

# Evaluation of Quality of Life and Related Factors in Dry Socket (Alveolar Osteitis) Cases: A Cross-Sectional Clinical Study

## Kuru Soket (Alveolar Osteit) Vakalarında Yaşam Kalitesi ve İlişkili Faktörlerin Değerlendirilmesi: Kesitsel Bir Klinik Çalışma

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**ABSTRACT Objective:** Dry socket (alveolar osteitis) is an annoying condition for patients with symptoms such as severe pain after tooth extraction, bad odor/taste in the mouth, and difficulty in eating. This study aims to examine the quality of life and related factors in patients diagnosed with dry socket after tooth extraction. **Material and Methods:** In this observational clinical study, 151 cases diagnosed with dry socket in a university hospital's oral and maxillofacial surgery clinic were included. The patients' pain and jaw function levels were evaluated with a visual analog scale (VAS). The quality of life was assessed using Oral Health Impact Profile-14 (OHIP-14) questionnaire. **Results:** 151 cases (55 men, 96 women) aged between 19 and 84 years (mean age: 41.74±12.42) diagnosed with alveolar osteitis were included in the study. The mean OHIP-14 score of all participants was 20.38. More than half of the dry socket cases (55%) were seen in the mandibular molar region, and the quality of life in dry socket cases developing in this region was worse than the others. A positive correlation was seen between the patients' VAS pain level and OHIP-14 scores, and a negative correlation was seen between VAS-function levels and OHIP-14 scores. **Conclusion:** In dry socket cases, as the pain level increases and the function level decreases, the patients' quality of life worsens. Clinicians should consider patients' quality of life along with clinical findings in the diagnosis and treatment of dry socket.

**Keywords:** Alveolar osteitis; dry socket; life quality; pain; tooth extraction

**ÖZET Amaç:** Kuru soket (alveolar osteit), diş çekimi sonrası şiddetli ağrı, ağızda kötü koku/tat, yemek yemede zorluk gibi semptomları olan hastalar için rahatsız edici bir durumdur. Bu çalışmanın amacı, diş çekimi sonrası kuru soket tanısı alan hastalarda yaşam kalitesini ve ilişkili faktörleri incelemektir. **Gereç ve Yöntemler:** Bu gözlemsel klinik çalışmaya bir üniversite hastanesinin ağız diş ve çene cerrahisi kliniğinde kuru soket tanısı konulan 151 olgu dâhil edildi. Hastaların ağrı ve çene fonksiyon düzeyleri görsel analog skala [visual analog scale (VAS)] ile değerlendirildi. Yaşam kalitesi Ağız Sağlığı Etki Profili-14 [Oral Health Impact Profile-14 (OHIP-14)] anketi kullanılarak değerlendirildi. **Bulgular:** Çalışmaya yaşları 19-84 arasında değişen (ortalama yaş: 41,74±12,42) alveolar osteit tanısı alan 151 (55 erkek, 96 kadın) olgu dâhil edildi. Tüm katılımcıların OHIP-14 puanı ortalaması 20,38 idi. Kuru soket vakalarının yarısından fazlası (%55) mandibular molar bölgede görüldü ve bu bölgede gelişen kuru soket vakalarının yaşam kalitesi diğerlerine göre daha kötüydü. Hastaların VAS ağrı düzeyi ile OHIP-14 skorları arasında pozitif korelasyon, VAS fonksiyon seviyeleri ile OHIP-14 skorları arasında ise negatif korelasyon gözlemlendi. **Sonuç:** Kuru soket olgularında ağrı düzeyi arttıkça ve fonksiyon düzeyi azaldıkça hastaların yaşam kalitesi kötüleşmektedir. Klinikyenler kuru soketin tanı ve tedavisinde klinik bulguların yanı sıra hastanın yaşam kalitesini de göz önünde bulundurmalıdır.

**Anahtar Kelimeler:** Alveolar osteitis; kuru soket; yaşam kalitesi; ağrı; diş çekimi

Dry socket (Alveolar osteitis) is one of the common complications after tooth extraction and was named dry socket by Crawford in 1896.<sup>1</sup> It is characterized as “postoperative pain, with or without bad breath, concomitant by a partially or completely rup-

tured blood clot in the alveolar socket, with increasing severity at and around the extraction site, between 1 and 3 days after tooth extraction”.<sup>2</sup> Any disruption in the socket after tooth extraction (disruption of clot formation, separation of the formed clot from the

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socket, prevention of cell migration) disrupts the healing process of the socket and leaves the bone exposed. After tooth extraction, dry socket symptoms begin to appear when the blood clot breaks down in the socket and the alveolar bone is exposed.

