covered the impact of these dysfunctions on the patient's autonomic nervous system, contributing to her POTS and exacerbating symptoms like dizziness during physical examinations. Imaging studies, including cervical and lumbar MRIs, were used to further delineate the extent of the structural damage and inform the treatment strategy. The course emphasized the importance of a multidisciplinary approach, incorporating chiropractic care, neurological evaluation, and specialized imaging to accurately diagnose and treat upper cervical dysfunction in the context of multiple trauma. Participants learned to navigate the complexities of managing patients with intricate medical histories and multisystem involvement, improving their ability to deliver comprehensive, patient-centered care. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

Interprofessional Spine Care Review: Cervical Cord Compression and Negative Pathological Reflexes – review of a patient presenting with clinical symptoms suggestive of cervical myelopathy, a condition that often manifests with neurological deficits due to spinal cord compression. Physical examination was notable for the absence of pathological reflexes, which typically serve as key indicators of myelopathy, adding a layer of complexity to the diagnosis. MRI imaging, including T1, T2, and STIR sequences, revealed significant cervical cord compression. The compression was primarily due to disc protrusion at specific vertebral levels, leading to central spinal canal stenosis. Discussion of signal changes appearing as areas of hyperintensity within the spinal cord, reflecting the presence of edema or myelomalacia—both of which suggest ongoing spinal cord injury. The T1-weighted images provided further detail on the structural integrity of the spinal cord and the surrounding vertebrae, while the STIR sequences, known for their sensitivity to fluid, highlighted areas of inflammation and edema within the spinal cord and adjacent soft tissues. Despite these significant imaging findings, the lack of pathological reflexes such as Babinski or Hoffman's signs posed a diagnostic challenge. Pathological reflexes are often considered hallmark signs of upper motor neuron lesions, and their absence can complicate the clinical picture, potentially leading to underestimation of the severity of the cord involvement. This case underscores the critical importance of integrating both clinical findings and detailed imaging studies in the assessment of cervical myelopathy. The discordance between the imaging evidence of significant spinal cord compression and the absence of expected reflex abnormalities highlights the need for a comprehensive and nuanced approach to diagnosis and management. The course emphasized that the absence of pathological reflexes should not discount the diagnosis of cervical myelopathy, especially when imaging findings clearly demonstrate cord compression and signal changes. Clinicians must remain vigilant and consider the full spectrum of clinical and imaging data to accurately assess the severity of cervical cord involvement and to formulate an appropriate management strategy, which may include conservative treatment, surgical intervention, or a combination of both, depending on the overall clinical context. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

Interprofessional Spine Care Review: Spine Pain and Modic Changes – a comprehensive review of a complex clinical case involving Modic changes in a 28-year-old female patient, who presented with significant spinal symptoms. Modic changes refer to pathological changes in the vertebral endplates and adjacent bone marrow, which can be detected on MRI and are classified into three types, each with distinct imaging characteristics and clinical implications. The course covered advanced diagnostic approaches, emphasizing the interpretation of x-rays and MRIs to identify and differentiate between Modic Type 1, Type 2, and Type 3 changes. Modic Type 1 is characterized by bone marrow edema and inflammation. It appears as low signal intensity on T1-weighted images and high signal intensity on T2-weighted images. On STIR (Short Tau Inversion Recovery) sequences, Modic Type 1 changes are typically hyperintense, indicating active inflammation. Clinically, this type is often associated with pain and may represent an acute or active degenerative process. Modic Type 2 represents fatty degeneration of the bone marrow. On MRI, Modic Type 2 changes appear as high signal intensity on both T1 and T2-weighted images. These changes suggest a chronic, stable process, where inflammation has subsided, and fat has replaced the bone marrow. Modic Type 3 is characterized by sclerosis or hardening of the bone. It appears as low signal intensity on both T1 and T2-weighted images. Modic Type 3 changes are indicative of an advanced, chronic stage of degeneration and are often associated with less pain, but more structural rigidity. The course explored various therapeutic interventions tailored to the patient's specific Modic changes, including chiropractic adjustments and ancillary therapies like physical therapy and anti-inflammatory treatments. The therapeutic approach was adapted as the patient's condition evolved, reflecting the importance of ongoing assessment and flexibility in treatment planning. A critical evaluation of the clinical outcomes was conducted, analyzing the patient's progress and setbacks over the course of treatment. This evaluation provided valuable insights into the effectiveness of different treatment strategies and highlighted the importance of adapting care plans based on patient response to optimize long-term outcomes. Content provided a deeper understanding of Modic changes and their impact on spinal health, enhancing their expertise in managing challenging spine cases within an interprofessional healthcare framework. The course emphasized the need for precise imaging interpretation and a nuanced approach to patient care, ultimately improving the ability to achieve better clinical outcomes for patients with Modic-related spinal conditions. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

Interprofessional Spine Care Review: Chiropractic Post Cervical and Lumbar Surgery – This course offered an in-depth exploration of effective communication strategies and patient navigation in the management of complex spine cases, with a particular focus on surgical interventions. Through the case review of a 60-year-old female patient with chronic neck and lower back pain, the course examined the impact of her extensive medical history, including her daily medication regimen and previous spine surgeries, on her current condition. Specific spine surgical techniques, such as cervical fusion, laminectomy with fusion, and minimally invasive decompression, were critically reviewed in the context of their long-term efficacy and impact on patient outcomes. The course emphasized the importance of interprofessional collaboration in managing such complex cases, underscoring the need for seamless communication among healthcare providers to optimize patient care. By focusing on the enhancement of clinical skills, participants learned to guide patients more effectively through their treatment journeys, ensuring

that care plans are tailored to individual needs and that all aspects of the patient's condition are considered. In addition to surgical technique review, the course highlighted strategies for improving patient-centered care, particularly in the post-operative period, where coordination between surgeons, chiropractors, physical therapists, and other healthcare professionals is crucial for improving functional outcomes. This comprehensive approach ensured that participants were well-equipped to manage the intricacies of spine care, from pre-operative planning through to post-operative recovery, enhancing their ability to deliver high-quality, coordinated care. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

Interprofessional Spine Care Review: ABCDE of MRI Spine Interpretation – *This course offered a comprehensive and detailed exploration of the ABCDE method, a systematic approach to interpreting spinal MRI scans that is critical for improving diagnostic accuracy in spine care. The method is structured around five key components, Alignment, Bone, Cord, Disc, and Everything else, each representing an essential aspect of spinal health that must be carefully evaluated in every MRI study. Alignment focuses on assessing the overall spinal curvature and alignment, identifying abnormalities such as scoliosis, kyphosis, or lordosis, which can have significant implications for both diagnosis and treatment planning. The Bone component involves a detailed examination of vertebral bone integrity, including the detection of fractures, bone density variations, and the presence of osteophytes, which are crucial for understanding the structural stability of the spine. The Cord aspect emphasizes the condition of the spinal cord, including the identification of cord compression, signal changes on T2-weighted images that might indicate myelopathy, and the evaluation of any other abnormalities such as syringomyelia or intramedullary lesions. Disc evaluation centers on the intervertebral discs, focusing on disc height, the presence of disc bulges or herniations, and the integrity of the annulus fibrosus, all of which are vital for diagnosing conditions like disc degeneration or radiculopathy. Everything else encompasses additional factors that could influence spinal health, such as the condition of the endplates, presence of Modic changes, the degree of spinal canal stenosis, ligamentous integrity, and the presence of soft tissue abnormalities or edema. This component ensures that no potential pathology is overlooked. By deepening their expertise in MRI interpretation, participants became more proficient in making accurate diagnoses and developing effective treatment plans tailored to individual patient needs. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.*

Interprofessional Spine Care Review: MRI and Axial Spinal Anatomy – Cervical and Lumbar Spine - *This course provided an in-depth exploration of axial MRI anatomy specific to the cervical spine, an essential area of expertise for healthcare professionals involved in spine care. Through detailed analysis and case studies, participants gained a comprehensive understanding of the axial plane imaging of cervical spine structures, including the vertebrae, intervertebral discs, spinal cord, and surrounding soft tissues. In addition to these critical spinal components, the course also focused on the interpretation of axial MRI scans that reveal important adjacent structures such as the paraspinal muscles, vascular structures like the vertebral arteries, and internal organs visible within the axial plane. The course covered the identification and implications of seeing structures such as the esophagus, trachea, and thyroid gland, which may be incidentally observed on cervical spine MRIs and could have clinical*

significance. *Emphasis was placed on the importance of accurately interpreting these axial MRI scans to diagnose a wide range of cervical spine conditions, including disc herniations, spinal stenosis, and other pathologies that can significantly impact patient management and treatment outcomes. Participants were trained to assess not only the direct spinal structures but also the condition of nearby muscles, which can reflect compensatory changes due to chronic pain or injury. The recognition of altered muscle mass or signal changes can provide additional clues to the patient's overall spinal health and guide therapeutic decisions.*., Participants enhanced their diagnostic precision, particularly in identifying subtle yet clinically relevant findings that could influence the treatment plan. This comprehensive approach to axial MRI interpretation not only improved participants' technical skills but also their ability to collaborate effectively in interprofessional care settings, ensuring that all relevant aspects of a patient's condition are considered in their care. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

