SURGERY

ESSENTIALS OF CLINICAL PRACTICE

FOURTH EDITION

EDITED BY
GEORGE L. NARDI, M.D.

GEORGE D. ZUIDEMA, M.D.

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GEORGE L. NARDI, M.D.
Professor of Surgery, Harvard Medical School; Visiting Surgeon, Massachusetts General Hospital, Boston

GEORGE D. ZUIDEMA, M.D.
Warfield M. Firor Professor and Director, Section of Surgical Sciences, The Johns Hopkins University School of Medicine; Surgeon in Chief, The Johns Hopkins Hospital, Baltimore

Foreword by Edward D. Churchill, M.D.

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CONTRIBUTING AUTHORS

HENRY F. ALLEN, M.D.
Henry Willard Williams Clinical Professor of Ophthalmology, Harvard Medical School; Consulting Chief of Ophthalmology, Massachusetts Eye and Ear Infirmary, Boston
Chapter 46

R. PETER ALTMAN, M.D.
Professor of Surgery, Columbia University College of Physicians and Surgeons; Chief, Division of Pediatric Surgery, Babies Hospital, Columbia-Presbyterian Medical Center, New York
Chapter 41

W. GERALD AUSTEN, M.D.
Edward D. Churchill Professor of Surgery, Harvard Medical School; Chief of the Surgical Services, Massachusetts General Hospital, Boston
Chapter 38

LOUIS BAKAY, M.D.
Professor and Chairman, Department of Neurosurgery, State University of New York at Buffalo School of Medicine; Chairman, Department of Neurosurgery, Erie County Medical Center, Buffalo
Chapter 44

CHARLES R. BAXTER, M.D.
Professor of Surgery, Southwestern Medical School, The University of Texas Health Science Center at Dallas; Director, Burn Unit, Parkland Memorial Hospital, Dallas
Chapter 6

GLENN E. BEHRINGER, M.D.
Associate Clinical Professor of Surgery, Harvard Medical School; Visiting Surgeon, Massachusetts General Hospital, Boston
Chapter 29

CONRADO C. BONDOC, M.D.
Lecturer in Surgery, Harvard Medical School; Assistant Surgeon, Massachusetts General Hospital; Associate Surgeon, Shriners Burns Institute, Boston
Chapter 5

MORTIMER J. BUCKLEY, M.D.
Professor of Surgery, Harvard Medical School; Visiting Surgeon and Chief, Cardiac Surgical Unit, Massachusetts General Hospital, Boston
Chapter 38

GREGORY B. BULKLEY, M.D.
Associate Professor of Surgery, The Johns Hopkins University School of Medicine; Surgeon, The Johns Hopkins Hospital, Baltimore
Chapters 4, 13, 27, 31, 32

JOHN F. BURKE, M.D.
Helen Andrus Benedict Professor of Surgery, Harvard Medical School; Visiting Surgeon, Massachusetts General Hospital, Boston
Chapter 5

PETER C. CANIZARO
Professor of Surgery, Cornell University Medical College; Attending Surgeon, Department of Surgery, The New York Hospital, New York
Chapter 6

ALFRED M. COHEN, M.D.
Assistant Professor of Surgery, Harvard Medical School; Co-Chief, Surgical Oncology, Massachusetts General Hospital, Boston
Chapters 17, 19

A. BENEDICT COSIMI, M.D.
Associate Professor of Surgery, Harvard Medical School; Chief, Clinical Transplant Surgery, and Associate Visiting Surgeon, Massachusetts General Hospital, Boston
Chapter 16

WILLIAM J. CURRAN, J.D., LL.M., S.M.Hyg.
Frances Glessner Lee Professor of Legal Medicine, Harvard Medical School, Boston
Chapter 3

JULES L. DIENSTAG, M.D.
Assistant Professor of Medicine, Harvard Medical School; Assistant in Medicine, Massachusetts General Hospital, Boston
Chapter 22

