We examined the changes in psychological distress and quality of life (QOL) during the perioperative period in oral cancer patients undergoing surgery and investigated the relationship between patient’s psychological distress and QOL.

Methods. Fifty patients participated. The Hospital Anxiety and Depression Scale (HADS; Japanese version), as a psychological test and the Functional Assessment of Cancer Therapy General (FACT-G); and Head and Neck (FACT-H&N), as quality of life (QOL) surveys were administered preoperatively, after surgery, and 1 month after leaving the hospital.

Results. Anxiety was highest pre-operation and depression was highest post-operation, but improvements in both were seen post-discharge. At the pre-operation time point, anxiety and depression low-score groups had significantly high scores on Emotional well-being and Functional well-being. At the post-operation time point, anxiety and depression low-score groups had significantly high scores on all QOL subscales.

Conclusion. Providing psychological support while considering anxiety might be particularly useful preoperatively whereas providing psychological support while considering depression might be particularly useful postoperatively.

Key words: oral cancer; perioperative period; psychological distress; quality of life

Introduction

Pathological changes accompanying oral cancer can be observed by the patients themselves. Symptoms arise in sites that carry out important functions in daily life, such as speech, swallowing, eating, and respiration. Furthermore, because of the esthetic damage and loss of function that accompany oral cancer due to treatment, these patients reportedly experience psychological suffering, including anxiety and depression. Between 15 and 50 percent of head and neck cancer patients, including those with oral cancer, suffer from major depressive disorder, which is higher than in all other types of cancer. Like stomach, pancreatic, and lung cancers, head and neck cancers reportedly have many symptoms, which are compounded by anxiety and depression.

Postoperative morbidity and fatality rates in oral cancer cases have declined in recent years because of advancements in treatment methods; however, when patients receive a diagnosis that requires treatment for oral cancer, they must confront various functional, mental, and social difficulties. The aim of this study was to examine changes in psychological distress, such as depression and anxiety, and quality of life (QOL) during the perioperative period in oral cancer patients.
undergoing surgery. We also investigated the relationship between patient’s psychological distress and QOL. We hypothesized that perioperative psychological distress would affect QOL. Thus, patients with oral cancer with lower psychological distress would experience better QOL compared with patients with higher psychological distress.

Materials and Methods

Subjects

Patients fulfilling the following criteria were included in our survey: (1) admitted to the oral surgery ward of the Tokyo Medical and Dental University Hospital Faculty of Dentistry and scheduled to undergo surgery to treat the initial onset of oral cancer, (2) aged 18 years or older, (3) was diagnosed with cancer, (4) exhibit physical symptoms but were able to be interviewed or respond to a self-administered written survey, and (5) not receiving treatment for a mental disorder nor had a prior history of mental disorder.

During the survey period from October 2008 to May 2010, 85 patients met our criteria. However, we were unable to invite all of these patients to participate in our study because of the limited period between the day of admission to the day of surgery. Consequently, 57 subjects, who gave their informed consent after the purposes of the present study were explained to them, participated in the study.

Methods

1. Procedure

This study was carried out with the approval of the Tokyo Medical and Dental University Board of Ethics. Interviews were conducted after explaining the purpose of the study to the subjects and obtaining their written consent. We conducted the survey at 3 different time points, namely, 1-7 days before surgery (pre-operation), 7-10 days after surgery (post-operation), and 1 month after leaving the hospital (post-discharge). The post-discharge survey was distributed by mail. We conducted the following 3 surveys on anxiety and depression: (1) the Hospital Anxiety and Depression Scale (HADS; Japanese version), as a psychological test; (2) Functional Assessment of Cancer Therapy General (FACT-G); and (3) Functional Assessment of Cancer Therapy Head and Neck, (FACT-H&N; Version 4, Japanese version), as a quality of life (QOL) survey.

