

POLYVINYL CHLORIDE (CORDO) FACIAL AND BODY PROSTHESES

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The prosthetic replacement of tissues of the human body lost as a result of trauma, disease, or congenital deformity has always been a challenge to those given the responsibility of reconstruction. Individuals specializing in this field are required to have a variety of knowledge and skills ranging between the artistic and the scientific.

First and foremost among these challenges is the need to seek out, develop, and apply materials which have special characteristics required to meet the task at hand. It has been our experience that the failure of an artificial restoration has more frequently been attributed to the lack of suitable materials rather than to the lack of appropriate techniques or creative ability. Over the years there has been one material which served well in the fabrication of prosthetic restorations. Since 1949 this Service has been producing facial and body restorations with polyvinyl chloride (PVC) copolymerized with polyvinyl acetate by plasticizing with solvents. The resulting material is polymerized by using cold cure technique. The basic polyvinyl-colored compound developed and used by the VA Prosthetics Center Restorations Service is Cordobond (R) P-315-B2 formulated as shown in Table 1. This material was originally developed for use in the fabrication of cosmetic gloves for covering mechanical artificial hands and passive partial hand restorations. The successful use of the PVC (Cordo) for this purpose led to experimentation which proved this material adaptable to the fabrication of most types of cosmetic facial and body restorations.

The formula given in Table 1 is known as a dip formula and was originally used as a base for slush mold casting. The cosmetic gloves shown in Figures 1 and 2 were fabricated using this technique. The PVC (Cordo) used produced superior results in capturing exact details existing in the mold. Glove thickness can be specifically controlled by determining the number of mold coatings to be applied. When used in producing cosmetic facial restorations, as shown in Figures 3, 4, and 5, this material is carefully applied to the surface of the mold used with reg-

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TABLE 1.—Formula for Polyvinyl Chloride (Cordo) Developed by Restorations Service, VA Prosthetics Center

Elements *	Quantity	
	Gm.	Oz.
Cordobond (R) P-315-B2 clear solution	2760	975
Paraplex G-50	300	10.5
Cordo thinner P-371	100	3.5
Stabilizer #12	40	1.4
Coloring	q.s.	q.s.

* More information is available upon request.

ular artist's brushes. The size and type of brush used are governed by the particular area of the mold being covered and the end result desired. Again thickness is controlled by the number of coatings applied to those areas where strength is required, tapering it to feather edges for those boundaries which will terminate on natural tissue areas where the greatest flexibility and blending are desired.



FIGURE 1.—Polyvinyl cosmetic glove given basic skin color tones with airbrush. Glove made to cover a mechanical hand or partial hand.

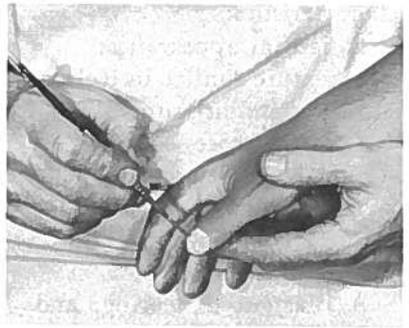


FIGURE 2.—Fingernail coloring being applied to cosmetic glove. Appearance of hair placed on wrist and forearm with crow quill pen.

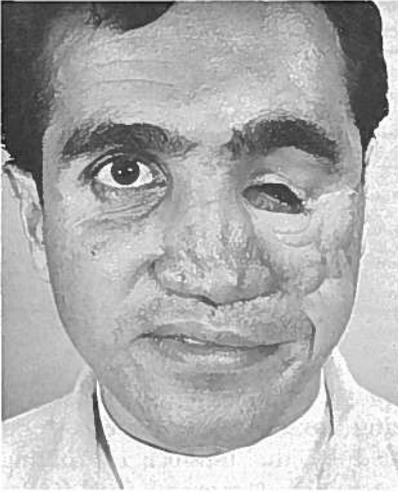


FIGURE 3.—Patient with severe zygomaticomaxillary damage involving loss of left orbital contents and dislocation of remaining natural orbital tissues.

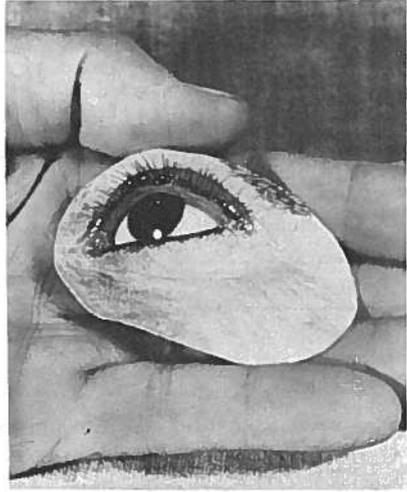


FIGURE 4.—Prosthesis designed to cover displaced orbital tissues with full cosmetic restoration. Restoration includes plastic artificial eye, eyelid, eyelashes, and other displaced facial tissue.

