

Improving the quality of life of parotid surgery patients through a modified facelift incision and great auricular nerve preservation

Verbesserung der Lebensqualität bei Parotischirurgie-Patienten durch eine modifizierte Facelift-Inzision unter Erhalt des N. auricularis magnus

Abstract

Postoperative quality of life after parotidectomy depends not only on surgical outcomes, such as the complete removal of a tumour, non-recurrence and the preservation of facial nerve function, but also on scar satisfaction and the degree of sensory dysfunction in the upper cervical area and at the ear lobe.

Especially young patients and women consider the scar in the infra-auricular area and in the neck region to be distressing and even disfiguring.

Resection of the great auricular nerve leads to paraesthesia and hypoesthesia, which leads to discomfort in many patients especially when using the telephone, shaving or wearing earrings.

A modified approach to the parotid gland via a facelift incision and the careful exposure of the great auricular nerve can reduce the aforementioned problems considerably and improve postoperative quality of life. We present our experiences with the modified approach at our institution.

Keywords: parotidectomy, facelift incision, Blair incision, quality of life, loss of sensation

Zusammenfassung

Die postoperative Lebensqualität nach Parotidektomien hängt nicht nur vom chirurgischen Ergebnis, also der kompletten Entfernung und dem nicht erneuten Auftreten des Tumors und dem Erhalt der N. facialis-Funktion, sondern auch von der Zufriedenheit mit der Narbe und dem Grad der Sensibilitätsstörungen im Bereich der präaurikulären Haut und des Ohrläppchens ab.

Insbesondere von jüngeren Patienten und Frauen wird die Narbe in der infraaurikulären und Halsregion als störend und teilweise entstellend empfunden.

Die Para- und Hyästhesien in Folge der Durchtrennung des N. auricularis schildern viele Patienten besonders beim Telefonieren, Rasieren oder Tragen von Ohrschmuck als unangenehm.

Durch einen modifizierten Zugang zur Glandula parotidea im Sinne einer Facelift-Schnittführung und der subtilen Präparation des N. auricularis können die genannten Probleme deutlich reduziert und die postoperative Lebensqualität verbessert werden. Wir stellen unsere Erfahrungen mit der Modifikation des chirurgischen Zugangs in unserer Klinik vor.

Schlüsselwörter: Parotidektomie, Facelift-Inzision, Blair-Inzision, Lebensqualität, Sensibilitätsstörung

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Introduction

Patient satisfaction after surgery for benign tumours depends mainly on three parameters: Preservation of facial nerve function, the scar, and loss of sensation in the area supplied by the great auricular nerve.

Whereas intraoperative monitoring and the use of optical devices such as microscopes and magnifying glasses enable surgeons to preserve facial nerve function in almost all cases, a Blair incision is often associated with visible scars and sometimes severe hypoaesthesia and paraesthesia in the region of the auricle and pre-auricular skin.

A Blair or "Lazy-S" incision allows the operating surgeon to expose the entire parotid gland and thus removing all tumours in this area as well as the lymph nodes in Levels I–III. This approach, however, has the disadvantage of visible scars in the infraauricular region, which can cause considerable distress especially to female and young patients. A facelift approach with a retroauricular incision can be performed to minimize adverse cosmetic effects. At the same time, it provides access to most regions of the parotid gland and facilitates the identification of the facial nerve. Aesthetically this approach is particularly useful for the management of benign parotid tumours located in the central and caudal regions of the lateral lobe of the parotid gland. Lymph node levels II and III and tumours that are located at the far periphery are the only structures that cannot always be successfully exposed via this approach.

The sensory loss that causes discomfort in patients results from the division of the great auricular nerve in the region of the Blair incision or the sacrifice of the anterior branch of the nerve. Especially the loss of sensation in the auricle and in particular in the ear lobe is distressing for patients, who report telephone difficulties and use the telephone on the non-operative ear or have difficulties shaving and wearing earrings. Preservation of the branch that supplies the ear lobe can minimize these symptoms.

Patients and methods

Preservation of the posterior branch of the great auricular nerve

The great auricular nerve originates from the cervical plexus and ascends to the posterior inferior region of the parotid gland, where it divides into several small branches. The nerve supplies sensation for an extensive area of the face including the skin over the parotid gland and the mastoid process and the surface of the external ear.

