

'Tissue Clay'

A New Technique for Augmentation Rhinoplasty

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• A new technique for dorsal augmentation during rhinoplasty was utilized in 58 patients over a period of four years. Microfibrillar collagen (Avitene) was combined immediately before the operation with autogenous whole blood, forming a "tissue clay," which was then sculpted into the desired dorsal contour. Tissue clay solidifies after one week and becomes palpably similar to bone. Long standing results of four years have documented the ability of the substance to augment the nose up to 1 cm in height. There have been no complications to date, and the average resorption rate over a two- to four-year period was 16%. The esthetic and functional results in 58 cases were deemed excellent, safe, and effective. (Arch Otolaryngol Head Neck Surg 1987;113:289-291)

Personal clinical experience in 58 case in which "tissue clay" was used for augmentation rhinoplasty is presented. The unique properties of tissue clay, a combination of microfibrillar collagen (Avitene) mixed with autogenous whole blood enhance the ability to aug-

ment the nose during cosmetic and reconstructive rhinoplasty. The qualities of tissue clay allow for immediate dorsal augmentation of up to 1 cm as well as more subtle corrections of contour defects during dorsal augmentation rhinoplasty. The nature of this substance allows for immediate sculpting of the dorsum of the nose, which in a period of one week becomes firm and solidified so that one month postoperatively the substance is palpably indistinguishable from bone. When utilized in the lower third of the nose during augmentation rhinoplasty, the substance becomes firm but does not become bone like, probably due to a lack of periosteal influence. The tissue clay's ability to incorporate itself almost immediately into the nasal dorsal tissue complex allows the surgeon to sculpt the nose in a natural manner. The influence of the blood clot derived from autogenous whole blood allows for the tissue clay to become incorporated into

the tissue of the body. The combined clinical experience in the use of tissue clay includes 58 cases over a four-year period, with the longest follow-up being four years and the minimum six months. There have been no complications to date, and the average resorption rate of the cases with a follow-up of longer than three years is 16%.

MATERIALS AND METHODS

Tissue clay is 1 g of microfibrillar collagen mixed immediately before the operation with 3 mL of autogenous whole blood. A claylike substance results after thorough mixing in a sterile bowl for approximately 30 s. The clay is then placed into a 3-mL syringe and injected into a subcutaneous pocket overlying the nasal dorsum.

Determination of the percent resorption rate in the 58 cases was performed using a photographic method; preoperative and postoperative photoanalyses

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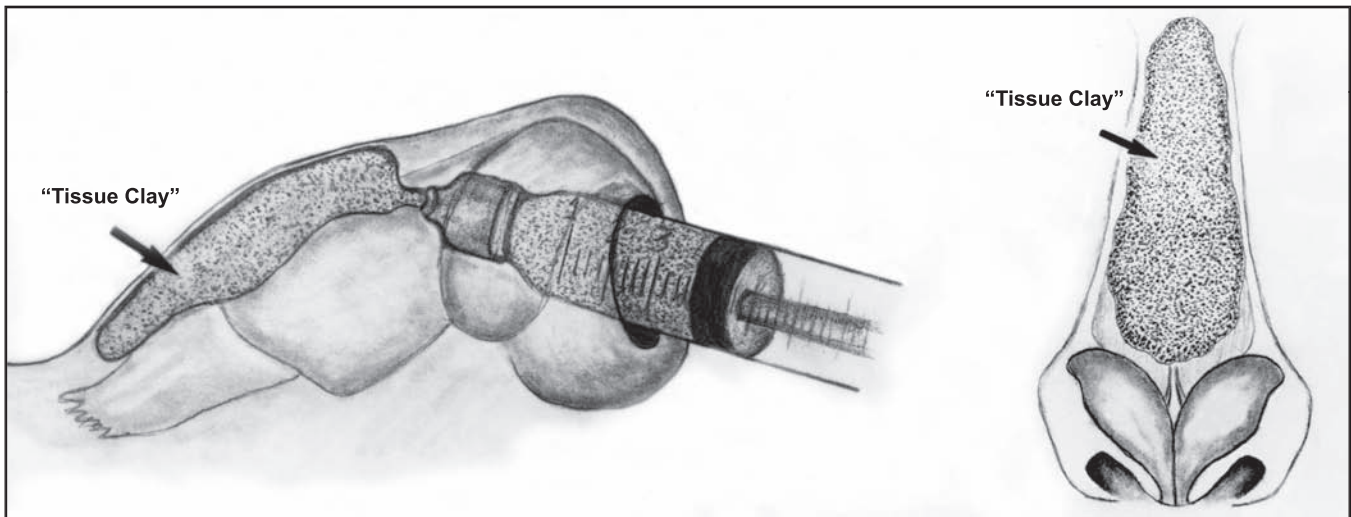