In the fabrication of cosmetic gloves and facial prostheses the Cordo material has been found to be most satisfactory. It has the following characteristics:

1. natural appearance;
2. texture similar in feel and pliability to natural skin;
3. translucence superbly matching that of natural flesh;
4. easily processed;
5. easily colored and surface tinted to match the patient's skin coloring;
6. easily cleansed;
7. retains shape;
8. resistant to tearing; and
9. fair durability.

Drying, cracking, and gradual development of surface tackiness were shortcomings encountered in the use of this material. Through experimentation with the quantity of plasticizer used in the formula, the durability of the material was improved. Color changes which take place as a result of use and exposure can easily be corrected by retinting the surface of the prostheses. When color changes can no longer be corrected by color retinting, the restoration can be replaced. The prosthesis accumulates dirt and surface stains much the same as natural skin. The remedy for this is simply to wash it with sanitary soap and water.

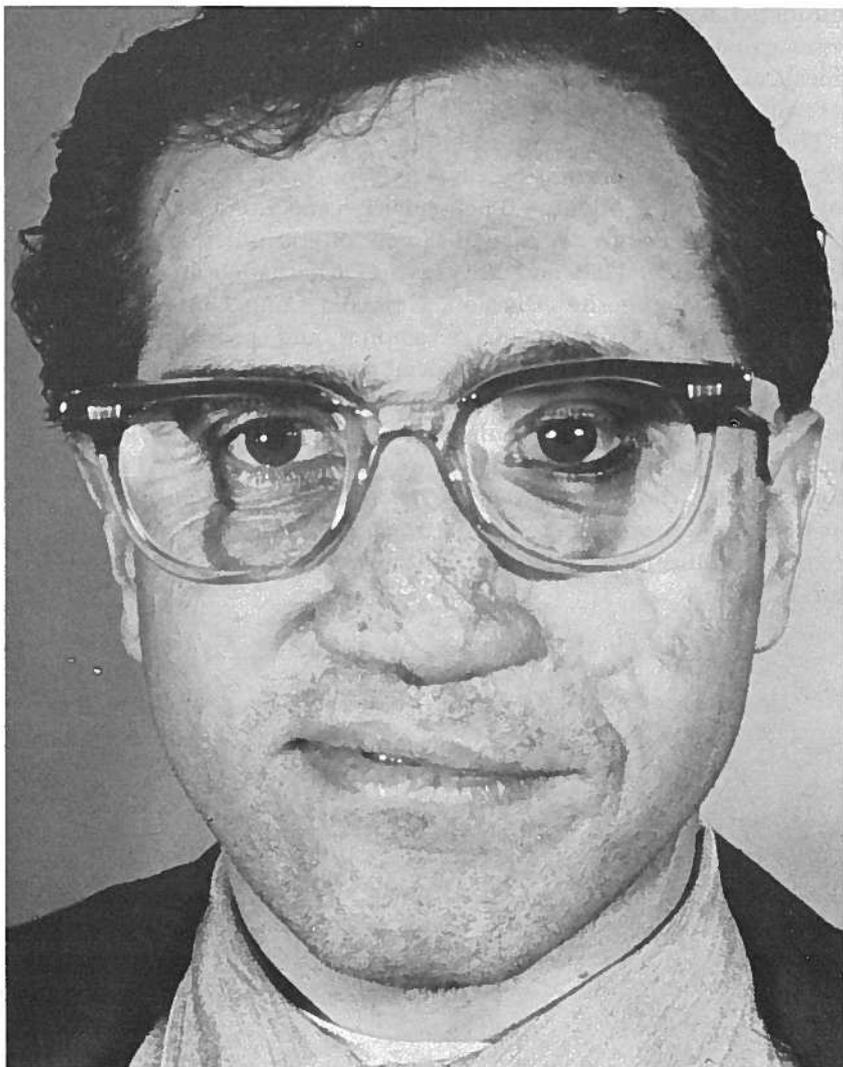


FIGURE 5.—Completed orbital restoration held in position by non-toxic adhesive. Glasses electively useful in hiding margins.

Each patient is given instructions on the special care and use of his restoration prosthesis.

Although many technicians have used the PVC material over a long period of time, other materials such as silicones and acrylics have been gaining favor in the field. Some of these materials are somewhat more durable, but the VAPC Restorations Service has continued to use the PVC compound because of its other desirable characteristics. All things

considered it is the opinion of this Service that regardless of the successes gained by the use of materials presently at hand, there is no "ideal material" and continued search for better ones remains a necessity.

The original development and adoption of Corbobond (R) P-315-B2 for use in the fabrication of facial and body restoration have involved several individuals. Their advice, cooperation, and hard work have made it possible. A particular note of gratitude must be given to Mr. Frederick M. Hall and Mr. Zav. T. Khachadoorian of the Ferro Corporation, Composites Division, Norwalk, Conn., for their cooperation and assistance given in developing and processing the basic material Cordo (R) P-315-B2. Special credits are also due Mr. Harvey T. Young, Technician, VAPC Restorations Service who originally developed the standard formula for Cordo for use in fabricating cosmetic hands and to Mr. Joseph Coppolino, Supervisor, VAPC Restorations Service who originally applied Cordo to facial and other body prostheses. Anyone interested in further information regarding the restoration illustrated should submit their inquiries to the Editor of this Bulletin.