The great auricular nerve winds around the posterior aspect of the sternocleidomastoid muscle. After perforating the deep fascia, it ascends upon the sternocleidomastoid muscle beneath the platysma to the parotid gland, where it divides into an anterior and a posterior branch. The

anterior branch provides sensory innervation to the skin overlying the parotid gland and communicates with the facial nerve in the substance of the gland. The posterior branch innervates the skin over the mastoid and the posterior surface of the auricle except at its upper part. A filament pierces the auricle to reach its lateral surface. The posterior branch communicates with the smaller occipital nerve, the auricular branch of the vagus-nerve, and the auricular branch of the facial nerve.

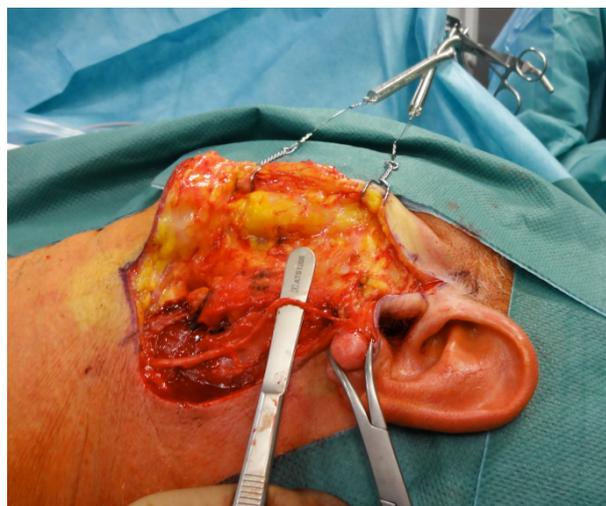


Figure 1: Exposure and preservation of the posterior branch of the great auricular nerve. The posterior branch is demonstrated with forceps. The anterior branches are resected during parotidectomy.

In 37 patients who underwent parotidectomy, the great auricular nerve branch that provides sensation to the ear lobe was identified and preserved (Figure 1). The patients were followed up for sensory testing after a minimum period of eight weeks. We used a caliper to perform one-point and two-point discrimination tests. The distance between the tips of the caliper was 4 mm. Sensation was tested in the region of the neck and at the ear lobe. Patients were compared with a historical control group of 99 patients whose great auricular nerve had been completely divided during parotid surgery and who underwent sensation tests at follow-up visits (Table 1).

Table 1: Data of patients with great auricular nerve sacrifice or preservation

	Sacrificed group	Preserved group
Number	99	37
Sex		
Male	47	20
Female	52	17
Age	58 (22–83) years	55 (24–79) years
Tumour entity		
Pleomorphic adenoma	50	22
Warthin tumour	33	10
Monomorphic adenoma	4	4
Other	12	1

Facelift incision

Over the past two years, 182 patients had a traditional Blair incision (Figure 2) and 32 patients had a facelift incision (Figure 3). A facelift incision was used only for patients with benign mobile parotid tumours smaller than 4 cm. Of the 32 patients, 18 were female and 14 male. Histological analysis showed pleomorphic adenomas in 17 cases, cystadenolymphoma in 11 cases, and monomorphic adenomas in 4 cases (Table 2).

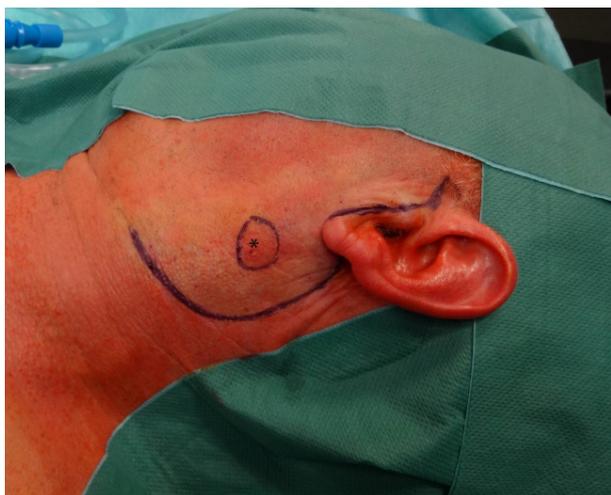


Figure 2: A standard Blair incision for parotidectomy. It starts at the root of the helix, continues along the tragus and the ear lobe and follows a natural skin crease in a curved fashion.

