

Editorial

In My Experience™...Orthopaedics: Then, Now, and Tomorrow: Reflections on a Half Century of Change

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The author reflects on what was, is, and will be in orthopaedics based on his fifty years in the field.

When asked to comment on the changes that I have witnessed in the care of the Orthopaedic patient over my life, it requires a deep dive into the changes between my practice and that of my father, Francis R. Conn, M.D. My father was the pioneer Orthopaedic surgeon in the Hattiesburg, Mississippi area. Dad trained in Orthopaedics on the LSU Orthopaedic service at Charity Hospital in New Orleans after finishing medical school (his last two years) at Tulane University. After completion of Dad's Orthopaedic residency, he moved the family to Hattiesburg, Mississippi in 1952. Interestingly, Dad told me that he had originally planned on practicing in Jackson, Mississippi, however once his training was complete he was informed by the late Dr. Tom Blake of Jackson that with three Orthopedists in Jackson there was not need for more. Understanding that a large part of the referral trauma to Jackson came from Hattiesburg, Dad set up shop in Hattiesburg.

All was not rosey for my father upon his arrival to the Hattiesburg medical community. With the general practitioners historically caring for all aspects of a patient's medical care and also owning the sole fracture table in Hattiesburg at the South Mississippi Infirmary (the railroad hospital), access to patients and equipment was restricted and my father became very frustrated. As fate would have it, a granddaughter of a prominent general practitioner suffered a serious elbow fracture which was attempted to be reduced by the general practitioner at Methodist Hospital. With the child's arm showing signs of impending circulatory issues, the daughter of the general practitioner implored her father to seek help from the young orthopaedic specialist. My father was called and reduced the child's elbow fracture to the delight of her mother and grandfather. From that point to this day, the playing field for utilization of Orthopaedic surgeons in the care of trauma patients had been laid.

My father's experience in caring for Orthopaedic patients came largely from treating the effects of polio in children and adults, limited internal fixation management of fractures of bones, non-operative care of ligamentous injuries to the knee, large incision openings of the joints when cartilage or other soft tissue injuries have occurred, and extensile exposure of spine and joint procedures.

Imaging technology to assist in the diagnosis of skeletal pathology was very limited. If a ruptured disc was suspected, the standard in the 50's and early 60's was the introduction of an oil based dye via a large bore spinal needle for a myelogram. Once multiple x-rays had been made with the patient placed in various positions to move the dye up and down the spinal canal, the patient was required to wait for settling of the dye and then extraction of this dye before removal of the needle. Not only was this painful and a protracted procedure, many patients suffered from post-spinal headaches due to the size of the spinal needle and the loss of spinal fluid.

Many spinal cord injuries required very prolonged bed rest and repetitive rotation to try to prevent skin breakdown via Stryker frames and other such devices due to the lack of stable fixation devices available to repair severely fractured and unstable vertebral injuries. Hospitalization for spine fractures in the 50's and 60's could run into the months! Death from blood clot or pneumonia was not uncommon.

Since low friction joint arthroplasty was not introduced until the mid to late 60's by Sir John Charnley of England, the hip fixation devices used by my father were mainly spacer devices designed to accommodate restoration of a broken or diseased joint, but not so much a restoration of function. The pinning of a hip fracture (intertrochanteric type) by my father required the use of two portable x-ray units and a fixed blade plate (Neufeld/Jewett triflange).

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This means of hip pinning required great skill in fracture reduction and an “artsy” approach to initial placement to avoid damaging the bony structure about the hip as well as avoiding prolonged surgical procedures. Even so, with a perfectly positioned Neufeld/Jewett, the fractured hip many times was left with a level of instability that precluded any consideration of early mobilization.

With the introduction of the Government as the single largest payer of healthcare services in the USA in the 60’s things began to change rapidly. While my father stuck to tried and true methodology until his eventual retirement in 1981, the rush to develop and produce enhanced orthopaedic stabilization and replacement devices was driven by the cost plus days of the early Medicare program. The advent of Total Joint Replacement and concerns about length of hospital stay had arrived.

In 1984, I returned home to practice Orthopaedic surgery after finishing my Orthopaedic residency in Greenville, South Carolina followed by a one year fellowship in Adult Reconstructive surgery at the Mayo Clinic. Many things have changed in the practice of Orthopaedics in the last 35+ years.

Whereas my father’s era of training was with children, the 80’s brought innovative techniques to repair and reconstruct adult orthopaedic patients. Instead of making large incisions into the knee joint for repair of torn cartilage or ligaments, arthroscopy came of age as it transitioned from Japan via Dr. Watanabe. No longer were pain, immobilization, and protracted recovery a part of getting over a knee surgery for trauma. As these 35 years have gone forward, significant advancements in techniques, devices, and instrumentation have continued to show improvements in care and the capacity to meet patient expectations for return to activities. Arthroscopy has progressed to include the shoulder, elbow, hip, wrist, and ankle. The instrumentation for these less accessible joints have made great strides in refinement leading to enhanced predictability of potential outcomes.

