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Reconstruction of Massive Facial Defects Using Composite Fibula Free Flap

It is very rare for a surgeon to be astonished by a clinical case. He is used to see the unbearable. Even so, I admit that I have been shocked when I saw Mr. A.K. for the first time. I was horrified by the end of one's life when the non- logic dominates.

The story began in 1996 with simple squamous cell carcinoma (SCC) in the left side -wall of the nose. The tumor was excised with affected margins once, twice, and thrice. The third one was in 2011, when the tumor has already invaded the left maxillary sinus, the left orbital floor, and the left half of hard palate, ***figure (1).*** Once more, the tumor was excised with no free margins.

Figure (1)
MRI- Axial section through the tumor mass.
(*) The tumor invaded the left maxillary sinus, the left nasal cavity, the left orbital floor, and the left hemimaxilla; the last two things are not visible in this section.

The patient was referred to us in the situation shown below in ***figures (2), (3).***

Figure (2):
Notice the total absence of the nose, the left hemi-maxilla, the left hard palate, the left orbital floor, and the left cheek- skin.
(*) In the right photo indicates to the nasogastric tube, whereas the (*) in the left one indicates to the silicon sheet put in place to substitute the orbital floor.

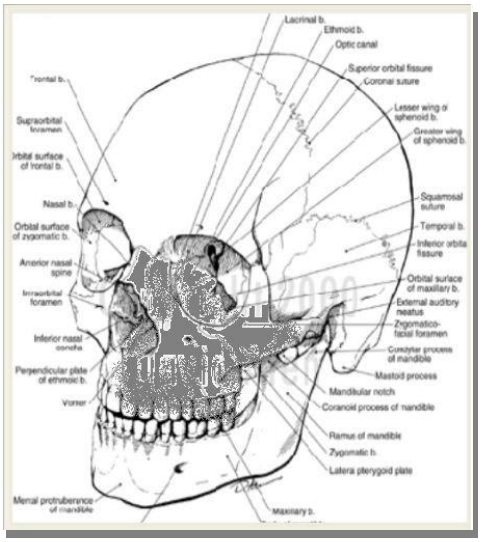

Figure (3):
Diagram of skull showing the osseous defect in gray color; the nose, left maxilla, left hard palate, and the left orbital floor.

The radiological studies showed no tumor invasion to the nearby organs. The decision was taken for a complex surgery in order to meet these purposes:

1 - Complete excision of the residual tumor;

2 - Nose reconstruction;

3 Left hemi-maxilla reconstruction;

4 Left orbital floor reconstruction;

5 Cheek reconstruction.

The composite fibular free flap with its four components variant (bone, muscle, fascia, skin) was chosen to realize our ambitious goal, as it has the following potentialities, ***figure (4):***

1- Up to 20 cm of bone component needed for the nose and the left hemi- maxilla reconstruction;

2- A fascial component that can support the above eye ball and separate the orbital and the left maxillary sinus from each other;

3- A muscular mass that can fill the space of the previously existing left maxillary sinus. In the same time, it supports the new orbital floor made by the fascial component;

4- Up to 10X10 cm of skin paddle to secure the new constructions;

5- Supplied by the fibular artery whose caliber is suitable for microsurgery. ***Figure (5).***

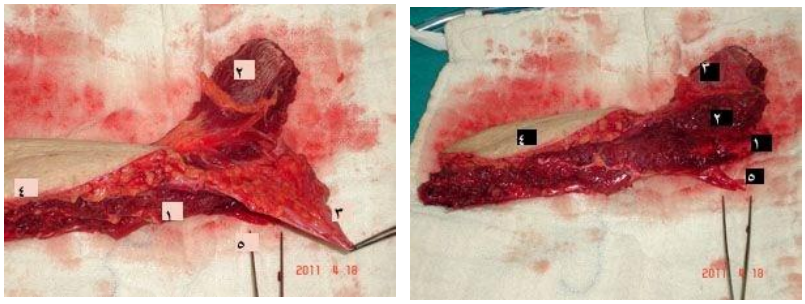

Figure (4): Composite free fibular flap (bone-muscle-fascia-skin). ١- fibula. ٢- muscular component (fibularis longus and brevis).٣- fascial component. ٤- skin paddle. ٥- vascular pedicle (fibular artery and veins).

