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Coping and Quality of Life After Total Laryngectomy

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Abstract

OBJECTIVE—To investigate how ways of coping and traditional factors (age, sex, time post-laryngectomy, stage of disease, radiation, alaryngeal speech method) predict global quality of life, head and neck cancer specific quality of life, and voice-related quality of life outcomes after total laryngectomy.

STUDY DESIGN—Cross-sectional survey.

SETTING—University-based laboratory and speech clinic.

SUBJECTS AND METHODS—Sixty-seven individuals who underwent total laryngectomy secondary to cancer were recruited from support groups and professional contacts. Individuals were at minimum 9 months post-laryngectomy. All outcomes were patient-reported and included demographic data as well as a number of validated questionnaires: the Ways of Coping-Cancer Version (WOC-CV) scale, the Voice-Related Quality of Life (V-RQOL) scale, and the University of Washington Quality of Life (UW-QOL) composite and global QOL scores.

RESULTS—Fifty-three individuals identified a stressful aspect of their laryngectomy. As a set, traditional variables (age, time post-laryngectomy, alaryngeal speech method) accounted for only 5% of global QOL scores, but between 25–30% of the variance of composite UW-QOL and VRQOL scores. Time post-laryngectomy was the strongest traditional predictor. Ways of coping accounted for 23–32% of all QOL scores. Avoidant coping strategies (both cognitive and behavioral escape) were among the strongest predictors of poorer QOL. When traditional variables were combined with ways of coping, they together accounted for 26%–46% of the variance of QOL outcomes.

CONCLUSION—Coping is important to consider when evaluating post-laryngectomy outcomes, above and beyond traditionally investigated factors.

Keywords

quality of life; total laryngectomy; coping

INTRODUCTION

Total laryngectomy continues to be a primary method of treatment for those diagnosed with laryngeal cancer. After total laryngectomy, individuals must learn a new method of verbal communication, and cope with changes to breathing and swallowing. Thus, one common

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outcome measure includes consideration of quality of life (QOL). Outcome studies have found that QOL is generally impacted during the first few months post-laryngectomy, but after 12-months, many patients adapt.¹⁻⁴ While these results are optimistic, there is still a portion of this population who experience long-term impact on QOL.⁵ As a result, it is important to identify factors that predict QOL so that targets for rehabilitation may be identified.

While the vast amount of literature in QOL after total laryngectomy has focused on traditional outcome predictors such as the patient's age, sex, alaryngeal speech type or disease severity, most studies have revealed only weak to moderate relationships between these factors and QOL.⁴ Few studies have examined psychosocial variables and their relationships with QOL.⁶ Investigating how factors such as coping relate to QOL is critical because coping has been shown to relate more strongly to QOL in other health conditions.⁷

Coping strategies are cognitive and behavioral efforts used to manage the internal and external demands of stressful circumstances.⁸ An encounter is considered stressful when it is perceived as potentially dangerous to one's physical or psychological well-being. Once an experience is deemed stressful, the degree of threat is assessed, and coping strategies are used to reduce potential harm. Rather than being a static component of personality, coping is multidimensional; individuals cope in different ways depending upon the context and stressors.⁹

A variety of frameworks have been proposed to explain coping.⁸ Dunkel-Schetter et al¹⁰ found that five patterns of coping emerged among cancer survivors, including: 1) seeking and using social support; 2) focusing on the positive; 3) distancing; 4) cognitive escape avoidance; and 5) behavioral escape avoidance. Seeking and using social support includes behavioral strategies such as asking for advice or talking to others about feelings. Rediscovering what is important in life or feeling as though a challenging experience (eg, cancer diagnosis) has resulted in personal growth are examples of focusing on the positive. Distancing refers to separation from the stressful event by using strategies such as refusing to think about it. Cognitive escape-avoidance uses thoughts to escape from the stressful event, such as wishing it would go away. Finally, behavioral escape-avoidance includes behaviors such as avoiding being with people, or trying to feel better by drinking or using drugs.¹⁰

