

ANTERIOR CRUCIATE LIGAMENT: HISTORY, ANATOMY, AND RECONSTRUCTION

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The purpose of this article is to provide surgical technologists with a better understanding of anterior cruciate ligament (ACL) reconstruction. It will cover a brief history of the ACL and its anatomy, diagnosis, and treatment.

Acquiring a better understanding of any surgical procedure can only enhance performance level and broaden the professional knowledge base.

Historical Background

One of the characteristics of modern surgical practice is the delusion that we are the first to present new concepts and treatments to our profession, only to discover upon closer examination that we have "reinvented the wheel." We sometimes forget that all our accomplishments are only a few stones added to the massive wall of medical knowledge already built by our medical ancestors.

Snook accurately accounts the history of the ACL in *The Crucial Ligaments*. He records that Claudius Galen of Pergamum and Rome must be given the credit for first describing the anatomy and nature of the ACL. Before his writing, ligaments were thought to be part nerve and to have some sort of contractile power. Galen wrote that ligaments were the supporting structures of diarthrodial joints, serving as stabilizers of these joints and limiting abnormal motion.

Interest in the structure lapsed for the next 1,600 years as medical attention was drawn to infectious disease and major trauma. The injured ligament was mentioned only in connection with dislocations and severe sprains. A knee with an injured ligament could always be braced.

In 1850, Stark treated patients with casts. In recovery, he found they had slight residual disability.

By 1917, Grone used different procedures such as replacements of the bony fragment by detaching a strip of fascia lata from its insertions and routing it through a tibial tunnel. Two years later, this procedure was modified by detaching a graft from its origin rather than from the insertion. This operation is the basis of the intraarticular reconstruction we use today.

In 1918, Alwyn Smith presented an overall review of the anatomy, biomechanics, mechanism of injury, diagnosis, and treatment of injuries to the ACL. He recommended reconstruction of the neglected tears by bringing the end of the graft up to the medial femoral condyle to reinforce the medial collateral ligament. He advanced the sartorius inser-

tion to provide extraarticular reinforcement and was the first to attempt prosthetic reconstruction using a silk substitute. Many theses have been published on the injuries to the ligaments of the knee joints.

By 1941, study of the ACL was still limited to case reports or descriptions of new procedures. A thorough study of sections of different ligaments and an analysis of the abnormal movement that resulted in the interactions between the several ligaments and menisci were discussed in a paper published by Brantigan and Voshell entitled "The Mechanics of the Ligaments and Menisci of the Knee Joint." This paper is usually quoted in any discussions of the biomechanics of the knee joint.

At the end of World War II, there was a rise in the popularity of athletics and the development of antibiotics. Infectious diseases ceased to be the major preoccupation of the medical profession. At the same time, surgery became safer because of antibiotics and the improvements in anesthesia techniques.

Shortly after this period, the concept began of dynamic reconstruction of ACL by transplanting semitendinosus tendon through the back of the knee forward into the tibia.

More progress was made in the diagnosis and treatment of injuries of the ACL. Simultaneous advances were made in other fields of medicine that had a direct effect upon the study of the ligament. The first of these was the improvement of radiologic diagnosis, especially arthrography.

In 1905, 10 years after Roentgen announced his discovery, Wendorff and Robinson performed the first arthrogram, a gas arthrogram of the knee. Lindblom in the late 1930s became the major proponent of arthrograms, but the popularity of the technique did not surge until the development of water-soluble media and the many technical developments in radiography in the late 1950s.

Advances in the treatment of ACL injuries occurred when a few orthopedic surgeons started working as physicians for American football teams. Coaches had been using films for scouting and teaching purposes since the early 1930s, and in this high-risk sport, the orthopedic surgeon could also use them to analyze the mechanics of injury to the intact knee. With the development of fiberoptic transmission of light, the use of arthroscopic surgical techniques increased rapidly through the work of several pioneers: Ward Casscells, Richard O'Connor, Robert Jackson, Lanny Johnson, Robert Metcalf, and many others.

