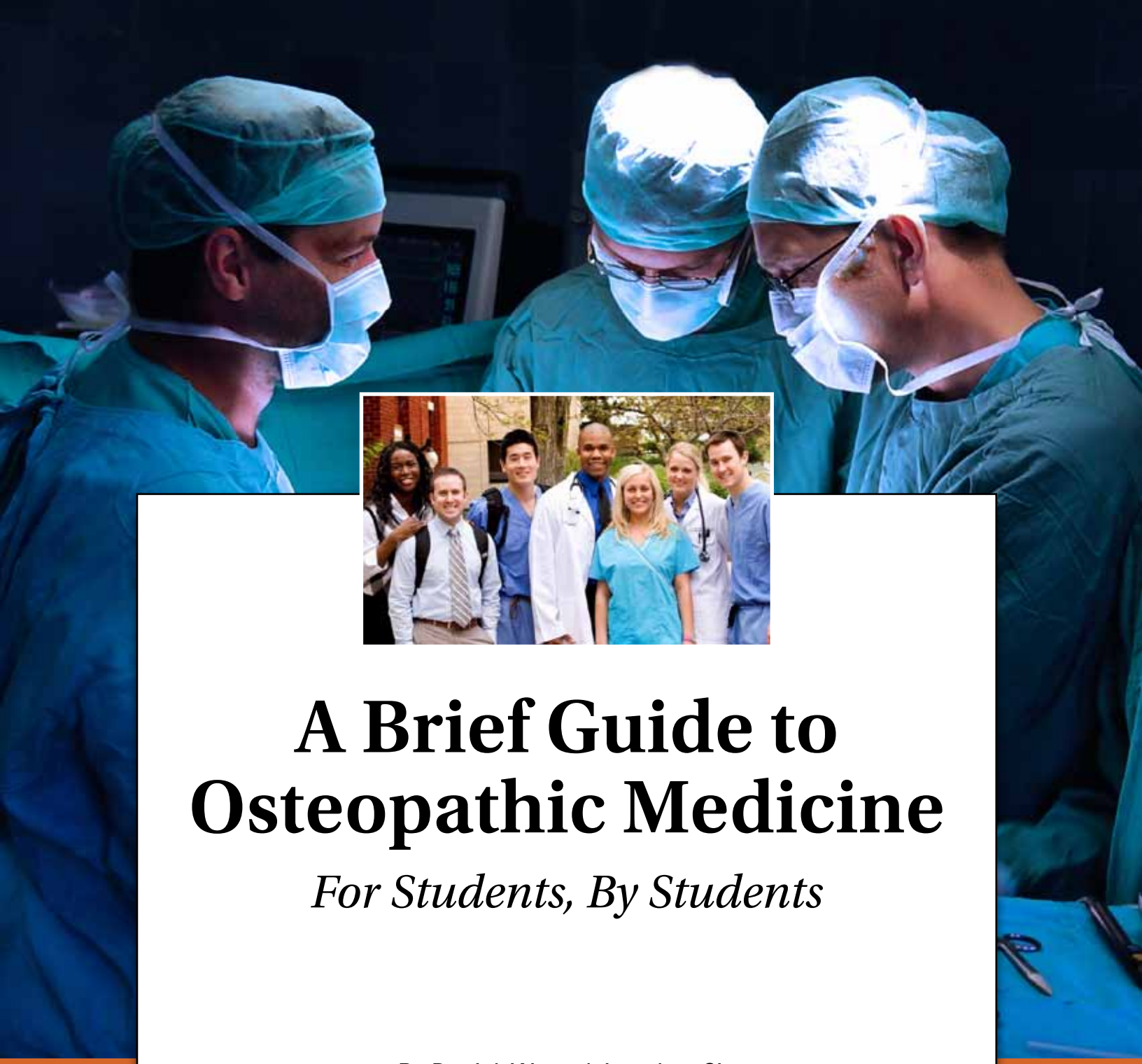

A Brief Guide to Osteopathic Medicine

For Students, By Students

By Patrick Wu and Jonathan Siu

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Dedication

This guidebook is dedicated to Dr. Patricia Rehfield for all her insight and support throughout the many months leading up to its publication.

Acknowledgements

To my sister Sophia and my friend Aysun for first introducing me to the world of osteopathic medicine. To my brother Nelson and my parents. And, to all my current and former classmates and professors, without whom my passion for osteopathic medicine would not be nearly so deep.

- Patrick Wu

Special thanks to Yuri, who has provided me endless support. I would not be where I am today without my Uncle Leo and Dr. Yue, who introduced me to osteopathic medicine, my sister Natalie and my parents, who placed their trust in me, and my friends and teachers in medical school, who have each inspired me in their own way.

- Jonathan Siu

Introduction

The decision to enter medical school is undoubtedly one of the most important decisions in a physician's life. Yet, the majority of Americans are not aware that two different medical schools of thought exist in the United States today: allopathic medicine and osteopathic medicine. While allopathic medical doctors, MDs, are almost universally recognized as being fully licensed physicians, most Americans would have difficulty defining an osteopathic physician (DO). In fact, many patients visit DOs every day without realizing they are receiving medical care from an osteopathic physician.

This short text was prepared as a guide to osteopathic medicine for the aspiring physician. When we began considering application to medical schools, neither of us had heard of the DO degree or osteopathic medicine. And even when we had been exposed to osteopathic medicine, we didn't have the time to properly educate ourselves; we were too busy studying for the MCAT, gathering letters of reference and writing personal statements – not to mention attending classes, volunteering, shadowing, working part-time and holding several leadership positions. We were basically doing anything and everything we could to make ourselves strong candidates for medical schools. In writing this guidebook, our goal is to give the prospective or current medical school student (and anyone else who might be interested) a convenient package with which to understand osteopathic medicine.

You may be thinking to yourself, "What can two second-year medical students tell me that I don't already know?" While we realize that we still have infinitely more to learn about the osteopathic approach to medicine (and medicine in general), we do currently attend an osteopathic medical school. Perhaps more important, we were in your position not too long ago, and we remember very clearly what it was like to be a "pre-med" student. We hope that because of this, we can better relate to some of your concerns than would, for instance, someone with more training and experience. We wish to convey to you the "osteopathic difference," that is, the difference it makes to attend an osteopathic medical school versus an allopathic medical school. Even after only one year of study, we could not imagine not being able to touch or interact with patients in the osteopathic manner throughout our training and future clinical practice. Osteopathic manipulative medicine and the art of palpation have truly become integral and meaningful parts of our medical training.

In writing this guidebook, our goal is not to impose our personal opinions about osteopathic medicine on you, but rather to present an overview of the profession that has been reviewed by our colleagues and professors and includes pertinent findings obtained through a systematic literature review of reputable sources.

The guidebook is divided into four chapters. The first chapter is an overview of what osteopathic medicine is and what a DO does. Chapter 2 delves into the philosophy and history of osteopathic medicine, from its modest U.S. origins to its widespread reach all around the world today. Chapter 3 consists of an outline of the different techniques involved in osteopathic manipulative medicine (OMM) and an FAQ section concerning OMM. Finally, in Chapter 4, we discuss the growing opportunities available for osteopathic medical students and DOs.

By the time you finish reading this guide, you should have a basic understanding of what osteopathic medicine is, and perhaps a desire to pursue it in the future. Our hope is that this knowledge will be carried on to your friends, family, classmates, co-workers and colleagues, thereby raising awareness of the osteopathic medical profession in your respective communities.

– Patrick Wu, Osteopathic Medical Student, MPH Candidate
& Jonathan Siu, Osteopathic Medical Student

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Myth or Fact?

In this section, we discuss some of the most common misconceptions about osteopathic medicine that exist among the general public and even among some members of the medical profession.

1. **MYTH:** *DOs are not "real doctors."*

   FACT: U.S.-trained DOs can prescribe medications, perform surgery, and pursue medical specialties in the same manner that MDs do.

2. **MYTH:** *DOs have limited practice rights.*

   FACT: In the United States, DOs and MDs are held equally in the eyes of the law and thus have full practice rights in all 50 states and the District of Columbia. However, only U.S.-trained DOs are considered full physicians (along with MDs) in the United States.

3. **MYTH:** *Osteopathic medicine is a drugless form of medicine.*

   FACT: Osteopathic medicine's founder, Andrew Taylor Still, originally intended for his form of medicine to utilize only a select few medications in certain situations at its conception in the 1800s. However, osteopathic medicine is science-based and has greatly evolved since then. During its evolution, osteopathic medicine has incorporated varied modalities of care, including (but not limited to) pharmaceutical drugs. Since 1929, pharmacology and the use of prescription medication have been taught in all osteopathic medical schools.

4. **MYTH:** *DOs are similar to chiropractors.*

   FACT: While osteopathic manipulative medicine bears some similarity to chiropractic, the two fields of health care represent completely different and separate schools of thought and practice, and have since each was conceived in the late 1800s. A detailed breakdown of the differences between osteopathic physicians and chiropractors is provided in **Chapter 3**.

5. **MYTH:** *DOs are just doctors who couldn't get into MD schools.*

   FACT: While some osteopathic medical students choose a DO school after being denied admission to their MD school of choice, many applicants choose to apply only to osteopathic schools based on prior contact with the profession or an interest in primary care. Still others choose to attend a DO school even after gaining admission to MD schools because of the "osteopathic difference."

6. **MYTH:** *"Osteopaths" are the same thing as "osteopathic physicians."*

   FACT: Both American osteopathic physicians and European osteopaths call themselves DOs. American practitioners are Doctors of Osteopathic Medicine, and European practitioners have a Diploma of Osteopathy. There is, thus, some confusion regarding the difference between U.S osteopathic physicians and osteopaths trained in other countries. Osteopaths (the term used for foreign-trained practitioners who practice osteopathic manipulation) are not physicians. Their training focuses on the musculoskeletal system and they are not licensed to prescribe medications or perform surgeries. They are trained primarily in the practice of osteopathic manipulative techniques. Conversely, U.S.-trained osteopathic physicians are fully licensed to practice the entire scope of modern medicine. Although you may hear U.S.-trained osteopathic physicians being referred to as osteopaths, most prefer the term "osteopathic physician" practicing *osteopathic medicine* in order to distinguish themselves from foreign-trained osteopaths practicing *osteopathy*.[1]

   This confusion has resulted in some reluctance in countries abroad to accept DOs as fully licensed physicians. Nevertheless, U.S.-trained DOs currently hold full medical practice rights in over 45 countries, and restricted rights in a few others.

1 Schierhorn C. AOA House reasserts preferred terms *osteopathic physician, osteopathic medicine. The DO*. Aug 4, 2010. Available from: American Osteopathic Association, Chicago, IL. Accessed Aug 6, 2011.

Chapter 1

What is a DO?

"Something Extra, Not Something Else"

Fast Facts:

- There are currently 63,000 osteopathic physicians[1] in practice in the United States. (This number is projected to be over 100,000 by the year 2020)[1,2]
- More than 20 percent of new medical students in the United States are training to be osteopathic physicians.[2] (By 2020, this number will grow to 25 percent.)[3,4]
- During the 2011-2012 academic year, there were more than 20,000 osteopathic medical students in training.[5]
- More than 5,600 new first-year osteopathic medical students matriculated at the start of the 2011-2012 academic year.[6]
- There were more than 14,000 applicants to osteopathic medical colleges during the 2010-2011 application season.[2]
- Osteopathic physicians comprise roughly 7 percent of the practicing physician population in the United States, but account for 16 percent of the total number of patient visits in communities with small populations (fewer than 2,500).[2]

There are two types of fully licensed medical doctors in the United States: MDs and DOs. While the MD degree stands for "Doctor of Medicine," the DO degree stands for "Doctor of Osteopathic Medicine." DOs practice osteopathic medicine, which represents a school of medical thought first introduced by Dr. Andrew Taylor Still in 1874. Osteopathic medicine encompasses a unifying philosophy and approach to patient care, as well as a system of diagnosis and treatment through the use of hands-on, manual manipulative medicine.

There exists a great deal of similarity between osteopathic medicine and what is known as "allopathic" (MD) medicine. Osteopathic physicians work alongside their MD counterparts in the same hospitals, private practices, and academic institutions. Like MDs, DOs are licensed to practice medicine, perform surgery, and prescribe medications in all 50 states. They may enter any specialty of medicine that they desire; such specialties range from primary care, such as pediatrics, internal medicine and family practice, to more specialized fields such as surgery, radiology, and anesthesiology. Both MDs and DOs can serve in all branches of the military service, and the two professions they represent are seen equally in the eyes of the law.[2]

So what makes osteopathic medicine different? First of all, osteopathic medicine, as an establishment and a profession, is very much separate from the allopathic medical profession. Accreditation organizations differ between the two professions. The American Osteopathic Association (AOA) serves as the primary certifying body and accreditation agency for health care facilities and graduate medical education, and the AOA Commission on Osteopathic College Accreditation (COCA) accredits the osteopathic medical colleges. The Accreditation Council for Graduate Medical Education (ACGME, which also accredits dual residency programs) and the Liaison Committee on Medical Education (LCME) serve allopathic medicine in a similar fashion. In addition, just as there are specifically osteopathic colleges, there are osteopathic board examinations, residency programs, hospitals, professional associations, and scientific journals. Depending on the state, boards granting medical licensure may be mixed (DO and MD) or separate, with distinct osteopathic boards handling only DO licensure.[7] Due to the disproportionate geographic distribution of DOs in the United States, which tends to be most concentrated the Midwest and Northeast, the presence of osteopathic medicine is greater in some states than others. States with larger DO populations are more likely to have separate osteopathic licensing boards than those with smaller DO populations.