2. Questionnaires

Because the psychological characteristics of oral cancer patients are complex and require a multi-faceted evaluation, we selected the HADS to evaluate psychological characteristics, the FACT-General (FACT-G) to evaluate general QOL, and the FACT-H&N to evaluate the aspects of QOL specific to patients with head and neck cancer.

Hospital Anxiety and Depression Scale (HADS; Japanese version)

HADS is a self-assessment scale that measures the psychological condition (i.e., anxiety and depression) of patients with physical ailments. The survey comprises 7 items related to anxiety (HADS-A) and 7 items related to depression (HADS-D), permitting the evaluation of depression uninfluenced by physical condition. Each item is scored from 0 to 3, with a diagnosis of the respective symptoms made according to the following scale: 0-7 points indicate no symptoms present, 8-10 points indicate possible affliction, and 11-21 points indicate that symptoms are present.

Japanese-language edition of the FACT-G

The FACT-G is a self-administered questionnaire assessing QOL; it comprises 7 physical-related items (physical well-being; PWB), 7 society- and family-related items (social/family well-being; SWB), 6 psychology-related items (emotional well-being: EWB), and 7 function-related items (functional well-being; FWB), resulting in a total of 29 items. Each item is rated on a scale of 0-4, where higher scores indicate higher QOL.

Japanese-language edition of the FACT-H&N, version 4

The FACT-H&N consists of the addition of 11 items relating to aspects of QOL specific to patients with head and neck cancer, such as eating, swallowing, speech, and esthetics, to the FACT-G.

3. Statistical Analysis

Psychological characteristics and chronological changes in QOL

Chronological changes between pre-operation, post-operation, and post-discharge scores on HADS and FACT-G, FACT-H&N were analyzed with one-way ANOVA and subsequent multiple comparison tests (Scheffe F test; p < 0.05).

Relationship between psychological characteristics and QOL

In order to determine the point in time where anxiety and depression worsen, we adopted a cutoff point following that used by Kugaya et al. They reported that an optimal cutoff point for screening for adjustment disorder and major depressive disorder in Japanese
cancer patients was 7 or 8 for the HADS-A, and 4 or 5 for the HADS-D, which provided sufficient sensitivity and specificity. Subjects were divided into high- and low-score groups for HADS-A (≧8: high score; ≦7: low score), and HADS-D (≧5: high score; ≦4: low score). FACT-G and FACT-H&N comparisons were performed with the Mann-Whitney U test.

Statistical analysis was performed using IBM Statistics SPSS Version 20.0.

Results

Subject characteristics

Of the 57 subjects, 2 did not complete the post-operation surveys and 5 more declined to continue participating after being discharged from hospital. Thus, this study ultimately sampled 50 subjects.

The demographics of the subjects are as follows. Participants consisted of 34 men and 16 women, with an average age of 60.28 ± 13.84 (age range: 29-86). Most of the subjects were married (76%) and 60% were employed. More than half of the subjects had received post-secondary education. Cancer on the tongue was the most common (27 cases), followed by the lower gingiva (16 cases); cancers in the tongue and lower gingiva accounted for 86% of the subjects, which reflects the pattern in the general Japanese population. With regard to clinical stage, 29 cases were in the early stages and 21 cases were in the advanced stages. Regarding operation procedure, approximately half of the patients had radical tumor excision, neck dissection, and/or free flap reconstruction.

Chronological changes in HADS

Average scores for anxiety and depression for all subjects at all 3 time points (pre-operation, post-operation, and 1 month post-discharge) are shown in Table 2.

Statistically significant differences were seen in all stages of chronological progression for HADS-A (F = 7.644, df = 2; p = 0.001) and HADS-D (F = 6.442, df = 2; p = 0.002).

Pre-operation and post-discharge (Scheffe F test, p = 0.002) and pre-operation and post-operation (Scheffe F test, p = 0.013) HADS-A scores differed significantly while pre-operation and post-discharge (Scheffe F test, p = 0.013) and post-operation and post-discharge (Scheffe F test, p = 0.002) HADS-D scores differed significantly. Anxiety was highest pre-operation and depression was highest post-operation, but improvements in both were seen post-discharge.

