

Know Aesculap®

A Corporate Overview



Aesculap, Inc.
Aesculap Implant Systems, LLC
Aesculap Biologics, LLC

AESCULAP®

The Aesculap AG headquarters in Tuttlingen, Germany, was built in 1898 after the company outgrew its first factory.



Aesculap
focuses on products
and services for the
core processes
in surgery.



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Aesculap's product specialties include a vast array of surgical instruments and sterile containers; implants for orthopaedic, neuro and spinal surgeries; wound closure technologies; biologic solutions; and surgical navigation systems.

Who We Are

Our Commitments

Employees



Products

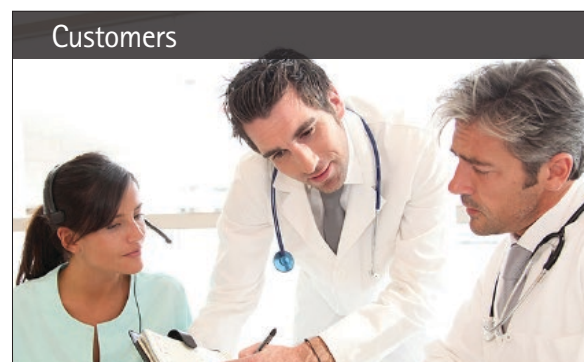


Environment



Our Vision

Through collaborative excellence, we will improve the quality of a patient's life and meet the needs of the changing healthcare environment.



Our Mission

We are committed to achieving collaborative excellence through a culture of **Sharing Expertise®** among our employees, partners, providers and patients. We take responsibility as an organization and as individuals to create a climate of trust, ethics and accountability.

We are part of a global, family-owned organization with a proud heritage that is passionately committed to providing high-quality, innovative products and services to all surgical disciplines, with particular focus in the fields of general, neuro, orthopaedics and spine.

We are committed to a long-term perspective of sustainable growth financed by our internal resources and innovative strength. Our commitment is to uphold this directive for the future generations of our employees and healthcare partners, and through them, our patients.

Know Aesculap

- Aesculap employs more than 11,700 people.
- Our annual sales exceed \$2 billion.
- We celebrated our 150th anniversary in 2017.
- We generate approximately 60% of our revenue from surgical instrument manufacturing.

Our Values

Our values are the foundation upon which our culture is built. They are the standard that every employee is held to, regardless of title, job function or responsibility. Embodying these values in our everyday work lives is the key to fostering a culture of collaboration and ensuring our long-term success as a company.

Integrity and Honesty	Quality and Efficiency
Responsibility to Our Employees	Accountability
Innovation	Sustainability



Sharing expertise refers to the continual exchange of knowledge and experience. We contribute to medical advancements from the perspective of the healthcare professional—and the patient—through innovation, efficiency and sustainability.

The B. Braun Group of Companies

B. Braun



B. Braun Hospital Care

The Hospital Care division provides products and services for general medical treatment and comprehensive therapy concepts in anesthesia, intensive medicine and infusion therapy.

- Infusion Therapy
- Clinical Therapy
- Pain Therapy

B. Braun Original Equipment Manufacturing (OEM)

The OEM division is a trusted outsourcing partner for medical device and pharmaceutical contract manufacturing.

- Custom Kits or Individual Components
- Fluid Administration Sets
- Design and Assembly
- Packaging and Sterilization

B. Braun Outpatient Market (OPM)

The OPM division is oriented toward general practitioners and the outpatient and inpatient care sectors.

- Continence Care and Urology
- Diabetes Care
- Infection Prevention
- Ostomy Care
- Wound Management

B. Braun Renal Therapies

The Renal Therapies division offers treatment systems designed to improve quality of life for patients with chronic kidney or metabolic disorders.

- Hemodialysis
- Acute Blood Purification
- Apheresis

Aesculap



Aesculap, Inc.

Aesculap, Inc. provides products, services and technologies for the core processes in all surgical disciplines.

Central Sterile Products and Services

- General and Specialty Surgical Instruments
- Sterile Containers

Surgical Specialties

- Neurosurgery Instruments and Power Systems
- Laparoscopy and Endoscopy Instruments
- Closure Technologies

Healthcare Solutions

- Aesculap Technical Services (ATS)
- Procedure Cost Management Services (PCMS)
- Surgical Asset Management (SAM)

Aesculap Implant Systems, LLC



Aesculap Implant Systems, LLC

Aesculap Implant Systems provides products, including total joint replacement systems, navigation systems and instrumentation for the treatment of knee, hip and spine disorders.