But what really distinguishes osteopathic medicine is the unifying approach and philosophy by which its physicians are guided in their practice of medicine. DOs pride themselves on their emphasis on preventive medicine, a patient-centered, holistic approach to care, and patient empowerment to strive toward the body's natural, optimal state of structure, function, self-healing and health. They also utilize diagnosis and manual manipulation of the neuromusculoskeletal system and stress its interconnectedness with every other organ system in the body. The belief in the "osteopathic difference" is quite widespread among osteopathic physicians. In fact, a random national mail survey of 950 osteopathic physicians found that a majority (59 percent) of respondents believed that their manner of

practice as a DO was different from that of MDs. Furthermore, 72 percent of these 560 respondents cited distinctions in their approach to medical care, such as the use of osteopathic manipulative medicine (OMM), a caring doctor-patient relationship, and a hands-on style of treatment and diagnosis, as main distinguishing factors.[8]

The 2003 Maine Osteopathic Outcomes Study (MOOS) set out to answer the question, "Do osteopathic physicians differ in patient interaction from allopathic physicians?" Researchers took audio-recordings of patient visits with both MDs and DOs and used a 26-item index of physician-patient communications considered to be reflective of modern osteopathic principles to judge the hypothesized difference in patient interaction. The study found that the DOs demonstrated a more personal, "osteopathic" communication style based on the 26-item index than did the MDs. The DOs were significantly more likely to use the patient's first name, discuss preventive measures, and discuss the patient's emotional state, family life, and social activities. Despite the study being small (18 participant physicians and 54 patient visits total), it was conducted in a double-blind fashion and offers important insights into the distinction between DOs and MDs.[9]

Increasingly, however, the lines between DO and MD are becoming blurred. In medicine today, "the training, practice, credentialing, licensure, and reimbursement of osteopathic physicians are virtually indistinguishable from those of allopathic physicians, with 4 years of osteopathic medical school followed by specialty and subspecialty training and [board] certification."[10] Bob Jones, author of *The Difference a D.O. Makes*, once proclaimed, "Osteopathic medicine is something extra, not something else."[11] He was referring to the additional 200 – 300 hours of osteopathic-specific instruction that osteopathic medical students receive in conjunction with coursework equivalent to that of their allopathic counterparts.[2]

The osteopathic curriculum consists of all the traditional disciplines: anatomy, behavioral science, biochemistry, biostatistics, embryology, genetics, histology, immunology, microbiology, pathology, pathophysiology, pharmacology and physiology (see Figure 1-1). Osteopathic medical students often study the same textbooks used in allopathic schools, and are taught by DOs as well as MDs.[12] However, unlike their allopathic counterparts, osteopathic students also spend at least 200 hours of preclinical education learning about the history of osteopathic medicine, the core osteopathic principles and philosophies, and OMM.[2] After attending medical school, which is usually composed of two years of in-classroom didactic courses followed by two years of clinical rotations in office, clinic, and hospital settings, osteopathic physicians go on to complete three to eight years of residency, the length of which depends on the specialty the doctor elects to pursue (see Table 1-1). While MD students typically rotate through large affiliated hospitals during their clinical years, osteopathic medical students are often exposed to a wider variety of clinical settings (i.e., hospitals of varying size, community-based clinics, etc.).

Figure 1-1. A general guide to the osteopathic medical school curriculum. Please check with individual colleges of osteopathic medicine for specifics.

Year 1	Year 2	Core Clinical Clerkships (Years 3 and 4)	Other Clinical Clerkships (Years 3 and 4)
Anatomy	Gerontology	Emergency Medicine	Anesthesiology
Physiology	Cardiology	Family Medicine	Cardiology
Clinical Skills	Gastrointestinal System	Internal Medicine	Gastroenterology
Radiology	Hematopoietic System	Obstetrics and Gynecology	Laboratory Medicine
Osteopathic Principles and Practices	Osteopathic Principles and Practices	Osteopathic Principles and Practices	Nephrology
Microbiology and Immunology	Pharmacology	Pediatrics	Neurology
Neuroscience	Endocrinology	Psychiatry and Behavioral Science	Oncology and Hematology
Histology	Psychiatry	Surgery	Orthopedics
Biochemistry	Respiratory		Otorhinolaryngology
Pathology	Ethics and Jurisprudence		Pulmonary Medicine
Doctor/Patient Communication	Family Medicine		Radiology
	Genitourinary System		
	Reproductive System		
	Pediatrics/Growth and Development		

Table 1-1. Steps to Licensure in the United States: DO vs. MD

	Doctor of Osteopathic Medicine (DO)	Doctor of Medicine (MD)
Pre-medical Requirements	Varies by school; most often: • General Chemistry: 2 semesters/3 quarters (with laboratories) • General Biology: 2 semesters/3 quarters (with laboratories) • Organic Chemistry: 2 semesters/3 quarters (with laboratories) • General Physics: 2 semesters/3 quarters (with laboratories) • Often additional Mathematics and/or English and Writing courses may also be required	
Standardized Admissions Examination	Medical College Admissions Test (MCAT)	Medical College Admissions Test (MCAT)
Years of medical school	4	4
Medical Licensing Exams:		
Step 1	COMLEX Level 1 required; USMLE Step 1 optional	USMLE Step 1 required
Step 2	COMLEX Level 2 required; USMLE Step 2 optional	USMLE Step 2 required
Step 3	COMLEX Level 3 required for some states[t] USMLE Step 3 optional	USMLE Step 3 required
Residency	Choice of one of the following: ACGME AOA Parallel/Dually Accredited (by ACGME and AOA)	ACGME
Board Certification	Osteopathic (AOA) or allopathic (ABMS) medical specialty boards	Allopathic (ABMS) medical specialty boards

Some states require the first year of residency (PGY-1) be AOA-approved; Resolution 42.
[t] These states are: California, Tennessee, Pennsylvania, West Virginia, Michigan, Oklahoma, Florida, and Vermont.

Producing competent *primary care physicians*, in particular, is part of the mission statement of many, if not all, U.S. osteopathic medical schools. According to the 2011 *U.S. News and World Report,* a popular source of medical school rankings, osteopathic medical schools rank among the top producers of primary care doctors in the nation, with Michigan State University College of Osteopathic Medicine (MSUCOM) being the top-ranked medical school in this category.[13] Consequently, some curricula may place a greater emphasis on such skills as bedside manner, interviewing and building the physician-patient relationship. These schools do not in any way force students to go into primary care – many students simply choose to do so.[14]

Osteopathic medical schools also use differing criteria when selecting candidates to interview and/or extend offers of admission. For example, in the evaluation of applicants, osteopathic medical schools place more emphasis on candidates' interest in and knowledge of osteopathic philosophy. They also are more likely to seek out students who are interested in pursuing careers in primary care and in rural or underserved areas.[3] Osteopathic admissions programs often view the candidate as a whole, and are more forgiving in the sense that they accept grade replacement for repeated courses. They are less likely to place as much emphasis on Medical College Admissions Test (MCAT) scores and/or GPAs as allopathic schools do.[12]

These differing criteria may explain some of the existing disparities in average admissions statistics between admitted students of osteopathic medical schools and those of allopathic medical schools. The 18,665 matriculating allopathic students in 2010 had an average combined MCAT score of 31.1 (Physical Science: 10.4, Verbal Reasoning: 9.9, Biological Science: 10.8) and average GPAs of 3.61, 3.75, and 3.67 for science, non-science, and total, respectively.[15] In contrast, the same year, the 5,428 matriculating osteopathic medical students had an average MCAT score of 26.49 (PS: 8.51, VR: 8.69, BS: 9.29) with average science, non-science, and total GPAs of 3.36, 3.57, and 3.47, respectively.[16]

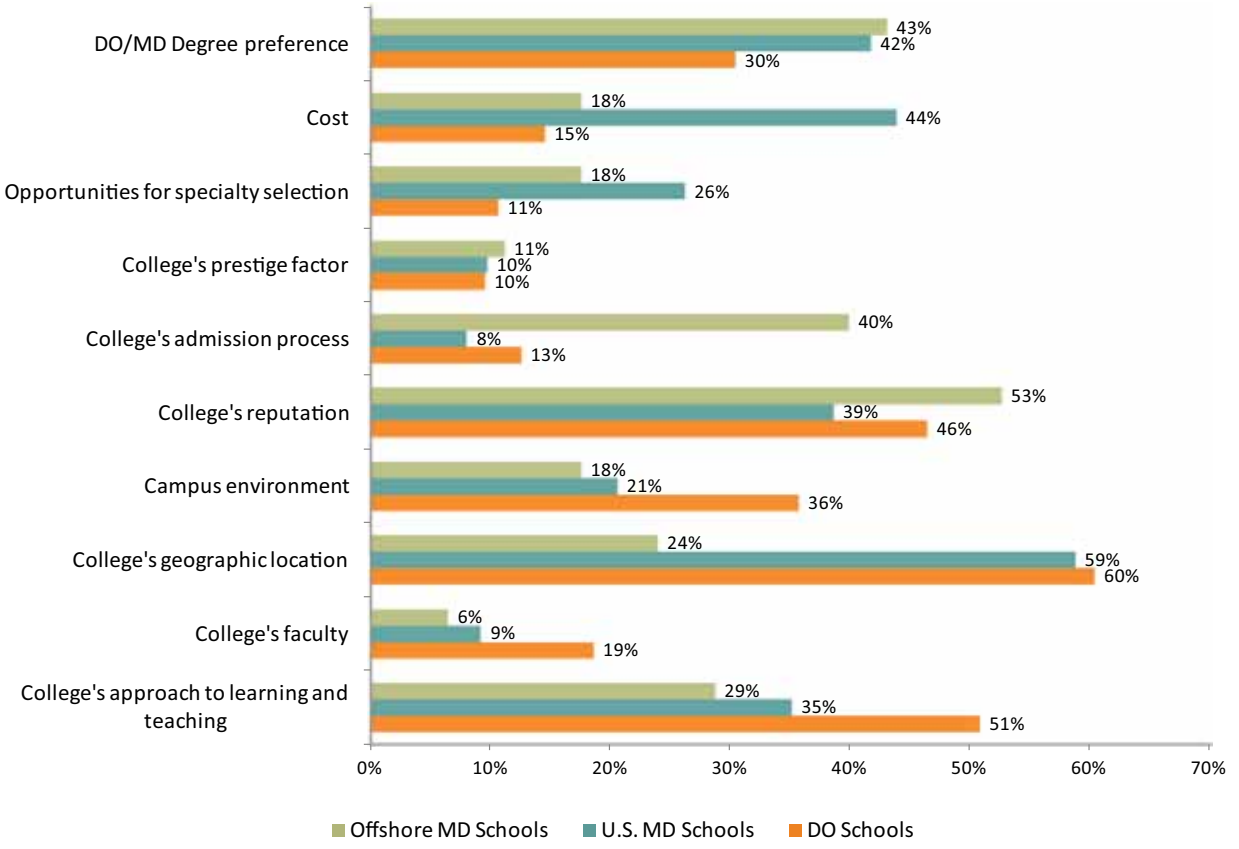
The other major factor contributing to this disparity is the difference in the actual applicant pools. Currently, the majority of medical school applicants do not apply to osteopathic medical programs, likely due to a general lack

of accessible and reliable information concerning osteopathic medicine. Many applicants have not had any significant exposure to the osteopathic profession, lack mentors familiar with the field, or have been misinformed by their peers and advisers. From our personal experience, this misinformation can sometimes perpetuate misconceptions, including the perception that osteopathic schools serve primarily as a "Plan B" rather than as an equally viable alternative to allopathic schools.

