



Presidential Address of the American Orthopaedic Society for Sports Medicine

The Past, Present, and Future*

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Ladies, gentlemen, guests, and especially members, I want to thank you for giving me the greatest honor I could ever have, the honor of serving as your President. I want to thank my father, who passed away a year and a half ago. He worked three jobs a week; my mother also worked full time and still managed to raise five children. They were both college graduates with a Master's degree, and they wanted to give all of their children the same educational opportunities they had. I want to thank my three children, who are the most wonderful kids one could ever wish to have. My daughter Elise Clancy-Ruoho is an attorney in Madison, Wisconsin. Her twin brother, Chris, is a psychiatry resident at Harvard. My youngest daughter Kerry is helping to run an internet company in Buenos Aires, Argentina, and is planning to go to law school next year.

My wife Kathy, who is much smarter and a far better golfer than I, has been so incredibly supportive in everything I have tried to do. She knows when and how to bring

me back to reality and how to bring me back to ground if my head gets too filled with helium. She is the sunrise and the majestic sunset of my every day.

As we enter into the millennium, I think that it is apropos that we look at the past, the present, and the future of sports medicine. We are indebted to those who have gone before us. They were the pioneers who set the foundation and the trail both for our Society and our knowledge in sports medicine. Their clinical teaching and research stimulated my generation to make the next step in our everlasting quest to prevent and treat sports-related injuries. We have grown so far and so fast that our newest members and candidate members are now the Society's fourth generation. In clinical discussions with our recent fellows, I have been disturbed that they have demonstrated little knowledge of the fathers of sports medicine and their contributions. Therefore, I would like to recognize just a few of the many leaders who have contributed so much to our current knowledge.

THE PAST

Dr. Don O'Donoghue in the early 1950s demonstrated that all ligaments, including the anterior cruciate, needed to be repaired. His ideas, presented in two classic papers, became the stimulus of considerable controversy that took another 25 years to become universally accepted and prac-

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ticed. His textbook became the bible for all of us during this same period of time. Needless to say, Dr. O'Donoghue was elected the first president of our Society.

Dr. Jack Hughston, who was nationally recognized in the treatment of sports-related injuries as well as for his excellence in all of orthopaedics, became the guiding light in our Society. He was always futuristic, and *The American Journal of Sports Medicine* is one of his greatest legacies. As our third president, he encouraged the Board of Directors to purchase the privately owned *Journal of Sports Medicine* and rename it *The American Journal of Sports Medicine*. He became the first editor. *The American Journal of Sports Medicine* is now the leading journal in the world in sports medicine, publishing the best in sports medicine research, a subject that used to be published exclusively in the *Journal of Bone and Joint Surgery*.

Dr. Don Slocum was the senior partner in the Eugene Orthopedic and Fracture Clinic and was assisted by Bob Larsen and Stan James. They were the first researchers to describe the concept of rotational instability of the knee, and they developed diagnostic tests and surgical procedures to address the instability. Stan James also devoted a tremendous amount of time studying injuries in runners; he was the pioneer in this field of study in this country.

Dr. James Nicholas, a prolific speaker and writer, was also a former president of the Orthopaedic Research Society. Although known for his knowledge and accomplishments in sports medicine, he was perhaps the most adamant about using proper scientific methods in both clinical and basic science as they applied to sports medicine problems.

Dr. Jack Kennedy, from the University of Western Ontario, was second to none in his clinical expertise and research in knee injuries. His textbook on adolescent knee injuries was dramatic and timely. He put the clinical evaluation of knee laxity on a more objective basis by developing a knee stress machine, and his papers were at the forefront of the debate concerning the treatment of ACL injuries, progressing from nonoperative, to extraarticular, to intraarticular procedures. Dr. Kennedy's discussion of papers was quite succinct and to the point and could be devastating, like going through a shredding machine, if you were way off the mark.

Several of our founding members have established benchmarks in the shoulder and were world leaders in this area. Dr. Carter Rowe's articles on recurrence rates in first-time glenohumeral dislocations and the operative treatment of recurrent instability are considered the orthopaedic bible. Dr. Charles Rockwood, another founding member and the first Chairman of the Board of Trustees of *The American Journal of Sports Medicine*, has been one of the world leaders in shoulder injuries, from the 1960s to the present.

Dr. James Garrick, founder of the first major university-based sports medicine program, in the late 1960s at the University of Washington, became the guru in sports medicine epidemiology. His work has produced significant changes in the practice of sports medicine.