The cause of dry socket is not entirely understood. It has been reported that factors such as gender, oral hygiene, smoking, presence of systemic disease, medication use, hormonal changes, region of the extracted tooth, indication for tooth extraction, difficulty of tooth extraction, experience of the dentist and trauma play a role in the occurrence of dry socket.<sup>3-5</sup> While symptoms such as pain, bad odor/taste and difficulty in eating are common in dry socket cases, symptoms such as swelling, bleeding and fever are less common.<sup>6,7</sup> Symptoms usually appear 1-4 days after tooth extraction, sometimes lasting more than 4 days.

Dry socket is one of the most common complications that can occur after tooth extraction. Dry socket may impair patients' quality of life with symptoms such as severe pain, bad taste in the mouth, and difficulty in eating after tooth extractions. Although many studies have been conducted to date investigating the quality of life after tooth extraction, especially after impacted tooth extraction, the quality of life in dry socket cases has not been investigated.<sup>8-10</sup>

This study aims to evaluate the quality of life and factors that may affect the quality of life in dry socket cases seen after tooth extraction in a university's oral and maxillofacial surgery clinic. Our H<sub>1</sub> hypothesis to be tested is that the quality of life of patients may vary depending on dry socket and related factors.

## MATERIAL AND METHODS

This prospective observational study was conducted in 2023-2024 at the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Afyonkarahisar Health Sciences University (Afyonkarahisar, Türkiye). The study protocol was approved by Afyonkarahisar University of Health Sciences, Clinical Research Ethics Committee (date: October 10, 2023, no: 2023/459) and the study was conducted in accordance with the rules of the Declaration of Helsinki. Participation was completely vol-

untary, participants who consented to take part in the study were informed and provided written consent.

This observational clinical study included 151 patients who applied to the oral and maxillofacial surgery clinic with complaints of pain after tooth extraction and were diagnosed with dry socket. Exclusion criteria were the absence of data on tooth extraction due to the extraction being performed at another center, the diagnosis of dry socket not being confirmed, and the patient being under 18 years.

Detailed anamnesis was taken from the participants and the extraction sockets were examined through clinical examination. Demographic information of the patients, alveolar osteitis etiological risk factors and clinical findings were recorded. The patients' pain and jaw functions (eating, drinking, speaking, etc.) levels were evaluated with a 10 cm visual analog scale (VAS) (for pain: 0; no pain; 10; the most severe pain that can be endured; for jaw functions: 0; no function; 10; no decrease in function). According to VAS-pain score, patients were divided into three groups: minimal pain (0-33.33 points), moderate pain (33.33-66.66) and severe pain (66.66-100 points). Similarly, according to VAS- jaw function levels, the participants were divided into 3 groups: severe insufficiency in jaw functions (0-33.33 points), moderate insufficiency in jaw functions (33.33-66.66 points) and mild insufficiency in jaw functions (66.66-100 points).

The Oral Health Impact Profile-14 (OHIP-14)-Turkish scale evaluated the participants' quality of life. The short OHIP-14 form is derived from the original 49 items. OHIP form developed by Slade and Spencer consists of 7 components and 14 questions in total, and each component has two questions.<sup>11</sup> Each question tests 5 possible answers ranging from "never" (zero points) to "very much" (4 points). The scale score ranges from 0 to 56, with higher scores indicating that quality of life is affected more frequently. In the study, the Turkish version of OHIP-14, whose validity and reliability were proven by Başol et al., was used. Each participant's OHIP-14 score was calculated and the relationship of quality of life with demographic data, alveolar osteitis etiological risk factors and clinical symptoms was evaluated.<sup>12</sup>

Statistical analysis of the data was performed using the SPSS statistical program, version 27 (SPSS Inc, Chicago, IL, USA). Normal distribution of the data was evaluated with the Kolmogorov-Smirnov test. Student's t-test analyzed continuous data that was found to follow a normal distribution. Kruskal-Wallis analysis test was used to evaluate variables that included more than two groups and did not show normal distribution. One-way ANOVA analysis was used to evaluate variables that included more than two groups and showed normal distribution. Additionally, Pearson correlation analysis was used to analyze measurable data with each other. The results were considered significant within the 95% confidence interval,  $p < 0.05$  and  $p < 0.001$ .

