

# Feminization of the Forehead: Contour Changing to Improve Female Aesthetics

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Anthropologists have identified those characteristics which enable them to differentiate the male from the female skull. Some women have masculine skeletal characteristics which, if changed, would improve their facial appearance. Changing the skeletal configuration through bony contouring of the craniofacial skeleton for aesthetic purposes is a natural spinoff of craniomaxillofacial surgery. Techniques for sculpturing the masculine characteristics present in the foreheads of some females are discussed. The deformity has been divided into three subdivisions. Group 1 patients can be treated through bony contouring alone; group 2 patients require bony contouring in conjunction with a methyl methacrylate cranioplasty; and group 3 are those patients with a more severe deformity requiring osteotomies. The technique, results, complications, and patient acceptance are discussed.

Identification of an individual as male or female generally takes only a fraction of a second. Within a group of females we are also rather quick to determine which we consider to be beautiful, attractive, plain, unattractive, and perhaps even ugly. However, when asked to explain why an individual woman was delegated to one of these classes, we are left to try to explain this on the basis of various contours, angles, planes, and textures. No attempt will be made in this paper to try to determine what those characteristics are. It is a contention, however, that some of the characteristics that we commonly see in the female face as being less than ideally attractive are features of a masculine nature.

Physical anthropologists and forensic pathologists are concerned with the identification and

separation of skulls by sex.<sup>1-6</sup> Prior to the computer and discriminant function analysis, these scientists primarily utilized three skeletal characteristics to separate the male from the female skull: the chin, the nose, and the forehead. With considerable training, the anthropologist was able to obtain an accuracy of approximately 70 to 76 percent. The chin is noted, in general, to be more pointed in the female, whereas the nose has a more acute glabellar angle in the male than in the female. The forehead is perhaps the easiest to separate (see Fig. 1). The male forehead has extensive supraorbital bossing, and above this there is often a flat area before the convex curvature of the upper forehead begins. In the female, the supraorbital bossing is considerably less, frequently nearly nonexistent, and above this there is usually less flatness and more of a continuous mild curvature. While some plastic surgeons have described the recontouring of the superolateral orbital angle within the bony orbit as increasing the beauty of the female orbital area, this is not something that has been identified by anthropologists as being more feminine.

The bony contours of the forehead can be modified to reduce masculine characteristics when they exist and thereby increase the feminine ones. This paper's purpose is to demonstrate such masculine characteristics in females, to describe the grouping of such characteristics and the treatment designed for their modification, and finally to present the results of such treatment.

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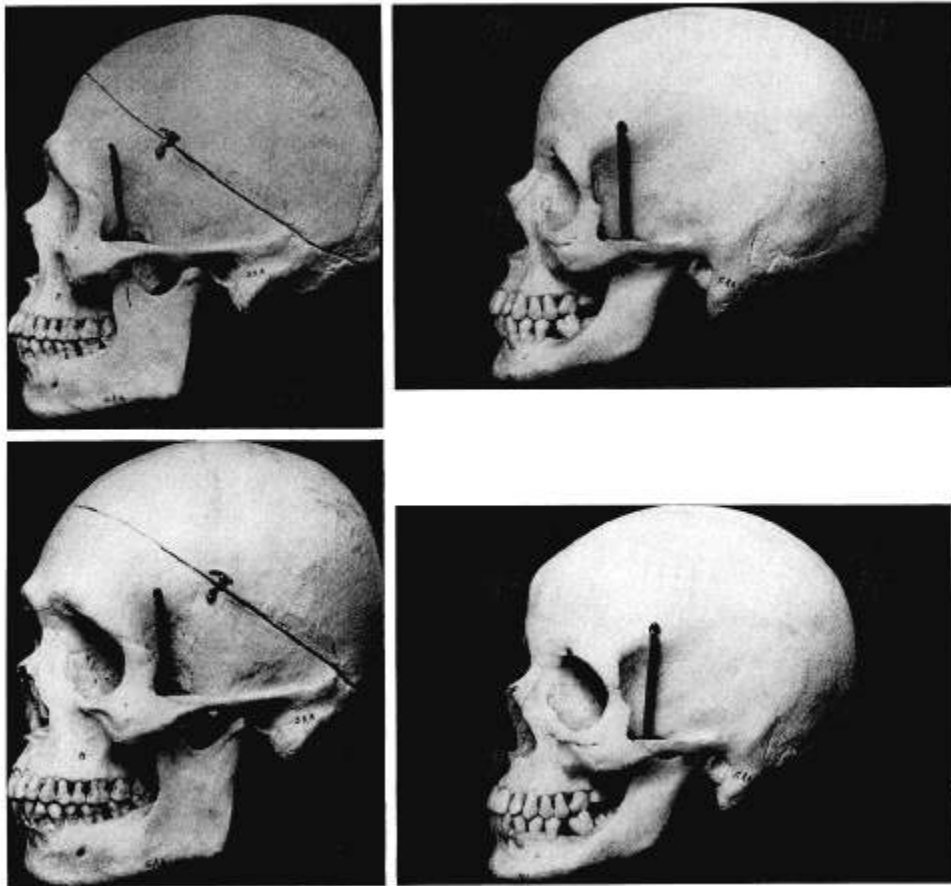


FIG. 1. Male and female foreheads. (*Left*) Note supraorbital bossing and flatness above the bossing in the male forehead. (*Right*) Note almost total absence of any supraorbital bossing and basically a continuous curve of forehead in the female forehead.