In fact, in a survey conducted by AACOM in which 3,301 respondents of 13,147 students who applied during the 2010 AACOMAS application cycle were asked to rank their top three reasons for matriculating at a particular medical school (osteopathic or allopathic), an MD student's preference of having an MD over a DO degree was ranked below geographic location and cost. The chart below presents the possible reasons for matriculation that were listed in the survey:[17]

Only a minority of the overall U.S. population is actually aware of the existence of DOs. In a national, random digit-dialing telephone survey of 499 adult, non-institutionalized, household respondents conducted in 2000, only 46 percent were aware of osteopathic physicians, while 16 percent knew they had actually visited a DO and a mere 7 percent knew they were current DO patients. Awareness was found to be directly associated with age, education, race, and Midwest residence (probably due to osteopathic medicine's Midwest origins).[18] Thus, young adults, who represent the majority of the medical school application pool, are thought to have a lower awareness of osteopathic medicine. However, the results of OSTEOSURV 2010, the most recent update to this decennial national survey, are set to be released later this year and may reflect the recent upsurge in the osteopathic physician population (see Figure 2-1).

While the admissions criteria and statistics may differ between osteopathic and allopathic medical schools, the student demographics in the two professions are fairly similar in terms of race/ethnicity, and are virtually identical in terms of sex, as detailed in Figure 1-2, Table 1-2, Figure 1-3, and Table 1-3.[19, 20, 21] However, racial minorities are consistently underrepresented in the medical profession, and this issue seems to be more pronounced in the osteopathic medical student population. The reasons



Source: American Association of Colleges of Osteopathic Medicine

Figure 1-2. Osteopathic Student Enrollment (2010-2011)

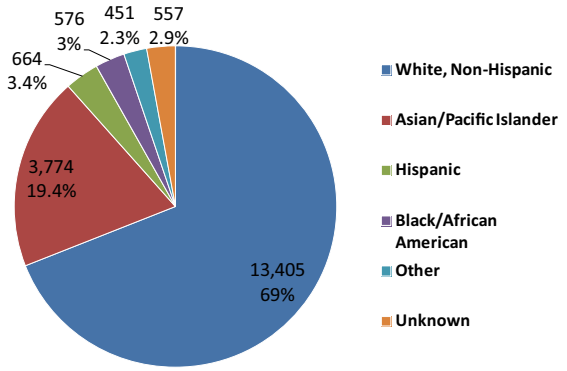


Table 1-2. Comparison of Race/Ethnicity Breakdown: Osteopathic vs. Allopathic

	Osteopathic (2010 - 2011)	Allopathic (2010)
White	69.0%	60.1%
Asian/ Pacific Islander	19.4%	22.3%
Hispanic/Latino	3.4%	8.2%
Black/African American	3.0%	7.0%
Other	2.3%	2.6%
Unknown	2.9%	2.8%

for this are complex, but one potential factor may be that osteopathic medical schools have less funding devoted to scholarships for economically disadvantaged students. Nevertheless, underrepresented minority students should not be discouraged from applying to osteopathic medical schools based on the current student population's racial composition. These statistics are simply statistics and do not in any way reflect bias against minorities within the osteopathic medical profession. Also, while osteopathic medical students have historically been older than their allopathic counterparts, the average age of students matriculating into osteopathic schools seems to be getting progressively younger every year. In 2010, it was 24.6 years old, not much older than the average age of MD school matriculants in the same year, which was 24.[22, 23]

If becoming a physician is your goal, the statistics and information provided above should be enough to show that there are indeed two similar, legitimate paths you can take to become trained as a physician in the United States. As we have also pointed out, however, there are several fundamental differences between allopathic and osteopathic education and practice. In the next chapter, we will discuss the history and origin of osteopathic philosophy in order to explain how this profession's foundation was laid over a century ago.

Figure 1-3 Osteopathic Student Enrollment by Sex (2010-2011)

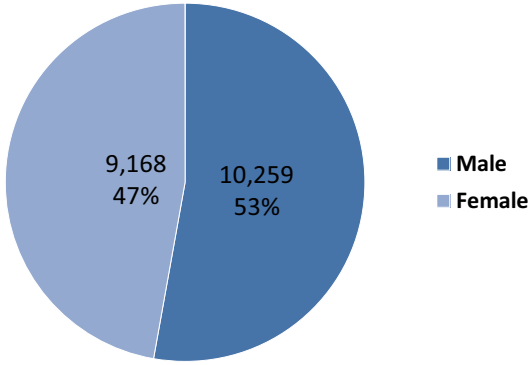


Table 1-3. Comparison of Sex Breakdown: Osteopathic vs. Allopathic

	Osteopathic (2010 - 2011)	Allopathic (2010)
Men	52.8%	52.6%
Women	47.2%	47.4%

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Chapter 2

The Philosophy and History of Osteopathic Medicine

The DO Difference: Not Just Manipulative Medicine

Fast Facts:

- Osteopathic medicine was founded in 1874 by Andrew Taylor Still.
- The American Osteopathic Association (AOA) defines osteopathic medicine as "a complete system of health care with a philosophy that combines the needs of the patient with the current practice of medicine."[1]

> "The human body is a machine run by the unseen force called life, and that it may be run harmoniously it is necessary that there be liberty of blood, nerves, and arteries from their generating point to their destination."
>
> *– Dr. Andrew Taylor Still*[1]

There are two main distinctions between osteopathic and allopathic physicians. The first, more obvious difference lies in the osteopathic physicians' use of osteopathic manipulative medicine (OMM). While OMM is most commonly known by the general public to treat neuromusculoskeletal injury, DOs may utilize it in their diagnosis and treatment of disease involving internal organs and all other parts of the body as well. The other, more subtle – and arguably more important – distinction between the two professions is that osteopathic medicine offers a concise philosophy on which all clinical practice is based. Central to this philosophy is the belief that the body has an inherent healing mechanism that allows it to maintain health, resist illness, and recover from disease processes. The goal of osteopathic medical treatment is to provide patients with the tools they need to restore and maintain their natural, self-healing state. The four major tenets of the osteopathic medical philosophy are listed and briefly explained below: [2, 3]

1. **The body is completely united; the person is a fully integrated being of body, mind and spirit.** No single part of the body functions independently. Each separate part is interconnected with all others and serves to benefit the collective whole of the person. Alterations in any part of the system, including an individual's mental and spiritual health, affect the function of the body as a whole and all other parts therein.

2. **The body is capable of self-regulation, self-healing, and health-maintenance.** Health is the natural state of the body, and the body possesses complex, homeostatic, self-regulatory mechanisms that it uses to heal itself from injury. In times of disease, when a part of the body is functioning sub-optimally, other parts of the body come out of their natural state of health in order to compensate for the dysfunction. During this compensatory process, however, new dysfunctions may arise. Osteopathic physicians must work to adjust the body so as to realign its parts back to normal. Osteopathic manipulative medicine aims to restore the body's self-healing capacity by decreasing allostatic load, or the physiologic effects of chronic bodily stresses,[1] and enhancing the immune system.

3. **Structure and function are reciprocally interrelated.** The structure of a body part governs its function, and thus abnormal structure manifests as dysfunction. Function also governs structure. In addition, if the body's overall structure is suboptimal, its functioning and capacity for self-healing will be inhibited as well.

4. **Rational treatment is based on an understanding of these three aforementioned principles.** These basic osteopathic tenets permeate all aspects of health maintenance and disease prevention and treatment. The osteopathic physician examines, diagnoses, and treats patients according to these principles.

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Background

WHILE OSTEOPATHIC MEDICINE was conceived fairly recently (less than 140 years ago), its history is rich and thought-provoking. The history of the osteopathic profession is central toward understanding the current state of osteopathic medicine and is thus taught as part of the osteopathic medical school curriculum. In fact, osteopathic medical students are often tested on the history and philosophy of osteopathic medicine, and are encouraged to integrate osteopathic teachings into their approach as clinicians. The rest of this chapter offers a concise history of osteopathic medicine. Much of the information we present here is derived from and elaborated on in much greater detail in Norman Gevitz's book, *The DOs: Osteopathic Medicine in America*, a must-read for anyone interested in learning more about the osteopathic profession.

Dr. Andrew Taylor Still (1828-1917) was the founder of osteopathic medicine. Osteopathic medicine was born in a time when many different approaches to medicine existed, some of them more rational than others. Indeed, common medical practices during this era included bloodletting and pharmacological use of toxic chemicals such as mercury and arsenic. Most of the drugs that are widely available today either had not been discovered or were not commonly recognized in Still's day. For example, Bayer did not patent aspirin until 1899, and it was not until 1935 that the first antibiotics (Sulfa drugs) became widely available.[4] Thus, it was only natural that other schools of medical thought sought to challenge orthodox practice. Homeopathy, one of the largest of these alternative schools, rejected common medical practice and instead based its remedies on empirical pharmacology and the concept of "like cures like," which stated that a drug whose physiological effects were most aligned with those of a particular disease could then be used to treat said disease. As much as 15 percent of the total U.S. physician population at this time adopted unorthodox approaches such as homeopathy.

Perhaps also surprising is the fact that medical doctors during this time did not receive four years of schooling at an established medical school like they do today. Usually they were trained first through apprenticeship under a licensed physician. Some would then elect to study in a medical college where they received brief schooling (frequently two years, the second being simply a review of the first).

Modest Beginnings

A.T. STILL first began studying medicine as an apprentice under the direction of his father, who was a physician as well as a preacher and missionary. During his apprenticeship, he treated Native American patients in the Kansas Territory. He then served in the Civil War as a surgeon. Later, he attended medical school at the College of Physicians and Surgeons in Kansas City, Missouri, but only completed his first year of schooling due to his frustration with the redundancy of medical education at the time. In 1864, Still lost three children to spinal meningitis, and from that point forward, he began to seriously question the efficacy of orthodox medicine and to search for a novel approach to medical practice.

Still's approach, which he termed "osteopathy," a combination of the Greek word *osteon*, meaning bone, and *pathology*, the study of disease, was but one of many emerging alternatives to allopathic thought at the time. In order to counter the suspect nature of the drugs utilized by orthodox medical doctors, many drugless modalities were established. These included hydropathy, the practice of drinking and immersing oneself in the purest water available, and magnetic healing, the use of magnets to restore bodily balance in terms of an invisible magnetic fluid. The latter, besides being drugless, also involved a philosophy of the body as a unit and the use of manual spinal

manipulations. All three of these characteristics struck a chord with Still. Through his study of anatomy, Still appreciated the interdependence in structure and function that existed between different tissues. Instead of proposing that a magnetic fluid gave balance to the body, however, he posited that obstruction of blood flow was the origin of disease. He also combined aspects of magnetic healing with the established trade of "bonesetting," or joint manipulation. He believed that the misplacement of spinal segments, for example, could interfere with nerve and/or blood supply, thus manifesting as disease.

The American School of Osteopathy

In the early 1870s, Still began to apply these principles to clinical practice and found that he could successfully treat a number of diverse ailments, including asthma, headache, sciatica, and paralysis, by diagnosing and manually adjusting vertebral segments and other bony structures without using drugs. Thus, in his practice, he rejected most of allopathic medicine's pharmacological agents except for a select few treatments, such as certain drugs in surgery and antidotes for poisonings. His rationale for minimalizing the use of drugs was based on his distrust of medications with unknown mechanisms of action and those used simply as remedial agents to mask symptoms (e.g., opiates, cathartics, diuretics, purgatives).

"On June 22nd, 1874, I flung to the breeze the banner of Osteopathy," wrote Still. For many years, despite Still's successes in practice, his philosophy was rejected by many of his friends, relatives and colleagues. Even when he attempted to present his ideas at Baker University in Baldwin, Kansas, a school that he and his family had helped to found, he was denied. He eventually settled in Kirksville, Missouri, a small town with a population of 1,800. However, because the patient population of Kirksville was limited, Still took his practice all around the state in order to make ends meet and support his wife and children. Through seemingly miraculous treatment of diseases via osteopathy, Still began to gain a reputation as the so-called "lightning bonesetter," and people began to travel many miles hoping to be cured of various ailments. It was becoming obvious that Still needed to establish a permanent place of practice.

In 1889, Still opened an infirmary in Kirksville, and in 1892, he founded the American School of Osteopathy (ASO) in order to share his osteopathic manipulative treatments with others. In addition to learning to perform osteopathic manipulations, the first student DOs were intensively trained in anatomy, which was central to Still's philosophy. The ASO was revolutionary not only with respect to its status as the first school of osteopathic medicine, but also in its anti-discrimination policy. Still's family was firmly abolitionist during the Civil War, and Still wanted to ensure that all qualified individuals, regardless of their race or sex, were given the opportunity to become physicians. Indeed, the ASO's inaugural class of 21 students contained 6 women,[5] which was very progressive for a time in which fewer than 5 percent of all U.S. medical students were women.[6] Most female medical students attended women's medical colleges. The ASO was among only a few U.S. medical schools to admit women, and began doing so even before Johns Hopkins University, which began the practice the following year in 1893.[7]

During these years, osteopathy became much more widely known. More patients began to visit Kirksville seeking treatment, while journalists from all around the Midwest wrote articles proclaiming the efficacy of osteopathy and citing patient testimonials as evidence. Still compiled these articles and published them in a *Journal of Osteopathy*, whose readership increased from a few hundred in 1894 to more than 18,000 within two years. However, the osteopathic profession's early success was not without opposition.

