

PRESIDENTIAL ADDRESS

The American Society for Surgery of the Hand

Harold E. Kleinert, M.D., *Louisville, Ky.*

These questions, often asked during my year as President, inspired the following address.

1. What is the recommended time for hand surgery training?
2. What should this training include?
3. If hand surgery is established as a specialty, does this exclude the general, orthopaedic, or plastic surgeon not trained specifically in this type of surgery?
4. How many hand surgeons does this country need?
5. What hand surgical services should be provided by a community hospital? By a medical center hospital?
6. What would be the effect of national health insurance?

The three major components of an effective, innovative medical program are (1) direct patient care, (2) teaching, and (3) research (Fig. 1). These may be envisioned as three overlapping circles, as in a Venn diagram. Direct patient care is the first priority, and when effectively administered, strong teaching and research capabilities follow (Fig. 2). Teaching stimulates research, for it is from the interchange between teacher and student that new ideas are created (Fig. 3). From the resolution of these ideas, new knowledge and service emerge (Fig. 4).

Patient care is either elective or emergency. The statement, "The surgeon who first operates plays the greatest role in the eventual outcome and the final result achieved," especially applies to the emergency patient.

The productive time lost by our nation from hand injuries sustained at work and home is so large that its value has not been estimated accurately. Patients are usually off of work or regular activity for 3 to 6 weeks following even minor hand injuries. If one combines

From the Department of Surgery, University of Louisville School of Medicine, Louisville, Ky.

Presidential Address to the Thirty-second Annual Meeting of the American Society for Surgery of the Hand, Las Vegas, Nev., Feb. 1-3, 1977.

Received for publication March 7, 1977.

Reprint requests: Harold E. Kleinert, M.D., 1001 Doctors Office Bldg., Louisville, Ky. 40202.

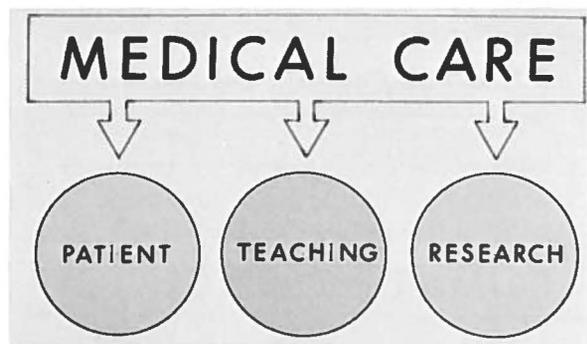


Fig. 1

this lost productivity with the amount paid in compensation for lost work time and adds the cost of medical care, then the annual national cost for hand injuries must be measured in billions of dollars.

Adequate primary surgical treatment would minimize secondary skin grafts and flaps, tendon grafts, nerve repairs and grafts, arthroplasties, and osteotomies. Effective emergency hand surgery thereby would reduce substantially all three factors in the high national cost of hand injuries: loss of productivity, compensation pay, and medical expenses.

Dr. Arnold Griswold, past chairman of the Department of Surgery at the University of Louisville, stated, "The surgeon capable of treating any emergency is likewise capable of treating any elective procedure."¹

As practicing hand surgeons, we should direct a large amount of our efforts toward primary treatment of the injured patient.

The surgeon dealing with the injured hand must be capable of performing primary tendon and nerve repairs, various forms of skin grafts and pedicle flaps, small one mm. vascular repairs utilizing vein grafts when necessary, and reduction of the most subtle articular fractures. Major hand emergencies therefore must be under the care of a comprehensively trained upper extremity surgeon.

