

## Quality of life after surgery for benign disease of the parotid gland

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### Abstract

**Objective:** To evaluate quality of life after surgery for benign neoplastic disease of the parotid gland.

**Patients and methods:** A quality of life questionnaire, which was created from the Hebrew version of the University of Washington Quality of Life prototype, was applied to 55 patients who underwent surgery for benign neoplastic parotid disease. All patients were examined in Baskent University Adana Teaching and Medical Research Center, where all except 10 subjects (who responded by phone) completed the quality of life questionnaire.

**Results:** The highest overall score was 96.3 indicating no salivary fistula. Only one patient complained of salivary secretion through the wound scar. The lowest overall score was 59.5 indicating loss of sensation. Although no post-surgical pain was reported by 32 (58 per cent) patients, 16 (29 per cent) patients reported a post-surgical change in their appearance. Scarring and surgical site depression were reported by 26 (47 per cent) and 17 patients (30 per cent), respectively. Facial nerve impairment was reported by seven patients (13 per cent) during the early post-operative period; these patients recovered from that impairment. The only significant statistical correlations were noted between general health and gender, and between post-surgical pain and gender. There was not any statistical correlation between all data and age, tumour type and education level.

**Conclusion:** The general status of patients who have undergone surgery for a benign parotid neoplasm can be assessed with a quality of life questionnaire. Patients' post-surgical quality of life can be improved by the correct choice of surgical approach and reconstructive method.

**Key words:** Parotid Neoplasms; Parotidectomy; Complications; Quality of Life

### Introduction

Benign masses account for 80 per cent of parotid gland tumours. Complete excision of that type of mass ensures minimal surgical morbidity and prevents tumour recurrence.<sup>1</sup> Parotidectomy is performed for benign and malignant diseases of the parotid gland. Various types of parotidectomy (superficial, total, radical) have been described in the literature.<sup>2</sup> Radical parotidectomy is usually performed for invasive malignant parotid tumours. After parotidectomy, complications such as facial nerve paresis or paralysis, scarring, salivary fistula, Frey's syndrome, infection, haematoma, great auricular nerve anaesthesia or recurrence of the tumour may occur.<sup>2</sup> These complications can affect quality of life. The goal of this study was to evaluate the impact of surgical treatment of benign parotid neoplasms on the patient's quality of life.

### Patients and methods

The medical records of the 57 patients who underwent superficial or total parotidectomy for benign

disease between January 2000 and December 2005 at the Baskent University Adana Teaching and Medical Research Center with a minimum six-month follow-up period were examined retrospectively. The patient related data included age, gender, education level, histological findings, procedure used, duration of follow up and complications. The patients were called in to the clinic to complete the quality of life questionnaire. In this study, the questionnaire created from the Hebrew version of the University of Washington Quality of Life prototype was used.<sup>2</sup> Two patients who were younger than 18 years of age were excluded from the study. Ten of the remaining 55 patients completed the questionnaire by phone.

The patients' data were compared with respect to the following factors: age older or younger than 45 years, gender, educational status and presence or absence of benign pleomorphic adenoma as opposed to other histological types. Statistical analyses performed included the Mann–Whitney U test, the Kruskal–Wallis H test, and the chi-square test. A *p* value of  $\leq 0.5$  was considered statistically significant.

## Results

Of the 55 patients studied, 28 were men and 27 were women (age range, 18–84 years; mean, 47.5 years). Nineteen patients were younger than 45 years and 46 patients were 45 years of age or older. Eleven patients had no education, eight had graduated from primary school, 15 had graduated from secondary school, 15 had graduated from high school, and six had graduated from a university. The mean duration of follow up was two years. The most common benign tumour was pleomorphic adenoma (34.5 per cent). Other benign conditions included Warthin's tumour, basal cell adenoma, oncocytoma, haemangioendothelioma, lipoma, chronic sialadenitis, tuberculosis, cyst, Sjögren's syndrome, sialadenosis and hyperplastic lymph nodes (Table I). All patients except four underwent superficial parotidectomy. Total parotidectomy was performed on only four patients, who were treated for a deep lobe tumour. Complications were evaluated with the quality of life questionnaire (Table II).

