



## Microsurgical Reconstruction for Advanced Head and Neck Tumors in Africa-Rescued Patients

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### Abstract

Although an early diagnosis and treatment would be ideal for head and neck tumors, sometimes it isn't possible for patients who live in some regions of Africa. We treated some of these patients with tumors rarely seen today in well-developed countries.

**Materials and Methods:** We retrospectively reviewed all free flap reconstructions for advanced head and neck tumors in Africa rescued patients between June 2014 and December 2017. Patient age, surgical treatment and reconstruction, complications and outcomes were analyzed.

**Results:** Twelve patients have been treated. There were 5 fibular bone flaps, 2 anterolateral thigh flaps, 2 profunda artery perforator flaps, 2 vertical rectus abdominal myocutaneous flaps and 1 latissimus dorsi muscle flap. No flap failures have been recorded. Two serious postoperative complications have been detected (one cerebrovascular event and one nosocomial infection) and one patient was diagnosed with distant disease in the follow-up. No locoregional relapse has been detected.

**Conclusion:** Surgical resection and microsurgical reconstruction may be safe and effective in these advanced head and neck tumors, although it isn't without potential serious complications.

**Keywords:** Head and neck; Tumor; Microsurgery; Reconstruction

### Introduction

Nowadays, many head and neck tumors are treated by specialized medical teams in hospitals with adequate infrastructures, equipment and general conditions. Ideally, an early diagnosis is essential for a favorable outcome in terms of survival and quality of life.

Some African countries don't have all the required conditions for the treatment of advanced head and neck tumors. Being Portugal a country historically with strong relationships with some African countries, the Portuguese National Health Care System has some protocols to rescue and treat these patients and give conditions for social integration.

Unfortunately, the rescue of some of these patients is delayed for many months or even years, which is the reason for the very advanced stage and dimension of some of these tumors, rarely seen today.

### Materials and Methods

We retrospectively reviewed all free flap reconstructions for head and neck tumors in African rescued patients. All patients were treated in Hospital Santa Maria-Lisbon, by the same senior author (Freitas H) between June 2014 and December 2017. Informed consent was obtained from all the patients included in this article. The patient's age, time elapsed since the first symptoms and the surgical treatment, surgical charts with reference to the oncological defect, flaps used for reconstruction and recipient vessels were all recorded. For midfacial/maxillary tumors and for oromandibular defects we used the Cordeiro and Chen classification [1] and Boyd's classification [2], respectively. Malignant neoplasms were staged with the TNM staging system [3].

For reconstruction of oromandibular defects we used, whenever possible, the free fibular osteoseptocutaneous or bone flap [4-6] or in extensive composite defects [7-8] a soft-tissue free flap with a reconstruction plate. In orbitomaxillary midfacial defects we used soft or fibula osteomyocutaneous free flaps as described in algorithmic approaches of Cordeiro and Hanasono [1,9-13].

All perioperative complications were analyzed, as the necessary treatment for it. Aesthetic

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outcomes were graded in 5 levels by subjective analysis of 3 independent surgeons based on clinical evaluation and postoperative photographs. Functional outcomes include speech and swallowing/dietary functions.

Finally, we reviewed follow-up time, locoregional relapses and distant disease for every patient.

## Results

A total of 12 patients were submitted to a free flap head and neck reconstruction following tumor resection, with a mean age of 41.2 years old (21-74 years) and with a mean time from onset of symptoms and the surgical treatment of 28.5 months (8-51 months). The diagnosis, surgical defect, flap used for reconstruction, recipient vessels and TNM staging are resumed in Table 1. Operative treatment required a multidisciplinary approach, with Plastic Surgery and Ear Nose and Throat teams in all patients and also a Neurosurgical team in 2 patients.

We used one Latissimus Dorsi muscle (LD) flap with a skin graft for a scalp and calvaria defect (patient 8) [14-19]. Two Anterolateral Thigh (ALT) flaps were used for total tongue reconstructions [20], one of them with a reconstruction plate for a segmental mandibulectomy defect (patients 1 and 4, respectively). A total of four fibular bone flaps were used for oromandibular reconstruction. Three were pure bone flaps (one in conjunction with condylar transplantation as described by Hidalgo) [13] and one was an osteoseptocutaneous flap. For midfacial reconstruction we used one fibular osteomyocutaneous

flap for a hemipalatomaxillectomy defect, two free Vertical Rectus Abdominis Myocutaneous (VRAM) flaps and two profunda artery perforator flaps for orbitomaxillary defects. Two patients had intracranial invasion and required craniectomy and fascia lata grafts for dural reconstruction (patients 6 and 8) [21,22]. We decided not to immediately reconstruct the calvarium with prosthesis to avoid postoperative complications.