Orthopaedics

Spine Solutions

Aesculap Biologics, LLC



Aesculap Biologics, LLC

Aesculap Biologics offers biologic and combination products for cartilage repair and regeneration.

- NOVOCART® 3D biologic
- NOVOCART® DISC biologic/device

Aesculap Academy



Aesculap Academy

Aesculap Academy offers accredited programs for the continuing education of medical providers, including physicians, nurses, hospital management and senior staff. Aesculap Academy supports B. Braun worldwide.

B. Braun Medical Inc. (B. Braun) operates in 64 countries on six continents. In the United States, B. Braun is headquartered in Bethlehem, Pennsylvania. Aesculap® is a B. Braun company headquartered in Center Valley, Pennsylvania.

Our History

A Tradition of Excellence and Innovation



In 1908 B. Braun made the first sterile, absorbable sutures. Many modern sutures are still made of sheep intestine (catgut).

Beginnings

Founded in 1867 by master knife maker Gottfried Jetter in Tuttlingen, Germany, Aesculap began as a manufacturer of classical surgical instruments. Exceptional quality and ingenuity drove the business. In the 1890s the company introduced the first stainless steel sterile containers—an innovation that revolutionized sterilization and related work flow. Before the turn of the century, the company had opened three subsidiaries, including its first U.S. branch; outgrown its factory and built a new one; and established and trademarked the Aesculap brand. In 1977 B. Braun acquired controlling interest in Aesculap. The company became a division of B. Braun in 1996.

Gottfried Jetter, company founder



Jetter's workshop in Tuttlingen, Germany



The Rod of Asclepius





In 2001 Aesculap opened its benchmark factory, one of the most modern implant manufacturing facilities in Europe.

Aesculap Today

Today Aesculap is the world's leading manufacturer of surgical instruments, sterilization containers and orthopaedic navigation systems. Coupling old-world craftsmanship with cutting-edge innovation, the company remains in the vanguard of medical technology, producing advanced products for disciplines such as neuro, spine and joint replacement surgeries and pursuing biologic and combination biologic/device products for cartilage repair and regeneration.

Know Our History

Our historical firsts include such groundbreaking innovations as:

- The first absorbable sutures
- The first injection pump for continuous medical infusions
- The first battery-operated power drill for surgical procedures
- The first pneumatic surgical motor



The name Aesculap derives from Asclepius, the Greek god of medicine, who is often depicted holding a serpent-entwined staff. Aesculap adopted the Rod of Asclepius, topped with a crown, as the company's trademark in 1899.