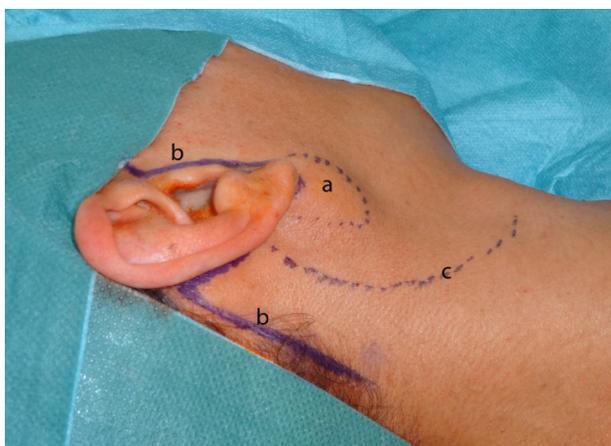


Figure 3: A modified facelift incision. It starts at the root of the helix, continues along the ear lobe in a retro-auricular direction and along the hairline in a caudal direction (b). Location of the tumour (a), Blair incision (c).

Postoperative complications including wound healing problems, skin necrosis, seroma, haematoma, facial nerve paresis, and gustatory sweating (Frey's Syndrome) were recorded. The patients were asked to rate their satisfaction with the cosmetic outcome using a scale from 1 (very good) to 6 (very poor).

Table 2: Data of patients who underwent a Blair incision or a facelift incision

	Blair incision	Facelift incision
Number	182	32
Sex		
Male	94	14
Female	88	18
Age	56 (20–88) years	51 (23–77) years
Tumour entity		
Pleomorphic adenoma	90	17
Warthin tumour	62	11
Monomorphic adenoma	14	4
Other	5	0
Malignancy	11	0

Preoperative diagnostic procedures for all patients included imaging, i.e. ultrasonography, computed tomography (CT) and magnetic resonance imaging (MRI), as well as fine-needle aspiration cytology (FNAC).

Results

Preservation of sensation

In the group of patients who underwent surgery with nerve preservation (the preserved group), 52% were able to discriminate two points in the region of the neck skin and 78% at the ear lobe. In the group of patients with great auricular nerve sacrifice (the sacrificed group), 42% were able to discriminate two points in the infra-auricular area and 50% at the ear lobe. During one-point tests, 74% of the preserved group and 65% of the sacrificed group stated that they felt touches in the region of the neck. In addition, 89% of the preserved group and 55% of the sacrificed group perceived the stimulus at the ear lobe (Figure 4, Figure 5, Figure 6, Figure 7).

