

MEDICINE

Burn Victims Saved

Military plan details burn treatment resulting from years of study and research. Patch grafts are now used to conserve skin but better methods of grafting are sought.

By FAYE MARLEY

► **QUICK ACTION** and new treatment procedures are now saving hundreds of severely burned patients. The military now has the treatment down to a Standard Operating Procedure. Here is how the SOP worked for the 23-year-old wife of an Air Force enlisted man in North Carolina:

Mrs. C. was building up the fire in a wood heating stove in her home when her clothes caught fire. Before the flames were put out, more than 50% of her body surface had been burned so deeply that the skin had been completely destroyed. She was taken at once to Womack Army Hospital at Fort Bragg. Army surgeons there treated her for shock.

She was given morphine. (Pain, however, is often negligible in severe burn cases because the skin nerve ends have been destroyed.)

Large amounts of blood and electrolyte (salt) solution were given through a polyethylene tube inserted into one of her veins. The tube was kept there for several days to avoid repeated insertions for transfusions.

Because of the obvious severity of the burns and the area covered, the Womack surgeons immediately telephoned the Brooke Army Medical Center's surgical research unit at Fort Sam Houston, Texas, to request a plane with a burn team to take the patient there.

MATS Sends Plane

Within hours, the team, composed of a doctor, a nurse and a trained Army specialist, was sent by the Military Air Transport Service of the Air Force. Within 30 hours after her accident, Mrs. C. was at Brooke Army Medical Center. A helicopter had brought her from Brooks Air Force Base in San Antonio to the Center.

The Brooke surgeons saw that the patient had safely survived the burn shock phase. Because severe burns on her face and neck had impaired her breathing, the surgeons cut open her windpipe.

On the fourth day the patient's condition was sufficiently stable to allow the surgeons to cut away the burned tissue from her hands and lower right leg under general anesthesia. Two days later skin grafts were applied from unburned areas of Mrs. C's own body to the destroyed areas.

In cases of this kind, the amount of skin available for grafting can be extended by cutting it into checkerboard squares. For example, a patch of skin 16 square inches is cut up into one-inch squares and grafted onto an area of the body, leaving a half inch between the patches. The epithelium (covering of the skin) grows from the

edges, and although scars will be left by the checkerboard method, it has the advantage of covering a larger area when the supply of skin is limited.

Mrs. C's grafts took well. She was able to use her hands ten days after the operation. The remainder of the full thickness burns of the body surface began to separate from the underlying living tissue in the third and fourth week.

A modified exposure method is used in the treatment of most of the patient's burns except for the hands. This method consists of placing one layer of coarse mesh gauze rather than thick heavy dressing over the grafted burn wounds.

The layer of gauze protects the skin grafts until they become firmly attached, permits the burn wound to remain dry and discourages the growth and multiplication of bacteria.

On the 26th day Mrs. C's face, ears and abdominal wall were grafted, and on the 39th day following the accident, grafting could be completed on her legs. The fifth and final skin grafting was then done. Mrs. C. is now completely healed and can move about.

The treatment of this patient has resulted from years of study and research. The Army

Standard Operating Procedure is now generally accepted in the United States. Further research continues at Brooke Army Medical Center, one of the 11 units under the U. S. Surgeon General's Medical Research and Development Command in Washington.

Lt. Col. Harold F. Hamit, chief, surgical research branch of the Command, said in an interview, "in addition to what we do in Army laboratories and hospitals, we spend some \$360,000 a year on burn research contracts with various universities and medical schools.

"Two of the physicians involved in the recent kidney transplant at Peter Bent Brigham Hospital in Boston, in which a non-identical twin was able to tolerate his brother's healthy kidney, are working under contracts with the Command.

Interested in Homografts

"Frankly, our interest in this case is primarily in its relationship to skin homografts," Col. Hamit said.

(There are three types of grafting: autografts, the use of the patient's own skin; homografts, in which the skin of another person is used on that of the burn victim; and heterografts, in which animal tissue is used.)

"At present, burn victims, other than identical twins, will not tolerate skin grafts from other persons very long. We are interested in whatever can be discovered about



MODIFIED EXPOSURE—Exposure treatment helps prevent infection in burned boy shown here after skin grafts are covered with light gauze to permit air to reach injured surface.

such things as protein differences between individuals who reject tissue grafts."

