

Laryngectomy: the patient's view

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Abstract

The disabilities following laryngectomy are well recognized. The incidence of these disabilities and the acceptability of the surgery to the patients were assessed by a questionnaire method. Sixty-five patients participated in the study. The incidence of disabilities are discussed. Total laryngectomy was felt to be a worthwhile operation by most of the patients in the study despite the disabilities they experienced afterwards.

Introduction

Loss of normal voice is the major disability following total laryngectomy. Other disabilities are loss of nasal function, altered deglutition, stoma problems, loss of thoracic fixation, personal and social problems. They are well recognized and are accepted as inevitable consequence of the surgery. This study was conducted to identify the prevalence of these disabilities among patients who have undergone total laryngectomy and laryngectomy and partial pharyngectomy for malignant tumours of larynx and laryngopharynx and to assess the overall acceptability of the surgery to these patients.

Materials and methods

Ninety-two surviving laryngectomees were identified in the Wolverhampton district from the regularly maintained departmental head and neck cancer register. Eighty-two of them were sent a questionnaire to assess their level of perceived disability and quality of life after surgery (Fig. 1). Ten patients who had undergone surgery in the preceding six months were excluded because they were still undergoing active rehabilitation and it

was considered too early to assess their long-term disability. Analysis of the case notes of the 65 patients who replied revealed that 54 patients had undergone total laryngectomy and 11 patients had undergone total laryngectomy and partial pharyngectomy.

Results

Sixty-five out of 82 patients replied (76 per cent). Forty-nine (75 per cent) of them were males and 16 (25 per cent) females. Figure 2 displays the distribution of the age at the time of analysis. The oldest was 89 year old male who was operated eight years before and the youngest was a 44-year-old female who was operated one year before the study (average age 68 years). The minimum post-operative duration was six months and the maximum was 35 years (average 7.8 years). Table I

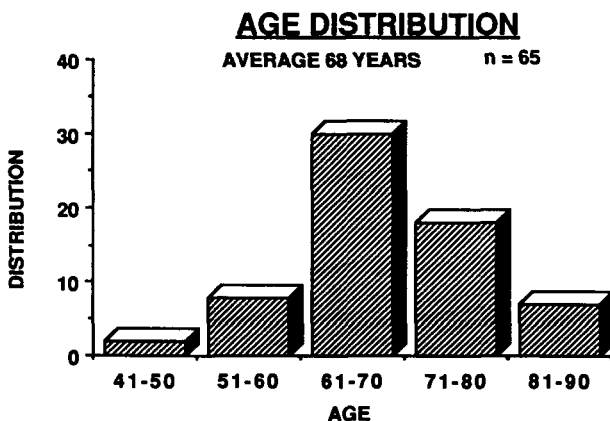


FIG. 1

TABLE I
 DURATION FOLLOWING SURGERY

> 6 months	< 1 year	4
> 1 year	< 3 years	18
> 3 years	< 7 years	10
> 7 years		33
	Total	65

TABLE II
 SPEECH

Satisfactory oesophageal voice:	No	Yes	
Laryngectomy group (Total: 54)	24 (44%)	30 (56%)	
Laryngectomy and partial pharyngectomy group (Total: 11)	8 (73%)	3 (27%)	
Loss of normal voice is it a disability	No reply	No	Yes
Satisfied with voice rehabilitation	1 (2%)	22 (34%)	42 (64%)
	3 (5%)	11 (17%)	51 (78%)
Present method of communication			
Vibrator: 2 (3%)	Whisper: 6 (9%)	No reply: 6 (9%)	
Pen & pad: 16 (25%)	Oesophageal voice: 35 (54%)		

FIG. 1
questionnaire

Note: PLEASE CIRCLE THE APPROPRIATE ANSWER:

Present Age:	Sex:	Male:	Female:
Number of years since laryngectomy:			
Speech:			
(a) Do you feel you have acquired satisfactory oesophageal voice:	No:	Yes:	
(b) Do you find losing your normal voice as much a disability as you thought before the operation:	No:	Yes:	
(c) Were you happy with the extent of voice rehabilitation you received following the operation:	Yes:	No:	
(c) What is your method of communication now: (1) Oesophageal voice (2) Vibrator (3) Pen and Pad (4) Whisper			
Nasal symptoms:			
(a) How is your sense of smell	No change:	Worse:	
(b) How is your sense of taste:	No change:	Worse:	
(c) Do you find not being able to sniff a problem:	No:	Yes:	
(d) Do you find not being able to blow the nose a problem:	No:	Yes:	
(e) Do you have troublesome nasal discharge:	No:	Yes:	
Swallow:			
Do you find it more difficult to swallow now than before the surgery:	No:	Yes:	
Straining:			
Do you have difficulty in any of the following since the operation:			
(a) Passing water:	No:	Yes:	
(b) Opening bowels:	No:	Yes:	
(c) Lifting heavy objects:	No:	Yes:	
Stoma:			
(a) Do you suffer from troublesome crusting:	No:	Yes:	
(b) Do you suffer from troublesome bleeding from the stoma:	No:	Yes:	
(c) Do you suffer from more frequent chest infection:	No:	Yes:	
Smoking:			
(a) Were you a smoker before the operation	No:	Yes:	
If Yes do you still smoke	No:	Yes:	
Swimming:			
(a) Were you a keen swimmer before the operation:	No:	Yes:	
(b) If Yes are you unhappy that you cannot swim now:	No:	Yes:	
Sexual Activity			
Do you feel the operation has restricted your sexual activity	No:	Yes:	
Social Activity:			
(a) Do you feel your social acceptability is reduced because of the stoma	No:	Yes:	
(b) Do you feel your social and outdoor activity have reduced since the operation	No:	Yes:	
(c) Are you happy to go out shopping or socializing on your own	No:	Yes:	
(d) Do you take someone with you to help to communicate	No:	Yes:	
Do you find attending laryngectomy club where you have an opportunity to share and discuss your problems useful:	No:	Yes:	
Do you feel the loss of your voice box, all the attended disabilities and the change in the quality of your life are a fair price to pay for the treatment of cancer:	No:	Yes:	

TABLE III
NASAL SYMPTOMS

	No change	Worse
Sense of smell	23 (35%)	42 (65%)
Sense of taste	46 (71%)	19 (29%)
Is it troublesome?	No	Yes
Unable to sniff	25 (38%)	40 (62%)
Unable to blow	23 (35%)	43 (65%)
Nasal discharge	45 (69%)	20 (31%)

shows the distribution of post-operative duration. The results of the questionnaire are given in Tables II to XII.

Discussion

Speech: (Table II)

The incidence of satisfactory development of oesophageal voice is quoted as occurring between 34 per cent and 86 per cent in various studies (Gates and Hearne, 1982). Although subjective, our study found that 56 per cent in the laryngectomy group and 27 per cent in the laryngectomy and partial pharyngectomy group felt that they had acquired satisfactory oesophageal voice. The use of an artificial larynx is clearly unpopular as only 3 per cent depend on this method whereas 25 per cent use pen and pad and 54 per cent in both surgical groups depend on oesophageal voice. It is surprising to see that 34 per cent of the patients did not find losing their voice as much a disability as they had thought before operation. All these patients also felt that they had acquired satisfactory oesophageal voice. Among the 64 per cent who found loss of their voice to be a disability only 26 per cent felt that they had acquired satisfactory oesophageal voice.

Nasal function: (Table III)

Excluding the nose by the creation of a permanent tracheostomy results in the loss of normal nasal function. Henkin *et al.* (1968) and Hoye *et al.* (1970) suggested that hyposmia following laryngectomy is inevitable as interruption of laryngeal afferents following the surgery significantly alters the olfactory acuity through a complex feedback mechanism. However, Moore-Gillon (1985) found that hyposmia following laryngectomy is due to loss of nasal air flow. Ritter (1964) found no significant difference between laryngectomees and a control group in odour detection by an insufflation method. He concluded that the power of olfaction did not change after laryngectomy. DeBeule and Damste (1972) found that 50 per cent of laryngectomees suffer from hyposmia in the long-term. In our group of patients 65 per cent and 29 percent respectively felt that their sense of smell and taste was reduced post-operatively. The problem of nose blowing following laryngectomy can be overcome by the

