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Presidential Address

Athena, Aesculapius and beyond: the art of mentoring
2001 North American Spine Society Presidential Address

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I want to thank all of you for coming at these troubled times: the down-turn of the economy and, of course, the devastating, dastardly attack on New York and Washington, DC. This was an act of murder, an act contrary to all religions. I (we) want to relay our condolences to the victims, their families and their friends. September 11 changed our world. However, for each sorrow, each pain, we also felt hope and witnessed courage; for each loss and each suffering soul, we have felt compassion and witnessed heroism. New York is rebuilding, Washington is rebuilding, America is rebuilding, not only the structures that were devastated, but our resolve, our determination and our response.

To quote John F. Kennedy, "Let every nation know, whether it wishes us well or ill, that we shall pay any price, bear any burden, meet any hardship, support any friend, oppose any foe to assure the survival and success of liberty."

One of the most compelling ways that we can provide support and ensure success is through the process of mentoring, my topic today. A mentor is a trusted guide and counselor. We have all needed one, and we have all been one. It is a role that physicians assume naturally and perhaps often without much conscious deliberation. Yet the process is so vital to our survival, individually and culturally, that I want to take the time to consider the history of mentoring, its role in medical education and the obligations, responsibility and rewards it represents for physicians today.

The term mentor comes from a character by that name in Homer's *Odyssey*. Mentor was the loyal friend, counselor and teacher of Odysseus' son Telemachus while Odysseus made his long journey back from the Trojan War. It is, however, questionable if a person named Mentor existed. Apparently, the goddess Athena (the goddess with the flashing eyes), who was infatuated with Odysseus, assumed the form of Mentor while watching over Telemachus [1,2]. So it is unclear if a person called Mentor actually existed or if Mentor was the goddess Athena who had transformed herself into a human being. To quote from the Odyssey, "She [Athena] assumed the appearance of Mentor and seemed so like him as to deceive both eye and ear"[3]. The names Mentes and Mentor, along with the word mental, stem from the Greek word for mind (menos), a marvelously flexible word that can mean intention, force or purpose as well as mind, spirit, remembrance or courage.

One of the greatest mentors in antiquity was the centaur Chiron. Centaurs were a strange mix of man and horse. Most centaurs were more like beasts than men and, as a rule, wild and savage creatures. Chiron was an unusually kind and peaceful centaur, who mentored many of the Greek leaders. Chiron had the energy and constitution of his wild nature, but he gentled and redirected it to teaching. He was the bridge between humans and the higher powers of nature and the universe. Chiron was a foster father and trainer to an army of Greek heroes, including Hercules, Achilles, Actaeon, Peleus and Aesculapius, the greatest surgeon of antiquity [2]. Chiron also taught the use of herbs, gentle incantations and cooling potions. As a mentor, Chiron led his heroes-in-training through their threshold of manhood by patiently teaching them the skills of archery, poetry and surgery. Chiron was not always rewarded for his efforts. His violence-prone pupil, Hercules, accidentally wounded him with a magic arrow. The wound was incurable, and the immortal Chiron begged the gods for death. Rather than live in eternal pain, he offered himself to Zeus as a substitute for Prometheus, whom he replaced in the underworld when his wish was granted. Chiron received the highest distinction the Greeks could bestow: Zeus transformed him into a constellation in the sign of the Zodiac—Sagittarius, a centaur firing a bow [2].

Aesculapius, one of Chiron's pupils, became Greece's legendary god of medicine. Aesculapius was able to help all types of maladies. He delivered all, whether suffering from wounded limbs or bodies wasted away with disease, even those who were sick unto death, from their torment. Apparently, he raised Theseus' son from death, an act that led to Aesculapius' death. Zeus would not allow a mortal to exercise such power over the dead, and he struck Aesculapius with a thunderbolt and killed him [2].

