

Then and Now – Medical



100 Years of Military Medicine



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THEN & NOW

by Sharon Adams

BANDAGES: FROM RAGS TO GLUE

Bandages and wound dressings have been around probably since the first child skinned a knee and the first cook's hand slipped while skinning dinner. Strips of hide or absorbent plant fibres were first used to staunch bleeding and protect wounds as they healed. Some of the earliest written records describe using such material to bind up battle wounds.

For millennia, strips of cloth have been used for bandages. In recent centuries armies have stockpiled clean bandages and governments have had campaigns to encourage civilian women to make and roll bandages for use at the front.

People used to save rags to tend to home front boo-boos until Earle Dickson, a cotton buyer for Johnson & Johnson, invented a convenient self-adhesive bandage for his accident-prone wife. His employer, who supplied sterile dressings and bandages for hospitals and the military, began producing Band-Aids® in 1920, and, well, consumers have been stuck on them ever since.

Until recently, handling of major wounds hadn't changed much since the battles described in those early written records. The United States military has poured research money into developing better bandages, since about half of all battlefield deaths are due to blood loss. That research has given us bandages that stop bleeding on contact, liquid and spray-on bandages and transparent adhesive bandages made of material that automatically forms a gel over a wound to speed healing. Though developed for the military, these bandages are already used in hospitals and ambulances, cutting down civilian bleeding deaths from traffic collisions, accidents and disasters.



From top: Lance-Corporal W.J. Curtis bandages a French boy, June 1944; nursing sisters make bandages at a British hospital in France.

PHOTOS: KEN BELL, LIBRARY AND ARCHIVES CANADA—PA141703; FRANK L. DUBERVILL, LIBRARY AND ARCHIVES CANADA—PA131389



AMBULANCES: FROM 'FLYING' HORSES TO WHIRLYBIRDS

For most of human history, a soldier wounded in battle lay where he fell, depending on comrades to tend wounds and haul him off the battlefield. Eventually commanders realized warriors could live to fight another day if treated faster, and the field hospital (initially called field ambulance) was born. Still, many soldiers died before they could reach the hospital. Noting how fast 'flying' horse-drawn artillery moved, Napoleon's physician Baron Dominique-Jean Larrey adapted the idea in 1792 for a 'flying ambulance'—a specialized horse-drawn cart to transport the injured.

Then someone realized survival rates would improve if battlefield litter-bearers could deliver immediate help, spurring development of medics. In 1878, the St. John Ambulance Association began training English civilians in first aid, thus improving disaster and accident survival.

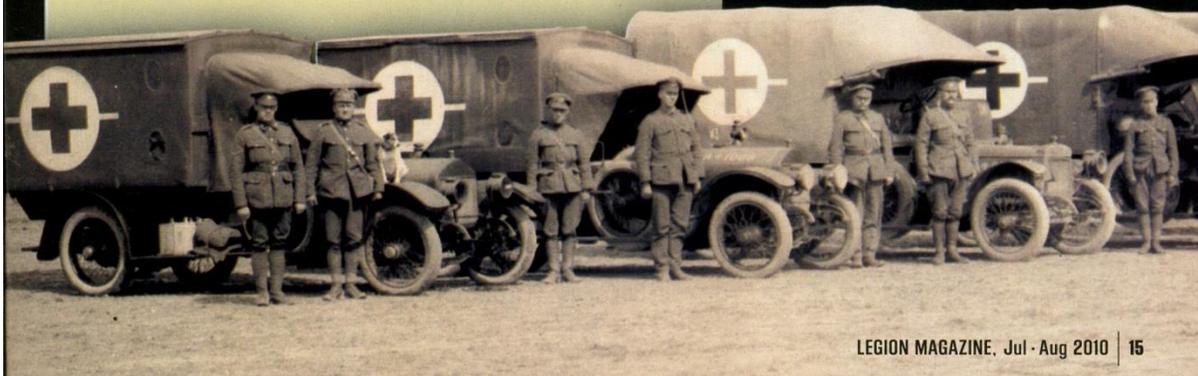
In the First World War, medical orderlies offered first aid before stretcher-bearers, including future Canadian prime minister Lester Pearson, carried the injured to dressing stations and ambulances. Methods were refined during the Second World War when Princess—later Queen—Elizabeth served as one of the ambulance drivers. Soon after the war civilian hospitals began using ambulances and trained emergency medical responders.

Today, trained civilian emergency medical technicians arrive in ambulances outfitted to begin sophisticated medical treatments while the patient is being transported to hospital. Injured soldiers are tended first by comrades and medics with sophisticated first aid training. They are then taken to well-equipped field hospitals. The seriously injured can be airlifted or medevaced to fully equipped hospitals.



