

OLYMPIC TORCH FLAP: ONE-STOP OPTION FOR SIMULTANEOUS BROW, UPPER AND LOWER LID RECONSTRUCTION IN POST BURN PATIENTS

LE LAMBEAU FLAMME OLYMPIQUE: LAMBEAU DE CHOIX POUR LA RECONSTRUCTION SIMULTANÉE DES SÉQUELLES DE BRÛLURES DU FRONT, DES PAUPIÈRES SUPÉRIEURES ET INFÉRIEURES

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SUMMARY. Facial units reconstruction in a post burn patient poses tough challenges. Simultaneous brow and lid reconstruction is one of them. This article presents a 45-year-old epileptic male with burn of complete face. The task of reconstructing the brow, upper and lower lids was successfully accomplished using a modification of the Guyuron postauricular fasciocutaneous flap, after initial grafting and radial forearm flap reconstruction of forehead and other parts of the face. The article gives a single-stop solution for simultaneous reconstruction of brow and lids using a random pattern extension of the traditional postauricular flap, thus proving the excellent vascularity and hence durability of the flap in spite of a 180 degrees change in the orientation of the flap with respect to the axis.

Keywords: postburn face, brow and lid reconstruction, postauricular flap modification

RÉSUMÉ. La reconstruction des unités esthétiques de la face dans les séquelles de brûlures constitue un grand défi. La reconstruction simultanée du front et des paupières en fait partie. Il s'agit de l'observation d'une brûlure pan faciale chez un homme épileptique de 45 ans. L'objectif de reconstruction du front et des quatre paupières fut atteint avec succès, en utilisant une modification du lambeau fascio cutané rétro auriculaire de Guyuron, réalisé secondairement, à la suite de gestes itératifs : greffe initiale après déterision, réparation du front par un lambeau pédiculé ante brachial radial, et greffes d'autres parties du visage. L'article propose ainsi une solution idéale pour la reconstruction simultanée du front et des paupières en utilisant l'extension du lambeau au hasard qu'est le lambeau traditionnel rétro auriculaire, celui-ci garantissant une excellente vascularisation et ainsi sa pérennité, malgré un changement d'orientation de 180° en respectant son axe.

Mots-clés: séquelles de brûlures de la face, reconstruction du front et des paupières, modification du lambeau rétro auriculaire

Introduction

Burn reconstruction is a tough challenge for the reconstructive surgeon due to the scarcity of native tissue. Local tissue for reconstruction is also limited. Though there are numerous options described for the reconstruction of brow and lids simultaneously, these methods are restricted in a facial burn patient in particular. Although free flap may sound like a respite, the availability of recipient vessels is another big question to be considered when facing the task of multi facial units reconstruction.

Case report

A 45-year-old male, a known epileptic on irregular medication, presented with 10-day-old third degree deep thermal burns on the face and upper neck. The patient had fallen un-

conscious over a fireplace used for keeping people warm following a seizure episode. By the time the relatives rescued him he had sustained full thickness burns on his entire face and upper neck region. The patient had lost his left eye as part of a trauma inflicted in childhood.

The challenges (*Fig. 1A*) that he presented were loss of bilateral brows, loss of bilateral upper eyelids and partial loss of bilateral lower eyelids. The other major challenge was exposed desiccated periosteum of the forehead region and frontoparietal region of the scalp and exposed nasal skeleton to the tip.