Numerous efforts were made to halt Still's practices, which were viewed as conflicting with the traditional medical establishment. For instance, the Missouri State Medical Association and other medical societies, including the homeopathic and eclectic societies, attempted to take legal action to limit the reach of osteopathic medicine. In response to pressures from the state legislature and its refusal to grant licensure to DOs, Still expanded his curric-

ulum to four terms, totaling 20 months of study, in subjects that included anatomy, physiology, surgery and obstetrics. The curriculum was later further expanded to include classes such as histology, pathology and chemistry.

In light of these changes, DOs were granted the right to practice in the state of Missouri in 1897. Rapid growth followed this legislation, and the student population of the ASO rose from 21 in its inaugural class to around 700 students by the turn of the century. During this time, Still also welcomed several new faculty, all of whom had personal experience with osteopathic medicine and many of whom held PhD and MD degrees.

As Still's school grew, so did the osteopathic profession. In 1897, the American Osteopathic Association (AOA) was founded to set educational standards across all osteopathic colleges and maintain a committee on osteopathic education. The *Journal of the American Osteopathic Association* (JAOA) was first published in 1901. All the while, osteopathic medicine remained as pure in its philosophy as it was when it was first conceived.

Higher Standards

THE EARLY 1900s were a time of constant flux for the osteopathic profession. Several more osteopathic medical schools were founded, but most closed for financial reasons, or merged with other schools. The question of whether or not to include pharmaceutical agents in osteopathic medical teaching and practice was heavily debated within the profession at this time, especially considering the contributions of scientists like Louis Pasteur and Robert Koch to the advancement of immunological and germ theory. Still was decidedly set against pharmaceuticals, mainly because of his deep-seated mistrust of drugs and his desire to keep osteopathic medicine as pure as possible. But, slowly, pharmaceutical agents were integrated into the curriculum of many osteopathic medical schools. In 1917, Still died at the age of 89. A statue in his honor was erected in the Kirksville courthouse square; it still stands there today.

Many challenges awaited the osteopathic profession in the wake of Still's death. The Flexner Report in 1910 forced many sub-standard medical schools, osteopathic, allopathic, eclectic and homeopathic alike, to change their curricula or even close in the decades that followed. Some general weaknesses Flexner's evaluation exposed among the existing eight osteopathic medical schools included: lower prerequisite coursework entrance standards than allopathic medical schools required, sparse basic science laboratory and clinical training facilities and inadequate faculty. The reasons behind the apparent inferiority of osteopathic education were complex (limited funding, more emphasis on rural and underserved populations, more part-time faculty, and fewer affiliated hospitals, to name a few), but ultimately led to lower pass rates on allopathic state licensing board exams and basic science board exams.

In response to the results of the Flexner Report, osteopathic medical colleges expanded their facilities, added a mandatory fourth year of study, and integrated biological and chemical agents into the curriculum. By 1920, all graduates of approved osteopathic medical schools had completed a four-year course of instruction. However, it was not until 1929 that osteopathic schools began to include pharmacology in their curricula. In the decades that followed, osteopathic medical schools continued to work toward keeping up with standards set by their allopathic counterparts.

Osteopathic medical colleges focused on improving their prerequisites for admission, basic science curriculum, and clinical training. By 1940, the existing six accredited osteopathic institutions had raised their prerequisite admissions requirements to two years of college coursework; by 1954, they had raised the requirements to three years. Commitment to the enhancement of a basic science curriculum was also a theme during this period, with significant increases in laboratory time, upgrades to laboratory facilities and equipment, and appointment of more qualified, full-time faculty. Clinical hour requirements experienced tremendous increases, from an average of 862 hours in 1935 to 2,214 in 1959. Much of this progress would not have been possible without financial backing from tuition increases, the Osteopathic Progress Fund, greater federal support, and the Hill-Burton Act of 1946.

With this rise in standards, DOs began to gain more headway in terms of professional recognition. The number of states in which DOs were eligible for full licensure rose from 26 in 1937 to 38 in 1960. Pass rates on medical and composite as well as basic science board examinations also made impressive strides. In the case of basic science exams, pass rates rose from 52.2 percent in 1942-1944 to 80.0 percent just a decade later; medical and composite exam pass rates experienced similar increases, rising from 62.6 percent in 1940-44 to 81.2 percent in 1955-59.

However, despite this commendable progress, there continued to be a skewed public perception of what a DO actually did. During this time, DOs constituted only 3-4 percent of the total U.S. physician population. In addition to small numbers, other barriers to widespread recognition included disproportionate geographic distribution of DOs, disparity in legal and practice rights, and osteopathic physicians' strong focus on primary care, which distanced them from the research scene that garnered so much media attention. Strong opposition from the allopathic community to extending DOs equal privileges, such as entrance into the medical military corps or holding of state and local health offices, was also a common theme during this time. Ironically, one consequence of DOs being prohibited from serving in the armed forces was that military MDs, upon returning to their respective communities

following their service, often discovered that they had lost much of their medical practice to DOs. This engendered further resentment of DOs by some members of the allopathic community.

The Trouble with California

MANY DOs BECAME frustrated with the inequities that persisted between the osteopathic and allopathic professions, including those of funding, faculty, postgraduate training, and public perception. This frustration was especially prevalent among DOs in California. Until the passage of the Hill-Burton Act, DOs in California were segregated from MDs in their medical practice. They were prohibited from training or seeing patients in facilities run by MDs. Furthermore, even after the act was passed in 1946, professional segregation persisted, as the legislation only lifted restrictions of DO practice rights in hospitals that had been built with federal funds.[8]

To make matters worse, California's allopathic medical establishment was decidedly anti-DO, and great efforts were made to try to eliminate the profession altogether. Talks were underway between DOs and MDs alike to merge the two professions by granting MD degrees to licensed California DOs. However, this proposal met significant opposition, with many MDs still believing DOs to be cultists and inferior practitioners, and many DOs fearing that this action would lead to a total amalgamation of the two professions, thereby stripping osteopathic medicine of its distinctive qualities.

In light of these issues, the 1940s and 1950s saw an unprecedented level of interaction between the two professions. An AMA committee visited osteopathic medical schools to better understand their curriculum and determine the quality of osteopathic medical education. The resulting reports concluded that osteopathic medicine was not, in fact, a cultist art, and that further efforts should be made by the allopathic community to generate greater interprofessional support for osteopathic medicine. However, in 1955, despite the committee's efforts, the AMA ruled in a house vote that osteopathic medicine would still be considered a cult and that there would be no formal professional relations without the DOs' total abandonment of any self-proclaimed uniqueness within their curriculum.

There was still the question of what was to happen in California. Most California DOs, as well the allopathic California Medical Association (CMA), were in favor of a merger, while the AOA remained opposed to it. Yet, the CMA specifically stipulated that it would only accept professional interaction with DOs who practiced according to scientific principles – not including osteopathy – and osteopathic schools that were in the process of being converted into accredited MD-granting institutions.[8]

Finally, in 1961, the CMA and the California Osteopathic Association (COA) came to an agreement that an academic MD degree would be offered to licensed California DOs. However, a number of provisions, including the loss of the ability for these "ex-DOs" to self-identify as osteopathic physicians, were included in this agreement. The end result amounted to the osteopathic profession losing one of its colleges, the California Osteopathic Medical Association, approximately 60 percent of its residency training programs and a significant number of DOs, with more than 2,000 California DOs becoming MDs. Furthermore, this action precluded the future licensure of DOs in California, causing the actual number of DOs practicing in California to plummet. That same year, the AMA issued a report that made its professional stance very clear: "There cannot be two distinct sciences of medicine or two different yet equally valid systems of medical practice." The merger was not the end-all for California. In the years following the merger, ex-DO MDs faced several serious challenges, including professional segregation and discriminatory policies that barred their certification by allopathic boards in California and other states.

Past, Present and Future

THROUGHOUT THE YEARS following the California merger, the osteopathic profession made great strides despite continued opposition and pressure for national amalgamation from the AMA. During the 1960s and 1970s, increasing federal and state support of professional schools, include osteopathic medical colleges, brought tens of millions of dollars to osteopathic education. In turn, faculty, equipment and facilities were vastly improved. In 1966, the U.S. military began to recognize DOs as equal to MDs, thereby allowing osteopathic physicians to serve as military physicians. Student qualifications also continued to improve in the five established osteopathic colleges, and by 1978, 95 percent of their matriculants held at least a Bachelor's degree.

Many more osteopathic medical colleges, including the profession's first public schools, were established as well. In 1969, the first state-supported osteopathic medical school was established at Michigan State University (MSUCOM). In 1971, the Texas College of Osteopathic Medicine (TCOM), which had enrolled its first students a year before, began to receive state funding. By 1975, TCOM became a public institution affiliated with North Texas State University (now the University of North Texas). Additional osteopathic schools followed suit, and by 1980, the total number of osteopathic schools had risen to 14. By 1982, there were more than 20,000 DOs in practice (see Figure 2-1).

By 1973, DOs were fully licensed to practice in all 50 states, with Mississippi being the last state to pass such legislation. The following year, the California State Supreme Court overturned the merger legislation from over a

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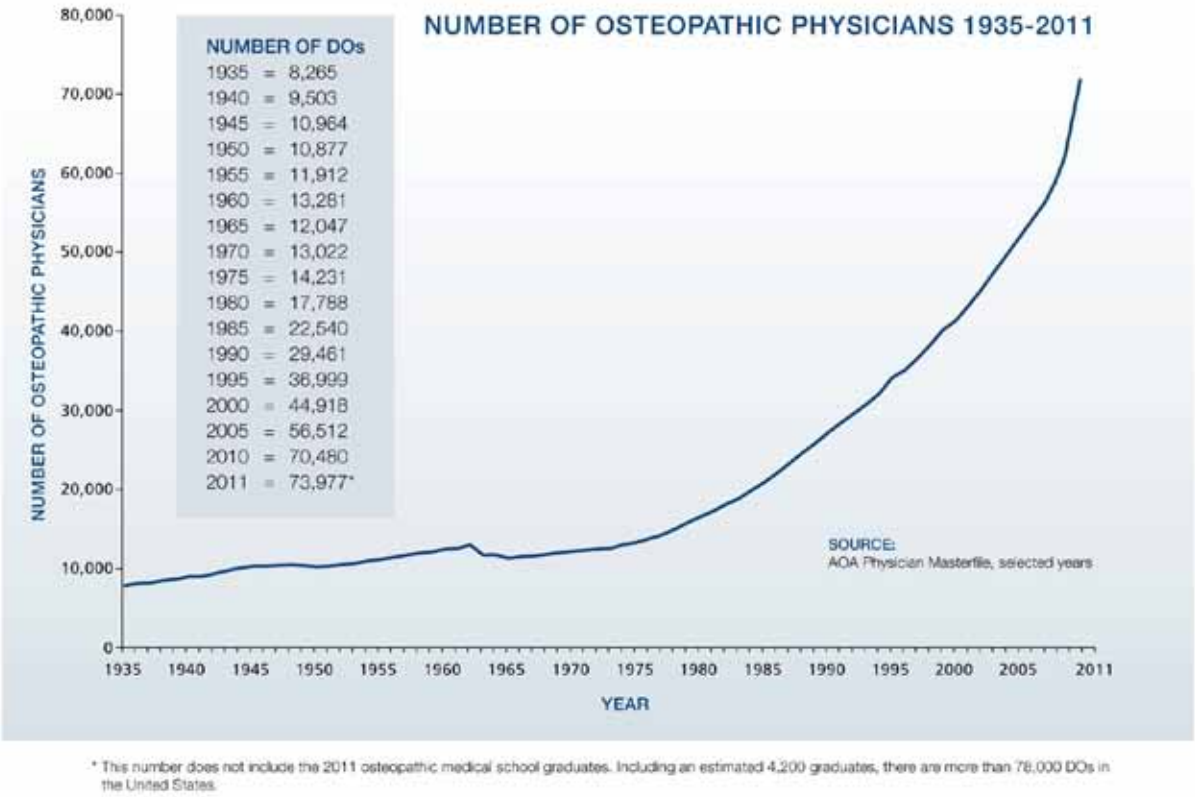
Figure 2-1. Growth in the Number of DOs

Source: 2011 Osteopathic Medical Profession Report



decade prior, thus allowing the reinstatement of an osteopathic licensing board, a medical society, and a new school, now known as Western University of Health Sciences College of Osteopathic Medicine of the Pacific. However, the emergence of government-sponsored insurance and managed care programs brought about new challenges for the osteopathic profession. DOs were historically severely underrepresented in the decisions regarding Medicare and Medicaid reimbursement for osteopathic medical services. In fact, it was not until 1995 that the first DO was named to serve on the Physician Payment Review Commission, which advised Congress on policy concerning such reimbursements.