Timeline

Aesculap: 150 Years of Progress



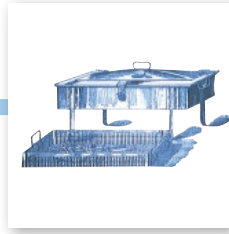
1867

Founded by knifemaker
Gottfried Jetter
in Germany



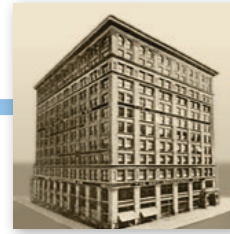
1890

Company operates in
Tuttlingen, Germany



1890s

First sterile containers
made of stainless steel



1893

First U.S. branch
opens on 5th Avenue
in New York City



1898

New factory built
in Tuttlingen houses
600 employees



1995

Aesculap Academy is
established



1988

Acculan® - First battery
operated medical
power drill



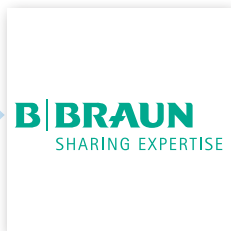
1986

Aesculap launches instacount®
- First to offer instrument
tracking capabilities



1982

Caspar - First Anterior
Cervical Dynamic
Plating System



1996

Aesculap becomes a
division of B. Braun



1999

New benchmark
factory built in
Germany



2000

Aesculap U.S. relocates to
Center Valley, PA
and St. Louis, MO



2005

Spinal Innovations
acquired



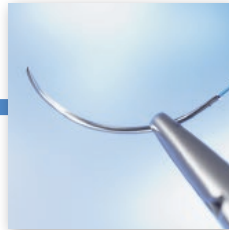
1899

Aesculap brand is established and trademarked



1904

"Illustrated Book of Patterns" contains over 10,000 products



1908

B. Braun manufactures first absorbable suture



1951

First injection pump for continuous infusions introduced



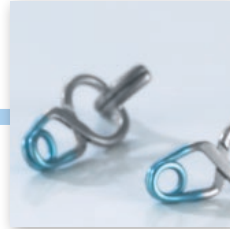
1980

Introduction of aluminum sterile packaging at AORN



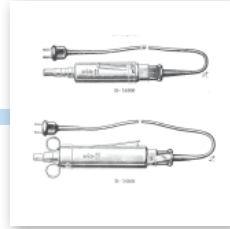
1977

B. Braun acquires controlling interest of Aesculap



1968

Yasargil® Aneurysm Clips introduced for use with surgical microscopes



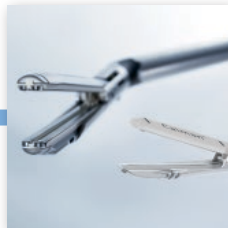
1967

Aesculap invents first pneumatic surgical motor



2007

Aesculap Implant Systems, LLC established - Spine R&D center built in PA



2011

Aesculap acquires assets of Aragon Surgical - Caiman® product launched



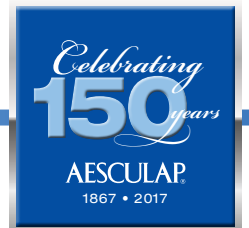
2012

Aesculap Biologics, LLC established



2015

activL® Artificial Disc enters market



2017

Aesculap celebrates 150 years

Aesculap, Inc.

Central Sterile Products and Services

Surgical Instruments



Aesculap offers hand-held stainless steel and titanium general and specialized instrumentation for a dozen specialties, including ENT, dental, ophthalmic, thoracic, OB/GYN, neuro, orthopaedic and reconstructive surgeries.

Know Surgical Instruments

- Aesculap is the world's leading supplier of surgical instruments.
- We offer more than 20,000 different products—the widest array from a single manufacturer.
- Our portfolio includes instruments for both open and minimally invasive surgeries.
- We adhere to the strictest manufacturing guidelines in the industry.

Dental Instruments



Quality Testing



Micro Instruments



Precision titanium micro instruments, like those above, provide unsurpassed control for cardiac and vascular surgeries involving delicate soft tissues.

Central Sterile Products and Services

Sterile Containers



Available in a range of sizes, Aesculap SterilContainer™ System allows hospitals to assemble, transport and store instrument sets before, during and after sterilization.



Silicone cushioning mats for instrument baskets assist with instrument placement and safe storage during transport and sterile processing.

Know Sterilization Solutions

- Aesculap is the market leader in rigid sterile containers—some 3,000 hospitals and surgery centers use our products.
- We hold more than 12 FDA approvals for different sterilization modalities, including steam, EtO and low-temperature hydrogen peroxide (STERRAD®* and V-PRO®†).
- Our SerilContainer™ System offers solutions that help lower operating costs, support green hospital initiatives and improve patient care.

* STERRAD is a registered trademark of Advanced Sterilization Products (ASP), a division of Ethicon, Inc., a Johnson & Johnson company.

† V-PRO is a registered trademark of STERIS Corporation.



The ground floor of Aesculap's Surgery Museum in Tuttlingen, Germany, showcases a vast collection of medical instrumentation.



At its Asclepius Surgery Museum, Aesculap traces the history of surgery, displaying an unprecedented collection of some 800 objects of significance and presenting the company's contribution to modern medical technology.

Aesculap, Inc.

Surgical Specialties

Neurosurgery Solutions



The proGAV 2.0®, our latest advance in hydrocephalus treatment, is an adjustable gravitational shunt valve that helps increase patient comfort by allowing a gradual change in opening pressure to correspond with body position.

Know Neurosurgery Solutions

- Aesculap is a world leader in cerebrovascular, tumor and hydrocephalus treatments.
- We offer the broadest range of neurosurgical device solutions from a single manufacturer.
- Among other products, our line includes instruments, shunts and valves, aneurysm clips, cranial fixation, bipolar forceps, neuroendoscopy and power systems.