JOSEPH T. FERRUCCI, JR., M.D.
Professor of Radiology, Harvard Medical School; Professor of Radiology, Massachusetts General Hospital, Boston
Chapter 11

JOSEF E. FISCHER, M.D.
Christian R. Holmes Professor and Chairman, Department of Surgery, University of Cincinnati College of Medicine; Chairman, Department of Surgery, University of Cincinnati Medical Center, Cincinnati
Chapter 7

WILLIAM J. FRY, M.D.
Lee Hudson–Robert Penn Professor and Chairman, Department of Surgery, Southwestern Medical School, The University of Texas Health Science Center at Dallas; Chief of Surgery, Parkland Memorial Hospital, Dallas
Chapter 34

THOMAS R. GADACZ, M.D.
Associate Professor of Surgery, The Johns Hopkins University School of Medicine; Chief, Surgical Service, Baltimore Veterans Administration Medical Center, Baltimore
Chapter 25

WILLIAM C. GRABB, M.D.
Professor of Surgery and Head, Section of Plastic Surgery, The University of Michigan Medical School; Staff Surgeon and Head, Section of Plastic Surgery, University of Michigan Hospital; Staff Surgeon, St. Joseph Mercy Hospital, Ann Arbor
Chapter 40

*THOMAS H. GREEN, M.D.
Associate Clinical Professor of Gynecology, Harvard Medical School; Visiting Surgeon, Massachusetts General Hospital, Boston
Chapter 42

HERMES C. GRILLO, M.D.
Professor of Surgery, Harvard Medical School; Chief of General Thoracic Surgery, Massachusetts General Hospital, Boston
Chapter 21

TIMOTHY S. HARRISON, M.D.
Professor of Surgery and Physiology, The Pennsylvania State University College of Medicine; Staff Surgeon, Milton S. Hershey Medical Center, Hershey
Chapter 36

*Deceased.

ANTHONY L. IMBEMBO, M.D.
Associate Professor of Surgery, The Johns Hopkins University School of Medicine; Surgeon, The Johns Hopkins Hospital, Baltimore
Chapters 23, 30

DARRELL A. JAQUES, M.D.
Associate Professor of Surgery, The Johns Hopkins University School of Medicine, Baltimore
Chapter 37

DAVID J. KANAREK, M.D.
Assistant Professor of Medicine, Harvard Medical School; Assistant Physician, Department of Medicine, Massachusetts General Hospital, Boston
Chapter 8

HOMAYOUN KAZEMI, M.D.
Professor of Medicine, Harvard Medical School; Chief, Pulmonary Unit, Department of Medicine, Massachusetts General Hospital, Boston
Chapter 8

GUY W. LEADBETTER, JR., M.D.
Professor and Chairman, Division of Urology, The University of Vermont College of Medicine; Chief of Urology, Medical Center Hospital of Vermont, Burlington
Chapter 43

EDWARD LOWENSTEIN, M.D.
Professor of Anesthesia, Harvard Medical School; Anesthetist, Massachusetts General Hospital, Boston
Chapter 9

ROBERT C. KNAPP, M.D.
William H. Baker Professor of Gynecology, Harvard Medical School; Chief of Gynecologic Oncology, Brigham and Women's Hospital; Chief of Gynecologic Oncology, Sidney Farber Cancer Institute, Boston
Chapter 42

WILLIAM R. MacAUSLAND, JR., M.D.
Assistant Clinical Professor of Orthopaedic Surgery, Harvard Medical School; Visiting Surgeon, Orthopaedic Surgical Service, Massachusetts General Hospital, Boston
Chapter 39

ALIX MATHIEU, M.D.
Professor of Anesthesia, University of Cincinnati College of Medicine, Cincinnati
Chapter 22

NATHANIEL M. MATOLO, M.D.
Associate Professor of Surgery, University of California, Davis, School of Medicine, Davis; Chief, Gastrointestinal Surgery, University of California, Davis, Medical Center, Sacramento
Chapter 28

JOHN McDERMOTT, M.D.
Resident in Surgery, Massachusetts General Hospital, Boston
Chapter 15

