

# Surgery in Hungary

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**A**fter providing data on the geography and demographics of Hungary, the 1100 years of Hungarian history are briefly surveyed. The introduction, development, and present state of medical education and, in particular, surgical education, including specialty training, are discussed. Attention is devoted to the organization of the surgical community and of surgical manpower in the country. Various disease patterns and their influence on surgical practice are discussed. Attention is also devoted to health care provision and research activity. Finally, the future of surgery, especially general surgery, is outlined. *Arch Surg.* 2000;135:730-734

## GEOGRAPHY AND DEMOGRAPHICS

Hungary, situated in the eastern part of central Europe, is 93 000 km<sup>2</sup> (**Figure**) (about as big as the state of Indiana in the United States), after being reduced to a third of its former territory as a result of the Treaty of Trianon, which put an end to World War I. On January 1, 1999, its population was 10 062 000, with a natural growth of -0.3%. Life expectancy at birth is 70.3 years (66.1 years for men and 74.7 years for women [1996 data]). Sixty-four percent of the population lives in towns and cities. The per capita gross domestic product is \$4800 (1999). There are 15 million Hungarians living all around the world, 5 million outside Hungary.<sup>1</sup>

## HISTORY

Historical evidence shows that the Magyars (Hungarians) originated from the family of Finno-Ugric peoples living in the northeast of Europe. The Magyars embarked on their independent existence on the European side of the Ural Mountains around 1000 BC. They spent about 1500 years in this homeland. During the last centuries of this period, they moved east of the Ural Mountains. In the fifth century AD, Hungarians left their homeland in western Siberia and migrated westward,

driven primarily by the migration of Turkic peoples, through the Caucasus Mountains and present day southern Russia, arriving eventually at the Carpathian Basin, where they live today.

Around 500 BC, the Carpathian Basin was inhabited by Illyrians, Thracians, and then Celts. The expansion of the Roman Empire reached this territory around 35 BC, when it became the province of Pannonia. In the fourth to sixth centuries, the territory was occupied by the Ostrogoths, Longobards, and then the Avars. Led by Prince Árpád, the Magyars arrived in the Carpathian Basin in 896 AD. The dynasty founded by Árpád reigned in the medieval Kingdom of Hungary from 904 to 1301 AD. King St Stephen I (997-1038) laid the foundations of Hungarian statehood and church organization. The migrant nomad people settled for good in the Carpathian Basin and embraced Christianity. In 1222, only 7 years after the Magna Carta, the country had a constitution, the so-called Golden Bull.

Hungary was one of the most important kingdoms of Europe in the Middle Ages. Embracing western Christianity, it became integrated into the cultural circulation of the feudal societies of Europe by the end of the 15th century. In 1526, Hungary was occupied by the Ottoman Turks, who ruled the country for 150 years. It took another 150 years after the expulsion of the Turks until Hungary sufficiently recovered to become once again

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fully integrated within Europe. The period of rapid economic and political consolidation ended with World War I, when the country lost two thirds of its territory, and soon the ending of World War II placed Hungary—together with several other European countries—under Soviet domination. The situation only changed in 1988 with the downfall of the Soviet regime. Since 1998, Hungary has been a member of the North Atlantic Treaty Organization, and since 1990, it has participated in the work of the Council of Europe. In all likelihood, Hungary will become part of the European Community within a few years.

## MEDICAL EDUCATION

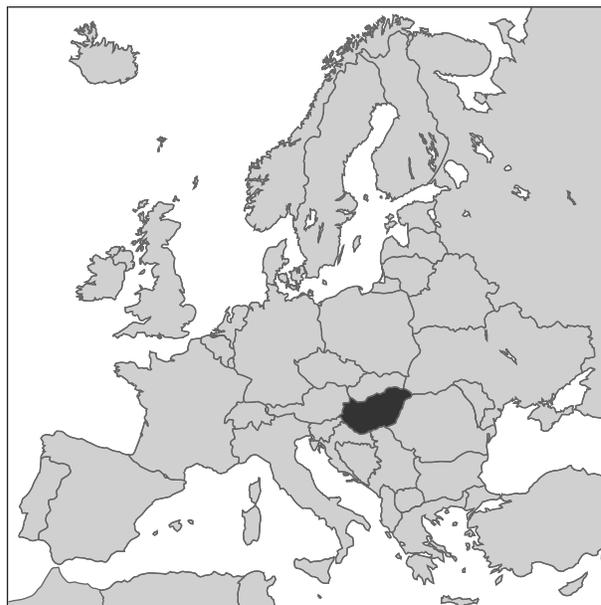
The first evidence of medical education in Hungary can be found in the bulla of Pope Boniface IX, issued in 1399. The Prebendal Academy in Esztergom, where medicine was one of the majors, and the name of the professor are mentioned in this document. The universities founded during the Middle Ages were devastated by the Turks, and Hungarians seeking medical education had to travel abroad.

