

3D Topographical Surface Changes of the Malar Region in Response to Compartmental Volumization of the Deep Medial and Lateral Cheek

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Introduction

Given the widespread use of facial fillers, and identification of distinct facial fat compartments^{1,2}, a better understanding of 3D surface changes in response to volume augmentation is needed. The malar region is one such area commonly treated with autologous fat grafting or fillers in which it is important to understand how compartmental volumization relates to topographical change.^{3,4}

Materials and Methods

Volumization of the deep medial cheek (DMC) and lateral cheek compartments were performed on nine cadavers at 1cc intervals up to 4cc. To define the zone of augmentation (ZOA), computer-overlay of interval 3D photographs with baseline surfaces was performed and color projection maps generated. The lower limit was set at 1mm projection change from baseline, as this corresponded to a clinically significant difference. Topographic changes in surface area, projection, and perimeter were studied.

Results

The DMC and lateral cheek demonstrated unique ZOA, defined by distinct shape and surface boundaries (Figure 1). The DMC maintained a diamond shape bound superiorly by the tear trough and inferiorly by the nasolabial fold. The lateral cheek was an elongated oval bound superiorly by the lid-cheek junction and inferiorly by the level of the zygomaticocutaneous ligament. (Figure 2).

Topographic dynamics were distinct. Perimeter and diameter showed initial increase between 1cc and 2cc and plateau between 2cc and 3cc. (DMC: *horizontal diameter* 22.7+/-3.6mm, 31.5+/-2.6mm, *vertical diameter* 26.6+/-3.8mm, 31.9+/-3.9mm, *perimeter* 105.8+/-15.7mm, 144.6+/-9.9mm, *Lateral cheek: horizontal diameter* 31.2+/-6.9mm, 41.6+/-5.3mm, *vertical diameter* 21.9+/-4.5mm, 27.25 +/-6.1mm, *perimeter* 124.2+/-14.4mm, 153.2+/-7.0mm). Alternatively, projection underwent triphasic growth characterized by initial filling, followed by steep increase in projection, then plateau. The maximum change in projected was between 2cc and 3cc (DMC 3.4+/-0.4mm, 4.5+/-0.5mm, *lateral cheek* 3.8+/-0.8mm, 4.5+/-1.2mm), corresponding to the point which perimeter begins to plateau and is restricted by the surrounding retaining ligaments.

Conclusion

With advances in 3D photography and computer analysis, we can now understand how surface anatomy changes in response to volume augmentation of facial compartments. Volumization of the deep medial and lateral cheek results in a unique ZOA with distinct shapes and boundaries. The tear trough and lid-cheek junction served as the superior surface boundary for both compartments.

Legend

Figure 1. Zone of augmentation for deep medial and lateral cheek from 1-4cc injection of fat analogue.

Figure 2. Dynamics for deep medial and lateral cheek augmentation.

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