Early diagnosis is important in the treatment of ACL injuries. DeHaven recommended the early use of the arthroscope in acutely injured knees in the presence of hemarthrosis. This procedure has led to early diagnosis

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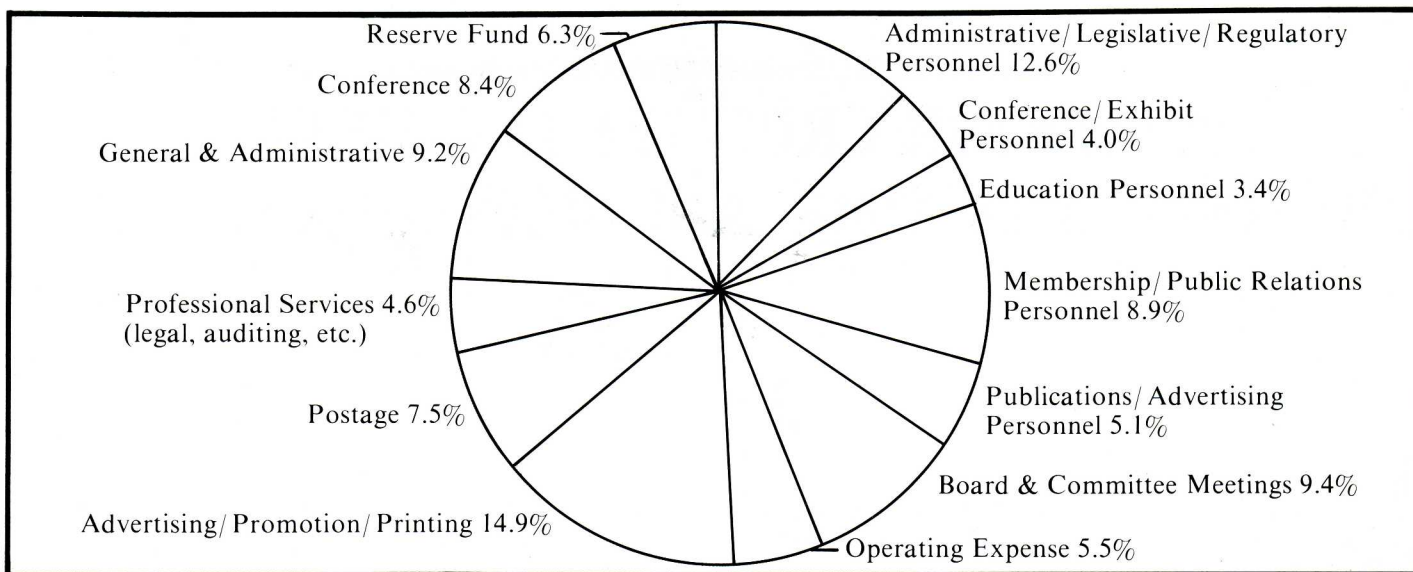


Figure 2. How your dues are allocated to AST programs.

nize that there are groups that can offer more services because of either higher dues or larger number of members, or both. We also recognize that some of these professions earn higher salaries.

The question has been raised as to whether AST has to have the dues increase to remain financially solvent. The answer to this is no. After purchasing the headquarters building, AST remains in strong financial shape. AST can continue offering the current level of membership benefits for probably 3 to 4 more years before inflation might begin to affect our current level of services.

You, the AST members, must decide whether you are satisfied with the status quo or if you want AST to increase the level of service it offers. The results of the membership survey conducted in 1990 suggest that you do want AST to expand several programs. If a dues increase of \$15.00 is approved, the additional revenue will be spent on the following programs:

- *The Surgical Technologist* will be published monthly instead of bimonthly.
- The job placement program will be expanded to increase the level of assistance given to AST members who are in the job market.
- The number of educational programs and publications offered to AST members will be increased, particularly home study opportunities and nationally sponsored seminars.
- Additional efforts will be directed to increasing recognition and awareness of the profession by employers, the public, and other health care professionals.

AST is committed to building a bright future for the profession. To reach that future and to continue being a valuable resource to its members, AST will need the additional financial strength that a dues increase would provide. □

Table. Survey of Membership Dues of Allied Health Associations (January 1992)

Association	Number of Members	Membership Rate
American Academy of Physician Assistants (AAPA)	15,000	\$185.00
American Association for Respiratory Care (AARC)	32,000	\$72.50
American Society of Radiologic Technologists (ASRT)	18,000	\$60.00
American Dental Hygienists Association (ADHA)	23,000	\$138.00
American Occupational Therapy Association (AOTA)	40,000	\$140.00
American Physical Therapists Association (APTA)	53,000	\$195.00
American Society of Extra-Corporeal Technology (AmSECT)	2,500	\$225.00
Association of Surgical Technologists (AST)	13,541	\$55.00
International Association of Healthcare Central Service Materiel Management (IAHCSMM)	7,500	\$50.00
National Association of Orthopaedic Technicians (AARC)	1,000	\$50.00

