

Dental uses for the anorganic bone chips have already been extensively tested in monkeys by Lt. Cdr. Philip J. Boyne and Cdr. Harvey Lyons at the Institute. This has led naturally to human trials, and successful use of the bone in humans has been reported by Drs. Boyne and Losee.

Capt. Donald Cooksey, an oral surgeon at the Naval Dental School, Bethesda, Md., is also using it in selected human cases.

For orthopedic bone surgery the first use of the bone in humans probably took place in September, 1956, when it was used to repair a crushed heel bone.

But the new bone is not a direct replacement for banked human bone grafts, Capt. Losee emphasizes. It should be considered only as a supplement to the human bone that is available, he believes.

One reason for this is that anorganic bone loses some of its tensile strength in the treatment process. The chemical solvent removes the collagen fibers of the bone, necessary to give it strength. In applications where a large area of strong bone is needed, anorganic bone would not work as well as a human graft.

One way to improve the strength of the bone may be to treat it incompletely with the solvent, Dr. Boyne explained. In this way, the exposed surfaces become anorganic but the core does not, and the entire graft remains much stronger. This possibility is now being tested.

Grafts Take Faster

An important advantage of anorganic bone is that it can be revascularized faster than freeze-dried human bone. Since all the organic debris has been removed from the bone's lattice-work, blood vessel growth can begin immediately. With human graft material, however, the body must clear out the organic material before the new blood supply can be established. Thus the synthetic bone actually saves the body time in accomplishing the same result.

Also, with freeze-dried bone, there is always the possibility that the graft may contain a virus, such as hepatitis virus. This might become reactivated in the new host, Capt. Losee believes.

The development of the bone was an unexpected offshoot of basic research done on the cause of tooth decay. Capt. Losee has been studying the differences between healthy teeth and decaying ones for more than 20 years and developed the bone to see what composes both the organic and inorganic parts of bone.

He devised the ethylenediamine process to obtain samples of a non-organic type of bone which he decided to call anorganic. Shortly afterwards, a reserve medical officer at the Institute, Dr. Lloyd Hurley, now at Presbyterian Hospital, New York, mentioned the difficulties in having bone grafts from one species of animal to take in a different species. Capt. Losee casually mentioned his treated bone and the work began.

The first bits of anorganic bone were transplanted in animals in the spring of 1955 at the Institute by Dr. Hurley with excellent results. The grafts took and prospered, with no sign of any foreign body reaction.

Then its use was picked up by another reserve medical officer, Dr. Hugh Rosomoff, a neurosurgeon now at Presbyterian Hospital, New York, who experimented with putting anorganic bone plugs in dogs' skulls.

Since then extensive animal trials and now human tests have proved the value of the new material.

At present Capt. Losee's lab is the country's only supplier of the bone and he has sent nearly 75 samples of it to researchers throughout the world. A large meat packing company has also become interested in the process and plans to make available bone from various types of animals.

Nature's Anorganic Bone

The age of the original bone is no barrier to its use for grafting, Capt. Losee has discovered. Dramatic proof of this came from experiments with bone brought back to him by Capt. Merrill Wheatcroft of the Naval Dental School from an Egyptian burial ground dating back between the 4th and 5th Dynasties.

"Nature had already removed all the organic material from the bone and we grafted it into the hind leg of a dog," Capt. Losee recalls.

The graft took as well as ethylenediamine treated bone and the dog became the first one in history to have leg bone nearly 7,000 years old.

Science News Letter, August 3, 1957

TECHNOLOGY

Blasting Noise Tests Jet, Missile Components

➤ ELECTRONIC components for jets and guided missiles are being tested by exposing them to high-intensity sound, A. R. Hopkins, a Radio Corporation of America executive, has revealed.

To give engineers ideas on how to design

better components that will withstand the terrific sound vibration in jets and missiles, "white sound," or pure sound of wide frequency range, with intensities up to 145 decibels, is beamed on components placed in a sound chamber.

A decibel, db, is a measure of sound power. When you whisper, your voice has an intensity of about 20 db. When you shout, you are generating sounds between 50 and 60 db. Human beings can tolerate only about 140 db.

Two models of the noise-machine, 36 by 18 by 72 inches, and 9 by 9 by 24 inches, generating sound with a range of 20 to 10,000 cycles per second, have been developed by acoustics engineers of RCA's theater and industrial products department.

Science News Letter, August 3, 1957

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