Case series of keloid wedge resection in the ear: a focus on aesthetic aspects

Sihyun Yoon¹, Seung Han Song², Youngwoong Choi¹

¹Department of Plastic and Reconstructive Surgery, Inje University Sanggye Paik Hospital, Inje University College of Medicine, Seoul; ²Department of Plastic and Reconstructive Surgery, Chungnam National University Hospital, Daejeon, Korea

INTRODUCTION

Keloid scars may cause a range of symptoms and aesthetic problems. The ear is one of the most frequent sites of keloids, and the earlobe and ear helix account for more than 80% of ear keloids. There are various surgical methods for removing keloids in the ear. Standard keloidectomy and core excision can be effective surgical methods compared to wedge resection since they preserve normal tissue surrounding the keloid. However, ears often show various types of asymmetry by default, which can be relatively difficult to detect, so wedge resection continues to be a useful surgical method for ear keloids. Here, we report four cases of keloids in the earlobe and ear helix that were successfully treated by wedge resection without a postoperative deformity or recurrence.

Keywords Keloid / Ear auricle / Reconstructive surgical procedures / Case reports

Received: Sep 5, 2022 Revised: Sep 27, 2022 Accepted: Sep 29, 2022
Correspondence: Youngwoong Choi Department of Plastic and Reconstructive Surgery, Inje University Sanggye Paik Hospital, Inje University College of Medicine, 1342 Dongil-ro, Nowon-gu, Seoul 01757, Korea
Tel: +82-2-950-1114, Fax: +82-2-950-1114, E-mail: pshero2@naver.com
Copyright © 2022 The Korean Society for Aesthetic Plastic Surgery. This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (https://creativecommons.org/licenses/by-nc/4.0/) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited. www.e-aaps.org

Case report

Case 1
A 24-year-old woman complained of a keloid in the right ear helix after a piercing. The keloid developed after an ear piercing 1 year ago, and no treatment had been performed for it. The size of the keloid was 1.2 × 1.2 × 0.8 cm. The keloid was removed through wedge resection under local anesthesia, and radiation therapy was performed for 3 days immediately after surgery. There were no complications in the wound healing process, and no specific product for scar management was used. At 6 months of follow-up, a slightly depressed scar was observed, but there was no significant deformity or recurrence (Fig. 1).
Case 2
A 29-year-old woman complained of a keloid in the left earlobe after a piercing. The keloid developed after an ear piercing 7 years ago, and no treatment had been performed for it. The size of the keloid was $2.5 \times 2.0 \times 1.0$ cm. The keloid was removed through wedge resection under local anesthesia, and no radiation therapy was performed. There were no complications in the wound healing process, and no specific product for scar management was used. During 2 years of follow-up, no significant deformity or recurrence was observed (Fig. 2).

Case 3
A 51-year-old woman complained of a keloid in the left ear helix after a piercing. The keloid developed after an ear piercing 3 years ago, and the patient underwent surgical excision once, but the keloid recurred. The size of the keloid was $1.5 \times 1.5 \times 1.0$ cm. The keloid was removed through wedge resection under local anesthesia, and no radiation therapy was performed. There were no complications in the wound healing process, and no specific product for scar management was used. During 1 year of follow-up, no significant deformity or recurrence was noted (Fig. 3).

Fig. 1. A 24-year-old woman with a keloid in the right ear helix after a piercing. (A) Intraoperative photograph; the keloid including the surrounding tissue was radically resected in a wedge shape, and the triangular defect was directly closed. (B) Six months post-operation.

Fig. 2. A 29-year-old woman with a keloid in the left earlobe after a piercing. (A) Preoperative photograph. (B) Two years post-operation.

Fig. 3. A 51-year-old woman with a recurrent keloid in the left ear helix after a piercing. (A) Preoperative photograph; the scar is noticeable from previous surgery. (B) One year post-operation.

