Effect of Face Lift on Earlobe Ptosis and Pseudoptosis

Arian Mowlavi, M.D., D. Garth Meldrum, M.D., Bradon J. Wilhelmi, M.D., and Elvin G. Zook, M.D.

Springfield, Ill.

The authors have previously described a classification system for earlobe ptosis and established criteria for earlobe pseudoptosis. Earlobe heights were characterized on the basis of anatomic landmarks, including the intertragal notch, the otobasion inferius (the most caudal anterior attachment of the earlobe to the cheek skin), and the subaurale (the most caudal extension of the earlobe free margin). The classification system was derived from earlobe height preferences as determined by a survey of North American Caucasians and identified the ideal free caudal segment (otobasion inferius to subaurale distance) measuring 1 to 5 mm (grade I ptosis). Also, earlobe pseudoptosis was defined by an attached cephalic segment (intertragal notch to otobasion inferius distance) measuring greater than 15 mm. In this study, the authors evaluated the effects of standard face lift surgery on earlobe ptosis and pseudoptosis by comparing the preoperative and postoperative earlobe height measurements from life-size photographs of 44 patients who underwent rhytidectomy performed by the senior author. The postoperative attached cephalic segment (intertragal notch to otobasion inferius distance, 12.22 ± 0.364 mm) increased over its preoperative attached cephalic segment (intertragal notch to otobasion inferius distance, 11.10 ± 0.406 mm) ($p = 0.041$). The postoperative free caudal segment (otobasion inferius to subaurale distance, 6.32 ± 0.438 mm) demonstrated only a trend toward decreased heights when compared with the preoperative free caudal segment (otobasion inferius to subaurale distance, 7.15 ± 0.489 mm) ($p = 0.210$). The incidence of pseudoptosis, defined by an attached segment (intertragal notch to otobasion inferius distance) greater than 15 mm, increased from 12.3 percent of preoperative patient earlobes to 17.3 percent of postoperative patient earlobes. An ideal free caudal segment (otobasion inferius to subaurale distance), defined by a range of 1 to 5 mm, was observed in only 37.0 percent of postoperative earlobes versus 22.2 percent of preoperative earlobes. Significant increases in the attached cephalic segments (intertragal notch to otobasion inferius distance) following rhytidectomies correlated with increased incidence of earlobe pseudoptosis, as observed in 17.3 percent of postoperative patient earlobes. Because the free caudal segment was negligibly affected by rhytidectomy, a majority of earlobes (63.0 percent) demonstrated persistent nonoptimal free caudal segment heights (otobasion inferius to subaurale distance > 5 mm). Earlobe height changes can result from either age-related lobule ptosis (increase in free caudal segment) as previously described or in patients undergoing rhytidectomy (increase in attached cephalic segment). Therefore, ideal lobule distances along with the effects of aging and rhytidectomy surgery on the lobule should be discussed with patients who are seeking a more youthful facial appearance, so that the aging ear may be addressed concurrently with the aging face. (*Plast. Reconstr. Surg.* 114: 988, 2004.)

Although guidelines for ear size and orientation have been studied, minimal attention has been directed to the ear lobule.[1–3] A complete assessment of earlobe height requires accounting for the entire lobule length as designated by its two components: the cephalic attached segment [the intertragal notch to the otobasion inferius distance as described by Loeb[4]] and its caudal free portion [the otobasion inferius to the subaurale distance] (Fig. 1).[5] A survey of North American Caucasians (59 males and 72 females) determined specific lobule length preferences that led to a new classification system for earlobe ptosis (based on the free caudal segment) and criteria for earlobe pseudoptosis (on the basis of the attached cephalic segment).[5] The survey revealed that the ideal Caucasian earlobe free caudal segment measured 1 to 5 mm (grade I ptosis) (Table I), and the criterion for earlobe pseudoptosis was defined by a nonideal attached cephalic segment greater than 15 mm (Table II).[5]

From the Plastic Surgery Institute, Southern Illinois University, School of Medicine. Received for publication August 4, 2003; revised November 20, 2003.