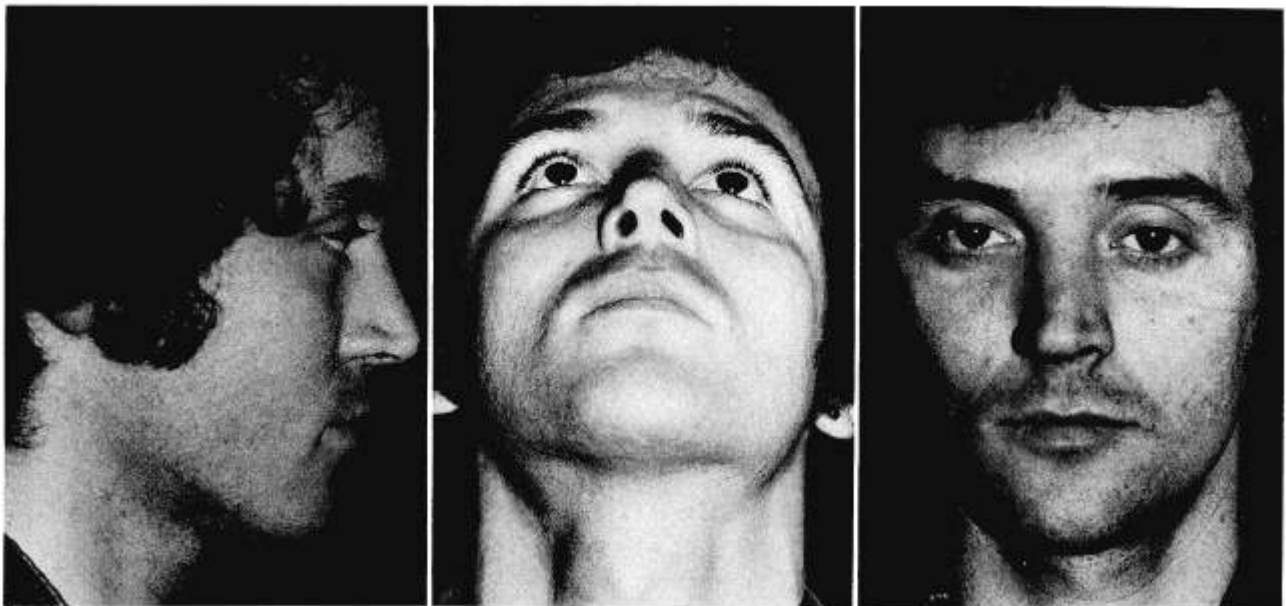


FIG. 2. Male forehead with normal moderate supraorbital bossing.

MATERIALS AND METHODS

Several hundred dry skulls were examined in the Atkinson skull collection at the University of the Pacific School of Dentistry in San Francisco. Characteristics identified in female and male skulls were then identified in female patients showing both feminine and masculine characteristics of the forehead. Degrees of deformity were noted on both dry skulls and patients, and then a treatment protocol based on these differences was developed. Lastly, various treatment tech-

niques were utilized in female patients to improve their forehead contour.

The characteristics described by physical anthropologists of the forehead were identified (Fig. 1). Figures 2 and 3 show such forehead characteristics in the normal male and female. Figure 4 shows the masculine forehead configuration in two women.

In order for a treatment to be utilized by the majority of plastic surgeons completing aesthetic surgery, it is important that the technique be safe, relatively easy, of low cost, and perhaps of