Today, numerous issues, including physician reimbursement, still surround osteopathic medicine. The most pertinent of these concerns are internship and residency shortages, public awareness and perception, clinical research on OMM, DO-MD relations, and the effort to distinguish DOs from MDs in light of the progressive blurring of distinctions between the two professions. All of these issues are quite complex and are further elaborated on later in this guidebook.

In the late 1800s, Andrew Taylor Still identified the neuromusculoskeletal system as the key element in health maintenance and stressed preventive aspects of medicine in place of drug therapy. During that time, osteopathy was truly separate and distinct from the world of allopathic medicine. Since then, as medicine in general has become more evidence-based and supported by research, osteopathic philosophy has evolved into a more complete and robust osteopathic *medicine*. The phrase "osteopathic medicine" is now the accepted term for the profession over "osteopathy," a now-antiquated term that represents a period when Still championed a near-drugless form of manual medicine. Since its conception, osteopathic medicine has adapted its body of knowledge to incorporate contemporary scientific thought, including germ theory, pharmacology, and other "allopathic" teachings. The central tenets of osteopathic thought, however, have been maintained and continue to guide DOs in their practice of medicine. Though interprofessional relations between MDs and DOs are better than they have ever been before, challenges still exist in terms of keeping the osteopathic tradition intact, improving the evidence basis of OMM via clinical research, and advocating for widespread recognition of DOs.

Famous Names in Osteopathic History and Research:

- **Ronald R. Blanck, DO:** The 39th Surgeon General of the United States Army.
- **Louisa Burns, DO:** Studied the osteopathic lesion in animal models; designed and executed the first large-scale research studies in osteopathic medical research.
- **John W. Cline, MD:** An advocate for osteopathy during the time of the California merger.
- **J. Stedman Denslow, DO:** Demonstrated aspects of the osteopathic lesion by recording muscle activity, found that facilitation of motor neurons occurred in somatic dysfunction and published his findings in prominent non-osteopathic journals.
- **Harrison H. Fryette, DO:** Through his physiological research developed principles concerning how the spinal segments function – they are widely taught and used today.
- **Lawrence Jones, DO:** Developed the strain and counterstrain technique.
- **J. Martin Littlejohn, DO, MD:** A Scottish graduate of ASO who was vital in the founding of the Chicago College of Osteopathy and the British School of Osteopathy.
- **Irwin M. Korr, PhD:** An accomplished researcher who integrated accepted physiologic models with osteopathic concepts.
- **Fred Mitchell, Sr., DO:** Studied sacral motion extensively and developed the Muscle Energy technique.
- **Stanley Schiowitz, DO:** Developed the Facilitated Positional Release technique.
- **William G. Sutherland, DO:** Developed the system of diagnosis and treatment known as "Osteopathy in the Cranial Field."[9]

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Chapter 3

Breaking Down Osteopathic Manipulative Medicine

The Techniques and Their Advantages

Definitions

- **Somatic dysfunction:** The overarching description of osteopathic diagnoses; is defined as "the impaired or altered function of related components of the somatic (body framework) system: skeletal, arthrodial, and myofascial structures, and related vascular, lymphatic, and neural elements."[1] DOs use the acronym TART (Tissue texture change, Asymmetry, Restriction, and Tenderness) as diagnostic criteria to evaluate a specific region of the body for somatic dysfunction.[2]
- **Key lesion:** Defined as "the somatic dysfunction that maintains a total dysfunction pattern including other secondary dysfunctions."[2]
- **Facilitation:** Refers to altered or enhanced neuronal activity (sensitivity), often due to repetitive stress. The neurons in a facilitated area are in a partial, sub-threshold excited state, meaning it takes less of a stimulus to cause sensation or pain.[2] This can often present as tenderness upon palpation and/or restriction of motion.
- **Tissue Texture Abnormality (TTA):** A palpable change in tissues from skin to periarticular structures that represents any combination of the following signs: vasodilation, edema, flaccidity, hypertonicity, contracture, fibrosis, as well as the following symptoms: itching, pain, tenderness, paresthesias. Types of TTAs include: bogginess, thickening, stringiness, ropiness, firmness (hardening), increased/decreased temperature and increased/decreased moisture.[2]
- **Restriction:** A resistance or impediment to movement.[2]
- **Ease**: Relative palpable freedom of motion of an articulation or tissue.[2]

A distinct component of osteopathic medical practice is a collection of treatment modalities called Osteopathic Manipulative Medicine (OMM), also referred to as Osteopathic Manipulative Treatment (or formerly Therapy) (OMT). Osteopathic physicians use OMM as a key treatment option in their care for patients. It involves the use of the hands as the primary diagnostic, treatment, and therapeutic tool. DOs utilize screening and scanning for visual and palpatory TART changes to identify areas of somatic dysfunction in the bones, muscles, joints, ligaments, and tendons, which can then be treated with a wide array of manual techniques. The goal of OMM is to address the somatic dysfunction either by directly treating the lesion, or by manipulating the body in such a way that allows the musculoskeletal system to correct itself – this would be called an "indirect" technique.[1] Oftentimes, OMM is used as an adjunct to traditional medical care and has been shown to reduce such clinical variables as pain, need for and extent of pharmaceutical drug use, and recovery time.[3, 4]

There are more than 500 different OMM techniques. Some are similar to those used by chiropractors, physical therapists, and/or massage therapists, while others methods are completely unique to osteopathic medicine.[3] Below is a list of the major OMM techniques (both direct and indirect) that DOs are trained to use: [1, 2]

Direct Treatment Modalities

- **Soft Tissue Techniques** – direct lateral or linear stretching of muscle and fascia (connective tissue that surrounds the muscles, organs and other structures), frequently used to prepare for or conclude overall treatment.
- **Articulatory Treatment System** – low velocity, moderate- to high-amplitude springing focused on joint functioning.
- **High Velocity Low Amplitude (HVLA)** – use of fast, short thrusts through restrictive articulatory barriers; a technique with which most people are familiar (also known as the "cracking" or "popping" technique).

- **Muscle Energy** – uses post-isometric relaxation to stretch muscles and increase range of motion. With the targeted muscle stretched to its barrier, the patient is instructed to move toward ease (away from restriction) while the physician resists by using an isometric counterforce.
- **Inhibition** – slow, direct application of steady pressure to relax muscles or reduce muscle contraction.

Indirect Treatment Modalities

- **Strain/Counterstrain** – focused on specific tender points on the body that are held in a position of ease for 90 seconds, after which the tenderness is relieved.
- **Facilitated Positional Release** – patient's spine is placed at neutral position while the isolated segment for treatment is placed at ease. Compression or traction is then added to release muscle, fascia, and/or joints.

Both Direct and/or Indirect Treatment Modalities

- **Myofascial Release** – encompasses many of the modalities mentioned above and is used to treat restrictions of muscle and fascia. This technique is generally not as aggressive as others and can thus be applied to a wider population.
- **Osteopathy in the Cranial Field** – a system of treatment that utilizes the intrinsic motion of the cranial and neurological system to treat the whole body; one of the most difficult techniques for physicians to master, and for this reason, one of the more controversial within the medical field.
- **Ligamentous Articulatory Release** – ligaments or joints are placed into a state of balanced tension until a release is felt.
- **Still Technique** – patient held at position of ease until release, then passively moved through the barrier quickly.

Treatment Modalities that are Neither Direct nor Indirect

- **Chapman's Reflexes** – Chapman's points are points on the body that, if tender, indicate visceral dysfunction. These can be treated in a variety of ways, including muscle energy and myofascial release.
- **Lymphatic Techniques** – rhythmic, usually passive, movement of patient to increase flow of lymphatic fluid.

Photo courtesy of DMU-COM

Frequently Asked Questions (FAQs)

How is OMM taught in osteopathic medical schools?

Approximately 200-300 hours of the first two years of osteopathic medical school are devoted to the manual manipulation portion of the osteopathic curriculum. Osteopathic medical students learn OMM in the same scientific manner that they learn pharmacology and other treatment regimens. For each osteopathic treatment modality, there are physiologic mechanisms of action, indications and contraindications, and situations when one technique may be more efficacious than another.

While osteopathic principles, philosophy and history are taught in traditional lecture format, the unique, hands-on nature of OMM requires training in clinical laboratories. During a typical OMM lab session, students partner up and take turns acting as the practitioner and as the patient. Over the course of the session, a faculty member leads the lab by demonstrating and explaining the technique to the class, while table-trainers, usually faculty members whose specialty is OMM and/or student OMM fellows, provide one-on-one guidance to students. Osteopathic students are first introduced to the world of OMM through differentiation of the "feel" of the different levels of tissue in the body (skin, fascia, muscle, bone, etc.). After gaining this palpatory literacy, they move on to more complex topics, such as osteopathic diagnoses, charting, physical exams, techniques and treatments. OMM can be challenging, though, as many students find that it takes a great deal of practice to master the techniques that they have learned. In fact, some even elect to pursue a year-long OMM fellowship, in which they receive additional training by rotating with OMM specialists, serving as table-trainers, and presenting lectures on OMM, sometime during or after their four-year osteopathic medical training.

Photo courtesy of OSU-COM

What evidence is there that OMM actually works?

There are many people who claim that OMM lacks the vaunted randomized, double-blind, placebo-controlled trials, which have been hailed as the gold standard for evidence-based research, to support or merit its use in clinical practice. However, there have been numerous studies that *do* support the efficacy of OMM. The problem is that these studies do not fit the gold standard criteria, and the reasons for why OMM studies are so will be discussed below. For instance, several randomized clinical trials (RCTs) have demonstrated that OMM is useful in the treatment of low back pain.[3, 5] One such RCT divided 178 patients into an OMM group and a standard-care group. Although this study found no difference between the two groups in terms of clinical outcomes, including pain, the OMM group required significantly less medications, most notably non-steroidal anti-inflammatory drugs (NSAIDs), which can sometimes have major adverse side effects, analgesics, and muscle relaxants. In addition, the OMM group required less physical therapy as compared to the standard-care group, and the average costs for care were significantly lower.[6]

In another study led by Licciardone on the efficacy of OMM for back pain during the third trimester of pregnancy, researchers compared back pain in three groups: usual obstetrical care (UOBC) and OMM (UOBC + OMM), UOBC and sham (placebo) ultrasound treatment (UOBC + SUT), and UOBC only. They found that back pain decreased in the UOBC + OMM group, remained consistent in the UOBC + SUT group, and increased in the UOBC-only group, but did not find statistical significance

Photo courtesy of CCOM/MWU

in the inter-group differences. This was a randomized study that stratified participants by age and number of previous pregnancies to reduce possible data confounding. However, the researchers admitted that the limited number of participants restricted randomization in terms of illicit drug use, ethnicity, and vaginal bleeding, and suggested a larger trial as the necessary next step.[7]

The Multicenter Osteopathic Pneumonia Study in the Elderly (MOPSE), which included more than 400 patients over the age of 50 hospitalized for pneumonia across seven community hospitals, demonstrated that the combination of OMT + conventional care significantly reduced length of stay, occurrence of respiratory failure or death, and use of IV antibiotics compared to the conventional care-only and light-touch (placebo) + conventional care groups.[8]

Throughout our review of the existing osteopathic literature, we discovered that finding strong, valid evidence to support OMM proved somewhat difficult due to the general shortage of research and the limitations of current studies. Common obstacles in osteopathic research include small sample sizes, the subjectivity of unclearly defined pain scales, lack of double-blinding, pre-trial participant bias regarding OMM, occasional lack of inter-judge reliability, and failure to account for inter-operator variability.[3]

Many factors contribute to the prevalence of such limitations in osteopathic research. The relatively low number of osteopathic physicians compared to allopathic physicians seems to be one important contributor. For example, a sufficient number of capable and willing osteopathic physicians to perform the research tasks is necessary to account for inter-operator variability. One possible explanation for osteopathic research seeming to have secondary importance in the profession is that few osteopathic schools are affiliated with teaching hospitals, in which large-scale projects could be conducted more freely and given a more visible position. Much like studies in surgery, psychiatry, and other procedures or personal therapies, implementing control groups and placebos is more difficult in osteopathic studies as well, hindering these studies from garnering the same acceptance in the scientific community as drug studies that can be double-blinded; currently, no treatment, sham (range of motion testing or palpation with no actual treatment), or light-touch treatment groups are used.[9] More single-blind studies, which would increase validity, should be performed with external OMM practitioners who provide treatment but do not have a vested interest in the study outcome.

