



Article

Body Image Concerns in People Who Underwent a Total Laryngectomy

Isabel Guimarães ^{1,*}, Gabriela Torrejano ², Raquel Aires ², Filomena Gonçalves ³, Susana Vaz Freitas ⁴, Paula Correia ⁵, Cláudia Romeiro ⁶, Inês Silvestre ⁷, Rita Bom ⁸, Paulo Martins ² and Ana R. Santos ²

- ¹ SLP Department, Alcoitão Health School of Sciences, Clinical and Therapeutics Pharmacological Unit, Faculty of Medicine, Instituto de Medicina Molecular, University of Lisbon, 1649-035 Lisbon, Portugal
 - ² ENT Department, Unidade Local de Saúde de Santa Maria, E.P.E., 1649-035 Lisbon, Portugal; gabriela.torrejano@gmail.com (G.T.); raquel.franca.aires@gmail.com (R.A.); p.martins3110@gmail.com (P.M.); ana.r.santos@ulssm.min-saude.pt (A.R.S.)
 - ³ ENT Department, Instituto Português de Oncologia de Lisboa Francisco Gentil, E.P.E., 1099-023 Lisbon, Portugal; mfgoncalves@hospitaldaluz.pt
 - ⁴ ENT Department, Unidade Local de Saúde de Santo António, E.P.E., 4099-001 Oporto, Portugal; svazfreitas@gmail.com
 - ⁵ ENT Department, Unidade Local de Saúde de Almada-Seixal, E.P.E., 2805-267 Almada, Portugal; paulacorreia.tf@gmail.com
 - ⁶ ENT Department, Hospital de Ponta Delgada-Hospital do Divino Espírito Santo de Ponta Delgada, E.P.E., 9500-370 Ponta Delgada, Portugal; cromeiro@gmail.com
 - ⁷ ENT Department, Unidade Local de Saúde de Coimbra, E.P.E., 3004-561 Coimbra, Portugal; tfines@gmail.com
 - ⁸ ENT Department, Unidade Local de Saúde do Alentejo Central, E.P.E., 7000-811 Évora, Portugal; ritabom@gmail.com
- * Correspondence: isabel.guimaraes@essa.scml.pt; Tel.: +351-21-460-74-50

Abstract: Background: Body image is a potential psychological burden after total laryngectomy (TL) with devastating effects on patients' health-related quality of life (HRQOL) and communication. This study focused on TL patients to determine the prevalence of dissatisfied body image and whether they have poorer HRQOL and difficulty adjusting to their new voice than TL patients with satisfied body image. It also aimed to investigate the potential predictors of body image. Methods: A multicenter cross-sectional study was conducted. For TL patients, the Body Image Scale (BIS), the European Organization for Research on Cancer Quality of Life Questionnaire, Core and Neck Module (EORTC QLQ C30 and EORTC H&N35), and the Self-Experiences of Communication after Laryngeal cancer (SECEL) were used. Patients were categorized as dissatisfied with their body image if the BIS score was ≥ 8 . Multiple regression analysis was performed using the BIS as the dependent measure and HRQOL (QLQ C30 and H&N35) and communication (SECEL) as independent variables. Results: Overall, 31.3% of TL patients had dissatisfied body image, significantly worse HRQOL, and difficulty adjusting to their new voice than patients with satisfied body image. The regression model showed that social eating and socializing (H&N35) and adjustment to their new voice (SECEL) were independent predictors of body image. The model explained 52% of the variance. Conclusions: Screening TL patients at risk for body image concerns may help develop effective interventions to optimize HRQOL and patient communication.

Keywords: cancer; total laryngectomy; body image; EORTC QLQ-C30; EORTC QLQ-H&N35; health-related quality of life



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1. Introduction

In 2020, there were around 220,600 newly diagnosed cases of laryngeal cancer worldwide [1]. Total laryngectomy (TL), the standard procedure for the treatment of advanced laryngeal cancer, is an important survival strategy but entails lifelong anatomical and functional disorders, such as a permanent tracheostoma, respiratory complications and loss

of laryngeal voice. In addition to the fear of death and the fear of surgery, patients have to cope with major lifestyle challenges resulting from functional disorders (e.g., loss of voice) and disfigurement (e.g., neck stoma). The physical changes can be a constant reminder of the patient's diagnosis and treatment and can have a profound impact on body image [2].

The body image of patients with head and neck cancer (HNC) has been studied to a limited extent, but a high prevalence has been found ranging from 22% to 77% [3–5]. More specifically, this includes 23.6% of patients with oral cavity cancer, skin cancer, and HNC [5] and between 14% and 28% of HNC patients [3]. Nevertheless, laryngeal cancer is less represented in the studies using this heterogeneous classification, accounting for between 6.5% and 28% of the total HNC sample, and no data have been reported specifically for TL patients [2–8].