After initial assessment, the patient was prepared for staged reconstruction procedures. The wounds were initially debrided and the major graftable areas were resurfaced with split skin grafts (*Figs. 1B, 1C*) harvested from one thigh. The periosteum was not debrided as this step was reserved for subsequent stages. Graft take was satisfactory. After 1 month post-op, observing complete healing of the donor site, the patient

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Fig. 1

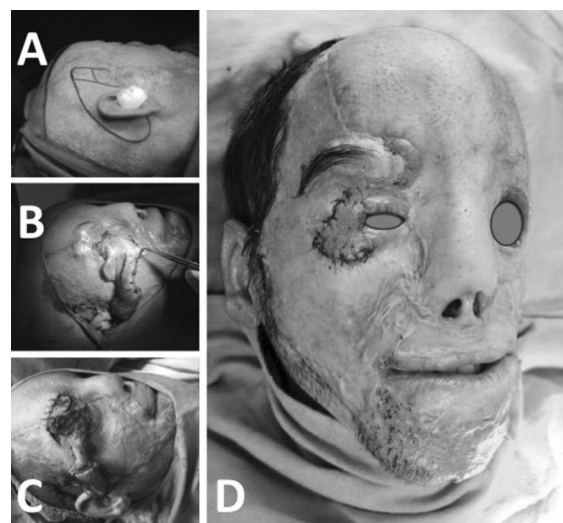


Fig. 2

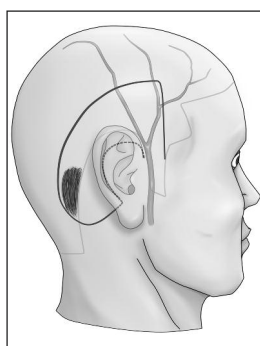


Fig. 3

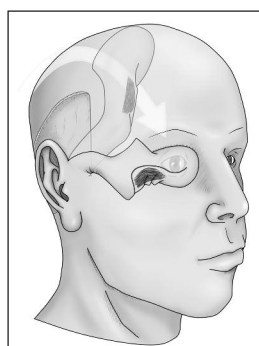


Fig. 4

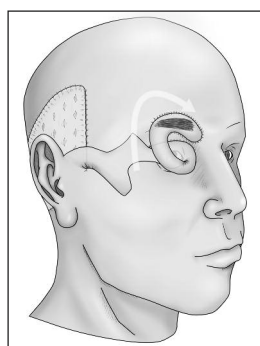


Fig. 5

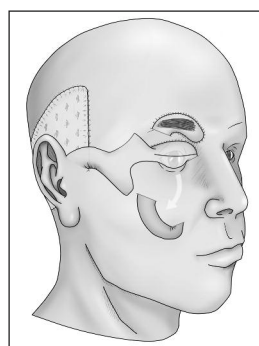


Fig. 6

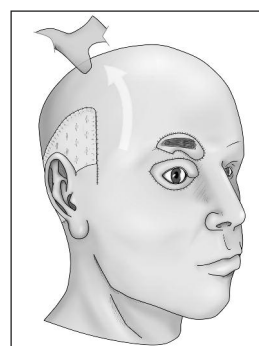


Fig. 7

was subjected to the second reconstruction stage where the forehead region and nose reconstruction were planned. Since the scalp was also extensively burnt, a pedicled extracorporeal radial forearm flap (Fig. 1D) was preferred over a free flap to resurface the exposed forehead, calvaria and nasal skeleton after sufficient debridement. The flap was successful after detachment and inset (Fig. 1E) after 3 weeks. It was initially planned that the same flap would be used for brow and upper eyelid reconstruction. However, the flap stiffened after some time, hence the plan had to be discarded. New tissue had to be found for planning flaps to reconstruct the brow and eyelids as the surrounding local tissues were already grafted and could not be used for harvesting flaps. The right eye was the only seeing eye, hence its reconstruction was planned first. A modified Guyuron flap (Figs. 2A, 3) that included the postauricular hairless skin along with a thin strip of the hair-bearing scalp region based on the posterior descending branch of superficial temporal artery were together raised as a single flap and then transposed anteriorly and its medial margin sutured to the debrided upper eyelid margin of the right eye. The raw area on the undersurface of the flap was grafted.