Surgeons of the past emphasized immediate surgical care to minimize infection. The advent of antibiotics has not significantly altered these 6 to 8 so-called "golden hours." The rapid transportation systems of

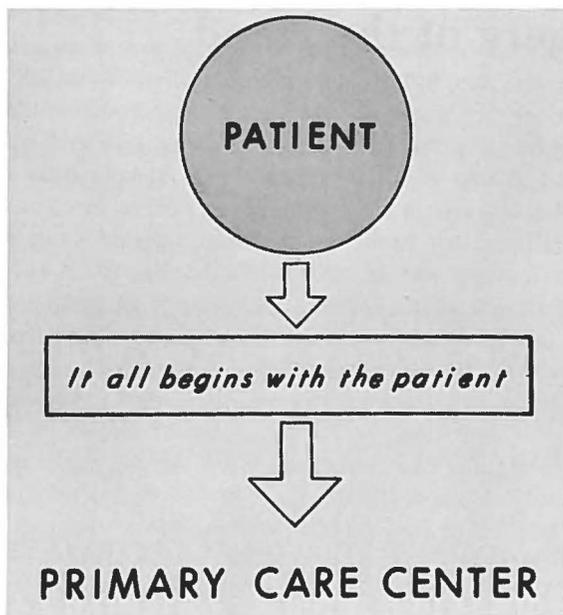


Fig. 2

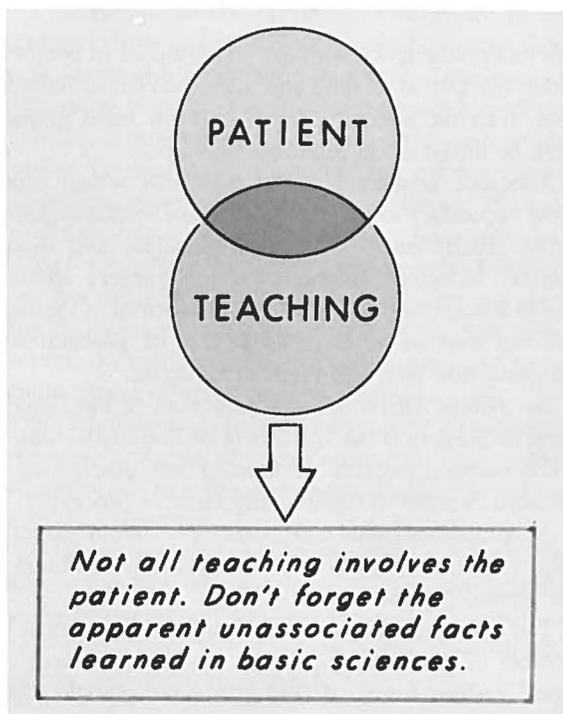


Fig. 3

this country offer the opportunity of highly specialized emergency care to anyone, within a few hours after injury.

Emergencies occur 24 hours a day; hence, a hand surgical service must provide 24 hour coverage. This serves to reduce substantially the number of secondary reconstructive procedures, and surgeons in training

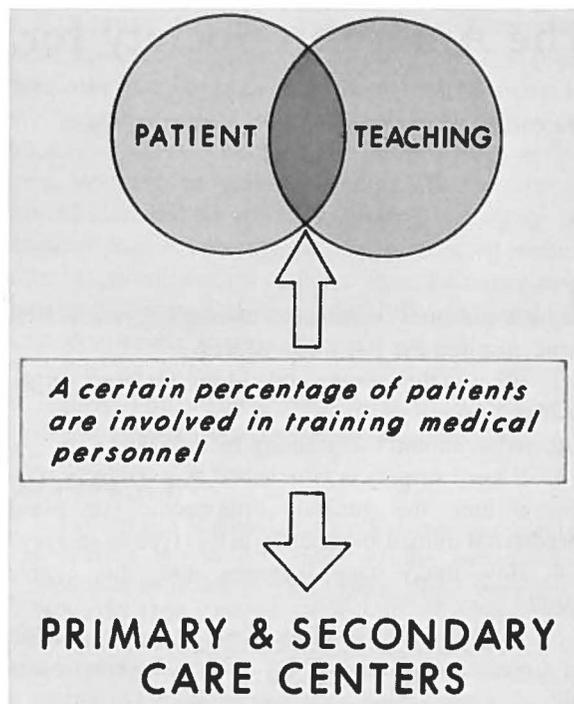


Fig. 4

thereby learn the importance of primary repair of upper extremity injuries. Delayed primary care, although possible, needs to be preceded by extensive cleansing and meticulous debridement shortly after the accident. Further, such care has no place when vascularity is lost.