Body image concerns are a common problem in TL patients [9–11]. Physical appearance (scars and localizations) and its negative esthetic and emotional effects were mentioned by more than 30% of TL patients [9]. TL patients also reported that they do not feel 'normal' with a hole in their neck and are burdened by the reactions of others [10]. Tracheostomy was associated with fear of coughing out during intercourse, the effects of breathing on a partner, and the perception of an unpleasant odor [9]. A more negative body image and higher symptom severity were associated with less willingness to talk in patients with hypopharyngeal and laryngeal cancer [11]. In addition, patients who underwent laryngectomy ranked physical consequences and interference with social activities as the two most important dimensions of health-related quality of life (HRQOL), followed by communication, which ranked third, and self-image as the seventh most important dimension [12].

Previous studies have shown that body image dissatisfaction should be considered a public health issue due to its high prevalence in HNC patients and its association with patients' functional abilities and psychological distress (e.g., looking and sounding different) [2,13], which are important markers of HRQOL [2,3,14]. Supportive care for physical and psychological functioning should be a warning for healthcare professionals to promote personalized postoperative care to optimize recovery and higher HRQOL in patients after TL [15].

Since the 1990s, the European Organization for Research and Treatment of Cancer (EORTC) has recommended the use of the core quality of life questionnaire (QLQ-C30) supplemented by site-specific modules (Head and Neck, H&N35) to assess the various aspects that define HRQOL in HNC patients [16–18]. In addition, a body image scale for cancer patients (Body Image Scale, BIS) was developed in collaboration with the EORCT [19]. BIS data have been reported in HNC patients [2–8,11], but not specifically on patients who underwent TL, and no information was found on European Portuguese (EP) patients after TL.

Therefore, this study focused on a sample of EP patients who underwent TL to determine the following: (i) the prevalence of dissatisfied body image; (ii) whether patients with dissatisfied body image have higher symptom severity and poorer communication experiences than patients with satisfied body image; (iii) the potential predictors of body image.

2. Methods

Ethical approval for this study following the Declaration of Helsinki was obtained from seven ethics committees.

2.1. Participants

Patients with laryngeal cancer who underwent TL were recruited between June and December 2016 from the Ear, and Nose Throat (ENT) outpatient clinics of seven different participating hospitals in Portugal. Written informed consent was obtained from each patient.

2.2. Materials

Each subject was described using demographic and clinical data. Four EP patient-reported outcome measures (PROMs) were administered: the Body Image Scale (BIS), the European Organization for Research on Cancer (EORTC) Quality of Life Questionnaire (QLQ C30) version 3.0 and the 35-item Head and Neck Module (H&N35) and the Self-Experiences of Communication after Laryngeal cancer (SECEL) [19–21].

The BIS is a 10-item questionnaire with three-dimensional components (cognitive, affective, and behavioral) to assess body image in patients with all types of cancer. The rating scale ranges from “not at all” (score 0) to “very much” (score 3) with a possible total score of 30 [19]. A cut-off score ≥ 8 is considered a valid indicator of psychological distress (dissatisfied body image) and clinically significant for the assessment of body image concerns [7,8,22]. The BIS was adapted cross-culturally for EP and validated in breast cancer patients [19]. No data were found for patients who underwent TL.

The EORTC QLQ C30 (version 3) is a 30-item, cancer-specific, self-administered questionnaire that measures physical and psychosocial functioning as well as the experience of symptoms. The questionnaire consists of five functioning scales (physical, role, cognitive, emotional, and social), three symptom scales (fatigue, pain, and nausea and vomiting), two global health/quality of life items, and six individual items (loss of appetite, insomnia, constipation, diarrhea, dyspnea, and financial impact of illness). The raw scores range from one (not at all) to four (very much) for the functioning and symptom scales and from one (very poor) to seven (great) for the global health and quality of life items. For the global health status/quality of life and functioning scales, high scores indicate good HRQOL, whereas a high score on the symptom scales indicates a high degree of symptom-related deterioration in HRQOL [16,17]. The EP version is reliable and valid so it can be used in different laryngeal cancer patients and different types of interventions [20]. In the present study, the Cronbach’s alpha of the EORTC-QLQ -C30 was 0.783.

The EORTC QLQ H&N35 is an add-on module to the QLQ-C30 with questions on problems related to the disease and treatment modality [17]. It contains seven multiple-item scales to assess symptoms in the areas of pain, swallowing, senses (taste/smell), speech, social eating, social contacts, and sexuality. Also included are six single-item scales that assess the presence of symptomatic problems related to pain in the mouth, teeth, mouth opening, dry mouth (xerostomia), sticky saliva, and coughing. The raw scores range from one (not at all) to four (very much) for the multi-item and single-item scales and from one (yes) to two (no) for five single-item scales. The scoring system is the same as that of the core questionnaire (EORTC QLQ C30). A high score on the symptom scales indicates a high level of symptomatology (discomfort or dysfunction). In the present study, the Cronbach’s alpha of the EORTC QLQ H&N35 was 0.879.