## RESULTS

### SOCIODEMOGRAPHIC CHARACTERISTICS AND QUALITY OF LIFE

The study comprised 151 patients (55 men, 96 women) ages varying between 19 and 84 years (mean age:  $41.74 \pm 12.42$ ) and diagnosed with alveolar os-

teitis. The majority of participants (63.6%) were women. More than half of the participants (53.6%) were under the age of 40. More than half of the participants (52.4%) had received primary education. Housewives constituted the largest occupational group with a rate of 47.2%.

The average OHIP-14 score of all participants was 20.38. There was no significant difference among the participants' OHIP-14 scores in terms of gender, age and education level. The quality of life of dry socket cases differed significantly according to occupation groups ( $p < 0.05$ ). The group with the highest OHIP-14 score was students, and their quality of life was observed to be significantly worse than the unemployed ( $p < 0.05$ ), (Table 1).

### ETIOLOGICAL RISK FACTORS AND QUALITY OF LIFE

The majority of participants had no systemic disease or medication use (80.8% and 76.8%, respectively). More than one-fifth of participants (22.5%) were smokers, and 15.2% of these patients reported smoking immediately after tooth extraction. 13.2% of the

**TABLE 1:** Relationship of OHIP-14 total scores with socio-demographic characteristics.

|                 | n   | %    | OHIP-14<br>$\bar{X} \pm SD$ | p-value       | Post hoc<br>p-value |
|-----------------|-----|------|-----------------------------|---------------|---------------------|
| Gender          |     |      |                             |               |                     |
| Male            | 55  | 36.4 | 18.87 $\pm$ 9.09            | $p = 0.115$   |                     |
| Female          | 96  | 63.6 | 21.25 $\pm$ 8.75            |               |                     |
| Age             |     |      |                             |               |                     |
| 19-29           | 26  | 17.2 | 20.92 $\pm$ 8.68            | $p = 0.214$   |                     |
| 30-39           | 55  | 36.4 | 22.14 $\pm$ 10.36           |               |                     |
| 40-49           | 28  | 18.6 | 18.53 $\pm$ 8.64            |               |                     |
| 50>             | 42  | 27.8 | 18.97 $\pm$ 6.78            |               |                     |
| Education level |     |      |                             |               |                     |
| Primary school  | 62  | 41.1 | 18.88 $\pm$ 7.48            | $p = 0.172$   |                     |
| Middle school   | 17  | 11.3 | 18.82 $\pm$ 9.56            |               |                     |
| High school     | 32  | 21.2 | 22.62 $\pm$ 11.67           |               |                     |
| Undergraduate   | 40  | 26.5 | 21.57 $\pm$ 7.91            |               |                     |
| Occupation      |     |      |                             |               |                     |
| Housewife       | 74  | 47.2 | 20.67 $\pm$ 8.87            | $p = 0.005^*$ | 2-4; $p = 0.003$    |
| Student         | 15  | 10.6 | 26.33 $\pm$ 6.3             |               |                     |
| Officer         | 23  | 17.1 | 21.21 $\pm$ 7.97            |               |                     |
| Employee        | 39  | 25.2 | 17.05 $\pm$ 9.25            |               |                     |
| Total           | 151 | 100  | 20.38 $\pm$ 8.92            |               |                     |

\* $p < 0.05$ ; OHIP-14: Oral Health Impact Profile; SD: Standard deviation.

participants did not brush their teeth even once a day. More than half (55%) of dry socket cases were seen in the mandibular molar region (Table 2). More than half (55.6%) of the indications for tooth extraction in dry socket cases were dental caries, followed by periodontitis with 18.5%. The majority of dry socket cases (87.4%) were single tooth extractions. It was observed that approximately 2/3 (66.9%) of dry socket cases occurred after traumatic tooth extraction. The socket was left open in approximately 70% (69.5%) of the cases. Approximately 75% (74.8%) of the cases were prescribed medication after the operation (Table 3).