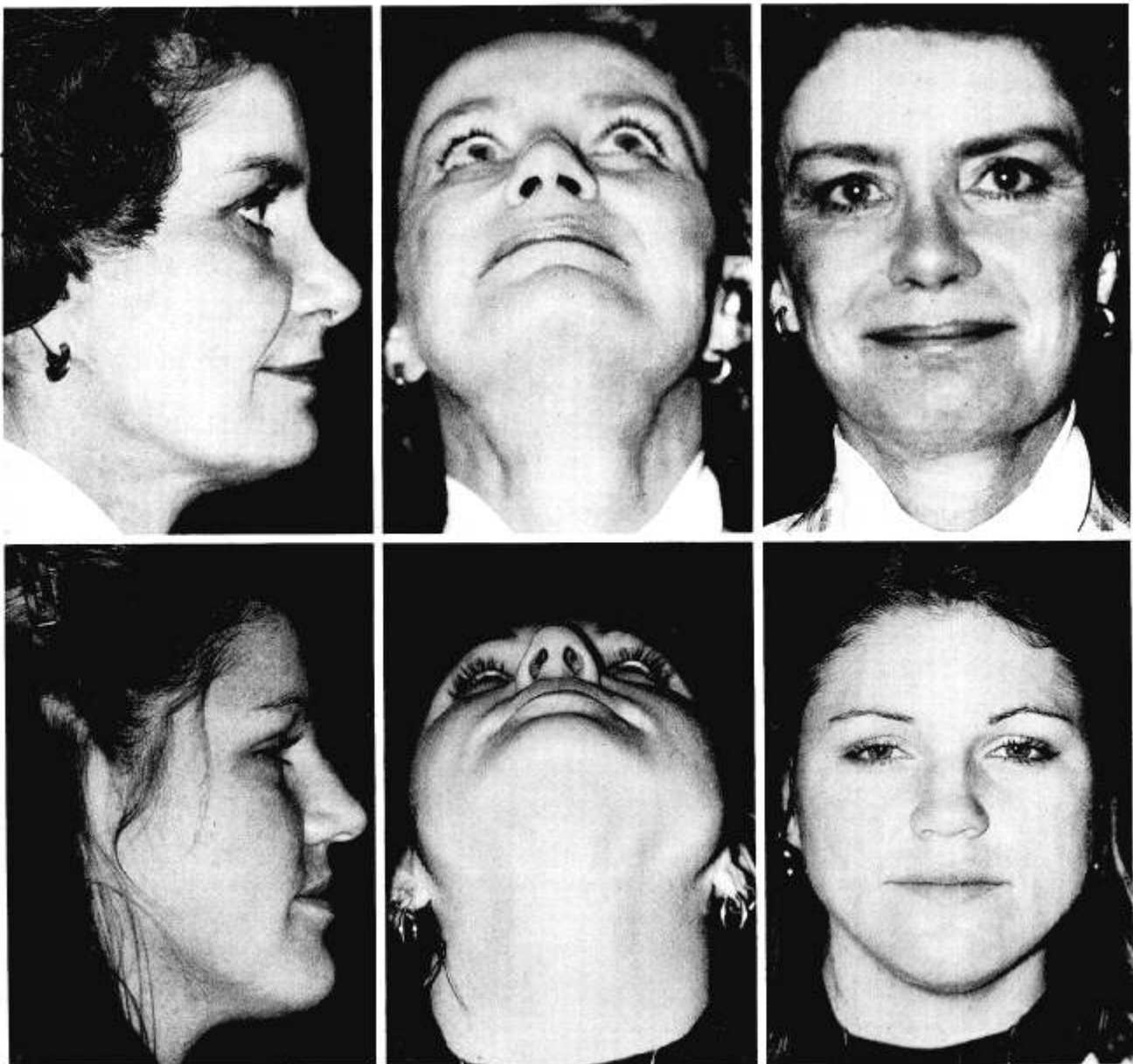


FIG. 3. Two women with normal forehead curvature.



FIG. 4. Two women with moderate supraorbital bossing and flatness above the bossing.

most importance, have a low possibility of doing harm. With this in mind, and comparing the degree of deformity and treatment necessary to correct the corresponding deformity, the various forehead contours have been divided into three groups.

Group 1 includes those patients with normal or slightly anterior projection of the supraorbital rims, minimal to moderate contour deformities (bossing), thick skull bone over the frontal sinus, and/or absence of the frontal sinus. These de-

formities can be corrected by bone reduction alone utilizing a pineapple or methyl methacrylate burr.

Group 2 includes those individuals with relatively normal or slightly anterior placement of the supraorbital rims but in whom the frontal bossing is combined with relatively thin bone over the frontal sinuses, the sinuses being of normal size. Correction of the deformity in these patients requires completing as much contouring of the bone as possible without entering the sinus

and then augmenting the concavity above the frontal bossing with methyl methacrylate and contouring to a final desired shape.

Group 3 includes those patients in whom the anterior projection of the supraorbital rims is so excessive that adequate bone reduction contouring is impossible without entering the frontal sinus. In these individuals, the frontal sinus must be opened through a sinus osteotomy and the entire anterior sinus wall and associated supraorbital rim set back and wired into position. Additional bony contouring is completed lateral and superior to the sinus and orbital rim osteotomies as necessary. Quite obviously, this group requires much more extensive and, to a degree, risky

surgery than the first two groups. The potential for loss of the setback frontal bone exists.

All the procedures completed on the patients shown in this paper were done under general anesthesia. However, groups 1 and 2 can be completed nicely under local anesthesia. All the surgeries were completed through a bicoronal incision, elevating the forehead soft tissues in the loose areolar tissue plane between the galea and the periosteum as in a standard forehead lift. The periosteum was incised transversely approximately one-third of the way from the bicoronal incision to the supraorbital rim and laterally along the superior temporal line to the lateral orbital rims. The periosteum was then elevated,