Opponents of around-the-clock specialized care argue, "The operating room is not staffed with skilled personnel 24 hours; surgeons will be tired and less competent in the middle of the night, etc. . ." The problem of surgical personnel—technician, nurse, and surgeon—can be solved at less expense than the cost of secondary and staged surgical procedures dictated by delay. Furthermore, it is sound economic practice to utilize a costly facility, such as the operating suite, not 8 hours a day, but 24.

If reconstructive procedures are reduced by specialized surgical care, more time could be devoted to disease processes, such as contractures, arthritis, tumors, congenital deformities, birth injuries, and those few residuals of severe injuries where treatment had to be staged.

Originally hand surgery in the United States was organized by 35 qualified specialists. The time available to them demanded that their efforts be directed toward reconstructive hand surgery. The emergency case remained with the unskilled surgeon and patients continued to require one or several staged recon-

structive procedures to re-establish useful hand function.

With the passage of time, more surgeons became interested in surgery of the hand, so that presently teaching includes both elective and emergency hand surgery training.

Levels of medical teachers are two. The first level is *the medical student*. Many of us teach students and influence or help to direct medical school curriculums. General physician awareness and interest in hand surgery are stimulated by those lectures. Summer student research programs often culminate in worthwhile projects such as the sensory reeducation study directed by Ray Curtis. The second level consists of *interns and residents*. The instructing hand surgeon's contact with residents (general, orthopaedic, or plastic) is for periodic short intervals throughout a 4 year training period. These brief, infrequent contacts create a tendency to avoid teaching responsibilities and to avoid evaluation of the learning experience and of the services rendered by each pupil. Too frequently a young surgeon of inadequate capability completes a residency because we avoided passing judgment or because the department needed a "worker" for the service to function smoothly. The department chairman has the responsibility of guiding, following, and encouraging a resident's progress. His active interest in the training program will improve the quality of care his patients receive.

Restoration of hand function demands a combination of sound clinical judgment with skilled, delicate, meticulous surgery. Selection of candidates for this quality of surgery should include performance testing of inherent mechanical hand aptitudes and dexterity, not just later judgment on learned hand skills. Applicants for dental school undergo hand dexterity performance tests. We should require the same mechanical dexterity tests of candidates seeking surgical training.

What is the desired amount of initial training for a hand surgeon? Is it 6 months, 1 year, or 2 years? Does this period of special training entitle one to a certificate of special competence or, better, to become a member of a board of hand surgery, should one be established?

If a hand surgery specialty is established, does this exclude the general, orthopaedic, or plastic surgeon not especially trained in hand surgery from performing this type of surgery?

Less complicated hand procedures can and are accomplished by those without specialty training. Here surgical conscience comes into play. That is, we perform procedures where we are capable and consider referral of complicated procedures to a specialized fa-