WILLIAM W. MONTGOMERY, M.D.
Professor of Otolaryngology, Harvard Medical School; Senior Surgeon in Otolaryngology, Massachusetts Eye and Ear Infirmary, Boston
Chapter 45

GEORGE L. NARDI, M.D.
Professor of Surgery, Harvard Medical School; Visiting Surgeon, Massachusetts General Hospital, Boston
Chapters 14, 15, 20, 26, 33

JOHN C. NEMIAH, M.D.
Professor of Psychiatry, Harvard Medical School; Psychiatrist in Chief, Beth Israel Hospital, Boston
Chapter 2

DINESH PATEL, M.D.
Clinical Instructor in Orthopaedic Surgery, Harvard Medical School; Assistant in Orthopaedic Surgery, Massachusetts General Hospital, Boston
Chapter 39

DONALD S. PIERCE, M.D.
Clinical Instructor in Orthopaedic Surgery, Harvard Medical School; Associate Orthopaedic Surgeon and former Chief, Department of Rehabilitation Medicine, Massachusetts General Hospital, Boston
Chapter 10

JUDSON G. RANDOLPH, M.D.
Professor of Surgery, George Washington University School of Medicine and Health Sciences; Surgeon in Chief, Children's Hospital National Medical Center, Washington, D.C.
Chapter 41

ROBERT H. RUBIN, M.D.
Assistant Professor of Medicine, Harvard Medical School; Assistant Physician, Infectious Disease Unit, Massachusetts General Hospital, Boston
Chapter 5

PAUL S. RUSSELL, M.D.
John Homans Professor of Surgery, Harvard Medical School; Visiting Surgeon and Chief of Transplantation Unit, Massachusetts General Hospital, Boston
Chapter 16

EDWIN W. SALZMAN, M.D.
Professor of Surgery, Harvard Medical School; Associate Chief of Surgery, Beth Israel Hospital, Boston
Chapter 12

JOHN J. SAVARESE, M.D.
Associate Professor of Anesthesia, Harvard Medical School; Associate Anesthetist, Massachusetts General Hospital, Boston
Chapter 9

DERACE L. SCHAFFER, M.D.
Clinical Associate Professor of Radiology, The University of Rochester School of Medicine and Dentistry; Radiologist in Chief, Genesee Hospital, Rochester, New York
Chapter 11

SEYMOUR I. SCHWARTZ, M.D.
Professor of Surgery, The University of Rochester School of Medicine and Dentistry; Senior Surgeon, The Strong Memorial Hospital, Rochester, New York
Chapter 24

ROBERT B. SMITH III, M.D.
Professor of Surgery, Emory University School of Medicine, Atlanta; Chief, Surgical Service, Veterans Administration Medical Center (Atlanta), Decatur, Georgia
Chapter 22

ROBERT K. VINSON, M.D.
Assistant Clinical Professor of Urology, The University of Vermont College of Medicine; Attending Surgeon of Urology, Medical Center Hospital of Vermont, Burlington
Chapter 43

CHIU-AN WANG, M.D.
Clinical Professor of Surgery, Harvard Medical School; Visiting Surgeon, Department of Surgery, Massachusetts General Hospital, Boston
Chapter 35

C. C. WANG, M.D.
Professor of Radiation Therapy, Harvard Medical School; Radiation Therapist and Head of Clinical Services, Department of Radiation Medicine, Massachusetts General Hospital, Boston
Chapter 18

W. DEAN WARREN, M.D.
Joseph B. Whitehead Professor and Chairman, Department of Surgery, Emory University School of Medicine; Director of Surgery, Emory University Affiliated Hospitals, Atlanta
Chapter 22

CLAUDE E. WELCH, M.D.
Clinical Professor of Surgery Emeritus, Harvard Medical School; Senior Surgeon, Massachusetts General Hospital, Boston
Chapter 1

WILLIAM ROSSER WILSON, M.D.
Assistant Professor of Otolaryngology, Harvard Medical School; Associate Surgeon, Massachusetts Eye and Ear Infirmary, Boston
Chapter 45