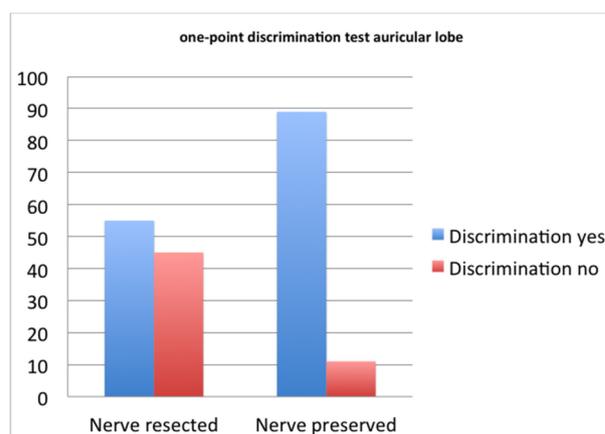


Figure 4: Results of the one-point discrimination test at the auricular lobe

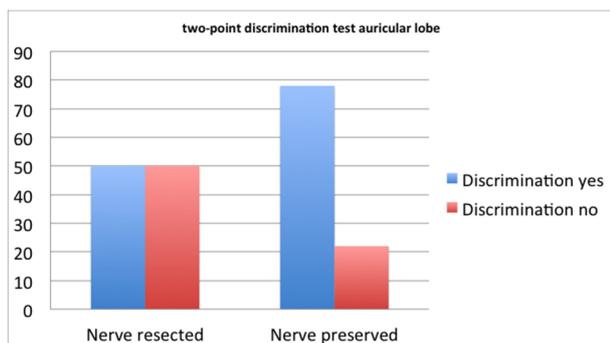


Figure 5: Results of the two-point discrimination test at the auricular lobe

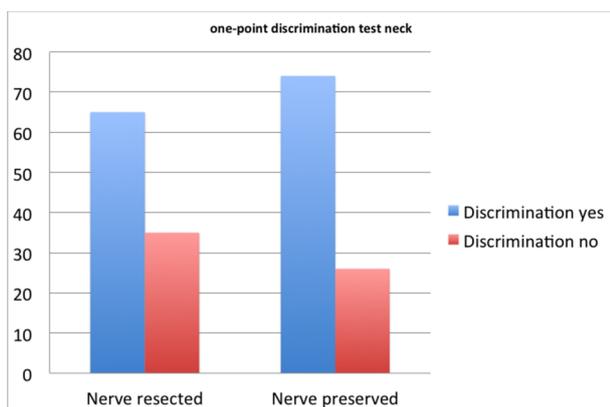


Figure 6: Results of the one-point discrimination test at the neck

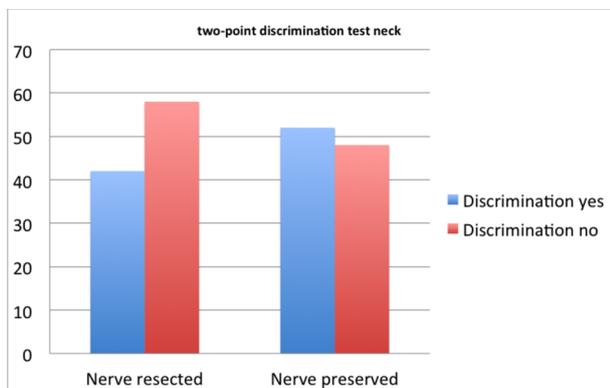


Figure 7: Results of the two-point discrimination test at the neck

Parotidectomy via facelift incision

No patient experienced severe complications. No patient had a tumour larger than 4 cm. Macroscopic and microscopic examinations showed that all tumours had been completely removed. In no case did parotidectomy via a facelift incision cause a substantial increase in operative time compared with surgery via a Blair incision (mean operative time for a facelift incision: 102 minutes). The facial nerve was identified and preserved in all cases. Two patients developed postoperative salivary fistulas, which were successfully managed by conservative methods. There was no incidence of Frey's syndrome. When patients were asked to rate their satisfaction with

the functional and cosmetic outcome of surgery on a scale from 1 (very good) to 6 (very poor), a mean score of 1.4 was obtained (Table 3).

Discussion

Following great auricular nerve division, many patients report hypoaesthesia that causes discomfort especially in the region of the ear lobe. Accordingly, preservation of the great auricular nerve can lead to higher sensibility or a more rapid regeneration of sensibility after surgery. Careful exposure of the nerve allows surgeons to preserve the branch of the great auricular nerve that provides sensibility to the ear lobe. We performed two-point discrimination tests in order to assess whether nerve-sparing surgery can preserve skin sensibility after parotidectomy. Tumour resection is almost always associated with initial impairment of great auricular nerve function. As a result, the vast majority of patients report hypoaesthesia in the first postoperative weeks. The most severe symptoms occur in the region of the ear lobe, at the angle of the mandible and in the infra-auricular area [1]. The decisive question is, however, whether or not the preservation of the great auricular nerve may lead to a more rapid regeneration of sensibility in the pre-auricular and infra-auricular regions. The anterior branch of the great auricular nerve runs over the parotid gland, where it divides into several smaller branches. Depending on the size and location of the tumour, the operating surgeon can attempt to preserve parts of the great auricular nerve during surgery in order to avoid loss of sensation especially in the ear lobe, which may be unpleasant for the patient. These aspects were already addressed by Vieira et al., who investigated two patient groups, i.e. patients who underwent nerve-sparing surgery and patients who underwent sacrifice of the great auricular nerve [2]. Immediately after surgery, both groups showed an impairment of sensibility especially at the ear lobe and in the infraauricular area. Patients who underwent great auricular nerve preservation reached preoperative sensibility levels within six months after surgery. In the other group of patients sensibility as well improved within six months after surgery but did not return to preoperative levels. Other authors [2], [3], [4] confirm that nerve-sparing surgery has great potential for rapid regeneration of sensory function despite initial hyposensibility. They found that patient quality of life improved when sensory deficits were reduced [3], [4]. Such deficits lead, for example, to difficulty using the telephone, shaving, combing hair, wearing earrings, and sleeping on the operated side [3]. By contrast, Porter and Wood [5] and Min et al. [1] did not find significant differences between patients who underwent parotidectomy with or without preservation of the great auricular nerve. On the basis of their studies, they conclude that the preservation of the great auricular nerve is unnecessary. In addition, nerve preservation can be impossible when tumour size or other factors require a parotidectomy than cannot be performed in a standard

Table 3: Results of parotid surgery using a Blair incision or a modified facelift incision. Scars were assessed using a scale from 1 (very good) to 6 (very poor).