TABLE IV
DEGLUTITION

	No	Yes
Is it more difficult to swallow		
Laryngectomy group	34 (63%)	20 (37%)
Laryngectomy and partial pharyngectomy group	3 (27%)	8 (73%)

TABLE V
STRAINING

Difficulty in	No reply	No	Yes
Passing water	1 (2%)	60 (92%)	4 (6%)
Opening bowel	1 (2%)	52 (80%)	12 (18%)
Lifting heavy objects	4 (6%)	24 (37%)	37 (57%)

use of a simple device (Wittich and Davis, 1983). We found that 65 per cent of laryngectomees felt that being unable to blow their nose was a problem and 62 per cent were troubled by not being able to sniff and 31 per cent of patients complained of troublesome nasal discharge.

Swallowing: (Table IV)

Conley (1960) suggests that dysphagia following laryngectomy is due to interruption of the pharynx and division of the pharyngeal branch of the vagus. Alternatively Schorbinger (1958) proposes a multifactorial origin of dysphagia resulting from post-operative cricopharyngeal spasm due to reduced local blood supply, interference with oesophageal innervation, recurrent carcinoma, metabolic disturbance or neuromuscular disorders. Duranceau *et al.* (1976) studied oesophageal pressure and motility after laryngectomy in ten patients and found a significant reduction in resting and contraction pressures as well as poor co-ordination and relaxation of the upper oesophageal segment when compared with normal volunteers. However they found no difference in the pressure or motility in the lower oesophageal segment between the two groups. In contrast, clinical symptoms were less striking. Only two out of ten laryngectomies and dysphagia, three had a feeling of 'food sticking after swallowing' and the other five patients were asymptomatic. Examination of Table IV shows the incidence of dysphagia among the two operative groups. Two among the 20 patients who complained of dysphagia (in the laryngectomy group) and one among the eight patients (in the laryngectomy and partial pharyngectomy group) required repeated dilatation. None of the 28 patients had lost weight, indicating that they do get the required nourishment. The increased incidence of dysphagia following total laryngectomy when combined with partial pharyngectomy is a probable consequence of physical narrowing of the pharynx. The altered second stage of swallowing may lead to an altered sensation interpreted as dysphagia in some of the laryngectomy patients. However, the relationship between the extent of pharyngeal resection and the degree of post-operative dysphagia needs to be analysed objectively.

Sphincteric function of larynx: (Table V)

Fixation of the chest in inspiration by the adduction of

TABLE VI
STOMA

	No	Yes
Troublesome crusting	42 (65%)	23 (35%)
Troublesome bleeding	55 (85%)	10 (15%)
Frequent chest infection	30 (46%)	35 (54%)

TABLE VII
SMOKING

	Non-smokers	Smokers
Pre-operative	12 (18%)	53 (82%)
Postoperative	48 (91%)	5 (9%)

vocal cords facilitates the rise in the intra-abdominal pressure while straining during defaecation (Guyton, 1981), micturition, weight lifting and parturition. With the larynx open, the capacity to raise the intra-abdominal pressure is reduced by 20 per cent (Stell and Evens, 1979). There are reports of women delivering after laryngectomy (Shaw, 1965). Robin and Olofsson (1987) and Shaw (1979) suggest that heavy lifting or strenuous digging is not possible as actions entail fixation of chest wall by closure of the larynx. This is disputed by Coyne *et al.* (1968).

Analysis of Table V shows that 6 per cent of patients have difficulty in micturition after surgery (3 per cent male and 3 per cent female) and 18 per cent have difficulty in defaecation emphasizing the well-known fact that latter requires greater straining. Although not quantified, 57 per cent in our group had difficulty in lifting heavy objects. Gilchrist (1973) attempted to quantify the weight laryngectomees can lift and found the results to be very variable and concludes that the extent to which lack of thoracic fixation affects physical power in men is uncertain.

Stoma: (Table VI)

The loss of the humidifying function of the nose results in crusting around the stoma and this is a well recognized problem following permanent tracheostomy (Gilchrist, 1973; Shaw, 1979; Robin and Olofsson, 1987). Thirty-five per cent of patients found crusting to be troublesome and 15 per cent felt that they suffer from troublesome bleeding. Fifty-four per cent complained of an increased frequency of chest infection. This could well be due to direct exposure of the lower respiratory tract to the infective agents which normally would have resulted in upper respiratory tract infection.