Considering the challenges associated with conducting clinical trials on OMM, it is not surprising that many researchers have now turned to in vitro models in order to demonstrate OMM's efficacy on the cellular level. In one study, human fibroblasts were subjected to repetitive motion strain (RMS) using a vacuum to simulate the cellular effects of somatic dysfunction. Some cells were then placed in a strain-free setting to simulate an indirect osteopathic manipulative technique (IOMT). RMS+IOMT cells displayed decreased release of pro-inflammatory cytokines as well as increased proliferation as compared with those subjected to RMS alone. These beneficial effects

persisted 24 hours after the IOMT was performed and continued even after the RMS was restored. Though in vitro studies such as this have their own limitations, they are useful in elucidating the biological mechanisms behind OMM's clinical effects.[10]

In this section we have presented a few studies demonstrating OMM's efficacy. While there are a number of studies in the literature that we felt had too many limitations to warrant much validity, we have listed a few notable examples of recent studies performed in osteopathic medical research at the end of this chapter. Thus, we encourage you to read the full articles of the research we have presented, the articles listed at the end of the chapter, and to conduct further research of your own.

Why do so few practitioners practice OMM on a daily basis?

A 2003 study by Spaeth and Pheley, which surveyed Ohio osteopathic physicians on their use of OMM for one week, revealed that 44 percent did not use OMM at all, 31 percent used OMM to treat fewer than 10 patients, and 25 percent used OMM to treat more than 10 patients. Of this 25 percent, 6 percent claimed to have treated more than 30 patients with OMM. The survey's 871 responses (38 percent response rate) fairly accurately represented the specialty distribution of Ohio osteopathic physicians.[11]

There are various reasons why DOs trained in OMM do not implement the techniques they learned in school into their practice. For some, it is difficult to integrate OMM into their specific specialty (e.g., surgery, radiology, dermatology). Also, some DOs may have gone to an osteopathic medical school simply to become a doctor, and do not necessarily believe in OMM or its principles. Others may not feel comfortable enough with OMM to perform it on patients; some techniques, such as HVLA, require greater proficiency to be used effectively and safely on patients. In the Spaeth and Pheley study, many of the practicing osteopathic physicians who reported limited use of OMM also rated their OMM training as "less than satisfactory, especially in the clinical years."[11] This reinforces the idea that more extensive, consistent training in OMM would be beneficial for patients, osteopathic physicians, and the profession as a whole. Other barriers that have been reported by DOs include limited time for patient visits, lack of or poor reimbursement for OMM treatments, and inadequate equipment or facilities available in their practice settings.[12]

Will public perception of OMM improve in the future?

In recent years, there has been a large movement within the osteopathic profession to support the expansion of OMM's scientific evidence base. In 2001, the Osteopathic Research Center (http://www.hsc.unt.edu/orc/) was established to focus on and enhance collaborative research describing OMM's clinical efficacy and mechanisms of action.[13] Several other independent programs with similar goals have also been launched at individual colleges of osteopathic medicine, including Michigan State University College of Osteopathic Medicine, Ohio University Heritage College of Osteopathic Medicine, and the University of Medicine and Dentistry of New Jersey School of Osteopathic Medicine.

In the article "Somatic, semantic distinctions: DOs try to come to terms with manual therapists," published in the AOA's *The DO*, the author discusses the controversy of DOs teaching non-DOs, such as physical therapists and other health care providers, osteopathic manipulative treatments. Some argue that because these non-DOs, some of whom are not licensed physicians, have not received comprehensive osteopathic medical training, they are not fit to practice OMT.[14] However, the reason this article was brought to your attention was to show that there is an increasing interest in OMT among manual therapists and MDs alike. In addition, there are now conferences, courses and rotations available to MDs that are specifically geared toward OMT training.[15] This trend will most likely continue as more and more physicians (and patients!) pursue alternatives to surgery and pain medications.

Photo courtesy of CCOM/MWY

Is OMM the same as chiropractic?

DOs are perhaps most commonly confused with DCs, or Doctors of Chiropractic. While there is some overlap between the two types of practitioners, they represent distinct professions and separate schools of thought. Chiropractic was first enunciated in 1895 by Daniel David Palmer, who observed that displacement of vertebrae could affect neurotransmission, thus manifesting as disease. Palmer was a magnetic healer, but unlike A.T. Still, he did not have a medical background. While the chiropractic philosophy is historically focused on the nervous system, the original notion of osteopathy was the need to restore blood flow, in particular, via manipulation of the neuromusculoskeletal system.[6] The differences in education and training between the two professions are apparent. A table comparing the background of DOs, MDs and DCs is provided below:[16]

	Degree		
Category	**DO**	**MD**	**DC**
Undergraduate training	4-year degree	4-year degree	90 hours of college credit (Some require a degree)
Graduate training	4-year Osteopathic Medical Degree (DO)	4-year Medical Degree (MD)	4-year Chiropractic Degree (DC)
Postgraduate training	• 1-year Internship • 2-8 years of Residency (varies with specialty)	• 1-year Internship • 2-8 years of Residency (varies with specialty)	None
Licensure/Scope of Practice	Fully Licensed to practice the complete spectrum of medical and surgical specialties in the United States.	Fully Licensed to practice the complete spectrum of medical and surgical specialties in the United States.	Licensed to practice chiropractic manipulation.
Can Prescribe Medications	Yes	Yes	No
Manual Medicine Training	Over 200 hours years 1 and 2; over 100 hours years 3 and 4.	None	Over 500 hours.

Photo courtesy of UNECOM

This section was meant to give you a better sense of what "osteopathic manipulative medicine" entails, and hopefully it answered most of your questions regarding OMM. The effectiveness of OMM remains a topic of ongoing debate and research despite past and current efforts to lay these arguments to rest. Whether an osteopathic physician uses OMM in his or her practice is based entirely on preference. With that said, it is an important core discipline and primary distinction of the osteopathic profession.

Additional Resources

BELOW IS A LIST of some recently published studies on osteopathic manipulative medicine.

Cramer, D., Miulli, D. E., Valcore, J. C., Taveau, J. W., Do, N., Hutton, D. S., . . . Panchal, R. R. (2010). Effect of pedal pump and thoracic pump techniques on intracranial pressure in patients with traumatic brain injuries. *J Am Osteopathic Assoc.*, 110(4): 232-238.

Crow, W.T., Gorodinsky, L. (2009). Does osteopathic manipulative treatment (OMT) improve outcomes in patients who develop postoperative ileus: A retrospective chart review. *International Journal of Osteopathic Medicine,* 12(1):32-37.

Cruser, D.A., Maurer, D., Hensel, K., Brown, S.K., White, K., Stoll S.T. (2011). A randomized, controlled trial of osteopathic manipulative treatment for acute low back pain in active duty military personnel. *J Man Manip Ther*, 0(0).

Earley, B. E., & Luce, H. (2010). An introduction to clinical research in osteopathic medicine. *Prim Care Clin Office Pract*, 37: 49-64. doi:10.1016/j.pop.2009.09.001.

Guiney, P.A., Chou, R., Vianna, A., Lovenheim, J. (2005). Effects of Osteopathic Manipulative Treatment on Pediatric Patients With Asthma: A Randomized Controlled Trial. JAOA, 105(1).

O-Yurvati, A.H., Carnes, M.S., Clearfield, M.B., Stoll, S.T., McConathy, W.J. (2005). Hemodynamic Effects of Osteopathic Manipulative Treatment Immediately After Coronary Artery Bypass Graft Surgery. *JAOA*, 105(10).

Phillippi, H., Faldum, A., Schleupen, A., Pabst, B., Jung, T., Bergmann, H., . . . Rietter, B. (2006). Infantile postural asymmetry and osteopathic treatment: a randomized therapeutic trial. *Developmental Medicine & Child Neurology*, 48: 5-9.

Pizzolorusso, G., Turi, P., Barlafante, G., Cerritelli, F., Renzetti, C., Cozzolino, V., . . . D'Incecco, C. (2011). Effect of osteopathic manipulative treatment on gastrointestinal function and length of stay of preterm infants: an exploratory study. *Chiropractic and Manual Therapies*: 19:15. doi:10.1186/2045-709X-19-15

Saggio, G., Docimo, S., Pilc, J., Norton, J., & Gilliar, W. (2011). Impact of osteopathic manipulative treatment on secretory immunoglobulin A levels in a stressed population. *J Am Osteopath Assoc.*, 111(3): 143-147.

Snider, K. T., Johnson, J. C., Degenhardt, B. F., & Snider, E. J. (2011). Low back pain, somatic dysfunction, and segmental bone mineral density T-score variation in the lumbar spine. *J Am Osteopath Assoc.*, 111(2): 89-96.

Wyatt, K., Edwards, V., Franck, L., Britten, N., Creanor, S., Maddick, A., & Logan, S. (2011). Cranial osteopathy for children with cerebral palsy: a randomised controlled trial. *Arch Dis Child*, 96: 505-512. doi:10.1136/adc.2010.199877

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3. Cole, S., & Reed, J. (2010). When to consider osteopathic manipulation: patients with low back pain, headache, and neck pain can benefit from this approach. Journal of Family Practice. 59(5): E5-E8.
4. Andersson, G.B.J., Lucente, T., Davis, A.M., Kappler, R.E., Lipton, J.A., Leurgans, S. A Comparison of Osteopathic Spinal Manipulation with Standard Care for Patients with Low Back Pain. N Engl J Med 1999; 341:1426-1431.
5. Licciardone, J. C. (2007). Osteopathic research: elephants, enigmas, and evidence. Osteopathic Medicine and Primary Care, 1:7.
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10. Meltzer, K. R., & Standley, P. R. (2007). Modeled repetitive motion strain and indirect osteopathic manipulative techniques in regulation of human fibroblast proliferation and interleukin secretion. J Am Osteopath Assoc. 107(12): 527-536.
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14. Schierhorn, C. (2011). Somatic, semantic distinctions: DOs try to come to terms with manual therapists. The DO. In American Osteopathic Association. Retrieved July 24, 2011, from http://www.do-online.org/TheDO/?p=38361.
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16. Comparison of Osteopathic Physicians, Allopathic Physicians, and Chiropractors. Osteopathic Healthcare of Maine. 2011. Retrieved Oct 19, 2011, from http://osteopathichealthcareofmaine.com/osteopathy/do-vs-md-and-dc/.

Chapter 4

Why Apply to Osteopathic Medical School?

Fast Facts:

- Approximately 62 percent of osteopathic physicians are in primary care (family and general practice, pediatrics, general internal medicine, and obstetrics and gynecology)[1]
- In a 2010-2011 survey of 4,337 first-year osteopathic medical students, 50 percent of students had already decided whether or not they would practice in underserved/shortage areas. Of those 50 percent, 86 percent responded that they planned to enter these areas in the future.[2]
- 45 percent of DO graduates matched in Internal Medicine, Family Medicine, or Pediatrics in the 2011 AOA residency match.[3] In the same year, 53 percent of DO graduates matching in the NRMP match were to these three primary care specialties.

This chapter is divided into several sections based on some of the primary reservations we have observed in pre-medical students with respect to applying to osteopathic medical schools. Each section addresses one of the most common concerns.

U.S. News & World Report Rankings

OSTEOPATHIC PHYSICIANS ARE well-recognized as having the propensity to enter primary care. In fact, the 2011 *U.S. News & World Report* reported that the top five U.S. medical schools producing the most primary care residents were osteopathic medical schools. Furthermore, an additional six osteopathic schools were listed in the top 20 schools producing primary care residents.[4, 5]

However, there has been much debate as to whether or not the *U.S. News & World Report's* criteria for major ranking categories, including research and primary care, provide a fair assessment of medical schools. Although some osteopathic medical schools are highly ranked by the system, with two ranking in the Top 20 Primary Care Medical Schools category, most are either poorly ranked or not ranked at all.[6] Why do osteopathic medical schools fare so poorly in these rankings?

First of all, research is generally more emphasized at allopathic medical schools, and thus DO schools rank lower than their MD counterparts in this category overall as well as associated subcategories, such as NIH grant funding – specifics of which are discussed in the next section of this chapter. Furthermore, the criteria used to judge the schools have inherent biases against osteopathic medical schools. The four main criteria, in order of weight in a school's overall score, include: quality assessment, proportion of graduates pursuing primary care, ratio of full-time faculty members to students, and selectivity of admissions.[6] The first, quality assessment, is determined via opinion surveys sent out to medical school deans and department heads, as well as allopathic residency directors, requesting ratings of each of the 133 allopathic and 26 osteopathic medical schools. These evaluators consistently rate osteopathic medical schools lower on average than allopathic medical schools, perhaps due to a lack of awareness and/or understanding of osteopathic medical education, especially in regions with a limited osteopathic presence. As for the primary care proportion, many more MDs than DOs enter internal medicine residencies only to later subspecialize, but these graduates are nevertheless counted as pursuing primary care. In addition, osteopathic medical schools use a higher proportion of part-time faculty members than do allopathic schools, thus not achieving comparable full-time-faculty-to-student ratios.[7]

During a recent *U.S. News & World Report* summit meeting entitled "The Impact and Future of Medical School Rankings," a panel of prominent medical school deans representing such high-ranking programs as Duke, Harvard and Yale met to discuss the influence of and possible improvements to the current ranking system.[8,9,10] The discussion was moderated by the editor of *U.S. News & World Report* and also included the company's director of data research, who has led the rankings project for many years. Concerns voiced regarding survey methodology were varied and included: the subjective and static nature of responses regarding program reputation, low response rates among residency directors, and limited knowledge of respondents about programs other than their own.[8,9,10] The summit participants also raised flaws in utilizing faculty-

Photo courtesy of LECOM

to-student ratios and MCAT scores as quality indicators.[8,10] Many suggested that more tangible measures of program quality be used, including board scores, residency match results, numbers of hours of clinical experience, available research opportunities and/or overseas rotations, and frequency of student-authored publications.[8,9,10] Dr. Jules L. Dienstag, Dean for Medical Education at Harvard Medical School, went so far as to propose that prospective medical students would be better off going to their schools' premedical advisors for information rather than relying on the rankings.[11] A full transcript and video of the event are available at www.usnews.com.

