Cosmetic Otoplasty

Alexander L. Schneider, MD, Douglas M. Sidle, MD*

KEYWORDS

• Otoplasty • Prominauris • Prominent ear surgery • Mustardé • Furnas

KEY POINTS

- Otoplasty for prominent ears is unique in that it is a widely performed and accepted procedure in the pediatric population, done for cosmetic and not functional motives.
- A detailed knowledge of auricular anatomy and anthropometric norms is essential for the facial plastic surgeon before undertaking any otoplastic surgery.
- There are myriad ways to correct prominauris and the facial plastic surgeon must possess a mastery of a wide variety of techniques to provide durable and acceptable results.

INTRODUCTION

It has been estimated that up to 5% of the population suffers from protruding ears, otherwise known as prominauris.[1] Prominauris is considered to be among the most common congenital deformities of the head and neck region, the most common congenital deformity of the external ear, and is transmitted in autosomal dominant fashion with variable penetrance.[2] This anatomic abnormality typically causes no physiologic change with regards to hearing, though it has rarely in the literature been documented to be an occupational liability in a specific military population.[3] The negative psychosocial impact of prominauris is often the motivating factor to seek surgical correction.[4] In young children and adolescents, the psychological effects are often due to a combination of name-calling, bullying, and ridiculing. The embarrassment and anxiety associated with these psychosocial stressors can lead to increased anxiety, behavioral abnormalities, and result in lack of social integration.[5,6] As a result, otoplasty for the correction of prominauris is a widely accepted cosmetic surgery in the pediatric population that is done solely for aesthetic reasons rather than for correction of an occupational or functional deficit.

EMBRYOLOGY

Before undertaking an intervention to correct prominauris, the surgeon must first possess a comprehensive knowledge of the anatomy of the ear. As with all anatomic knowledge, this begins with understanding the pertinent embryology. The otic placode is the precursor of the ear and develops during the third gestational week. The origin of the auricle (or pinna) is rooted in the concept of the hillocks of His: the hillocks consist of 6 mesodermal swellings that encircle the dorsal surface of the first branchial groove. The first (mandibular) branchial arch is responsible for the development of the 3 cranial-most hillocks, which in turn are responsible for the development of the (1) tragus, (2) helical crus, and (3) helix. The second (hyoid) branchial arch is responsible for the development of the next most caudal hillocks: (4) antihelix, (5) antitragus, and (6) lobule. The hillocks fuse by week 12 and when this fusion occurs inappropriately a preauricular sinus tract may result. The concha is postulated to derive from ectoderm of the first branchial groove, with the upper portion becoming the cymba concha, the middle portion becoming the cavum concha, and the caudal-most portion becoming the intertragal incisura.

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Department of Otolaryngology–Head and Neck Surgery, Northwestern Memorial Hospital, Northwestern University, 676 North Saint Clair, Suite 1325, Chicago, IL 60611, USA
* Corresponding author.
E-mail address: dsidle@nm.org

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SURFACE ANATOMY

The ear is a complex structure composed of elastic cartilage and skin. The 3-dimensional topography of the external ear with its many elevations, depressions, involutions, and folds is reflective of the underlying cartilaginous structure. The auricular cartilage is a single piece of elastic fibrocartilage, invested with perichondrium on all surfaces, and has a relatively uniform thickness throughout. The anterior aspect of the auricle is concave and contains the aforementioned complicated topography, due in large part to the skin envelope of the anterior and lateral auricle being fine, thin, and firmly adherent to the underlying cartilage with little intervening subcutaneous tissue between skin and cartilage. The posterior aspect of the auricle is smooth, convex, and covered with a skin envelope that is considerably less adherent, with a thin subcutaneous areolar tissue layer between the skin and cartilage; these characteristics are useful in flap elevation.

The important surface features of the auricle are seen in **Fig. 1**A. The helix is the peripherally located rim of the auricle. It extends anteriorly to form the root of the helix, or crus of the helix, oriented horizontally above the external acoustic meatus. Immediately inferior to the root of the helix is the tragus. The space between the crus of the helix and the tragus is the anterior incisure. The antitragus is posteroinferior to the tragus, and the space between the tragus and antitragus is known as the intertragal incisure. The antihelix begins at the antitragus and runs anterior and parallel to the helix, initially as a single prominence. In its superior-most extent, the antihelix splits into superior (posterior) and inferior (anterior) crura, and the depression created by this division is known as the triangular fossa. The deep concave furrow in between the helix and the antihelix is known as the scapha or scaphoid fossa. The concha is a cavity posterior to the external auditory meatus and surrounded by the antihelical fold. The crus of the helix divides the conchal cavity into the cymba (superior) and cavum (inferior) concha, which is approximately 8 mm deeper than the tragus and antitragus. Below the antitragus is the lobule, which is devoid of cartilage, composed entirely of areolar connective tissue and fat, and marks an important landmark for the inferior auricle.

NEUROVASCULAR SUPPLY

The neurovascular structures of the auricle are shown in **Fig. 2**A, B. Arterial blood supply to the ear is primarily derived from branches of the external carotid artery, superficial temporal artery (anterior), occipital artery (posterior), and posterior auricular artery (posterior). The superficial temporal artery exits the substance of the parotid gland, travels beneath the anterior auricular muscle, and then divides into branches that supply the anterior auricle. The posterior auricular artery leaves the external carotid artery, runs deep to the posterior auricular muscle and great auricular nerve, and branches to supply the posterior surface of the ear. Venous drainage consists of veins of the same name, which ultimately drain into the external jugular vein. The end branches of these vessels form an extensive anastomotic blood supply to the auricle, which is of great import for local flap auricular reconstruction. The sensory innervation of the external ear is complex. The great auricular nerve, a branch of the cervical plexus, innervates the inferior surface. The lesser occipital, also a branch of the cervical plexus, innervates the posterior superior surface. The auriculotemporal nerve, a branch of the mandibular component of the trigeminal nerve, innervates the anterior superior surface. The concha proper and tragus are innervated by the Arnold nerve, which is a small distal branch of the vagus nerve.

AURICULAR MUSCULATURE

The musculature of the auricle can be divided into extrinsic and intrinsic muscles. The extrinsic muscles connect the auricle with the skull and scalp, whereas the intrinsic connect different parts of the auricle to each other. The superior auricular is the largest of the external muscles. It is thin, fan-shaped, and has its origin on the lateral aspect of the galea aponeurotica, inserting onto the superior aspect of the cranial surface of the auricle. The anterior auricular muscle is also thin and fan-shaped, arises from the anterolateral edge of the galea aponeurotica, and inserts onto a projection on the front of the helix. The posterior auricular consists of 2 to 3 fascicles. It is smaller, has its origin in the mastoid portion of the temporal bone, and inserts onto the inferior aspect of the cranial surface of the concha. The intrinsic auricular muscles are primarily composed of helicis major, helicis minor, tragus, and antitragicus, which surround the conchal bowl. Cranial nerve VII supplies the auricular musculature via its posterior auricular and temporal branches, though these muscles generally have very little volitional movement.

NORMAL ANTHROPOMETRIC FEATURES

Anthropometric studies have revealed that the vertical length of the adult auricle measures between