The SECEL is a 35-item questionnaire covering three areas: general (five statements), environment (fourteen statements), attitude (fifteen statements), and a final item that was not included in the scoring system (question number 35: ‘Do you talk as much now as you did before you had laryngeal cancer?’) with three possible answers (yes, more, and less). The general subscale describes global communicative attitudes, such as being relaxed or calm and acknowledging the disease and treatment, while the environment subscale focuses on the experience of the voice with the environment. The attitude subscale describes self-perception and the perception of communication by others. It is rated on a four-point Likert scale. The SECEL total score of 34 varies from 0 (no difficulty) to 102 (indicating greater difficulty in adapting to the new voice) [23]. The EP version is reliable and valid for use in patients who underwent partial or TL [21].

2.3. Procedures

Basic demographic and clinical data were collected from all patients scheduled for an ENT consultation. After obtaining informed consent, structured face-to-face interviews were conducted by speech-language pathologists (SLPs), the co-authors.

2.4. Data Analysis

The BIS data were previously analyzed for reliability (internal consistency and test-retest) and convergent validity using the EORCT QLQ C30, H&N35, and SECEL. TL patients were divided into two groups based on the BIS score: (i) group A with BIS < 8 as an indicator of satisfied body image and thus no psychological distress and, (ii) group B (BIS ≥ 8 as an indicator of dissatisfied body image) [7,8,16].

HRQOL was measured using the QLQ C30 and H&N35 and results were presented by domain: global health/quality of life, functionality, and symptoms. The raw scores of the two PROMS were linearly transformed to a scale from 0 to 100, as recommended [24].

Descriptive statistics: Mean and standard deviation (M ± SD), median and interquartile range (IQR) were calculated for all variables in the study. A Mann–Whitney U test, chi-square test, and Spearman test were used to compare or relate BIS, QLQ C30, H&N35, SECEL, and clinical and demographic data. Multiple linear regression with a stepwise selection procedure was used to determine which combination of variables was the most strongly associated with the main dependent measure: Body Image Scale total score. Only three predictor variables were included in the model to determine the dependent measure: the results of the QLQ-C30, the H&N35, and the SECEL. Only variables with a *p* value < 0.05 were included in the model.

The data were analyzed using the IBM Statistical Package for the Social Sciences (SPSS) version 27, SPSS Inc., Chicago, IL, USA.

3. Results

3.1. Participants

A total of 116 participants were enrolled in the study, 36 of whom had missing demographic and clinical information. Therefore, data from 80 participants (response rate, 69%) were included in the study.

Table 1 provides an overview of the participants’ characteristics. The majority (68.7%) of participants reported being satisfied with their body image (Group A), while the rest (31.3%) were dissatisfied with their body image (Group B). In both groups, they were predominantly men, married or in a committed relationship, and retired. No age effect was found between the two groups ($\chi = 30.274$, $df = 31$ $p = 0.503$). The level of education was predominantly the same or lower than 4 years and similar between the groups ($\chi = 1.848$, $df = 2$, $p = 0.397$).

Table 1. Patients’ socio-demographic and clinical data.

		Total Sample ^a <i>n</i> = 80	Group A ^b BIS < 8 <i>n</i> = 55	Group B ^c BIS ≥ 8 <i>n</i> = 25
		<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Sex	Male	80 (100)	55 (100)	25 (100)
Age (years)	mean ± standard deviation (Range)	63.3 ± 10.0 (44–81)	63.8 ± 10.1 (45–81)	62.2 ± 10.3 (44–79)
Education	≤4 years (elementary)	40 (50.0)	30 (54.1)	10 (40.0)
	5–12 years (secondary)	30 (37.5)	25 (34.5)	11 (44.0)
	Higher education (>12 years)	9 (11.3)	5 (9.1)	4 (16.0)
Marital status	Single	13 (16.3)	7 (12.7)	6 (24.0)
	Married or cohabiting	54 (67.5)	39 (70.9)	15 (60.0)
	Divorced or widower	13 (16.3)	9 (16.4)	4 (16)
Occupation	Retired	67 (86.6)	46 (83.6)	21 (84.0)
	Unemployed	1 (1.3)	1 (1.8)	0
	Works	11 (13.8)	9 (12.7)	4 (16.0)
Cancer stage	II	8 (10.0)	5 (9.1)	3 (12.0)
	III	30 (37.5)	22 (40.0)	8 (32.0)
	IV	41 (51.2)	28 (50.0)	9 (52.0)

Table 1. Cont.