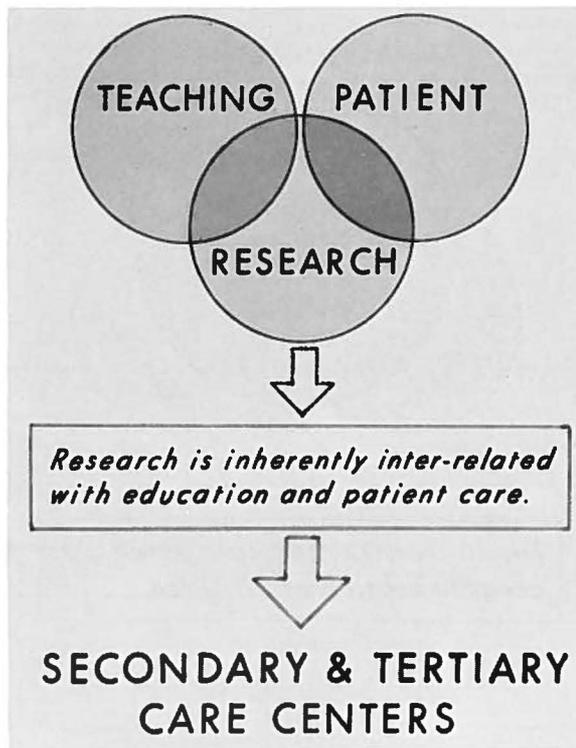


Fig. 5

cility. Remember: the surgeon who operates plays the greatest role in the eventual outcome of that patient.

For surgeons who principally practice hand surgery, 1 year of training after residency is ideal. For the surgeon in a medical center performing highly specialized procedures, 2 years is more appropriate; however, for this to be worthwhile for the trainee, most training programs would need to be upgraded.

A complete program for the hand trainee, in addition to direct patient care, includes weekly formal lectures, conferences on interesting and complex patients, on x-ray, and on pathology. Free time is provided for the anatomy and research laboratories, for studying, for developing new ideas and concepts, and for the practice of surgical techniques.

Even after we have obtained our training in hand surgery, there must be continuing secondary education.

The American Society for Surgery of the Hand has divided continuing education into (1) the primary care physician, (2) the surgical specialist, (3) hand surgery specialist. To date the Society has been especially active in providing continuing education for the surgical specialist. Approximately eight postgraduate hand symposia, aimed at the surgical specialist, are given each year across the United States.

When do you become a proficient hand surgeon? Not in 6, 12, or 24 months, but only after several years of

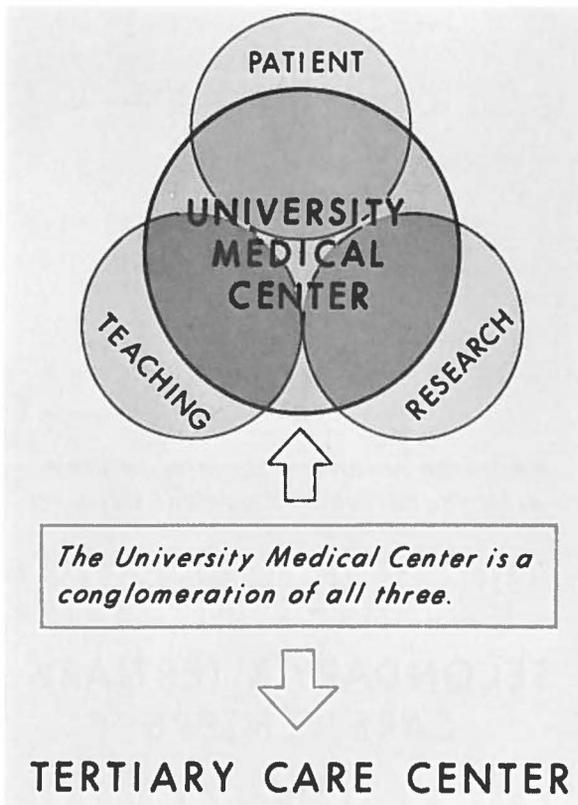


Fig. 6

practice, applying the principles of hand surgery. To improve ourselves, the hand surgery specialists, there is the annual American Society for Surgery of the Hand meeting, the Correspondence Letter to communicate new ideas, and the recently established JOURNAL OF HAND SURGERY. Additionally, conferences are being planned for the hand surgery specialist where the faculty is to be ourselves and where problems and interesting cases can be discussed in depth and detail. Here innovative ideas and procedures can be reviewed without fear of the uninitiated performing the procedure with possible disastrous results.