Dr. John Marshall from the Hospital for Special Surgery

in New York was one of the primary leaders in the "changing of the guard" in the treatment of ACL injuries. He recognized that the ACL was "the key to the knee" and needed intraarticular treatment. He was killed in an airplane crash while flying to the 1980 Winter Olympic Games in Lake Placid. John would certainly have accomplished much more in the field of sports medicine if not for his untimely death.

Dr. Joseph Torg is a good friend and someone to whom we and our patients owe so much. His accomplishments are too numerous to mention, but it was he alone in the 1960s who pioneered the changes from the old style of football cleat to the present soccer type of shoe. In doing so, Dr. Torg saved many thousands of athletes from serious knee injuries. His contributions to the prevention of injuries of the head and neck in sports and his fight to get the rules changed concerning spearing in football have probably saved hundreds of athletes from spinal cord injury. Few in sports medicine have had the impact of Joseph Torg.

Dr. Robert Kerlan, also a founding member of the AOSSM, was perhaps the best clinician that I have ever had the pleasure to observe. He was an eloquent speaker who was blessed with great vision and foresight. Because of severe chronic medical illness, our membership suffered significantly from lost opportunities to hear this great man lecture. His partner, another founding member of the AOSSM, Dr. Frank Jobe, has always been at the cutting-edge throughout his entire career, and he definitely left us a legacy in the treatment of the ulnar collateral ligament injuries of the elbow.

I am pleased to announce that the Board of Directors of the Society has established the AOSSM Hall of Fame to preserve our heritage and to recognize the past, present, and future leaders in sports medicine.

I wish to personally thank four gentlemen for their help in my career. Dr. John Feagin was a founding member and the 14th President of our Society. He was the head team physician for West Point, his alma mater, and the grandfather of the ACL in this country. He became my "rabbi" (a very important New York City police term). In New York City, if you wished to rise in the ranks of the NYPD, someone of high rank had to be watching over you and pulling the strings to get you up the ladder, but you had to have the "stuffing" to make the climb. John Feagin has been the rabbi for John Bergfeld, Walt Curl, Jay Cox, and many others. Dr. Feagin took up the gauntlet left behind by Dr. O'Donoghue in trying to resolve the ACL dilemma, which was quite controversial. If it were not for John Feagin's helping hand and belief in my work, I would still be on the outside looking in.

I would also like to thank Dr. Les Bodnar, a founding member and the 5th President of this Society. He was the team orthopaedic surgeon for Notre Dame, and the gentleman who took personal interest in me. He was directly responsible for my going to the University of Wisconsin and establishing a sports medicine program. I want to thank my big brother, Dr. John Bergfeld. I was his junior partner at the United States Naval Academy, and he was truly my big brother at the Naval Academy, the Univer-

sity of Wisconsin, and throughout my entire career. I can never thank him enough. Lastly, I would like to thank my partner for the past 11 years, Dr. James R. Andrews, for his support and friendship. His work ethic and capabilities are beyond belief.

THE PRESENT

This brings us to the present. The current Board of Directors—president-elect Walt Curl; vice president, Clarence Shields; past presidents, Duane Messner and Doug Brown; secretary, Bill Grana; treasurer, Jack Ryan; and Bert Mendelbaum, Carol Tietz, Kevin Black, and Peter Indelicato, President of COD—were beyond outstanding. As a collective unit, they emanated such a positive intellectual force that many goals were accomplished. This was the first year that we have had a full-time executive director, Irv Bomberger, who accomplished so much administratively that our time and the staff's time was directed proactively. The achievements of Irv Bomberger and his staff this year made my life easier and more efficient, and makes our previous presidents drool with envy.

In 1962, Clint Compere, president-elect of the Academy, established the AAOS Committee on Sports Medicine because of significant interest by the members in this emerging field. In 1972, 76 orthopaedic surgeons whose main interest was sports medicine, who were predominantly team physicians, and who believed that sports medicine represented a unique body of knowledge, met in Washington, D.C., to found the American Orthopaedic Society for Sports Medicine. Dr. O'Donoghue, in his presidential address, reiterated the key goals of the new Society, "to foster, promote, support, augment, develop and encourage investigative knowledge of sports medicine and its many ramifications: to develop and encourage the teaching and education of the same by developing educational materials and to provide specialized training for orthopaedic surgeons."