		Total Sample ^a n = 80	Group A ^b BIS < 8 n = 55	Group B ^c BIS ≥ 8 n = 25
		n (%)	n (%)	n (%)
Time since surgery	mean ± standard deviation (years)	3.7 ± 5.6	3.5 ± 5.7	4.1 ± 5.3
	(Range in years)	(1–39)	(1–39)	(1–24)
	<12 months	44 (55.0)	30 (54.5)	14 (56.0)
Treatment	≥13 months	31 (38.8)	20 (36.4)	11 (44.0)
	Radiotherapy (RT)	19 (23.8)	14 (25.5)	5 (20.0)
	Quimiotherapy (QT)	1 (1.3)	1 (1.8)	1 (4.0)
Pain (QLQ-C30—item 9)	RT + QT	12 (15.0)	11 (20)	6 (24.0)
	not at all	60 (75.0)	44 (80.0)	16 (64.0)
	from a little to very much	20 (25.0)	11 (20.0)	9 (36.0)
Depression (QLQ-C30—item 24)	not at all	53 (66.3)	44 (80.0)	9 (36.0)
	from a little to very much	27 (33.7)	11 (20.0)	16 (64.0)
	not at all	35 (43.8)	28 (50.9)	7 (28.0)
Irritability (QLQ-C30—item 23)	from a little to very much	45 (45.0)	27 (41.8)	18 (72.0)
	not at all	48 (60.0)	38 (69.1)	10 (40.0)
	from a little to very much	32 (40.0)	17 (30.9)	15 (60.0)
Tension (QLQ-C30—item 21)	not at all	39 (48.8)	30 (54.5)	9 (36.0)
	from a little to very much	41 (51.2)	25 (45.5)	16 (64.0)
	Esophageal voice	29 (36.3)	23 (41.8)	6 (24.0)
Primary mean of communication (N)	Tracheoesophageal voice	25 (31.3)	18 (32.7)	7 (28.0)
	Electrolaryngeal speech	6 (7.5)	2 (3.6)	4 (16.0)
	Murmured speech	20 (25.0)	12 (21.8)	8 (32.0)
	The same	14 (17.5)	14 (25.5)	0
Talk as much now as before your laryngeal cancer?	Less	60 (75.0)	36 (65.5)	24 (96.0)
	More	6 (7.5)	5 (9.1)	1 (4.0)

^a Missing information on Education [1 (1.3)]; Marital status [1 (1.3)]; Occupation [1 (1.3)]; Cancer stage [1 (1.3)], Time from surgery [5 (6.3)] and Treatment [42 (52.5)]. ^b Missing information on Education [1 (1.8)]; Marital status [1 (1.8)]; Occupation [1 (1.8)], Time from surgery [5 (9.1)] and Treatment [29 (52.7)]. ^c Missing information on Cancer stage [1 (4.0)] and Treatment [13 (52.0)].

The most common tumor stage (T) was T3 and T4 (88.8%) and the time since surgery was generally less than one year in both groups (Table 1). The median time since patients' last surgery before participation in the study did not differ significantly between the groups ($\chi = 8.053, p = 0.781$).

The primary means of communication in Group A were the esophageal and tracheoesophageal voice (74.5%), while Group B mainly used murmured speech, followed by the tracheoesophageal voice (60%). The majority in both groups reported speaking less than before surgery, although the percentage was higher in Group B than in Group A (90% versus 65.5%).

3.2. BIS Data

Data for the BIS showed high internal consistency (Cronbach's alpha = 0.906) and high reproducibility in 25 TL patients, (intraclass correlation = 0.897; 95% confident interval = 0.818–0.934). Also, significant positive correlations were found between BIS and SECEL (0.542, $p < 0.001$), EORCT QLQ C30 (0.325 $p = 0.003$) and H&N35 (0.568 $p < 0.001$).

The overall mean score for the BIS was significantly worse in group B (dissatisfied body image) (Table 2).

Patients who were married or cohabiting did not differ significantly from divorced or widowed patients ($U = 341.500; p = 0.879$) in the BIS total score. However, single TL patients had a significantly higher BIS total score (mean = 8.54; median = 7) than married or cohabiting patients (mean = 5.0; median = 3) ($U = 219.00; p = 0.034$), but no significant differ-

ence was found in divorced or widowed (median = 3) patients ($U = 54.500; p = 0.125$). The BIS total score did not differ by occupation (employed or retired) ($U = 309.500; p = 0.393$).

Table 2. Sample values for the BIS questionnaire.