There were no significant difference between the participants' OHIP-14 scores in terms of the presence of systemic disease and medication use. Participants' OHIP-14 scores were significantly different accord-

ing to tooth brushing frequency, smoking status, and menstruation/oral contraceptive use. Those who never brushed their teeth had a better quality of life than those who brushed once or twice a day ( $p<0.001$ ). Smokers and those who smoked immediately after tooth extraction had a significantly better quality of life than non-smokers ( $p<0.05$ ). The quality of life of those who were menstruating and/or using oral contraceptive medication was significantly worse than the others ( $p<0.05$ ) (Table 2).

The participants' OHIP-14 scores differed significantly depending on the jaw area where the tooth was extracted, the indication for tooth extraction, the number of teeth extracted, and post-operative bleeding status (Table 3). It was seen that the quality of life of the participants who developed dry socket in the mandibular molar region was significantly worse

**TABLE 2:** Change of OHIP-14 total scores according to patient-related etiological risk factors.

|  | n   | %    | OHIP-14<br>$\bar{X}\pm SD$ | p-value        | Post hoc<br>p-value |
|--|-----|------|----------------------------|----------------|---------------------|
| <b>Presence of systemic disease</b>        |     |      |                            |                |                     |
| Yes  | 29  | 19.2 | 18.65±7.71                 | $p=0.247$      |                     |
| No   | 122 | 80.8 | 20.79±9.16                 |                |                     |
| <b>Drug use</b>                            |     |      |                            |                |                     |
| Yes  | 35  | 23.2 | 19.61±8.12                 | $p=0.202$      |                     |
| No   | 116 | 76.8 | 20.48±8.92                 |                |                     |
| <b>Teeth brushing frequency</b>            |     |      |                            |                |                     |
| Less than once a day                       | 20  | 13.2 | 13.30±8.64                 | $p=0.000^{**}$ | 1-2; $p=0.000$      |
| One time per day                           | 73  | 48.3 | 21.12±8.85                 |                | 1-3; $p=0.000$      |
| Two times a day                            | 58  | 38.4 | 21.89±8.05                 |                |                     |
| <b>Smoking</b>                             |     |      |                            |                |                     |
| Yes  | 34  | 22.5 | 17.5±8.52                  | $p=0.032^*$    |                     |
| No   | 117 | 77.5 | 21.22±8.89                 |                |                     |
| <b>Smoking after tooth extraction</b>      |     |      |                            |                |                     |
| Yes  | 23  | 15.2 | 17.13±8.21                 | $p=0.047^*$    |                     |
| No   | 128 | 84.8 | 20.96±8.94                 |                |                     |
| <b>Menstruation/oral contraceptive use</b> |     |      |                            |                |                     |
| Yes  | 14  | 9.3  | 24.5±6.12                  | $p=0.021^*$    |                     |
| No   | 137 | 90.7 | 19.96±9.07                 |                |                     |
| <b>Location</b>                            |     |      |                            |                |                     |
| Maxillary anterior                         | 4   | 2.6  | 13±3.46                    | $p=0.000^{**}$ | 1-6; $p=0.013$      |
| Maxillary premolar                         | 13  | 8.6  | 12.07±3.3                  |                | 2-3; $p=0.016$      |
| Maxillary molar                            | 26  | 17.2 | 18.84±7.01                 |                | 2-6; $p=0.000$      |
| Mandibular anterior                        | 2   | 1.3  | 13±0                       |                | 3-6; $p=0.012$      |
| Mandibular premolar                        | 23  | 15.2 | 17.52±7.6                  |                | 5-6; $p=0.002$      |
| Mandibular molar                           | 83  | 55   | 23.49±9.23                 |                |                     |
| Total                                      | 151 | 100  | 20.38±8.92                 |                |                     |

\* $p<0.05$ ; \*\* $p<0.001$ ; OHIP-14: Oral Health Impact Profile; SD: Standard deviation.