Fig. 1- Left, Injection of clay through intercartilaginous incision. Right, Distribution of tissue clay after final sculpting

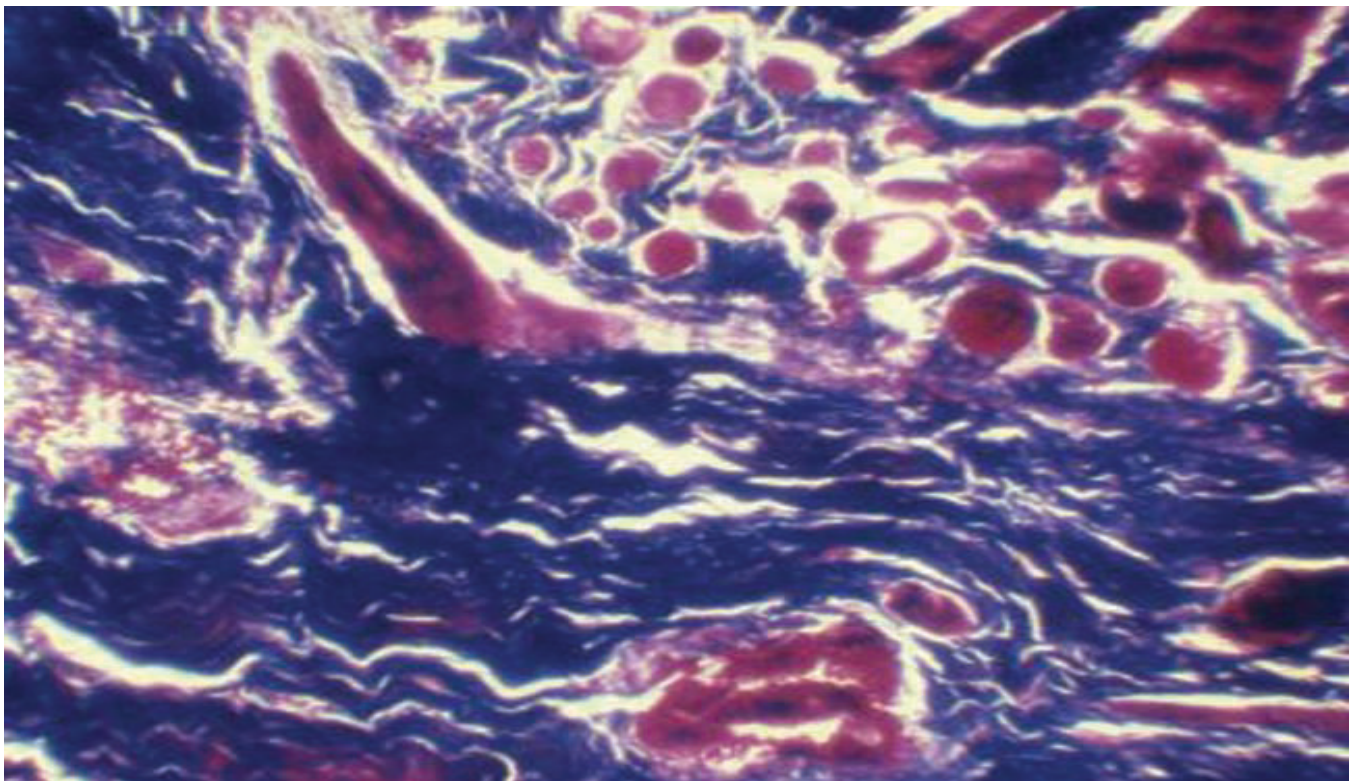


Fig 2.- Photomicrograph of "tissue clay" biopsy specimen from nasal dorsum at level of nasal bones four years after implantation. Swirling collagen bands (blue) are seen deep to procerus muscle (red)

were performed by an independent observer. Dorsal augmentation was measured at six-month intervals, and these percent values were calculated into a resorption rate, which averaged 16% for all cases with a follow-up of longer

than three years' duration.