Items		Total Sample n = 80	Group A n = 55	Group B n = 25
1. Have you been feeling self-conscious about your appearance? Tem-se sentido inseguro em relação à sua aparência?	M ± SD *	0.51 ± 0.73	0.22 ± 0.46	1.16 ± 0.80
	Median	0	0	1
	IQR **	0–1	0–0	1–2
2. Have you felt less physically attractive as a result of your disease or treatment? Tem-se sentido menos atraente fisicamente como consequência da sua doença/tratamento?	M ± SD	0.64 ± 0.86	0.24 ± 0.47	1.52 ± 0.87
	Median	0	0	1
	IQR	0–1	0–0	1–2
3. Have you been dissatisfied with you appearance when dressed? Tem-se sentido insatisfeito com a sua aparência quando vestido?	M ± SD	0.41 ± 0.72	0.19 ± 0.47	0.92 ± 0.91
	Median	0	0	1
	IQR	0–1	0–0	0–2
4. Have you been feeling less feminine/masculine as a result of your disease or treatment? Tem-se sentido menos feminina/masculino como consequência da sua doença/tratamento?	M ± SD	0.35 ± 0.75	0.07 ± 0.33	0.96 ± 0.34
	Median	0	0	1
	IQR	0–0	0–0	0–2
5. Did you find it difficult to look at yourself naked? Achou difícil olhar para si mesmo despido?	M ± SD	0.45 ± 0.78	0.16 ± 0.47	1.00 ± 1.04
	Median	0	0	1
	IQR	0–1	0–0	0–2
6. Have you been feeling less sexually attractive as a result of your disease or treatment? Tem-se sentido menos atraente sexualmente como consequência da sua doença/tratamento?	M ± SD	0.64 ± 0.89	0.18 ± 0.39	1.64 ± 0.86
	Median	0	0	1
	IQR	0–1	0–0	0–2
7. Did you avoid people because of the way you felt about your appearance? Evitou encontrar-se com pessoas por causa de como se sentiu em relação à sua aparência?	M ± SD	0.38 ± 0.75	0.05 ± 0.23	1.08 ± 1.0
	Median	0	0	1
	IQR	0–0.75	0–0	0–2
8. Have you been feeling the treatment has left your body less whole? Sentiu que o seu tratamento deixou o seu corpo menos saudável?	M ± SD	0.83 ± 0.85	0.58 ± 0.69	1.36 ± 0.95
	Median	1	1	1
	IQR	0–1	0–1	1–2
9. Have you felt dissatisfied with your body? Sentiu-se insatisfeito com o seu corpo?	M ± SD	0.61 ± 0.89	0.20 ± 0.45	1.52 ± 0.96
	Median	0	0	1
	IQR	0–1	0–0	1–2
10. Have you been dissatisfied with the appearance of your scar? Sentiu-se insatisfeito com a aparência da sua cicatriz?	M ± SD	0.79 ± 0.99	0.33 ± 0.51	1.8 ± 1.04
	Median	0	0	2
	IQR	0–1	0–1	1–3
Total	M ± SD	5.6 ± 6.1	2.2 ± 2.20	13.04 ± 5.35
	Median	3	2	11
	IQR	0.25–8	0–4.0	8.5–17.5

* Mean ± standard deviation; ** interquartile range.

A detailed analysis of the BIS items showed that Group B (dissatisfied body image) scored the highest overall mean for item 10 “dissatisfied with the appearance of the scar”, 6 “less sexually attractive”, 2 and 9 equally “less physically attractive and dissatisfied with the body” as the top three items, while Group A scored item 8 “treatment has left the body less whole”, 10 and 2. Group B scored the lowest overall mean with item 3 “dissatisfied with the appearance when dressing” and Group A with item 7 “avoid people because of perceived appearance” (Table 2).

3.3. HRQOL Data

The data of the EORCT QLQ C30 are shown in Table 3. Based on the mean scores, Group B scored significantly worse than Group A on the global HRQOL, physical and social functioning, and symptom scales, particularly for fatigue, pain, diarrhea, and financial difficulties (Table 3).

Table 3. Sample values for the QLQ C30 questionnaire.