Table 1 Subjects’ characteristics

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number (%)</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>34 (68.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>16 (32.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age, y</td>
<td>60.28</td>
<td>13.84</td>
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</tr>
<tr>
<td>Marital status</td>
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</tr>
<tr>
<td>Married</td>
<td>38 (76.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>12 (24.0)</td>
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<td></td>
</tr>
<tr>
<td>Education level</td>
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<td></td>
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</tr>
<tr>
<td>12 &lt;</td>
<td>11 (22.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 12</td>
<td>28 (56.0)</td>
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<td>Unknown</td>
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</tr>
<tr>
<td>Occupation</td>
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</tr>
<tr>
<td>Employed</td>
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</tr>
<tr>
<td>Others</td>
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<td>Stage</td>
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</tr>
<tr>
<td>Early</td>
<td>29 (58.0)</td>
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</tr>
<tr>
<td>Advanced</td>
<td>21 (42.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site</td>
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<td></td>
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</tr>
<tr>
<td>Tongue Mouth floor</td>
<td>28 (56.0)</td>
<td></td>
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</tr>
<tr>
<td>Upper Gingiva Sinus</td>
<td>4 (8.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Gingiva Buccal mucosa</td>
<td>18 (34.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation procedure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tumor excision</td>
<td>13 (26.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tumor excision + neck dissection</td>
<td>10 (20.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tumor excision + neck dissection + flap reconstruction</td>
<td>23 (46.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>4 (8.0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: Disease Stage Early: stages I and II; Advanced: stages III and IV

Table 2 Chronological changes in HADS

(average ± SD; repeated-measures analysis of variance [ANOVA])

<table>
<thead>
<tr>
<th></th>
<th>Pre-operation</th>
<th>Post-operation</th>
<th>Post-discharge</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>6.08 ± 4.01</td>
<td>5.26 ± 3.82</td>
<td>3.91 ± 3.52</td>
<td>0.001</td>
</tr>
<tr>
<td>Depression</td>
<td>5.36 ± 4.68</td>
<td>5.69 ± 4.60</td>
<td>3.60 ± 3.39</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Note: For anxiety and depression, the higher the score, the higher the level of symptoms.
Average QOL scores for all subjects at all 3 time points (pre-operation, post-operation, and post-discharge) are displayed in Tables 3 and 4. Statistically significant chronological differences were found in PWB (F = 8.875, df = 2; p < 0.0001), FWB (F = 6.156, df = 2; p = 0.003), and H&N (F = 23.66, df = 2; p < 0.0001). Statistically significant differences were seen between pre- and post-operation scores (Scheffe F test, p = 0.012) and between post-operation and post-discharge scores (Scheffe F test, p < 0.0001) for PWB. For FWB, significant changes were observed between post-operation and post-discharge scores (Scheffe F test, p = 0.014), while differences between pre- and post-operation scores (Scheffe F test, p < 0.0001) and between post-operation and post-discharge scores (Scheffe F test, p < 0.0001) were found for H&N. PWB scores were lowest pre-operation, but improved significantly from post-operation to post-discharge. FWB and H&N worsened post-operation, but improved to pre-operation levels post-discharge.

Relationship between psychological characteristics and QOL

At the pre-operation time point, the HADS-A low-score group had significantly high scores on EWB (Z = 3.701; p < 0.0001) and FWB (Z = 2.491; p = 0.013). This group also tended to have high scores on FACT-H&N (Z = 1.782; p = 0.075).

At the post-operation time point, the HADS-A low-score group had significantly high scores on all subscales. The results were as follows: PWB (Z = -3.618; p < 0.0001), SWB (Z = -2.109; p = 0.035), EWB (Z = -4.215; p < 0.0001), FWB (Z = -2.241; p = 0.025), and H&N (Z = -2.345; p = 0.019).