EARL F. WOLFMAN, JR., M.D.
Professor of Surgery, University of California, Davis, School of Medicine, Davis; Chief, General Surgical Service, University of California, Davis, Medical Center, Sacramento
Chapter 28

WILLIAM C. WOOD, M.D.
Assistant Professor of Surgery, Harvard Medical School; Assistant in Surgery and Medical Director, Cox Center for Cancer Management, Massachusetts General Hospital, Boston
Chapters 17, 19

GEORGE D. ZUIDEMA, M.D.
Warfield M. Firor Professor and Director, Section of Surgical Sciences, The Johns Hopkins University School of Medicine; Surgeon in Chief, The Johns Hopkins Hospital, Baltimore
Chapters 4, 13, 25, 27, 30, 31, 32, 34, 40

PREFACE

This fourth edition, published 22 years after the first, is no longer concise in size; nevertheless, we have attempted to maintain a concise presentation and organization of the subject matter. Every chapter has been completely rewritten, the number of illustrations has been increased, and the text has been presented in a double-column format for easier readability.

It is the editors' hope that this volume will serve as a useful introduction for the medical student undertaking the study of surgery for the first time. It is designed to serve as a core surgical textbook, containing the type of basic information that students of surgery should understand. It is our hope that it will also be a practical guide for residents and for nonsurgeons undertaking rotations on clinical services where a working knowledge of surgery and surgical specialties is necessary. It also should prove to be useful for postdoctoral students who are preparing for licensure or certifying examinations; it is also our hope that it will be a reference for the practicing surgeon.

We wish to acknowledge the critical review and suggestion for reorganization of Dr. Gregory Bulkley, the continuing and loyal help of Miss Judith Godden, and the persistent and untiring supervision of Ms. Lin Richter of Little, Brown and Company.

G. L. N.
G. D. Z.

FOREWORD TO THE FIRST EDITION

The discovery of the circulation of the blood completely obscured William Harvey's early, and to some extent legendary, identity as a wound surgeon. Despite this, his direct and common-sense approach to an understanding of things bears many earmarks of the way of a surgeon. Harvey saw with great clarity the difference between the art and the science of surgery—a topic that has been hashed and rehashed down to the present day. The art, according to Harvey, concerns itself with things to be done; the science concerns itself with things to be known.

This book with its honest and unpretentious title places major emphasis on things to be known. The readers who seek it out are those who have some glimmer of interest in learning about those things they are obliged to know.

After Lord Lister made surgery safe for democracy, our branch of the profession became diluted with men fascinated and distracted by the many opportunities for doing. They came to regard book learning as so much tripe and, as in medieval days, surgical undertakings became an easy way out for the illiterate. Many of these acrobats had the skilled fingers of good craftsmen and lost no opportunity to build up the image of the operation as a delicate and highly intricate bit of prestidigitation. This image became embedded in their own minds and in the beliefs of their clients. The operation became glorified as the beginning and end-all of surgery.

But events caught up with the acrobats. Surgery as a breathtaking technical binge came to an end, and even its doing became an emotionally tamed act of precision. It became all too obvious that the hand requires guidance by the mind and that the need for knowledge must be anticipated if one is to keep out of trouble. An instrument the surgeon neglects to have in readiness may be sterilized and handed to him in a few minutes. Knowledge which is lacking at a crucial moment cannot be supplied by the circulating nurse. The acrobats soon found themselves being tucked away in mothballs; no one, it seemed, was any longer the slightest bit interested in their strutting and their clichés. Some, when they felt the ground being cut out from under them, took to the great books of surgery in dead earnest; others turned to professor-clobbering as a rearguard action. Even this sport has gone out of fashion in enlightened communities. American surgeons today, at least most of them, are seriously concerned with things that must be known. So are medical students, interns, and residents. It is not easy to pull the wool of fuzzy thinking over the eyes of these young men.