Coping patterns may be adaptive or maladaptive depending on the context. For example, using cognitive escape-avoidance strategies may be adaptive when dealing with short-term stressors, but maladaptive when faced with more chronic stressors, such as ongoing cancer treatment.¹¹ In cancer patients, cognitive and behavioral escape-avoidance strategies predict elevated levels of distress¹⁰, chronic disease progression, depression¹², mortality, and poor QOL outcomes.^{13,14} In contrast, optimism, seeking social support, and focusing on the positive are inversely related to pain and distress, and relate directly to fewer comorbid health conditions.¹⁰

While these results have been investigated in other cancer survivors, very few studies have examined these relationships after total laryngectomy^{15,16}, and no study has examined how coping strategies predict QOL compared to traditional variables. This study investigated the following: 1) What is the relationship between traditional variables (eg, stage of disease, age, sex, time post-treatment, presence of radiation, communication method) and QOL after total laryngectomy?; 2) What is the relationship between patterns of coping and QOL?; and 3) How much do traditional variables and coping patterns together predict QOL after total laryngectomy?

METHODS

Subjects

Subjects were recruited through support groups, professional email lists, and professional contacts. All subjects had undergone total laryngectomies at least nine months prior to participation to avoid the fluctuation of QOL scores that occur immediately post-surgery.^{1,3,4} Subjects included adults with no additional medical conditions (beyond head and neck cancer treatment) that affected speech, and were able to complete questionnaires in English. Individuals were paid for their participation.

Data Collection

The University of Washington Institutional Review Board approved the procedures in this study. Subjects were either sent a login to a secure website or mailed a packet, and were given three weeks to complete the questionnaires before being contacted once for follow-up.

Demographic measures—Demographic information included age, sex, primary language, marital status, ethnic background, education, and work status. Medical history included site of cancer diagnosis, stage of cancer, date of diagnosis, type(s) and length of treatment, date of laryngectomy, and primary communication method.

University of Washington Quality of Life (UW-QOL) questionnaire—The UW-QOL (V4) was used to measure disease-specific QOL.¹⁷ The UW-QOL consists of 12 items measuring health-related domains that are averaged to derive a composite QOL score ranging from “0” (worst health-related QOL) to “100” (best health-related QOL). The second part of the UW-QOL consists of three questions related to global QOL. Each item is calculated independently to represent a global QOL score, ranging from “0” (worst QOL) to “100” (best QOL). Because the first two global questions measure health-related QOL and relate to the composite health-related QOL score, only the general QOL question was included for analysis in this study. Global QOL was therefore derived from the question: “Considering everything in your life that contributes to your personal well-being, rate your overall quality of life during the past 7 days.”

Voice-Related Quality of Life (V-RQOL) scale—The V-RQOL¹⁸ is a 10-item questionnaire that measures the impact of voice disorders, including total laryngectomy, on voice-related QOL.¹⁹ Participants respond to each item using a 5-point Likert scale from 1 (*not a problem*) to 5 (*Problem is as bad as it can be*). Responses are added to determine a total score (0–50), and then scores are transformed (0–100), with higher scores representing better voice-related QOL.

Ways of Coping-Cancer Version (WOC-CV) questionnaire—The WOC-CV was adapted from the *Ways of Coping-Revised* questionnaire, resulting in a 51 item questionnaire, which has been published previously.^{10,14} Subjects were first asked to identify a stressor they had experienced in the last two weeks related to their laryngectomy, and then rate it on a 5-point Likert scale from 1 (*not stressful*) to 5 (*extremely stressful*).¹⁰ Participants then responded to 51 statements consistent with various coping strategies, and indicated the degree to which a strategy was used; response options ranged from 0 (*not used*) to 3 (*used a great deal*). Scaled scores for each item result in summary scores (averaged across particular items) that represent the frequency of engagement for each coping pattern: 1) seeking or using social support; 2) focusing on the positive; 3) distancing; 4) cognitive escape-avoidance; and 5) behavioral escape-avoidance. Higher scores represent higher frequency of engagement.