**TABLE 3:** Change of OHIP-14 total scores according to etiological risk factors associated with the surgical procedure.

| "  | n   | %    | OHIP-14<br>X±SD | p-value          | Post hoc<br>p-value |
|--|-----|------|-----------------|------------------|---------------------|
| <b>Tooth extraction indication</b>       |     |      |                 |                  |                     |
| Caries                                   | 84  | 55.6 | 20.77±9.17      | <i>p=0.006**</i> | 1-2; <i>p=0.002</i> |
| Periodontitis                            | 8   | 5.3  | 10.5±4.56       |                  | 2-3; <i>p=0.027</i> |
| Periapical lesion                        | 17  | 11.3 | 18.76±6.5       |                  | 2-4; <i>p=0.000</i> |
| Pericoronitis                            | 28  | 18.5 | 23.5±8.92       |                  | 2-5; <i>p=0.021</i> |
| Tooth root extraction                    | 14  | 9.3  | 19.42±8.11      |                  |                     |
| <b>Number of extracted teeth</b>         |     |      |                 |                  |                     |
| Single                                   | 132 | 87.4 | 20.93±8.99      | <i>p=0.028*</i>  |                     |
| Multiple                                 | 19  | 12.6 | 16.52±7.50      |                  |                     |
| <b>Type of tooth extraction</b>          |     |      |                 |                  |                     |
| Atraumatic                               | 50  | 33.1 | 19.6±10.84      | <i>p=0.449</i>   |                     |
| Traumatic                                | 101 | 66.9 | 20.77±7.83      |                  |                     |
| <b>Socket closing</b>                    |     |      |                 |                  |                     |
| Socket open                              | 105 | 69.5 | 20.73±9.66      | <i>p=0.714</i>   |                     |
| Suture approximation                     | 44  | 29.1 | 19.47±7.11      |                  |                     |
| Full coverage                            | 2   | 1.3  | 22±0            |                  |                     |
| <b>Post-operative drug use</b>           |     |      |                 |                  |                     |
| Yes                                      | 113 | 74.8 | 20.21±10.2      | <i>p=0.900</i>   |                     |
| No                                       | 38  | 25.2 | 20.44±8.49      |                  |                     |
| <b>Post-operative bleeding</b>           |     |      |                 |                  |                     |
| Yes                                      | 35  | 23.2 | 23.17±9.45      | <i>p=0.035*</i>  |                     |
| No                                       | 116 | 76.8 | 19.54±8.62      |                  |                     |
| <b>Post-operative granulation tissue</b> |     |      |                 |                  |                     |
| Yes                                      | 51  | 33.8 | 22.19±9.87      | <i>p=0.075</i>   |                     |
| No                                       | 100 | 66.2 | 19.46±8.49      |                  |                     |
| <b>The day of severe pain started</b>    |     |      |                 |                  |                     |
| Day one                                  | 21  | 13.9 | 23.47±10.13     | <i>p=0.355</i>   |                     |
| Day two                                  | 47  | 31.1 | 19.55±8.76      |                  |                     |
| Day three                                | 35  | 23.2 | 19.51±7.99      |                  |                     |
| Others                                   | 48  | 31.8 | 20.47±9.13      |                  |                     |
| Total                                    | 151 | 100  | 20.38±8.92      |                  |                     |

\**p*<0.05; \*\**p*<0.001; OHIP-14: Oral Health Impact Profile; SD: Standard deviation.

than the others (*p*<0.05), (Table 2). Additionally, the quality of life of participants with dry socket in the maxillary molar region was worse than in those with dry socket in the maxillary premolar region (*p*<0.05), (Table 2). Participants who had tooth extractions for pericoronitis had significantly worse quality of life than participants who had tooth extractions for other indications (*p*<0.05). The quality of life of participants who underwent multiple tooth extraction was significantly better than those who had single tooth extraction (*p*<0.05). It was found that the quality of life of the patients who had bleeding after tooth extraction was significantly worse than those who did not (*p*<0.05). However, there was no significant difference

between the OHIP-14 scores of the participants in terms of extraction method (traumatic/atraumatic), socket closure status after tooth extraction, post-extraction medication use, presence of granulation in the socket after extraction, and the date of onset of pain (Table 3).

#### CLINICAL SYMPTOMS AND QUALITY OF LIFE

While 23.2% of the patients reported that bleeding continued when the tampon was removed 1 hour after extraction, all patients reported varying degrees of pain in the extraction area. In clinical examination, granulation tissue was observed in the extraction socket in 33.8% of the cases. Pain complaints occurred in the majority of participants (68.2%) in the

