

HISTORICAL PERSPECTIVE

Louis A. Goldstein, MD

*A Pioneer in Spinal Deformity Surgery*Daren McCalla, MD, Paul T. Rubery, MD, Kenneth Foxx, MD, Robert W. Molinari, MD
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During the first half of the 20th century interest in spinal deformity grew due to common conditions of that era including polio and tuberculosis. This article will discuss Louis Arnold Goldstein, a visionary leader in spinal deformity surgery from Rochester, New York and one of the founders of the Scoliosis Research Society. Louis A. Goldstein was a talented surgeon, administrator, and clinician scientist. He also started a spine surgery fellowship program that still bears his name and that continues to train complex spine surgeons.

Key words: Adolescent Idiopathic Scoliosis, Louis A. Goldstein, Scoliosis Research Society, University of Rochester.

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During the first half of the 20th century, interest in the surgical management of spine deformities grew as physicians sought solutions to the spinal disorders associated with the common diseases of the time, including tuberculosis and poliomyelitis. Among the practitioners at the forefront of this movement was Louis Arnold Goldstein, a visionary leader in spine surgery from Rochester, New York. Along with contemporaries such as John R. Cobb, John H. Moe, and Paul R. Harrington, Dr. Goldstein played a significant role both in advancing understanding of spine deformity, and also in the education of future orthopedic surgeons¹ (Figure 1A, B).

Louis A. Goldstein, affectionately known to his trainees as “L.A.G.,” was born in 1907, and raised in Spring Valley a small town 40 miles north of New York City. One of Dr. Goldstein’s more memorable traits was his calm, quiet demeanor when speaking, never getting “visibly excited.”

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This trait was due in part to a severe speech impediment that afflicted him in his youth, which caused him to question his aspiration to become a doctor. He eventually overcame this and completed his undergraduate studies at Alfred State College before enrolling in medical school at the University of Rochester in 1928. During his first year in Rochester, he met Mildred Messinger, a bright young woman studying German literature at the college campus. They married a few years later, started a family and a life in the city where they met and where they would affect the community for decades.

After his medical school graduation in 1932, Dr. Goldstein initially pursued an Internal Medicine residency at Rochester, but quickly learned that his talents and temperament were better suited for surgery transitioning the following year. Ironically, L.A.G. had an early distaste for orthopedics, in part due to the bed rest management of fracture patients at the time, which led to prolonged hospital stays and monotonous days spent on rounds.² R. Plato Schwartz, then chief of the Division of Orthopedics in the Department of Surgery, however, took notice of Goldstein’s natural work ethic and curiosity, and personally requested that he join the relatively new residency program. In 1934, Goldstein’s orthopedic education began in earnest.²

Dr. Goldstein progressed admirably through his residency. A pivotal moment in his orthopedic education was the visit to Rochester of Professor Marius Smith-Petersen.³ The distinguished surgeon and the impressionable trainee evidently forged an immediate personal connection. Smith-Petersen invited Goldstein to Boston for a traveling fellowship in 1937, one of the first residents in Rochester afforded such an opportunity. It was during his time as a fellow, that Goldstein would develop his interests in scoliosis, learning the most advanced techniques of the day, including turn-buckle casting, while caring for post-polio patients in the Vermont Poliomyelitis Clinics. When Goldstein returned to Rochester, Dr. Schwartz charged him with improving the treatment of scoliosis in the community, to which the budding spine pioneer responded, “I’m not sure what I can do about scoliosis, I’m confused by the whole situation.”² Despite his seeming trepidation, Dr. Goldstein vigorously embraced this challenge. He sought out further educational experiences including work in local polio and tuberculosis clinics, received mentorship from Albert

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A



B

Figure 1. **A**, Louis Goldstein (front row middle) with nursing and physiotherapy staff, circa 1950. **B**, Dr. Goldstein taking measurements on a radiograph of a spinal fusion patient.

Ferguson, a radiologist at The New York Orthopedic Hospital, and pursued extensive overseas travel.²

At the outbreak of World War II, Dr. Goldstein enlisted in the armed forces as a physician and he was deployed to Europe in 1942 (Figure 2). During his service, he assisted in the care of soldiers and citizens of all nationalities and helped to establish general hospitals, eventually becoming chief of the 19th General Hospital in France.² Limited resources on the front lines led to Goldstein experimenting with utilizing a patient's own bone to augment healing, a technique that he would bring back to the United States and which would eventually revolutionize the fields of spine and orthopedic surgery. Despite his good intentions and achievements, Dr. Goldstein would recall difficult encounters with German officers because of his Jewish-American background.

When the war ended in 1946, Dr. Goldstein returned to Rochester. Over the next few years, he would expand his reputation as a clinician, researcher, mentor, and educator in the field of spine deformity while working in private



Figure 2. Dr. Goldstein while serving in the United States Army in World War II.

practice and serving as a professor at the University of Rochester. He was a passionate advocate for affordable healthcare in his community and was a leader in establishing the Genesee Valley Blue Cross.