From top: Canadian soldiers evacuate wounded in Afghanistan, 2006; a medical technician checks equipment in the wartorn country; vehicles of No. 3 Field Ambulance, July 1916.

PHOTOS: COMBAT CAMERA; LIBRARY AND ARCHIVES CANADA—PA000397



ANTISEPTICS: FROM CARBOLIC ACID TO ANTIBIOTICS

Today, nobody expects anyone to die of a broken leg, having a baby or from suffering a minor wound. But 150 years ago, these could be death sentences. Broken legs and wounded arms were often amputated, and nearly half of all amputees died. Childbed fever was the second most likely cause of death of women of childbearing age.

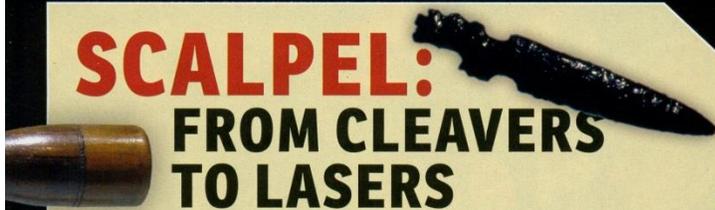
Infection was a major killer until Louis Pasteur discovered the connection between bacteria and disease in the mid-1800s. Some physicians like England's Joseph Lister (yes, the mouthwash was named for him), embraced the idea of keeping patients' environment—and their doctors and the equipment they use—clean in order to prevent transmission of germs. In 1865, Lister began spraying wounds, tools and the patient with carbolic acid to kill germs.

Sometimes luck moves science along. In 1890, when a nurse at Johns Hopkins Medical School found her hands irritated by antiseptic, Dr. William Halsted suggested using rubber gloves, launching the sterile dress code still in use today.

By the First World War, modern methods of cleanliness, sterilization and chemical prevention of infection improved the chances of survival on the battlefield. That war was the first major conflict in which enemy action—and not disease—killed more soldiers. Patients today are protected from germs both inside and out: surgical instruments and dressings are routinely sterilized, patient environments are scrubbed and treated with antiseptics, medical personnel wear sterile garments and patients themselves down antibiotics to keep germ populations from growing.



SCALPEL: FROM CLEAVERS TO LASERS

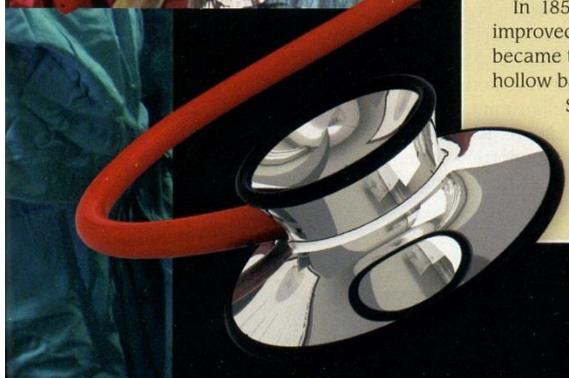


Holes in Stone Age human skulls prove surgery is almost as old as humanity itself. The first scalpels were made of flint or obsidian, but as technology developed, scalpel blades were made from copper, bronze and steel and shaped to their purpose: straight, double-edged, leaf-shaped—even curved, for faster battlefield incisions and amputations.

Once it became less risky (that is, pain-free and germ-free) surgery burgeoned into a variety of specialties. In the mid-20th century, the operating microscope introduced microsurgery, allowing for repair of tiny and delicate structures, like nerves and capillaries, the smallest blood vessels.

Today, light and sound have been harnessed as surgical tools. Laser (light amplification by stimulated emission of radiation) surgery uses a focused light beam to remove or vaporize abnormal tissue; it's commonly used to correct vision by reshaping the cornea. A harmonic scalpel uses ultrasound to vibrate the blade more than 30,000 times a second, simultaneously cutting and coagulating to control bleeding.

New devices include an electroscalpel combined with a mass spectrometer which carries out a molecular analysis during the operation, identifying and mapping unhealthy tissue. Robotics increase precision, giving surgeons steadier 'hands' than their own. They can operate through smaller incisions—and with less blood loss and pain and quicker healing times. And with robotics, a surgeon no longer has to be in the same room (or country) as the patient.



STETHOSCOPE: FROM PAPER TUBES TO COMPUTERS WITH EARS

Too modest to put his ear to a young woman's chest, in 1816 French physician René Laennec fashioned a listening device by rolling some papers into a hollow tube, thus inventing the stethoscope, the iconic symbol of the doctor. Within a year, he'd made a foot-long wooden model and used it thereafter to study chest diseases, especially tuberculosis, which ironically claimed his own life within a decade.