DOI: 10.1097/01.PRS.0000133172.28160.6F

Copyright © American Society of Plastic Surgeons. Unauthorized reproduction of this article is prohibited.

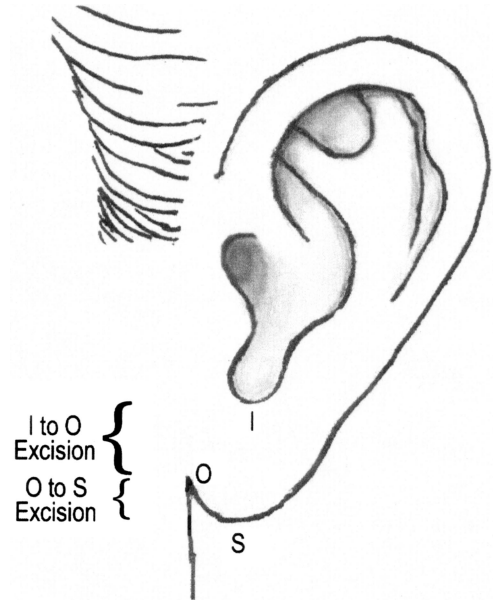

FIG. 1. The anatomical landmarks of the intertragal notch (*I*), otobasion inferius (*O*), and subaurale (*S*) are illustrated. Earlobe height parameters are defined with respect to the attached cephalic segment (I to O distance) and the free caudal segment (O to S distance).

TABLE I
Classification of Earlobe Ptosis on the Basis of Analysis of Preferred Otobasion Inferius to Subaurale Distances in Both the Male and Female Faces

Ptosis Grade	Free Caudal Segment (O to S distance) (mm)
0	0
I (ideal)	1–5
II	6–10
III	11–15
IV	16–20
V	>20

O to S, otobasion inferius to subaurale.

In a follow-up study, we determined the effects of aging on lobule heights by evaluating preoperative earlobe height measurements of patients seeking facial rejuvenation surgery.[6] The average attached cephalic segment (intertragal notch to otobasion inferius distance) of patient earlobes measured 11.10 ± 0.406 mm, and the average free caudal segment (otobasion inferius to subaurale distance) of patient earlobes measured 7.15 ± 0.489 mm.[6] Assessment of patient groups on the basis of single-decade age differences, ranging from 40 to 80 years of age, demonstrated an increase in the free caudal segment (otobasion inferius to subaurale distance) with increasing age ($p = 0.003$).[6] Assessment of patient groups based on single-decade age differences demonstrated no increase in the attached cephalic segment (intertragal notch to otobasion inferius distances) with increasing age ($p = 0.281$).[6]

TABLE II
Designation of Pseudoptosis

Pseudoptosis	Attached Cephalic Height (I to O distance)
+	>15 mm
–	≤15 mm

I to O, intertragal notch to otobasion inferius.

In this study, we proposed to evaluate postoperative, life-size profile photographs of 44 patients after rhytidectomy to determine the effects of face lift surgery on the attached cephalic segment and free caudal segment heights. All patients had been treated by standard superficial musculoaponeurotic system plication rhytidectomy and postoperatively followed by the senior author. By delineating the effects of face lift surgery on the above earlobe parameters, we hoped to better delineate indications for earlobe reduction procedures in patients undergoing rhytidectomy procedures.

PATIENTS AND METHODS

Life-size lateral-profile photographs were evaluated retrospectively from among 44 North American Caucasian patients undergoing rhytidectomy surgery. Facial heights were standardized on the basis of previous anthropometric measurements establishing a glabella to gnathion height in North American Caucasians (female: 103.6 mm, male: 116.7 mm).[7] Earlobe height was measured taking into account the attached cephalic segment (intertragal notch to otobasion inferius distance) and the free caudal segment (otobasion inferius to subaurale distance) (Fig. 1). Inclusion criteria included North American Caucasians who underwent rhytidectomy and experienced an unremarkable postoperative course. Photographs were excluded if patients wore earrings or had hairstyles that prevented visualization of all three landmarks (intertragal notch, otobasion inferius, and subaurale).