At the pre-operation time point, the HADS-D low-score group had significantly high scores on EWB (Z = -2.888; p = 0.003) and FWB (Z = -3.043; p = 0.002). They also tended to score highly on H&N (Z = -1.944; p = 0.052).

At the post-operation time point, the HADS-D low-score group had significantly high scores on all subscales. The results were as follows: PWB (Z = -3.618; p < 0.0001), SWB (Z = -2.527; p = 0.011), EWB (Z = -2.742; p = 0.006), FWB (Z = -2.233; p = 0.025), and H&N (Z = -2.133; p = 0.032).

Discussion

Chronological changes in psychological characteristics and QOL

Our study revealed that exacerbation of perioperative anxiety peaked just before surgery and that exacerbation of depression peaked immediately after
Anxiety improved gradually from the preoperative to the postoperative period and after discharge. One month after discharge, the scores decreased to two-thirds of their preoperative values.

Scores pertaining to the physical aspects of QOL were minimal before surgery but increased gradually over time. One month after discharge, the scores were approximately 2 times higher than their preoperative levels. Therefore, our results suggested that an improvement in the physical aspects of the QOL was likely associated with a reduction in anxiety.

Exacerbation of perioperative depression peaked from the preoperative to the postoperative period, and a comparison with preoperative conditions showed a slight improvement in depression at 1 month after discharge. The functional aspects of QOL, as well as QOL pertaining to the head and neck, were the lowest postoperatively, but QOL after discharge returned to approximately the preoperative level. The findings suggest that depression is associated with QOL pertaining to the head and neck and the functional aspects of the QOL.

Although preoperative anxiety is common to all patients receiving surgical treatment, patients with head and neck cancers, including those with oral cancers, are especially prone to anxiety due to predicted functional deficits and changes in facial appearance.

Depression tends to start developing before biopsy and is established after cancer is diagnosed. Jacobsen has reported that severe depression tended to develop when surgery had a major impact. In addition, Heisfeld et al. examined the scientific literature published between 1986 and 2008 on depression in patients with head and neck cancers and found that severe depression developed from the time of cancer diagnosis, through treatment, and continued up to 6 months after treatment completion. They also reported that mild to moderate depression may persist for 3 to 6 years after diagnosis. In this study, depression symptoms improved at 1 month after discharge. This difference in findings may be due to the inclusion of results from the 1980s, when local flaps were still used for reconstruction, by Heisfeld et al.; local flaps might have led to extensive esthetic impairments and functional deficits postoperatively. In recent years, postoperative impairments have become less severe for the following reasons: (1) patients’ QOL has been taken into consideration, (2) chemotherapy and radiation therapy are performed preoperatively to reduce the tumor before its resection, and (3) free flaps ensuring better prospects in terms of esthetics and functional aspects are when performing reconstruction surgery. Our findings suggest that, for the patients who were included in this study, depression improved at an earlier stage because approximately half the participants underwent reconstruction surgery with free flaps, and therefore, had less esthetic and functional impairments.