In academia, Dr. Goldstein would continue to grow as a thought leader in the field of orthopedics and spine surgery. He actually returned to Europe in 1954, visiting the United Kingdom and Scandinavia for 2 months to observe the practice of orthopedics. His experience included hand surgery, nerve repair, arthroplasty, congenital hip dislocation, and rehabilitation, and spinal deformity. The culmination of Dr. Goldstein's academic pursuits would manifest through the creation of the text, "The Surgical Treatment of Scoliosis."⁴ This publication provided a guideline for the complete care of scoliosis patients, with focus on a multidisciplinary approach, indications for surgery, classification of curves, preoperative planning, surgical technique, postoperative care, and reported outcomes as reflected by Goldstein's own practice (Figure 3). In this text he would describe his technique for harvesting and utilizing autograft bone from a patient's spine and pelvis to stimulate a robust fusion. Interestingly, the publishing of this work in the late 1950s closely coincided with a novel concept in the treatment of scoliosis—augmenting correction by way of internal fixation. Being among the foremost leaders in this largely uncharted territory, Goldstein was one of the earliest



Figure 3. Turnbuckle casting technique. Image from Goldstein, L.A., *The Surgical Treatment of Scoliosis*, By Louis A. Goldstein. Appendix: Anesthesia in Scoliosis, by D. Vernon Thomas. 1959.

adopters and reporters of the successful use of Harrington rod instrumentation in adolescent idiopathic scoliosis.⁵

In 1966, Dr. Goldstein became a founding member of the Scoliosis Research Society (SRS; www.srs.org) and was integral in developing one of the earliest classification schema for scoliosis (Figure 4).⁶ In 1976, he was elected President of the SRS at the 11th Annual Meeting in Ottawa, Canada; however, due to illness, he was unable to preside over the 1977 Hong Kong meeting, where Dr. Kirkland Ashley served in his place. His service to the SRS and his dedication to research into scoliosis are commemorated by the society's Louis A. Goldstein Award, which is given to the

best clinical research poster presented at the annual meeting. Back in Rochester, he served as Chief of the Division of Orthopedic Surgery from 1969 to 1974. As a result of his tireless advocacy with the Dean, the Division achieved Departmental status at the end of his tenure. He became Professor Emeritus of Orthopaedic Surgery in 1986, although he continued to pursue research and spend a few days per week in his office.

One of Dr. Goldstein's last innovations at the University of Rochester was creating an orthopedic spine surgery fellowship, which today bears his name. L.A.G.'s vision was for a "broad based training session, not restricted to

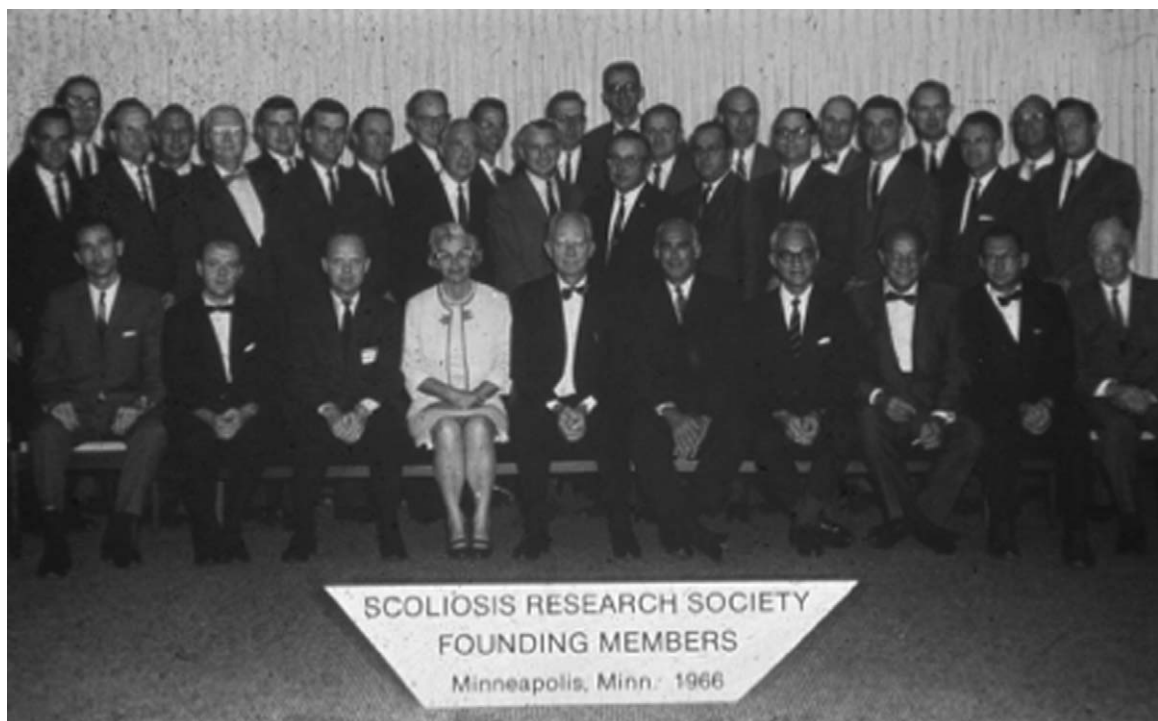


Figure 4. Dr. Goldstein (bottom row, fourth from the right) with the founding members of the Scoliosis Research Society.

spine deformity but covering all of the spine.”² To date, 34 fellows have graduated from the program, including several current leaders in spine surgery. Their ongoing contributions are an apt tribute to Dr. Louis A. Goldstein’s remarkable curiosity, energy, and leadership.

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