Trauma care has seen huge changes over the last 35 years. When I first came home, care of a pelvis fracture patient primarily involved bed rest and the use of traction harness. While this technique was successful in a large percentage of cases, the prolonged immobilization and frequent lack of bony anatomy restoration led to protracted recovery and potential future post-traumatic hip joint changes. The use of skeletal traction with counterbalancing weights attached to ropes and pulleys in the patient’s bed was still considered standard of care in 1984. Open surgical repair of femur fractures with intra-medullary rods allowed the patient to get out of bed in a few days and begin rehabilitation. Today, with closed, limited incision intra-medullary rodding techniques supported by fluoroscopy, trauma patients can be mobilized early and restoration of function at adjacent joints can be anticipated.

Imaging for spinal column conditions and stabilization after trauma have seen enormous strides. Water soluble dyes eliminated the need for large bore needles and removal of the old oil base materials. Subsequently, the introduction of CT scan and then MRI have revolutionized the

capacity of an Orthopaedic surgeon to diagnose and treat disorders of the spine. The 90’s brought improved materials, designs, and techniques for not only stabilizing spinal trauma, but also to do so via limited surgical exposures thus less tissue trauma. Now we could ambulate spinal trauma cases and expect to see them home in 5-7 days versus months. The need for plaster body jackets and halos with pins attached to the head for stabilization had diminished.

Managing arthritic joints such as the hip and knee have seen tremendous improvements over the course of my practice years. While at the Mayo Clinic, I was privileged to work with the late Dr. Dick Bryan on a pilot study for an early porous coated, non-cemented femoral knee replacement device. This revolutionary concept has since been adapted to include all or part of all major joint replacement procedures. Surgical incisions in the mid 80’s were little influenced by a desire to limit as much as a desire to see. “The wound will heal side-to-side”, I was told more than once by my early mentors in South Carolina and Rochester, Minnesota. Leaving hip replacements in the bed for 10 days post-op in a hip sling was the norm for my area when I finished my Fellowship. Imagine the shock when I told Physical Therapy at my hospital to ambulate my hip and knee patients the day of surgery! In time patients have migrated from early ambulation to the Out-patient setting with overnight stay or day of surgery discharge fast becoming the norm for carefully selected patients. In 2002, I performed out-patient partial knee replacements in my ASC to the delight of my very satisfied patients. With CMS revamping the In Patient Only rule for joint replacement surgery, the move to alternative surgical settings should intensify.

Today, with advanced instrumentation and techniques, the capacity to resurface diseased arthritic joints while maintaining soft tissue integrity has zoomed to the forefront such as the Direct Anterior approach to the hip. The introduction of Robotic-assisted technology in joint replacement surgery has helped Orthopaedic Surgeons better seek that anatomical correctness in implant positioning and balancing. The materials that we use for “resurfacing” diseased joints has undergone radical change. Early uni-polar metal hip prosthesis have given way to combinations of metal on metal (MOM), ceramic on ceramic, and ceramic on highly cross linked polyethylene (Plastic).

With this change of thinking and materials, the expectations of the surgical patient have likewise accelerated. These 35 years have seen patients go from concern over simply controlling pain in an arthritic joint to expectations of “full/normal” joint recovery. With these accelerated expectations comes a younger generation of patients seeking earlier intervention to maintain their lifestyle. The ability to provide these extreme levels of expectations for our patients continues to challenge us further into areas of new and evolving technology. Biomaterials that enhance or act as a scaffold for bony regeneration have allowed Orthopaedic surgeons to “save” damaged joints from near-term deterioration. The transferring or cultivating of one’s own cartilage has allowed the potential for filling or repairing defects on the weight-bearing surface. The era of Joint Preservation versus replacement continues to evolve.

Through dedicated research efforts, we can expect to unlock the mystery of the causation of osteoarthritic joint diseases as well as the inflammatory joint diseases. With an understanding of the actual physiological and genetic source of these joint conditions comes the opportunity for early intervention and prevention. Will we still be “resurfacing/replacing” parts of diseased arthritic joints in 35 more years or will an advanced biomaterial reverse and restore joint function without the need for boney resection?

The future of Orthopaedic care is yet to unfold. Imagine the First Assistant surgeon being remote with advanced connectivity to the operating room environment and capable of intervention with perhaps a joy stick control. Could Artificial Intelligence (A.I.) generated holographic joint images craft a 3-D like printed joint replacement on site intra-operatively? With the rapid rise in Artificial Intelligence and machine learning models, will Orthopaedic surgeons someday find their first assistant to be a fully autonomous robot?

What has **not** changed over the past 50 years are our patients. During my practice I was quick to remind others that while technology in healthcare has expanded rapidly,

the human beings that we care for have not seen such a transformation. **The human centric aspect of medical care will continue to be the differentiator in an evolving complex medical environment.**

“Nobody cares what you know, until they know how much you care.”-
Theodore Roosevelt.

The opportunity to treat people requiring orthopaedic care is both challenging and rewarding. To see the improvement in the ability to perform activities of daily living for our arthritic joint patients after resurfacing/replacement surgery or trauma management helps to reinforce our desire to help our patients.

Time will tell the ultimate story, but the future for advancing 21st century and beyond Orthopaedic care is exciting.

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