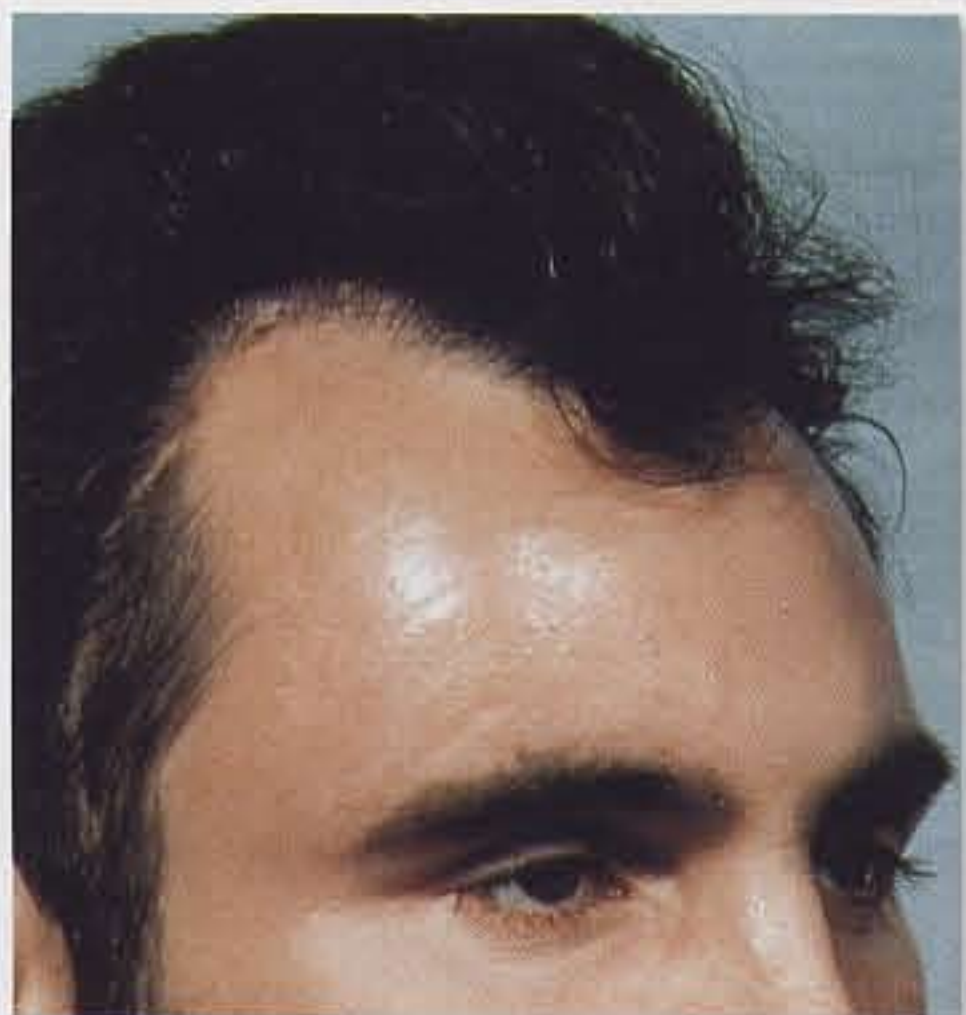
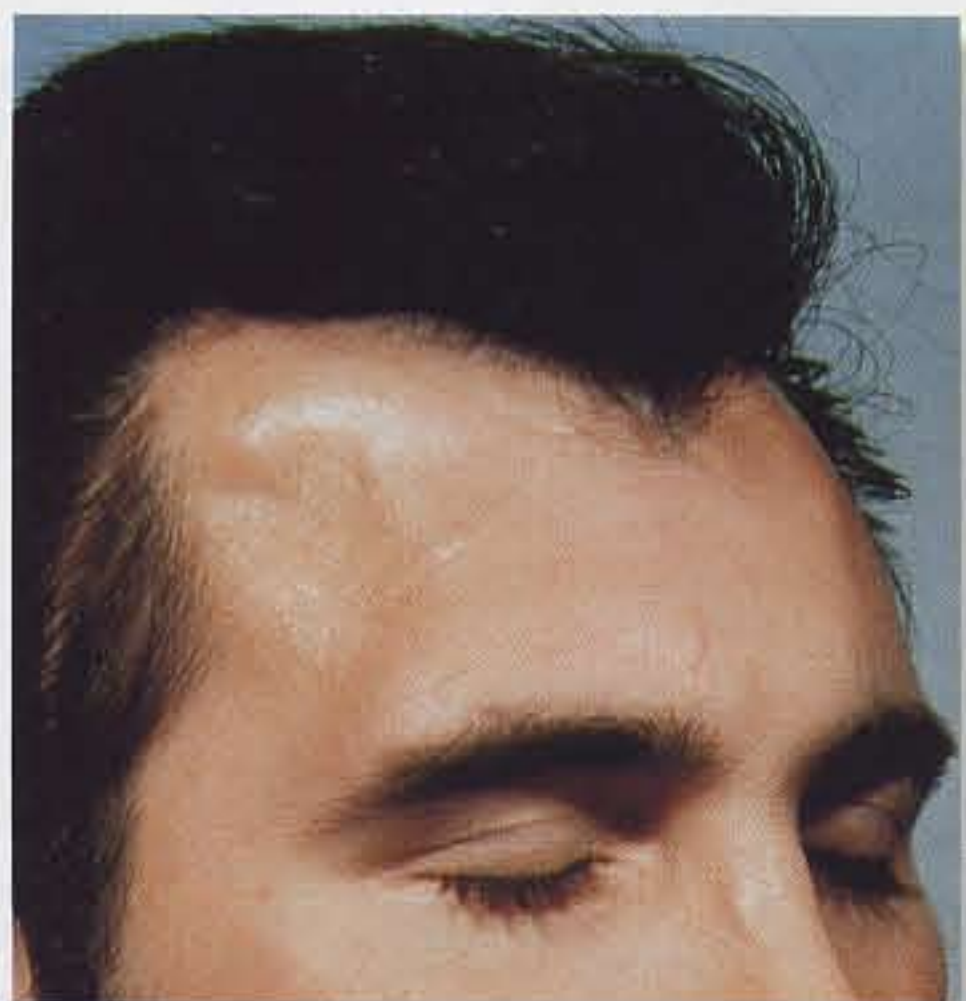


