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# The histology of facial aesthetic subunits: Implications for common nasal reconstructive procedures

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## KEYWORDS

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**Summary** Reconstruction of cutaneous nasal defects is often a challenging problem with multiple solutions. Many factors must be considered when deciding on the appropriate reconstructive procedure, including optimally matching donor site skin to the original recipient site skin. To the best of our knowledge no objective study has been undertaken to examine which areas best match the histological features of skin from various nasal cosmetic subunits.

We have undertaken a descriptive histological analysis of skin from 25 facial and nasal aesthetic subunits from four male Caucasian cadavers, aged 65–88.

The three variables looked at were epidermal thickness, dermal thickness and density of pilosebaceous subunits. Our findings have been plotted on photographs of the face to provide visual maps of facial histological features by cosmetic subunit. Our results show that histologically, the best matched skin for reconstructing a given nasal defect is likely to come from an adjacent nasal subunit. Looking at distant donor sites, the helical root, helical rim and pre-auricular area are closest to nasal skin in terms of dermal thickness. In terms of density of pilosebaceous units, the helical root, pre-auricular area and lateral forehead are the three areas best matched to nasal skin.

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The nose is the most prominent feature of the face and its surface is made up of several concave and convex surfaces. In 1985 Burget and Menick<sup>1</sup> built on Gonzalez-Ulloa's<sup>2</sup>

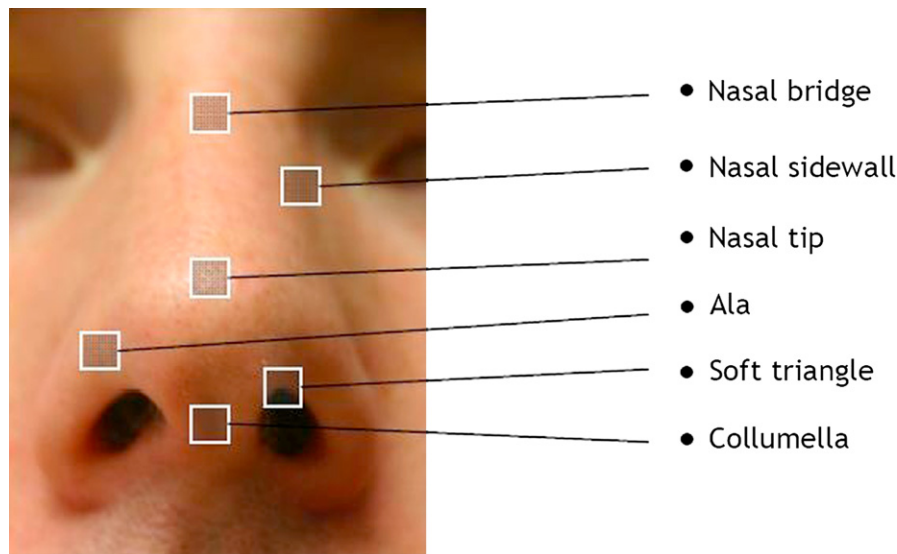
concept of facial aesthetic subunits by further dividing the nose into cosmetic subunits. These are the tip, dorsum, sidewalls, alar nasae, and soft triangles (Figure 1).

Reconstruction of cutaneous nasal defects is challenging both due to the unique character of nasal skin and the prominence of the nose. Although anecdotally there are common areas from which grafts may be harvested, no

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**Figure 1** The aesthetic subunits of the nose.

objective study has been undertaken to delineate the areas which most closely mimic the characteristics of the skin of nasal subunits.

Our study examines aims to examine the histological features of the skin of the various nasal subunits and compare these with each other and skin from common facial donor sites used in reconstructing nasal defects.

## Materials and methods

25 cosmetic subunits of the face and scalp were identified and full thickness biopsies were taken from four male cadavers, all of whom were Caucasian and with ages ranging from 65 to 88. The biopsies were fixed in 10% phosphate buffered formalin for 48 h. The skin was harvested and cut longitudinally ready for paraffin histology. 5 µm thick sections were cut using a Leica Microtome (Leica RM2165, Leica Instrument GmbH, Nussloch, Germany) and mounted onto saline-coated slides for Haematoxylin and Eosin (H&E) staining. Stained sections were evaluated under an Olympus BX51 light microscope (Olympus, Sydney, Australia) using plain light. Images of the histology were captured using a colour video camera connected to the microscope.

For each specimen, three random areas were evaluated under 10 times magnification by two blinded observers and the mean results were taken. Measurements were taken for epidermal thickness, dermal thickness and density of pilosebaceous units. As there is considerable variation in epidermal and dermal thickness in any given specimen, the final figure for each specimen was obtained by calculating the mean of five separate measurements taken across the specimen. Density of pilosebaceous units was defined as the number of units seen under a randomly selected 2.5 mm length of specimen.

## Results

Considerable variation was noted across the various cosmetic subunits yet the same subunits in different individuals demonstrated a high degree of similarity. For ease of

presentation the results for mean dermal thickness were split into four grades (Table 1). Similarly the mean density of pilosebaceous units was split into three categories (Table 2). These results have then been illustrated on the face overlying their corresponding aesthetic subunits to provide a visual 'map' of facial histological features (Figures 2 and 3). No meaningful variation in epidermal thickness was apparent.

The mapping of basic histological characteristics of facial skin in Figures 2 and 3 highlights the uniqueness of nasal skin compared to non-nasal facial skin both in terms of dermal thickness and density of pilosebaceous units.

## Discussion

Nasal reconstruction encompasses a wide range of procedures ranging from total nasal reconstruction to reconstruction of small soft tissue defects. Given that the nose is one of the most common sites for skin cancers<sup>3</sup> simple

**Table 1** Mean dermal thickness of biopsied facial subunits split into four grades

Grade	Dermal thickness micrometers	Aesthetic subunit
I	600–999	Medial forehead, paramedian forehead, lateral forehead, upper lid, cheek, post auricular, helical rim
II	1000–1399	Pre-auricular, helical root, lobule, collumella, upper lip
III	1400–1799	Nasal bridge, nasal sidewall, nasal tip, soft triangle, glabella
IV	>1800	Ala, philtrum

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