Gerhard van Swieten, the eminent professor of the first Vienna School, Vienna, Austria, and initiator of university reform in Vienna promoted the foundation of a medical faculty at the University of Nagyszombat in 1769 during the reign of Queen Maria Theresa. In 1777, the university was transferred to Buda, and in 1783, it moved to Pest, the city on the other side of the Danube River.

Surgeons obtained their medical education at the Faculty of Medicine. There was a lower degree called *civil surgeon* and a higher one called *magister chirurgiae* (master of surgery). Only those having this latter title could then become doctors of surgery. After passing the necessary examinations, doctors of surgery became physicians, and physicians also had the possibility of studying for a doctorate in surgery. The curriculum and the system of examinations were repeatedly modified, as prevailing conditions required. During the Revolution and the War of Independence of 1848 to 1849, changes in curriculum called for no separate courses for surgeons and for a degree of doctor of general medicine. After the Revolution was repressed by the Habsburgs, severe retaliation followed, paralyzing economic and cultural life in Hungary. The use of Hungarian as the official language of the country was only granted in 1860. Finally, this period of repression came to an end with the Compromise of 1867. The reform plans of medical education had to wait until 1872, when the curriculum for the degree *doctor medicinae universalis* (equivalent to MD) was introduced and the surgical doctorate was abolished.

In 1872, the second medical faculty was established in Kolozsvár, followed by the addition of medical faculties to the universities in Debrecen (in 1918) and Pecs and Szeged (in the 1920s). From the 1870s on, several institutes and clinics were founded where the technical equipment was up to contemporary standards. The number of students enrolled kept increasing. Women were admitted to the medical faculty only after 1895.

Development of health care in Hungary followed the pattern of the general trends of European standards and



The location of Hungary in Europe.

was closely related to, and in interaction with, the latter. Many renowned Hungarian physicians studied and worked abroad from the 16th century onward. This practice is not unusual even now. Before, students visited the universities of Germany, Italy, and Austria, whereas in recent times students more frequently study medicine in the United States, England, Germany, France, the Netherlands, Switzerland, and Sweden. From the 1920s on, physicians and investigators from abroad came to Hungary to do research and to exchange results.

Famous Hungarian scholars, who educated generations of surgeons, were always open-minded about the latest scientific and technical achievements. János Balassa, the first professor of surgery at the Medical Faculty of Pest, used the ether anesthesia developed by dentist William Morton as early as February 1847, a few months after its first successful use in Boston, Mass.

The first Hungarian-language medical periodical, *Orvosi Hetilap* (*Medical Weekly*), was founded in 1857. This was the sixth medical journal of the world.

Several Hungarian surgeons have made important contributions to the universal development of surgery.

In 1844, several decades before the pathogenic role of bacteria was discovered, Ignác Semmelweis, professor of gynecology, was able to prevent sepsis, relying on empirical findings. He introduced the system of surgical antisepsis. When the mortality of puerperal fever was 5% to 10% in the most famous hospitals of Europe, no woman died during childbirth in his division in Budapest as a result of the strict antiseptic measures he had introduced. This is why he was called “savior of mothers.” His statue can be found in the Hall of Fame in Chicago, Ill, among those of the greatest figures of the history of medicine: Hippocrates, Galenus, and William Harvey.

Jenő Pólya, MD, is known for the technique of gastrectomy named after him, which he described in 1910. William J. Mayo, MD,<sup>2</sup> called attention to the advantages of this method in an enthusiastic article. Between the 2 world wars, several American surgeons visited Pólya’s

department to study his method. Among others, Lester R. Dragstedt, MD, studied the basics of gastric surgery from him.<sup>3</sup> Pólya was elected honorary member of the American College of Surgeons in 1939.<sup>4</sup>

The construction of the surgical stapler was also a Hungarian achievement. In 1909, Hümér Hüttl, MD, used such an instrument of his own construction, while the simpler gastric stapler, which was also easier to use, was designed by Aladár Petz, MD, in 1921. The device soon became famous and was adopted worldwide. Several American articles dealt with the advantages of using the "Petz sewing clamp." His name is used as a verb in the German surgical literature (*petzen*, meaning "to use the gastric stapler"). All the linear and circular staplers in use today have been developed based on the principles described by Hüttl and Petz.

