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Microvascular reconstruction of facial defects in settings where resources are limited

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Abstract

The surgical treatment of defects caused by noma is challenging for the surgeon and the patient. Local flaps are preferred, but sometimes, because of the nature of the disease, there is not enough local tissue available. We describe our experience of free tissue transfer in Ethiopia. Between 2008 and 2014, 34 microsurgical procedures were done over 11 missions with the charity Facing Africa, predominantly for the treatment of defects caused by noma (n = 32). The mean duration of operation was 442 minutes (range 200 – 720). Six minor wound infections were treated conservatively and did not affect outcome, a return to theatre was required in 4 patients with wound infections and one with a haemorrhage; 2 flaps failed and 2 partially failed, one patient developed an oronasal fistula, and one had an infection at the donor site that required a repeat graft. In settings where resources are limited, free flaps can be used when local tissue is not available and they cause less morbidity than pedicled tissue transfer.

Keywords: Noma; Low resource; Resource poor; Free flap; Microvascular reconstruction

Introduction

Noma is a disfiguring disease of the face that has been known by many different names.[1] It has an estimated incidence of 40 000 – 140 000/year globally, and is now predominantly restricted to the "noma belt" of Mauritania, Senegal, Mali, Niger, Chad, Sudan, and Ethiopia.[2] In Europe it was last seen during the Dutch famine of 1944, although it had essentially been eradicated in the continent by the end of the 19th century and before the advent of penicillin. It is a disease of poverty and famine, and tends to affect children whose immunity is depressed after viral illness. Mortality rates are high (90%) and those who survive the acute phase are often left with complex deficiencies of bone and soft tissue.[3] In some cases local flaps cannot be used for reconstruction, which presents an additional challenge to the surgical team.

Tissue defects that are too big to be repaired with local flaps alone have previously been treated with the transfer of tubed pedicled tissue.[4] More recently, microvascular techniques have revolutionised treatment by minimising mor-

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bidity and improving results,[5,6] but they are complex and require specialist equipment, facilities, and expertise, and the potential for failure remains even when done at specialist centres. We describe our experience of free tissue transfer in Ethiopia over a 6-year period.

Patients and methods

Over 11 missions to Ethiopia between 2008 and 2014 in association with Facing Africa, a non-governmental organisation, 29 patients had 34 microsurgical procedures (Table 1). Five patients had 2 free flaps and were operated on during different missions as part of a planned, staged reconstruction. The age range was 8 - 45 years and the female:male ratio was 19:10. Defects caused by noma were scored according to the NOITULP classification (nose, outer and inner lining of the cheek, trismus, upper and lower lip, and particularities).[7] Reconstruction was with radial forearm (n = 22), anterolateral thigh (n = 5), parascapular (n = 5), abdominal (n = 1), and latissimus dorsi (n = 1) flaps. Most defects were related to noma (n = 27), but one patient had been burned and another had squamous cell carcinoma. Procedures were done at the Myung Sung Christian Medical Centre (n = 32/34), the Cure Hospital (n = 1/34), or the Yekatit 12 Hospital (n = 1/34) in Addis Ababa.

Ethiopia has a population of 94 million and 80% live in rural communities. In 2013 the country had a per capita GDP of $505 and a per capita health expenditure of $18.[8] In the absence of the visiting team the usual caseload for the plastic surgery department was burns and trauma. Local surgeons, anaesthetists, and nursing staff had some experience of tubed

Table 1
Overview of free flap reconstruction. Case numbers 6, 19, 20, 26, and 27 were treated in 2 stages.

Case No.	Age (years)	Sex	Diagnosis	NOITUL	Particularities	Flap	Flap survival
1	18	M	Noma	2.3.4.2.2.1	Loss of right orbital floor	Radial forearm	Yes
2	24	F	Noma	0.2.2.2.1.1	-	Radial forearm	Yes
3	18	F	Noma	0.3.3.3.2.2	-	Radial forearm	Yes
4	11	M	Noma	0.3.3.3.2.1	Loss of left maxillary sinus	Radial forearm	Yes
5	18	F	Noma	0.3.4.0.1.2	-	Radial forearm	Yes
6	16	F	Noma	2.4.3.0.3.2	Loss of hard palate	Radial forearm	Yes
	16	F			-	Parascapular	Yes
7	45	F	SCC		-	Anterolateral thigh	Yes
8	24	F	Noma	2.3.3.3.0.0	-	Anterolateral thigh	Partial
9	17	F	Noma	1.2.2.2.2.1	-	Radial forearm	Yes
10	25	M	Noma	1.1.1.2.4.4	-	Radial forearm	Yes
11	30	M	Noma	0.3.3.4.2.1	-	Radial forearm	Yes
12	19	F	Noma	4.0.0.0.0.0	-	Radial forearm	Yes
13	18	F	Noma	4.2.2.0.0.0	Loss of premaxilla	Radial forearm	Yes
14	40	M	Noma	1.3.3.3.3.3	-	Abdominal	Yes
15	25	M	Noma	2.4.4.3.3.3	Loss of left orbital floor and left hemipalate	Latissimus dorsi	Yes
16	18	F	Noma	3.3.3.3.4.4.	Defects in both cheeks	Parascapular	Yes
17	14	F	Noma	1.0.0.0.4.0	-	Anterolateral thigh	Yes
18	8	F	Noma	1.4.4.2.3.2	Loss of premaxilla and left maxillary sinus, and partial loss of left hemipalate	Parascapular	Yes
19	11	F	Noma	3.4.4.3.4.4	Loss of right orbital floor and right maxillary sinus, and partial loss of right hemipalate	Radial forearm	Yes
	12	F			-	Radial forearm	Yes
20	19	F	Noma	4.4.4.3.4.2	Loss of premaxilla and right orbital floor	Radial forearm	Yes
	20	F		4.4.4.3.4.2	Loss of pre maxilla and right orbital floor	Radial forearm	Yes
21	25	F	Noma	1.4.4.0.3.1	Loss of left orbital floor	Radial forearm	No
22	17	F	Noma	1.3.3.3.2.2	-	Anterolateral thigh	No
23	30	M	Noma	0.2.2.3.1.2	-	Radial forearm	Yes
24	18	F	Noma	4.0.0.0.4.1	Loss of premaxilla	Radial forearm	Yes
25	20	M	Noma	0.0.0.0.0.4	-	Radial forearm	Yes
26	16	M	Noma	2.4.4.3.3.1	Loss of left orbital floor	Radial forearm	Yes
	19	M			-	Anterolateral thigh	Yes
27	32	M	Noma	4.1.1.0.4.1	Loss of premaxilla	Radial forearm	Yes
	33	M			-	Parascapular	Yes
28	30	F	Noma	0.3.4.2.4.2	-	Radial forearm	Yes
29	29	F	Burns		-	Parascapular	Partial