Col. Hamit said one of the most promising studies is that of ribonucleic acids (RNA) and deoxyribonucleic acids (DNA) in the white blood cells and other kinds of cells. He said these acids appear to form some of the basic "building blocks" of the proteins in the chromosomes, nuclei and other parts of the cell.

"Slight differences in combination of the basic elements of these proteins appear to be responsible for some of the differences in individuals, and we are trying to learn what these differences are," he explained.

PUBLIC HEALTH

May Reduce Strontium-90

► AN IMPORTANT ADVANCE has been reported toward ultimate control of strontium-90, an element in radioactive fallout and one of the recognized hazards of the atomic age.

Dr. Willard F. Libby, a former Atomic Energy Commissioner, has suggested that the biological availability of strontium-90 might be reduced if nuclear explosions were conducted so that the strontium-90 is incorporated in insoluble particles that would make it unavailable to living organisms. Such incorporation would have to take place in the bomb cloud during the time required for condensation of the explosive material.

Dr. Libby's theory was tested in a series of experiments by Drs. E. A. Bryant, G. A. Cowan, J. E. Sattizahn and B. Warren of the University of California's Los Alamos Scientific Laboratory at Los Alamos, N. M.; Drs. W. R. Heald and R. G. Menzel of the U. S. Department of Agriculture soil and water conservation research division, Beltsville, Md.; and Dr. R. F. Reitemeier of the AEC's division of biology and medicine in Washington, who report their results in *Science*, 132:327, 1960.

Certain requirements must be met to successfully reduce the biological availability of strontium-90 (its uptake in plants from contaminated soil):

1. Incorporation in particles able to resist prolonged exposure to weathering and soil.

2. Incorporation in sufficiently large particles so that the strontium-90 does not diffuse appreciably in the 28 years of its half-life.

3. The right temperature history to allow incorporation of strontium-90 formed by decay of non-condensable krypton-90, a gaseous predecessor of strontium-90 with a 33-second half-life.

The extent to which the requirements are met determines the availability of the strontium-90. Tests showed that availability could be reduced by 50%. However, complete failure of any one requirement apparently results in complete failure to reduce availability.

The extent of world-wide fallout reduction also may depend on whether the explosion is at ground-level or in the air.

Obtaining enough of the patient's own skin to cover the burn area is a problem in cases of large-sized burns. Skin from other people is often used as a temporary covering until the victim's own skin can grow.

The Russians have used the membrane lining the abdominal wall of cattle for a temporary graft or "dressing" to the burned skin of human beings. There are cases in the United States in which the skin from unborn calves has been used as a temporary graft on people. Skin from persons who have just died is commonly used for temporary grafts, provided permission has been granted prior to death.

• *Science News Letter*, 78:122 August 20, 1960

Ground-level will offer the possible advantage of increased local fallout as opposed to world-wide fallout.

• *Science News Letter*, 78:123 August 20, 1960

ROCKETS AND MISSILES

"Sky-Writing" Satellites Forecast by Russians

► "SKY-WRITING" by satellites as far from the earth as the moon or farther, using small batches of the element lithium, is forecast by five Russian scientists.

They suggest a method for substantially increasing the brightness of space rockets by ejecting a cloud of gas that will glow like an artificial comet. The development of a lithium artificial comet will solve the problem of optical observations of man-made satellites within the solar system, they predict.

A cloud of vaporized sodium has already been used by the Russians to aid in tracking the lunar rocket launched on Sept. 12, 1959. Since sodium is not an "ideal substance" for making artificial comets, they recommend lithium. One reason is that 40 times as much sodium is needed as when lithium is used.

The suggestion for using artificial lithium comets is reported in *Soviet Astronomy*, 3:986, 1960, published in New York by the American Institute of Physics, in a translation of a paper by I. S. Shklovskii, V. F. Esipov, V. G. Kurt, V. I. Moroz and P. V. Shcheglov of the P. K. Shternberg State Astronomical Institute.

• *Science News Letter*, 78:123 August 20, 1960

PUBLIC SAFETY

Home Fires Have Decreased in Past Year

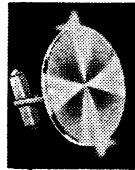
► THE NATIONAL BOARD of Fire Underwriters has reported that the home inspection program of the International Association of Fire Chiefs has decreased fires by five percent throughout the nation in the past year. In 1959, 15,000,000 homes in the United States were inspected by uniformed firemen.

• *Science News Letter*, 78:123 August 20, 1960

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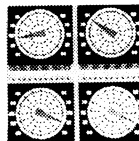


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