Data Analysis

First, descriptive data were calculated for all of the traditional variables, as well as QOL scores. To determine relationships among traditional variables and QOL measures, Chi-Square, Spearman's Rho, and Pearson's Correlation Coefficients were calculated. Next, the five WOC-CV coping pattern scores were determined. WOC-CV subscales were summarized in terms of both mean and proportional scores (ie, proportion of total coping effort by type). Relationships among coping strategies and QOL were determined using Pearson's Correlation Coefficients.

To determine the variance predicted in QOL scores by coping patterns, by traditional variables, and by both, a number of regression analyses were performed. Only individuals who identified a "stressful situation related to laryngectomy" (ie, a score of "2" or more) were included because coping is used to regulate stressful events. Patient and disease demographic variables were entered into multiple linear regression analyses as predictor variables, and QOL scores (composite and global UW-QOL scores and V-RQOL scores) were entered as predicted variables. Next, the five coping pattern summary scores were entered into multiple linear regression analyses, with the coping patterns as predictor variables, and QOL scores as predicted variables. Finally, both coping patterns and traditional variables were entered into linear regression analyses, with coping strategies and traditional variables as predictor variables, and UW-QOL and V-RQOL scores as predicted variables.

RESULTS

Subject Characteristics

Ninety-nine questionnaires were provided to individuals who had undergone total laryngectomies. Sixty-seven questionnaires were completed and returned, representing a 68% response rate. Subjects (51 males, 16 females) were on average 63 years old (range = 44–89 years) and were on average 84 months post-laryngectomy (range = 9–333 months) (see Table 1).

QOL and Traditional Variables

Overall, moderate QOL scores were found, with the mean UW-QOL composite score being 76.62 ($SD=13.53$); the UW-QOL global score was somewhat lower ($M=68.66$; $SD=18.16$). The mean voice-related QOL score also was moderate ($M=68.42$; $SD=19.61$).

To investigate relationships between QOL and traditional variables, a number of correlation analyses were performed (see Table 2). Results showed a mostly moderate relationship between time post-laryngectomy and QOL; those who were more distant survivors had better QOL. A significant, but weak relationship was found between age and composite UW-QOL, with older individuals having better scores. Communication method also had a significant, but weaker relationship with V-RQOL. Post-hoc tests revealed no significant differences across alaryngeal speech methods: electrolarynx ($M=77.28$; $SD=9.29$), tracheoesophageal ($M=66.45$; $SD=19.31$), and esophageal speech ($M=72.94$; $SD=24.33$). V-RQOL was significantly worse for those who used writing/augmentative devices ($M=40.50$; $SD=21.02$).

Ways of Coping

Stressful aspects related to total laryngectomy—Before subjects completed the WOC-CV questionnaire, they identified a stressful event and rated its severity. All responses were answered relative to this stressful event. Forty-two percent of subjects ($n=28$) indicated *limitations in physical ability, appearance, or life style due to cancer* were the most stressful

aspects of their total laryngectomy. The second most frequent stressor was *fear of uncertainty about the future due to cancer*, reported by 28% (n=19). *Acute pain symptoms, or discomfort from illness or treatment and problems with family or friends related to cancer* were indicated for 9% (n=6). The mean stressfulness rating was 2.3, or *somewhat stressful* ($SD=0.90$), with 53 individuals reporting at least a somewhat stressful event (>2) related to their laryngectomy.

Ways of coping—The five WOC-CV coping pattern scores are presented in Table 3. Subjects tended to use distancing, focusing on the positive, and seeking social-support more than cognitive and behavioral escape avoidance.

WOC-CV coping strategy scores also were summarized in terms of proportional scores, which denote the portion of total coping effort represented by each pattern of coping. On average, subjects used distancing most (31% of their total coping efforts) and both cognitive and behavioral-escape avoidance patterns least (see Table 3).

QOL and Coping Patterns

To examine relationships between QOL and WOC-CV, Pearson's Correlation Coefficients were performed among the five patterns of coping with each of the QOL scales (see Table 4). Correlations ranged from weak to moderate, with all but three correlations being negative. Cognitive escape- and behavior-escape avoidance showed the strongest correlations.