Another suggestion for improving the *U.S. News & World Report* methodology is that because medical schools' educational missions significantly differ from one another, these differences should be reflected in the ranking system. Alternative methods of ranking the schools have been proposed, many including factors related to how well a school fulfills its own unique, individual mission.[12] Other systems incorporate more underappreciated variables, such as proportions of primary care graduates, graduates serving in underserved health-professional-shortage areas, and/or graduates with minority backgrounds underrepresented in medicine.[13] A George Washington University study combined these variables and others into a "social mission score" with which to rank medical schools. Its ranking system placed many prestigious programs that consistently top the *U.S. News & World Report* rankings much lower, or even at the bottom in some cases. Osteopathic medical school programs' ranks varied, as their primary care physician outputs were consistently high but their proportions of underrepresented minority graduates were found to be lacking.[13]

Research and Other Opportunities

AS WE'VE NOTED before, primary care-focused education, not research, bears the heaviest emphasis within the mission statements of osteopathic medical schools. In addition to this deliberate focus on education, a key issue contributing to this lack of emphasis on research is the disparity in research funding between allopathic and osteopathic institutions. Despite steady yearly increases in research funding from various sources, including the National Institutes of Health (NIH), pharmaceutical companies, state and local sources, and private foundations, osteopathic medical schools still significantly trail their allopathic counterparts in funding from all of these source categories.[14]

For instance, in 2010, 133 institutions affiliated with allopathic medical schools in all U.S. states and territories received funding from the NIH, the primary U.S. agency responsible for biomedical and health-related research. The total amount of NIH funding for these institutions was upwards of $11.5 billion, representing over half of the total NIH U.S. funding granted that year. This funding was predominantly geared toward research, but also was utilized for training, fellowships, and construction. Out of the 133 institutions receiving NIH funding, the median dollar amount received was that at the University of Arizona, which was granted about $45.2 million.[15]

In contrast, only 13 academic institutions affiliated with osteopathic medical schools received funding from the NIH in 2010, with a grand total of $75.2 million combined. The median amount received by an osteopathic institution was the just over $1.5 million granted to Touro University College of Osteopathic Medicine - California.[15] (It should be noted, however, that these figures represent the amount of funding granted to the academic institutions as a whole, not necessarily the individual colleges of medicine or osteopathic medicine.)

There are many factors that contribute to this wide disparity in funding. First, the majority of osteopathic medical schools are private, graduate-level institutions not affiliated with large, undergraduate institutions. In fact, only six of the 26 osteopathic medical schools are public, and only four are affiliated with undergraduate institutions. Another possible factor could be reputation or simply precedence, as many osteopathic medical schools were not founded until the 1970s and beyond. In fact, only five of the current schools were established before 1969 (A.T. Still University - Kirksville College of Osteopathic Medicine, Des Moines University College of Osteopathic Medicine, Philadelphia College of Osteopathic Medicine, Chicago College of Osteopathic Medicine of Midwestern University, and Kansas City University of Medicine and Biosciences College of Osteopathic Medicine.[16]

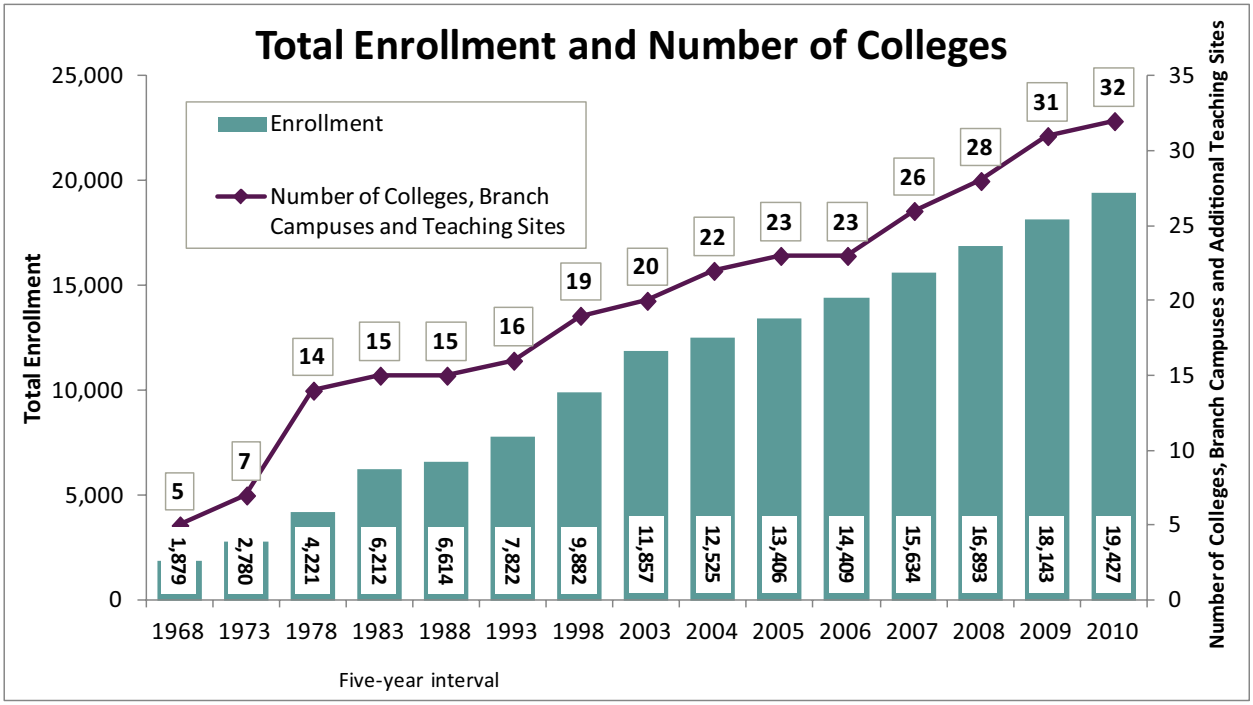
Still, diverse opportunities exist for osteopathic medical students to enrich their educational experience. Eight osteopathic colleges currently offer medical scientist training programs (DO/PhD), and 25 offer other joint degree programs combined with the DO degree, including Master's degrees in epidemiology, public health, biomedical sciences, health care administration, and business administration, as well as the Juris Doctorate (JD) degree. Eleven schools even offer joint-degree BS/DO or BA/DO programs.[17]

Photo courtesy of LMU-DCOM

Growth of the Profession

DESPITE THE LIMITED funding sources of its colleges, the osteopathic profession is steadily growing. DOs are one of the fastest-growing groups of practitioners in the health care industry today.[1] Enrollment in the osteopathic medical colleges has risen by 58 percent since 2003.[18] This past spring (2011), there were 4,200 graduates from all osteopathic medical colleges, a 15.7 percent increase over the 3,631 DOs who graduated in spring 2010.[18] This recent surge can be attributed to the establishment of a large number of osteopathic medical schools in the last decade (see Figure 4-1). The number of osteopathic medical colleges has grown from just five colleges in 1968 to 26 colleges, four branch campuses and four remote teaching sites, composing a grand total of 34 instructional sites today (see Figure 4-1, Table 4-1 & Table 4-2). Despite this growth, the distribution of osteopathic physicians in the United States remains geographically disproportionate, heavily favoring such areas as the Midwest and the Northeast.

Figure 4-1. Osteopathic Medical School Enrollment and Number of Colleges (1968-2011)



Source for enrollment data is the AACOM Annual Medical School Questionnaire. Year refers to the start of the academic year.

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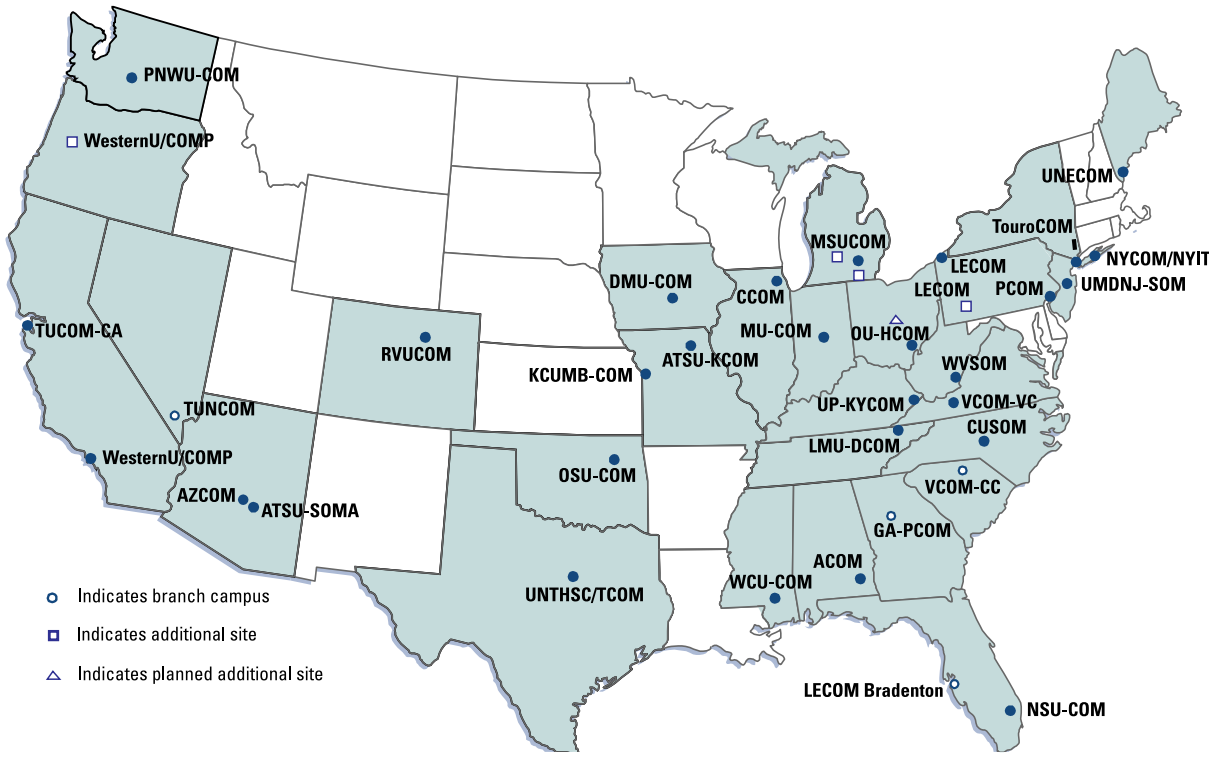
Table 4-1. Current Osteopathic Medical Schools in the United States

State	School	City	Est.
Alabama	Alabama College of Osteopathic Medicine	Dothan	2012
Arizona	A.T. Still University School of Osteopathic Medicine in Arizona	Mesa	2006
Arizona	Arizona College of Osteopathic Medicine of Midwestern University	Glendale	1995
California	Touro University College of Osteopathic Medicine-California	Vallejo	1997
California	Western University of Health Sciences/College of Osteopathic Medicine of the Pacific	Pomona, Lebanon, OR	1977
Colorado	Rocky Vista University College of Osteopathic Medicine	Parker	2006
Florida	Lake Erie College of Osteopathic Medicine at Bradenton	Bradenton	2004
Florida	Nova Southeastern University College of Osteopathic Medicine	Davie	1979
Georgia	Georgia Campus-Philadelphia College of Osteopathic Medicine	Suwanee	2004
Illinois	Chicago College of Osteopathic Medicine of Midwestern University	Downers Grove	1900
Indiana	Marian University College of Osteopathic Medicine	Indianapolis	2012
Iowa	Des Moines University College of Osteopathic Medicine	Des Moines	1898
Kentucky	University of Pikeville Kentucky College School of Osteopathic Medicine	Pikeville	1997
Maine	University of New England College of Osteopathic Medicine	Biddeford	1978
Michigan	Michigan State University College of Osteopathic Medicine	East Lansing, Detroit, Clinton	1969
Mississippi	William Carey University College of Osteopathic Medicine	Hattiesburg	2008
Missouri	A. T. Still University - Kirksville College of Osteopathic Medicine	Kirksville	1892
Missouri	Kansas City University of Medicine and Biosciences College of Osteopathic Medicine	Kansas City	1916
Nevada	Touro University Nevada College of Osteopathic Medicine	Henderson	2004
New Jersey	University of Medicine and Dentistry of New Jersey – School of Osteopathic Medicine	Stratford	1976
New York	New York College of Osteopathic Medicine of New York Institute of Technology	Old Westbury	1977
New York	Touro College of Osteopathic Medicine – New York	Manhattan	2006
North Carolina	Campbell University College of Osteopathic Medicine	Buies Creek	2012
Ohio	Ohio University College of Osteopathic Medicine	Athens	1975
Oklahoma	Oklahoma State University Center for Health Sciences College of Osteopathic Medicine	Tulsa	1972
Pennsylvania	Lake Erie College of Osteopathic Medicine	Erie, Seton Hill	1992
Pennsylvania	Philadelphia College of Osteopathic Medicine	Philadelphia	1899
South Carolina	Edward Via College of Osteopathic Medicine: Carolinas Campus	Spartanburg	2010
Tennessee	Lincoln Memorial University DeBusk College of Osteopathic Medicine	Harrogate	2006
Texas	University of North Texas Health Science Center at Fort Worth Texas College of Osteopathic Medicine	Fort Worth	1970
Virginia	Edward Via College of Osteopathic Medicine – Virginia Campus	Blacksburg	2003
Washington	Pacific Northwest University of Health Sciences College of Osteopathic Medicine	Yakima	2005
West Virginia	West Virginia School of Osteopathic Medicine	Lewisburg	1972

*Note that several other colleges of osteopathic medicine not listed here are under consideration for accreditation. More information can be found here: http://www.osteopathic.org/inside-aoa/accreditation/predoctoral%20accreditation/ Documents/new-and-developing-colleges-of-osteopathic-medicine-and-campuses.pdf.