Access	Number	Nature of tumour (number)	Operative time (minutes)	Scar assessment (mean score)	Salivary fistula	Frey's syndrome	Facial nerve damage
Blair incision	182	Benign (171) Malignant (11)	98 (+/-19.3) 143 (+/-25.4)	2.6 2.9	7 2	2 0	2 (marginal mandibular branch) 5 (marginal mandibular branch, buccal branch)
Facelift incision	32	Benign (32)	102 (+/-9.1)	1.4	1	0	0

manner. The results of these studies, however, do not constitute an argument against great auricular nerve preservation during parotidectomy. The high percentage of patients with recovery of sensibility shows that this surgical option provides enough benefits for patients to justify efforts to preserve the nerve.

The two-point discrimination tests we performed in the region of the ear lobe and in the infra-auricular area suggest that our patients benefited from nerve-sparing surgery. The percentage of patients who were unable to identify a stimulus in the region of the neck was 35% in the group with nerve division, compared to 26% in the group with nerve preservation. Similarly, the percentage of patients who were unable to identify a stimulus at the ear lobe was 35% in the group with nerve division and as low as 11% in the group with nerve preservation. Two-point discrimination tests showed that 78% of the preserved group and 50% of the sacrificed group were able to discriminate two points at the ear lobe. Since nerve-sparing surgery can be associated with temporary nerve damage, a longer period of regeneration may lead to even better long-term results of nerve preservation. In our study, we performed sensation tests after a minimum postoperative period of eight weeks (mean period: 208.72 days) in the preserved group. By contrast, the mean time between surgery and sensory testing was as long as 1746.70 days in the sacrificed (control) group.

In addition preservation of nerve function can improve the quality of life. This applies in particular to patients with hypoaesthesia who report problems with shaving, wearing earrings or using the telephone on the operative side and also to patients who report discomfort when being kissed or caressed in the operative area.

Facelift incision

For many years, the Blair incision has been successfully used in parotid surgery to obtain safe access and achieve excellent exposure of the parotid gland [6]. The S-shaped incision allows surgeons to expose the facial nerve in a retrograde fashion and to extend the incision for a neck dissection. A major disadvantage of a Blair incision is a visible scar in the neck that many (especially young and female) patients consider to be distressing and stigmatising (Figure 8).

Different approaches that provide exposure of the parotid gland and improve cosmetic outcome have been de-

scribed [7], [8], [9], [10], [11], [12], [13]. The use of a facelift incision for parotid surgery was first described by Appiani [14] approximately forty years ago. Terris et al. [15] modified the standard facelift incision in order to gain access to the parotid gland. This approach allows surgeons to expose large portions of the parotid gland and to easily identify the facial nerve. Aesthetically, it is a useful alternative especially for the management of benign parotid tumours that are located in the central and caudal regions of the lateral lobe of the parotid gland (Figure 9).

In our opinion, however, the facelift incision has limitations. Lymph node levels II and III as well as tumours located at the far periphery cannot always be reliably exposed via this approach. In these cases, there is a risk of damage to the marginal mandibular branch of the facial nerve or incomplete tumour resection. In addition, the nerve cannot be identified by retrograde dissection, for example in the presence of large and fixed tumours. We recommend the use of a Blair incision for the removal of malignant tumours that require lymph node excision and tumours which are located at the far periphery or in the deep lobe of the parotid gland. In our patient population, a facelift incision was therefore used only in patients with benign parotid tumours (pleomorphic adenomas, Warthin tumours and monomorphic adenomas), tumours with a diameter of less than 4 cm, and tumours located in the medio-anterior lateral lobe of the parotid gland (Figure 10). Facelift incisions can also be extended in the cranial and occipital directions in order to obtain a wider exposure of the parotid gland or can be extended in the cervical direction in a curved fashion in order to expose the superior lymph nodes (Figure 9). These modifications, however, are associated with a risk of wound healing problems or necrosis at the distal end of the flap [8] and should therefore be used only in cases in which the surgical strategy must be changed during surgery as a result of the tumour entity or difficulties associated with nerve dissection. These limitations also require that facelift incisions be performed only by surgeons who have extensive experience with the use of the Blair incision for parotid surgery and even experienced surgeons must expect a learning curve [8].