Complications, outcomes and follow-up were resumed in Table 2. No flap has been lost but we had serious complications in two patients (patient 6 and 8). The mean value of the subjective aesthetic outcome was 3.9 (5.0-2.0). For the functional outcomes, the speech had an average of 4.7 (5 - 1) and the swallowing/dietary function had a mean value of 3.6 (4-2).

We had a mean follow-up time of 22.7 months (3-45) and in this period no locoregional relapse has been diagnosed. One patient died 10 weeks after surgery with a nosocomial pneumonia (patient 6) and another after sixteen months (patient 4) with a lung metastasis. No other distant disease has been detected.

## Case Presentation

### Clinical report 1 (patient 8, Figure 1)

A 33-year-old man with a peripheral nerve sheath malignant tumor of temporoparietal scalp with intracranial and dural invasion was submitted to a wide resection with craniectomy and dural excision. Dural reconstruction was done with fascia lata graft and the remainder of the defect was covered with an LD muscle flap and split-

**Table 1:** Operative treatment required a multidisciplinary approach, with plastic surgery and ear nose and throat teams in all patients and also a Neurosurgical team in 2 patients.

	Diagnosis	Surgical Defect	Reconstruction and Flap used	Recipient Vessels
Patient 1	Tongue SCC	Total Glossectomy	ALT Flap	S Thyr A Facial V
Patient 2	Ossifying Fibroma (mandibular)	Segmental Mandibulectomy (Boyd type Lo)	Fibular Bone Flap	S Thyr A Ext Jug V
Patient 3	Odontogenic Myxoma (mandibular)	Segmental Mandibulectomy (Boyd type LCLo)	Fibular Bone Flap	S Thyr A Facial V Ext Jug V
Patient 4	Oral Floor SCC	Total Pelvi-Glossectomy and Segmental Mandibulectomy (Boyd type LCLm)	ALT Flap and Reconstruction Plate	S Thyr A Lingual V Ext Jug V
Patient 5	Adenoid Cystic Carcinoma (maxillary)	Radical Maxillectomy (Cordeiro type III-B)	VRAM Flap	Facial A Facial V
Patient 6	Sebaceous Carcinoma (eyelid)	Orbital Maxillectomy (Cordeiro type IV), Mandibulectomy (Boyd type Hs), Craniectomy	VRAM Flap	Ext Car A Facial V Ext Jug V
Patient 7	Calcifying Epithelial Odontogenic Tumor (mandibular)	Segmental Mandibulectomy (Boyd Type Lm)	Fibular Osteoseptocutaneous Flap	S Thyr A Facial V
Patient 8	Peripheral Nerve Sheath Malignant Tumor (Scalp)	Scalp, Calvarium and Dural defects	Latissimus Dorsi muscle flap and STSG	S Temp A S Temp V
Patient 9	Lacrimal Sac SCC	Suprastructure Maxillectomy and Ethmoidectomy (Cordeiro Type IV)	Profunda Artery Perforator Flap	Facial A Facial V Ext Jug V
Patient 10	Ameloblastoma (mandibular)	Segmental Mandibulectomy (Boyd Type HCo)	Fibular Bone Flap	S Thyr A Facial V
Patient 11	Conjunctival Tarsal SCC	Suprastructure Maxillectomy and Ethmoidectomy (Cordeiro Type IV)	Profunda Artery Perforator Flap	S Temp A S Temp V
Patient 12	Ameloblastoma (maxillary)	Infrastructure Maxillectomy (Cordeiro Type II-B)	Fibular Osteomyocutaneous Flap	Facial A Facial V

SCC: Squamous Cell Carcinoma; STSG: Split Thickness Skin Graft; A: Artery; V: Vein; S Thyr: Superior Thyroid; S Temp: Superficial Temporal; Ext Jug: External Jugular; Ext Car: External Carotid