Predicting QOL with Ways of Coping and Traditional Variables

Based on the intercorrelations (see Tables 2 and 4), three traditional variables (TNM stage, sex, and radiation) showed weak relationships with QOL ($r < 0.2$). Therefore, eight variables (age, time since laryngectomy, communication method, and all five coping variables) were used in the subsequent regression analyses. Results from the entire sample (Tables 2 and 4) may be compared with those found for the subset (n=53) of patients who identified stressors related to their laryngectomy (see Table 5).

Age, time post-laryngectomy, and communication method first were used to predict QOL scores. Traditional variables were entered independently and as a simultaneous set. In general, time since total laryngectomy predicted the most amount of variance (equivalent to % predicted) of all QOL scores, and speech method was the strongest predictor of V-RQOL (see Table 5). Next, the five patterns of coping were entered independently and as a set. Behavioral escape-avoidance and cognitive escape-avoidance were the strongest predictors, particularly for the composite UW-QOL and V-RQOL. Finally, traditional variables and the five patterns of coping (WOC-CV) scores were entered as predictors of QOL. Together, the traditional variables accounted for 25%–30% of the symptom specific QOL scores, with weaker prediction for global QOL (4.5% variance). The five patterns of coping predicted a similar, albeit a somewhat stronger amount of the variance (range 23%–32%). When all the demographic variables were combined with all five patterns of coping as a set, they accounted for 26–46% of the variance (see Table 5).

DISCUSSION

This study investigated how traditional variables compared with patterns of coping in predicting QOL after total laryngectomy. As a set, traditional variables accounted for 25–30% of the variance of symptom-specific QOL scores, but not global QOL. Ways of coping accounted for 23–32% of all QOL scores. When traditional variables were combined with ways of coping, together they accounted for 26%–46% of the variance. The results reveal

the unique contribution of ways of coping to QOL outcomes after total laryngectomy, and have implications for research and clinical practice.

Traditional Variables and QOL

The sample in this study was representative of the laryngectomy population and was comparable to demographics found in other research.² Most participants in this study were recruited through an online support group, and all participants were paid. Thus, results related to coping and QOL need to be interpreted with these demographics and potential biases in mind.

Overall, results from this study revealed moderate QOL scores after total laryngectomy, consistent with previous literature.^{2,19,20} The relationship between traditionally investigated variables (e.g., TNM stage of disease, age, sex, time post-laryngectomy, etc.) and QOL revealed that most variables were weak predictors. For example, although previous research has shown a relationship between increased severity of disease (higher T-stage) and lower QOL^{4,13}, no significant relationship was found in this study between these variables. This result is consistent with more recent studies indicating that treatment type may override stage when relationships are examined.¹ The weak relationship with radiation also needs to be interpreted with caution since 84% of participants had received radiation; this limits the strength of this finding.

In the present study, significant relationships were found between communication method and QOL. In fact, communication method was the strongest predictor of V-RQOL. These results need to be interpreted with caution due to the small sample size of the non-speech group ($n=5$). Among those who used alaryngeal speech methods, no significant differences were found with regard to speech type.²¹

As predicted, increased time post-laryngectomy was associated with higher QOL scores, and was the strongest independent predictor of all traditional variables.^{1,3,4} Subjects in the present study were on average 84 months post-laryngectomy. Terrell et al¹ found that even 10 years after treatment for head and neck cancer, patients reported problems in specific domains related to QOL. Thus, while QOL may fluctuate during the first few months post-treatment, it may improve over time.

Ways of Coping and QOL

In this study, the most frequently reported stressful problem related to having a laryngectomy was *limitations in physical ability, appearance or lifestyle* (42%), followed by *uncertainty about the future due to cancer* (28%). Overall, subjects rated their problems as *somewhat stressful* (mean rating = 2.3). These stressors are consistent with those reported by cancer survivors in general, although the degree of stress reported has been reported higher, particularly among those who were recently diagnosed.^{10,14}

In the present study, distancing was the coping pattern used most frequently, while behavioral escape- and cognitive escape-avoidance were used least. List et al¹⁴ also found behavioral escape-avoidance was used least among recently diagnosed head and neck cancer patients; however, their sample engaged in seeking social-support most frequently. How these patterns of coping change over time, and how they differ between different types of cancer patients should be further examined.