### Table 5 Relationship between Psychological Characteristics and QOL

<table>
<thead>
<tr>
<th>Variable</th>
<th>Anxiety pre-operation</th>
<th>Anxiety post-operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACT-G</td>
<td>high (n=16)</td>
<td>low (n=34)</td>
</tr>
<tr>
<td></td>
<td>p value</td>
<td>high (n=11)</td>
</tr>
<tr>
<td>PWB</td>
<td>11.12±8.40</td>
<td>11.39±9.49</td>
</tr>
<tr>
<td></td>
<td>12.63±3.72</td>
<td>19.36±4.87</td>
</tr>
<tr>
<td>SWB</td>
<td>18.19±6.54</td>
<td>19.44±7.39</td>
</tr>
<tr>
<td></td>
<td>18.09±5.02</td>
<td>21.75±5.58</td>
</tr>
<tr>
<td>EWB</td>
<td>11.06±5.43</td>
<td>17.35±4.42</td>
</tr>
<tr>
<td></td>
<td>10.36±4.25</td>
<td>19.13±4.14</td>
</tr>
<tr>
<td>FWB</td>
<td>15.06±6.28</td>
<td>20.06±6.88</td>
</tr>
<tr>
<td></td>
<td>11.64±8.49</td>
<td>18.03±6.34</td>
</tr>
<tr>
<td>FACT-H&amp;N</td>
<td>20.13±8.89</td>
<td>25.24±6.81</td>
</tr>
<tr>
<td></td>
<td>11.18±7.36</td>
<td>16.54±6.99</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Depression pre-operation</th>
<th>Depression post-operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACT-G</td>
<td>high (n=25)</td>
<td>low (n=25)</td>
</tr>
<tr>
<td></td>
<td>p value</td>
<td>high (n=28)</td>
</tr>
<tr>
<td>PWB</td>
<td>11.92±10.22</td>
<td>10.72±4.69</td>
</tr>
<tr>
<td></td>
<td>15.46±4.69</td>
<td>20.96±4.69</td>
</tr>
<tr>
<td>SWB</td>
<td>18.56±8.35</td>
<td>19.52±5.40</td>
</tr>
<tr>
<td></td>
<td>19.29±5.32</td>
<td>23.04±5.40</td>
</tr>
<tr>
<td>EWB</td>
<td>13.2±4.80</td>
<td>17.48±4.16</td>
</tr>
<tr>
<td></td>
<td>15.32±5.78</td>
<td>19.59±4.16</td>
</tr>
<tr>
<td>FWB</td>
<td>15.76±6.84</td>
<td>21.16±6.89</td>
</tr>
<tr>
<td></td>
<td>14.57±7.05</td>
<td>19.23±6.89</td>
</tr>
<tr>
<td>FACT-H&amp;N</td>
<td>21.16±7.02</td>
<td>26.04±7.94</td>
</tr>
<tr>
<td></td>
<td>13.36±6.29</td>
<td>17.91±7.94</td>
</tr>
</tbody>
</table>

Abbreviations: High: high score group; Low: low score group.
Relationship between psychological characteristics and QOL

A comparison between the groups with high and low preoperative anxiety and depression scores found significant differences in mean values in terms of the emotional and functional aspects of QOL. Moreover, a comparison between the groups with high anxiety and depression and groups with low anxiety and depression revealed significant differences in mean values in all aspects of QOL after surgery and that more severe anxiety and depression were associated with deterioration in all aspects of QOL.

Hassanein et al. previously reported that emotional distress in patients with head and neck cancers, including those with oral cancers, was related to overall QOL, and that the association was especially strong with the physical, functional, and head-and-neck aspects of QOL. This study focused on the perioperative period and the findings revealed further that, preoperatively, the psychiatric and functional aspects of QOL were related to patients’ emotional distress whereas all aspects of QOL were involved postoperatively, including those pertaining to the head and neck.

Our findings revealed that, during the perioperative period, namely preoperatively and postoperatively, patients with oral cancers are subjected to emotional distress, which is associated with QOL. When caring for patients with emotional distress, caution must be taken because of the possibility of them developing anxiety before surgery and depression after surgery.

In the perioperative period, anxiety is negatively associated with the physical aspects of QOL whereas depression is negatively associated with the functional and head-and-neck aspects of QOL. Therefore, healthcare professionals in charge of treatment need to be aware of this information and respond accordingly. In addition, different aspects of QOL are associated with different stages of the perioperative period. Therefore, clinicians should carefully monitor changes in patients’ physical symptoms during diagnosis and treatment and healthcare professionals should provide adequate information on the importance of preventing a worsening of physical symptoms specific to oral cancers. In addition, healthcare professionals should be aware of the limitations of their communications with patients and should use programs and organizations aimed at providing patient support.