# Cosmetic Surgery TIMES

## DESIGNED BY COMPUTER

### Customization Brings Facial Implants into the 21st Century



By Karen Nash  
Contributing Editor

LOS ANGELES—Using computers to improve the design of implants for use in plastic surgery became a reality about a decade ago. Now, the technology is expanding to develop custom implants.

William J. Binder, MD, FACS, an assistant clinical professor and attending surgeon in the department of head and neck surgery at the University of California (Los Angeles) Medical Center, remembers when computer and implant technology joined forces.

"In 1987, I sat down with an engineer from the aerospace industry and used the first 3-D CAD/CAM software to design facial implants in the computer so you could finally make the contour the way you wanted," says Dr. Binder. "That changed the entire world of facial implants and introduced facial contouring."

Dr. Binder, who also is an attending surgeon at Cedars Sinai Medical Center, Los Angeles, says the change allowed surgeons to augment not only the skeletal structure, but also to simulate the replacement of lost soft-tissue mass. Small disks of material or little, button-sized, silicone dots stuck on a bone created unnatural looking projections under the skin. He says computer-designed implants enable the surgeon to take the entire geographical area of the augmentation into consideration, rather than performing



Dr. Binder

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These views show the patient, who was involved in an accident, before (top) and after receiving a custom 3-D Accuscan implant for reconstruction of a defect in the forehead. (Photographs courtesy of William J. Binder, MD, FACS)

spot augmentation. Spot augmentation is often anomalous and inexact.

#### Advanced Technology

Dr. Binder says that today, the same technology has advanced so individual differences can be scanned, and customized implants can be made to solve specific anomalies in individual patients. He, along with Alan Kaye, MD, an oral maxillofacial surgeon at Cedar Sinai Medical Center designed the 3-D Accuscan system (Implantech Associates Inc., Ventura, CA) to create custom implants allowing facial contour defects to be rebuilt with extreme accuracy. Historically, facial deformities include orthognathic surgery, which involves cutting, moving, and regrafting bone.