In 1974, when I became a member of the Society, I knew who we were. However, the past 25 years have seen tremendous progress in our knowledge base, impressive technological developments, and major changes in the way we practice medicine, with increasing demands on our time. Last year, as the newly elected president of this Society, I was constantly bothered by the question "who are we now and where are we going." I voiced these concerns to the immediate past-president, Doug Brown, who was also dealing with a number of difficult issues, including the question of subspecialty certification, previously called CAQ or Certificate of Added Qualification. These questions were brought to the Board of Directors, who voted unanimously to survey the membership concerning subspecialty certification, but to do it in the most scientific way possible. To this end, our executive director, Irv Bomberger, selected Leever Research Services as the most qualified group to fulfill our requirements. Leever Research Services met with the Board of Directors, the Members Benefit Committee, headed by Bob Stanton, and our administrative staff to develop a questionnaire to yield the most scientifically credible answers. The questionnaire

was submitted not only to our 1187 active members, but also to 2503 AAOS (non-AOSSM) members, the names of whom were provided by the Academy, who had previously expressed an interest in sports medicine. Forty-seven percent (558) of our members and 24% (601) of the nonmember AAOS group responded to the questionnaire. This response far exceeded the return expected based on similar studies, and the survey results leave little to be debated. Here are the questions and the responses.

1. *Who are we?* Ninety percent of our members serve as team physicians; 77% provide both on-field and office-based consulting as a team physician.
2. *Types of teams covered:* high school teams, 74%; college teams, 62%; community teams, 46%; professional teams, 36%; both elite and nonelite, 65%.
3. *Primary practice setting:* private practice, 54%; private practice with academic appointment, 29%; university full time, 15%; exclusive HMO, 2%.
4. *Patient visits:* The average AOSSM member sees 306 patients per month; 174 (57%) of the injuries incurred in these patients are sports-related.
5. *Surgical procedures:* AOSSM members average 28 cases a month, of which 17 (61%) are sports-related.
6. *Education delivery:*
 1. Printed *American Journal of Sports Medicine*, 80%
 2. Attendance at courses, 72%
 3. Attendance at AOSSM annual meeting, 68%
 4. Printed educational materials devoted to research and technique, 60%
7. *Sports medicine-related journals regularly read:*
 1. *American Journal of Sports Medicine*, 97%
 2. *Journal of Bone and Joint Surgery*, 74%
 3. *Journal of the American Academy of Orthopaedic Surgeons*, 72%
 4. *Arthroscopy*, 62%
 5. *Physician and Sportsmedicine*, 35%
8. *Reasons members belong to the AOSSM:*
 1. Professional interaction with other sports medicine colleagues, 86%
 2. Mentorship with established specialists, 61%
 3. Personal promotion and support to the Society, 53%
 4. To demonstrate that your practice meets the high qualifications for AOSSM membership, 40%
9. *AOSSM members satisfaction:* 93% are very satisfied or satisfied.

Several very critical questions were also asked. The first question asked was whether orthopaedic sports medicine was a unique body of knowledge and a unique area of practice. The replies were: 80% said it was a unique body of knowledge, 86% said it was a unique practice area, and 78% said it was both.

The second critical question asked for a response to ten statements, five positive for subspecialty certification (CAQ) and five against CAQ. The number of those responding positively (51%) was essentially the same as those responding negatively (49%). However, respondents under 45 years of age yielded a 66% positive response and respondents over age 55 yielded a 65% negative response. The most critical question asked was: If subspecialty cer-

tification was available in sports medicine, would you seek it? In reply, 70% of AOSSM members responded positively, 60% of sports-interested AAOS members (nonmembers of AOSSM) also responded positively. When broken down by age, 97% of all under 45 would seek it, 66% of those between 45 and 54 would seek it, 36% of those over 55 years of age would seek it. Further, 79% of AOSSM members who devote 50% or more of their time to sports medicine would seek certification if available.

I believe the Board of Directors, the Members Benefit Committee, and the Council of Delegates has done its due diligence and the membership has voiced its opinion. As a result of these findings, I will ask the Board of Directors to continue moving forward on the application for subspecialty certification in sports medicine.

In response to our members' interest in a more active participation in the Society, a Member Benefit Committee was established last year by my predecessor, Doug Brown, to address these concerns. The committee is actively developing a mentor program and a practice-development program for our members. The committee is also actively looking to increase our membership by trying to attract those AAOS sports-interested orthopaedic surgeons who are not currently members of AOSSM.