In this study, mostly negative correlations were found between coping patterns and QOL. These results contrast with previous research, which has identified certain coping patterns as adaptive (ie, associated with positive outcomes) or maladaptive.¹⁶ The only exception to this trend was the modest correlation showing that those who engaged in focusing on the

positive also reported increased global QOL scores. Yet, this strategy did not contribute significantly to symptom specific QOL scores (see Table 5). The results suggest that individuals who used any coping strategy, particularly behavioral and cognitive escape-avoidance, demonstrated poorer outcomes, and that these relationships may have overridden any so-called “positive” coping strategies. Use of these particular strategies has predicted poorer QOL in previous studies.^{12–14}

The present study was the first to examine how traditionally investigated variables compared to coping in predicting QOL after total laryngectomy. The traditional variables accounted for only a modest (4.5%) amount of the global QOL score, but predicted about a quarter of the variance in the composite UW-QOL and V-RQOL scores (range 25%–30%). The five patterns of coping predicted a similar amount of the variance in QOL scores (range 23%–32%), including global QOL. Results suggest that coping patterns may influence QOL at least as much as traditional factors, particularly for overall QOL. Together, traditional variables and coping patterns predicted 26% of the global QOL scores, 39% of V-RQOL, and 46% of the composite UW-QOL.

Results from this study are consistent with the literature, which has revealed that coping strategies may uniquely contribute to QOL.⁶ However, a stronger contribution of coping patterns for predicting outcomes was found in this study compared to other populations. For example, Aarstad et al¹³ found that only 10% of the common variance of QOL was related to coping in other head and neck cancer patients. However, when psychological factors (coping/personality trait) were combined, they accounted for about 30% of the variance in QOL. How factors such as personality and coping independently contribute to QOL need further study.

Future Research and Clinical Implications

The WOC-CV was used in this study to investigate patterns of coping after total laryngectomy. However, results may only be interpreted at the group level to reveal patterns of coping in large populations.⁹ Scales appropriate for measuring individual coping patterns should be studied before results are applied clinically. If certain ways of coping are found to result in poorer outcomes, these strategies may be targeted for intervention, resulting in improved QOL.²² Future studies investigating how coping and other psychosocial factors affect QOL are warranted to optimize rehabilitation and improve QOL post-laryngectomy.

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TABLE 1

Selected Demographic Characteristics (N = 67 subjects).

Characteristic	No. (%)
Sex	
Female	16 (24)
Male	51 (76)
Marital status	
Married	40 (60)
Single	6 (9)
Divorced	13 (19)
Widowed	8 (12)
Ethnic group	
American Indian	2 (3)
Asian	1 (1)
White (Caucasian)	64 (96)
Educational background	
Post-graduate (Master's; Ph.D.)	13 (19)
College graduate	20 (30)
Some college	23 (34)
High school graduate	8 (12)
Some high school	3 (5)
Cancer stage	
I	8 (12)
II	2 (3)
III	17 (25)
IV	27 (40)
Unsure/did not answer	13 (19)
Received Radiotherapy	56 (84)
Primary method of communication	
Artificial larynx	20 (30)
Tracheoesophageal speech	35 (52)
Esophageal speech	7 (10)
Writing/augmentative device	5 (8)

TABLE 2

Correlations (and 95% confidence intervals) between Traditional Variables and QOL for all participants.