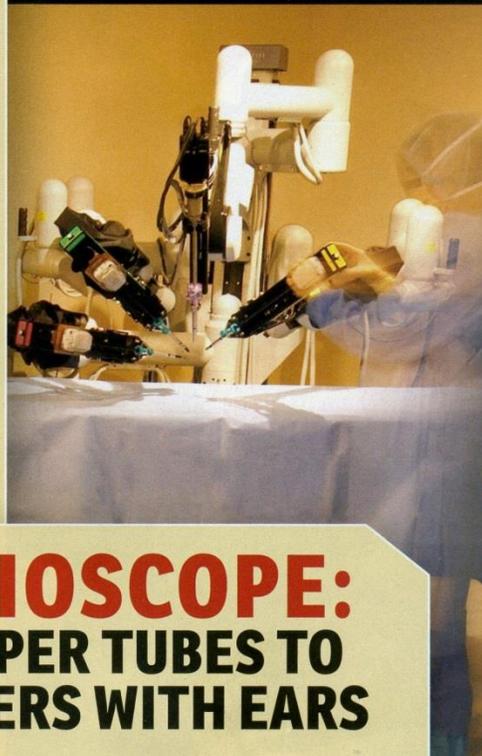
The basic design has often been tweaked. The shape shifted from tube to trumpet to disc. Wood and ivory used to fashion esthetically pleasing features in the 19th century have given way to the stainless steel and Tygon tubing of today.

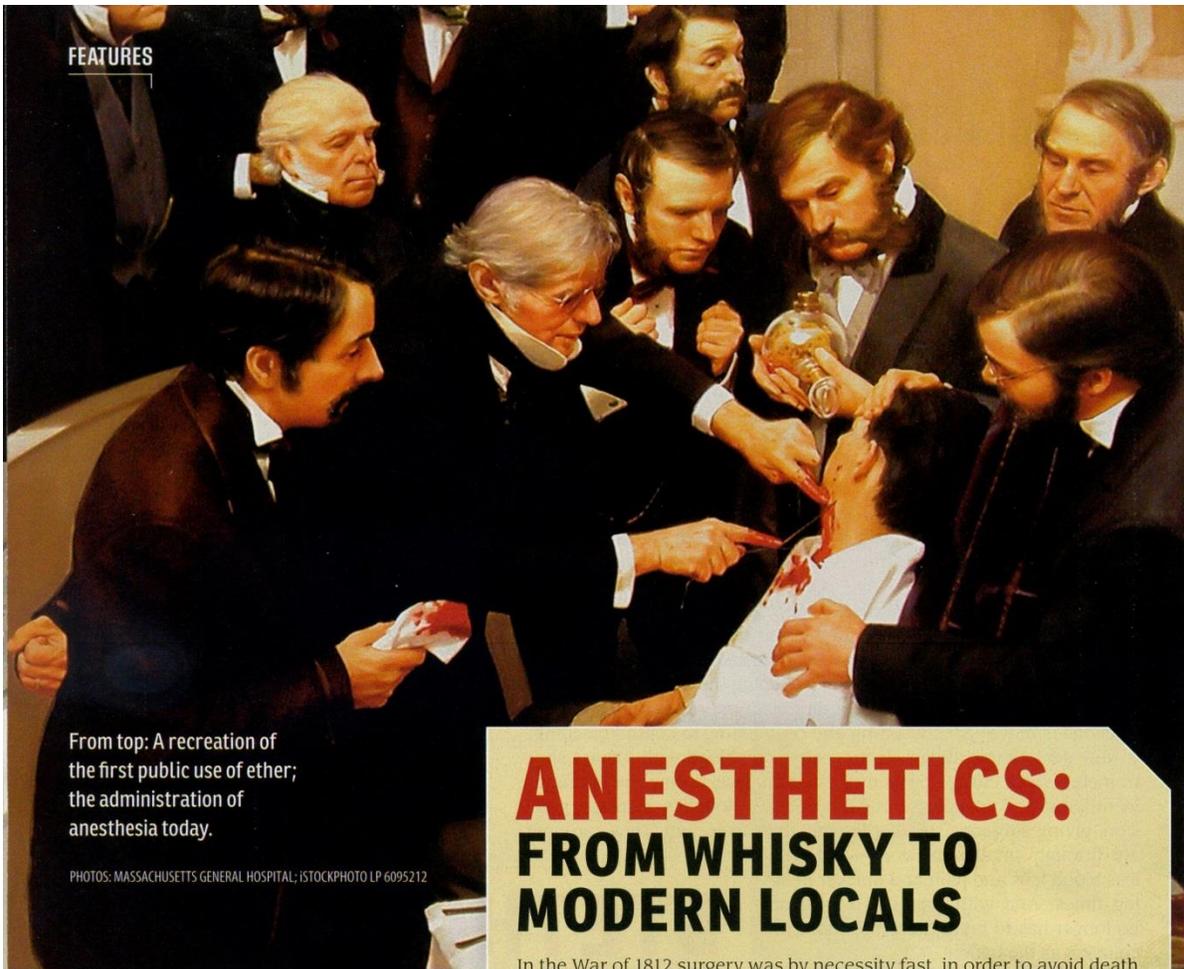
In 1851 someone cottoned on to the idea that hearing might be improved if both ears were employed, and soon binaural equipment became the norm. Amplification devices evolved from diaphragms and hollow balls to today's electronics.

