Deep Cheek Fat Volumes and Midfacial Aging

Jacob I. Tower, MD°; Neil A. Gordon, MD; and Boris Paskhover, MD

Abstract

Background: Midfacial volumizing procedures are increasingly common in facial rejuvenation. However, the changes that occur in midfacial fat with aging are poorly understood.

Objectives: The aim of this study was to determine how deep cheek fat volume is predicted by age.

Methods: We conducted retrospective cross-sectional and longitudinal studies of patients based on facial computed tomography (CT) scans. In the cross-sectional cohort, multiple linear regression analysis was performed to model the relations between age and deep cheek fat volumes. In the longitudinal analysis, changes to deep cheek fat volumes were tracked among subjects who underwent multiple facial CT scans.

Results: The cross-sectional cohort comprised 109 patients. The mean (SD) age of the subjects was 59.7 (15.0) years (range, 21.7-91.1 years). A linear regression analysis showed that increasing age was associated with increasing deep cheek fat volume ($\beta = 0.015$, $P < 0.001$). Additional regression analyses showed that the gain of fat with aging was more pronounced in the caudal aspect of the cheek ($\beta = 0.007$, $P < 0.001$) than in the cephalad ($\beta = 0.005$, $P < 0.001$). Twenty-three subjects were identified for longitudinal analysis. The mean (SD) ages at initial and final imaging time points were 50.0 (5.8) and 60.3 (5.2) years. In the deep fat compartment, there was an average gain of 0.23 mL over 10.3 years ($P = 0.03$).

Conclusions: Age is an important predictor of midfacial deep cheek fat volume. In this study, there is no evidence of adipose volume loss in the deep cheek compartment. Rather, aging was associated with an increase in deep cheek fat, possibly reflecting pseudoherniation of buccal fat.

Level of Evidence: 2

2

Risk

The goal of facial rejuvenation is to reverse or prevent the anatomic changes that occur with age to restore a youthful appearance to the face. Volume loss within the soft tissue envelope is considered to be a critical factor in aging facial aesthetics, and consequently numerous soft tissue filler products and techniques have been described for volume restoration.[1] However, facial aging is a multifactorial process, and other changes, including midfacial ptosis, loss of elasticity, and facial skeletal changes (bony volume loss), are also known to contribute to the aged appearance. The relative importance of each factor is still being elucidated, and many questions remain, especially with regard to the soft tissue volume loss theory of midfacial aging.

The adipose anatomy of the face is compartmentalized into deep and superficial layers (Figure 1). It is theorized that each fat compartment is morphologically distinct and

may behave independently of the others over time with regard to volume change.[2] This theory is partially supported

Dr Tower is a Resident, Department of Surgery, Section of Otolaryngology, Yale School of Medicine, New Haven, CT. Dr Gordon is the Director, Head and Neck Aesthetic Surgery, Department of Surgery, Section of Otolaryngology, Yale School of Medicine, New Haven, CT. Dr Paskhover is an Assistant Professor, Department of Otolaryngology, Head and Neck Surgery, Rutgers New Jersey Medical School, Newark, NJ; and the Division Chief, Facial Plastics and Reconstructive Surgery, St. Barnabas Medical Center, Robert Wood Johnson Barnabas Health, Livingston, NJ.

Corresponding Author:
Dr Jacob I. Tower, Department of Surgery, Section of Otolaryngology, Yale School of Medicine, 800 Howard Avenue, 4th Floor, ENT office, New Haven, CT 06519, USA.
E-mail: jacob.tower@yale.edu; Twitter: @DrJTower