Postoperative earlobe height (attached cephalic and free caudal segment) averages and standard errors were calculated for bilateral ears in each patient when possible. These data allowed for determination of the incidence of patients who demonstrated pseudoptosis (attached cephalic segment >15 mm) and the incidence of patients in various ptosis grades

Copyright © American Society of Plastic Surgeons. Unauthorized reproduction of this article is prohibited.

FIG. 2. Preoperative (*left*) and postoperative (*right*) lateral views of a face lift patient demonstrate increased attached cephalic segment height and a trend toward decreased free caudal segment height.

(based on free caudal segment heights), including the ideal otobasion inferius to subaurale distance range between 1 and 5 mm. The paired *t* test was utilized to compare differences between postoperative and preoperative values, presented as the mean ± SEM (Sigma Stat 2001; SPSS, Chicago, Ill.).

RESULTS

In this study we compared the postoperative and preoperative earlobe height measurements of 44 patients undergoing face lift surgery. Patient ages ranged from 40 to 79 years (average age, 58 years). Postoperative photographs were obtained between 1 to 11 months after surgery, with an average follow-up time of 3.9 months. The postoperative attached cephalic segment (intertragal notch to otobasion inferius distance, 12.22 ± 0.364 mm) increased significantly when compared with the preoperative attached cephalic segment (intertragal notch to otobasion inferius distance, 11.10 ± 0.406 mm) ($p = 0.041$) (Fig. 2). The postoperative free caudal segment (otobasion inferius to subaurale distance, 6.32 ± 0.438 mm) demonstrated a trend toward decreased height only when compared with the preoperative free caudal segment (otobasion inferius to subaurale distance, 7.15 ± 0.489 mm) ($p = 0.210$) (Fig. 2). Pseudoptosis, defined by a postoperative intertragal notch to otobasion inferius distance greater than 15 mm, was detected in 17.3 percent of postoperative earlobes versus 12.3 percent of preoperative earlobes (Table III). An ideal free caudal segment with an otobasion inferius to subaurale distance range of 1 to 5 mm, or grade I ptosis, was attained in 37.0 percent of postoperative earlobes versus 22.2 percent of preoperative earlobes (Table IV).

TABLE III

Incidence of Pseudoptosis in 44 Patients before and after Facial Rejuvenation Surgery

Pseudoptosis	I to O Distance (cm)	Preoperative Incidence (%)	Postoperative Incidence (%)
+	>1.5	12.3	17.3
−	≤1.5	87.7	82.7

I to O, intertragal notch to otobasion inferius.

DISCUSSION

Earlobe ptosis, as a designation of earlobe changes associated with facial aging, has been recently defined.[5,6] In 1972, Loeb[4] recognized the potential need for earlobe reduction in certain individuals as a supplement to rhytidectomy surgery. His observations were limited to the attached cephalic earlobe segment, which he measured in 667 face lift patients. He noted an attached cephalic segment range between 1 to 2.5 cm and advocated correction when this distance exceeded 2.0 cm preoperatively.[4] In 1992, McKinney and Cunningham[1] considered

TABLE IV

Incidence of Ptosis in 44 Patients before and after Facial Rejuvenation Surgery

Ptosis Grade	O to S Distance (mm)	Preoperative Incidence of O to S Distances (%)	Postoperative Incidence of O to S Distances (%)
0	0	12.3	7.5
I	1–5	22.2	37.0
II	6–10	38.3	37.0
III	11–15	27.2	18.5
IV	16–20	0	0
V	>20	0	0

O to S, otobasion inferius to subaurale.

Copyright © American Society of Plastic Surgeons. Unauthorized reproduction of this article is prohibited.

the entire ear lobule height by measuring the intertragal notch to the subaurale (intertragal notch to subaurale) distance in 100 predominantly Caucasian subjects. They found an average total lobule height of 18 mm (range, 12 to 25 mm). They defined the average total lobule height ratio (length of lobule to long axis of ear) as 28 percent (range, 23 to 34 percent) and concluded that the total lobule height should be corrected when exceeding 33 percent.[1] Unfortunately, neither of these studies considered the differential influences of the attached cephalic segment and the free caudal segment.