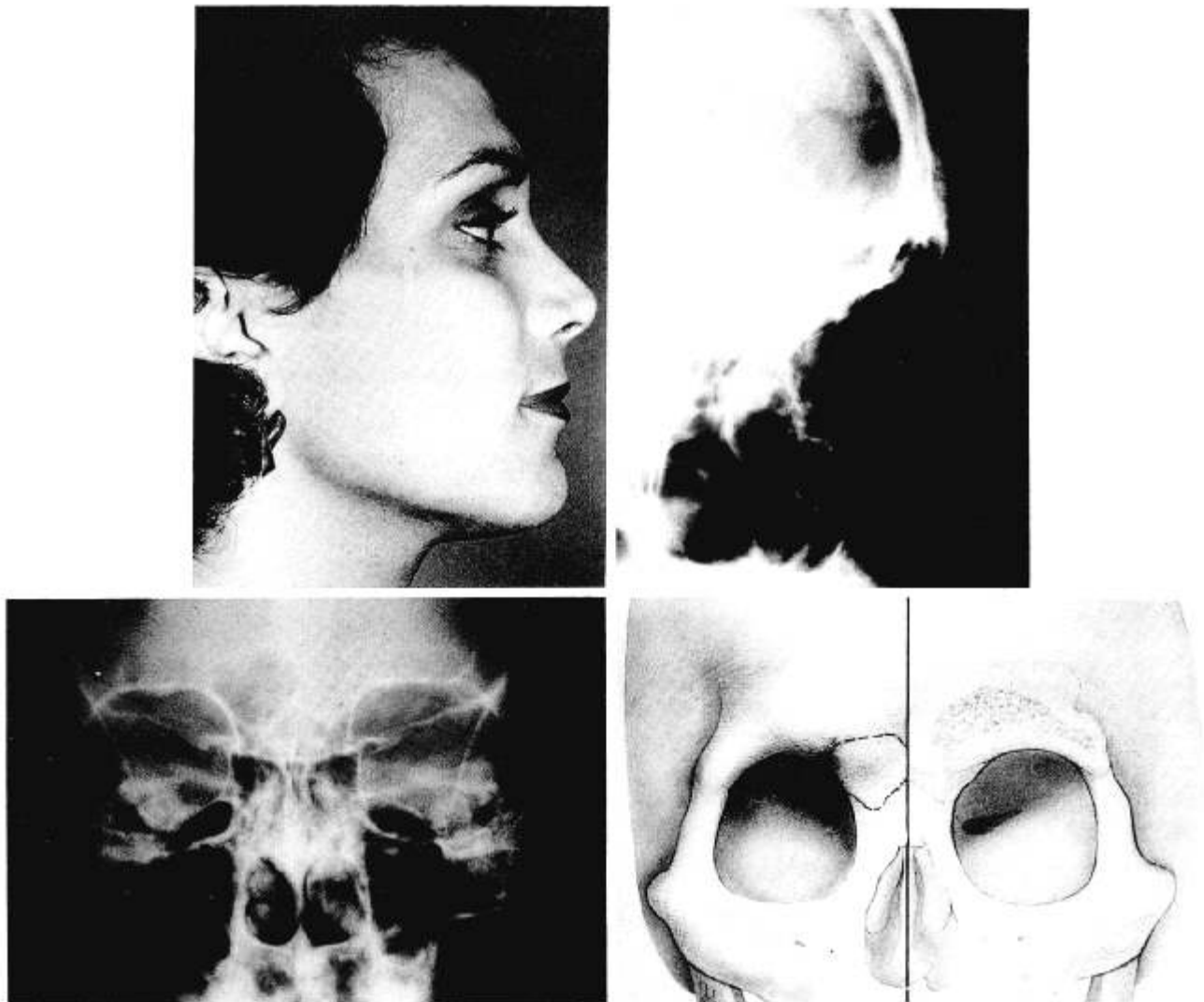


FIG. 5. Group 1 patient. (Above, left) Lateral view of face. (Above, right) Comparison view lateral radiograph. (Below, left) Posteroanterior radiograph. (Below, right) Drawing showing contouring surgery completed on left side of forehead.

protecting the supraorbital neurovascular bundle. After completion of the contouring procedures, the wounds were all closed by repositioning the periosteum, placement of interrupted galeal sutures, followed by skin closure with staples. A forehead dressing was placed which was removed the day following surgery, but it could be left for 2 or 3 days if desired. No drains were ever used. All the patients received prophylactic antibiotics, usually a cephalosporin.

#### RESULTS

An example of a group 1 patient is shown in Figures 5 and 6. In this individual, the anterior wall of the sinus was thick and the one frontal sinus (on the right) was small. It was possible to

correct the deformity entirely by bone contouring. No changes have occurred after 2 years of follow-up.

A 32-year-old group 2 patient is shown in Figures 7 and 8. A drawing showing the relative degree of bony contouring and the position of the methyl methacrylate, which was placed in the soft state directly on the bone and then contoured, is shown. The follow-up of 3 years has shown no changes.

I do not have an example of the group 3 degree of deformity in a female, but I probably will some time in the future. Therefore, one of the two males who has asked for correction of this degree of supraorbital rim prominence is shown. These two males were not asking to have

