

Reconstruction of Nasal Deformity Resulting from Mucormycosis Using a Chin Silicone Implant

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Summary: The clinical manifestations of mucormycosis vary depending on the location of the infection. In general, sepsis begins within the oral cavity or nose and then spreads to the central nervous system through the eyes. It is typically seen in immunocompromised patients, including those who have been exposed to high doses of cortisone, such as corona virus disease 2019 patients. The infection can lead to severe destruction of the bones of the palate, nose, and maxillary and sinusoid areas. Treatment may require both medical and surgical intervention. In the secondary stage of recovery from mucormycosis, various methods of reconstructive surgery for the external nasal structure can be used. To my knowledge, this is the first case that compares to secondary nasal restoration. A former patient with mucormycosis was treated using an autologous bone graft from the ilium, and after 2 years, the restoration was done using a silicone implant due to the absorption of the bone graft. The restoration using the silicone implant led to satisfactory results for the patient and the surgeon from an aesthetic standpoint, and we did not notice any inflammatory or infectious symptoms during the 11-month follow-up period. (*Plast Reconstr Surg Glob Open* 2024; 12:e6088; doi: [10.1097/GOX.0000000000006088](https://doi.org/10.1097/GOX.0000000000006088); Published online 21 August 2024.)

Mucormycosis is a rare fungal infection that affects the oral and maxillofacial regions. It is even rarer for healthy individuals with normal immune systems to develop this infection. However, those with weakened immune systems are highly susceptible to these opportunistic infections, which can affect the soft and hard tissues within the facial skeleton. The infection needs to be treated with surgical intervention and long-term, high-dose antifungal therapy.¹ Mucormycosis usually begins by infecting the maxillary bone or nose and can quickly spread to infect the sinuses.

The infection known as mucormycosis can start in the nasal and sinus cavities, and then spread to the orbital tissues. From there, it can infect other parts of the body such as the eyes, brain, lungs, and other organs.² Mucormycosis is a serious condition that causes severe damage to the maxillary and nasal bones.^{3,4}

There are several methods to restore facial bone defects caused by mucormycosis. Autologous bone grafts are one such method, and the iliac crest is the preferred

donor site for this type of graft. Approximately 20 cm³ of spongy bone is harvested from the donor site and used to fill the defect. However, autologous bone grafting has some disadvantages, including pain, hematoma, possible visceral injuries at the donor site, and a long surgical time due to the need for two surgical sites (donor and recipient). Additionally, there is a risk of bone graft resorption.⁵

In cosmetic and reconstructive facial surgery, inorganic facial implants are used to alter the dimensions of the face. These implants are made of various synthetic materials such as porous polyethylene, silicone, polytetrafluoroethylene, or calcium hydroxyapatite. They are inserted through surgical approaches, intraoral or extraoral, and can be placed in the cheek or chin area, the body of the mandible, or the nasal bone.

Implants can be secured using either sutures or titanium screws. However, one of the major downsides of using these implants is that they often require multiple adjustments to achieve the desired shape and size during the surgical procedure. Additionally, the risk of infection is particularly high with silicone implants.⁶

CASE PRESENTATION

A 52-year-old man visited our clinic in Lattakia, Syria, seeking nose reconstruction after contracting mucormycosis 3 years prior due to a coronavirus disease 2019 infection. The mucormycosis caused severe damage to his maxillary bone, palate bone, nasal bone, and zygomatic

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Fig. 1. A photograph of the patient 2 years after autologous bone grafting.



Fig. 2. A photograph of the patient 2 years after autologous bone grafting (frontal view).

bone. The patient had previously undergone drug and surgical treatments, including reconstruction of the maxillary and zygomatic bones. Tissue biopsy was done for detection of biofilm or any infection before reconstructing the nasal bone using an ilium graft, but tissue biopsy was not done before silicone implant.

The surgery involved reconstructing the nasal bone using an ilium graft with an open surgical approach. The outcome was aesthetically pleasing. However, within 2 years of the surgery, the bone graft was completely absorbed. (Figs. 1 and 2). As a result, a decision was made to use a silicone implant to reconstruct the nasal bone; a silicone chin implant was used instead, as there was no nasal implant of this size available (Fig. 3).

A 10-mm surgical incision was made between the cartilages inside the nasal passage with minimal dissection to create a tunnel for the silicone graft to be placed. The graft was then modified to match the shape of the deformity, and the tunnel was made narrow to ensure the stability of the graft. Once the graft was in place, suturing was performed (Fig. 4). The patient was closely monitored for 11 months after the procedure, and both the patient and surgeon were pleased with the cosmetic results. No signs of inflammation or infection were observed during this time.



Fig. 3. A photograph of silicone chin implant.



Fig. 4. A photograph of the patient after insertion of the silicone chin implant.

DISCUSSION

Nasal reconstruction can be performed using autologous bone, autografts from the rib, synthetic materials, and the manufacture of patient-specific implant using 3D printing.⁷ Bone and cartilage grafts have lower infection rates but may result in long-term resorption and donor-site morbidity. On the other hand, synthetic materials like silicone are cheap and easy to reshape, but may be associated with extrusion and infection. However, there is no published case in the medical literature where a modified silicone implant was used to repair a nasal bone defect resulting from a previous infection with black fungus.

A study conducted by Kevin et al⁸ suggested that calvarial bone is a highly useful material in primary, revision, and compromised settings. The study found that split calvarial bone grafts are durable, reliable, and adaptable. It can also be used safely in cases involving radiation, infection, and inflammation. However, in this specific case, the ilium graft was initially used due to the large size of the defect.

A study conducted by Deva⁹ shows that silicone nasal augmentation is a safe and effective procedure for moderate increases in nasal height. This series contradicts previous reports and showed no associated infection. By shaping the implant appropriately to the patient's

nasal phenotype, the risk of extrusion may be reduced. Additionally, the study by Zhang et al¹⁰ indicates that the silicone nasal implant can effectively reduce the rate of postoperative complications. Therefore, augmentation rhinoplasty using this implant allows for a more natural-looking outcome.

CONCLUSIONS

There is a shortage of articles addressing the reconstruction of nasal bone deformities caused by mucormycosis. This case report illustrates the effectiveness of using silicone implants to achieve a positive aesthetic outcome. However, long-term follow-up is crucial, especially in cases involving repeated resorption and infection.

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DISCLOSURE

The author has no financial interest to declare in relation to the content of this article.

PATIENT CONSENT

The patient provided written consent for the use of their image.

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