**TABLE 4:** Comparison of life quality according to pain and jaw function levels of participants.

| Pain levels (VAS)            |   |  |   |                 |                |
|------------------------------|---|--|---|-----------------|----------------|
| OHIP-14                      | Moderate pain (n=21)                        |  | Severe pain (n=130)                         | Total (n=151)   | p-value        |
|                              | $\bar{X}\pm SD$                             |  | $\bar{X}\pm SD$                             | $\bar{X}\pm SD$ |                |
| 1. Functional limitation     | 0.95±2.1                                    |  | 1.42±1.85                                   | 1.35±1.89       | $p=0.292$      |
| 2. Physical pain             | 4.9±2.11                                    |  | 5.73±1.62                                   | 5.61±1.71       | $p=0.04^*$     |
| 3. Psychological disturbance | 0.85±1.65                                   |  | 2.11±1.6                                    | 1.94±1.66       | $p=0.001^{**}$ |
| 4. Physical disability       | 3.76±2.23                                   |  | 3.63±2.24                                   | 3.65±2.23       | $p=0.815$      |
| 5. Psychological disability  | 1.71±1.92                                   |  | 2.69±1.47                                   | 2.55±1.57       | $p=0.036^*$    |
| 6. Social inadequacy         | 2.19±1.53                                   |  | 2.77±1.65                                   | 2.69±1.64       | $p=0.131$      |
| 7. Handicap                  | 1.8±1.47                                    |  | 2.53±2.01                                   | 2.43±1.95       | $p=0.047^*$    |
| OHIP-14 global score         | 16.38±9.7                                   |  | 21.03±8.65                                  | 20.38±8.92      | $p=0.026^*$    |
| Jaw function levels (VAS)    |   |  |   |                 |                |
| OHIP-14                      | Severe insufficiency in jaw functions (n=9) | Moderate insufficiency in jaw functions (n=39) | Mild insufficiency in jaw functions (n=103) | Total (n=151)   | p-value        |
|                              | $\bar{X}\pm SD$                             | $\bar{X}\pm SD$                                | $\bar{X}\pm SD$                             | $\bar{X}\pm SD$ |                |
| 1. Functional limitation     | 4.65±1.58                                   | 1.53±1.58                                      | 1±1.74                                      | 1.35±1.89       | $p=0.000^{**}$ |
| 2. Physical pain             | 6.11±1.26                                   | 6.12±1.8                                       | 5.37±1.67                                   | 5.61±1.71       | $p=0.044^*$    |
| 3. Psychological disturbance | 1.33±1.73                                   | 2.46±1.88                                      | 1.79±1.53                                   | 1.94±1.66       | $p=0.055$      |
| 4. Physical disability       | 6±1.41                                      | 4.15±1.91                                      | 3.26±2.25                                   | 3.65±2.23       | $p=0.000^{**}$ |
| 5. Psychological disability  | 4.11±1.36                                   | 2.89±1.51                                      | 2.29±1.51                                   | 2.55±1.57       | $p=0.001^{**}$ |
| 6. Social inadequacy         | 3.33±1.73                                   | 3±1.50   | 2.52±1.67                                   | 2.69±1.64       | $p=0.151$      |
| 7. Handicap                  | 3.44±1.5                                    | 2.89±1.84                                      | 2.16±1.98                                   | 2.43±1.95       | $p=0.037^*$    |
| OHIP-14 global score         | 29±3.96                                     | 23.07±8.97                                     | 18.61±8.56                                  | 20.38±8.92      | $p=0.000^{**}$ |

\* $p<0.05$ ; \*\* $p<0.001$ ; OHIP-14: Oral Health Impact Profile; SD: Standard deviation; VAS: Visual analog scale.

**TABLE 5:** Correlations of OHIP-14, VAS-pain and VAS-jaw function.

|                  |                     | OHIP-14  | VAS-Pain | VAS-Jaw function |
|------------------|---------------------|----------|----------|------------------|
| OHIP-14          | Pearson correlation | 1        | 0.269**  | -0.387**         |
|                  | Sig. (2-tailed)     |          | 0.001    | 0.000            |
| VAS-pain         | Pearson correlation | 0.269**  | 1        | -0.187*          |
|                  | Sig. (2-tailed)     | 0.001    |          | 0.021            |
| VAS-jaw function | Pearson correlation | -0.387** | -0.187*  | 1                |
|                  | Sig. (2-tailed)     | 0.000    | 0.021    |                  |
|                  | N                   | 151      | 151      | 151              |

\*Correlation is significant at the 0.05 level (2-tailed); \*\*Correlation is significant at the 0.01 level (2-tailed); OHIP-14: Oral Health Impact Profile; SD: Standard deviation; VAS: Visual analog scale.

first three days after the tooth extraction. The most important finding in dry socket cases is pain at varying levels and is the most important reason for patients to consult a physician. Therefore, the participants' quality of life was compared in terms of pain and function levels. No patients were included in the minimal pain group in the study.