Interprofessional Spine Care Review: Acute vs Chronic Nerve Injury - a detailed case study focusing on the differential diagnosis and management of acute versus chronic nerve injuries in the lumbar spine was presented. *The course provided an in-depth review of diagnostic tools, including the interpretation of motor strength assessments, MRI findings, and advanced electrophysiological testing such as electromyography (EMG) and nerve conduction velocity (NCV) studies. The course placed specific emphasis on the use of EMG to assess muscle denervation, reinnervation patterns, and the chronicity of nerve injuries. Participants learned to analyze key EMG parameters such as insertional activity, spontaneous potentials like fibrillations and positive sharp waves, and motor unit action potentials (MUAPs). These parameters are crucial for determining the extent of nerve damage, the age of the injury, and whether the nerve is undergoing reinnervation. The presence of fibrillations and positive sharp waves, for instance, indicates ongoing denervation, while changes in MUAPs can reveal the degree of reinnervation and the chronicity of the lesion. The H-Reflex study, a critical component in evaluating S1 radiculopathy, was also covered extensively. This technique involves stimulating the tibial nerve at the popliteal fossa and recording the reflex response from the soleus muscle. The course detailed how specific parameters such as latency (the time it takes for the reflex to occur), amplitude (the strength of the reflex), and side-to-side comparison of the H-Reflex are utilized to assess the integrity of the S1 nerve root. These measurements are instrumental in differentiating between acute and chronic lesions, as delays in latency and reductions in amplitude can indicate the presence of a chronic radiculopathy. Moreover, the course emphasized the importance of correlating these electrophysiological findings with clinical assessments and MRI results. MRI imaging was particularly valuable in visualizing the anatomical causes of nerve compression, such as disc herniation, spinal stenosis, or foraminal narrowing. Participants were trained to integrate these findings into a comprehensive diagnostic framework that informs targeted, evidence-based treatment plans.* Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – Reading MRIs - a standardized approach – in-depth review of the basic methods used to read an MRI study of the cervical and lumbar spines. *This basic systematic approach covers the ABCDEs of MRI interpretation which includes Alignment, Boney anatomy, spinal Cord,*

intervertebral Disc and Everything else. Additional focus was given to the spinal ligamentous structures including ligamentum flavum, interspinous ligament, supraspinous ligament and facet capsule. Detailed review of the T1, T2 and STIR sagittal and axial views was presented. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards – PACE - 2024

Interprofessional Spine Care Review: Enhancing Communication and Patient Navigation –

A comprehensive review of a clinical case involving a patient with acute lower back pain was conducted. The discussion included an in-depth analysis of T1, T2, and STIR MRI sequences of the lumbar spine. Detailed findings from the imaging studies were presented, highlighting the presence of a hemangioma and a Tarlov cyst. Additionally, Modic type 1 and type 2 changes at the intervertebral endplate were noted, along with intervertebral disc extrusion. The case discussion emphasized the importance of accurately diagnosing and managing the condition, particularly focusing on identifying the pain-generating structures. This approach ensures a targeted and effective treatment plan. Furthermore, the presentation outlined the significant benefits of clinical care coordination with community medical providers, underscoring the importance of a multidisciplinary approach in managing complex cases of lower back pain. The integration of various healthcare professionals is essential for optimizing patient outcomes and providing comprehensive care. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

Next-Gen Diagnostics: The Frontier of AI in Advanced Imaging - an in-depth understanding of the latest advancements in AI applications within medical imaging. Exploration of state-of-the-art diagnostic tools, engaged with AI technologies that enhance image precision, and analyzed the integration of these innovations into clinical practice. *Outline of the techniques for interpreting AI-assisted imaging results were discussed, contributing to improved diagnostic accuracy and patient outcomes over time. Appreciation for the ethical implications of AI in healthcare, preparing participants to responsibly implement next-generation diagnostic technologies was reviewed. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.*

Mastering Big Data in Healthcare: The Key to Unlocking Value and Innovation – participants were equipped with the skills to understand how big data will be harnessed in the medical field. Participants delved into methodologies for collecting, analyzing, and interpreting large datasets to drive innovation and enhance value in healthcare services. *They emerged with a proficiency in the basic understanding of big data to inform clinical decision-making, improve patient outcomes, and streamline operational efficiencies. The curriculum also covered ethical considerations and compliance with basic healthcare data regulations, ensuring that attendees have a basic understanding of the complexities of data privacy and security within a professional practice. Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.*

Revolutionizing Medical Records: AI-Enhanced Documentation from Conversations - participants were provided with comprehensive insights into the

utilization of AI for the transformation of patient-provider conversations into accurate medical records. *Attendees gained proficiency in advanced documentation tools that leverage AI to streamline the data capture process, enhance record accuracy, and improve overall clinical efficiency. The course emphasized practical applications, ensuring participants understand the processes of integrating these AI solutions into their clinical practice, thereby elevating the standard of patient care, and safeguarding meticulous medical record-keeping.* Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

Artificial Intelligence in Healthcare: Clinical and Administrative Advancements - the transformative role of AI in modernizing patient care, clinical decision-making, and healthcare administration was explored. *An in-depth look at how AI enhances operational efficiencies, alleviates the administrative load on healthcare practitioners, and provides critical analysis of vast data streams for improved diagnostic and management outcomes was presented. Implications of rapid growth in life science research and the integration of these findings into practice was outlined. Critical discussions included navigating the challenges of data privacy and the ethical deployment of AI technologies, aiming to equip healthcare professionals with the skills needed to lead in a progressively AI-driven healthcare environment.* Federation of Chiropractic Licensing Boards, PACE; National Spine Management Group, 2024.

Clinical Grand Rounds - Vision 2033: Navigating Tomorrow's Healthcare Landscape - Delivered a dynamic and forward-thinking presentation on the anticipated evolution of the healthcare sector by 2033. *Explored emerging trends, technological advancements, and societal shifts set to redefine healthcare delivery and patient outcomes. Emphasized the integration of artificial intelligence (AI) and its transformative impact on healthcare practices, including AI-driven diagnostics, personalized treatment modalities, and predictive analytics. Equipped attendees with strategic insights to anticipate and navigate future challenges and opportunities in the rapidly evolving healthcare landscape.* National Spine Management Group, Federation of Chiropractic Licensing Boards PACE, 2024.

Required Elements for 100% Reimbursement, Diagnosing Active, Sequella, and Subsequent encounter codes for connective tissue pathology. *The documentation elements required for 99202, 99203, 99204, and 99205. Developing ethical financial relationships for reimbursement in the medical-legal community and the documentation required. Using laws, regulations, and case law in contemporary practice to manage cases.* Academy of Chiropractic Post-Doctoral Division, PACE Approved for The Federation of Chiropractic Licensing Boards, Long Island, NY, 2024.

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – Histochemical and Traumatic Causes of Degenerative Disc Disease - Detailed review of the tenants of degenerative disc disease in the human spine. *A review of metabolic factors including bone and cartilage remodeling, lipid metabolism and oxidative stress within the disc was presented. Outline of adverse biomechanical factors including levels of modic changes, reaction to microtrauma and responses to increased mechanical stresses due to loss of sagittal and coronal spinal balance. Discussion reviewing biochemical factors such as innate and*

adaptive immunity, inflammation and low-grade discitis were presented. Emphasis was placed on individual risk factors such as smoking and weight gain. Genetic factors were discussed and correlated to environmental risk factors for degenerative disc disease. 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

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – Interprofessional Care with the Primary Care Physician – *detailed overview of the needs of the primary care physician and the diagnosis and management of mechanical spine pain. Discussion of peer-reviewed medically indexed research studies supporting chiropractic in the pain management phase of care is presented. Specific statistics in the reduction of opioid prescription refills particularly in older and injured patients were presented. Complaint reporting and consistent communication was outlined and reviewed with particular emphasis on clinical workflows within the practice environment.* 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

Spinal Biomechanics and Anatomical Pathology Grand Rounds. *The diagnosis of acute and chronic spinal ligament laxity and spinal joint instability was discussed along with the application to spine surgical planning and pain management procedures.* PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2023

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – Lumbar Kyphosis Post Multi-Level Fusion – *detailed review of a case of impaired spinal biomechanics post lumbar fusion. Discussion related to a multi-level lumbar spina fusion in a 65-year-old female patient and residual lower extremity radiculopathy was presented. Analysis of influence of right sided knee replacement and subsequent right sided neuropathy post-surgery was outlined. Progression of spinal symptoms cranially to include neck pain and bilateral hand paresthesia was discussed. Detailed review of upper and lower extremity EMG/NCV findings, lumbar MRI, cervical MRI and plain film radiographs were presented. Clinical correlation to anatomical versus biomechanical causes of extremity paresthesia was discussed with detailed analysis of lumbar neuroforamen and pelvic incidence. Spinal compensation in the cervical spine related to lumbar biomechanical pathology was 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 – 2023

Spinal Biomechanics and Anatomical Pathology Grand Rounds, *Medical-legal reporting of diagnosis of acute versus chronic disc and ligament injury and the tools necessary for accurate diagnosis, prognosis, exacerbation, or aggravation. How to build a reputation for ethical and accurate medical legal reporting was also reviewed.* PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2023

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – *Diagnosis and Referral of Cauda Equina Syndrome* – detailed overview of the anatomy of the lumbar spine and surrounding neurological systems was presented and outlined. Clinical symptoms and risks of clinical progress were discussed. Upper vs lower motor neuron lesions were reviewed and correlated to cauda equina syndrome. The difference between suspected and confirmed cauda equina syndrome was detailed and explained. Emphasis was placed on early intervention and emergency surgical referral in patients with cauda equina syndrome. 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

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – *Vertebral Artery Anatomy and Pathologic Injury* – in-depth review of the anatomical course of the vertebral artery in the cervical spine with specific emphasis on the V1, V2, V3 and V4 segments and their anatomic boundaries. Specific epidemiology of Cervical Artery Dissection (CAD) was presented and outlined. Risk factors for CAD such as atherosclerosis, inflammation, and genetic tissue disorders such as Marfans and Ehlers-Danlos Syndromes were detailed. Clinical symptoms of CAD were presented such as Horner's Syndrome, cerebral ischemia, vertigo, and nausea were presented. Detailed review of hemodynamic versus thromboembolic causes of ischemia post CAD were 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