**Table 2:** Complications, aesthetic and functional outcomes (speech and diet) and follow-up time of all patients.

	Complications	Aesthetic	Speech	Diet	Follow-up
Patient 1		5	3	3	45 months
Patient 2		4.7	5	4	44 months
Patient 3		4	5	3	42 months
Patient 4	Cervical abscess (day 7): Surgical drainage	3.7	2	2	Died in 16th month
Patient 5	Postoperative hematoma (day 3): Surgical drainage	2.7	5	4	31 months
Patient 6	Partial Loss Donor Site STSG: NPWT -Tracheostomy hemorrhage and pneumothorax (3 weeks) -Nosocomial infection and pneumonia (10 weeks)	2	1	3	Died at 10th week
Patient 7		4.7	5	4	20 months
Patient 8	Thrombotic cerebrovascular event (day 3): sequel of right upper limb paresis -Epicranial hematoma (day 5): bedside drainage - Partial loss STSG: dressing changes	4.7	5	4	17 months
Patient 9		3.3	5	4	13 months
Patient 10		4.3	5	4	10 months
Patient 11		3	5	4	6 months
Patient 12		4.3	5	4	3 months

Aesthetic outcomes were graded in 5 levels (5=excellent, 4=good, 3=moderate, 2=fair, 1=poor). Functional outcomes include speech (5=normal, 4=near normal, 3=intelligible, 2=slurred, 1=tracheostomy required) and swallowing/diet (4=unrestricted, 3=soft, 2=liquid, 1=nasogastric tube feeding or gastrostomy dependent). NPWT=negative pressure wound therapy.

thickness skin graft. On postoperative day 3 the patient developed a left thrombotic cerebrovascular event with subsequent sequel of right upper limb paresis. A partial skin graft loss was noted but was successfully treated conservatively.

**Clinical report 2 (patient 6, Figure 2)**

Seventy-three years-old man with a sebaceous carcinoma originating in the right superior eyelid was surgically treated with a tumor resection that required an orbital maxillectomy (with no palatal resection), ramus and condyle mandibulectomy, parotidectomy, frontotemporoparietal craniectomy with dural resection in the middle fossa of the cranial base. Reconstruction of the dural defect was done with a fascia lata graft and the defect was closed and obliterated with a free VRAM flap. In the early postoperative period, a partial skin graft loss of the donor site was noted and was treated conservatively. Three weeks after surgery the patient suffered a severe tracheostomy hemorrhage after decannulation that required an emergent cannulation that was inadvertently traumatic and an ensuing pneumothorax developed. The patient needed to stay in the hospital and suffered a nosocomial infection, dying on postoperative week 10 with severe bilateral pneumonia.

**Clinical report 3 (patient 3, Figure 3)**

A 21-year-old man with a slow-growing mandibular mass and chronic hemorrhage was admitted to our unit with a 4 gr/dl of hemoglobin. After anemia was treated and a biopsy that revealed an odontogenic myxoma he was submitted to a segmental mandibulectomy (angle to angle) and reconstruction with a fibular bone flap with 3 bone segments. No postoperative complications were recorded and now the patient is waiting for oral rehabilitation.

**Discussion**

The twelve patients analyzed in this study had very advanced local head and neck tumors, not commonly seen in well-developed countries nowadays. Certainly, this is the result of a long period of time between the onset of symptoms and the definitive diagnosis and



**Figure 1:** Preoperative photograph (above left) and magnetic resonance imaging reconstruction (above right) and coronal cut (middle left) demonstrating the dural invasion. Intraoperative view of the surgical defect after dural reconstruction with a fascia lata graft (middle right) and postoperative photographs (below left and right) at 3 months. The small de-epithelialized areas were treated conservatively.

treatment (mean time of 28.5 months). Diagnosis varied from slow and progressive benign tumors to aggressive malignant tumors (like oral floor SCC in patient 8). Flaps used in these patients were the traditional free flaps used in head and neck reconstruction [23-26]. Of note, two profunda artery perforator flaps [27-29] were used for



**Figure 2:** Preoperative photographs (above) and intraoperative surgical defect (below left). Postoperative day 8 (below right).