The spring needle constructed by the Hungarian pulmonologist János Veress, MD, in 1938, widely used in laparoscopic operations, is one of the important technical innovations in surgery.

Many excellent surgeons were forced to emigrate from Hungary during the wars, revolutions, and political turmoils of the 20th century. They settled in different countries all over the world and brought fame to their native country.

George Berci, MD, who devised several endoscopic instruments, was the first to use a surgical minicamera in Australia, where he worked. Later, he moved to the United States, where he constructed several surgical instruments, which have been named after him.

Medical education and the development of medical universities were adversely influenced by the political and economic consequences of the 2 world wars. Despite the utmost difficulties of the 50 years following World War II, the 4 graduate and 1 postgraduate medical faculties in Hungary gradually developed sufficiently to fulfill the needs of the country for educating health specialists in medicine and surgery. The 4 medical faculties are financed by the Hungarian state. University education is free, and scholarships are granted to those with good academic records. Entrance to the university is bound to a written test. There is no *numerus clausus*; each year, the universities set a limit to the scores to be attained in the entrance test for admission. In the academic year 1996-1997, 6386 students were enrolled at the 4 medical faculties. Of those enrolled, 25% were foreign nationals. In addition, 980 students studied dentistry and 1155 studied pharmacy at these faculties. During this same period, 1015 physicians graduated, and 480 of these were women.

### SURGICAL EDUCATION

The medical curriculum covers 6 years (12 semesters), after which students have to pass a state examination. After a successful examination, the degree of doctor of medicine (MD) is conferred. Physicians usually seek further graduate education and training to qualify as specialists. There are 46 different specialties to choose from. To acquire board certification in a subspecialty, an examination has to be passed according to the requirements of the specialty board. Graduate training in gen-

eral surgery takes 5 years, but is going to be increased to 6 years. After 30 months (half of that period), a written test must be taken. Having passed this successfully, applicants may carry on with their training at a surgical department. If failed, the test can be repeated only once. At the end of the 5-year period of practical training, the applicant has to pass an oral examination for the board certification in surgery to be conferred. In the 1990s, an average of 89 applicants passed this examination each year. Training in subspecialties like vascular surgery, pediatric surgery, and thoracic surgery takes another 2 to 5 years.

The number of general surgeons and specialists in the different subspecialties in 1996 was as follows:

Specialist	Board-Certified Surgeons, No.
General surgeons	1167
Orthopedic surgeons	260
Vascular surgeons	176
Neurosurgeons	111
Plastic surgeons	99
Pediatric surgeons	89
Thoracic surgeons	88
Cardiac surgeons	37

It has been a long-standing endeavor of the representatives of various specialties to reorganize postgraduate education for medical specialists. These efforts have been supported by the negotiations between the European Community and Hungary. Based on these negotiations, ministerial orders have been initiated to create a new system of postgraduate education based on European standards and on United Europe Medical Standards proposals. United Europe Medical Standards is the oldest body representing physicians in Europe. Its aim is to study issues related to specialist training and practice. In response to an edict from the commission to do something about the variable standards of specialist training in Europe, it has agreed on an ambitious harmonization program.

### SURGICAL ASSOCIATION

The organizing committee of the Hungarian Surgical Association was convened on November 16, 1906, and the association held its first general assembly on May 31, 1907. At that time, the membership included 316 persons. The mission of the association was formulated by its first president as follows: "We cannot remain isolated from the world at large. Nationalistic isolation is harmful even for great nations. For us, who are situated in the heart of Europe geographically, it is always important to identify intellectually with Europe." Although the Hungarian Surgical Association is 92 years old, this mission is still valid. National congresses of the association are held every other year; 54 have been organized so far. In the period between the congresses, the regional chapters of the association organize meetings regularly to discuss relevant clinical and scientific issues.

The membership of the Hungarian Surgical Association currently is 994 persons. Many of them are also full or honorary members of various foreign and international scholarly associations. The American College of Surgeons has 4 Hungarian members.

The Hungarian Surgical Association has 2 official periodicals: *Magyar Sebészet* (*Hungarian Surgery*) is a journal published in Hungarian, while *Acta Chirurgica Hungarica* (*Hungarian Surgical Proceedings*) publishes articles in English and German.

### SURGICAL MANPOWER

To obtain information on various aspects of surgical manpower, the International Federation of Surgical Colleges circulated a questionnaire to some 26 countries around the world in 1986. We characterize surgical manpower and activity in Hungary based on answers given to these questions.