Because of the orientation of the scalp hair, for brow reconstruction the flap had to be divided partially from proximal to distally and then the proximal part of the flap was sutured to the destined brow area after excision of the grafted skin in the brow region. This part resembled an Olympic torch (Figs. 2B, 2C, 4, 5) hence the choice of the nomenclature for the flap. The skin bridge was divided after 3 weeks. The brow flap was viable. At this stage the upper eyelid flap was modified further

to also reconstruct the lateral part of the lower eyelid. The base of the pedicle harboring the temporal vessels was finally divided after a further 3 weeks and inset was completed (Figs. 2D, 6, 7).

At the end of the procedure both flaps were surviving well with anatomically correct brow hair orientation.

Further reconstruction of the left upper and lower eyelids and left brow is required, and the patient was offered two options: either a similar procedure or a custom-made prosthesis including a shell for the blind left eye for cosmetic reasons. The patient has still to decide between them.

Discussion

Numerous descriptions of eyelid reconstruction and brow reconstruction have been described separately in literature. There have been many local flaps¹ described for lid reconstruction, like the trickle flap, Tenzel, Modified Hughs procedure and Mustarde cheek rotation flap. Reconstruction with combined mucochondral and cheek rotational flap has also been described. The islanded superficial temporal artery flap² based on the frontal branch is one of the most popular techniques for brow reconstruction provided the anterior branch is viable. The other option to bring hair-bearing skin to the brow region is to hair graft the area, provided the bed is vascular to support the follicles. In order to be viable, these flaps require intact local tissues. Yet another option would be a free microvascular,^{3,4} pedicled⁵ transfer provided there are good recipient vessels. Apart from a few descriptions such as two islanded flaps⁶ based

on the anterior and posterior branches of the superficial temporal artery for the brow and the lid and the medusa flap,⁷ not many surgeons have attempted simultaneous brow and lid reconstruction in a background of burns especially. Moreover, the above-described islanded flap would require a further laser procedure to get rid of the hairs on the flap destined to form the lid. Since in our patient the anterior part of scalp was burnt and so was the scalp hair, and because he needed both brow and lid reconstruction, we were left with either a washios flap or Guyuron⁸ modification of the washios flap. A washios flap involves extensive scalp mobilization and hence greater blood loss, while the Guyuron modification practically involves postauricular skin devoid of hair follicles.

In this article we describe a flap that has been modified to reconstruct both the hair-bearing brow and the hairless upper and lower lid regions. The flap is designed to comprise the postauricular skin along with a thin strip of hair-bearing skin abutting the hairline the size of which matches the expected brow length. The flap is harvested in the usual manner for the Guyuron flap and then transposed anteriorly. The secondary defects are grafted, including the undersurface of the flap.

Since the hair follicles of the scalp are directed medially when the flap is transposed, the brow flap is designed in reverse manner and the proximal part of the hair-bearing territory is first sutured to the medial most pole of the destined brow. This gives the overall shape of the flap an "Olympic torch" appearance. The rest of the flap is insetted as far as possible. The flap

is probably a random pattern flap as an extension of the Guyuron flap, whose anatomical basis⁸ has already been explained.

The brow flap was divided from the lid flap at 3 weeks, when the lid flap was further modified to reconstruct the lateral part of the lower lid also.

The base of the pedicle of this flap was finally divided after a further 3 weeks and the base returned to the donor site. Both the flaps survived well in spite of a mild congestion noted in them initially. The congestion that reigns in the initial 48 hours has been described in the Guyuron modification of postauricular fasciocutaneous flap also and has been attributed to the readjustments of the venous return from the tiny flaps.

Conclusion

This article proves time and again that in complex situations like the one presented here, the solution for reconstruction may simply be lying in the age-old tested methods of pedicled flaps with subtle modifications depending on the case scenario. Though the modification is minor, the anatomical basis provides us with an opportunity to use a single vascular axis to reconstruct two different units of the face (one hair-bearing and another non hair-bearing) which would otherwise have been a tough challenge for the operating surgeon. The modification not only enabled the reconstruction but also helped to achieve it aesthetically.

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