The highest overall score was 96.3 indicating no salivary fistula. Only one patient complained of salivary secretion through the wound scar, which resolved after a pressure dressing was applied. The lowest overall score was 59.5 indicating loss of sensation with an importance of 1.32 (corresponding to a place between "was affected but is now normal" and "sensation deficit exists but is not bothersome"). The highest importance value was 2.61 indicating local effects with a second highest score of 93.2 and the lowest importance value was 1.27 indicating a salivary fistula. No post-surgical pain was reported by 32 patients (58 per cent). However, 16 patients (29 per cent) reported a change in their appearance. Scarring and surgical site depression were reported by 26 (47 per cent) and 17 (30 per cent) patients, respectively. Facial nerve impairment was found in seven (13 per cent) patients during the early post-operative period. Facial paralysis in those seven patients was a complication of surgery that resolved. Eighteen patients responded 'yes' to the question addressing dry mouth and six answered 'yes' to the association of xerostomia with having undergone surgery. One patient was diagnosed as having Sjögren's syndrome.

TABLE I

INCIDENCE OF DIAGNOSTIC FINDINGS IN THE SUBJECTS STUDIED

Benign condition diagnosis	Patient number ( <i>n</i> )	Per cent
Pleomorphic adenoma	19	33
Warthin's tumour	14	24
Basal cell adenoma	5	9
Oncocytoma	1	2
Haemangioendothelioma	1	2
Lipoma	1	2
Chronic sialadenitis	4	7
Tuberculosis	3	5
Cyst	4	7
Sjögren's syndrome	1	2
Lymphoepithelial lesion	1	2
Sialadenosis	1	2
Hyperplastic lymph node	2	3
Total	57	100

No statistical correlation was found when all data were analysed according to patient age. A significant statistical correlation between general health and gender and between post-surgical pain and gender was noted. The importance of post-surgical pain related to gender was statistically significant. There was no significant correlation between all data and tumour type and between all data and the patients' education level (Table III).

## Discussion

Parotid masses are managed more easily today than in the past because of advances in technology and surgical technique. Surgeons continue to endeavour to minimise the risk of complications resulting from parotidectomy.<sup>3</sup>

Facial nerve paralysis has a significant functional and emotional impact on patients. Patients with facial nerve paralysis often complain about compromised mastication, dysphagia, drooling, poor eye closure and the social ramifications of cosmetic deformity.<sup>3</sup> The incidence of facial nerve paresis or paralysis is as high as 30 per cent to 65 per cent for transient weakness and 3 per cent to 6 per cent for permanent dysfunction.<sup>4</sup> Marshall and colleagues<sup>5</sup> reported a transient facial nerve paresis rate of 24.4 per cent and a permanent palsy rate of 1.9 per cent in their series. Mehle and colleagues<sup>6</sup> reviewed the results of 256 consecutive patients who underwent parotid surgery for benign neoplasia over a 15-year period. Those authors reported that immediate facial nerve dysfunction occurred in 46.1 per cent of those patients and that permanent facial nerve dysfunction developed in 3.9 per cent.

Many surgeons recommend the use of intra-operative facial nerve stimulation during parotid surgery to prevent trauma to the facial nerve.<sup>3</sup> In their study, Nitzan and colleagues<sup>2</sup> found 14 patients with facial impairment. Patients' perception of facial impairment is not always the same as the surgeons'. The patients may think that the facial impairment is minimal although it is completely resolved. This is so interesting that Nitzan and colleagues<sup>2</sup> include patients' perceptions in their questionnaire. We agree that this point is very important too. In our study, we found seven patients with transient facial impairment. When we compared the rate of facial paralysis with the subjects' age, gender and tumour type, we found no statistically significant correlation.

The greater auricular nerve innervates most of the auricle and a small adjacent area of skin. Division of the greater auricular nerve during parotidectomy causes a sensory deficit around the skin of the jaw and ear.<sup>7</sup> Patients with that type of sensory deficit are often unable to wear earrings. They experience discomfort when they are touched or kissed and are more susceptible to burns and injuries and to sustaining cuts while shaving. Some such patients have been forced to give up skiing because cold weather causes discomfort.<sup>7–9</sup> Christensen and Jacobsen<sup>9</sup> found that the posterior branch of the greater auricular nerve could be preserved in 70 per cent of patients if