THE FUTURE

This brings us to the future. What lies ahead for you in the near future is almost unbelievable. Looking at some of the things that are just surfacing brings me back to the night when I was a first-year resident on call at the hospital, glued to the black-and-white picture of Neil Armstrong taking "one small step for man and one giant leap for mankind." When the broadcast was over, I went outside and looked up at the moon; I could not believe that what I had just witnessed was possible. The future is just around the corner and it is incredible.

In the future, we will see significant advances in tissue engineering, computer-assisted surgery, computer imaging, and robotics. Tissue engineering, as defined by Doug Jackson, is a multidisciplinary approach aimed at solving some of the most perplexing biologic problems, namely the creation of new tissues and organs similar to the original tissue. Tissue engineering is the manipulation of cellular and bioactive mediators that will stimulate the host to produce improved or normal tissue at the injury site. There are currently three basic methods that have been developed to manipulate host cells.

The first method is the direct injection or implantation of scaffolds containing the necessary growth factors such as platelet-derived growth factor (PDGF), transforming growth factor (TGF), basic fibroblastic growth factor (bFGF), and bone morphogenic protein (BMP). However, in some cases the bioactive proteins have a lifespan that is too short. Thus, a second method is being developed to manipulate the genetic code of the reparative cell by introducing the necessary genes that will stimulate the cell to produce the required bioactive proteins. This method is

called gene therapy. Genes are introduced into the target cells by a vector, which may be either viral or nonviral. Viruses are the most effective vectors because their life cycle requires them to deliver their own genes into the cell they infect. Retroviruses, adenoviruses, herpes simplex, and other viruses have been developed for this purpose and are currently being used in human clinical trials. Marker genes have been successfully transferred to all major musculoskeletal tissues and efficacy in animal models is now being evaluated. Interestingly, human trials are already ongoing in the treatment of inflammation in rheumatoid arthritis. Finally, many investigators are studying the tissue transfer of mesenchymal progenitor cells or mesenchymal stem cells, which have the capacity of differentiating into the appropriate cell type during healing. This technique has great potential but still needs further evaluation.

The second major technological advancement lies in the field of computers. Cars, skyscrapers, and airplanes are now designed and built almost exclusively with the assistance of computers. Computer-assisted ACL surgery is currently being performed as demonstrated by Hans-Ueli Stäubli in Bern, Switzerland. Computer modeling, virtual reality, and augmented reality are the primary focus in the near future. In virtual reality, two-dimensional imagery from MRI, CT, fluoroscopy, and ultrasound is stacked in the third dimension to become volume elements called voxels. In time, these models will allow for many exciting things, such as evaluating correct tunnel placement in ACL/PCL surgery and determining articular surface contact pressures during loading with various graft positions. The applications to all fields of orthopaedic surgery will be immense.

Augmented reality is a display technique of computer-generated imagery onto live patient anatomy. Using augmented reality, a surgeon wearing a special headset will visualize the exact image of the fractured hip as he views the proximal thigh. As the surgeon moves his head, so will the visual image of the hip fracture move. The surgical procedure will be performed by looking directly at the thigh and augmented visual imagery, not at a computer screen. One example is an ACL-augmented reality technique developed by Klos in the Netherlands where a computer program projects the proposed graft onto a fluoroscopic image of the knee.

For the "high-tech" surgeon, computer-aided surgical robots will drill tunnels in the proper location as preoperatively determined by the surgeon from the MRI or CT scan. One such device, CASPAR (computer-assisted surgical planning and robotics) is already in use in Germany and is being evaluated at the University of Pittsburgh by Dr. Freddie Fu. Using three-dimensional data generated by CASPAR, the surgeon can plan the surgery and the robot can use the input data to drill a precise tunnel. And for those who do not like their assigned OR nurse, a robotic scrub nurse will not only give you the exact instrument, but it can be programmed to give you encouraging feedback that some surgeons need during surgery.

CONCLUSION

Finally, I would like to share with you a note from the presidential address of Dr. Rolie Jakob of the International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine (ISAKOS). "There is a recent study from the British National Health Service telling us that orthopaedic surgeons working to the age of 65 drop dead at a average of 18 months later, while they will

survive another 15 years if they had only worked until age 60." This may or may not be good news to our 45-year-old and younger members, but it is certainly thought-provoking to our members over 55 years old.

In closing, we have an enthusiastic and growing membership, and I believe that our Society's future is bright. I sincerely thank you for allowing me to be your president during the past year.