Teaching stimulates new ideas for patient care and research (Fig. 5). Students enter training programs not as empty minds but with minds that spill ideas as new concepts are poured in. Thus teaching and research are integral aspects of the advances in our field. Present progress in hand surgery includes new materials, sutures, joint implants, and prostheses and improved surgical techniques, of which currently the most popular are those done with the aid of the microscope. As with any tool, the user only becomes competent through repeated use of that tool. Proficiency with the microscope is obtained by using the microscope. Proficient microsurgions actually are faster repairing nerves

and small vessels than are surgeons who attempt careful repair with *macrosurgical* techniques.

We think of research as being done in university and medical centers (Fig. 6); however, community hospitals also set up basic research programs. Notable examples are Harry Buncke's pioneer microsurgery work in San Mateo in replantation and free tissue transfer and Al Swanson's program at Blodgett Memorial Hospital in Grand Rapids where silicone joint implants were developed. Both programs have influenced patient care strikingly.

Technicians, medical students, physicians at all levels, and specialists in allied fields, such as biology, physics, chemistry, and various engineering specialties, participate in basic medical research. The Society has established seed grant money to aid development of research-oriented projects. To date, applications for this money are few. This indicates that either our membership is not aware of these grants or, of course, that no one is in need of money!

Direct application from research studies to the patient needs to be preceded by controlled field trials. Unfortunately this is not always so. For instance, there are nearly as many metal and plastic joint prostheses on the market as surgeons inserting them. Most of these are available from the manufacturer with glowing advertisements as to their qualities, yet backed by all too few field studies.

New surgical techniques and procedures often have their inception from clinical practice. For each new technique or procedure to be meaningful, the practitioner must review clinical cases periodically to determine the efficiency of these procedures. To do so requires accurate data storage, often computer based.

In these days of increasing technology and complicated procedures, should everyone be trained or accomplished in all aspects of surgery of the hand? This includes procedures such as bone grafts, tendon grafts, skin grafts, pedicle flaps, joint replacements, and microsurgery. Microsurgery includes free nerve grafts; brachial plexus reconstruction; vascular repairs; vascular autografts, as often needed in replantation; vascularized tissue transfers like the groin flap for skin and subcutaneous tissue coverage; island sensory flaps, such as skin from the first and second toes to provide sensation in the hand, or perhaps eventually auto- or homograft joint replacement by direct microvascular repair; and, finally, vascularized nerve and muscle transposition when all muscle groups have been avulsed.

How many of these services should be and are provided in medical centers where manpower is the great-

Table I. Qualification of surgeons treating hand problems and ratio to population*

<i>Type of service required</i>	<i>Who provides this service</i>	<i>Ratio of surgeon to population</i>
Common hand problems	General surgeon (casualty departments)	1:25,000
Industrial injuries requiring reconstruction	General, orthopaedic, and plastic surgeons (general hospital)	1:100,000
Flexor tendon injuries, nerve grafts, rheumatoid arthritis, and Dupuytren's contracture	Hand surgeon	1:350,000
Complex congenital anomalies requiring reconstruction and shifting of digits	Hand surgeons with special training (university centers)	1:800,000
Replantation of limbs and digits	Hand surgeons with special training in microsurgical techniques (regional centers)	1:10,000,000+

*From Entin M: Self-fulfilling prophecies: Reflections on the future of A.S.S.H. *J Bone Joint Surg* 56A:1088-1091, 1974.

Table II. Relation of membership in American Society for Surgery of the Hand (ASSH) to the population of the United States and Canada

<i>Year</i>	<i>Membership of ASSH*</i>	<i>Population of United States (millions)†</i>	<i>Population of Canada (millions)†</i>
1946	35	142	11.5
1956	79	168	16
1966	127	196.5	20
1976	340	215	23

*All classifications.

†Projected figures.

est? How many should be performed by the surgeon in smaller hospitals with minimal resources?