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – *Magnetic Resonance Imaging of the Enthesis* – detailed presentation on magnetic resonance imaging of the enthesis. Description of the function of the enthesis ranges of ligaments and tendons and the lack of conventional MRI protocols to properly visualize them was presented. Review of tissues that are MRI visible and those that are MRI invisible was outlined. Parameters of MRI visible tissue that have short T2s and rapid MR signal decay were detailed. Tendons and ligaments with T2s of 4-10 ms were outlined as being able to be distinguished only with short TE gradient echo sequences and the requirement of tissues with T2s of .5-2ms and less than 100us requiring UTE sequences. 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

Spinal Biomechanics and Anatomical Pathology Grand Rounds. The concept of whole person impairment was reviewed. The utilization of the AMA Guides to Permanent Impairment and how to accurately determine the appropriate percentage was also reviewed. A comparison of the 5th and 6th edition of the AMA guides was reviewed. PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2023

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – *Biomechanical Changes and Degenerative Disc Disease* – *detailed presentation on the biomechanical effects of intervertebral disc degeneration on the human cervical spine. Review of relevant anatomy including vertebral bodies, healthy intervertebral disc, degenerative intervertebral disc, spinal nerves, spinal cord, spinal ligaments, and facet joints was outlined. Structural changes were correlated to biomechanical alterations with a detailed focus on the C5-6 segment of the spine. Aberrant facet joint loading was discussed and correlated to intervertebral disc disease and alternations in normal motion and acceleration of spinal arthritis.* 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

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series - *Medical Legal Opinions – evidence-based workflows* – *a detailed review of the process to effectively render a medical legal opinion on the causality, bodily injury and persistent functional loss of a traumatically injured spine patient. Focus was on clinical correlation of the mechanism of action, patient history, physical examination, imaging films/studies and persistent functional loss. Emphasis was placed on interprofessional communication and differentially diagnosis pre-existing conditions versus those that are acutely present post injury. Segmental spinal analysis of intervertebral disc and arthritic pathology was 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 – 2023

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – *Characteristics of TMJ disc, meniscus and IVD tissue* – *a comprehensive review of the common histological characteristics in the temporomandibular disc, meniscus and intervertebral disc was presented. A particular perspective on tissue engineering was provided with emphasis on biomechanical properties. Overview of cell sources, scaffolding and stimuli was presented in the context of tissue engineering and therapeutic approaches to degeneration in those particular tissues. Focus was on similarity and differences between these fibrocartilage discs in terms of their similarities and their differences.* 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

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – *Risk Factors for Intervertebral Disc Pathology* – *a comprehensive review of the risk factors associated with intervertebral disc pathology. Detailed focus on acute versus chronic injury as well as genetic and environmental factors on intervertebral disc pathology was presented. Review of the classical theory of aging and progressive wear and tear was outlined and contrasted to acute traumatic injury. Intervertebral disc anatomy was reviewed and correlated to MRI based grading systems for degenerative intervertebral disc disease. Proper*

interprofessional communication to both the medical and legal professions was emphasized with a focus on known scientific analysis. 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

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – *Magnetic Resonance Imaging Diagnosis of Demyelinating Diseases* – *detailed review of the most common demyelinating diseases including multiple sclerosis, neuromyelitis optica spectrum disorder (NMOSD), acute disseminated encephalomyelitis (ADEM) and myelin oligodendrocyte glycoprotein (MOG) encephalomyelitis was presented. Specific findings on advanced imaging such as MRI were presented to ensure a timely and accurate diagnosis. MRI roles including diagnosis, imaging biomarkers and the monitoring of pharmacological side-effects were listed and discussed. Characteristic lesions of demyelinating disease were presented and listed in detail with a specific focus on the T1, T2 weighted images and sagittal FLAIR was 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 – 2023*

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – *Pathophysiology of Intradural Extramedullary Spinal Cord Tumors* – *common intradural extramedullary tumors were reviewed including meningioma, schwannoma and their association with neurofibromatosis. Specific characteristics, locations and symptomatic pain patterns were presented. Correlation of symptom manifestation with imaging characteristics was detailed and emphasized. MRI findings reviewed included T1 and T2 weighted images. Interprofessional communication was emphasized particularly with the primary care physician and spine surgeon. Emphasis was placed on schwannoma and radiculopathic symptoms due to dorsal sensory nerve involvement. Additional tumor types such as myxopapillary ependymoma and paraganglioma were outlined with specific attention paid to their involvement with the Cauda equina. 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*

Spine Management Grand Rounds Internet Live and Recorded Regularly Scheduled Series – *Pathophysiology of Intermedullary Spinal Cord Tumors – Part 2* – *review of interprofessional communication with the neurosurgeon and primary care physician in patients with IMSCT was presented. Intraoperative ultrasonography as a surgical adjunct to assist in the location and measurement of IMSCT was outlined. Importance of delineation of tumor versus normal tissue was described and emphasized. Surgical considerations for removal were outlined and correlated to operative outcomes. Specific surgical technique was presented and outlined in an evidenced based systematic review. 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*

Spine Management Grand Rounds Internet Live and Recorded Regularly Scheduled Series – *Pathophysiology of Intermedullary Spinal Cord Tumors – Part 1* – discussion of Intermedullary Spinal Cord Tumors (IMSCT) was presented with details regarding astrocytoma, hemangioblastoma and ependymomas. Review of specific characteristics of each of and their visualization on T1, T2 and STIR MRI images was presented. Clinical manifestations were emphasized including neck and back pain with details surrounding interprofessional communication with the neurosurgeon presented. Emphasis was additionally placed on early diagnosis and aggressive management with the spine surgeon. Intermedullary spinal cord metastasis was detailed and presented in the context of the neck and back pain 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 – 2023

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – *Diagnosis and Management of Seronegative Spondyloarthropathies* – review of the clinical diagnosis of seronegative spondyloarthropathy was presented with attention paid to the two most common types, ankylosis spondylitis and psoriatic arthritis. Details regarding a complete physical examination assessing for swelling, redness and reduced range of motion were presented along with focus on enthesitis and spinal mobility. Overview of the HBLA-27 allele and generic risk association was presented. Details associated with radiographic evidence of seronegative spondyloarthropathies were discussed including sacroiliac joint sclerosis and vertebral hyperostosis. Interprofessional management with rheumatology 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 – 2023

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – *Pathophysiology of Craniocervical Arterial Dissection* - detailed review of the anatomical structure and layers of the arterial wall was presented including the tunica externa, intima, and adventitia. Discussion of intimal tearing and thrombus formation was provided focused on hypoxic clinical patient presentations. Diagnostic angiography as the gold standard was presented. Clinical presentation of craniocervical arterial dissection was reviewed with past medical history such as genitive connective tissue disorders such as fibromuscular dysplasia, Ehlers-Danlos, Marfan, and Loeys-Dietz syndromes. Delineation between musculoskeletal and vascular manifestations of head/neck pain was presented and outlined with particular attention being given to hypoxic clinical presentations. 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

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – *Diagnosis and Management of Lumbar Spinal Stenosis* – review of MRI as the gold standard for the diagnosis of lumbar stenosis (LSS) with emphasis on plain film radiograph's historical limited role in 3-D diagnosis. Analysis of a convolutional neural network (CNN) for

the diagnosis of severe lumbar stenosis using radiography was presented. Discussion of gradient weighted class activation mapping (Grand-CAM) was reviewed. Overview of the algorithm trained by a CNN to identify LSS on radiographs which showed high diagnostic accuracy and its application as a possible triage tool was 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 – 2023

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – RAND Center for Collaborative Research – *discussion and review of the RAND Corporation’s Center for Collaborative Research in Complementary and Integrative Health (CIH), established in 2020. Outline of the responsibilities of a profession were presented including development of continued knowledge related to the profession that has an influence on the lives of the public. Details of the collaboration and sharing of financial, epidemiological, statistical, and public health professionals within a consortium of academic institutions. Presentation of objectives of CIH including maintaining guidance and support to chiropractic college institutions, training for investigators and the improvement of funding competitiveness through increased scale and reduced transaction costs of research 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*

Grand Rounds – Chiropractic Management – Multiple Spine Injuries – *analysis of patients presenting with multiple spinal injuries post trauma was presented. Overview of ligamentous, intervertebral disc and cartilage injuries was reviewed. Discussion of clinical symptoms and correlation to objectified injury was discussed. Interprofessional collaboration with emphasis on clinical indications for the chiropractic adjustment, need for medical specialist referral, necessity of advanced imaging modalities such as MRI/CT and course of care was outlined and reviewed. Hallmark signs of ligamentous injury such as mid-line tenderness 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 – 2023*

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – anatomy & biomechanics of the sacroiliac joint – *review of the anatomical structure of the sacroiliac joint was presented including ligamentous and cartilaginous components. Mechanical movement and restrictions were discussed and correlated to the surrounding anatomy. Review of causes of the sacroiliac joint as a source of pain was outlined. Differences in bony structure including cortical bone thickness and muscular overlay were detailed. Differentiation of different ligaments supporting the sacroiliac joint and the primary restraint of anatomical movement was presented including the posterior, sacrotuberous, sacrospinous, anterior, interosseus and iliolumbar ligaments. 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*

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – Chiropractic Management – Prostate Cancer Mimicking Hip Pain – *outline of a patient presenting with hip pain to a chiropractic clinic was presented. A complete history of non-response to conservative interventions was detailed. Failure of non-steroidal anti-inflammatory medication, physiotherapy and acupuncture was discussed. Further workup including the ordering of plain film radiography and advanced imaging was presented with detailed clinic and scientific rationale. Emphasis was placed on nine other similar cases published in the literature with the patient having no prior history of cancer or bony metastasis prior to evaluation in the chiropractic office. Review of processes pertaining to patient history taking, physical examination, response to past care and utilization of imaging modalities to arrive at an accurate diagnosis was underscored.* 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