**Figure 3:** Preoperative photographs (above) and intraoperative inset of the osseous fibula flap (middle left). Two years postoperative panorex (middle right) and photographs (below).

the reconstruction of orbitomaxillary defects, with good results and no postoperative complications. For mandibular reconstruction, it's worth mentioning patient 10 with a Boyd HCo defect that required a pure fibular bone flap with five osseous segments and a condylar transplant [13] (after intraoperative histologic confirmation of a disease-free condyle). All osteotomies in fibular bone flaps were made with the guidance of templates based on preoperative CT scans. The only patient with an infrastructure palatomaxillary defect (patient 12) was reconstructed with a fibular osteomyocutaneous flap [10,11], with the skin island utilized for palatal reconstruction, the two bone segments for alveolar arch reconstruction and flexor hallucis longus muscle paddle for maxillary sinus obliteration. This patient experienced no postoperative complications and even with the

shortest follow-up in this study (only three months) the early result is very satisfactory. Between all the complications, we had two that deserve a special mention. One was in patient 6, 3 weeks postoperative severe tracheostomy hemorrhage after decannulation that required an emergent recannulation (with subsequent pneumothorax). Ten weeks after surgery the patient died from nosocomial pneumonia. The other severe complication (patient 8) was a thrombotic cerebrovascular event 3 days after reconstruction of the dura and scalp with an LD flap (with the ensuing sequel of right upper limb paresis). These two patients were analyzed in clinical reports 1 and 2.

The aesthetic outcome was generally good with an average value of 3.8. The main factors that contributed to a poor aesthetic outcome were the use of the flap cutaneous paddle for facial skin reconstruction and an orbital exenteration (patients 5, 6, 9 and 11). Functional speech and dietary outcomes were also generally good, with an average score point of 4.7 and 3.6, respectively. As we could also expect these functions were significantly worse in the patients with a glossectomy defect.

Although our follow-up is relatively short with an average of only 22.7 months, no locoregional relapses were diagnosed and only one distant disease was noted 8 months after surgery (patient 4 died at month 16 with lung metastasis).

The patient population in this study was heterogeneous with significant differences in their diagnosis and prognosis. They share the delay in the surgical treatment and the very advanced local head and neck tumors. This study may show us that traditional free flap techniques used in head and neck reconstruction [23-26], can also be utilized in these patients with advanced tumors, with acceptable results.

## Conclusion

Although not with the absence of severe complications, resection and microsurgical reconstruction of advanced local head and neck tumors in African patients can be utilized with satisfactory results. More studies are necessary to confirm the safety of these surgeries and long-term results in survival and functional outcomes.

## References

1. Cordeiro PG, Chen CM. A 15-year review of midface reconstruction after total and subtotal maxillectomy: Part I. Algorithm and outcomes. *Plast Reconstr Surg.* 2012;129(1):124-36.
2. Boyd JB, Gullane PJ, Rotstein LE, Brown DH, Irish JC. Classification of mandibular defects. *Plast Reconstr Surg.* 1993;92(7):1266-75.
3. Groome PA, Schulze K, Boysen M, Hall SF, Mackillop WJ. A comparison of published head and neck stage groupings in carcinomas of the oral cavity. *Head Neck.* 2001;23(8):613-24.
4. Taylor GI, Miller GD, Ham FJ. The free vascularized bone graft. A clinical extension of microvascular techniques. *Plast Reconstr Surg.* 1975;55(5):533-44.
5. Hidalgo DA. Fibula free flap: A new method of mandible reconstruction. *Plast Reconstr Surg.* 1989;84:71-9.
6. Wei FC, Chen HC, Noordhoff MS. Fibular osteoseptocutaneous flap: Anatomic study and clinical application. *Plast Reconstr Surg.* 1986;78(2):191-200.
7. Daniel RK. Mandibular reconstruction with free tissue transfers. *Ann Plast Surg.* 1978;1(4):346-71.
8. Daniel RK. Reconstruction of mandibular defects with revascularized free rib grafts. *Plast Reconstr Surg.* 1978;62(5):775-76.

