Scalp and Calvarial Reconstruction

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ABSTRACT

Over the past several decades, an improved understanding of the blood supply of local flaps, increased experience with tissue expansion, and the development of techniques for microsurgical transfer of distant flaps have greatly contributed to the ability of plastic surgeons to repair scalp defects. This article will review basic anatomy, principles, and pearls of reconstruction for simple to complex scalp defects. Included will be anatomic considerations, indications and contraindications for reconstruction, and an overview of reconstructive options.

KEYWORDS: Scalp reconstruction, microsurgery, calvarium reconstruction, tissue expansion, scalp anatomy

Reconstruction in patients with scalp and/or calvarial defects can be simple or complex. Over the past several decades, an improved understanding of the blood supply of local flaps, increased experience with tissue expansion, and the development of techniques for microsurgical transfer of distant flaps have greatly contributed to the ability of plastic surgeons to repair these defects.

As with reconstructions at other locations, the reconstructive "ladder" applies to scalp and calvarial reconstruction. Primary closure is the first choice when feasible. Other methods of reconstruction, in ascending order of complexity, are skin grafts, local flaps with or without tissue expansion, occasionally regional flaps, and free flaps. This article will review basic anatomy, principles, and pearls of reconstruction for simple to complex scalp defects.

ANATOMY

A comprehensive knowledge of the anatomy of the scalp and calvaria is essential in planning reconstructions. The scalp is composed of five layers, which can be remembered using the well-known mnemonic SCALP: (1) skin, (2) subcutaneous fat, (3) galea aponeurotica, (4) loose areolar tissue, and (5) pericranium. The scalp integument is the thickest skin in the body (3 to 8 mm). The hair-bearing quality of the scalp in most patients makes aesthetically pleasing reconstruction a challenge.[1] The galea aponeurotica continues as the frontal muscle anteriorly and the occipital muscle posteriorly. Laterally, the galea aponeurotica is continuous with the temporoparietal fascia. The pericranium fuses with the deep temporal fascia laterally.

In addition, the scalp is inelastic, with the galea aponeurotica being poorly elastic and the pericranium being nearly nondistensible. The parietal regions, located over the temporoparietal fascia, are the areas of the scalp with the greatest mobility.

A well-vascularized subcutaneous layer lies superficial to the galea aponeurotica. A robust choke vessel system allows relatively long local flaps to survive without distal necrosis. The vascular supply of the scalp includes the paired supratrochlear, supraorbital, superficial temporal, posterior auricular, and occipital arteries and their accompanying veins. The supratrochlear and

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