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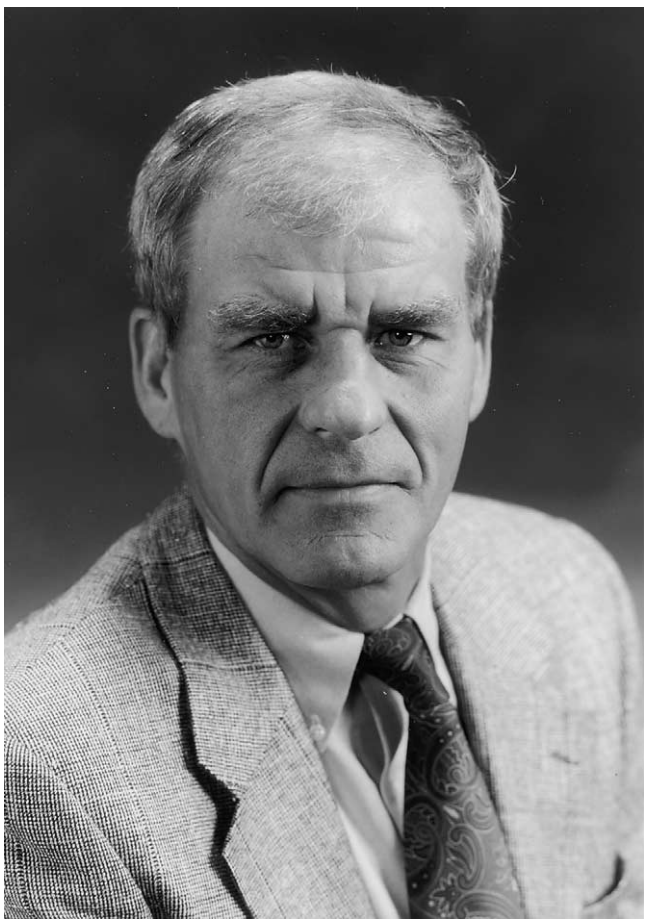
The Greeks adopted Aesculapius from the ancient Egyptians, who knew him as Iminhotep. Iminhotep was vizier in the court of the pharaoh Zoser and a royal architect credited with writing the religious *Book of Wisdom*. For more than 2000 years, people sang his praises for his skill as a doctor. In 535 BC he was awarded full status as a god [4].

Throughout antiquity, temples to Iminhotep and Aesculapius (who were the same) were common throughout the Mediterranean and for hundreds of years attracted patients seeking miraculous cures. In the temples, the sick and maimed prayed and made sacrifices. During sleep, Aesculapius revealed to the supplicants how they would be cured. Snakes played a significant part in this cure. Although the specifics are unknown, snakes were considered sacred servants of Aesculapius, which is most likely why the most recognized emblem of medicine, the caduceus, is a serpent entwined around a staff. The symbol is also known as the staff of Aesculapius. Followers of Aesculapius, known as Aesculapiads, practiced in temples ministering to the sick [4,5].

One of the followers of Aesculapius, Hippocrates (460–377 BC), changed the practice of medicine from an art involving the sacred to a discipline based on observation, reasoning and experiments. Two of the most brilliant ancient philosophers, Plato and Aristotle, mentioned Hippocrates' name with obvious admiration and respect. Plato called him "Aesculepiad" and Aristotle referred to him as the "leader of Aesculapius" [6]. Hippocrates rejected the longstanding concept that illness was caused by divine powers. He attributed disease to natural causes and believed that treatment should be based on observation, reasoning and experience. This radical departure from convention earned Hippocrates the title the father of medicine [7]. According to Hippocrates, the ideal physician was concerned primarily with the patient, not only the disease.



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Hippocrates also was the father of spine surgery. In his book *On Joints* [8]. Hippocrates described anatomy and diseases of the spine and suggested treatment for patients with spinal deformities. He considered knowledge of spinal anatomy essential for physicians: "One first should get the knowledge of the structure of the spine; for this is also requisite for many diseases" [7]. Hippocrates described the segments of the human spine in *The Nature of Bones* [7,9] and classified diseases of the spine into five groups: kyphosis, scoliosis, concussion of the spinal cord, dislocation of the vertebrae and fracture of the spinous processes. These abnormalities were treated by correcting the abnormal curvature and reducing the dislocation. He used what is now known as Hippocrates' ladder and Hippocrates' boards to help achieve these goals.

Hippocrates was respected, not only as a great physician, but as an inspired teacher, that is, as a mentor. One of his pupils was Galen (129–200 AD) [4,5]. At an early age, Galen received intensive instruction from his father, who exposed him to the importance of anatomy, empiricism and the doctrines of Hippocrates. Galen's contributions to medicine were staggering. He wrote extensively: 9 books on anatomy, 17 on physiology, 6 on pathology, 14 on therapeutics and 30 on pharmacology. Galen's views dominated European medicine for 15 centuries until the time of Andreas Vesalius (1514–1564) and William Harvey (1578–1657).

In the East two other giants, Rhazen and Avicenna, became known healers and mentors [4,5]. Rhazen (854–925 AD) wrote 273 manuscripts primarily on medicine. Although Rhazen was an independent thinker, much of his work consists of compilations of the theories of Hippocrates and Galen. Rhazen's work *Al-Hawi* or *Continens* is one of the greatest encyclopedias of ancient medicine. It was first printed in Latin in 1486. Physically, it is the largest and heaviest of the medical books printed before 1501. Incidentally, Rhazen was the first to use animal gut for sutures [5].