Now, Dr. Binder's system also combines 3-D CT scanning with 3-D Accuscan technology to determine the exact measurements of needed implants.

"That information is then forwarded to Medical Modeling Inc., a facility in Colorado," Dr. Binder explains. "It transforms that 2-D image into a 3-D image in the computer. Then, that is run through another process which actually produces a life-size 3-D model of the patient's bone structure. The model is returned to Implantech, which then makes the implant to fit that defect exactly."

#### Perfect Fit

The base of the implant is so precise it fits the skeletal structure perfectly. "The posterior surface of the implant conforms exactly to the surface of bone so that in most cases it doesn't even need a fixation technique; it just locks into place," says Dr. Binder.

Dr. Binder explains that the computer-designed implants offer several

advantages over more traditional procedures:

- The patient is anesthetized for a shorter period of time because all of the preliminary work of shaping the implant is done before surgery begins.
- The need to estimate the shaping is reduced along with the time it takes to cut and move bone.
- Surgery can generally be done on an outpatient basis, and therefore the surgery is more affordable.
- Custom implants solve problems created when standard, "off-the-shelf" implants fail to correspond accurately to the surfaces of the underlying structure.
- The implants are more stable

A person may think they have a big nose, when actually the problem is a small or recessive chin. Creating a more pleasing balance to the facial features by building up the chin can make the entire profile more attractive.

with less tendency to move.

- Also, the imaging system can be a life-saver for patients needing reconstructive work.

"We had an accident victim in Australia who was comatose for 2 weeks. He had numerous neurological procedures which left a major depression in his temporal area. We just molded an implant to the computer model and placed the implant into the defect during surgery. The patient was perfectly reconstructed [see photographs]."

#### More on The Horizon

Dr. Binder sees the use of the computer-designed implants expanding as technology continues to improve.

"It's very exciting," he says. "I think what you're eventually going to find—in about 5 to 7 years when the technology advances—will eventually be

communicated via modem. It will be a very streamlined process to obtain a custom implant.

"It will be less labor intensive and will be much less costly because the computer will eventually be able to gauge the thickness of the skin and predict the amount of facial augmentation a particular implant design will create, if inserted in the correct area.

"The computer will design the implant to fit that particular patient, and create the result you're looking for in real life. That's exciting."

In addition, to correct facial deformities, Dr. Binder advocates facial contouring as an optional procedure for people considering a facelift. He says, however, that the computer-designed, patient-specific implant is not necessarily the answer. While the custom-designed implant reduces the cost of reconstructive surgery, it can increase the cost of some standard cosmetic procedures.

Balance is key in the art of facial contouring. Features are combined—proportion and balance create the image of beauty.

"When the balance is pleasing, the eye and mind are attracted to them. When they are out of proportion, we tend to consider them unattractive," Dr. Binder says.

#### 'Youthful Vitality'

Dr. Binder finds the submalar or midfacial augmentation a method for restoring a "youthful vitality" to the face. For selected patients, perhaps in their mid-40s, combining the implants with facelift surgery may be the solution. With the implants in place, lines around the mouth may be smoothed without pulling the skin too tight, preventing the folds from returning too quickly.

result in the entire profile looking more attractive.

Sometimes, fat that sits under the chin needs to be removed to define the jawline more clearly and to improve the effect created by a mandibular implant.

Mandibular implants follow the same course of anesthesia and antibiotics as described for the submalar implant.

The procedure takes about 30 minutes to 40 minutes and can be done on

an outpatient basis. An incision can be made either underneath the chin in the submental crease where it is barely seen, or in the mouth or the labiomental sulcus. Sizers can be tried during surgery to determine which looks best on a patient.

Dr. Binder and the late Larry Schoenrock, MD, have edited a book—"Facial Contouring and Alloplastic Implants in the Facial Plastic Surgery Clinics." It has been described as the first surgical text of its kind. CST

#### Figuring Out the Problem

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