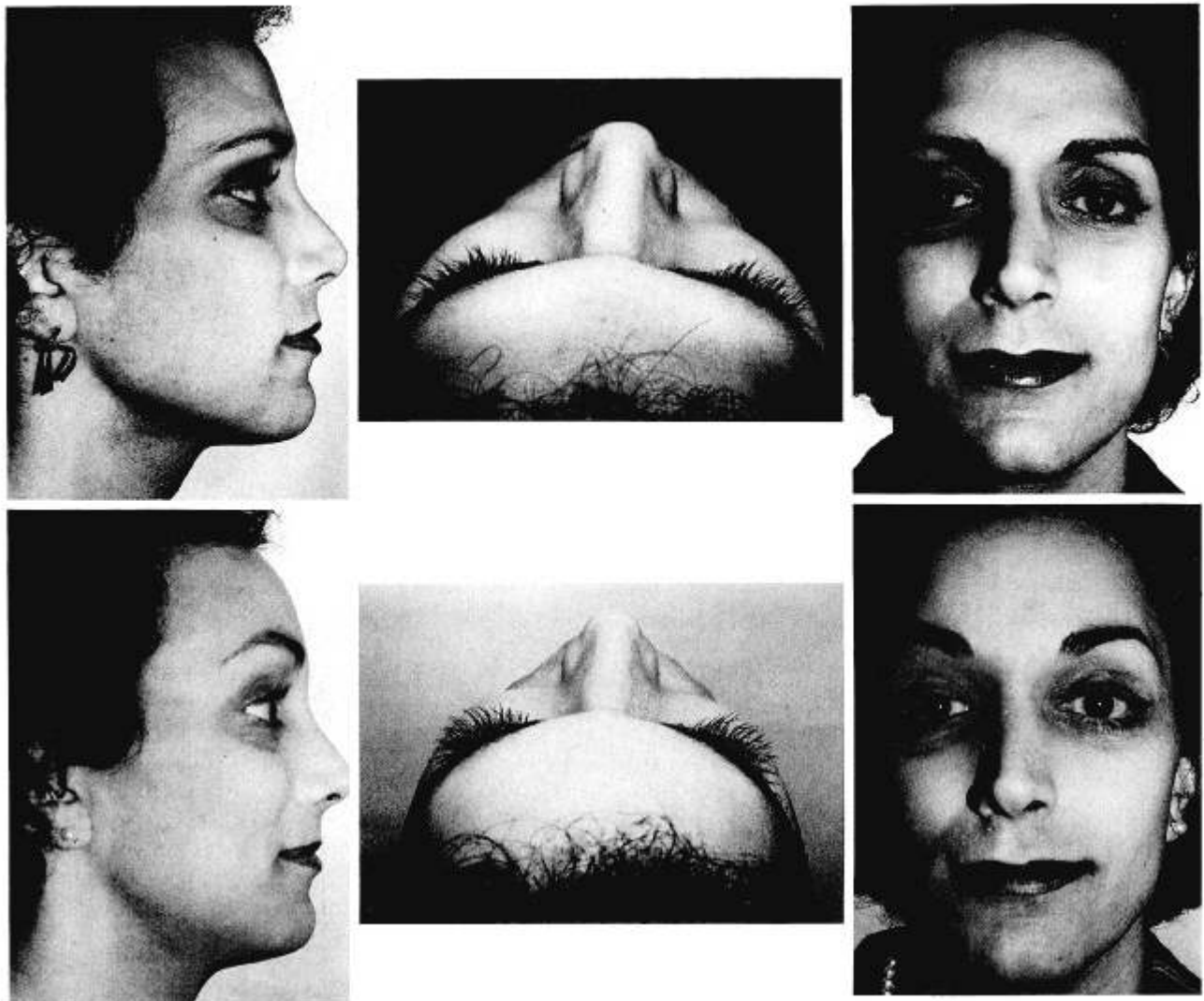


FIG. 6. Same patient as in Fig. 5. Preoperative (*above*) and postoperative views (*below*).

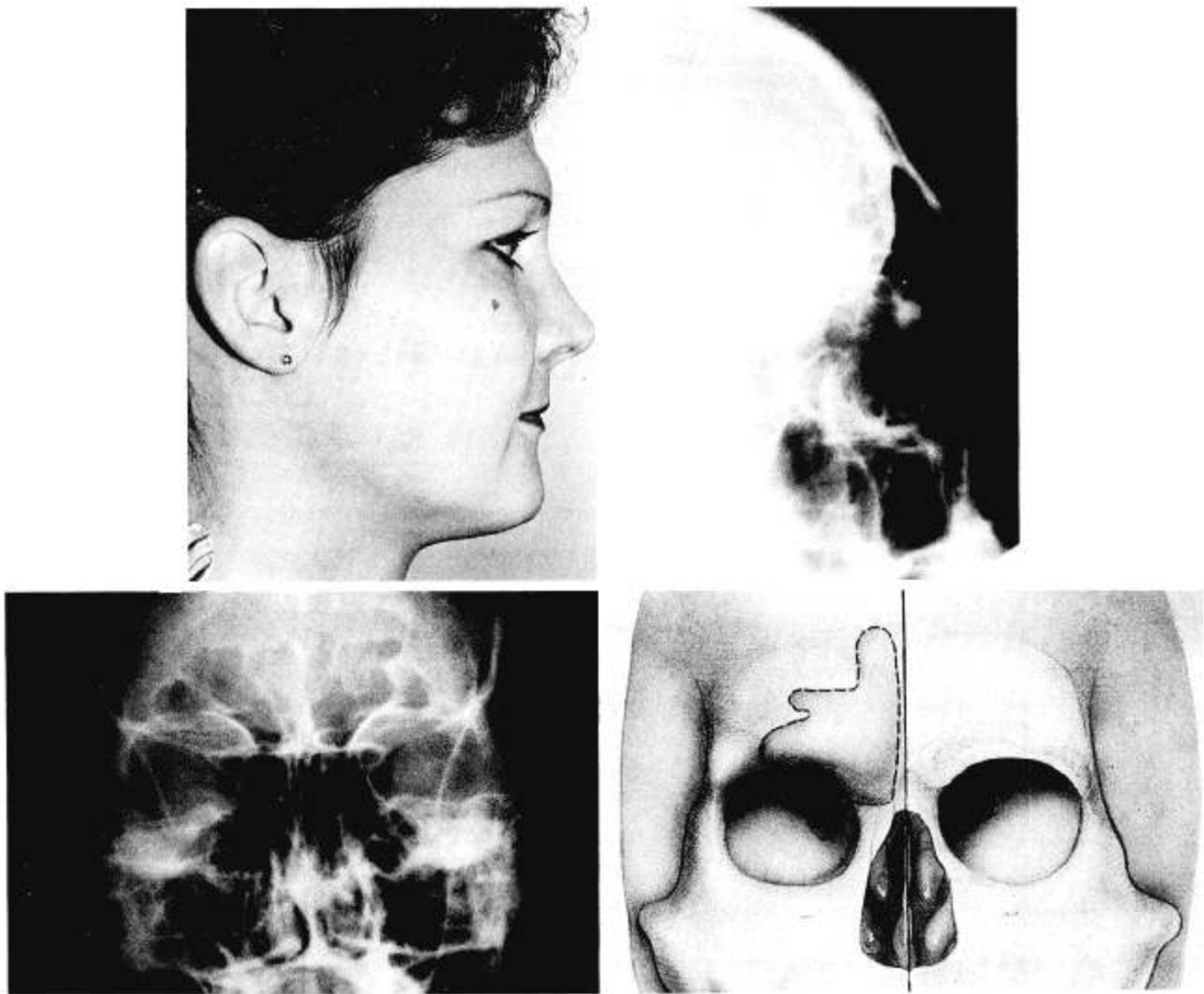


FIG. 7. Group 2 patient. (Above, left) Lateral view of face. (Above, right) Comparison view lateral radiograph. (Below, left) Posteroanterior radiograph. (Below, right) Drawing showing contouring surgery completed. Note methyl methacrylate (whiter area) above the bone-contoured area.

their foreheads feminized, only to have their supraorbital rims set back. If a female were to present with this degree of deformity, it probably would be very masculine appearing. In the 19-year-old man shown (see Figs. 9 and 10), the osteotomy extended into the orbit so that the entire anterior frontal sinus wall and the adjacent portion of the supraorbital rims were set posteriorly. In order to establish a desirable contour, it was necessary to cut the frontal bone into three pieces on each side of the midline. Additional bony contouring was completed as necessary, especially laterally, where the bone is quite thick. Methyl methacrylate was not utilized.