		Total Sample	Group A	Group B	A versus B <i>p</i> -Value
			BIS < 8	BIS ≥ 8	
Global health status/QoL	M ± SD *	71.5 ± 21.5	75.9 ± 19.2	61.7 ± 23.4	0.011
	Median	75	75	66.7	
	IQR **	58.3–83.3	58.3–100	50–79.2	
<i>Functional scales</i>					
Physical functioning	M ± SD	63.8 ± 32.6	67.5 ± 33.7	55.7 ± 28.9	0.020
	Median	80	80	73.3	
	IQR	35.0–86.7	53.3–86.7	33.7–80	
Role functioning	M ± SD	27.3 ± 34.3	23.6 ± 34.6	35.3 ± 32.7	0.133
	Median	0	0	50	
	IQR	0–66.7	0–66.7	0–66.7	
Emotional functioning	M ± SD	52.6 ± 36.7	48.3 ± 40.1	62.0 ± 25.8	0.692
	Median	66.7	66.7	66.7	
	IQR	0–83.3	0–83.3	58.3–79.2	
Cognitive functioning	M ± SD	29.4 ± 37.4	28.8 ± 37.3	30.7 ± 37.5	0.809
	Median	0	0	0	
	IQR	0–83.3	0–83.3	0–83.3	
Social functioning	M ± SD	27.1 ± 35.0	20.9 ± 34.3	40.7 ± 33.4	0.010
	Median	0	0	50	
	IQR	0–66.7	0–66.7	0–66.7	
<i>Symptoms scales</i>					
Fatigue	M ± SD	17.8 ± 18.3	14.5 ± 17.1	24.9 ± 19.0	0.010
	Median	11.1	11.1	22.2	
	IQR	0–33.3	0–22.2	11.1–33.3	
Pain	M ± SD	8.7 ± 16.3	6.7 ± 14.0	13.3 ± 19.2	0.037
	Median	0	0	0	
	IQR	0–16.7	0	0–16.7	
Nausea/Vomiting	M ± SD	0.42 ± 3.7	0	1.3 ± 6.7	0.138
	Median	0	0	0	
	IQR	0	0	0	
Dyspnea	M ± SD	12.5 ± 23.3	10.3 ± 22.1	17.3 ± 25.7	0.172
	Median	0	0	0	
	IQR	0–33.3	0	0–33.3	
Insomnia	M ± SD	17.5 ± 29.5	18.8 ± 30.6	14.7 ± 27.4	0.560
	Median	0	0	0	
	IQR	0–33.3	0–33.3	0–33.3	
Loss of appetite	M ± SD	9.6 ± 19.3	7.3 ± 15.3	14.7 ± 25.6	0.207
	Median	0	0	0	
	IQR	0	0	0–33.3	
Constipation	M ± SD	11.2 ± 21.2	10.9 ± 22.3	12.0 ± 19.0	0.476
	Median	0	0	0	
	IQR	0–25.0	0	0–33.3	
Diarrhea	M ± SD	4.2 ± 11.1	2.4 ± 8.7	8.0 ± 14.5	0.037
	Median	0	0	0	
	IQR	0	0	0–16.7	
Financial difficulties	M ± SD	20.4 ± 25.7	15.1 ± 23.0	32.0 ± 28.0	0.004
	Median	0	0	33.3	
	IQR	0–33.3	0–33.3	0–50	

* Mean ± standard deviation; ** interquartile range.

In H&N35, Group B scored significantly worse than Group A on 6 of the 18 items (swallowing, trouble with social eating and social contacts, less sexuality, teeth, and felt ill) (Table 4).

Table 4. TL patients values for the H&N35 questionnaire.

		Total Sample	Group A	Group B	A versus B <i>p</i> -Value
			BIS < 8	BIS ≥ 8	
Pain	M ± SD	7.5 ± 15.4	5.4 ± 11.5	12.0 ± 21.4	0.231
	Median	0	0	0	
	IQR	0–8.3	0–8.3	0–20.8	
Swallowing	M ± SD	15.0 ± 23.2	10.0 ± 19.2	26.0 ± 27.7	0.006
	Median	0	0	25	
	IQR	0–25	0–8.3	0–41.7	
Senses problems	M ± SD	39.4 ± 34.5	37.3 ± 33.9	44.0 ± 36.0	0.399
	Median	33.3	33.3	50	
	IQR	0–66.7	0–50	8.3–75	
Speech problems	M ± SD	51.8 ± 29.6	50.0 ± 32.5	54.7 ± 21.3	0.949
	Median	66.7	66.7	55.7	
	IQR	41.7–66.7	33.3–77.8	44.4–66.7	
Trouble with social eating	M ± SD	11.4 ± 17.9	6.4 ± 11.4	22.3 ± 23.9	<0.001
	Median	0	0	16.7	
	IQR	0–16.7	0–8.3	0–37.5	
Trouble with social contact	M ± SD *	12.2 ± 19.1	4.7 ± 8.8	28.6 ± 24.8	<0.001
	Median	0	0	20	
	IQR **	0–20	0–6.7	6.7–43.3	
Less sexuality	M ± SD	25.2 ± 31.0	16.1 ± 27.2	45.3 ± 29.5	<0.001
	Median	16.7	0	50	
	IQR	0–33.3	0–33.3	25–66.7	
Teeth	M ± SD	17.1 ± 29.3	9.7 ± 21.9	33.3 ± 37.3	<0.001
	Median	0	0	33.3	
	IQR	0–33.3	0	0–66.7	
Opening mouth	M ± SD	9.2 ± 21.2	6.1 ± 14.5	16.0 ± 30.7	0.175
	Median	0	0	0	
	IQR	0	0	0–33.3	
Dry mouth	M ± SD	24.6 ± 31.7	21.2 ± 31.0	32.0 ± 32.6	0.084
	Median	0	0	33.3	
	IQR	0–33.3	0–33.3	0–33.3	
Sticky saliva	M ± SD	24.8 ± 31.8	23.0 ± 30.7	28.0 ± 34.7	0.599
	Median	0	0	0	
	IQR	0–33.3	0–33.3	0–66.7	
Coughing	M ± SD	24.6 ± 30.8	21.2 ± 29.6	32.0 ± 32.6	0.102
	Median	0	0	33.3	
	IQR	0–33.3	0–33.3	0–33.3	
Felt ill	M ± SD	12.1 ± 24.4	5.4 ± 15.4	26.7 ± 33.3	<0.001
	Median	0	0	0	
	IQR	0	0	0–50	
Pain killers	M ± SD	20.0 ± 40.3	16.4 ± 37.3	28.0 ± 45.8	0.231
	Median	0	0	0	
	IQR	0	0	0	
Nutritional supplements	M ± SD	5.0 ± 21.9	5.5 ± 22.9	4.0 ± 20.0	0.783
	Median	0	0	0	
	IQR	0	0	0	
Feeding tube	M ± SD	3.7 ± 19.1	3.6 ± 18.9	4.0 ± 20.0	0.937
	Median	0	0	0	
	IQR	0	0	0	
Weight loss	M ± SD	23.8 ± 42.8	20.0 ± 40.4	32.0 ± 47.6	0.245
	Median	0	0	0	
	IQR	0	0	0	
Weight gain	M ± SD	28.9 ± 45.5	30.9 ± 46.6	28.0 ± 45.9	0.794
	Median	0	0	0	
	IQR	0	0–100	0	

