This commemorative note, in recognition of the 100th anniversary of radiology in osteopathic healthcare, reviews the development of the specialty from the initial availability of primitive equipment to its present status as an important component of patient care and a significant element in the consideration of socioeconomic issues affecting patient welfare. The osteopathic medical profession was quick to grasp the potential of the new modality, and its history is an exciting aspect of osteopathic medicine's progress.

(Key words: Radiology, history; radiology in osteopathic medicine; American Osteopathic College of Radiology)

This year is the 100th anniversary of radiology as a component of osteopathic healthcare. Three years after Wilhelm Konrad Roentgen announced his discovery, "x-radiance" equipment was installed at The American School of Osteopathy (ASO) in Kirksville, Missouri. Apparently, this was the second x-ray apparatus installed west of the Mississippi River. The first arteriographic images known to have been made in the United States were accomplished at the American School of Osteopathy following cadaveric injection with a mercury compound that hardened within the vascular system (Figure 1). Exposure times were 1 hour or so. The work, authored by William Smith, MD/DO, was published in the December 1898 issue of The American X-Ray Journal. (Figure 2 is the opening page of an article on the procedure, which appeared in the January 1899 issue of The Journal of Osteopathy.) Smith and David Littlejohn, MD, who taught "x-radiance and sanitary science" at ASO, compete for the designation of "first osteopathic radiologist." 2

Other radiographic installations were developed in the Midwest in rapid succession. The Still College Infirmary in Des Moines, Iowa, was performing diagnostic and therapeutic procedures before 1900. Its director of x-ray, A.B. Shaw, published a plea for specialization within the profession in The Cosmopolitan Osteopath in 1902. A small amount of radium was in use at the College, and George A. Still, in 1903, speculated that it might be used to treat deep-seated tumors. 3 The Southwestern Osteopathic Sanitarium in Blackwell, Oklahoma, had a department headed by C.G. Tillman, DO, who had been trained in the US Army.

Radiology emerges as an academic pursuit and clinical practice modality

By the early or mid 1920s, the "specialty" of radiology was emerging as an academic pursuit and a clinical practice modality. Earl Hoskins, DO, of the Chicago College of Osteopathy, presented a paper on radiologic research to the American Osteopathic Association (AOA) convention in 1917. He refined the technique of erect postural studies in 1921, empha-

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tal’s Osteopathic Unit opened in 1928 with a three-room radiography suite, headed by Herman E. Beckwith, DO, who also directed instruction at the College of Osteopathic Physicians and Surgeons, which had been called the Pacific College of Osteopathy. The faculty was expanded by 1929, with the addition of Floyd J. Trener, DO, and Jack Frost, DO. Frost had been trained at the Los Angeles County Hospital.

Trener had been superintendent and radiologist at the Des Moines General Hospital. His move to California proved to be a seminal event in osteopathic radiology, just as did the addition of Paul T. Lloyd to the PCO faculty. Trener became chief of the radiology department at Monte Sano Hospital, and after 12 years, entered private practice in Los Angeles. He restricted his practice to radiation therapy, probably being the first osteopathic physician to do so. He and Lloyd were to become compelling forces in the development of radiology as an organized and disciplined component of osteopathic medical practice. Trener presented a paper titled, “Colloidal gold with radiation therapy in cancer,” to the American Osteopathic Society of Radiology, the precursor of the American Osteopathic College of Radiology (AOCR), at the AOA meeting in 1929. The paper was later published in the Journal of Laboratory Diagnosis. His contributions to the profession are commemorated by the Trener Memorial Lecture at the annual AOCR meeting.

Osteopathic radiologists organize

By the early 1930s, it was evident that organization of the radiologists in the profession was necessary for educational and scientific purposes, as well as other mutual interests. In the 1920s and 1930s, x-ray section met in conjunction with the AOA conventions, and some of the papers presented were published in the JAOA. In 1927, the American Osteopathic Society of Radiology was organized with 25 physicians, only 6 or 8 of whom devoted full time to the practice of the specialty. The small membership proved to be insufficient for survival, and although the group held several annual meetings, it disbanded in 1930.

Organizational efforts revived in 1937 in response to the assiduous and tireless efforts of J. Armande Poria, DO, who enlisted the cooperation of many of the osteopathic physicians practicing radiology as a specialty, including Eugene R. Kraus, DO, Paul T. Lloyd, and Floyd Trener. In 1938, Poria was encouraged by a group of representative osteopathic radiologists to develop a constitution and bylaws for a college of radiology. Criteria for membership eligibility in the organization were difficult to resolve. At the same time, the Advisory Board for Osteopathic Specialists, established by the AOA in 1938, was investigating the certification of specialists. It heard a plea from Floyd Trener that the AOA appoint a national examining board of radiologists. The AOA Board of Trustees established the American Osteopathic Board of Radiol-
SKIAGRAPHY AND THE CIRCULATION.