Spine Management Grand Rounds Internet Live and recorded Regularly Scheduled Series – Chiropractic Utilization of X-ray in Clinical Practice - *review of field doctor response statistics regarding utilization of x-ray in clinical practice was presented. Guest author was interviewed outlining the basis and rationale for the academic paper reviewed. Discussion surrounding the use of x-ray for both anatomical contraindications to care (red flags) and assessment of biomechanical parameters was presented. Literature supporting the conservative co-management of spinal biomechanical abnormalities within the greater healthcare system was emphasized. Evidence based practice was outlined with particular focus on the utilization of x-ray in the management of the chiropractic 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 – 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

Grand Rounds – Chiropractic Management – Lumbar Intervertebral Disc Extrusion – *analysis and review of T1, T2 and STIR MRI images with specific discussion on the presence of inflammatory fluid and migration of intervertebral disc material. Communication with spine surgeon was emphasized with particular focus on verbal reporting and clinical documentation. Interprofessional communication pitfalls were outlined and presented. Medical necessity of advanced imaging was presented with clinical correlation of orthopedic and neurological*

examination findings 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 – 2023

Grand Rounds – Chiropractic Management – Differential Diagnosis Intervertebral Disc, Facet Joint, Sacroiliac Joint and Hip – *detailed necessity of creating a differential diagnosis was presented and emphasized. Review of the gold standard in imaging avascular necrosis of the hip was presented with focus on delineation between intervertebral disc, spinal facet joint, sacroiliac joint and hip was presented. Overlapping referral patterns was shown and reviewed in detail. Diagnosis and causation of avascular necrosis in the hip was presented with emphasis on non-traumatic etiology. Surgical vs non-surgical management 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 – 2023

Coding and Care Planning, ICD -10, and CPT cross-coding requirements form the acute stage through rehabilitation, including home care. *The documentation of passive vs. active care in chronic and trauma case management.* PACE Approved for the Federation of Chiropractic Licensure Boards, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2023

Coding and Care Planning with Spinal Biomechanical Pathology, The documentation of short and long-term care, including demonstrative validation or spinal pathology in the clinical setting. *Connective tissue pathological mechanisms in chronic and traumatic etiology.* PACE Approved for the Federation of Chiropractic Licensure Boards, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2023

The Safe Use of X-Ray in a Clinical Setting, Utilizing the guidelines created by the American College of Radiology and the evidence in the scientific literature for case management involving x-ray. *Understanding the standards for safe radiation exposure when creating a demonstrative spinal biomechanical diagnosis and ruling out anatomical pathology.* PACE Approved for the Federation of Chiropractic Licensure Boards, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2023

Spinal Biomechanics and Anatomical Pathology Grand Rounds. The long-term clinical outcomes of chronic LBP with hypermobility due to ligament laxity was reviewed with evidenced based literature. *Potential interventions and their expected outcomes were presented.* PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2022

Spinal Biomechanics and Anatomical Pathology Grand Rounds. Chiropractic Diagnosis and Management of Motor Vehicle Crash Injuries, *A review of the ligament, biomechanical and neurologic implications of a chronic cervical spine conditions, age dating cervical spine pathology and acute cervical spine injury including cervical spinal cord edema. The methods to*

determine stability and co-management with medical specialists was reviewed. Identification of the biomechanical ligament injury associated with the structural compromise, disc herniation with traumatic annular fissures and triage for neurosurgical consultation was reviewed. PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2022

Interprofessional collaboration including co-management, triage, and referral to medical specialists along with record keeping and documentation sharing with pain management and surgical specialties was reviewed. *Clinical indications for surgical consultations were presented.* PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2022

The long-term clinical outcomes of chronic hypermobility due to ligament laxity was reviewed. *Potential interventions and their expected outcomes were presented.* PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2022

Chiropractic diagnosis of acute disc and ligament injury and the tools necessary for accurate diagnosis, prognosis, and treatment planning. *Ethical and accurate medical legal reporting was also reviewed.* PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2022

Grand Rounds – Chiropractic Management – MRI Cervical Spine – Axial Anatomy – *detailed review of anatomical structures on the axial slices of cervical spine MRI were presented. Musculature presented included sternocleidomastoid, splenius cervicis, splenius capitis, logus capitis, longus colli and semispinalis capitis in both the T1 and T2 axial sequences. Traversing vs exiting spinal nerves were contrasted and compared to cervical spine. Neurological structures such as the spinal cord, ventral and dorsal nerve roots were identified. Visualization and discussion of benefit of T2 axial sequences in the identification of facet joint pathology was presented. Emphasis was placed on the structure and morphology of the intervertebral disc and spinal ligaments including anterior longitudinal ligament, posterior longitudinal ligament, facet capsule, interspinous, supraspinous, intertransverse and alar ligaments were 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 – 2022.

Management of Acute and Chronic Lumbar Herniated Discs. *Interprofessional collaboration including co-management, triage, and referral to medical specialists along with record keeping and documentation sharing with pain management and surgical specialties was reviewed.*

Clinical indications for surgical consultations were presented. PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2022

Chiropractic Diagnosis and management of cervical spine disc herniation was presented.

Differential diagnosis of acute disc injury vs chronic disc herniation was reviewed. Co-management with medical specialist was also reviewed. A discussion of available pain management procedures as also presented. PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2022

Chiropractic Diagnosis and management of lumbar spine disc herniation was presented.

Differential diagnosis of acute disc injury vs chronic disc herniation was reviewed. Co-management with medical specialist was also reviewed. A discussion of available pain management procedures as also presented. PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2022

Grand Rounds – Chiropractic Management – CT Lumbar Spine Anatomy – *detailed review of anatomical structures in the axial, sagittal and coronal planes of CT of the lumbar spine. Musculature presented included gluteus medius, psoas major, multifidus, iliacus, lumbar paraspinals and quadratus lumborum in both the T1 and T2 axial sequences. Emphasis was placed on the structure and morphology of the hard tissues of the spine with particular focus on the facet joints and pars interarticularis. Location and anatomical structure of the sacroiliac joint was presented and 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 – 2022.*

Chiropractic Diagnosis of ligament injury to the upper cervical region was presented. *The methods and tools to determine injury to the Occipital-Atlanto and Atlanto-Axial ligaments were presented. Correlation to mechanism of injury and medical legal reports were reviewed. The AO standards for spinal instability was presented. PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2022*

Grand Rounds – Chiropractic Management – MRI Lumbar Spine – axial anatomy – *detailed review of anatomical structures on the axial slices of lumbar spine MRI were presented. Musculature presented included gluteus medius, psoas major, multifidus, iliacus, lumbar paraspinals and quadratus lumborum in both the T1 and T2 axial sequences. Traversing vs exiting spinal nerves were contrasted and compared to cervical spine. Neurological structures*

such as conus medullaris, caudia equina, filum terminale, ventral and dorsal nerve roots were identified. Visualization and discussion of benefit of T2 axial sequences in the identification of facet joint pathology was presented. Emphasis was placed on the structure and morphology of the intervertebral disc and spinal ligaments including anterior longitudinal ligament, posterior longitudinal ligament, facet capsule, interspinous, supraspinous, intertransverse and iliolumbar were detailed. Location and anatomical structure of the sacroiliac joint was presented and 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 – 2022.

Grand Rounds – Chiropractic Management and Patient Triage – *review and discussion on the beginning of patient triage at phone intake was presented and related to the physical examination, review of diagnostic imaging and diagnosis. Detailed discussion of proper triage protocols including physical examination findings, plain film radiographs, MRI, diagnosis, and response to care was presented. Evidence based utilization of advanced imaging protocols was detailed including presence of neurological deficit non-response to care, increase in radicular symptoms and spinal instability on plain film imaging. Overview of interprofessional communication during triage including last E/M report, imaging reports, specialist referral and demographic sheet was 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.*

Grand Rounds – Indications and Absolute/Relative Contraindications to Chiropractic Care – *review of inclusion criteria accompanying modification of chiropractic treatment plan due to an absolute or relative contraindication to chiropractic care. Examples of clinical rationale, physical examination findings and proper diagnoses were provided. Review of the definitions of both relative and absolute contraindications to chiropractic care, specific details on referral to medical specialty were provided. Analysis of regional contraindications and treatment in adjacent regions were provided and discussed. The keys to understanding indications to care were detailed including the patient interview, review of medical records, diagnosis, and spinal examination findings. Review of most common reasons for chiropractic license violations were presented including application of the chiropractic adjustment to a contraindicated condition, failing to refer in the presence of a contraindication, failure to properly evaluate the patient to determine if a contraindication is present and failing to properly document the patient encounter. 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 – x-ray dosage, sagittal balance and surgery success rates – *discussion related to millisievert and cumulative effective dose was presented. Outline of the definition and research process of achieving Minimal Clinically Important Difference in spine surgery was discussed. CED levels below 100mSv was reviewed and compared to patients receiving multiple plain film radiographs. Discussion and relation of spinal biomechanics, sagittal balance, utilization of spine radiographs and MRI to working with the neurosurgeon was*

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.

Imaging, Case and Strain/Sprain Reporting, Documentation, and coding for X-ray and MRI reports, and patient education. *Connective tissue pathology as sequella to trauma and diagnosing of ligament laxity and strain-sprain in conjunction with biomechanical lesions of the human spine. The demonstrative reporting of spinal biomechanical lesions and the subsequent creation of treatment plans.* PACE Approved for the Federation of Chiropractic Licensing Board, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2022

Chiropractic Management and treatment planning utilizing Symverta biomechanical assessments was reviewed. *The methods to determine improvement in stability and biomechanical balance as well as co-management with medical specialists was reviewed. Identification of the biomechanical primary lesions and compensations associated with the structural compromise was reviewed.* PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2022

Clinical Grand Rounds – Acute vs Chronic Radial Fissures – Diagnosis and Management – *outline of morphological presentations of concentric, radial and transverse fissures within the annulus fibrosus of the intervertebral disc. Consensus driven definitions were presented as outlined by recommendations of the combined task forces of the North American Spine Society, American Society of Spine Radiology, and American Society of Neuroradiology. Modified Dallas Classification of annular fissures was reviewed and outlined. Specific correlation to annular fissure type and intervertebral disc morphology was detailed. Specific correlative factors linking annular fissures with acute and chronic injury was presented and 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.

