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An overview of the medical specialties most relevant to chiropractic practice and education

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Objective: The purpose of this article is to present an overview of the key medical and surgical specialties most likely relevant to chiropractic practice in the United States. Understanding the similarities and differences in the training and typical practices of these medical providers may enhance a chiropractor's likelihood to collaborate and increase participation in team-based care.

Methods: This was a descriptive analysis to develop preliminary content on US medical physician specialties. Selection was informed by the authors' clinical experience with medical collaboration, along with results of previously published work on medical specialties most commonly reported to be involved in referral patterns with US chiropractors. Data from the Accreditation Council for Graduate Medical Education and individual specialty boards were synthesized through an iterative process, and supplemented by qualitative input from subject matter experts. Data were entered into tabular format for review and analysis.

Results: We propose that the medical and surgical specialties most relevant to typical US chiropractic practice are internal medicine, family medicine, emergency medicine, physical medicine and rehabilitation, neurology, pain medicine, rheumatology, radiology, orthopedic surgery, and neurological surgery. There is overlap in scope of conditions and diagnostic and therapeutic tools utilized by various medical specialties.

Conclusion: This work describes 8 medical and 2 surgical specialties proposed to be most relevant to general chiropractic practice in the United States. The results may have relevance to interprofessional education and collaboration.

Key Indexing Terms: Chiropractic; Education; Medical Specialties; Interprofessional Relations

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INTRODUCTION

Integration and closer collaboration with medicine has been a long-standing goal for the US chiropractic profession.[1] The International Chiropractors Association and American Chiropractic Association have supported collaboration over the past 3 decades, releasing hospital privileging guidelines to assist with current and future integration in 1987 and 1991, respectively.[2,3] In 1992, the American Chiropractic Association assembled the Hospital Relations Committee, with both organizations additionally advocating and supporting legislative expansion of chiropractic services in the health care systems of the Department of Defense and Department of Veterans Affairs.[3–5]

A futurist analysis has recommended that the chiropractic profession increase its integration within mainstream medicine in the coming years.[6] According to the report, chiropractors will be integrated and exposed to allopathic physicians with increasing frequency through student clerkships, residencies, and chiropractic government programs, such as the Loan Repayment Program of the National Health Service Corps.[7] There is a growing trend of chiropractors practicing in various private medically integrated settings within the United States.[8] Increased numbers of graduates and established chiropractors are seeking employment in traditional medical settings.[9]

Interprofessional collaboration has been known to improve health care processes and outcomes and has been acknowledged by the World Health Organization to be necessary to the success of primary health care.[10,11] Interprofessional education is a known facilitator of interprofessional collaboration, yet within the United States, chiropractic training and continuing education chiropractors have received little exposure to or education about other health care providers.[11–13] A larger focus on interprofessional education could potentially lead to improved clinical outcomes.[12]

Medical providers and systems are complex.[13] There are many similarities between provider types yet many differences based on specialty. A barrier to collaboration and chiropractic integration into medical settings may be the lack of interprofessional education.[6] Foundational work is needed to introduce and develop educational content on medical providers for doctor of chiropractic (DC) trainees within the United States. Foundational research aims to advance education and learning and should address important research problems or questions related to education.[14] The purpose of this article is to identify an initial set of medical specialties most broadly related to typical US chiropractic practice. Our aim is to describe those specialties that US chiropractors are most likely to receive referrals from and/or send referrals to in the course of patient care, hoping that this material may assist in interprofessional education of chiropractors.