In order to reduce emotional distress in patients, there is a need for a multi-occupational approach by integrating specialized knowledge from various fields, as well as a family support system.

This study was conducted on a small number of patients and the survey period was limited to 1 month after surgery. In addition, it was impossible to conduct a detailed study of oral cancer-specific QOL. Thus, this could be a subject for future studies.

Conclusion

Our study revealed that the severity of emotional distress in patients with oral cancer varied according to perioperative time points, and that the aspects of QOL associated with emotional distress differed according to timing. Providing psychological support while considering anxiety might be particularly useful preoperatively whereas providing psychological support while considering depression might be particularly useful postoperatively.

References

Appendix

The Hospital Anxiety and Depression Scale

1 I feel tense or wound up:
   Most of the time
   A lot of the time
   From time to time, occasionally
   Not at all

2 I still enjoy the things I used to enjoy:
   Definitely as much
   Not quite so much
   Only a little
   Hardly at all

3 I get a sort of frightened feeling as if something awful is about to happen:
   Very definitely and quite badly
   Yes, but not too badly
   A little, but it doesn’t worry me
   Not at all

4 I can laugh and see the funny side of things:
   As much as I always could
   Not quite as much now
Definitely not so much now
Not at all

5 Worring thoughts go through my mind:
A great deal of the time
A lot of the time
From time to time but not too often
Only occasionally

6 I feel cheerful:
Not at all
Not often
Sometimes
Most of the time

7 I can sit ease and feel relaxed:
Definitely
Usually
Not often
Not at all

8 I feel as if I am slowed down:
Nearly all the time
Very often
Sometimes
Not at all

9 I get a sort of frightened feeling like butterflies in the stomach:
Not at all
Occasionally
Quite often
Very often

10 I have lost interest in my appearance:
Definitely
I don’t take so much care as I should
I may not take quite as much care
I take just as much care as ever

11 I feel restless as if I have to be on the move:
Very much indeed
Quite a lot
Not very much
Not at all

12 I look forward with enjoyment to things:
As much as I ever I did
Rather less than I used to
Definitely less than I used to

Hardly at all

13 I get sudden feeling of panic:

Very often indeed

Quite often

Not very often

Not at all

14 I can enjoy a good book or radio or TV programme:

Often

Sometimes

Not often

Very seldom

*Functional Assessment of Cancer Therapy General (FACT-G)*

**PHYSICAL WELL-BEING**

1 I have a lack of energy

2 I have nausea

3 Because of my physical condition, I have trouble meeting the needs of my family

4 I have pain

5 I am bothered by side effects of treatment
6 I feel ill

7 I am forced to spend time in bed

SOCIAL/FAMILY WELL-BEING

1 I feel close to my friends

2 I get emotional support from my family

3 I get support from my friends

4 My family has accepted my illness

5 I am satisfied with family communication about my illness

6 I feel close to my partner (or the person who is my main support)

7 I am satisfied with my sex life

EMOTIONAL WELL-BEING

1 I feel sad

2 I am satisfied with how I am coping with my illness

3 I am losing hope in the fight against my illness

4 I feel nervous

5 I worry about dying

6 I worry that my condition will get worse

FUNCTIONAL WELL-BEING

1 I am able to work (include work at home)

2 My work (include work at home) is fulfilling
3 I am able to enjoy life

4 I have accepted my illness

5 I am sleeping well

6 I am enjoying the things I usually do for fun

7 I am content with the quality of my life right now

*Functional Assessment of Cancer Therapy Head and Neck,*

1 I am able to eat the foods that I like

2 My mouth is dry

3 I have trouble breathing

4 My voice has its usual quality and strength

5 I am able to eat as much food as I want

6 I am unhappy with how my face and neck look

7 I can swallow naturally and easily

8 I smoke cigarettes or other tobacco products

9 I drink alcohol (e.g. beer, wine, etc.)

10 I am able to communicate with others

11 I can eat solid foods

12 I have pain in my mouth, throat or neck