TABLE II  
RESULTS OF THE PAROTIDECTOMY QUALITY OF LIFE QUESTIONNAIRE

No	Domain	Range	Results			
			Mean	Range	Importance	Range
1	Your general health is	1 Poor 2 Not bad 3 Good 4 Very good 5 Excellent	2.89	1–5	NA	NA
2	Compared with 1 year before diagnosis, your health is now	1 Much worse 2 Worse 3 The same 4 Better 5 Much better	3.21	2–5	NA	NA
3	Pain	100 No pain 75 Some pain, treatment not needed 50 Some pain, treatment needed 25 Much pain, treated with narcotic medication	88.18	50–100	1.47	1–3
4	Appearance	0 Severe uncontrollable pain 100 No change 75 Some change 50 Bothering change 25 Severe change	91.81	50–100	1.32	1–3
5	The scar	0 Cannot be with people 100 Is hardly noticeable 75 Noticeable but not bothersome 50 Noticeable and bothersome 25 Noticeable and very bothersome 0 Unbearable	86.81	50–100	NA	NA
6	Change or asymmetry in facial contour	100 Is hardly noticeable 75 Noticeable but not bothersome 50 Noticeable and bothersome 25 Noticeable and very bothersome 0 Unbearable	91.36	50–100	NA	NA
7	Sensation in the operated site	100 Is not affected 75 Was affected but is now normal 50 Sensation deficit exists but is not bothersome 25 Sensation deficit exists and is bothersome 0 Sensation deficit exists and is unbearable	59.54	25–100	1.32	1–3
8	Local effects	100 None 75 Erythema or sweating during eating meals 50 Erythema or sweating that is not bothersome 25 Erythema or sweating that is bothersome 0 Erythema or sweating is intolerable	93.18	50–100	2.61	1–4
9	Salivary secretion through the wound scar (fistula)	100 No secretion through the wound at any time 66 Non-bothersome secretion that resolved 33 Bothersome secretion that resolved 0 Secretion persists	96.34	0–100	1.27	1–3
10	Facial nerve	100 No damage to facial movement 66 Facial movement was impaired but has resolved completely 33 Partial impairment of facial movement 0 Total impairment of facial movement	95.67	66–100	1.38	1–3
11	Is your mouth dry?	Yes/No	Yes, 18 No, 37			
12	Do you associate dryness of mouth with the surgery?	Yes/No	Yes, 6 No, 49			

NA = Not applicable. Importance of each following item to overall quality of life: 1 = not important; 2 = a little bit important; 3 = somewhat important; 4 = quite a bit important; and 5 = extremely important