Avicenna (980–1037 AD) was the most widely influential Arabic contributor to medicine. The ideas of Aristotle and Hippocrates stimulated him. Besides medicine, he wrote books on grammar, poetry and astronomy. *The Cannon* (*Al-Qanum*), a collection of about 100 works by Avicenna, was the basis of medical curricula in Africa and Europe until the mid-seventeenth century. Avicenna described the cause of epilepsy and diabetes. *The Cannon* supported doctrine compatible with Church dogma, that reasoning was more important than observation in the overall treatment of

patients. Overall, Avicenna's world view was medieval, and he contributed little to the development of a more modern scientific attitude [5].

Not until the seventeenth century, the "age of scientific revolution," did a major turning point in the history of medicine occur. Instead of asking why things occurred, scientists began to ask how things occurred. However, the seventeenth century was not an innovative period in medical education. In universities and medical societies teaching was at best haphazard and depended on the works of antiquity or the writings of Arabic authors, such as Avicenna.

Throughout the seventeenth and eighteenth centuries and most of the nineteenth century, medicine was taught at medical centers that greatly benefited from the charismatic presence of a single teacher or mentor. Alexander Monro (1697–1767), who was succeeded by his son and grandson by the same name, was a master anatomist who made Edinburgh the principle center of medical instruction for the English-speaking world [4,5]. Morgagni (1682–1771) did the same for the University of Padua when he disposed of the ancient humoral theory of a single morbid cause for all diseases. Many giants, including Harvey, Hunter, Magendie, Virchow, Vesalius, Billroth and Horsley, contributed to medical education by teaching admiring student apprentices. The formal education of budding physicians before and after receiving their medical degree was nonexistent. Admission requirements for medical schools were minimal. Usually a high school or equivalent education was all that was needed. Annual sessions were short and often a repetition of previous years [10].

A few medical schools, such as Harvard, Michigan and Pennsylvania, were attempting to establish university standards and faculties. However, in 1893 the establishment of Johns Hopkins University School of Medicine, headed by William Welch and William Osler, was a bold, inspired departure in medical education. Welch, a pathologist, first introduced microscopy and bacteriology into the United States. Osler was a firm advocate of extensive bedside training for medical students. These two giants, joined by William Halsted, changed US medical education and established a pattern that persists today [10].

Johns Hopkins required a college degree as a prerequisite for admission. The university provided a 4-year curriculum, made extensive use of laboratories for teaching purposes and integrated the hospital and college facilities to provide clinical training to advanced students. In 1904, Halsted's resident training program, modeled after the German Oberartz system, consisted of serving as an assistant for 6 years in preparation for 2 years as house surgeon (similar to the contemporary chief resident) [10,11]. The trainees received extensive clinical experience and were expected to engage in research. In 1954, this pattern of training was formalized by the Committee on Graduate Surgical Training (now the Resident Review Committee in Surgery).

The training of medical students, however, was still seeded with corruption, profiteering, fraud and malpractice. In 1910, the Flexner report (commissioned by the Carnegie Foundation for the Advancement of Teaching) on medical education in the United States and Canada helped to introduce the standard medical curriculum, which persists, largely unmodified, today. Before the report, the primary problem with medical education centered on the motivation to profit from educating physicians and a concomitant disregard for libraries, laboratory facilities, admission standards or even knowledgeable faculty. It led to an epidemic of iatrogenic morbidity and mortality [12].

Besides emphasizing biomedical teaching and standards, Flexner stressed that budding physicians needed "a varied and enlarging culture experience"[13]. Consequently, medical educators in the latter half of the twentieth century turned their attention to training humane physicians to treat illnesses, not only with technology and pharmacology, but also with attentive listening and empathy. In the beginning and even now for a variety of reasons, this move to teach humanities to future physicians was and is quite slow. Students were and are infatuated with high technology (ie, computers). The Dawn of Dig is with us and quickly fading into the Age of Dig. Financial incentives often overshadow appropriate and correct patient care. An ingredient appears to be missing, an ingredient needed to transform brilliant biomechanical technicians into effective healers. Perhaps incorporating a humanitarian curriculum into medical schools or even earlier in high schools or college could reverse this tendency. The days of subjecting medical students to overwork, abuse, demeaning attitudes and unrealistic demands must end. Physician-teachers who apply scientific and humanistic views to the marvelous technology of contemporary medicine and through it, to healing, need to serve as actual mentors to foster this mindset.