Cranial Fixation



Bipolar Forceps



Aneurysm Clips



It takes 30 production steps to produce one Yasargil® aneurysm clip and 70% of the work is performed manually under the microscope.

Surgical Specialties

Laparoscopy Solutions



Aesculap offers more than 100 combined patterns of monopolar and bipolar hand-held laparoscopic instruments in standard and bariatric lengths.

Closure Technologies



Histoacryl® Flexible, Aesculap's latest innovation in topical skin adhesives, requires only one layer to achieve a full-strength bond.

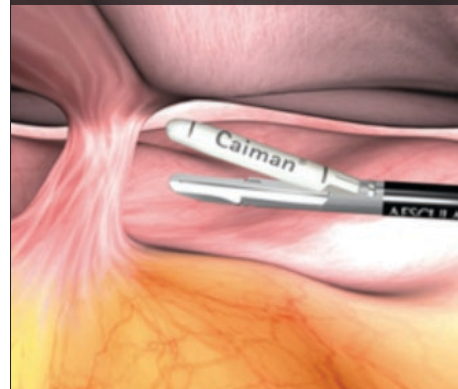
Know Laparoscopy Solutions

- Aesculap offers instruments that enable minimally invasive surgery in specialties such as general, bariatric, urologic and gynecologic surgeries.
- Our portfolio includes a wide range of reusable, reposable and single-use laparoscopy instruments, ligation clip applicators, endoscopes and reusable trocar systems.


Know Closure Technologies

- B. Braun manufactured the first absorbable suture in 1908.
- Today, Aesculap's portfolio of absorbable and non-absorbable sutures is among the most comprehensive in the business.
- Introduced in 1968, Histoacryl® is one of the most popular tissue adhesives in the world.

Advanced Energy Solutions



In open and laparoscopic procedures, the proprietary design of Caiman® vessel sealers provides uniform compression for improved sealing.



In 1968 Aesculap helped revolutionize the field of neurosurgery with the introduction of the first aneurysm clip. Since then, surgeons have implanted more than 2 million Aesculap Yasargil® aneurysm clips in patients worldwide.

Aesculap, Inc.

Healthcare Solutions

Technical Services



Each technician receives rigorous, continual training led by an Aesculap Master Craftsman, the most skilled instrument makers in the business.

Instrument Tracking



Aesculap's instrument tracking system helps hospitals achieve greater efficiency, safety, savings and performance.

Know Aesculap Technical Services (ATS)

- ATS provides a complete portfolio of preventive maintenance programs and repair services for surgical instruments and sterilization containers, including other manufacturers' products.
- We have a national network of mobile technicians or we can provide a full-time technician at the customer's site.
- We are the only instrument repair provider with the quality standards of an OEM.

Know Aesculap Instrument Tracking

- Through a technology partnership with Microsystems, Aesculap helps customers capture, organize and analyze critical data, such as the number and condition of their instruments and where they are used and located.
- The software provides convenient settings for easy product cross-referencing, on-screen product images, an integrated catalog and pre-negotiated GPO or IDN pricing to facilitate ordering.

Healthcare Solutions

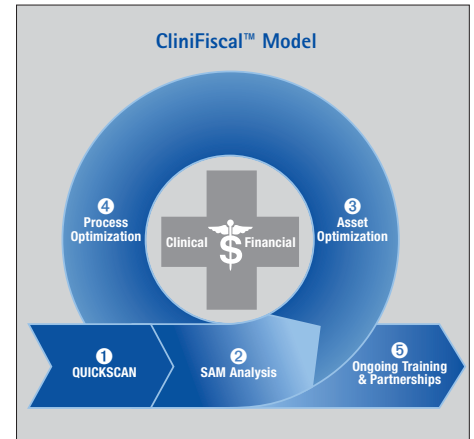
Surgical Asset Management



SAM helps healthcare systems save time and money by eliminating obsolete instrument sets, reducing vendor variety, and standardizing set configurations and instrument processes for all surgical disciplines.

Know Surgical Asset Management (SAM)

- Aesculap's surgical asset management cycle is the only one in the industry specifically designed to balance both clinical and financial outcomes.
- The five-step CliniFiscal™ Model is the key to our SAM success.
- Our SAM consultants are highly trained industry experts with decades of central sterile department management, OR and leadership experience.