* Mean ± standard deviation; ** interquartile range.

3.4. Communication Data

TL patients with dissatisfied body image (Group B) had significantly more difficulty adapting to the new voice and talked less after surgery than Group A (TL patients with satisfied body image) (Table 5).

Table 5. Sample values for the SECEL questionnaire.

		Total Sample	Group A	Group B	A versus B p-Value
			BIS < 8	BIS ≥ 8	
Total	M ± SD *	38.2 ± 17.7	32.4 ± 15.5	51.0 ± 15.7	<0.001
	Median	37	33	51	
	IQR **	24.3–49.8	21.0–46.0	39.5–61.0	
General subscale	M ± SD	4.0 ± 2.5	3.6 ± 2.4	5.0 ± 2.4	0.015
	Median	4.0	3.0	6	
	IQR	2.0–6.0	1.0–6.0	3.0–6.5	
Attitude subscale	M ± SD	12.0 ± 9.3	8.8 ± 7.6	18.9 ± 9.0	<0.001
	Median	10.5	6	16	
	IQR	5.0–15.0	3.0–12.0	11.5–27.5	
Environment subscale	M ± SD	22.2 ± 9.1	20.0 ± 8.7	27.0 ± 8.2	0.002
	Median	23	21	27	
	IQR	16.0–28.8	11.0–27.0	21.5–34.0	
Talk as much now as before your laryngeal cancer?	M ± SD	2.6 ± 0.8	2.4 ± 0.9	3.0 ± 0.2	0.003
	Median	3	3	3	
	IQR	2.0–3.0	1.0–3.0	3.0–3.0	

* Mean ± standard deviation; ** interquartile range.

3.5. Predictors of Body Image

The best-fit regression model showed that the QLQ C30 scale was not significantly related to body image (BIS total score).

The results presented in Table 6 show that the overall model combining three predictors represents a highly significant model estimate ($p < 0.001$) for body image. The multiple coefficient of determination (adjusted R²) shows that only 52% of the total variation in body image scores around their mean can be explained by the predictor variables. In this model, H&N35 social contact was the strongest predictor contributing to body image (beta weight coefficient of 0.483) followed by SECEL total and H&N35 social eating. In addition, within-model *t*- and *p*-values indicated that these three variables were significant independent predictors.

Table 6. Predictors of body image.

F (3,76) = 29.375 $p < 0.001$ Adjusted R ² = 0.522				
Predictors	Coefficient B	Beta weight	t-value	p-value
(Constant)	−0.414		−0.351	0.727
SECEL Total	0.084	0.242	2.627	0.010
QLQ H&N35 social contact	0.155	0.483	5.205	<0.001
QLQ H&N35 social eating	0.081	0.237	2.973	0.004

4. Discussion

In the present study, using a clinically significant BIS cut-off point [7,8,22], a prevalence rate of 31.3% of TL patients dissatisfied with their body image was found, indicating a relevant number of people at risk of psychological distress. The percentage found was in the range of previously reported values for TL [9] and HNC patients [3–5]. Nevertheless, it is lower than the previously mentioned 89% of body image concerns in HNC patients [8]. There could be two alternative explanations for these differences. First, the present study

included only TL patients, whereas the earlier study included patients with oral cavity cancer, skin cancer, and HNC and different types of treatment. It is not surprising that TL has a lower prevalence rate of body image concerns than in some of the HNC studies in which oral cavity cancer, for example, is the most common [3–5]. A plausible explanation is that the face (oral cavity) is crucial for audiovisual communication and elementary functions such as chewing and swallowing. Second, the current study was a cross-sectional design with 80 TL patients, whereas the previous study was a longitudinal study with 219 HNC patients (16.9% of laryngeal cancer cases).