There was a significant difference in both the total OHIP-14 total score and most of the OHIP-14 subscale scores of the groups according to pain level

( $p<0.05$ ). Physical pain, psychological disturbance, psychological disability, handicap subscale scores and total OHIP-14 scores of those with severe pain were significantly higher than those with moderate pain (Table 4). A significant difference was observed in both total OHIP-14 scores and most of the OHIP-14 subscale scores of dry socket cases according to their function levels ( $p<0.001$  and  $p<0.05$ , respectively). As the function level decreased, functional limitation, physical pain, physical disability, psycho-



logical disability, handicap subscale scores and OHIP-14 total scores increased significantly (Table 4). According to the correlation analysis of the data obtained from the participants, a positive correlation was seen between VAS-pain scale scores and total OHIP-14 scores of dry socket cases, and a negative correlation was seen between VAS-function scale scores and total OHIP-14 scores of dry socket cases (Table 5).

## DISCUSSION

Dry socket is an annoying condition for patients with symptoms such as severe pain after tooth extraction, bad odor/taste in the mouth, and difficulty in eating. It has been reported that the symptoms observed after tooth extraction seriously affect the quality of life of patients.<sup>8,9</sup> In this first study in the literature on the relationship between dry socket cases and quality of life, it has been observed that dry socket and many factors related to dry socket affect the quality of life of patients.

In many studies, it has been observed that most dry socket cases develop after mandibular molar area tooth extractions, mandibular third molar extractions, or mandibular impacted tooth operations.<sup>3,13</sup> There are more complications after third molar surgery, and most of the studies in the literature have examined the relationship between mandibular third molar surgery and quality of life.<sup>9,14</sup> In a study conducted in America, the complications that may occur in third molar surgeries were examined and some complications, including dry socket, infections, bleeding, mandibular fractures, maxillary tuber fractures, root fractures, aspiration, oro-antral fistula and temporomandibular joint disorders were determined.<sup>15</sup> In a study conducted in 2017, the relationship between maxillary third molar extractions and quality of life was examined.<sup>16</sup> It has been observed that maxillary third molar extractions are associated with post-extraction pain and affect the quality of life of patients in the first two days after extraction.<sup>16</sup> In the study conducted by Zheng and his et al., the effect of online follow-up on the quality of life of patients whose impacted lower third molar teeth were extracted was evaluated, and it was observed that the quality of life was worse affected in terms of pain, speech, eating

and appearance in the group in which online follow-up was not performed.<sup>17</sup> As a result of a comprehensive literature review conducted in Morocco, it was shown that mandibular impacted tooth operations negatively affect the quality of life.<sup>9</sup> Supporting this, in this study, the majority of dry socket cases (55%) were seen in the mandibular molar region. In this study, it was observed that the mandibular molar region had the worst quality of life with 23.49 points. The fact that the mandibular molar region has a worse quality of life compared to all other regions in dry socket cases may be related to the difficulty of cleaning the region and the fact that the extraction of teeth in the region is more difficult.

The most important factor in negatively affecting the quality of life in dry socket cases is severe pain.<sup>2,8,13</sup> In this study, it was observed that as the pain level of individuals increased, their quality of life significantly worsened. Both total OHIP-14 and physical pain, psychological distress, psychological disability and handicap OHIP-14 subscale scores of participants with severe pain levels were found to be significantly higher. In the correlation analysis, a positive correlation was seen between VAS-pain scale scores and total OHIP-14 scores, and as the pain level of the participants increased, OHIP-14 scores increased significantly.