Clinical Grand Rounds – Intervertebral Disc Nomenclature and Morphology – *discussion of intravertebral disc morphology was presented and reviewed. Correlation between morphological and ideological findings was presented. Detailed review of spondylosis deformans, intravertebral osteochondrosis, intravertebral disc herniation and bulge was outlined. Specific detail was placed on changes in disc morphology due to ligament injury in the human spine. Clinical correlation of disc herniation versus disc bulge was presented. Overview and detailed analysis of types of annular tearing in the disk was presented with an emphasis on the delineation between clinical findings and findings on advanced imaging.* 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 – Trial Testimony and the Spine Management Patient – *discussion and presentation of the trial process and requirements of both the treating physician and expert*

physician was outlined. Emphasis was placed on detailed preparation of case flow and objective demonstrable findings. Review of courtroom proceedings including witness and expert testimony was included. Expert versus treating physician requirements were presented. Emphasis was placed on thorough evaluation and narrative reporting processes to prepare for court room questioning. Specific review of illustration of demonstrative evidence was 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 – Degenerative versus Acute Intervertebral Disc Pathology – *review of the scientific and validated process for evaluating degenerative disc disease in the human spine was reviewed. Detailed analysis of differentiating between acute and chronic changes was emphasized. Overview and discussion of advanced imaging as well as plain film radiographs with dynamic views was presented. Review in detail of the Pfirrmann scale and it's association with intravertebral disc degeneration was presented including all Pfirrmann grades with illustrative reference. 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.*

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 Management of Upper Extremity Neurologic Deficits and Pre-existing Intervertebral Disc Pathology – *review of objectification of neurological deficits including loss of sensation, aberrant deep tendon reflexes, loss of strength and the presence of pathological reflexes was presented and discussed. Criteria for co-management in the presence of neurological deficits with the pain management physician and the spine surgeon was outlined. Detailed presentation on CPT coding and E/M documentation requires was discussed and reviewed. Absolute and relative contraindications to chiropractic care was demonstrated 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 Management of a L5-S1 Lumbar Disc Extrusion – *review of objective muscle weakness as the primary indication for surgical interventions in patients with intervertebral disc herniations and extrusions was presented. Discussion of parameters for physical examination findings to warrant ordering advanced imaging and surgical consultation. Overview of rationale for evaluation of spinal central canal in patients with abnormal neurological findings was reviewed. Duties of a Spine Management PhysicianTM in the diagnosis and co-management of patients with intervertebral disc extrusions was outlined. Clinical correlation and coordination of care was detailed including timing of advanced imaging order and surgical referrals. 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 Degenerative Lumbar Spondylolisthesis – *A review of the ligament, biomechanical and neurologic implications of a degenerative lumbar spondylolisthesis was presented. The methods to determine stability and co-management with medical specialists was reviewed. Identification of the biomechanical compensations associated with the structural compromise was reviewed. PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 2022*

Clinical Grand Rounds – Chiropractic Spine Management – Role of Diagnostic Injections in Spinal Disorders - *Review and discussion of objective data derived from ordering diagnostic spinal injections. Patient triage in relation to facet joint injury, ligament laxity, radiculopathy, herniation of the intervertebral disc and sacroiliitis was outlined. Patient injury data from physical examination, provocative testing and diagnostic imaging was correlated clinically with response to diagnostic block after appropriate referral to medical specialty. The sacroiliac joint as an underdiagnosed source of chronic lower back pain was outlined. Review of gold standard for diagnosis of sacroiliitis, fluoroscopy-guided block was 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

Clinical Grand Rounds – Chiropractic Spine Management – MRI Sequences and Imaging Acquisition – *detailed discussion of MRI physics and imaging acquisition sequences in clinical practice. Thorough review of image intensity definitions and the correlation to tissue type including nerve, cerebral spinal fluid, muscle, bone, ligament, and tendon. Overview of fat suppression techniques including STIR and FLARE utilization and clinical necessity. Discussion of sequence categories including Proton Density, T1, T2 and Diffusion Weighted was presented. Overview of Flow Sensitive sequences was briefly presented. Spine Echo (SE), Gradient Echo (GE), Inversion Recovery (IR) and Echoplanar Imaging (EPI) were outlined and contrasted in clinical context. Requirements for MRI examination were reviewed. Updated information was presented on MERGE imaging in the cervical spine.* 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 Acute Spinal Ligament Injury – *Review of the ligament injury thresholds, methods of diagnosis utilization of SITR pulse Sequence MRI as the gold standard for evaluating the age of and pathophysiology was discussed and presented. Biomechanical assessment of hypermobility associated with ligament laxity was presented along with the specific ligament involved in the clinical picture. When and how to triage to medical specialist was reviewed. Review of the four columns of vertebral architecture was detailed.* PACE Approved for the Federation of Chiropractic Licensing Board, 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, New York, 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 – Understanding Surgical Approaches and Techniques – *overview of Lumbar Interbody Fusion (LIF) as an established treatment for a range of spinal disorders such as degenerative pathologies, trauma, infection, and neoplasm was presented. Mechanical techniques and implant processes were discussed. Range of LIF approaches was outlined including posterior lumbar interbody fusion (PLIF), transforaminal lumbar interbody fusion (TLIF or MI-TLIF), oblique lumbar interbody fusion/anterior to psoas (OLIF/ATP), anterior lumbar interbody fusion (ALIF), lateral lumbar interbody fusion (LLIF). Review of Minimally Invasive Surgery (MIS) was discussed and detailed. 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 and the MS Patient – *review of prodromal symptoms relating to the typical presentation of the multiple sclerosis patient as a novel update in clinical diagnosis. Recognition of subtle symptoms was emphasized. Multiple sclerosis as the leading cause of neurological disability in young adults was outlined and the importance of early recognition and prompt intervention. Overview of prodromal symptom trends occurring years before full symptoms appear and emphasis was placed on the Doctor of Chiropractic as a front-line provider in their recognition, clinical referral pathways were discussed.* 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.

Medical and Interprofessional Communication – *detailed overview of medical legal communication in relation to patient subjective and objective clinical findings. Outline of direct and cross-examination techniques were presented. Overview of Voir Dire and Daubert hearings were outlined. Discussion of examination of proof in relation to causality, bodily injury, and persistent functional losses was reviewed. Court testimony flow, professional expectations, and court room etiquette was presented and emphasized.* National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City, College of Chiropractic – Ft. Lauderdale, Florida 2022.

Spine Management – **discussion and outline of case management workflows related to the management of acute and chronic spine pain with a particular focus on pain of traumatic origin.** *Evidence-Based communication and Electronic Health Record processes were*

emphasized and presented. Patient management and triage based on patient history, physical examination and imaging findings was outlined. Overview of interprofessional referral options including physical therapy, interventional pain management and spine surgery was discussed in detail. Spine Management as concept was discussed by Dr. John Edwards, neurosurgeon in relation to reducing escalation of non-urgent cases as well as creating space for patients with urgent need. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City, College of Chiropractic – Ft. Lauderdale, Florida 2022.

Documentation and Communication in Spine Management – *presentation of compliant healthcare documentation including E/M initial and re-evaluations, daily progress notes and medical-legal narrative reports was provided. Workflows detailing interprofessional referral language, advanced imaging requests and patient communication were detailed. Streamlined processes for creating and maintaining compliant, evidence based, patient centered clinical reporting was given. Emphasis was placed on the role of a Spine Management Physician in the processes of interprofessional communication and case management. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City, College of Chiropractic – Ft. Lauderdale, Florida 2022.*

Histology and Physical Tolerance of Spinal Ligaments – *presentation of the histological structural organization of spinal ligaments including analysis of tropocollagen as the basis for anatomical structure. Review of the structural hierarchy of the spinal ligament from microscopic to macroscopic was included. Anisotropic properties of spinal ligaments were defined, and examples presented. Detailed review of spinal entheses was presented with emphasis on advanced imaging and chronic enthesopathy. New insights into the pathogenesis, diagnostic modalities, and treatment of spinal enthesitis was outlined and presented. Specific focus was on traumatic injury to the spinal entheses and the difference in formation of spinal osteophytes and enthesophytes. Biomechanics of the degenerative spine was detailed and reviewed in terms of clinical spine management. National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City, College of Chiropractic – Ft. Lauderdale, Florida 2022.*

Accident Reconstruction and Expert Reporting – *Crash dynamics and basic physics formulas were presented and detailed. Review of biomechanical expert reports and included mathematics was discussed with context given to data collection and accuracy. Spinal injury thresholds were reviewed as well as the Law of Conservation of Energy and its relationship to crash dynamics. Specific mathematical examples were presented including workflows to review the accuracy of biomechanical expert reporting and mathematical formulas. National Spine Management Group,*

LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City, College of Chiropractic – Ft. Lauderdale, Florida 2022.

Degenerative versus Acute Ligament Laxity – *an updated scientifically validated grading system for the identification of degeneration of the intervertebral disc and motion segment was presented. Details such as radiographic signs of disc degeneration including loss of disc height, osteophyte formation and diffuse sclerosis were provided. Grading examples were provided in radiographic and gross specimen form starting with Grade 0 (no degeneration) to Grade 3 (severe degeneration). Outline of the validity and interobserver agreement of this grading system was shown for both the cervical and the lumbar spine. Review and emphasis on the difference between osteophyte formation and enthesophytes was again outlined.* National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City, College of Chiropractic – Ft. Lauderdale, Florida 2022.