How many hand surgeons are needed, one for every 50,000 or one for every 1,000,000 population? President Martin Entin,² during his 1974 address, gave these figures (Table I).

Observe from Table II: hand surgeons increased 10 to 1 in 30 years, as compared to the general population^{1,2} increase of less than 2 to 1.

Does the nation need more hand surgeons? It does, but only provided skilled care is directed to the initial injury as well as to elective hand surgery. Distribution of hand surgeons needs guidance; not all can remain in large metropolitan areas,—many must locate in communities of 50,000 to render excellent primary care in community hospitals.* The more highly specialized procedures would be transferred to appropriate medical centers. As an estimate, North America would require the services of approximately 1,000 hand surgeons.

The Certification Committee, under the direction of John Adams, is providing guidelines for advancement of the specialty. This important committee oversees (1) the preparation and continued improvement of exami-

nations for the new hand surgeon as well as self-assessment for the practicing hand surgeon, (2) the development of guidelines and requirements for hand surgery training programs after specialty training, (3) the establishment of the eligibility of a candidate to take the examination, and (4) the initial and periodic evaluation and inspection of hand training programs.

After the above has been accomplished, members of the American Society for Surgery of the Hand can rightfully speak out for certification and/or specialty boards.

Certain political pitfalls are in the path of continued advancement in hand surgery and, indeed, of all medicine.

There are two most prominent in my mind. The first is the medical-legal problem which presently interferes with good medical care. Why, in this country, which I believe delivers the best medical care available in the world, are we subject to by far the greatest number of medical-legal actions of any country? There are several answers offered, including the degree of physician-patient rapport; however, the underlying cause is that ours is the only country where the legal profession charges by contingency fee. The second is the national health insurance question or possibly the heralding of national socialization, an insoluble problem in countries with extensive welfare programs such as ours. I do not have

*In the United States there are 520 communities with 25,000 to 50,000 inhabitants and 240 communities with 50,000 to 100,000 inhabitants.³

to cite examples of once mighty, now bankrupt, countries that have followed such a course.

Socialized countries with healthy economies have no welfare; jobs, food, shelter, and health care are provided; however, you must work for these provisions. Nations that socialize or attempt to socialize, yet maintain a broad welfare program such as we have, become greatly weakened economically or indeed actually become bankrupt. This is not to say that extensive welfare programs in themselves are wrong or to say that socialization is wrong. However, it is to say emphatically that our leaders must realize that we can choose between broad welfare programs or socialization, but to combine both destroys morale, lowers the general standard of living and even more of health care, and thereby results in the opposite of what was intended.

What then are predictions for the future of hand surgery?

There will be better patient care; hand surgery will take advantage of improved technology in all fields of science.

Computerization greatly facilitates case study and compilation of final results. The computer is as reliable as the material inserted; yet even today we find ourselves searching, debating, and having difficulty in standardizing methods for the clinical assessment of patients. In spite of such stumbling blocks, use of computers permits continued advancement, evaluation, and improvement.

The search for predictable collagen control already has clinical application. The use of the electron microscope has supplied information on etiology of disease and its treatment. Advances in immunology and biochemistry may make prosthetic joint replacement avoidable, except for trauma and congenital defects. Future joint replacements may be accomplished by inserting vascularized homojoints rather than metal or plastic prostheses that slowly separate from methylmethacrylate cement and bone. The implication and extension of such related procedures are boundless. We know the epiphysis remains open if revascularized when transferred. Application of this principle may change treatment of problems such as congenital absence of the radius, Madelung's deformity, and avascular disorders of other bones.

In summary, progress in hand surgery has unlimited possibilities. Eventually some hand surgeons will specialize within the field of hand surgery.

REFERENCES

1. Personal communication.
2. Entin, M.: Self-fulfilling prophecies: Reflection on the future of A.S.S.H., *J. Bone Joint Surg.* **56A**:1088-1091, 1974.
3. Communication: United States Bureau of the Census, January 1977.