Smoking: (Table VII)

Epidemiological data have demonstrated the strong correlation between tobacco usage and laryngeal cancer and the relative risk ratios range from 6.1 to 15.8 in smokers compared with non-smokers (Bastian, 1986). Table VII shows that 82 per cent of our patients were smokers before the surgery and 18 per cent were non-smokers. More importantly 9 per cent of the previous smokers continue to smoke following surgery further

TABLE VIII
SWIMMING

Pre-operative	
Non-swimmers	Swimmers
46 (71%)	19 (29%)
Post-operative	
Unhappy about not swimming	
No	Yes
9 (47%)	10 (53%)

TABLE IX
SEXUAL ACTIVITY

Restricted due to	No reply	No	Yes
surgery	11 (17%)	34 (52%)	20 (31%)

increasing the chances of a second primary in the lower respiratory tract. However this figure is lower than the group studied by DeBeule and Damste (1972) in The Netherlands where 50 per cent of patients continued to smoke after laryngectomy. Interestingly most of them had changed from cigarettes to cigars and/or pipes. (Perhaps because they were a better fit to the tracheostome!).

Swimming: (Table VIII)

Shaw (1979) and Robin and Olofsson (1987) state that swimming must be prohibited after laryngectomy. Twenty-nine per cent of our patients were keen swimmers before surgery. More than half are unhappy in having to give up their hobby after laryngectomy. Devices have been developed to overcome the problem of drowning (Gray, 1982; Darvill, 1983). These devices will probably only be of help to keen, highly motivated, fit and previously experienced swimmers.

Sexual activity: (Table IX)

Gilchrist (1973) found that 83 per cent of patients continue to have normal sexual relationship after laryngectomy and Meyers *et al.* (1980) found that in 67 per cent of patients in his study group the surgery had not affected the sexual activity. However, in this study only 52 per cent of the patients questioned were of the view that the surgery had not restricted their sexual activity and 17 per cent of the patients did not reply to this question.

Social activity: (Table X)

Darvill (1983) reports that the aspect of laryngectomy most patients find difficult to accept is the stoma and laryngectomy has a profound effect upon their sense of social acceptability. Examination of Table X shows 51 per cent of patients felt that their social acceptability was not reduced because of the stoma; these patients also felt that they had acquired satisfactory oesophageal voice. Whereas among the 45 per cent of patients who found their social acceptability to be reduced because of the stoma, none felt that they had acquired satisfactory oesophageal voice. Fifty-eight per cent found their social and outdoor activity reduced following laryngectomy but most of them continue to be independent

TABLE X
SOCIAL ACTIVITY

	No reply	No	Yes
Social acceptability affected due to stoma:	3 (4%)	33 (51%)	29 (45%)
Social and outdoor activity reduced	2 (3%)	25 (39%)	38 (58%)
Shop and socialize alone	1 (2%)	21 (32%)	43 (66%)
Take someone to help communicate	2 (3%)	42 (65%)	21 (32%)

TABLE XI
LARYNGECTOMY CLUB

Do not attend because of age or distance: 9 (14%)
Not useful 5 (8%)
Useful 51 (78%)

TABLE XII
ACCEPTABILITY OF LARYNGECTOMY

Do you feel the loss of your voice box, all the attended disabilities and the change in the quality of your life are a fair price to pay for the treatment of cancer:

No reply	No	Yes
2 (3%)	4 (6%)	59 (91%)

despite their disability as 66 per cent of them are happy to go out shopping or socializing on their own and 65 per cent of them do not take anyone with them to help to communicate.

Laryngectomy club: (Table XI)

Fourteen per cent did not attend the club because of old age or distance. Seventy-eight per cent found the laryngectomy club useful where they had the opportunity to share and discuss their problem against a small minority of 8 per cent who did not find the club useful.

Acceptability of laryngectomy: (Table XII)

Total laryngectomy is a long established treatment for advanced and radiation recurrent laryngeal malignancies. Ninety-one per cent of the patients felt that the operation was worthwhile despite its effects on the quality of life. This is certainly a comforting finding to any head and neck surgeon.