Traditional Variable	QOL Score		
	Composite UW-QOL Correlation (95% CIs)	Global UW-QOL Correlation (95% CIs)	V-RQOL Correlation (95% CIs)
Age	0.268 [*] (.030 – .477)	0.171 (–.072 – .394)	0.050 (–.192 – .286)
Sex	–0.109 (–.340 – .134)	–0.152 (–.378 – .091)	–0.085 (–.318 – .158)
Time since TL	0.422 ^{**} (.203 – .601)	0.279 [*] (.042 – .486)	0.383 ^{**} (.158 – .570)
Radiation	–0.117 (–.347 – .126)	0.005 (–.235 – .244)	0.166 (–.077 – .390)
Stage of Disease	–0.150 (–.406 – .128)	–0.082 (–.347 – .195)	0.193 (–.084 – .442)
Communication method	–0.177 (–.400 – .066)	–0.044 (–.281 – .198)	–0.277 [*] (–.484 – –.040)

Note: Confidence Intervals = CIs; Stage of disease correlations are reported for 52 participants with known stage only.

^{*} Correlation is significant at the 0.05 level (2-tailed).

^{**} Correlation is significant at the 0.01 level (2-tailed).

TABLE 3

Mean and Proportional Coping Scores for all participants.

Coping style	Mean (SD)	Proportional Score (%) and (SD)
Seeking social-support	1.13 (0.50)	22.02 (7.45)
Cognitive escape-avoidance	0.93 (0.50)	14.58 (6.07)
Distancing	1.44 (0.48)	31.50 (9.19)
Focusing on the positive	1.33 (0.71)	19.57 (12.44)
Behavioral escape-avoidance	0.80 (0.42)	12.33 (4.90)

TABLE 4

Correlations (and 95% confidence intervals) between Coping Strategies and QOL scores for all participants.

	Composite UW-QOL <i>r</i> (95% CIs)	Global UW-QOL <i>r</i> (95% CIs)	V-RQOL <i>r</i> (95% CIs)
SS	–0.274* (–.482 – –.037)	–0.081 (–.315 – .162)	–0.159 (–.384 – .084)
CEA	–0.462** (–.632 – –.250)	–0.229 (–.444 – .011)	–0.353** (–.546 – –.124)
D	–0.274* (–.482 – –.037)	0.046 (–.196 – .283)	–0.163 (–.388 – .080)
FP	–0.109 (–.340 – .134)	0.275* (.038 – .483)	0.002 (–.238 – .242)
BEA	–0.479** (–.644 – –.270)	–0.340** (–.536 – –.109)	–0.463** (–.632 – –.251)

Note : Pearson Correlation Coefficient = *r*; Confidence Intervals = CIs; Seeking or using social support = SS; Cognitive escape-avoidance = CEA; Distancing = D; Focusing on the Positive = FP; Behavioral escape-avoidance = BEA

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

TABLE 5

Regression coefficients for 53 individuals who reported stressful events related to total laryngectomy (>2 on the WOC-CV scale).

Values represented in R-Squared (% variance predicted)

<i>Predictor</i>	<i>Composite UW-QOL</i>	<i>Global QOL</i>	<i>V-RQOL</i>
Traditional			
Age	0.121 *	0.032	0.011
Time Since TL	0.215 **	0.132 **	0.117 *
Speech	0.064	0.001	0.154 **
WOC-CV			
SS	0.102 *	0.011	0.028
CEA	0.209 **	0.099 *	0.120 *
D	0.035	0.016	0.017
FP	0.063	0.058	0.026
BEA	0.218 **	0.001	0.202 **
Regression variable sets			
Traditional: Age, Time Since TL, & Speech	0.299 **	0.045	0.253 **
WOC-CV: SS, CEA, D, FP & BEA	0.317 **	0.246 *	0.233 *
All: Age, Time Since TL, Comm method, SS, CEA, D, FP & BEA	0.463 **	0.257	0.389 **

Note: Data are presented as individual predictors and as variable sets. Time since TL = Time since total laryngectomy; Seeking or using social support = SS; Cognitive escape-avoidance = CEA; Distancing = D; Focusing on the Positive = FP; Behavioral escape-avoidance = BEA; Comm method = Communication method.

* F change statistic is significant at the .05 level.

** F change statistic is significant at the .01 level.