Fig. 4. A 26-year-old woman with a keloid in the left ear helix after a piercing. (A) Preoperative photograph. (B) Six months post-operation.
The surgical method may be selected depending on the size or the keloid tissue and preserve the surrounding tissue as much as [12], and then it was accepted as a method to specifically remove method to effectively treat “dumbbell-shaped” keloids in the ear volvement. Core excision was initially introduced as a surgical faces of the ear, but can also be used for cases of one surface in used when keloid has involved both the anterior and posterior sur

my), core excision (core extirpation), and a combination of these into standard keloidectomy, wedge resection (radical keloidecto

Studies have generally classified surgical methods for ear keloids with consideration of the characteristics of the keloid (such as the tent. Therefore, it is important to perform surgery appropriately and a deformity of the ear after surgery are inevitable to some ex

resection. Several studies have compared the recurrence rate of ke

loids according to the surgical method used. Lee et al. [11] argued that core excision was the best surgical method for keloids in the ear in terms of the recurrence rate. Park et al. [10] reviewed 1,027 patients who underwent surgical excision of keloids in the ear, and reported that the recurrence rate ranged from 7.6% to 11.2% depending on the surgical method. However, the differences in the recurrence rate between each method were not analyzed statistically since the surgical method was determined according to the type of keloid; furthermore, there have been few reports on the aesthetic results related to the ear shape after keloid removal.

Reconstruction of soft tissue defects following the surgical re

moval of keloids in the ear is still a challenging task for surgeons. Surgeons must consider the size and shape of the ear, scar, and re

currency. Even if reconstruction is successful, volume reduction and a deformity of the ear after surgery are inevitable to some extent. Therefore, it is important to perform surgery appropriately with consideration of the characteristics of the keloid (such as the location, size, and type) for each patient.

Studies have generally classified surgical methods for ear keloids into standard keloidectomy, wedge resection (radical keloidecto

my), core excision (core extirpation), and a combination of these surgical methods. Standard keloidectomy is a method that removes the keloid by an elliptical incision through the keloid-involved surface, and it is mainly performed on pedunculated-type keloids. Wedge resection, also called radical keloidectomy, is commonly used when keloid has involved both the anterior and posterior sur

faces of the ear, but can also be used for cases of one surface in

volvement. Core excision was initially introduced as a surgical method to effectively treat “dumbbell-shaped” keloids in the ear [12], and then it was accepted as a method to specifically remove the keloid tissue and preserve the surrounding tissue as much as possible [13].

The surgical method may be selected depending on the size or type of the keloid, without there necessarily being a single optimal choice. In standard keloidectomy, the surgeon must remove all ke

loid tissue to reduce the risk of recurrence, and depending on the depth of the keloid, the thickness of the remnant skin flap may vary, so attention should be paid to both the recurrence risk and the re

construction method during surgery. Core excision also requires attention to keloid recurrence due to incomplete excision, and trim

ming the remnant skin after keloid excision is necessary. After trim

ming, the distance from the defect to the ear contour border may be too short to be meaningful for preserving the tissue, or it may lead to a “dog ear” after closure of the defect, especially in areas such as the earlobe and ear helix. Wedge resection has the disadvantage of reducing the absolute volume of the ear after reconstruction to a greater extent than other surgical methods, since it removes even normal tissue, but the method is simple and none of the other con

siderations discussed above need to be taken into account. In par

ticular, wedge resection can be performed relatively easily when the keloid is located in the earlobe or ear helix.

It is aesthetically important to maintain the symmetry of facial features, which are often bilaterally symmetrical or occur in pairs on the face. However, the overall shape of each ear cannot be com

pared at the same time when the face is viewed from the front. Ears often show asymmetry by default, and in particular, they show var

ious types of asymmetry depending on various factors such as sex, race, and earlobe type [14,15]. Considering the aforementioned characteristics of the ear, it can be considered that the volume re

duction itself caused by the surgical resection of keloids does not cause significant deformities of the ear and reconstructing the ear in a way that preserves the normal shape is more important than achieving symmetry of both ears. Thus, wedge resection can be an attractive option in that it can sufficiently preserve the intact shape of the ear, and Park et al. [10] even argued that wedge resection of keloids located in the earlobe has the advantage of obtaining a youth

ful appearance by reducing the size of the earlobe.

Therefore, we suggest some characteristics of patients that can predict better results when wedge resection is performed. First, if the keloid is close to the outer contour of the ear, the size of the de

fect after resection can be minimized. Second, if the keloid is in a long-detached earlobe, a youthful appearance of the ear can be ob

tained by removing some of the earlobe tissue together by wedge resection. Third, if the scapho-conchal angle is small, the asymme

try is relatively difficult to notice because the area of the ear observ

able from the front is small.