Chiropractic Science Research – *review and presentation of updated peer-reviewed medically indexed research supporting chiropractic management of spine pain was detailed. Timeline of publication was emphasized with three years being the maximum timeframe for up-to-date data. Comprehensive review of evidence supporting chiropractic management of the spine pain patient in the Pain Management, Corrective, and the Health Maintenance Phases of care. Methods to communicate this evidence to the medical and legal communities was presented in the context of compliant patient centered clinical documentation. Efficiency of a Spine Management Physician versus conventional primary care was presented. Emphasis on the hierarchy of published evidence starting with Foundational Evidence up to Level 1 evidence was presented.* National Spine Management Group, LLC, Federation of Chiropractic Licensing Boards, Cleveland University Kansas City, College of Chiropractic – Ft. Lauderdale, Florida 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 Synovial Cyst of the Spine – *review and outline of the diagnosis and management of a spinal synovial cyst was presented. Discussion surrounding patient history, physical examination and advanced imaging findings was outlined. Structure and appearance of synovial cyst on T1 and T2 weighted MRI was presented, and the benign nature of these lesions was reviewed. Indications for specialist referral and patient centered management ranging from watchful waiting to surgical intervention due to neurologic compromise was reviewed. Advanced imaging differences between plain film radiographs, CT and MRI was outlined and discussed. MRI signal on T2 weighted image in relation to cerebral spinal fluid was highlighted. 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.*

Documenting Clinical Findings and Diagnosis, Correlating clinical findings with x-ray and advanced imaging to conclude and accurate diagnosis, prognosis and treatment plan. *The utilization of demonstrative documentation in diagnostic testing to visualize pathology in the trauma and non-trauma case. PACE Recognized for the Federation of Chiropractic Licensure Board, Academy of Chiropractic post-Doctoral Division, Long Island, NY, 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 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 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 – 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 Non-Specific Spine Pain – *outline and discussion of the mechanical origins of spine pain emphasizing common biomechanical parameters was presented. Review of chiropractic-based maintenance care in the management of patient centered spine pain was introduced. Introduction of a Spine Management Physician was presented outlining the natural history of spine pain in the human population. Interprofessional communication and case management was emphasized with focus on societal burden of*

mismanagement was 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 – 2021.

Chiropractic Diagnosis and Management of Whiplash Disorder – *outline and discussion of Whiplash as a mechanism of injury with particular focus on damage to underlying tissue structures. Review of anatomy, with specific focus on surrounding muscular, supraspinous ligament, interspinous ligament, spinal nerve, spinal cord, facet capsule and dorsal/ventral nerve roots was presented. Clinical correlation to imaging studies and its influence on management of the Whiplash patient was reviewed. Focused attention was paid to Whiplash as a mechanism of injury and not a complete diagnosis. 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.*

Chiropractic Diagnosis and Management of the Post-Surgical Patient - *outline and analysis of spinal biomechanical parameters in a whole spine model of care in the post-surgical analysis of the spine pain patient. Review of the details of measuring Pelvic Incidence and discussion of history of its analysis in relation to sagittal balance and vertebral body rotation was discussed. Outline of movement from a regional model of spine care to a full spine model was presented particularly in the context of pain management strategies post-surgery. Analysis of the components of the post-surgical patient including muscle movement patterns, segmental mobility, spinal curvature and rotation in the coronal, sagittal and axial planes was resented. Interprofessional communication and co-management 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.*

Chiropractic Diagnosis and Management of the Pre-Surgical Patient – *outline and analysis of spinal biomechanical parameters in a whole spine model of care. Review of the details of measuring Pelvic Incidence and discussion of history of its analysis. Outline of movement from a regional model of spine care to a full spine model was presented. Analysis of the components of the pre-surgical patient including muscle movement patterns, segmental mobility, spinal curvature and rotation in the coronal, sagittal and axial planes was 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 – 2021.*

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 Lumbar Facet Syndrome -

discussion of the clinical presentation of lumbar facet syndrome with specific attention paid to the pathogenesis and differential diagnosis of lumbar disc herniation, disc bulge and radiculopathy. 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. 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 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 Lumbar Disc Herniation – *review of the pathogenesis and morphological presentation of lumbar intervertebral disc herniation. 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.*

Documentation, Demonstrative and Compliance, Elements of Evaluation and Management codes 99202-99203-99204-99205, inclusive of complexity of management and time components. Demonstrative documentation of spinal-related pain generators; spinal cord, thecal sac, myelomalacia, spinal nerve root insult, connective tissue, recurrent meningeal nerves. Academy of Chiropractic Post-Doctoral Division, PACE Approved for the Federation of Chiropractic Licensing Boards, Long Island, NY, 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.*

Clinical Grand Rounds – Importance of Interprofessional Healthcare Communication and Teamwork – *Discussion of the history of interprofessional healthcare and the acknowledgement by the World Health Organization was presented. Specific detail on chiropractic academia and student perception of its importance was outlined. The growth and importance of both interprofessional education and communication was stressed and reviewed. Need for a clear professional identity to facilitate interprofessional education and 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 – Cervical Spinal Alignment and Knee Replacement Revision Rates – *Review of the most common cervical spinal sagittal alignment parameters and their relationship to interprofessional communication was presented. Discussion of rationale for knee replacement revision surgery including aseptic loosening, fracture and prosthetic joint infection was reviewed. Specific statistical review on revision surgery and effective treatment of end-stage knee osteoarthritis was presented. Details of evidence-based research outlining patients with cervical degenerative disorders having a higher rate of total knee replacement revisions than*

those without degenerative changes. Analysis of the benefit of radiographic studies looking at the mechanical relationship between the cervical spine and knee composition was outlined 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 – 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 – 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.*

Trends in Spinal Healthcare, *Analyzing spinal healthcare trends in both utilization and necessity and understanding the marketplace and how a clinical excellence level is reflected in a doctors' documentation and credentials. Treatment pathways in triaging spinal pathobiomechanics. Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City, Long Island, NY, 2021*

MRI Spine Interpretation Advanced Diagnosis, *An evidence-based understanding of time-related etiology of disc pathology considering the American Society of Neuroradiology's designation of protrusion, extrusion, and sequestration of spinal discs, T1, T2, STIR and Proton-Density weighted evaluation to diagnose spine form MRI accurately. Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City, Long Island, NY, 2021*

Spinal Biomechanical Engineering Analytics and Case Management, *Utilizing spinal mensurating algorithms to conclude a pathobiomechanical vs. normal spine in the absence of anatomical pathology. Clinically correlating a history and physical examination findings to x-ray biomechanical results in creating an accurate diagnosis, prognosis, and treatment plan.*

Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City, Long Island, NY, 2021

MSK Extremity Radiological Interpretation, *Utilizing both MRI and x-ray to diagnose 1) Arthritis - Inflammatory and Degenerative, 2) Advanced cartilage assessment, 3) Rotator Cuff Tears, 4) Labral tears (shoulder and hip), 5) Tendon injuries and degeneration, 6) Meniscal tears, 7) Ligamentous injuries, 8) Common fractures, 9) Sports-related injury patterns, 10) Plantar fasciitis.* Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City, Long Island, NY, 2021

Demonstrative Medical-Legal Documentation, *The narrative report. How to effectively create medical-legal documentation and what the courts look for. Making your "4-Corner" (narrative) report demonstrable and build a reputation as an evidence-based provider. The step-by-step minutiae of building a report.* Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City, Long Island, NY, 2021

Managing Non-Anatomical Spine Pain, *Treatment modalities centered upon "best-outcomes" in an evidence-based model considering chiropractic vs. physical therapy and chiropractic vs. medicine. Considerations of disability, pain reduction, functional improvement, drugs utilized, and side-effects are all considered.* Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City, Long Island, NY, 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 – Patient Triage – *testing and physical examination workflows – evidence-based evaluation of the spine pain patient was outlined and presented. Thorough review of criteria for ordering plain film and advanced imaging was discussed and demonstrated. Clinical rationale for ordering electrodiagnostic testing and patient referral criteria overview was demonstrated. EMR and documentation workflows were discussed, and efficiency protocols were outlined and applied to evidence based physical examination procedures with and without a*

medical scribe. Details of re-evaluations and clinical outcomes were reviewed 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 – Diagnosis of Lumbar Facet Syndrome – *overview of the most common pain syndrome in the lumbar spine including societal burdens was presented. Discussion of facet joint arthrosis being the most frequent facet joint pathology in the human spine. Outline of level of correlation between clinical symptoms, physical examination findings and degenerative spinal conditions was discussed. Presentation of diagnostic facet block and the medical necessity of such a referral when indicated was 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 – 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 degeneration 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 – Inter-professional Communication with the Personal Injury Attorney – *review of the outlined of the initial and re-evaluation E/M reporting in an injured patient. Discussion targeted compliant reporting and interprofessional communication with the attorney. Specific methods of ensuring compliant reporting were discussed and outlined. Statutory language, permanency determination and impairment were presented and reviewed in context of the final narrative report. Emphasis was placed on the objectification of persistent functional loss and causal relationship in the personal injury patient. Supporting medical evidence of intervertebral disc pathology including disc herniation, disc bulge and annular tear was provided. 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 – Advanced Imaging Upper Cervical Spine and Documentation – *Discussion and review of ligament injury in the upper cervical spine. Focus was on missed diagnosis due to a lack of imaging and interprofessional communication. Discussion of upper cervical anatomy including occipital condyles, C1/C2 articulation in both MRI, plain film and CT scanning was presented using imaging slides. Clinical documentation was reviewed with particular attention paid to clinical documentation errors from other providers. Discussion on case management and interprofessional communication to correct documentation errors 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.