First Delineation of the Arterial System with X-Rays Achieved by the American School of Osteopathy.

WILLIAM SMITH,

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THE AMERICAN X-RAY JOURNAL:

IT IS probable that every teacher of anatomy has, at some period or other, felt in his inmost being a desire to see how the structures of the body appeared before being subjected to the mutilation of the knife and the necessary alteration of relations. This desire was satisfied in a great measure so far as the skeletal apparatus was concerned by the advent of the Roentgen rays; but the extreme permeability of the soft parts of the body rendered further observation of little value. In the case of the vascular apparatus an easy method appeared to be the injection of the arteries with some substance impervious to the rays, and, of course, the first agent thought of was mercury. Unfortunately the metal is very heavy and also has a tendency on injection to be erratic in its distribution; as a consequence the mere weight of the injected material breaks down the smaller vessels or in other cases we find serious hiatuses in the resultant radiograph.

The school with which I am connected as Demonstrator of Anatomy recently secured a ten-plate Van Houten & Ten Broeck static machine, together with a Dennis fluorometer and a series of large sized Crookes' tubes, Monell type, and the idea entered my head to try and ascertain whether it was not possible to devise some system of arterial injection which should comply with the following requirements: First, be of such consistence as to be readily injected into the smallest vessels without solution of contiguity; second, be almost, if not quite, as impervious to the rays as is bone; third, be of such consistence, either on injection or immediately thereafter, as not to tend to gravitate to the more dependent parts of the body and so leave the higher vessels devoid of injection; fourth, be of such weight as not to rupture the smaller vessels. On these lines I made some experi-
ogy (AOBR) in 1939—the first specialty examining board in the profession. The Board conducted examinations according to a rigid protocol. It issued no grandfather certifications. All originally certified radiologists were examined by other examiners. The Board members realized that an educational arm was necessary to preserve practice standards and to serve as a pool for future AOBR members. The question of membership in the organization that had been proposed by Porias, Kraus, and others was now solved. Membership would be limited to certified radiologists. Efforts to establish the AOCR were revitalized. The group convened for the first time in 1941 at the Detroit Osteopathic Hospital. These two events, the formation of the Examining Board and the organization of the College, were fundamental to the subsequent role radiologists were to play in osteopathic healthcare.7

AOCR establishes educational standards

The primary function of the AOCR was to be educational. At the time of its inception, opportunities for training were fragmented, often locally organized, and relatively unguaranteed by any entity with national status and AOA approval. Over the course of the next quarter of a century, efforts of the AOCR and the AOBR were devoted to establishing rigid and increasingly demanding standards for residency training and for postgraduate study for practicing radiologists. Preceptorships were gradually phased out. Residency programs were initially 3 years and were eventually increased to 4. Midyear and other postgraduate programs sponsored by the AOCR became increasingly sophisticated, intense, and varied in content. The AOCR made many of these efforts in concert with the AOBH, which set standards of training as a requirement for examination and reported areas of deficiency in examinations to the College, guiding the content of educational programs that were sponsored, initiated, and organized by the AOCR.

By the mid 1960s, the AOCR educational activities were spread throughout the year and included a 4-day annual meeting, a midyear postgraduate program, and physics and radiation biology courses for residents. Scientific and technical exhibits became an important element of the annual meeting, aided by the generosity of many commercial exhibitors and donors.

Controversial issues erupt

Convulsive issues affecting radiologists began to develop as the educational activities of the specialty matured. The rapid growth of osteopathic hospitals after World War II and in the 1950s revealed controversial relationships between hospitals and radiology services vs. reimbursement, distribution of income from radiologic procedures, hospital “profit” from radiologic practice, and so forth. Subsequent societal issues and events, from the inception of Medicare to the development of health maintenance organizations, preferred provider organizations, and other models to control the burgeoning cost of healthcare, changed the practice of radiology and the relationship of the radiologist to the referring physician, the patient, and the hospital.

Osteopathic radiologists were lost to the profession when the Los Angeles College became an allopathic medical institution, most California DOs acquired licenses as allopathic physicians, and the California Osteopathic Association merged with the California Medical Association. In the 1970s and 1980s, prestigious allopathic residency training programs encouraged the application and acceptance of DOs, and osteopathic programs suffered losses of applicants. At completion of the training cycle, many osteopathic physicians chose to remain at their training institutions or accepted positions at other allopathic hospitals.