TECHNIQUE

The tissue clay is prepared immediately before the operation as described

above and is held in a 3-mL syringe until needed. Routine intercartilaginous incisions are performed, followed by undermining of the subcutaneous pocket, preferably with the periosteum intact. The syringe is placed just through the



Fig. 3.- Top, Preoperative view showing dorsal contour defect. Bottom, Lateral view one year after "tissue clay" rhinoplasty.

intercartilaginous incision, and the clay is injected into the dorsal pocket under minimal pressure (Fig 1, left). After the clay is appropriately positioned, water is placed on the nose and the clay is sculpted and modeled into the desired contour and configuration.

Some of the excess clay will exude from the incision site at this time; therefore, slight over injection initially is desirable. Figure 1, right, shows the distribution of the clay after final contouring. The intercartilaginous incision is closed using a 6-0 chromic suture to allow for minimal leakage of the clay during the immediate postoperative period. Full septorhinoplasty can be performed at the same time; however, if a significant amount of dorsal augmentation is desired, this is done as a separate procedure, through a unilateral intercartilaginous incision. Tip definition, columella reconstruction, or nasal valve reconstruction can then be performed three to six months later. Osteotomies are performed using a minimal incision technique and can be done at the initial stage. Routine tape and aluminum splint dressings are utilized for seven days, after which time the dressings are removed and the tissue clay is semisolidified. At seven days, after the dressings are removed, slight contour imperfections can be molded effectively by placing warmed gauze over the nose for five minutes and by resculpting at this time. The final setting of the tissue clay occurs in approximately one month.

FUTURE CONCEPTS AND RESEARCH GOALS

Clinical studies are presently being conducted in the case of tissue clay to augment and contour other areas of the face, including the malar region, chin, forehead, and orbital and temporal regions. Ongoing research efforts are also being carried out to determine the fate of microfibrillar collagen and to find out what percentage of collagen is newly synthesized and what percentage of the microfibrillar collagen remains intact. Future research is now being designed to document the stability of this collagen, to analyze the influence of periosteum and perichondrium on the fate of the microfibrillar collagen, and to determine to what extent the autogenous whole blood clot affects the stability and integration of this substance into the body.^(1,2) It is well documented that the microfibrillar collagen actively entraps platelets, inducing a phenomenon of aggregation with rapid clotting and adherence to soft tissue^(3,4) This factor is probably the basis for the adaptability of tissue clay and its ability to integrate itself so well into the surrounding tissues.

RESULTS

The combined clinical experience in the use of tissue clay includes 58 cases over a four year period, with the longest follow up being four years and the minimal follow-up being six months. The theoretical complications include the following: local or systemic infec-