Quickscan,™ a four-day on-site examination of surgical instrumentation, water quality, and central sterile department processes, systems and workflows, is the first crucial step in our SAM CliniFiscal™ Model.



Analysis reveals that 99% of hospitals have some kind of water quality issue.



A five-year study of 10 health systems showed that hospitals had an average of 3,000 unnecessary or unusable instruments. With our SAM, they enjoyed an average annual savings of 573 hours and \$150,261 in reprocessing costs.

Aesculap Implant Systems

Orthopaedics

Knee Implants



Aesculap applies its patented seven-layer Advanced Surface Technology to all metal knee implant components, including stems and augments.

Know Orthopaedics

- Aesculap is the world leader in orthopaedic navigation and one of the largest implant companies in the world.
- Our Advanced Surface Technology offers enhanced protection against the top prostheses-related reasons for knee implant failure and revision: metal ion release and wear.
- We are the only manufacturer to offer a complete portfolio of fully encapsulated metal implant components for knee arthroplasty (joint replacement surgery).

Navigation



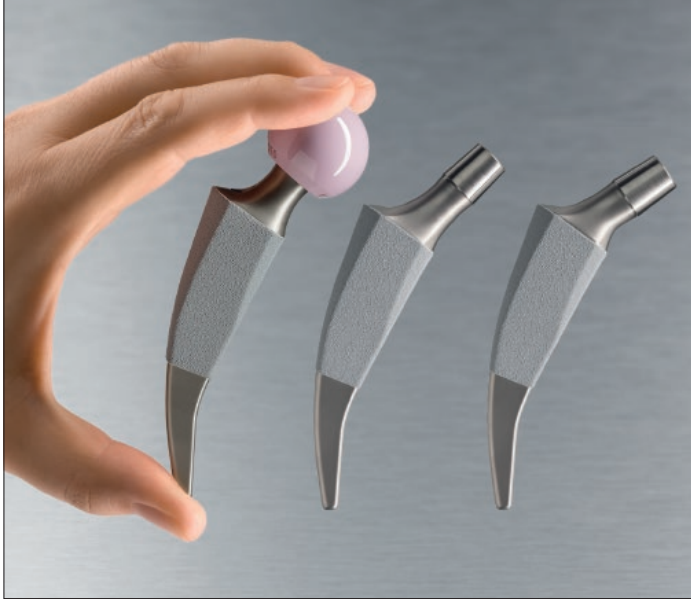
Aesculap's OrthoPilot® navigation system enables image-free, computer-aided orthopaedic surgery and optimal implant positioning.



Revision surgery (surgery to replace a failed implant) can be particularly problematic. Aesculap's EnduRo™ Rotating Hinge System ensures long-term success.

Orthopaedics

Hip Implants



The Metha® Short Hip System (left), which is ideally suited to minimally invasive, cementless total hip arthroplasty, and the Excia® T Standard Hip Stem (right) are designed to accurately restore joint biomechanics and address the growing demand for bone conservation.

Know Orthopaedics

- Aesculap's Total Hip Solution is a comprehensive hip replacement system that combines anatomic accuracy, long-term stability and dynamic implant options.
- We offer a full array of products and sizes to help ensure the proper fit for each patient's anatomy.
- Our product line supports minimally invasive hip replacement surgery and a variety of surgical approaches.

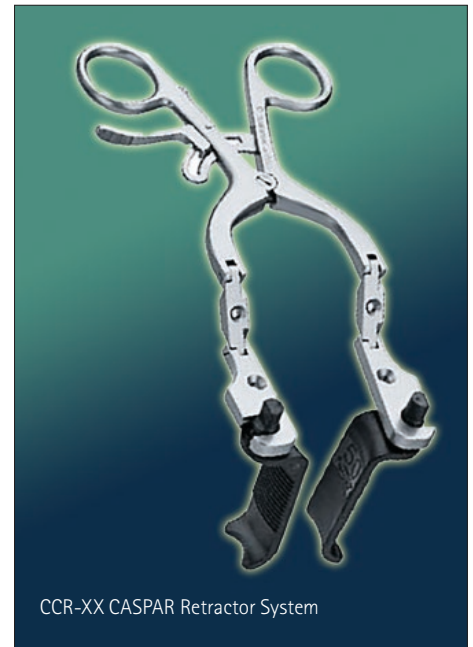


The porous Plasmapore® μ -CaP coating offers the optimal foundation for potential bone growth and enhances the Metha® Short Hip Stem's stability.