TABLE III  
RESULTS OF THE QUESTIONNAIRE COMPARING PATIENT GROUPS

	Patient age			Gender			Tumour type			Level of education					
	<45 Years (n = 19)	>45 Years (n = 36)	<i>p</i>	Male (n = 28)	Female (n = 27)	<i>p</i>	Mixed tumour (n = 19)	Other (n = 36)	<i>p</i>	Illiterate (n = 11)	Primary school (n = 8)	Secondary school (n = 15)	High school (n = 15)	University (n = 6)	<i>p</i>
1. Health, general	3.00	2.83	.618	3.11	2.67	.03	2.63	3.03	.097	2.73	2.88	3	2.87	3	.965
2. Health, now	3.32	3.17	.413	3.29	3.15	.434	3.37	3.14	.272	3.09	3.13	3.20	3.27	3.50	.691
3. Pain	86.84	88.89	.582	91.96	84.26	.05	84.21	90.28	.189	79.55	87.50	95.00	86.67	91.67	.168
4. Importance	1.53	1.44	.582	1.32	1.63	.047	1.63	1.39	.189	1.82	1.50	1.20	1.53	1.33	.168
5. Appearance	90.79	92.36	.913	92.86	90.74	.517	90.79	92.36	.737	86.36	87.50	95.00	91.67	100.00	.146
6. Importance	1.37	1.31	.938	1.29	1.37	.517	1.37	1.31	.737	1.55	1.50	1.20	1.33	1.00	.146
7. Scar	85.53	87.50	.795	86.61	87.04	1	82.89	88.89	.118	86.36	90.63	90.00	85.00	79.17	.447
8. Asymmetry	90.79	91.67	.792	90.18	92.59	.459	90.79	91.67	.895	88.64	90.63	95.00	88.33	95.83	.403
9. Sensation	57.89	60.42	.733	58.04	61.11	.670	57.89	60.42	.733	59.09	56.25	60.00	55.00	75.00	.596
10. Importance	2.68	2.58	.733	2.68	2.56	.670	2.68	2.58	.733	2.64	2.75	2.60	2.80	2.00	.596
11. Frey	92.11	93.75	.554	95.54	90.74	.255	94.74	92.36	.836	90.91	90.63	90.00	100.00	91.67	.306
12. Importance	1.32	1.25	.554	1.18	1.37	.255	1.21	1.31	.836	1.36	1.38	1.40	1.00	1.33	.306
13. Saliva	92.95	98.14	.233	96.43	96.26	.564	92.95	98.14	.233	93.91	100.00	97.73	93.33	100.00	.885
14. Importance	1.21	1.06	.233	1.11	1.11	.564	1.21	1.05	.233	1.18	1.00	1.07	1.20	1.00	.885
15. Facial	98.21	94.33	.232	93.93	97.48	.249	96.42	95.28	.724	90.73	95.75	100.00	93.20	100.00	.217
16. Importance	1.32	1.42	.647	1.39	1.37	.863	1.42	1.36	.757	1.45	1.50	1.27	1.53	1.00	.259
17. Xerostomia, yes	6	12	.572	7	11	.170	5	13	.336	6	5	3	3	1	.075
Xerostomia, no	13	24		21	16		14	23		5	3	12	12	5	
18. Surgery related, yes	3	3	.338	2	4	.317	3	3	.338	1	3	2	0	0	.074
Surgery related, no	16	33		26	23		16	33		10	5	13	15	6	

Statistical analyses performed included the Mann–Whitney U test, the Kruskal–Wallis H test, and the chi-square test. Importance of each following item to overall quality of life: 1 = not important; 2 = a little bit important; 3 = somewhat important; 4 = quite a bit important; and 5 = extremely important

cautious dissection was performed. Marshall and colleagues<sup>5</sup> reported that 66.2 per cent of patients commented on noticing a sensory deficit in the cheek area and the ear immediately after surgery, but that incidence had decreased to 30.6 per cent per cent one year after surgery. In their study, Porter and Wood<sup>10</sup> stated that there was no difference in the sensory loss incurred if the greater auricular nerve was sacrificed or preserved. Patel and colleagues<sup>11</sup> concluded that in 53 patients, greater auricular nerve sacrifice during parotidectomy had no significant effect on quality of life. de Ru and colleagues<sup>1</sup> reported that of 45 patients 14 (32 per cent) complained of severe dysaesthesia that greatly affected their quality of life. In their quality of life study, Nitzan and colleagues<sup>2</sup> found that of 53 patients who had undergone parotidectomy three complained of sensation impairment. In our study, 43 patients complained of a sensory deficit in the skin supplied by the greater auricular nerve. We did not preserve the greater auricular nerve in our patients. When we compared the rate of dermal sensory deficit with the subjects' age, gender, level of education and tumour type we found no statistically significant correlation. Perhaps dermal sensory deficit is related to nerve preservation.

Frey's syndrome is a well-known complication of parotidectomy. The clinical incidence of Frey's syndrome after parotid surgery has been reported to be as high as 53 per cent.<sup>12</sup> Frey's syndrome is characterised by unilateral sweating and flushing of the facial skin in the area of the parotid gland during eating. The pathogenesis of Frey's syndrome is based on the aberrant regeneration of sectioned parasympathetic fibres, which occurs when the connection of those nerve fibres with parotid tissue has been interrupted.<sup>13</sup> Several procedures can prevent Frey's syndrome occurring during parotidectomy. Surgical methods (thick skin flap elevation or the use of fascia lata grafts, dermal fat grafts, sternocleidomastoid muscle flaps, superficial musculoaponeurotic system flaps or temporoparietal fascia flaps<sup>14–18</sup>) involve interposing a barrier between the sweat glands and the exposed post-ganglionic parasympathetic nerve fibres. Asal and colleagues<sup>18</sup> used the sternocleidomastoid muscle flap in 12 of 24 patients, and no flap was used in the other 12 patients in their study. Those authors indicated that the result was zero per cent in the sternocleidomastoid muscle flap group and 50 per cent in the non-flap group, as determined by the starch–iodine test. Casler and Conley<sup>13</sup> prevented Frey's syndrome by using an inter opposing flap made of the superficial musculoaponeurotic system. The authors found no clinical evidence of gustatory sweating in their groups of patients. de Ru and colleagues<sup>1</sup> reported that five of 45 patients with Frey's syndrome did not receive that type of flap. In our study, nine patients complained of flushing and gustatory sweating. In all patients, preventive measures for Frey's syndrome were not taken intra-operatively. When the rate of Frey's syndrome was correlated with the subjects' age, gender, education level and tumour type, we found no statistically significant correlation.