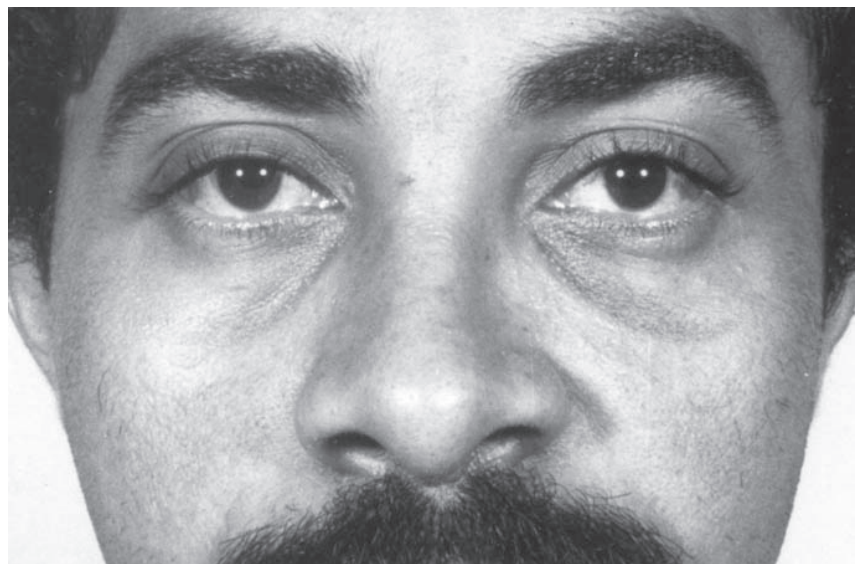
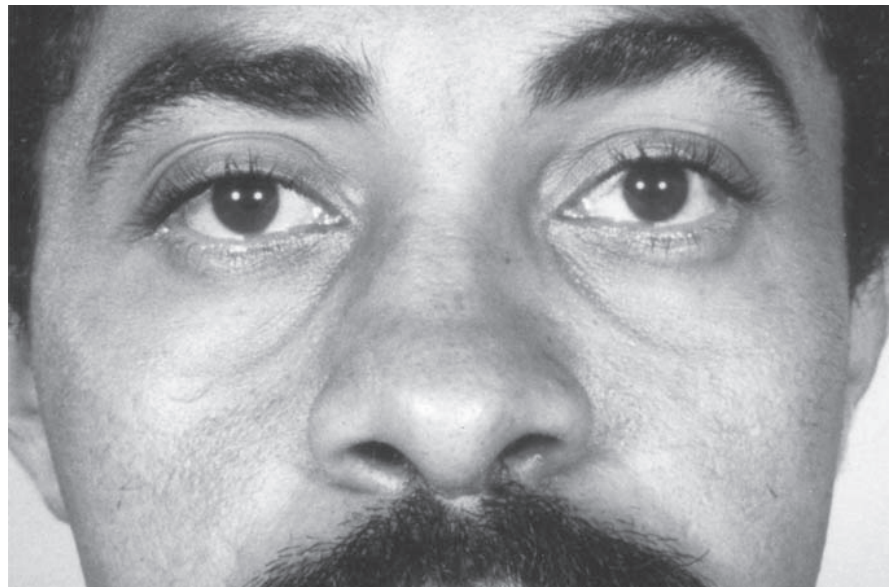


Fig 4. - Top, Preoperative view showing dorsal contour deformity. Bottom, Frontal view three years after "tissue clay" rhinoplasty

tion, toxic effect, contour defects, or adjacent tissue reaction, none of which were evident. The overall functional and esthetic results were excellent, with emphasis placed on full integration of the tissue clay into the local tissue area with minimal resorption (16%) over three to four years. Figure 2 is a photomicrograph of a tissue clay biopsy specimen obtained four years after

implantation Figures 3 through 5 show the results that can be obtained utilizing the tissue clay rhinoplasty technique

COMMENT

The mixture of autogenous whole blood with microfibrillar collagen forms a malleable claylike substance

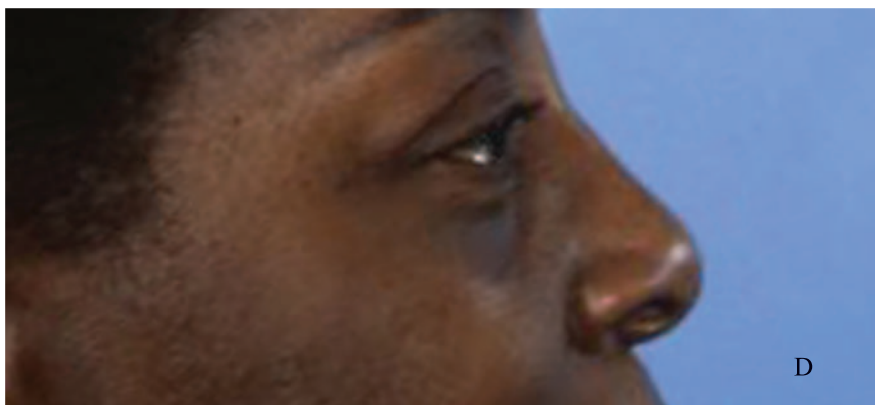


Fig 5. - **A**, Preoperative three-quarter view. **B**, Three-quarter view one year after "tissue clay" rhinoplasty. **C**, Preoperative lateral view of same patient. **D**, Lateral view one year after tissue clay rhinoplasty.

that is an ideal material for augmentation when it is placed subcutaneously in the nasal dorsum during rhinoplasty. The clay remains intact, with minimal resorption (16%) and complete safety. Continued long term follow up studies will be performed to evaluate any untoward systemic or local effects.

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