Over the last half century, the medical world has become bureaucratized and depolarized and, yes, specialized. Yet the popular expectation of medicine remains in part traditional, that is, to receive excellent care from caring, devoted physicians. Nevertheless, almost all US citizens want that excellent care to include the latest breakthroughs and high-technology procedures or techniques. Throughout these conflicting changes and demands, how is the learning process to avoid becoming depersonalized, boring, procedural and, ultimately, unsuccessful?

The greatest challenge to improving medical education is to modify the internal culture of the academic health center to reinforce the scientific and humanistic values that medical educators wish to impart. At present, this is no small task, because the managed-care revolution has caused medical schools and teaching hospitals to become less friendly to patients and students, contributing to the deterioration of bedside clinical skills, the demoralization of faculty and perhaps has affected the quality of care adversely [14]. Managed care is a business that survives, in part, by its ability to deny customers the product they want, a product that can be the difference between life and death. A patient's bill

of rights presently under consideration by Congress should provide the right of a second opinion, prohibit health plans from paying bonuses to administrators for denying care, guarantee access to emergency care and specialties and establish procedures for timely internal and external review.

The emphasis on the bottom line has eroded the quality of the clinical learning environment, particularly by reducing the time available for teachers to teach and for students to learn [14,15]. One might wonder about the long-term consequences of educating the nation's physicians in today's commercial atmosphere in which a good visit is a short visit, patients are "consumers" and institutional officials more often speak about the financial sheets than service and relief of patients' suffering. This attitude challenges the altruism and idealism that students typically bring to the study of medicine [14,15].

To make the culture of teaching centers less commercial and more service oriented requires not only attention to formal didactic teaching but active faculty mentoring. This combination can help create competent residents and physicians. Criteria for teaching centers, lectures and mentoring are being defined by a joint initiative of the American Board of Medical Specialties (ABMS) and the Accreditation Council for Graduate Medical Education (ACGME). It is hoped that these criteria will lead to competent residents.

Learning and mentoring, however, should continue throughout a physician's career. In 1910, Flexner recommended that physicians pursue life-long learning and critical teaching skills [16]. Until recently, Flexner's educational recommendation has not been implemented. Acquiring competency during medical school and residency is mandatory, and maintaining that competency is just as crucial. The ABMS appointed a task force on competence in March 1998. The ABMS is the umbrella organization for 24 member boards, including the American Board of Orthopedic Surgeons and the American Board of Neurological Surgeons, among others.

Board certification signifies that diplomates have met their board standards through education, training, knowledge, skills and experience. The public, hospitals, health plans and other organizations recognize these certification credentials as attainment of high standards. Nevertheless, the ABMS and its member boards recognize that board certification does not necessarily guarantee that a diplomate will practice competently after the certification process. The public has come to understand this point as well. Recertification by most boards every 10 years or so is designed to stimulate diplomates to "keep up" with new knowledge by testing, usually by taking a written examination.

Unfortunately, simply passing a written examination does not connotate competency in contemporary medical practice. Medicine, especially highly technical specialties such as spine surgery, changes more often than every 10 years. Changes occur almost daily. Neither the appropriate and skillful use of these changing technologies nor desirable characteristics such as professionalism and communication skills can be assessed adequately by a written examination.

Consequently, the ABMS and ACGME have agreed on six general competencies that both residents and practicing physicians should display: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism and system-based practices [17]. Most of these competencies are self-explanatory. Possibly, system-based practice needs further explanation. Competency in a system-based practice means how a physician practices cost-effective care, understands the interaction of practice in a larger system and acts as an advocate for patients within the health-care system. These general competencies will formally be used in the Accreditation of Residency Program after July 1, 2002. The six general competencies can differ, depending on the specialty. For example, the communication skills needed by a spine physician differ from those of a pathologist. Medical knowledge and patient care also differ among specialties. Despite these differences, competencies should be measurable, teachable and learnable.

Besides the six general competencies, the ABMS and its member boards agreed that four primary elements are required to maintain certification [17]: evidence of professional standing, evidence of commitment to life-long learning and involvement in periodic self-assessment, cognitive expertise and practice performance.