Documentation and Coding, CPT Coding Guidelines for Initial and Established Patients with *particular attention paid to Patient History, Review of Systems, Social and Family History, Physical Examination, and Medical Decision making. Specific differences in coding levels and required elements for a 99202-99203-99204-99205, and a 99212-99213-99214-99215.* Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City Long Island, NY, 2021

Demonstrative Documentation and Ethical Relationships, *Pathways to improve coordination of care, and interprofessional communication with collaborating physicians. Maintaining ethical relationships in the medical-legal community through documentation and communication of demonstrable diagnosis, prognosis, and treatment plans.* Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City Long Island, NY, 2021

MRI Spine Interpretation, Clinical case review of MRI's including sagittal, axial, T1, T2, STIR, and proton density sequences. Identified will be the vertebrae, spinal cord, discs, nerve roots, thecal sac, posterior longitudinal ligament, epidural veins, and fat saturation pulses. Pathology will include bulges, herniations, protrusions, extrusions, myelomalacia, cord edema, and schmorl's nodes. Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City Long Island, NY, 2021

Spinal Biomechanical Engineering Clinical Grand Rounds, *Case reviews utilizing E/M, MRI, and x-ray mensuration report to conclude an accurate diagnosis, prognosis, and treatment plan.*

Common diagnosis requiring interprofessional collaboration with a discussion of diagnostic dilemmas and proper communication methods. Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City Long Island, NY, 2021

Demonstrative Diagnosis and Documenting Spinal Pathology, *Analyzing patient records, x-rays and MRI's in determining etiology of traumatically-induced pathological lesions. Clinically correlating the history, clinical findings, imaging findings and diagnosed bodily injuries to conclude and accurate diagnosis, prognosis, and treatment plan.* Academy of Chiropractic Post-Doctoral Division, PACE Approved for the Federation of Chiropractic Licensing Boards, Long Island, NY, 2021

Demonstrative Diagnosis and Documenting Spinal Disc Injuries, *Differentially diagnosing disc vs. posterior longitudinal ligaments vs. Thecal Sac vs. spinal cord vs. Ligamentum Flava pathology and insult. Identifying the borders of lesions and discerning between anatomic structures pathologically effected demonstrably.* Academy of Chiropractic, Post-Doctoral Division, PACE Approved for the Federation of Chiropractic Licensing Boards, Long Island, NY, 2021

Clinical Grand Rounds – Facet Joint Thresholds and Alteration of Motion Segment Integrity – *discussion of the predominant mode of joint loading of the cervical facet joints during whiplash injury related to retraction tension on the facet joint capsule. Review of shear forces, translation of the inferior and superior facet joint as well as injury risk due to excessive stretching of spinal ligaments was presented. Overview and discussion of mechanical trauma to ligament tissue and subsequent microstructural damage not visibly detected was outlined. Threshold for microstructural changes during retraction, reduced ligament stiffness and unrecovered strain was discussed in detail. Individual response to facet joint capsule response supported in the medical literature 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 – 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 sequelae 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.

Clinical Grand Rounds – Biomechanical Compensation and Intervertebral Disc Extrusion –

detailed review of MRI documented lumbar disc extrusion measuring 12mm including STIR, T1 and T2 sagittal and axial images. Presentation of radiographic biomechanical analysis outlining sagittal alignment and vertebral body rotations. Discussion of co-management of spinal pathology while considering both the biomechanical and anatomical components of spine pain. Radiographic review included lateral neutral, lateral flexion, lateral extension and AP views. Clinical correlation and discussion of pre and post-surgical care was 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 – Nomenclature and Morphology of Intervertebral Disc Pathology –

updated review and demonstration of intervertebral disc nomenclature related to intervertebral disc degeneration, trauma and other pathology. Specific attention paid to the agreed upon nomenclature between the Combined Task Forces of the North American Spine Society, American Spine Society, American Society of Spine Radiology and American Society of Neuroradiology.

Details were provided in comparison to intervertebral disc herniation and intervertebral disc degeneration. Radial fissures were reviewed and outlined including circumferential, transverse and radial pathology and its anatomical relation to the intervertebral disc. 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 – Pathophysiology of Osteophyte Formation – *discussion and presentation of extraspinal and vertebral osteophyte classification. Review of traction osteophyte formation and its relationship to the vertebral body and degenerative changes was discussed. Factors influencing osteophyte formation such as Transforming Growth Factor Beta and the relationship to the initiation of osteochondrosis was outlined. Details of segmental osteophyte formation on regional biomechanics was reviewed. Peer reviewed evidence of the effects of spinal arthrodesis on adjacent segment degeneration, anterior and posterior osteophyte formation 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.*

Hospital Based Spine Care Qualified, *Credentialed in hospital protocols, emergency room protocols, acute and chronic patient triage inclusive of MRI spine interpretation, spinal biomechanical engineering, head trauma, concussion, mild traumatic and traumatic brain injuries. Co-credentialed through the ACCME (Accreditation Council for Continuing Medical Education), Cleveland University – Kansas City and the Academy of Chiropractic, Long Island, New York, 2021*

Interprofessional Hospital Based Spine Care, *Trends in hospital and emergent care in the healthcare delivery system inclusive of policies, hospital staffing and current care paths for mechanical spine issues. Cleveland University Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2021*

Trends in Spinal Healthcare, *Analyzing spinal healthcare trends in both utilization and necessity and understanding the marketplace and how a level of clinical excellence is reflected in a doctors' documentation and credentials. Treatment pathways in triaging spinal pathobiomechanics. Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City, Long Island, NY, 2020*

MRI Spine Interpretation, *An evidence-based understanding of time-related etiology of disc pathology considering the American Society of Neuroradiology's designation of protrusion, extrusion, and sequestration of spinal discs, Considering the signal intensity of discs in age-*

dating pathology and acquisition protocols for advanced spinal imaging. Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City, Long Island, NY, 2020

Spinal Biomechanics; A Literature Perspective, *An evidenced-based model for spinal biomechanical engineering and pathobiomechanics considering the pathophysiological limits in translations, angular deviation, and rotational planes. Utilizing the Cartesian system in plotting vertebral points to demonstratively conclude an accurate diagnosis, prognosis and biomechanical treatment plan with the consideration of long-term care in the non-specific mechanical spine pain patient when necessary. Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City, Long Island, NY, 2020*

Case Management of Mechanical Spine Pathology, *Clinical Grand Rounds of herniated, protruded, extruded, sequestered, and bulging discs. Differentially diagnosing vascular vs. mechanical spinal lesions and the necessity for urgent vascular, neurological intervention, Collaborating in a team environment utilizing a neuroradiologist, electrophysiologist, and neurosurgeon with the chiropractor as the primary spine care provider. Academy of Chiropractic Post-Doctoral Division, Cleveland University – Kansas City, Long Island, NY, 2020*

Pathobiomechanics and Documentation, *CPT Coding Guidelines for Initial and Established Patients with particular attention paid to Patient History, Review of Systems, Social and Family History, Physical Examination, and Medical Decision making. Specific differences in coding levels and required elements for a 99202-99203-99204-99205. Academy of Chiropractic Post-Doctoral Division, Cleveland University Kansas City, Long Island, NY, 2020*

Using Documentation and Ethical Relationships, *Pathways to improve coordination of care, and interprofessional communication with collaborating physicians. Maintaining ethical relationships in the medical-legal community through documentation and communication of demonstrable diagnosis, prognosis and treatment plans. Academy of Chiropractic Post-Doctoral Division, Cleveland University Kansas City, Long Island, NY, 2020*

Spinal Biomechanical Engineering Clinical Application, *History of clinical biomechanics with an emphasis on the diagnosis and management of spine pain of mechanical/functional origin. Evidence-based symptomatic vs. asymptomatic parameters using peer-reviewed medical index literature. Computerized mensuration analysis of spinal biomechanical pathology. Comparison of demonstrable spinal biomechanical failure on imaging to clinical evaluation and physical examination. Academy of Chiropractic Post-Doctoral Division, Cleveland University Kansas City, Long Island, NY, 2020*

Spinal Biomechanical Engineering Clinical Grand Rounds, *Case reviews utilizing E/M, MRI, and x-ray mensuration report to conclude an accurate diagnosis, prognosis, and treatment plan. Common diagnosis requiring interprofessional collaboration with a discussion of diagnostic dilemmas and proper communication methods.* Academy of Chiropractic Post-Doctoral Division, Cleveland University Kansas City, Long Island, NY, 2020

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.* Cleveland University - Kansas City, 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, 2020

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.* Cleveland University - Kansas City, 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, 2020

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.* Cleveland University - Kansas City, 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, 2020

MRI Spinal Pathology, *MRI interpretation of bone, intradural, extradural, cord and neural sleeve lesions. Tuberculosis, drop lesions, metastasis, ependymoma, schwannoma and numerous other spinal related tumors and lesions.* Cleveland University - Kansas City, 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, 2020

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.* Cleveland University - Kansas City, 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, 2020

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.* Cleveland University - Kansas City, 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, 2020

MRI Protocols Clinical Necessity, *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 sequelae, including bulge, herniation, protrusion, extrusion and sequestration.* Cleveland University - Kansas City, 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, 2020

MRI Interpretation of Lumbar Degeneration/Bulges, *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.* Cleveland University - Kansas City, 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, 2020

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-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. Central canal and cauda equina compromise interpretation with management.* Cleveland University - Kansas City, 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, 2020

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.* Cleveland University - Kansas City, 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, 2020

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.* Cleveland University - Kansas City, 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, 2020

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.* Cleveland University - Kansas City, 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, 2020

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.* Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020

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.* Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020

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. Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020

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.* Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020

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.* Cleveland University Kansas City, 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, 2020

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.* Cleveland University Kansas City, 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, 2020

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.* Cleveland University Kansas City, 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, 2020

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.* Cleveland University Kansas City, 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, 2020

Orthopedic Testing: Clinical Grand Rounds, 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. 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. Cleveland University Kansas City, 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, 2020

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.* Cleveland University – Kansas City, 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, 2020

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.* Cleveland University – Kansas City, 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, 2020

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.* Cleveland University – Kansas City, 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, 2020

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. Cleveland University – Kansas City, 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, 2020

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.* Cleveland University – Kansas City, 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, New York, 2020

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.* Cleveland University – Kansas City, 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, New York, 2020

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 grey matter, thalamus and cortices involvement.* Cleveland University – Kansas City, 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, New York, 2020