There have been no complications in any of

the 26 patients so treated, with follow-ups from 3 months to 9 years. Ages have ranged from 16 to 62 years. It is not uncommon to have a temporary serous collection of fluid develop following the placement of a methyl methacrylate cranioplasty which may require repeated aspirations over a 3- to 10-day period depending on the recurrence of the fluid. If this happens, there is a tendency for fluid to reaccumulate in a decreasing amount until it is undetectable. I would not consider this a complication but rather an occasional tissue reaction to the methyl methacrylate. This has occurred in 3 of 21 patients (14 percent) in whom methyl methacrylate was used. No infections, loss or shifting of the methyl methac-

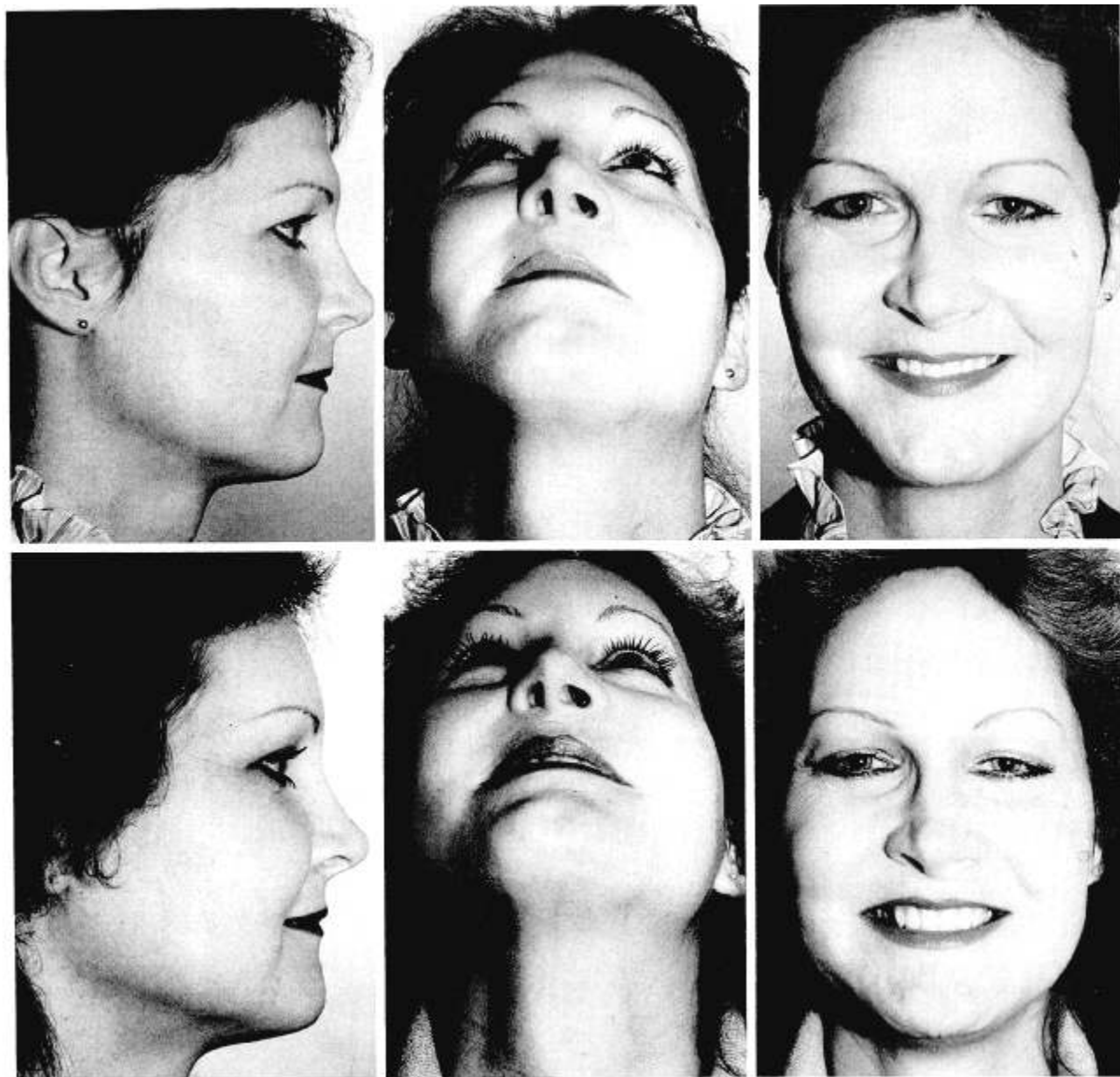


FIG. 8. Same patient as in Fig. 7. Preoperative (*above*) and postoperative views (*below*).

rylate, or notice of a margin of bone or acrylic has occurred.

#### DISCUSSION

Bony sculpturing of the face is rapidly becoming a part of cosmetic surgery and is a natural spinoff of craniofacial and maxillofacial surgery.<sup>7,8</sup> The ability to improve contours not possible through soft-tissue work alone has become very exciting. Patient satisfaction has been extremely high. In fact, there have not been any patients even slightly dissatisfied with the results of forehead contouring for aesthetic purposes.