Fortunately, the authors of this book have not tried to set down all they know, nor, indeed, any large part of the many things that any surgeon needs to know. Beyond that which is set down, guide lines are strung to lead the reader into depths that he must explore for himself when the need comes to know more.

Surgery is not a single applied science. It is the application of many sciences to management of disease and injury. With all areas of science whooping it up and hell-bent on making new discoveries, it is no easy task to keep abreast of what is going on. A backward look at the efforts to make knowledge accessible to busy students and busy surgeons shows a wide variety of endeavors. An early form was the encyclopedic system of surgery. When systems stretched into many volumes, new editions became so expensive that the capital investment required to own one was out of proportion to the rate of obsolescence. An attempt at loose-leaf systems designed for p.r.n. refills and supplements was not too successful. The expense

and nuisance in adding freshly distilled knowledge soon dampened the ardor of the owner. Then came the parting of the ways between things to be known and how-to-do-it. Atlases and operative surgeries encourage the novice by their convincing simplicity and, until they are outgrown, are useful for the beginning doer. Things to be known are boiled down and labeled "principles," but now even these volumes have come to weigh ten or twelve pounds, particularly when the volume is made up of separate contributions by big-name experts. The editor usually tries to hatch too many chickens, and the law of chance provides him with too many infertile eggs. Monographs, particularly those of a size that slip into the pocket, will always be welcomed for study in depth. Abstracts and annual surveys of periodical literature mix the wheat with the chaff despite warning signals posted by the skeptical editor.

This book is a new venture that does not quite fit into any of these familiar categories. It is a vade mecum of things to be known, not a cookbook telling about things that may be done. There is no pretense of encyclopedic scope, but the reader is tempted to pick up a thread of ideas and follow it to its sources. My guess is that it will prove to be the right book at the right time.

Edward D. Churchill

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*Deceased.

PART I
GENERAL PRINCIPLES

NOTICE

The indications and dosages of all drugs in this book have been recommended in the medical literature and conform to the practices of the general medical community. The medications described do not necessarily have specific approval by the Food and Drug Administration for use in the diseases and dosages for which they are recommended. The package insert for each drug should be consulted for use and dosage as approved by the FDA. Because standards for usage change, it is advisable to keep abreast of revised recommendations, particularly those concerning new drugs.

1

CLAUDE E. WELCH

SURGEONS—THEN AND NOW

A thousand surgeons, more or less, are certified annually by the American Board of Surgery. The surgical specialties add nearly 3000 more to the 100,000 individuals who perform nearly 20 million operations a year in the United States. The immense efforts that are required for these daily tasks tend to dull the interest of surgeons in any events of the past.

Yet each physician should recognize surgery's heritage even though nearly all of the facts recorded in this text (with the exception of those related to anatomy) are the products of the past half century. It is appropriate at the outset to recognize our humble beginnings. Many of us are ignorant or scornful of the contributions of the giants of the past. Yet a knowledge of what they faced and conquered should give us courage to tackle the seemingly insoluble problems that face us today.

At the outset the student may do well to ask what surgery is all about. What has it done in the past? What is it doing now? What course may it take in the future?

The term *surgery* has defied definition but has invited description. In the language of the dictionary, surgery is the treatment of disease by manual or instrumental methods. Probably this statement would have sufficed several hundred years ago. Today it is obvious that surgery is more than treatment and that physicians as well as surgeons must work with hands as well as tools. Indeed, the physician who carries out cardioversion or inserts pacemakers is truly a surgeon, while the surgeon who interprets the electrocardiogram and administers appropriate drugs acts as a physician. The surgeon is a physician as he prescribes intravenous alimentation; the nurse who inserts the needle and starts the flow is actually the surgeon. Strict lines between physicians, surgeons, and paramedical personnel are becoming more vague. Thus, surgery of the present day combines technique, a habit of action, and above all a body of knowledge generally recognized to have been developed by surgeons of the past.