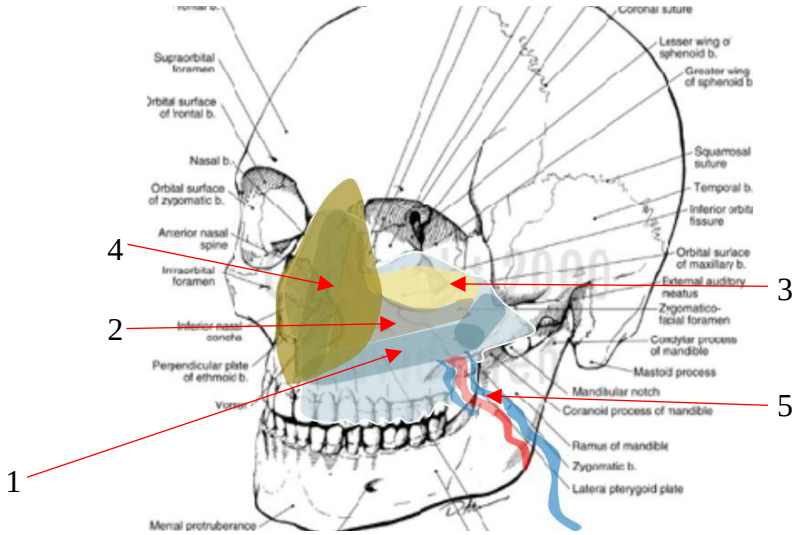

Figure (5): Diagram of skull and the composite fibular free flap in its final place.
١- fibula. ٢- muscular component (fibularis longus and brevis). ٣- fascial component. ٤- skin paddle. ٥- vascular pedicle (fibular artery and two veins).

In surgical exploration, the left facial artery looked very thin in comparison with the fibular artery with 1/2 ratio. Even so, arterial anastomosis is directly done between the two arteries in end to end fashion. The left facial veins were fibrosed. A saphenous bypass of 15 cm long was necessary to drain the fibular vein into the superficial jugular vein. ***Figures (5)– (6)***

Figure (6): vascular anastomosis
Direct arterial anastomosis, fibular artery-to- left facial artery, end-to-end, (inner one). Indirect venous anastomosis, via saphenous bypass, one of the fibular veins-to- superficial jugular vein (outer one).

Figure (7)
Per-operating views.

Post- operating follow up:

The operation lasted for 11 hours. CSF leakage occurred in the attempts to reach free tumor margins in the cribrous plate. The dural perforation had been recognized and had been closed by direct stitch over a strip of fibular muscle. The patient was on mechanical ventilation for 72 hours. On the 4th day, tracheostomy was thought to be necessary. The patient was on TPN for 7 days. Afterward, an attempt for oral intake failed. So. NGT was put in place. On 7th post-op day, acute pulmonary oedema installed. On the 9th post-op day, the patient's heart stopped beating for 3 minutes. He has been resuscitated.
The flap was still warm but with slow capillary refilling, ***figure (8).*** Doppler signals were normal. On the 10th post-op day, there was a minimal surgical exploration of the different components of the flap. We were satisfied of their viability. During the same procedure, a glabellar flap was performed to recover the mini- plate exposed in the glabellar region. On the 26th post-op day, the patient had cerebral hemorrhage and comma. He died 4 days afterwards.

Figure (8)
5th post-op day
(The skin paddle was warm but with slow capillary refilling).

(*) More reported cases of using the Free Fibula Flap in bone reconstruction on these links (Personal Archives):

1- Maxilla Reconstruction.
2- Mandible Reconstruction.
3- Ulna Reconstruction.
4- Tibia reconstruction in case of recalcitrant osteitis (1).
5- Tibia Reconstruction (2).
6- Radius Reconstruction (1).
7- Radius Reconstruction (2).

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