All the procedures have been completed on late adolescents or adults. Such procedures can be easily completed in group 1 and 2 patients during a standard forehead lift, even under local anesthesia. It is important to realize that in this area the soft-tissue contours follow the bony contours; i.e., in my experience if the bossing is eliminated from the bone, it will be eliminated from the soft-tissue contours and does not need to be overcorrected. This is not to imply that there is necessarily a millimeter of soft-tissue change per millimeter of bone reduction. The exact amount of bone to be removed will depend on the anat-



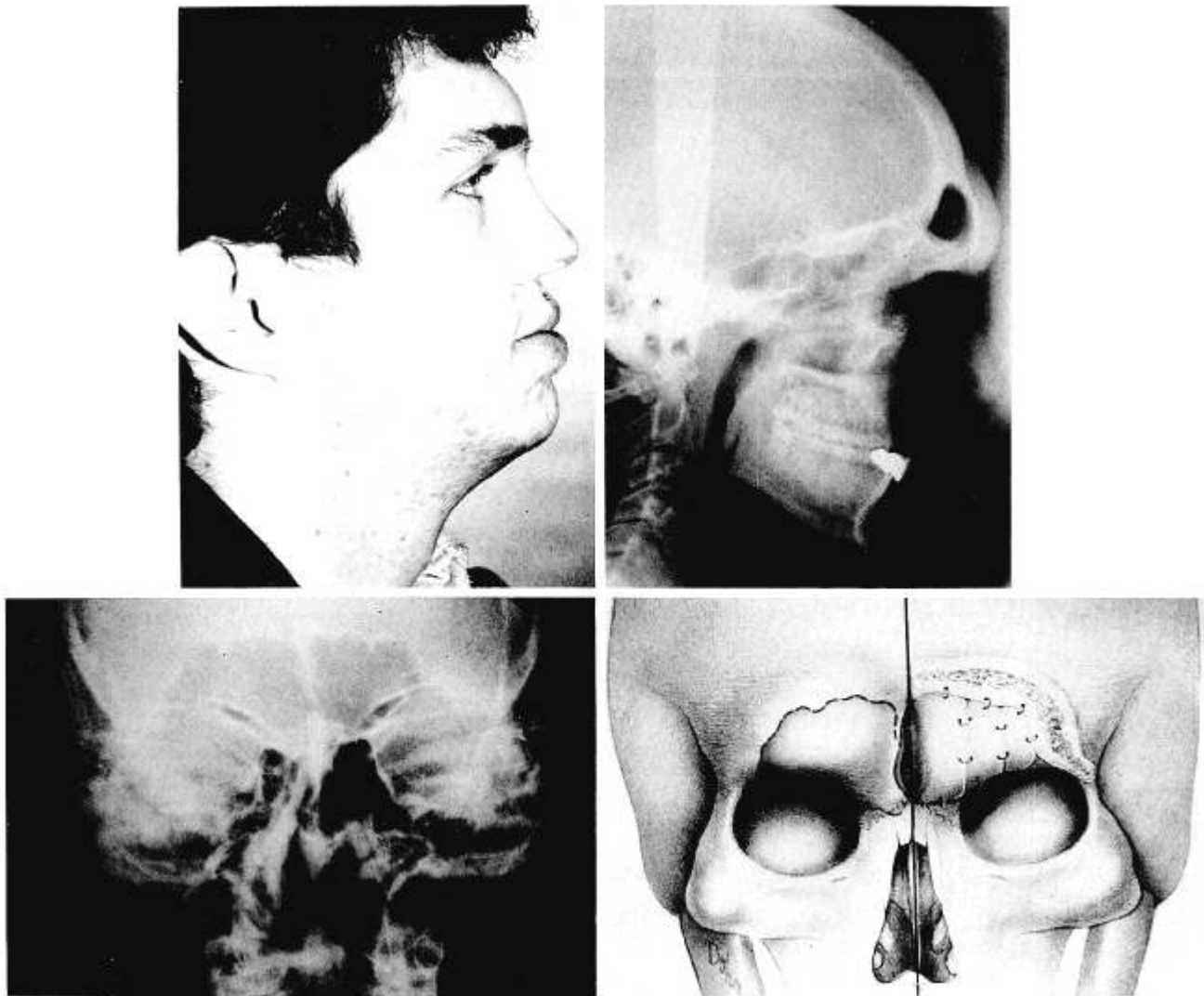


FIG. 9. Group 3 patient. (Above, left) Lateral view of face. (Above, right) Comparison view lateral radiograph. (Below, left) Posteroanterior radiograph. (Below, right) Drawing showing osteotomies and setting back of anterior sinus wall and supraorbital rim. Note also the additional bone contouring.

omy present and the result desired; the sculpturing ability of the surgeon will determine the end result.

These procedures are particularly useful in male-to-female transsexuals in whom a more feminine skull contour is desired. Indeed these procedures have been completed on five patients in this series with very pleasing results.

The procedure has been very safe, and there have been no complications. The operative time is low, usually requiring less than 2 hours to complete, except in the group 3 patients, in whom the procedure is much more involved, taking several hours.

With regard to the use of methyl methacrylate, similar techniques for forehead reconstruction

have been utilized by myself and others on adolescents with craniofacial deformities with a similar satisfaction rate.<sup>9-12</sup> There is no evidence of bone erosion or implant displacement in any of the patients in whom methyl methacrylate was utilized, whether craniofacial or aesthetic. Jobe,<sup>13</sup> who has done considerable research on bone erosion from overlying implants, suggested this finding when he stated that he would not anticipate any bony erosion since these implants probably would not migrate when placed over such a large convex surface.