The evidence of professional standards differs among specialties. Nonetheless, it could consist of verification that a diplomate has maintained basic credentials, including a nonrestrictive state licensure and unrestricted hospital privileges. Evidence of commitment to lifelong learning and involvement in periodic self-assessment could consist of a required number of continuing medical education credits and self-assessment tests, such as the College of Surgeon's Surgical Education program or the Self-Assessment Neurosurgery examination. Evidence of cognitive expertise most likely would consist of a proctored written examination. Finally, practice performance could be evaluated by patient satisfaction surveys, peer review, analysis of practice pattern from patients' charts and outcome analysis by reviewing practice-specific key cases. Quality and assurance committees at many hospitals may be helpful in meeting these requirements. Being competent in these four elements will ensure that a physician is "a life-long learner."

The North American Spine Society (NASS) is uniquely positioned to assist in this educational process. The Society offers multiple courses, especially those for continuing medical education credits at the annual meeting. Both members and nonmembers are encouraged to attend the Current Procedure Terminology course, hands-on courses, joint meetings with our Japanese and South American colleagues and sports symposia as part of the life-long learning process. On-line courses could help the process of periodic self-assessment. Residents and fellows are encouraged to attend review courses to foster their learning. The annual

meeting is the exclamation point of the education opportunities that NASS offers.

Throughout this presentation, I have emphasized the importance of mentors. Those of you in the audience who are parents are mentors for your children. You, the parent, should be a shining example, because your child will copy you and follow in your footsteps. You have the opportunity, or you should make the opportunity, to teach, to love, to befriend, to encourage and to cheer on your children. Take the time. Do not delay. You will not regret the investment.

The physicians (teachers) in the audience should be mentors to medical students, residents and younger colleagues, and even to peers. You have a chance to influence budding or new physicians. Devote the extra time and effort to impart knowledge and skills and to guide and counsel them. Let them see your excitement and enthusiasm. Share your failures with them as well as your successes, but emphasize their role in the success and your role in the failure. All of you in the audience take care of patients. Your patients not only seek relief from pain, suffering, disease or disorders, they also seek counseling and guidance, that is, mentoring. The physician's primary professional duty and responsibility is the appropriate and compassionate treatment of patients. This duty should be performed with integrity, honor, respect. It should never be driven by self-serving, greedy or financial goals.

From the heroes in Greek mythology to Hippocrates to Halsted, Flexner, Welch, Osler and others, we in medicine have had the good fortune to have enjoyed great mentors. A mentor is someone who cares; someone who is competent and gives of themselves freely; someone who values respect, knowledge, and fairness. Each of you can be that mentor. Each of you should be that mentor, be it to your colleagues, your students, your children or your patients. Medicine is at a crossroads with pressures related to financial management, high technology, litigation and endless paperwork, all of which erode the humanistic, caring way that we and our patients like to be treated. Being a competent physician means being a mentor and creating an environment that emphasizes excellence and healthy morale. In this way we can hope to navigate safely through the difficult terrain ahead so that at the end of the day, we have the respect of those around us but, more importantly, our own.

Personally, I have been blessed with wonderful mentors throughout my life. My parents guided me, taught me, loved me through childhood and beyond. They mentored me through the rough post–World War II years in Germany. They guided me through our early years here in the United States after we immigrated in the 1950s. Although they have both passed away, they still influence me daily. Mr. Reynolds, for whom I worked on a chicken farm for 5 years, instilled hard work and dedication in me. The examples set for me by Bill Buchsbaum in medical school, Bill Schucart, Mike Scott and especially my Chief Ben Stein, during my residency helped me through the difficult years of training and beyond. Mentoring from my colleagues and friends, especially Robert Spetzler, is welcomed and helps me get through every day. Mentoring from my children, who teach me love and give me happiness and laughter, are vital to my existence. Finally, mentoring from my wife, Lynne, in the form of love and friendship, is as important to me as breathing. I want to thank her for putting up with me for 27 plus years by being by my side.

In conclusion, I want to thank you all for giving me the opportunity to serve as president of the North American Spine Society. It was a privilege that I hope I fulfilled well and an honor that I will cherish. Thank you for your attention.

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Aesculapius originated the art of bandaging and use of purgatives. He also advocated cleaning of teeth and extractions. Hippocrates (500 B.C.) was supposed to be a descendant of Aesculapius. Hippocrates became famous both as practioner and writer on medical subjects. He did not believe in magic. He stressed nature's role in healing. Hippocrates raised the art of medicine to a high level. Also in one of his texts (Peri-Arthron) he devoted 32 paragraphs to the dentition. He appreciated the importance of teeth.Â The American Society of Dental Surgeons, first national dental organization. The Baltimore College of Dental Surgery, the first school in the world for the training of dentists was founded by Harris and Harden. Crawford W. Long discovers either anesthetic, but does not publicize it.