Originally, osteopathic residents in allopathic training programs were denied entrance to osteopathic certifying examinations. A change in AOA policy eventually permitted those who trained under allopathic medical auspices with prior approval of their programs by the AOA Committee on Postdoctoral Training, to qualify for osteopathic certification. This encouraged a return to osteopathic hospitals by some of the trainees. However, many chose to remain, and they have achieved important positions in exemplary institutions. The continuation of training programs in osteopathic medical institutions and success in filling them are ongoing problems. At present, there are 65 residents in osteopathic training programs. Some of these programs are being downsized or eliminated. One hundred six osteopathic physicians are in ACGME-accredited radiology residency programs.8

These events were partially engendered by the entrance of radiology into the “hi-tech” era of nuclear medicine, computerized axial tomography, ultrasonography, magnetic resonance imaging, and radiation oncology. Osteopathic radiologists embraced the new modalities, but training was obtainable primarily at institutions with the financial resources to keep current with the technology.

AOCR establishes Education Foundation

At about the same time, the AOCR embarked on a mission of public education in radiologic healthcare issues by establishing the Education Foundation, initially financed by AOCR Board members and other interested contributors, and later by generous help from commercial supporters. In 1987, a videotape for public exhibition and use was produced. Titled “A Gift of Life,” it discussed screening mammography in the early diagnosis of breast carcinoma. It was seen by perhaps 20 million television viewers on numerous cable and Public Radio channels and by other groups to whom it was made available on request. The Foundation completed a second project on colorectal cancer, with Steve Allen as a participant. At present, the Foundation directs its efforts toward supporting AOCR educational activities.

Organized radiologists cooperate

The complexities of societal/healthcare and governmental/healthcare issues, as well as the increasing crossover of osteopathic and allopathic radiologic services in both training situations and in hosp-
tial staffing, resulted in gradually expanding cooperation of organized radiology groups and societies. An osteopathic radiologist ascended to the presidency of the prestigious Philadelphia Roentgen-Ray Society. DOs serve on the Mammographic Quality Standards Act Advisory Board, on the American College of Radiology (ACR) Managed Care Committee and on its Task Force on Colorectal Cancer. The AOCR and the American College of Radiology officers and board members attend each others' meetings. The AOCR became a member of the ACR Intersociety Commission, a “think-tank” of delegates from multiple organized radiology groups with various agendas and areas of concern. An osteopathic radiation oncologist is a member of the American Medical Association Relative Value Update Committee. These and other areas of cooperation have afforded opportunity to osteopathic radiologists to help shape, influence, and debate public and governmental policies in healthcare issues.

Osteopathic radiologists train in nuclear medicine

Nuclear medicine became important in clinical radiology in the 1950s. Some osteopathic radiologists were able to attend the basic course offered by the Atomic Energy Commission in Oak Ridge, Tenn, following which they had to be certified in clinical uses of each isotope by attending a required number of clinical procedures under the direction of already-licensed physicians. Osteopathic Hospital Of Philadelphia acquired the first Gamma camera, an early entry into the isotopic medicine instrumentation field, in the profession. A Cliniscan scanner was installed at Metropolitan Hospital in 1959. Osteopathic radiologists particularly interested in nuclear medicine were already beginning to devote much, or all, of their time to this subspecialty.

In 1971, the AOCR approved the certification examination of the American Board of Nuclear Medicine for its members and petitioned the AOA to establish an osteopathic board for the same purpose. In 1982, the Nuclear Regulatory Commission (NRC), successor to the Atomic Energy Commission, accepted AOBR certification for licensure to use isotopes, and minimal training standards for residents were adjusted to comply with NRC licensing requirements. At present, some osteopathic radiologists restrict their practices to nuclear medicine. There are 88 DOs certified by the AOA and 19 DOs certified by the ABR.

Osteopathic radiologists take their place in the military

Thanks to the persistent efforts of the AOA, interestingly recounted by Gevitz, osteopathic physicians are serving in the Armed Forces of the United States in many capacities. A DO radiologist, Richard Lynch, is presently a Brigadier General in the Medical Corps of the US Army Reserve. There are at least four DO radiologists who are members of the Association of Military Osteopathic Physicians and Surgeons, Inc.

Comment

This commemorative history relates the enthusiasm with which the osteopathic medical profession embraced the newly discovered modality of “x-radiance” at the end of the 19th century and early in the 20th century. Osteopathic radiologists made early contributions to the radiology literature, as well as technical and procedural advances. Organized radiology, in concert with the AOA and its committees and commissions, achieved high standards in educational activities and principles of practice. Currently, the cooperation of osteopathic and allopathic radiology groups facilitates the debates, problem solving, and resolution of many problems relating to the changing healthcare environment. It has been an exciting 100 years.

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