The use of methyl methacrylate for cranio-  
plasty has stood the test of time when proper attention to detail is given.<sup>14,15</sup> Attention to detail is particularly important if there has been pre-

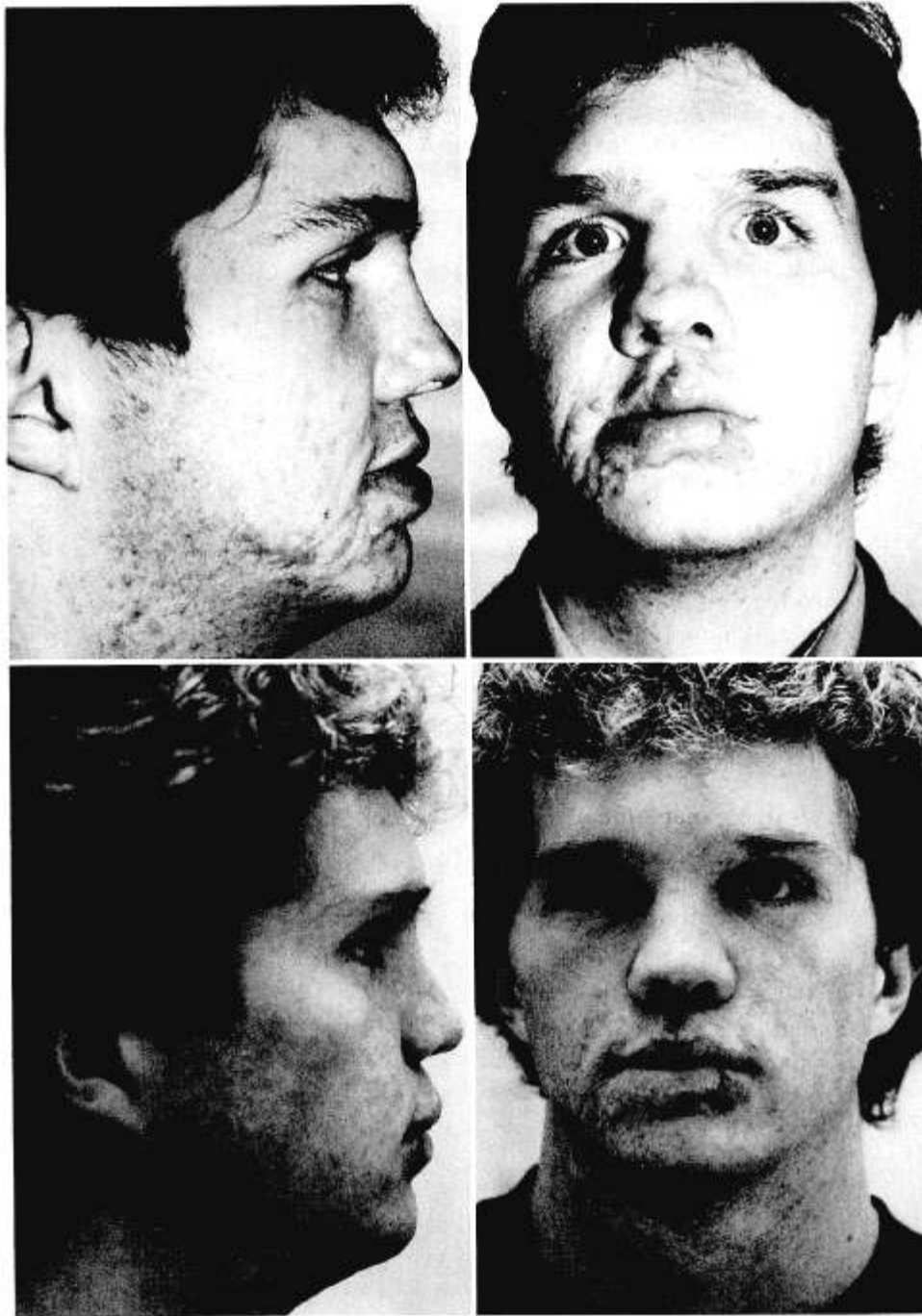


FIG. 10. Same patient as in Fig. 9. Preoperative (*above*) and postoperative views (*below*).

vious surgery or trauma which has resulted in scars and/or infection. Methyl methacrylate should never be used within 6 months of an infection, and it should never be used under a split-thickness skin graft or around areas of extensive scarring. In these cases, autologous bone is the only form of treatment at present. Gonzales-Ulloa and Stevens<sup>16</sup> have used methyl meth-

acrylate for contouring of the forehead for aesthetic purposes with pleasing results.

I feel that it is extremely important in group 3 patients that methyl methacrylate *not* be used simultaneously with the osteotomies even if deemed necessary for contour improvement. Quite obviously, there will be a temporary leak of bacteria in the osteotomy sites. To place

methyl methacrylate immediately over this area or even adjacent to it would subject the patient to a possible significant infection, probable removal of the methyl methacrylate, and possible necrosis of the anterior sinus wall. If in these patients it is felt that the bony contour would need to be augmented with methyl methacrylate, I would wait at least 6 months and then only place the methyl methacrylate if there was a bony seal over the entire frontal sinus.

Autologous bone or bone substitute (e.g., demineralized bone<sup>17</sup>) has not been satisfactory in my hands for augmentation purposes on the forehead because it has not been dependable. The unpredictability of the degree of resorption and the need for reoperation, for either further augmentation or contour adjustment, has made the use of these methods unsatisfactory for cosmetic augmentation in this area, particularly for those patients requiring greater augmentation than a few millimeters. Bony augmentation, and the remodeling that follows, often results in considerable surface irregularity. Additionally, the morbidity at the bone-graft donor site can be significant, especially if large quantities of bone are necessary.

There is no reason to think that similar techniques could not be used to masculinize a feminine-appearing forehead in a male. Methyl methacrylate could very easily be placed and contoured to give more frontal bossing if it were lacking. The techniques would be basically the same except that bony contouring probably would not be indicated and the entire technique would be that of augmentation using acrylic. The results obtained would be based solely on one's ability to sculpt methyl methacrylate using a hand piece and burr. With the new contouring programs available for three-dimensional CT scans, one could program a desired forehead contour and cut an exact-fitting prosthesis.<sup>18,19</sup>

I do not agree with Whitaker's philosophy of augmenting the supraorbital rims in females by bringing down a roll of pericranium.<sup>20</sup> I feel that this is contrary to the desired contour of the female forehead.

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