In 1996, Hungary had 82000 hospital beds. The number of beds at general surgical and traumatological departments was 13666. These beds were used to 74.4% of their full capacity. The average length of hospitalization at surgical wards was 8.2 days. In 1996, 44031 physicians were employed in Hungary. Of these physicians, 1191 were specialized surgeons. Currently, there are 909 candidates participating in postdoctoral education for specialization in surgery. In 1995, health spending in Hungary amounted to 1% of the gross domestic product (in the United States, it was 13.5% in 1997), and 27% of the total spending was used for medications.

A system of emergency care and ambulance service was first presented at a conference on hygiene by the Knights of the Order of St John in London, England, in 1881. The Voluntary Ambulance Service of Budapest started its activity on May 10, 1887. There are now 200 ambulance stations in the country. Their tasks include transportation of long-term patients and taking care of emergency cases, the latter always with qualified medical personnel. In 1996, the number of emergency calls was 640000.

### DISEASE PATTERNS AND THEIR INFLUENCE ON SURGICAL PRACTICE

In 1998, 197093 patients were admitted to different surgical wards. Of these patients, 147511 underwent some kind of surgical operation. The most frequent general surgical operations are as follows:

Type of Surgical Procedure	Number
Hernia	26253
Cholecystectomy	24312
Laparoscopic	16849
Traditional	7463
Appendectomy	11519
Breast surgery	11202
Thyroid surgery	5935
Rectal surgery	3504
(resection and extirpation)	
Colon resection	2552
Gastric resection	1466
Pancreas resection	1142
Hepatic resection	331
Esophagus resection	231

Thoracic surgical interventions have been performed in Hungary since the end of the 1930s. The first lobectomy was performed in 1936, the first pneumonec-

tomy in 1944, ligature of Botallo duct in 1949, resection of the coarctation of the aorta in 1950, closed heart surgery in 1951, and open heart surgery in 1962. The various thoracic surgical interventions performed in 1997 were as follows:

Thoracic Surgical Procedure	Number
Pulmonary resection	
Cancer	1846
Tuberculosis	159
Mediastinoscopy	324
Mediastinal tumors	223
Pulmonary metastasectomy	117
Open heart surgery	4750

Reconstructive vascular surgery has become widespread since the mid-1950s. These operations are performed primarily in university centers. The state of vascular surgery is as follows:

Vascular Surgical Procedure	Number
Varicosity	11004
Embolectomy (Fogarty)	5470
Lower limb arterial reconstruction	5376
Carotid reconstruction	2108
Aneurysm resection	526
Upper limb arterial reconstruction	102

The first kidney transplantation in Hungary was performed on December 21, 1962. Up to September 1, 1999, approximately 2500 renal transplantations had been performed in 4 centers. The first (unsuccessful) liver transplantation was performed in 1983; so far, 79 hepatic transplantations have been done. The first heart transplantation was performed on January 3, 1992, with 28 performed to date. Pancreas transplantation (2 cases) was introduced in 1999 (implantation of fetal islet cells was performed even earlier). Transplantation of cartilage cells is soon to be started.

According to mortality statistics in Hungary, cardiovascular diseases are the most frequent causes of death (73753 deaths per year), followed by neoplastic diseases (33418 deaths per year). The frequency of deaths secondary to malignant tumors is increasing: 30 years ago, Hungary was 13th among 33 countries (163.5 per 100000 inhabitants), whereas today, it takes the leading position among 46 countries (265 per 100000 inhabitants).

Statistics for 1995 reveal that among the various malignant tumors, death in men is caused most frequently by lung cancer (n=5278), followed by gastric cancer (n=1486), carcinoma of the prostate (n=1380), and colon cancer (n=1316). In women, the order of frequency is as follows: breast cancer (n=2239), pulmonary cancer (n=1823), colon cancer (n=1425), and gastric cancer (n=1102). About 55% of the operations performed for breast cancer were conservative.

Minimally invasive surgery started in Hungary, just like in all other countries, with laparoscopic cholecystectomy. The first such intervention was performed in December 1990. Minimally invasive techniques are used for appendectomy, hernioplasty, adrenalectomy, splenectomy, and thoracic sympathectomy and for the treatment of spontaneous pneumothorax. Such techniques are used for the surgical treatment of tumors only after careful consideration.<sup>5</sup>

Before the political changes of the 1990s, all Hungarian citizens were covered by national health insurance. Wages were low, since the state withheld a considerable portion of the salaries, which was then used for government health spending.

The system has changed recently, but everyone is still covered by the national health scheme. Employees contribute 3% of their gross salary to the state-owned health insurance, while employers contribute an additional 11% plus a so-called health care contribution worth approximately \$15 for each employee. Medical and hospital care, including surgical care, is free.

Approximately half of the bills for prescriptions are covered, but certain basic drugs are 100% subsidized by this insurance system.