9. Cordeiro PG, Santamaria E. A classification system and algorithm for reconstruction of maxillectomy and midfacial defects. *Plast Reconstr Surg.* 2000;105:2331-46.
10. Hanasono MM, Silva AK, Yu P, Skoracki RJ. A comprehensive algorithm for oncologic maxillary reconstruction. *Plast Reconstr Surg.* 2013;131(1):47-60.
11. Hanasono MM, Skoracki RJ. The omega-shaped fibula osteocutaneous free flap for reconstruction of extensive midfacial defects. *Plast Reconstr Surg.* 2010;125(4):160e-2e.
12. Hanasono MM, Lee JC, Yang JS, Skoracki RJ, Reece GP, Esmali B. An algorithmic approach to reconstructive surgery and prosthetic rehabilitation after orbital exenteration. *Plast Reconstr Surg.* 2009;123(1):98-105.
13. Hidalgo D. Condyle transplantation in free flap mandible reconstruction. *Plast Reconstr Surg.* 1994;94(4):770-81.
14. Pennington DG, Stern HS, Lee KK. Free flap reconstruction of large defects of the scalp and calvarium. *Plast Reconstr Surg.* 1989;83(4):655-61.
15. Furnas H, Lineweaver WC, Alpert BS, Buncke HJ. Scalp reconstruction by microvascular free flap transfer. *Ann Plast Surg.* 1990;24(5):431-44.
16. Lutz BS, Wei FC, Chen HC, Lin CH, Wei CY. Reconstruction of scalp defects with free flaps in 30 cases. *Br J Plast Surg.* 1998;51(3):186-90.
17. Van Driel AA, Mureau MA, Goldstein DP, Gilbert RW, Irish JC, Gullane PJ, et al. Aesthetic and oncologic outcome after microsurgical reconstruction of complex scalp and forehead defects after malignant tumor resection: an algorithm for treatment. *Plast Reconstr Surg.* 2010;126:460-70.
18. Gordon L, Buncke HJ, Alpert BS. Free latissimus dorsi muscle flap with split-thickness skin graft cover: A report of 16 cases. *Plast Reconstr Surg.* 1998;70(2):173-8.
19. Lipa JE, Butler CE. Enhancing the outcome of free latissimus dorsi muscle flap reconstruction for scalp defects. *Head Neck.* 2004;26(1):46-53.
20. Engel H, Huang JJ, Lin CY, Lam W, Kao HK, Gazyakan E, et al. A strategic approach for tongue reconstruction to achieve predictable and improved functional and aesthetic outcomes. *Plast Reconstr Surg.* 2010;126(6):1967-77.
21. Sabatino G, Capone G, Marchese E. Autologous dural substitutes: a prospective study. *Clin Neurol Neurosurg.* 2015;128:123-9.
22. Abuzayed B, Kafadar AM, Oğuzoğlu SA, Canbaz B, Kaynar MY. Duraplasty using autologous fascia lata reinforced by on-site pedicled muscle flap: Technical note. *J Craniofac Surg.* 2009;20(2):435-8.
23. Hurvitz KA, Kobayashi M, Evans GRD. Current options in head and neck reconstruction. *Plast Reconstr Surg.* 2006;118(5):122e-33e.
24. Neligan PC. Head and neck reconstruction. *Plast Reconstr Surg.* 2013;131(2):260e-9e.
25. Hanasono MM, Matros E, Disa JJ. Important aspects of head and neck reconstruction. *Plast Reconstr Surg.* 2014;134(6):968e-80e.
26. Wei FC, Dayan JH. Scalp, skull, orbit and maxilla reconstruction and hair transplantation. *Plast Reconstr Surg.* 2013;131(3):411e-24e.
27. Scaglioni MF, Kuo YR, Yang JCS, Chen YC. The posteromedial thigh flap for head and neck reconstruction: Anatomical basis, surgical technique and clinical applications. *Plast Reconstr Surg.* 2015;136(2):363-75.
28. Mayo JL, Canizares O, Torabi R, Allen Sr RJ, Hilaire HS. Expanding the applications of the profunda artery perforator flap. *Plast Reconstr Surg.* 2016;137(2):663-9.
29. Wu JCW, Huang JJ, Tsao CK, Abdelrahman M, Kolios G, Cheng MH. Comparison of posteromedial thigh profunda artery perforator flap and anterolateral thigh perforator flap for head and neck reconstruction. *Plast Reconstr Surg.* 2016;137(1):257-66.