The present results indicated that TL patients with dissatisfied body image had a higher percentage of comorbidities such as pain, depression, anxiety (irritability and tension), and fatigue than patients with satisfied body image (Group A). These results confirm the evidence that laryngeal cancer patients with a more negative body image had a higher symptom severity [11].

The fact that married or cohabiting patients in the present study were less concerned about their body image than single TL patients is not consistent with previous data in which single HNC patients were the least concerned. The discrepancies noted could be related to methodological differences between the studies in terms of study design (cross-sectional versus longitudinal), sample size (80 versus 224), population (Portuguese versus Canadian), and diagnosis (TL versus HNC, which accounted for 17% of laryngeal cancer cases) or other unknown reasons [3]. This could be an interesting area for further research.

The highest scoring BIS items in patients with body image dissatisfaction were related to “. . .feeling less physically and sexually attractive” and dissatisfaction with the “appearance of the scar”, which is consistent with the main characteristics reported in adults treated for cancer [3,9]. It would be beneficial to identify in the future which affective, evaluative or behavioral body image perceptions most influence the sexual functioning in patients who underwent TL.

The data presented here provide evidence that TL patients with a dissatisfied body image had significantly poorer HRQOL and greater difficulties adjusting to the new voice compared to TL patients with a satisfied body image.

A detailed analysis showed that TL patients with body image dissatisfaction scored significantly worse on physical markers (fatigue, pain, diarrhea, swallowing, teeth), and psychosocial markers (problems with social contacts and social eating, difficulty adjusting to the new voice, and speaking less after surgery, less sexuality, feeling ill and financial difficulties) as well as global HRQOL. In line with the present study, other researchers have also indicated that lower physical functioning of patients due to body structure and function, and higher psychosocial markers are important factors for greater body image concerns and lower HRQOL [3,8]. Published studies have shown that physical consequences and impairment in social activities and communication are the three most frequently mentioned dimensions of quality of life [25,26].

It is worth noting that 48% of TL patients with body image dissatisfaction, in the present study, used a communication mode (murmured speech and eletrolaryngeal speech) that limits social functioning and activities and contributes to poorer HRQOL.

Difficulties in social activities and speaking due to permanent tracheostoma have already been documented as one of the problems in TL patients [25,26]. Sexual impairment has also been associated with permanent tracheostomy and communication disorders [9,27]. In the present study, 32% of patients in Group B use murmured speech and the inability to speak intelligibly may have a negative impact on sexual intercourse with a partner or on social contacts.

Overall, the present results are consistent with previous research showing that physical consequences, restricted social activities and communication difficulties were the highest-rated HRQOL dimensions [12].

The fact that body image perception in the present study was moderately (52%) associated with troubles in social activities (contacts and eating), and difficulties in adapting to the new voice is consistent with previous literature that has shown that body image was

associated with problematic social functioning in middle-aged men and that a lower speech ability was associated with more negative functioning and poorer body image perception in laryngeal cancer patients [9,11,28]. This has important implications for healthcare professionals, as patient-centered care is generally preferable [15]. Interventions should not only focus on physical and functional impairments but also on supporting psychological and social functions. Medical, rehabilitative, psychological, and social support play an important role in restoring meaningful communication, psychological adjustment, and overall HRQOL [29].

The present study had several limitations that should be addressed in the future. First, the study was based on a small cohort of TL patients, particularly in terms of representativeness of body image dissatisfaction ($n = 25$). Unfortunately, a data dropout of 31% was observed. The absence of clinical data, such as RT and QT information, was due to the lack of electronic databases, which made it difficult to access “old” data. Seven outpatient clinics participated in the present study, and the time between surgery and participation in the study ranged from 1 month to 39 years. Second, due to the limited number of participants in Group B, it is possible that some of the items of the QLQ C30 and the H&N35 were not sensitive to actual differences, so patients with low scores may be lumped together (“floor effect”) even if they differ in measurable ways. However, the present study aimed to gain insights into patients’ perceived body image, which is an important concern for both patients and healthcare professionals. In the future, data collection will benefit from better compliance. Therefore, obtaining meaningful information from a small sample in which wide variability in scores was observed should be carefully considered.

Despite the limitations described above, this study extended previous research and provided useful information that would not have been obtained otherwise. In addition, this study utilized several recommended, validated PROMs developed for cancer populations in general (QLQ-C30) and specifically for head and neck cancer (H&N35) and laryngeal cancer (SECEL). There is potential for further research, as mentioned above, or in other areas that were not analyzed, as these were not the objectives of the study.

5. Conclusions

Patients who underwent TL and had a dissatisfied body image showed significantly worse HRQOL and greater difficulty adapting to their new voice than patients with a satisfied body image. In addition, 52% of body image perception was predicted by difficulties in social eating and contacts, as well as difficulties in adapting to their new voice. This suggests that the BIS is an important outcome that can be used in conjunction with other cancer-specific and communication-related self-reported outcomes.

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