The introduction of private health insurance is under consideration, although such a system used to exist and functioned well before World War II. Improvement of health care is expected from this measure. Several hospitals had to be shut down during the past years, and the number of hospital beds has been reduced considerably, due partly to the worsening economic conditions but also based on the consideration that private health care will achieve the modernization of the health care system more efficiently.

## RESEARCH

Investigators in many small countries are, at least early in the course of their career, handicapped by the limited information available in their native language. To participate in international research activities, they have to master at least 1 foreign language, which today is English. In addition, few countries are in the fortunate economic situation to provide excessive resources to basic science research. It is not by chance that of the 13 Hungarian scientists who have been awarded the Nobel prize, it was only Albert Szent-Györgyi, MD, who received the prize while he worked in Hungary; all the others had left the country to work abroad by the time they became internationally recognized.

According to an article published in the January 1999 issue of *Science*,<sup>6</sup> Hungary leads the list of the countries in central and eastern Europe for scientific achievements. Hungary's 23rd position among all countries of the world means that the country has contributed to global and European science much more than would be expected based on the number of its inhabitants and the money spent on science. In 1997, Hungarian investigators (of all fields) published 8514 scientific articles in international journals. Of these, 1584 were published in medical periodicals. This is remarkable if we consider that only 1% of the gross domestic product was being used for research and development in Hungary in 1999. In countries of the European Union, this proportion averages 1.8%; in the United States, it is 2.5%; and in Japan, it is 2.8%.

"To predict the future of health care is an extremely difficult, if not dangerous undertaking" stated Matloff.<sup>7(p1311)</sup> Jack<sup>8(p493)</sup> raises the following question: "Will there even be surgeons or will robots have taken over?"

Advances in medical science may alter the practice of general surgery, since some diseases formerly managed by surgeons will be treated by medical specialists. In addition, advances in medical technology may lead to further surgical subspecialization and thereby narrow the scope of practice of general surgeons. Trends affecting general surgery indicate that the range of medical problems managed by this specialty will be different 20 years from now. It has been estimated that more than 45% of general surgery trainees continue to further subspecialty training in Hungary. "We cannot simply preserve general surgery. The emperor is already half undressed," writes Warsaw,<sup>9(p268)</sup> and we can fully agree with him. Specialization is necessary, and the pattern of specialization is mainly in the interest of patients. "General surgery cannot rest on its laurels," noted Organ<sup>10(p146)</sup> in the ARCHIVES in 1990.

The future of surgery is endangered by several factors: (1) the business side of medicine, (2) overproduction of surgeons, (3) uncontrolled development, (4) the discrepancy between expectations and reality, and (5) the loss of empathy from the physician-patient relationship.

It is the task of our, and of the next, generation of surgeons to avoid these dangers. We would like to conclude by quoting Leffall La Salle<sup>11(p728)</sup>:

Perhaps the French Jesuit philosopher Pierre Teilhard de Chardin expressed it best when he said "Some day after mastering the winds, the waves, the tides and gravity, we shall harness for God the energies of love and then for the second time in the history of the world man shall have discovered fire." And it is that love and that fire that highly ethical surgeons exemplify so well.

*Reprints not available from the author.*

## REFERENCES

1. Barabas AP, Marcuson RW. Post-communist surgery in eastern Europe. *Ann R Coll Surg.* 1993;32:87-90.
2. Mayo WJ. Radical operation for cancer of the pyloric end of the stomach. *Surg Gynecol Obstet.* 1914;19:683-691.
3. Waisbren SJ, Modlin IM, Lester R. Dragstedt and his role in the evolution of therapeutic vagotomy in the United States. *Am J Surg.* 1994;167:344-359.
4. Sándor J, Sándor A, Modlin IM. Eugene Pólya: the Billroth of Budapest. *J Am Coll Surg.* 1995;181:352-362.
5. Besznyák I. Minimally invasive technique in surgical oncology. *Eur J Surg Oncol.* 1994;20:193-195.
6. Koenig R. Eastern Europe's research gamble. *Science.* 1999;283:22-24.
7. Matloff JM. The practice of medicine in the year 2010. *Ann Thorac Surg.* 1993; 55:1311-1325.
8. Jack D. The surgeon's story. *Lancet.* 1998;352:493.
9. Warsaw AL. Restoration, not preservation, of general surgery residency. *Arch Surg.* 1993;128:265-268.
10. Organ CH Jr. The future of general surgery. *Arch Surg.* 1990;125:145-146.
11. Leffall La Salle D Jr. Medical ethics in today's society. *Mitt Dtsch Ges Chir.* 1997; 4:268-271.