Surgery has followed a meandering course through the centuries. Technical excellence long dominated the scene; however, as art has tended to be replaced by science, anesthesia, bacteriology, biochemistry, physiology, immunology, and other disciplines have all had their day or anticipate it in the future. History is strewn with spectacular surgical feats unsupported by science. Indeed, some sciences lose their luster; anatomy is the outstanding present casualty. Little can be said about the future except that the stream of surgery certainly will shift its direction.

Clearly, then, a flexible, questioning mind is essential for the surgical student. So it was with the great surgeons of the past. They were often from humble origins and were often uneducated, but they broke with tradition. They were iconoclasts but keen observers, as a brief recitation of their accomplishments will demonstrate.

Surgical developments in historical times began with the Hindus. As early as about 500 B.C., they were familiar with all of the essential surgical techniques that we know today except for the control of hemorrhage from large arteries by ligature. (Even prehistoric peoples in many areas of the world carried out circumcision, trephining of the skull with flints, and amputations.) The Hindus also removed cataracts and bladder stones. Plastic and reconstructive surgery had its origin at this time when women whose noses had been amputated for adultery had replacements made by flaps taken from the cheek. Thus, misfortune has always been the spur of surgery, just as for centuries battle casual-

ties led to the greatest increase in the knowledge of wound care.

Though no names remain associated with the development of surgery in Babylonia or in Egypt, a considerable body of knowledge did exist when these ancient civilizations flourished. (It may be of interest to surgeons who today worry about malpractice claims that failure to effect a cure of a Babylonian noble might be punished by the amputation of the physician's hands.)

The time of Hippocrates (460–370 B.C.) marked the dawn of European medicine. The familiar Hippocratic oath was directed particularly toward ethical practices of teacher and scholar. The prohibition against cutting for a stone would suggest that some surgeons were less than respectable at that time. However, Hippocrates' treatment of fractures, dislocations, and wounds was most advanced. Wounds preferably were kept dry and were irrigated only with pure or boiled water or wine. Immobilization was stressed, as was the importance of skin coaptation. Thus, many of the principles of the surgery of trauma were established.

Celsus, a man of letters rather than a physician, in the first century A.D. wrote eight books (*De Re Medicina*), mainly from Greek sources. He made the first description of ligatures, described many surgical instruments, and also noted the cardinal signs of inflammation (dolor, tumor, calor, rubor) that still are taught to every medical student.

Galen (131–201 A.D.), the greatest Greek physician after Hippocrates, was the last important name in European medicine for 1500 years. From the point of view of surgery, his books on experimental pathology and on anatomy were the most significant. However, since his anatomical studies were made on animals, human anatomy remained obscure and physiology was based on many erroneous concepts.

Surgery as well as medicine fell into a long period of disrepute after the time of Galen. Yet there were wounds to treat, cataracts, fistulas in ano, and strangulated hernias. Most of these problems were handled by traveling quacks. Medical knowledge became tied with the church and, according to Garrison (1929), degenerated into "a mixture of obsolete theory and faith healing." Dissatisfaction with this situation led to an edict of the Council of Rheims in 1131, which forbade clerics to practice medicine. At the same time, monks were forbidden to wear beards, so surgeons, who were also the barbers of the time, profited from the abolition of long hair. These lay barber-surgeons, originally trained to bleed and to shave monks, gradually learned the principles of wound care; they also gave enemas and extracted teeth.

Regulation of surgeons and barbers was overdue when the Collège de St. Côme was founded in Paris in 1210. This was a surgical guild that remained under the domination of clerics known as surgeons of the long robe. The lay surgeons (surgeons of the short robe), who were actually barber-surgeons, had to be examined and qualified by their clerical superiors. Perhaps we could say that they were the men who today have to pass their boards in order to practice.

Garrison (1929) has said that "the principal interest of the medieval period lies not in its internal medicine, for there was precious little of it, but in the gradual development of surgery from the ground up by faithful, sometimes obscure followers of the craft, who in France, at least, were kept ostracized and short-coated by the edicts of the clerics of St. Côme." The conflict between those engaged in metaphysical speculation and those whose knowledge was gained from experience has been traced through succeeding ages by Churchill (1951). The same battle persists, warns Churchill, and could lead to the ultimate failure of men who do not learn by experience. This conflict was early exemplified by Ambroise Paré, who rose from an obscure origin and was castigated by the Collège. Nevertheless, he became one of the greatest surgeons of all times.