METHODS

This is a descriptive analysis to develop preliminary content on US allopathic specialty training and scope relevant to typical DC collaboration.[15,16] This type of analysis is the first stage of the instructional design, the general analysis of learning needs, and the systematic development of instruction. One such approach, the ADDIE instructional design model, includes 5 principles: analysis, design, development, implementation, and evaluation.[15,16] The analysis phase identifies characteristics of the target learning group and determines instructional goals in the context of the given environment. The design phase identifies learning objectives to help outline content. The development phase creates and develops relevant content. The implementation phase includes the actual delivery of material to students, with the evaluation phase including formative and summative assessment.[15,16] This article is limited to the analysis stage.[14]

Two investigators with a combined 29 years of experience in medical systems used consensus discussion to draft an initial data set and subsequent iterations. Our selection approach was informed by our clinical experience with the medical specialties with which we most commonly interact. We also drew from published work on medical specialties most commonly reported to be involved in referral patterns with US chiropractors.[17–19] The Accreditation Council for Graduate Medical Education was identified as the gold standard data source for medical specialties. Additional consultation with medical specialty subject matter experts was used as needed for additional information and to resolve discrepancies. To that end, we obtained input via 1-on-1 conversations and/or electronic communications with 2 primary care physicians, 1 physiatrist, 1 pain medicine specialist, and 1 radiologist, all based in the United States.

RESULTS

From the analysis phase of the ADDIE instructional design model, we identified 8 medical and 2 surgical specialties that we propose are most relevant to typical chiropractic practice in the United States. These were primary care (internal or family medicine), emergency medicine, physiatry, pain medicine, rheumatology, neurology, radiology, orthopedic surgery, and neurosurgery. Below is a brief review of each specialty, intended to provide education for chiropractic students, interns, residents, and practitioners for their interprofessional interactions. More specific details for each specialty are provided in Table 1.

In the United States, these specialties require the physician to complete a residency program for licensure. Following the 4 years of allopathic or osteopathic medical school education, residency training confers the additional knowledge and skills required of the given specialty area of practice. Residency programs vary from 3 to 7 years in duration and can be differentiated into categorical or advanced residencies. The postgraduate year 1 refers to the internship year or first year of residency. Categorical residencies include the internship year within the length of the residency. Advanced residencies begin in the postgraduate year 2 and require that one completes the first year following medical school separately prior to admission. In this case, the postgraduate year −1 year is classified as a "preliminary" or "transitional year." A preliminary year (also referred to as a categorical internship) involves the study of 1 particular specialty, whereas a transitional year includes numerous rotations through multiple specialties. Advanced residency programs often specify the requirement of either a preliminary or a transitional year prior to commencement.[20,21] Optional fellowships, which provide extended specialized training beyond the traditional residency, typically range between 1 and 3 years in length.[22]

Internal Medicine

General internists handle a broad and comprehensive spectrum of adult illness and are recognized as experts in diagnosis and treatment of chronic diseases and their prevention. They serve as the primary care physicians (PCPs) for all health conditions, including musculoskeletal issues. Some pertinent therapeutic interventions include medication management and some musculoskeletal injections generally not necessitating fluoroscopy (nonspinal). Internists are required to complete a 3-year residency and can participate in advanced fellowships ranging from 1 to 3 years. Some important subspecialties/fellowships in terms of chiropractic practice are adolescent medicine, geriatric medicine, rheumatology, and sports medicine.[23,24]

Chiropractors will most commonly interact with PCPs regarding medical management of most nonemergency patient conditions encountered in practice. As a general starting point for DCs, referral to a PCP is appropriate for conditions outside of chiropractic scope and/or unresponsive to chiropractic care. This is particularly applicable in instances where the DC does not have a strong indication of the next steps in medical management. For instances in which the DC has a greater sense of direction, a particular medical specialty may be considered.