References

- Bastian, R. W. (1986) Benign mucosal disorders, Saccular disorders and neoplasms. In *Otolaryngology, Head and Neck Surgery*. (Cummings, C. W., Fredrickson, J. M., Harker, L. A., Kreausend, C. J., Schuller, D. E., Eds.) Vol. 3, The C.V. Mosby Co: Toronto. p. 1987-2028.
- Conley, J. J. (1960) Swallowing dysfunction associated with radical surgery of head and neck. *Archives of Surgery*, **80**: 602-607.
- Coyne, M., Stram, J. R., Payton, O. D., Klein, G. A., Kressler, J. F. (1968) The laryngectomee and lifting. *Archives of Otolaryngology*, **88**: 106-109.
- Darvill, G. (1983) Rehabilitation—Not just voice. In *Laryngectomy Diagnosis to Rehabilitation*. (Edels, Y., ed.) Croom Helm: London. pp. 192-217.
- DeBeule, G., Damste, P. H. (1972) Rehabilitation following laryngectomy. The results of a questionnaire study. *British Journal of Disorders of Communication*, **7**: 141-147.
- Duranceau, A., Jamieson, G., Hurwiltz, A. L., Jones, R. S., Postlethwait, R. W. (1976) Alteration in esophageal motility after laryngectomy. *American Journal of Surgery*, **131**: 30-35.
- Gates, G. A., Hearne III, E. M. (1982) Predicting oesophageal speech. *Annals of Otolaryngology, Rhinology and Laryngology*, **91**: 454-457.
- Gilchrist, A. G. (1973) Rehabilitation after laryngectomy. *Acta Otolaryngologica*, **75**: 511-518.
- Gray, R. G. (1982) Swimming after laryngectomy. *Laryngoscope*, **92**: 815-817.
- Guyton, A. C. (1981) Movement of food through alimentary tract. In *Text book of Medical Physiology*. W. B. Saunders: London. pp 748-800.
- Henkin, R. I., Hoyer, R. C., Ketcham, A. S., Gould, W. J. (1968) Hyposmia following laryngectomy. *Lancet*, **ii**: 479-481.

- Hoye, R. C., Ketchaam, A. S., Henkin, R. I. (1970) Hyposmia after paranasal sinus exenteration or laryngectomy. *American Journal of Surgery*, **120**: 485–491.
- Moore-Gillon, V. (1985) The nose after laryngectomy. *Journal of the Royal Society of Medicine*, **78**: 435–439.
- Meyers, A. D., Aarons, B., Suzuki, B., Pilcher, L. (1980) Sexual behaviour following laryngectomy. *Ear, Nose and Throat Journal*, **59**: 327–329.
- Ritter, F. N. (1964) Fate of olfaction after laryngectomy. *Archives of Otolaryngology*, **79**: 169–171.
- Robin, P. E., Olofsson, J. (1987) Tumours of the larynx. In Scott-Brown's Otolaryngology. 5th edition. Vol. 5. (Stell, P. M., Kerr, A. G., eds.) Butterworths: London. pp. 186–234.
- Schoibinger, R. (1958) Spasm of cricopharyngeal muscle as cause of dysphagia after total laryngectomy. *Archives of Otolaryngology*, **67**: 271–275.
- Shaw, H. J. (1965) Glottic cancer of larynx 1947–56. *Journal of Laryngology and Otolaryngology*, **79**: 1–14.
- Shaw, H. (1979) Tumours of the larynx. In Scott-Brown's Diseases of Ear, Nose and Throat. 4th edition. Vol. 4. (Ballantyne, J., Groves, J., eds.) Butterworths: London. pp. 421–508.
- Stell, P. M., Evens, C. C. (1979) Physiology of larynx and tracheobronchial tree. In Scott-Brown's Diseases of Ear, Nose and Throat. 4th edition. Vol. 1. (Ballantyne, J., Groves, J., Eds.) Butterworths: London. pp. 433–475.
- Wittich, D. J., Davis, R. K. (1983) Laryngectomy nose-blowing. *Laryngoscope*, **93**: 953–954.

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