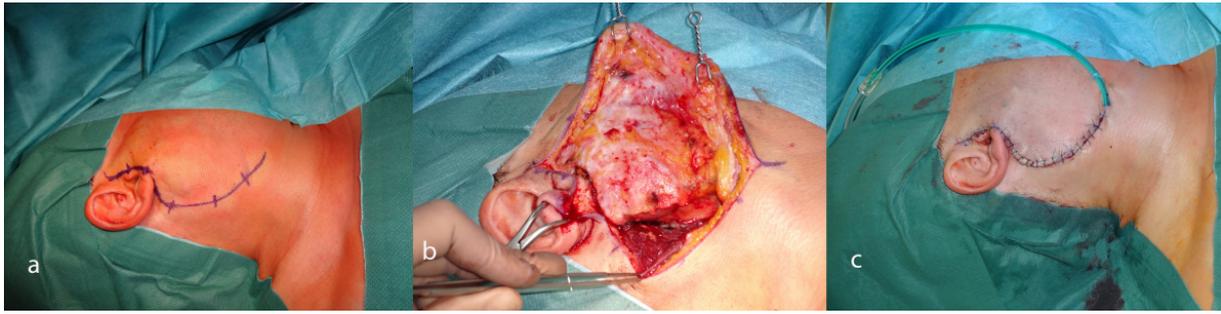


Figure 8: Complete exposure of the parotid gland using a Blair incision. (a) Outline of the incision before surgery. (b) Complete exposure of the parotid gland. (c) Appearance of the incision after wound closure.

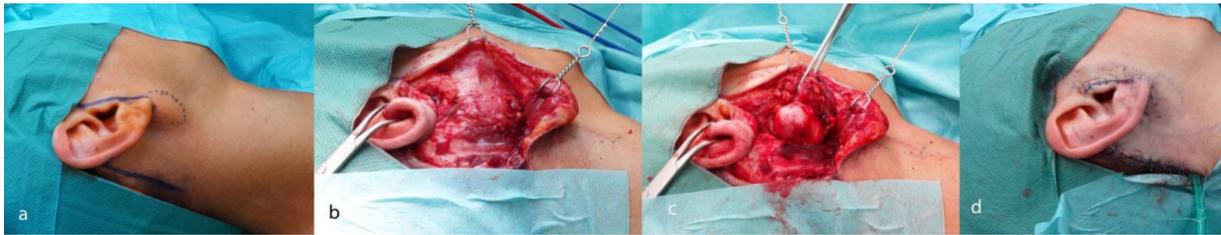


Figure 9: Exposure of an anterior central pleomorphic adenoma of the parotid gland. (a) Outline of the incision before surgery. (b) Exposure of the parotid gland. (c) Location of the tumour. (d) Appearance of the incision after wound closure

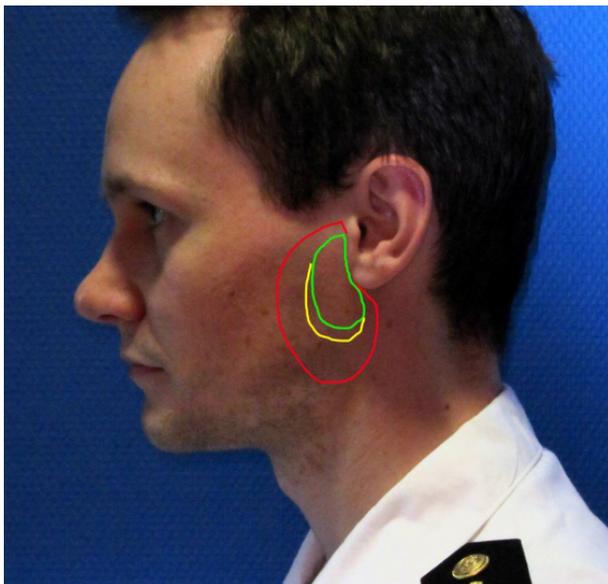


Figure 10: Tumour locations and their suitability for a facelift incision. Green (medio-central area) – excellent suitability; yellow – limited suitability; red (caudal, anterior and cranial areas) – poor suitability

Conclusions

When the great auricular nerve branch that supplies the ear lobe is preserved during parotidectomy, a postoperative loss of sensibility in the region of the ear can be prevented and hypoaesthesia, which many patients consider to be unpleasant or even distressing, can be avoided or reduced. This approach leads to a marked improvement in the quality of life of patients and their performance of daily activities such as using the telephone, wearing earrings and shaving. It does not limit the radicality of surgery. A facelift incision allows surgeons with experience

in parotid surgery to gain safe access and to achieve excellent cosmetic results with a low risk of complications in suitable patients.

The techniques described here lead to a considerable improvement in the outcome of surgery for benign parotid tumours.

Notes

Competing interests

The authors declare that they have no competing interests.

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