Family Medicine

Family medicine is similar to internal medicine but has a more direct focus on family and community, spanning all

Table 1 - The Specialties

Specialty	Training	Subspecialties	Relevant Practice
Internal medicine[23,24]	3-y residency; optional fellowships/subspecialties	Addiction medicine Adult congenital heart disease Advanced heart failure and transplant Cardiovascular disease Clinical cardiac electrophysiology Clinical informatics Critical care medicine Endocrinology, diabetes, and metabolism Gastroenterology Geriatric medicine Hematology Hospice and palliative medicine Infectious disease Internalmedicine—pediatrics Interventional cardiology Medical oncology Nephrology Pulmonary disease Rheumatology Sleep medicine Transplant hepatology	Diagnostic Consultation Laboratory imaging Therapeutic Medication Referral
Family medicine[25,26,43]	3-y residency; optional fellowships/subspecialties	Adolescent medicine Geriatric medicine Hospice and palliative medicine Pain medicine Sleep medicine Sports medicine	Diagnostic Consultation Laboratory imaging Therapeutic Medication Referral
Emergency medicine[27,28]	4-y residency; optional fellowships/subspecialties	Addiction medicine Clinical informatics Emergency medical services Medical toxicology Pediatric emergency medicine Sports medicine Undersea and hyperbaric medicine	Diagnostic Consultation Laboratory imaging Therapeutic Medication Wound care Expeditious referral to surgery, medical, or psychiatric care
Physical medicine and rehabilitation[29,30]	4-y residency; optional fellowships/subspecialties	Brain injury medicine Neuromuscular medicine Pain medicine Pediatric rehabilitation medicine Spinal cord injury medicine Sports medicine	Diagnostic Consultation Electrodiagnostic studies Laboratory Imaging Therapeutic Medication Trigger point injections Botox injections Joint injections Therapeutic exercise Brace and artificial limb prescription

age-groups. Again, family medicine doctors serve as PCPs for all health conditions, including musculoskeletal issues. Therapeutic interventions that are typically used for musculoskeletal conditions include medication management and injections not requiring fluoroscopy. Residency training is 3 years following medical school with optional fellowships ranging from 1 to 3 years in length. Relevant subspecialties are geriatric and sports medicine.[25,26]

Emergency Medicine

Emergency medicine is dedicated to the diagnosis and treatment of unforeseen illness or injury. This can include

Table 1 - Continued.

Specialty	Training	Subspecialties	Relevant Practice
Neurology[31,32]	4-y residency; optional fellowships	Brain injury medicine Clinical neurophysiology Endovascular surgical neuroradiology Epilepsy Neurodevelopmental disabilities Neuromuscular medicine Pain medicine Sleep medicine Vascular neurology	Diagnostic Consultation Electrodiagnostic studies Laboratory Imaging Therapeutic Medication Trigger point injections Botox injections
Pain medicine[33,34]	Fellowship-trained anesthesiologists, neurologists, physiatrists, or psychiatrists; 1-y postresidency		Diagnostic Consultation Electrodiagnostic studies Laboratory Imaging Therapeutic Medication Pulsed radio frequency Neuromodulation Nerve ablation Intrathecal pump Spinal cord stimulation Trigger point injections Botox injections Joint injections Interventional procedures
Rheumatology[35,36]	Fellowship-trained internists (adult rheumatology) and pediatricians (pediatric rheumatology); 2-y postresidency		Diagnostic Consultation Laboratory imaging Cytopathology Chemical pathology of aspirated joint fluid Therapeutic Medication Joint injections Joint aspirations
Radiology[37,38]	5-year residency; optional fellowships	Abdominal radiology Clinical informatics Endovascular surgical Neuroradiology Interventional radiology Musculoskeletal radiology Neuroradiology Nuclear radiology Pediatric radiology Vascular and interventional radiology	Diagnostic Consultation Radiographs Magnetic resonance imaging Computed tomographic fluoroscopy Interventional radiology Ultrasound nuclear medicine Mammography Positron emission tomographic scan Therapeutic (depends on subspecialty) Radiation therapy Angioplasty Atherectomy Thrombolysis Embolization Occlusion of brain aneurysms

Table 1 - Continued.