Figure 4-2. Current distribution of osteopathic medical schools in the United States



Residency Opportunities

THE INCREASE IN the number of osteopathic medical schools has been so steep, in fact, that the number of new osteopathic school graduates has already surpassed the number of available AOA residencies. For the 2011 AOA match, there were 3,875 new osteopathic graduates and only 2,549 AOA residency positions. However, because osteopathic graduates can also apply to allopathic residencies accredited by the Accreditation Council for Graduate Medical Education (ACGME), the match ended with only 419 unmatched osteopathic graduates. In recent years, it has become more popular for osteopathic students to apply to ACGME residencies.[19] Reasons for an individual's choice of an allopathic residency program as opposed to an osteopathic program include factors such as location and program availability (which changes from year to year, especially in the case of some smaller specialties). Occasionally, the perception that ACGME residencies are superior to those of the AOA in terms of quality and future employment eligibility may also influence this decision.[20]

In our research, it was difficult to locate a centralized database or source for reviews, some metrics of quality, and prestige of residency programs. Most sources were, unfortunately, scattered and from individuals with varied general opinions of either residency match program. Nonetheless, sources did share commonalities in the advice given about residency programs. They agreed that each student should carefully consider all of the following factors to determine the perfect fit for his/her individual goals: program stability, program support, prestige, patient population, level of academic orientation, and everything that program location entails (e.g., cost of living, sources of entertainment, suitable environment for raising a family).[21] Ultimately, considering all of these aspects will influence selection of certain residency programs over others.

Recently, a member of the Student Doctor Network (SDN) forum (http://forums.studentdoctor.net/), a popular online forum for members of the pre-health and professional health care community to discuss various topics related to their respective fields, gathered 2011 residency match data from the AOA and the National Resident Matching Program (NRMP), the allopathic matching service. Because the two programs are distinct and do not present each other's match statistics, his goal was to combine data for osteopathic students who participated in the AOA match with those who participated in the NRMP match. The combined data demonstrated that of the 3,875 osteopathic graduates in 2011, 3,456 (89.19 percent) matched into an AOA or NRMP residency program. 1,895 DO graduates out of the 2,112 who applied for the AOA match (89.64 percent) matched. 71.70 percent of DO graduates who applied for the NRMP match matched into an

ACGME residency, compared to the 94.40 percent U.S. MD NRMP match rate in the same year.

Percentages of allopathic and osteopathic students who matched in specific specialties (see Table 4-3) showed that there were some important distinctions in proportions of graduates (DO vs. U.S. MD) going into certain fields, namely Family Medicine, Pediatrics, and Emergency Medicine. Despite the common misconception that highly competitive specialties are not open to DO graduates, significant numbers of DOs enter such fields as orthopedic surgery, anesthesiology, and diagnostic radiology.

Several limitations of this data analysis were acknowledged by the contributing SDN member, Jimmy DeMeo, who is currently an osteopathic medical student at Lake Erie College of Osteopathic Medicine (LECOM). For instance, the analysis did not take into consideration how applicants ranked specialties, whether or not they matched into their top choice of specialty, multiple match attempts, post-match placement, or scramble results. It also did not include results from the San Francisco matching program, which is a third system apart from the AOA and NRMP that matches applicants to a few highly competitive specialties, including neurotology, ophthalmology, and plastic surgery.

Table 4-3. U.S. MD vs. DO Residency Match Percentages by Specialty (2011)

Specialty	DO Graduates	U.S. MD Graduates
Family Medicine	19.51%	7.39%
Pediatrics	8.14%	10.04%
General Internal Medicine	18.66%	16.7%
Emergency Medicine	11.61%	7.25%
Obstetrics and Gynecology	5.52%	5.07%
Psychiatry	4.03%	3.65%
Diagnostic Radiology	2.53%	5.04%
Anesthesiology	4.26%	6.26%
Orthopedic Surgery	2.53%	3.53%
Dermatology	0.71%	1.76%
Neurological Surgery	0.32%	0.99%

*Note: these percentages combine data from the 2011 NRMP match and the 2011 AOA match.

Licensing Examinations

SINCE 2001, ALL state licensing boards have accepted the Comprehensive Osteopathic Medical Licensure Examination of the United States (COMLEX-USA), which is produced by the National Board of Osteopathic Medical Examiners (NBOME). The United States Medical Licensing Exam (USMLE), produced by the National Board of Medical Examiners (NMBE), is the licensing exam that all allopathic medical students are required to take. Both are comprised of three tests, called "steps" by the USMLE and "levels" by the COMLEX, which must be passed for a physician to gain unlimited licensure to practice medicine in the United States.

According to 2010 USMLE Performance Data published in the *2010 NBME Annual Report*, 92 percent of MD students (N=18,116), 82 percent of DO students (N=1,964), and 70 percent of foreign medical students and graduates (N=14,203) passed the USMLE Step 1 exam on their first attempt. The pass rates for the USMLE Step 2 exam (from 2009-2010) showed narrowing between the groups: 97 percent (N=17,493), 92 percent (N=982), and 83 percent (N=11,422), respectively.[22] The reason only a minority of DO students elect to take the USMLE is because it is optional and not required for their licensure.

Osteopathic medical students may elect to take the USMLE based on a variety of reasons, including the desire to pursue an allopathic residency program. Osteopathic medical students are unique in that they have the option to apply for osteopathic (AOA) residency programs, allopathic (ACGME) residency programs, dual-accredited programs, or both AOA and ACGME programs. However, all osteopathic students are required to take the COMLEX, regardless of whether or not they elect to take the USMLE. Thus, those who do take the USMLE must take both exams, which slightly differ in their length, emphasis, and question type, although they cover similar material apart from OMM.

Conclusion

NEARLY 140 YEARS ago, Dr. Andrew Taylor Still founded osteopathic medicine on the basis of the interdependence he observed among all of the body's anatomical parts, as well as the unity that linked an individual's mind, body, and spirit. Through this philosophy, he sought to reform and revolutionize the practice of medicine. Today, the original philosophy and principles of osteopathic medicine have become inextricably linked to modern advancements in clinical practice.

In recent years, the osteopathic medical profession has flourished. It has seen its greatest increases in the number of U.S. osteopathic medical schools, DO graduates, and opportunities available to osteopathic physicians. Osteopathic medicine continues to gain headway in terms of interprofessional collaboration with MDs as well as general recognition of its presence within medicine.[23] However, the task of clearly defining and popularizing the "DO difference," that is, the unique contribution DOs offer to the practice of medicine, remains an important challenge facing the new generation of osteopathic physicians.

Meanwhile, the current pre-medical student culture is as competitive as it has ever been. As average admissions statistics continue to improve every year, more and more highly qualified applicants compete for a limited number of medical school seats. Consequently, pre-medical students are known to strive for the best possible grades and test scores and the most prestigious medical schools. It is only natural that some pre-medical students who do not fully understand the history or context of osteopathic medicine would cast osteopathic medicine off as an inferior profession based solely on its lower admissions statistics, lack of emphasis on research, and/or lower percentages of practitioners in highly specialized fields.

Our hope is that readers of this guidebook will come away with a more realistic and objective perspective on the advantages of and future challenges facing osteopathic medicine. Furthermore, we would like to reiterate that osteopathic medicine does not deserve a reputation as a "second choice" profession; each and every DO and osteopathic medical student made the conscious choice to pursue osteopathic medicine.

With less than 10 percent of allopathic medical graduates entering family practice residencies each year,[24] the continued training of competent primary care physicians (PCPs) by osteopathic schools is extremely important.[25] Only 32 percent of U.S. physicians are in primary care, while reports by the Council on Graduate Medical Education (COGME) and ACGME recommend that this percentage be at least 40 percent.[26] Furthermore, the nationwide average of PCPs-to-population ratio is a mere 88 PCPs per 100,000 people.[26] Emphasis on preventive medical services in recent health care reform initiatives will undoubtedly increase the demand for PCPs, but the current shortage and declining interest in primary care raise the question of where the supply of PCPs will come from.[27] While large-scale policy changes are undoubtedly necessary to fully combat this issue, the desire and training of osteopathic physicians to enter primary care is truly valuable, especially in this time of need.

With so many osteopathic medical schools focusing on producing primary care physicians, some people interested in specializing may dismiss the idea of attending an osteopathic medical school. However, even osteopathic medical schools with a mission statement of producing more primary care physicians do not restrict or disadvantage students who are thinking about entering a subspecialty in the future. On the contrary, we believe that a strong foundation in primary care, osteopathic principles, and OMM can aid a physician no matter what specialty he or she decides to practice.

Medicine is evolving every day. New medications and treatment modalities are constantly being discovered. But perhaps just as important as scientific advancements is the constant flux of the culture of medicine. Within the medical field today, there are many different types of health care providers and allied health professionals who work together to treat patients, oftentimes having overlapping scopes of practice. These health care professionals include but are not limited to: MDs, DOs, physician assistants, nurses and nurse practitioners, pharmacists, podiatrists, chiropractors, dentists, optometrists, clinical psychologists, and physical therapists. Considering the varied educational backgrounds represented in health care today, it is important for those in the field (and those planning to enter it) to understand and appreciate this diversity.

As future physicians, one of our goals will be to help our patients make informed decisions, and we would not have it any other way with you, our reader. We hope that this guide will help *you* make an informed decision about osteopathic medical school. While this is in no way a comprehensive collection of all the opinions regarding osteopathic medicine, we tried our best to cover as many bases as possible, and to provide you with an objective, informative presentation of osteopathic medicine. The fact that you are reading this shows that you are already well on your way toward making an informed decision. We applaud your efforts and urge you to continue to learn more by referring to our cited works, utilizing our recommended resources, conducting some more research of your own, and of course, shadowing DOs. There is no better way to learn about an occupation than to experience it yourself.

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Appendix

Recommended Resources

The following is a list of resources we found to be extremely useful to our personal understanding of osteopathic medicine and to facilitating our applications to osteopathic medical schools. Good luck!

Pre-SOMA: The only undergraduate pre-medical organization that focuses exclusively on osteopathic medicine. Find a chapter at your school or start your own chapter! http://www.studentdo.com/pre-soma/

AACOMAS® Application: The central application service for osteopathic colleges; https://aacomas.aacom.org/

AACOM Osteopathic Medical College Information Book: Application information and deadlines, admissions requirements, FAQs, and links to more resources; http://www.aacom.org/resources/bookstore/

American Association of Colleges of Osteopathic Medicine: http://www.aacom.org/

American Osteopathic Association (AOA): http://www.osteopathic.org/

Search the AOA's Physician Database: Get in contact with a DO in your area; http://www.osteopathic.org/osteopathic-health/find-a-do/Pages/default.aspx

Student Osteopathic Medical Association (SOMA): The national professional society of osteopathic medical students; http://www.studentdo.com/

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Endorsements

The following organizations have endorsed the *Brief Guide to Osteopathic Medicine*:

Osteopathic Physicians and Surgeons of California

Student Osteopathic Medical Association (SOMA)