Dry socket is a common complication after tooth extraction, therefore, complications that may occur after tooth extraction and dry socket symptoms are largely similar.<sup>9,14,15</sup> Many studies have shown that impacted tooth operations restrict patients' jaw functions and negatively affect their quality of life.<sup>15,18</sup> In the study conducted by Ibikunle and Adeyemo, the symptoms observed after third molar surgery seriously affected the quality of life.<sup>19</sup> It has been shown that patients' chewing and swallowing functions, jaw movements, enjoyment of eating, and sleep quality are negatively affected after third molar surgery, and their quality of life decreases significantly.<sup>19</sup> In this study, it was observed that 31.8% of dry socket cases had low or moderate jaw functions. There was a significant difference in both total OHIP-14 scores and OHIP-14 subscale scores of the participants according to their function levels. In the correlation analysis, a negative correlation was seen between

VAS-function scale scores and total OHIP-14 scores. When the relationship between jaw functions and OHIP-14 subgroups in dry socket cases was examined, it was seen that all except psychological discomfort and social inadequacy were affected. It was observed that as the participants' function level decreased, their quality of life also worsened.

Conditions such as pain, swelling, dry socket, and trismus that develop after simple tooth extractions, surgical tooth extractions, or impacted tooth operations affect the post-operative quality of life of patients to a greater or lesser extent.<sup>14,15,19,20</sup> Many factors that may have an impact on post-operative quality of life, such as flap design, number of sutures, topical cortisone use, different rotary instruments, PRF and laser applications, are examined.<sup>21-26</sup> For example; it has been determined that post-operative complications affect the quality of life differently in patients with different flap designs.<sup>21</sup> In the study conducted by Wang and his et al., post-operative complications were seen less in the group where single suture was used in patients using modified triangular flap.<sup>22</sup> Our study found no substantial difference in quality of life between patients who underwent traumatic and atraumatic tooth extraction. Similarly, the quality of life of patients whose sockets were left open and those whose sockets were closed were similar.

Studies show that complications after tooth extractions are more common and more severe in third molar surgeries than in simple tooth extractions. However, even after simple extractions, complications such as pain, swelling, dry socket, and difficulty in eating are observed.<sup>20</sup> In the study by Adeyemo and et al., investigating the relationship between non-surgical extractions and quality of life, the total mean OHIP-14 score was found to be  $26.2 \pm 8.3$ .<sup>20</sup> While more than 30% of patients reported that their chewing ability, ability to open the mouth, and enjoyment of eating were affected after tooth extraction, a small number of participants (12.5-15.1%) also reported sleep disturbance. In the study of Adeyemo et al., no significant relationship was found between age, gender, extraction indications, extraction time, intrdry socketperative complications and worsening of quality of life.<sup>20</sup> In this study, the total mean  $\pm$  standard deviation of OHIP-14 scores was found to be

$20.38 \pm 8.92$ . In this study, similar to the results of Adeyemo et al., while there was no significant difference between sociodemographic data and quality of life in dry socket cases, a significant difference was observed between extraction indications and quality of life ( $p < 0.05$ ).<sup>20</sup>

The most important limitation of this study is the small number of samples and the absence of a control group. The patients' quality of life was evaluated with the OHIP-14 self-report questionnaire, and these self-report questionnaires are subjective in nature. In this study, OHIP-14, the most practical and comprehensive scale for assessing oral health-related quality of life, was used and the quality of life of dry socket cases was discussed for the first time in the literature.<sup>11</sup>

## CONCLUSION

Dry socket is a phenomenon that is frequently encountered after tooth extraction and negatively affects the patient's quality of life with severe pain, bad odor/taste and difficulty in eating. The lack of a definitively effective treatment method in the treatment of dry socket shows the importance of risk factors and protective/preventive activities in the etiology. Even though every precaution is taken to avoid dry socket cases after tooth extractions, it is seen that dry socket can develop. Study results showed that in dry socket cases, patients' quality of life worsened as their pain increased and jaw functions decreased. In dry socket cases, quality of life should be evaluated along with clinical symptoms, and treatment interventions should aim to improve the quality of life of patients.

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### Conflict of Interest

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*



## Authorship Contributions

**Idea/Concept:** Ömer Ekici; **Design:** Ömer Ekici; **Control/Supervision:** Ömer Ekici; **Data Collection and/or Processing:** Ömer Ekici, İsmail Çalıřkan; **Analysis and/or Interpretation:**

Ömer Ekici, İsmail Çalıřkan; **Literature Review:** Ömer Ekici, İsmail Çalıřkan; **Writing the Article:** İsmail Çalıřkan; **Critical Review:** Ömer Ekici; **References and Fundings:** Ömer Ekici; **Materials:** Ömer Ekici, İsmail Çalıřkan.

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