Some models today automatically record heart beat, have state-of-the-art sound sensors, amplification, noise reduction technology and interface with computers so doctors can record sounds and confirm diagnoses. A basic model can be had for about \$20 today—with a limited lifetime warranty.

Opposite page, from top: The Lister Spray mechanism; modern Surgery. This page, from top: An obsidian scalpel; the da Vinci Robotic surgical system; Stethoscope evolution.

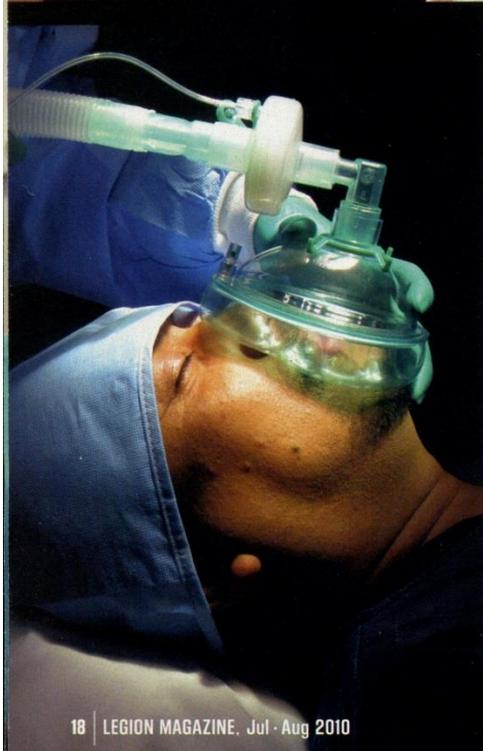
PHOTOS: ØYSTEIN HORGMO/STERILEEYE.COM; VETTA STOCK PHOTO 8708782; FOUNDATION FOR THE ADVANCEMENT OF MESOAMERICAN STUDIES; da VINCI STANDARD SURGICAL SYSTEM PICTURES; ISTOCKPHOTO 5623147; ROBERT A. THOM





From top: A recreation of the first public use of ether; the administration of anesthesia today.

PHOTOS: MASSACHUSETTS GENERAL HOSPITAL; ISTOCKPHOTO LP 6095212



ANESTHETICS: FROM WHISKY TO MODERN LOCALS

In the War of 1812 surgery was by necessity fast, in order to avoid death by shock. With luck, a soldier might get whisky and something hard to clamp down on before an amputation, otherwise stout straps and muscle kept patients as still as possible as they endured surgery.

When the first chemical gases were used in 1842 to induce unconsciousness, Canadian doctors and dentists quickly adopted 'anesthetics' (from Greek words meaning without sensation). In 1847, Canadian newspapers ran advertisements for Letheon gas, a form of ether given to Sir John A. Macdonald's fragile wife Isabella during the protracted birth of their first son. The next year, chloroform was used at Montreal General Hospital during an amputation.

With general anesthetics rendering patients unable to feel, react to or remember pain, surgeons could go inside the body to treat disease and repair defects, and take their time to repair badly damaged limbs or do amputations. Discovery of safe, injectable anesthetics followed, leading to regional and local anesthesia—numbing only those areas requiring surgery, not the whole body.

In 1942, Dr. Harold Griffith of Montreal pioneered a great advance—using muscle relaxants, reducing the necessary dose of anesthetics. In a career spanning both world wars, he served in all three branches of the Canadian military and was decorated for bravery at Vimy Ridge. He advocated expanding the role of anesthesiologists to charting vital signs and supporting patients' breathing. In addition to knocking patients out and keeping them under, modern anesthesiologists use sophisticated electronic equipment to monitor patients' vital signs, including heart rate and rhythm, blood pressure, breathing and kidney function.

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