Specialty	Training	Subspecialties	Relevant Practice
Orthopedic surgery[39,40]	5-y residency; optional fellowships	Adult Reconstructive orthopedic surgery Foot and ankle orthopedic surgery Hand surgery Musculoskeletal oncology Orthopedic sports medicine Orthopaedic surgery of the spine Orthopaedic trauma Pediatric orthopedic surgery	Diagnostic Consultation Diagnostic imaging Therapeutic Surgery Arthroscopy Arthroplasty Joint injections Brace prescription and casting
Neurological surgery[41,42]	6–8-y residency	Endovascular surgical neuroradiology	Diagnostic Consultation Diagnostic imaging Therapeutic Surgery

significant trauma, acute neurologic incident, suspicion of acute cauda equina syndrome, or referral for significant signs/symptoms when the PCP is not available. Emergency room doctors serve as the PCP for emergency situations for all health conditions, including musculoskeletal diseases. Emergency medicine may be practiced in a hospital-based emergency department, in an urgent care clinic, in an emergency medical response vehicle, or at a disaster site. Therapeutic interventions include medication management, wound care, or expeditious referral to surgery, medical, or psychiatric care. Required residency is 4 years, with optional fellowships ranging from 1 to 3 years each. Some subspecialties that may be important in the context of musculoskeletal conditions are emergency medical services, pediatric emergency medicine, and sports medicine.[27,28]

Physical Medicine and Rehabilitation

Physical medicine and rehabilitation, also called physiatry, is involved with prevention, diagnosis, and treatment of conditions related to the brain, musculature, bones, and nerves ranging from brain injury to back pain. In addition to clinical and imaging diagnosis, physiatrists can utilize electrodiagnostic studies, which measure changes in electrical activity related to neuropathy, myopathy, and related conditions. Therapeutic interventions can include trigger point injections, Botox injections, ultrasound-guided peripheral joint injections, therapeutic exercise/coordination with physical therapies, and brace/artificial limb prescription. Residencies are 4 years, with optional fellowships ranging from 1 to 2 years. Musculoskeletal-related subspecialties include neuromuscular medicine, pain medicine, pediatric rehabilitation medicine, spinal cord injury, and sports medicine.[29,30]

Neurology

Neurology involves the diagnosis and treatment of diseases or impaired function of the brain, spinal cord, peripheral nerves, muscles, autonomic nervous system, related vasculature, and neuromuscular conditions, particularly headache. Similar to physiatrists, neurologists may utilize electrodiagnostic studies to aid in diagnosis. Some interventions used for musculoskeletal conditions include trigger point injections, Botox injections, and ultrasound-guided joint injections. Residency is 4 years in length, with optional fellowships ranging from 1 to 4 years. Pertinent subspecialties are brain injury medicine, neurodevelopmental disabilities, neuromuscular, and pain medicine.[31,32]

Pain Medicine

Pain medicine is concerned with the prevention, evaluation, treatment, and rehabilitation of people suffering from pain disorders: acute pain, chronic pain, oncologic pain, and neuropathic pain. Pain medicine uses a patient-centered approach (with open communication between the patient and the clinician) that considers the whole person, encourages healthy lifestyle changes, restores wellness, brings together all appropriate modalities/approaches/clinicians to achieve these aims, and encourages a team approach (with the patient serving as an active member of the team).[33,34]

Pain medicine physicians manage musculoskeletal and radicular conditions, most commonly using injections or other interventional procedures. General diagnostic tools include advanced imaging or electrodiagnostic studies. Therapeutic practices related to musculoskeletal conditions include analgesic medication management, trigger point injections, Botox injections, peripheral joint injections, fluoroscopic spinal/pelvic joint injections, epidural injections (transforaminal, interlaminar, or caudal), radiofrequency ablation, intrathecal pump, and spinal cord stimulator implantations. Pain medicine is an optional 1-year fellowship most commonly following anesthesiology, neurology, or physiatry residencies.[33,34]