Spinal Trauma Pathology, Biomechanics of Traumatic Disc Bulge and Age Dating

Herniated Disc Pathology, *The biomechanics of traumatic disc bulges as sequelae from trauma and the comorbidity of ligamentous pathology. Age-dating spinal disc pathology in accordance with Wolff's Law.* Cleveland University – Kansas City, 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, New York, 2020

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. Cleveland University – Kansas City, 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, New York, 2020

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.* Cleveland University – Kansas City, 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, New York, 2020

Neurology of Ligament Pathology- Normal Morphology and Tissue Damage, *Connective tissue morphology, embryology and wound repair as sequelae to trauma. Full components of strain-sprain models and permanency implications with wound repair and osseous aberration with aberrant structural integrity.* Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2020

Neurology of Ligament Pathology- Spinal Biomechanics and Disc Pathology, *Disc pathology as sequella to trauma; herniation, extrusion, protrusion, sequestration and how the spinal unit as one system creates homeostasis to balance the pathology.* Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2020

Neurology of Ligament Pathology- Neurological Innervation, *The peripheral and central innervation of the disc and spinal ligaments of the dorsal root ganglion, spinal thalamic tracts, periaqueductal gray areas innervating the Thalamus and multiple regions of the brain. The efferent neurological distribution to disparate areas of the spine to create homeostatis until tetanus ensues creating osseous changes under the effect of Wolff's Law.* Academy of Chiropractic, Post-Doctoral Division, Cleveland University-Kansas City, College of Chiropractic, Long Island, NY, 2020

Electrodiagnostics: Electromyogram/Nerve Conduction Velocity (EMG/NCV), *Diagnosis & Interpretation: Anatomy and Physiology of Electrodiagnostics: An in-depth review of basic neuro-anatomy and physiology dermatomes and myotomes to both the upper and lower extremities and the neurophysiology of axons and dendrites along with the myelin and function of saltatory for conduction. The sodium and potassium pump's function in action potentials.* Cleveland University, Kansas City, Academy of Chiropractic, Post-Doctoral Division, Long Island NY, 2020

Electrodiagnostics: Electromyogram/Nerve Conduction Velocity (EMG/NCV), Diagnosis & Interpretation: Nerve Conduction Velocity (NCV) Part 1: *Nerve conduction velocity testing, the equipment required and the specifics of motor and sensory testing. This section covers the motor and sensory NCV procedures and interpretation including latency, amplitude (CMAP) physiology and interpretation including the understanding of the various nuances of the wave forms.* Cleveland University, Kansas City, Academy of Chiropractic, Post-Doctoral Division, Long Island NY, 2020

Electrodiagnostics: Electromyogram/Nerve Conduction Velocity (EMG/NCV), Diagnosis & Interpretation: Nerve Conduction Velocity (NCV) Part 2: *Compound motor action potentials (CMAP) and sensory nerve action potentials (SNAP) testing and interpretation including the analysis and diagnosis of the wave forms. It also covers compressive neuropathies of the median, ulnar and posterior tibial nerves; known as carpal tunnel, cubital tunnel and tarsal tunnel syndromes. This section offers interpretation algorithms to help understand the neurodiagnostic conclusions.* Cleveland University, Kansas City, Academy of Chiropractic, Post-Doctoral Division, Long Island NY, 2020

Electrodiagnostics: Electromyogram/Nerve Conduction Velocity (EMG/NCV), Diagnosis & Interpretation: Needle Electromyogram (EMG) Studies: *The EMG process, inclusive of how the test is performed and the steps required in planning and electromyographic study. This covers the spontaneous activity of a motor unit action potential, positive sharp waves and fibrillations. The insertional activity (both normal and abnormal), recruitment activity in a broad polyphasic presentation and satellite potentials. This covers the diagnosing of patterns of motor unit abnormalities including neuropathic demyelinated neuropathies along with acute myopathic neuropathies. This section also covers the ruling out of false positive and false negative results.* Cleveland University, Kansas City, Academy of Chiropractic, Post-Doctoral Division, Long Island NY, 2020

Electrodiagnostics: Electromyogram/Nerve Conduction Velocity (EMG/NCV), Diagnosis & Interpretation: Overview of EMG and NCV Procedures, Results, Diagnoses and Documentation. *The clinical incorporation of electrodiagnostic studies as part of a care plan where neuropathology is suspected. It also covers how to use electrodiagnostics in a collaborative environment between the chiropractor as the primary spine care provider and the surgeon, when clinically indicated. This section covers sample cases and health conclude and accurate treatment plans based upon electro-neurodiagnostic findings when clinically indicated.* Cleveland University, Kansas City, Academy of Chiropractic, Post-Doctoral Division, Long Island NY, 2020

Traumatic Brain Injury and Concussion Overview: *This section is an in-depth overview of traumatic brain injury in concussion. It discusses that all brain injuries are traumatic and dispels the myth of a “mild traumatic brain injury.” Also, this covers triage protocols and the potential sequela of patients with traumatic brain injuries.* Cleveland University, Kansas City, Academy of Chiropractic, Post-Doctoral Division, Long Island, NY, 2020

Head Trauma and Traumatic Brain Injury Part 1: *This section discusses gross traumatic brain injuries from trauma and significant bleeding with both epidural and subdural hematomas. There are numerous case studies reviewed inclusive of neurosurgical intervention and postsurgical outcomes.* Cleveland University, Kansas City, Academy of Chiropractic, Post-Doctoral Division, Long Island, NY, 2020

Head Trauma and Traumatic Brain Injury Part 2: *This section continues with multiple case studies of gross traumatic brain injuries from trauma requiring neurosurgical intervention and also discusses recovery sequela based upon the significance of brain trauma. This module also concludes with concussion protocols in traumatic brain injury short of demonstrable bleeding on advanced imaging.* Cleveland University, Kansas City, Academy of Chiropractic, Post-Doctoral Division, Long Island, NY, 2020

Concussion And Electroencephalogram Testing: *This this section covers concussion etiology and cognitive sequela where gross bleeding has not been identified on advanced imaging. It discusses the significance of electroencephalogram testing in determining brain function and pathology (if present). This module also covers the understanding of waveforms in electroencephalogram testing in both normal and abnormal scenarios.* Cleveland University, Kansas City, Academy of Chiropractic, Post-Doctoral Division, Long Island, NY, 2020

Concussion And Electroencephalogram Testing Pathological Results: *This module covers amplitude, conduction and conduction delays as sequela to traumatic brain injury to diagnose concussion and traumatic brain injury in the absence of gross bleeding and advanced imaging. This section covers electroencephalograms and event-related potentials which measures the brain response that is a direct result of specific sensory or motor events. It is a stereotype electrophysiological response to a stimulus and provides a noninvasive means of evaluating brain function. In this module multiple case studies are discussed with ensuing triage protocols pending the results.* Cleveland University, Kansas City, Academy of Chiropractic, Post-Doctoral Division, Long Island, NY, 2020

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. Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020

Spinal Biomechanical Engineering: Full Spine Digital Analysis, *Digitalizing and analyzing the full spine image 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 gait 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.* Cleveland University Kansas City, 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, 2020

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 algorithm along with corrective guidelines.* Cleveland University Kansas City, 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, 2020

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 (AOMSI) 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.* Cleveland University Kansas City, 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, 2020

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, ocular and proprioceptive neurological integration in the righting reflex as evidence in imaging. Digital and numerical algorithm in analyzing a spine.* Cleveland University Kansas City, 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, 2020

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.* Cleveland University Kansas City, 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, 2020

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.* Cleveland University Kansas City, 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, 2020

Spinal Biomechanical Engineering: Cartesian System, *The Cartesian Coordinate System from the history to the application in the human body. Explanation of the x, y, z axes in both translation and rotations (thetas) and how they are applicable to human biomechanics.* Cleveland University Kansas City, 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, 2020

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.* Cleveland University Kansas City, 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, 2020

Documenting Clinically Correlated Bodily Injury to Casualty, *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. Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020

Documentation and Reporting for the Trauma Victim, *Understanding the necessity for the accurate documentation and diagnosis utilizing the ICD-10 and the CPT to accurately describe the injury through diagnosis. Understanding and utilizing state regulations on reimbursement issues pertaining to healthcare. Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020*

Neurodiagnostic Testing Protocols, *Physiology and Indications for the Trauma Patient, 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. Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020*

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. Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020*

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. Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020*

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. Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020*

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. Cleveland University – Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020

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.* Cleveland University - Kansas City, 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, 2020

Chiropractic as the First Option for Spine, *A Literature-Based Standard, Utilizing clinical findings in conjunction with advanced imaging and electrodiagnostic findings in managing collaborative relationships with medical specialists. Applying a literature standard to care to ensure conservative care as the first option .* Cleveland University Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020

Chiropractic as the First Option for Spine, *A Literature-Based Standard, Managing spinal related cases based upon MRI findings of herniations, bulges, protrusion, extrusions (comminuted and fragmented) utilizing thin-sliced acquisition protocols. When to consider ordering T1, T2, Short Tau Inversion Radiant, proton density and Dixon sequencing for spinal related pathology.* Cleveland University Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020

Chiropractic as the First Option for Spine, *A Literature-Based Standard, Creating literature-based documentation inclusive of history and a clinical examination that encompasses causality, diagnosis, prognosis and treatment plans. Ensuring the whole person impairment ratings are consistent with contemporary literature.* Cleveland University Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020

Chiropractic as the First Option for Spine, *A Literature-Based Standard, Spinal biomechanical engineering models related to pathobiomechanics and literature-based standards in creating an accurate diagnosis, prognosis, and treatment plan. Determining impairment ratings based upon alteration of motion segment integrity utilizing motion-imaging, and creating demonstrable evidence for continued treatment plans.* Cleveland University Kansas City, Academy of Chiropractic Post-Doctoral Division, Long Island, NY, 2020

SELECTED MEMBERSHIPS

National Spine Management Group, 2021 - Present

Academy of Chiropractic, 2020 - Present

Foundation for Chiropractic Progress, 2020 - Present