An acquired deformity resulting from aging involves elongation or ptosis of the earlobe and may be attributed to attenuation of elastic fibers secondary to the gravitational pull.[7] We have previously demonstrated that the free caudal segment (otobasion inferius to subaurale distance) may be prone to elongation from age-related changes.[6] In contrast, this study demonstrates that the attached cephalic segment (intertragal notch to otobasion inferius distance) is more vulnerable to elongation secondary to rhytidectomy. Significant increases in the attached cephalic segment height probably follow increased caudal and anterior tension vectors that are generated following insetting of the facial skin flaps. Increase in the attached cephalic segment height is reflected in the increased incidence of earlobe pseudoptosis that was observed in of postoperative patient earlobes (17.3 percent versus 12.3 percent) (Table III). Finally, evaluation of postoperative earlobe segment heights demonstrates that a significant number of earlobes (nearly 63.0 percent) maintain a nonoptimal, free caudal segment height (Table IV). Because the free caudal segment was not significantly affected by rhytidectomy surgery, reduction of this segment should be considered when measuring greater than 5 mm preoperatively.

This study demonstrates several possible indications for earlobe rejuvenation procedures to recreate an optimal ptosis grade and to avoid a pseudoptosis deformity. With respect to earlobe ptosis, we believe that the free caudal segment (otobasion inferius to subaurale distance) reduction may be indicated in preoperative patients demonstrating ptosis greater than grade I ptosis (>5 mm). Attached cephalic segment (intertragal notch to otobasion inferius distance) reduction may be indicated in two patient populations: patients with preoperative attached cephalic segment (intertragal notch to otobasion inferius distance) greater than 15 mm and preoperative rhytidectomy patients with borderline pseudoptosis (intertragal notch to otobasion inferius distance, 14 to 15 mm), as these patients are at risk for developing postoperative pseudoptosis (resulting from the lengthening effect intrinsic to rhytidectomy). Although the average increase in the attached cephalic segment was clinically minimal at just over 1 mm, this increase was statistically significant and consistently observed in a majority of patients. Therefore, both lobule components (the attached cephalic segment and free caudal segment) should be considered independently and the effects of aging and face lift surgery on lobule segment heights should be discussed with patients who are seeking a more youthful facial appearance, so that the aging ear may be addressed concurrently with the aging face.

Arian Mowlavi, M.D.
The Plastic Surgery Institute
Southern Illinois University
School of Medicine
747 N. Rutledge
P.O. Box 19653
Springfield, Ill. 62794-9653
amowlavi@hotmail.com

REFERENCES

1. McKinney, P., and Cunningham, B. L. *Aesthetic Facial Surgery.* New York: Churchill Livingstone, 1992. P. 222.
2. Farkas, L. G. *Anthropometry of the Head and Face.* New York: Raven, 1994. P. 374.
3. Rubin, L. R., Bromberg, B. E., Walden, R. H., and Adams, A. An anatomic approach to the obtrusive ear. *Plast. Reconstr. Surg.* 29: 360, 1962.
4. Loeb, R. Earlobe tailoring during facial rhytidoplasties. *Plast. Reconstr. Surg.* 49: 485, 1972.
5. Mowlavi, A., Meldrum, D. G., Wilhelmi, B. J., Ghavami, A., and Zook, E. G. The aesthetic earlobe: Classification of lobule ptosis based on survey of North American Caucasians. *Plast. Reconstr. Surg.* 112: 266, 2003.
6. Mowlavi, A., Meldrum, D. G., Wilhelmi, B. J., and Zook, E. G. Incidence of earlobe ptosis and pseudoptosis in patients seeking facial rejuvenation surgery and effects of aging. *Plast. Reconstr. Surg.* 113: 712, 2004.
7. Enna, C. D., and Delgado, D. D. Surgical correction of common facial deformities due to leprosy. *Plast. Reconstr. Surg.* 42: 422, 1968.

Copyright © American Society of Plastic Surgeons. Unauthorized reproduction of this article is prohibited.