Just prior to Paré, Vesalius (1514–1564) made his great contribution. He was, according to Garrison, "the most commanding figure in European medicine after Galen and before Harvey. He alone made anatomy what it is today." A surgeon as well, he operated for empyema and cancer of the breast. His famous book, *De Humani Corporis Fabrica,*

was described by Osler as "the greatest book ever written."

He came at a propitious time, for the nature of surgery was changing. Amputations had become more common, not only on account of two of the ravages of the Middle Ages—leprosy and ergotism—but also as a response to the effects of gunpowder. The care of battle wounds became the new development of Renaissance surgery. For the first time, it could be based on a sound knowledge of anatomy, chiefly because of Vesalius' discoveries.

Paré (1510–1590) profited immensely from Vesalius' work but was, as well, possessed by ambition and interested in all aspects of surgery. Most notably, he learned from observation and experience. Battle wounds were treated at that time by the application of burning oil, but one night his oil gave out and he found that untreated wounds fared much better. This was only one of his breaks with tradition. He is known appropriately as the Father of Modern Surgery because of many innovations, including the reintroduction of ligatures for control of hemorrhage, the founding of orthopedics by excision of the elbow joint, and the development of techniques in dentistry and obstetrics.

He was a great exception, for during the Renaissance true surgeons were extremely rare. Most surgical procedures were done by wandering wastrels. When they operated on male hernias, they usually removed the corresponding side of the scrotum, and occasionally, if the knife slipped, amputated the midline organ as well. (No wonder itinerant surgery was the order of the day.) Obstetrics was in such a sorry state that any woman with an abnormality of presentation or labor was almost certain to die.

Struggles between various medical factions reached a peak at this time. Barbers and surgeons were closely associated, since both could draw blood and were required to cut hair. In England the barbers and surgeons were united under Henry VIII as depicted in Holbein's famous picture now hanging in the Royal College of Surgeons. Surgeons were regarded with disdain by physicians. In fact, physicians, surgeons, and barbers would unite in varying combinations against one another. Not until 1745 was the ultimate and final separation of barbers from surgeons accomplished in England.

In France, surgery was made a noble profession by a single act. Louis XIV suffered from a fistula in ano. By an operation that could be done today by any intern, his surgeon, Felix, cured the king and elevated surgery to a respectable level. Thereafter, it remained essentially a French possession until the time of John Hunter. Despite Hunter's genius, however, France continued to dominate the field of surgery throughout the eighteenth century. The Collège de St. Côme merged with the French Academy, the surgical section was opened in 1731, and soon after that Louis XV separated surgeons from barbers and wigmakers. Meanwhile, Prussian army surgeons were still required to shave officers, and American surgery was practically nonexistent.

The influence of political decisions on the course of surgery was made apparent when during the French Revolution medical faculties and societies were abolished. London profited from the move and then served as a center for the training of many American surgeons, including John Warren and Valentine Mott. Cooper, Colles, and Syme were among the surgeons of the British Isles who dedicated their lives to surgery.

However, the man truly responsible for the emergence of the English school of surgery was John Hunter (1728–1793), anatomist, surgeon, and educator. He was a great comparative anatomist and the founder of experimental and surgical pathology. It has been said that he found surgery a mechanical art and left it an experimental science. His name has been immortalized by the Hunterian Lectures of the Royal College of Surgeons, which was established in 1800, and by the magnificent anatomical collection housed in its museum.

Meanwhile in the Kentucky backwoods, Ephraim McDowell was making surgical history by performing the first ovariotomy in America in 1809. However, the two major achievements that were to open wide the doors of surgery did not take place until later. In 1846 ether anesthesia, previously used by Long, was first demonstrated to the public in the Massachusetts General Hospital in Boston.