With the development of Plasmapore® coating in 1988, Aesculap introduced its first cementless hip prosthesis. Additionally, our latest coating technologies also increase the stability and survivorship of our hip implant systems.

Aesculap Implant Systems

Spine Solutions



Based on the needs of today's spine surgeons, the Quintex™ Cervical Plating System and the CeSpace™XP Interbody System—combined with the CCR-XX CASPAR Radiolucent Cervical Retractor System—elevate surgical versatility while delivering a new level of ACDF fusion.

Know Spine Solutions

- Aesculap offers a wide and ever-expanding portfolio of implants and instruments for open and minimally invasive surgical treatments of spinal disease, degeneration, damage and deformities—from the cervical to the sacral region.
- We were among the first companies to enter the spine market with the introduction of the CASPAR Plating and Retractor System for anterior cervical discectomy and fusion (ACDF).
- We continue to redefine ACDF with next-generation technologies like the Quintex™ and CeSpace™XP Systems.



Spine Solutions



The Arcadius[®] XP L Spine System with Plasmapore[®] XP coating is a unique interbody device for lumbar spine fusion. Four diverging screws enable fast, easy insertion.



Our activL[®] product is the first lumbar artificial disc with a mobile ultra-high molecular weight polyethylene core that helps maintain the mechanics of a healthy spine.

Know Spine Solutions

- Our Plasmapore[®] XP, an osteoconductive pure titanium porous coating for PEEK* spinal implants, provides proven biocompatibility, enhanced stability and improved visibility during imaging.
- Aesculap offer numerous devices for various lumbar spinal fusion procedures, such as the Arcadius[®] XP L, ProSpace[™] XP and TSpace[®] XP Interbody Systems.
- Other advances include the activL[®] Artificial Disc with Intelligent Motion Technology[™], which provides an alternative to fusion surgery for patients with low back issues.

* PEEK is a registered trademark of Invivo Biomaterial Solutions



In early 1980s Aesculap revolutionized anterior cervical fusion surgery with the introduction of the CASPAR Cervical Plate and CASPAR Retractor System, which remain the gold standard for disc repair in the neck.

Aesculap Biologics



Aesculap's NOVOCART® products start with a patient's own cells, harvested through biopsy. The cells are combined with growth factors and smart biomaterial devices to create an individualized implantable treatment.



Biologic solutions represent the future of healthcare worldwide

Know Biologics

- Established in 2012, Aesculap Biologics—with German development partner TETEC, AG—focuses on biological approaches to repairing and regenerating diseased or damaged joint tissues.
- Aesculap is pursuing two biologic/device combination products: NOVOCART® 3D and NOVOCART® DISC.



NOVOCART 3D is designed to repair the articular cartilage of the knee, where damage can lead to osteoarthritis.



NOVOCART® DISC for treatment of lumbar spine problems is the subject of a Phase 2 trial in the E.U.

Know **Biologics**

- In August 2014 NOVOCART® 3D moved into an FDA Investigational New Drug (IND) Phase 3 clinical trial, and the first U.S. study patient was implanted with the product.
- We are exploring NOVOCART® DISC for treating degenerative disc disease of the lumbar spine. Future targets of R&D include cartilage repair in the hip and ankle.



NOVOCART® 3D has been in commercial use since 2003 in the European Union and implanted in more than 9,000 patients. Aesculap is conducting a Phase 3 clinical trial to bring NOVOCART® 3D to the U.S. market.

Aesculap Academy

Aesculap Academy



The Aesculapium in Tuttlingen, Germany, serves as the world headquarters for Aesculap Academy.

Know Aesculap Academy

- In 44 countries Aesculap Academy offers interdisciplinary, interprofessional dialogue and training for physicians, senior nursing staff, and OR, anesthesia, hospital ward and management staff.
- In the U.S. it presents programs at Aesculap corporate headquarters and other locations nationwide.
- Aesculap Academy has received the prestigious Frost & Sullivan Global Medical Professional Education Institution of the Year Award three times.



Accredited continuing medical education (CME) courses consist of hands-on workshops, management seminars and international symposia.

Tuttlingen, Germany, remains an industry hub. More than 50% of the world's surgical instruments are manufactured there.



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