We present four cases in which earlobe and ear helix keloids were removed by wedge resection. In these cases, there was no de

formity of the ear or keloid recurrence, and these cases indicate that wedge resection is still useful as a surgical method for keloids in the earlobe and ear helix. However, due to the limitations of a case report, an objective comparison of results between surgical methods was not possible. Nevertheless, based on our cases, there

Case 4
A 26-year-old woman complained of a keloid in the left ear helix after a piercing. The keloid developed after an ear piercing 8 years ago. The patient underwent surgical resection 2 years ago, but the keloid recurred. The size of the keloid was 1.3×1.0×1.0 cm. The keloid was removed through wedge resection under local anesthesia, and no radiation therapy was performed. There were no comp

lications in the wound healing process, and no specific product for scar management was used. During 10 months of follow-up, no significant deformity or recurrence was observed (Fig. 4).

DISCUSSION

Treatments for keloids include surgical and non-surgical methods. Surgical resection is an important treatment modality for keloids in the ear, and several surgical methods have been used for keloid resection. Several studies have compared the recurrence rate of keloids according to the surgical method used. Lee et al. [11] argued that core excision was the best surgical method for keloids in the ear in terms of the recurrence rate. Park et al. [10] reviewed 1,027 patients who underwent surgical excision of keloids in the ear, and reported that the recurrence rate ranged from 7.6% to 11.2% depending on the surgical method. However, the differences in the recurrence rate between each method were not analyzed statistically since the surgical method was determined according to the type of keloid; furthermore, there have been few reports on the aesthetic results related to the ear shape after keloid removal.

Reconstruction of soft tissue defects following the surgical re

moval of keloids in the ear is still a challenging task for surgeons. Surgeons must consider the size and shape of the ear, scar, and re

currency. Even if reconstruction is successful, volume reduction and a deformity of the ear after surgery are inevitable to some extent. Therefore, it is important to perform surgery appropriately with consideration of the characteristics of the keloid (such as the location, size, and type) for each patient.

Studies have generally classified surgical methods for ear keloids into standard keloidectomy, wedge resection (radical keloidecto

my), core excision (core extirpation), and a combination of these surgical methods. Standard keloidectomy is a method that removes the keloid by an elliptical incision through the keloid-involved surface, and it is mainly performed on pedunculated-type keloids. Wedge resection, also called radical keloidectomy, is commonly used when keloid has involved both the anterior and posterior sur

faces of the ear, but can also be used for cases of one surface in

volvement. Core excision was initially introduced as a surgical method to effectively treat “dumbbell-shaped” keloids in the ear [12], and then it was accepted as a method to specifically remove the keloid tissue and preserve the surrounding tissue as much as possible [13].

The surgical method may be selected depending on the size or type of the keloid, without there necessarily being a single optimal choice. In standard keloidectomy, the surgeon must remove all ke

loid tissue to reduce the risk of recurrence, and depending on the depth of the keloid, the thickness of the remnant skin flap may vary, so attention should be paid to both the recurrence risk and the re

construction method during surgery. Core excision also requires attention to keloid recurrence due to incomplete excision, and trim

ming the remnant skin after keloid excision is necessary. After trim

ming, the distance from the defect to the ear contour border may be too short to be meaningful for preserving the tissue, or it may lead to a “dog ear” after closure of the defect, especially in areas such as the earlobe and ear helix. Wedge resection has the disadvantage of reducing the absolute volume of the ear after reconstruction to a greater extent than other surgical methods, since it removes even normal tissue, but the method is simple and none of the other con

siderations discussed above need to be taken into account. In par

ticular, wedge resection can be performed relatively easily when the keloid is located in the earlobe or ear helix.

It is aesthetically important to maintain the symmetry of facial features, which are often bilaterally symmetrical or occur in pairs on the face. However, the overall shape of each ear cannot be com

pared at the same time when the face is viewed from the front. Ears often show asymmetry by default, and in particular, they show var

ious types of asymmetry depending on various factors such as sex, race, and earlobe type [14,15]. Considering the aforementioned characteristics of the ear, it can be considered that the volume re

duction itself caused by the surgical resection of keloids does not cause significant deformities of the ear and reconstructing the ear in a way that preserves the normal shape is more important than achieving symmetry of both ears. Thus, wedge resection can be an attractive option in that it can sufficiently preserve the intact shape of the ear, and Park et al. [10] even argued that wedge resection of keloids located in the earlobe has the advantage of obtaining a youth

ful appearance by reducing the size of the earlobe.