Frey's syndrome may be related to the surgical techniques used or to the type of surgery performed.

Salivary fistula, which is an unpleasant complication of parotid surgery, occurs in less than 2 per cent of patients who have undergone the procedure.<sup>19</sup> In one study, the incidence of post-parotidectomy fistula was reported as 14 per cent.<sup>20</sup> Although a number of treatments for post-parotidectomy fistula have been advocated, there is no standard therapeutic approach. Methods of treating that complication include completion parotidectomy; radiation therapy; tympanic neurectomy; the use of pressure dressings, anticholinergic medications or botulinum toxin; and the restriction of oral intake.<sup>21,22</sup> Salivary fistula after parotidectomy developed in only one of our patients. We treated that fistula with a pressure dressing. We found that the rate of salivary fistula, when correlated with the subjects' age, gender, level of education and tumour type was not statistically significant.

- **This study aims to evaluate quality of life after surgery for benign neoplastic disease of the parotid gland**
- **A quality of life questionnaire, which was created from the Hebrew version of the University of Washington Quality of Life prototype, was applied to 55 patients who underwent surgery for benign neoplastic parotid disease**
- **After parotidectomy, complications such as facial nerve paresis or paralysis, scarring, salivary fistula, Frey's syndrome, infection, haematoma, great auricular nerve anaesthesia or recurrence of the tumour may occur**
- **Patients' post-surgical quality of life can be improved by the correct choice of surgical approach and reconstructive method**

Post-surgical scarring and surgical site depression, which can affect facial contour, are important to some patients. Scarring can be minimised by modification of the incision.<sup>23</sup> Terris and colleagues<sup>23</sup> suggested a modified face lift incision, which, when compared with the results of the modified Blair incision, resulted in improved patient satisfaction. Surgical site depression can be prevented by rotation of the sternocleidomastoid muscle. Chow and colleagues<sup>24</sup> suggested that sternomastoid muscle transposition combined with a face lift incision would improve the cosmetic outcome of superficial parotidectomy. Meningaud and colleagues<sup>25</sup> proposed superficial musculoaponeurotic system lifting techniques as a new standard procedure for parotidectomy that would prevent a conspicuous scar and the formation of a deep hollow dorsal to the mandible. However, those techniques cannot be used in obese patients or in those from whom a malignant tumour has been removed. In our patients, we used a modified

Blair incision but did not perform reconstruction. We found that 26 patients experienced post-surgical scarring and 17 exhibited a compromised facial contour. We found no statistically significant correlation between the rate of scarring and the subjects' age, gender, level of education or tumour type or between facial contour and those factors. However, in their study, Nitzan and colleagues<sup>2</sup> found a significant correlation between patients' age and appearance.

Post-surgical pain can vary according to the operation type, the patient's personality and the medicine prescribed as post-surgical treatment. In our study, there was a statistically significant correlation between gender and post-surgical pain (which affected women more than men). We noted another statistically significant correlation between our subjects' overall health and gender. Nitzan and colleagues<sup>2</sup>, however, found a significant correlation between their subjects' overall health and age.

### Conclusion

All complications of parotid surgery can affect the patient's quality of life. The degree of that impact, however, is a factor of the patient's personality. We did not find a statistically significant correlation between the incidence of complications and the subjects' age, gender, educational status and tumour type, with the exception of overall health and gender and post-surgical pain and gender. The quality of life of patients who undergo surgery for a benign parotid neoplasm can be assessed by the questionnaire used in this study and can be improved by the appropriate selection of surgical approach and reconstructive method.

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