Rheumatology

Rheumatology focuses on the pathogenesis, diagnosis, and management of over 100 complex disorders, including

autoimmune disease, arthritis, musculoskeletal conditions, and fibromyalgia, in addition to common musculoskeletal conditions, such as osteoarthritis and osteoporosis. Diagnostic techniques include cytopathology and chemical pathology of aspirated joint fluid. Some therapeutic interventions relevant to musculoskeletal conditions are trigger point injections, Botox injections, joint injections, and aspirations. Rheumatology requires a 2-year fellowship performed after internal medicine or pediatric residencies.[35,36]

Radiology

Diagnostic radiology includes image-based diagnosis and image-guided therapeutic techniques. Radiologists are specialists in the interpretation of all imaging studies and are likely the most common specialists chiropractors may interact with regarding diagnostic assessment of musculoskeletal cases. The principal diagnostic tools used are conventional x-rays, ultrasound, computed tomography, magnetic resonance imaging, and nuclear medicine, including positron emission tomography. Interventional radiology is an imaging-based therapeutic subspecialty that employs techniques including angioplasty, atherectomy, thrombolysis, embolization, and occlusion of brain aneurysms. Residency is 5 years, with fellowships lasting from 1 to 2 years. Some important subspecialties include abdominal radiology, neuroradiology, musculoskeletal radiology, and pediatric radiology.[37,38]

Orthopedic Surgery

Orthopedic surgery focuses on prevention and diagnosis of musculoskeletal disorders and injury and their treatment with medical, surgical, and physical techniques. Orthopedic surgeons typically specialize in either spine or extremity conditions. Advanced imaging is used to aid in diagnosis. Typical interventions used include surgery, arthroscopy, arthroplasty, joint injections, brace prescription/casting, and therapeutic exercise/coordination with physical therapies. Residency is 5 years, with optional fellowships of a year. All orthopedic subspecialties are concerned with musculoskeletal conditions.[39,40]

Neurological Surgery

Neurological surgery is a surgical specialty that provides care for adult and pediatric patients in the diagnosis and treatment of pathological processes that modify the function of the central nervous system and peripheral nervous system, autonomic nervous system, supporting structures (meninges, skull, skull base, and vertebral column), and their vascular supply. Neurosurgeons may specialize in spine, central nervous system, or peripheral nervous system cases or may include a combination thereof. Advanced imaging is the principal means of diagnosis. Treatment commonly involves operative management, including laminectomy, discectomy, spinal fusion, instrumentation, tumor resection, and vascular surgery, including aneurysm repair. Residency is 7 years, with optional fellowships of a year.[41,42]

DISCUSSION

To keep up with trends in the health care system, to be positioned for advances in chiropractic integration, and to improve patient outcomes, chiropractors need to collaborate with the PCP and a variety of medical and/or surgical specialties. A deeper understanding of the similarities and differences in the training and typical practices of medical providers may enhance a chiropractor's knowledge to participate in interprofessional collaborative team-based care.

This preliminary work describes the medical and surgical specialties proposed to be most relevant to general chiropractic practice in the United States. While there is considerable overlap in the range of conditions seen and diagnostic/therapeutic tools utilized by various medical specialties, there are unique characteristics within each specialty's focus. A baseline understanding of the specialties presented herein is an important underpinning for chiropractic practice. Other medical specialties may be applicable to chiropractors who serve more of a niche patient population. This could include occupational medicine, sports medicine, obstetrics and gynecology, oncology, and pediatrics.

Limitations

This preliminary descriptive analysis did not assess the implementation or evaluation components of the instructional design process.[15] Future work is needed to address these aspects. Also, the consensus and consultation process could have been more structured, using Delphi methodology or a similar approach.

CONCLUSION

This work describes 8 medical and 2 surgical specialties proposed to be most relevant to general chiropractic practice in the United States. The material presented in this article may be used to inform curricular content and may be relevant to DC educational policy and practice.

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