Therefore, we suggest some characteristics of patients that can predict better results when wedge resection is performed. First, if the keloid is close to the outer contour of the ear, the size of the de

fect after resection can be minimized. Second, if the keloid is in a long-detached earlobe, a youthful appearance of the ear can be ob

tained by removing some of the earlobe tissue together by wedge resection. Third, if the scapho-conchal angle is small, the asymme

try is relatively difficult to notice because the area of the ear observ

able from the front is small.

We present four cases in which earlobe and ear helix keloids were removed by wedge resection. In these cases, there was no de

formity of the ear or keloid recurrence, and these cases indicate that wedge resection is still useful as a surgical method for keloids in the earlobe and ear helix. However, due to the limitations of a case report, an objective comparison of results between surgical methods was not possible. Nevertheless, based on our cases, there
is no need to avoid radical resection, such as wedge resection, in appropriately selected patients.

NOTES

Conflict of interest
Youngwoong Choi is an editorial board member of the journal but was not involved in the peer reviewer selection, evaluation, or decision process of this article. No other potential conflicts of interest relevant to this article were reported.

Patient consent
The patients provided written informed consent for the publication and use of their images.

ORCID
Sihyun Yoon https://orcid.org/0000-0003-3297-1453
Seung Han Song https://orcid.org/0000-0001-5996-3408
Youngwoong Choi https://orcid.org/0000-0002-2211-2981

REFERENCES

1. Seo BF, Ko HS, Kwon H, et al. V-Y advancement flap: aesthetic reconstruction for auriculotemporal keloid excision. Arch Aesthetic Plast Surg 2017;23:164-7.
2. Huang C, Wu Z, Du Y, et al. The epidemiology of keloids. In: Teot L, Mustoe TA, Middelkoop E, et al., editors. Textbook on scar management. Cham: Springer; 2020. p. 29-35.
3. Chike-Obi CJ, Cole PD, Brissett AE. Keloids: pathogenesis, clinical features, and management. Semin Plast Surg 2009;23:178-84.
4. Shih B, Bayat A. Genetics of keloid scarring. Arch Dermatol Res 2010;302:319-39.
5. Joh YH, Shin SJ, Park MC, et al. Review of keloid patients with clinical experience. Arch Aesthetic Plast Surg 2014;20:165-8.
6. Robles DT, Berg D. Abnormal wound healing: keloids. Clin Dermatol 2007;25:26-32.
7. Kim CJ, Choi H, Na CH, et al. Clinical and epidemiological study of ear keloids: a 10-year single-institution study. Korean J Dermatol 2021;59:8-14.
8. Gauglitz GG, Korting HC, Pavicic T, et al. Hypertrophic scarring and keloids: pathomechanisms and current and emerging treatment strategies. Mol Med 2011;17:113-25.
9. Ogawa R, Akaishi S, Dohi T, et al. Analysis of the surgical treatments of 63 keloids on the cartilaginous part of the auricle: effectiveness of the core excision method. Plast Reconstr Surg 2015;135:868-75.
10. Park TH, Seo SW, Kim JK, et al. Earlobe keloids: classification according to gross morphology determines proper surgical approach. Dermatol Surg 2012;38:406-12.
11. Lee Y, Minn KW, Baek RM, et al. A new surgical treatment of keloid: keloid core excision. Ann Plast Surg 2001;46:135-40.
12. Salasche SJ, Grabski WJ. Keloids of the earlobes: a surgical technique. J Dermatol Surg Oncol 1983;9:552-6.
13. Brown LA Jr, Pierce HE. Keloids: scar revision. J Dermatol Surg Oncol 1986;12:51-6.
14. Sforza C, Grandi G, Binelli M, et al. Age- and sex-related changes in the normal human ear. Forensic Sci Int 2009;187:110.e1-7.
15. Azaria R, Adler N, Sifren R, et al. Morphometry of the adult human earlobe: a study of 547 subjects and clinical application. Plast Reconstr Surg 2003;111:2398-402.