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# ASSESSMENT OF THE RELATIONSHIP BETWEEN EDEMA MEASUREMENT METHODS AFTER IMPACTED MANDIBULAR THIRD MOLAR SURGERY

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**Abstract**

**Background:** The aim of this clinical study was to evaluate edema using two different methods after mandibular impacted third molar surgery and compare these methods with each other.
**Materials and Methods:** The mandibular impacted third molar teeth in the mesioangular position of the patients were extracted by the same surgeon with the same techniqu.. Edema measurements were made on preoperative, postoperative second and postoperative seventh days. Two methods were used to evaluate the edema. In the first method, the distances between certain points on the face were measured by the physician with the help of a paper ruler. In the second method, the edema scale was given to the patients. With the help of this scale, the patients evaluated postoperative swelling themselves. The correlation between two methods was examined.
**Results:** Sixty patients (34 males and 26 females) were included in this prospective study. There was no correlation between the physicians's measurements and the patient's scoring. *(p>0.05)*
**Conclusion:** In the evaluation of edema in the postoperative period, the edeme scale, which is filled in accordance with the subjective evaluation of the patient, was not sufficient alone. Edema should be by measuring the distance between specific points on the face.
**Key Words:** Edema, Scale, Third molar surgery

## 1. Introduction

Third molar surgery is one of the most common procedures in oral surgery. swelling pain, trismus, hemorrhage or alveolitis are among the complications seen after this operation (Conrad et al., 1999). One of these complications is edema that is a tissue response that develops due to surgical trauma. The edema reaches the maximum level within 24-48 hours after the operation depending on the amount of tissue damaged. It begins to decrease 3 and 4 days after the operation (Mico-Llorens et al., 2006). Subjective methods are often used to assess the amount of edema after the third molar surgery. Visual analogue scale (VAS), which includes subjective evaluations of patients themselves, is also frequently preferred (Berge, 1989; Chaudhary et al., 2012). But mathematical methods have been used to define and measure changes in facial morphology (Holland, 1979). To evaluate the edema often the distances between the reference points defined on the human face are measured as metric. The four reference

points most commonly used for this purpose: Tragus, lateral cantus, gonion and soft tissue pogonion (Ustün et al., 2003).

The aim of this study was to evaluate the relationship between measuring distance between two points on the human face by the physician and the subjective scoring performed by the patient with the edema scale in order to measure the edema after the impacted third molar surgery.

## 2. Material and Methods

### *2.1. Study Design*

Necmettin Erbakan University, Dentistry Faculty Ethics Committee (2018-05) was approved for the study. Sixty patients were included the study. The inclusion criteria were as follows: Patients aged 18-40 years, mucosa and bone retantion mesioangular position according to the winter classification, patients with no systemic disease and allergies.

The exclusion criteria were as follows: Patients with acute pericoronitis, severe periodontal disease and third molars with any pathological condition, smokers or alcohol users, pregnant and lactation women.

All operations were carried out by the same surgeon under local anesthesia with the same technique. Before the operation, patients rinsed their mouths with 10% povidon iodine mouthwash for one minute. Inferior alveolar block and buccal anesthesia were performed with of 4% articain HCl and 1:200.000 epinephrine solution. The envelope flap was removed as mucoperiosteal with the vertical incision. Using the rotary instruments, the bone was removed with 0.9% serum physiologic irrigation. The odontosection were performed to all teeth and extracted. The wound was covered with 3-0 silk suture. The patients were postoperatively prescribed a 5-day course of 100 mg flurbiprofen twice daily, 1 gr amoxicillin twice daily, and 0.12% chlorhexidine gluconate antiseptic mouthwash every 8 hour.

Two methods were used to evaluate the edema after the operation.

In the first method, three distance measurements were performed on the patient's face with the help of a paper ruler in order to evaluate the edema. These measurements:

- Angulus Mandibula-Lateral Kantus
- Tragus-Labial Komissura
- Tragus-Pogonion (Ustün et al. 2003).

Measurements were done and recorded in milimeter (mm) on preoperative day, 2. and 7. postoperative day.

In the second method, the edema scale was given to the patients. With the help of this scale, the patients evaluated postoperative swelling themselves (Dolanmaz et al., 2013). The patient marked a value between 0 and 5 on the edema scale on the second and seventh post-operative day while they were in front of the mirror.

0. No swelling
1. Very little swelling…… Swelling is not noticeable
2. Moderate swelling… Swelling is noticeable but does not prevent eating and drinking.
3. Severe swelling…… Swelling is clearly evident and prevents eating.
4. Very severe swelling… Swelling is conspicuous and prevents chewing, but mouth can be opened normally.
5. Excessively swelling… The swelling is very noticeable, it prevents chewing and the mouth does not open.

### *2.2. Statistically Analysis*

Shapiro-Wilk test was used for the normal distribution of parameters. Oneway Anova test was applied for the parameters conforming to the normal distribution. Spearman correlation analysis was used to analyze the relationships between parameters that do not conform to normal distribution. The level of significance accepted as $p<0.05$.

## 3. Results

This prospective study consisted of 60 patients (34 males, 26 females) with a mean age of 22.39 ± 6.09. There was a statistically significant difference between patient and physician measurements on the 2nd day ($p<0.05$). There was no statistically significant difference in the 7th day measurements ($p >0.05$). There was no correlation between the patients' edema score on the 2nd day and the measurement of the edema on the 2nd day by the physician. The 2nd and 7th day median and p values of the measurement methods performed by the patients and the physician are given in Table 1.

| | 2nd day edema | 2nd day edema | 2nd day edema | 7th day edema | 7th day edema | 7th day edema |
|---|---|---|---|---|---|---|
| Median value of patient's assessment | 3 | 3 | 3 | 0 | 0 | 0 |
| Median value of the physician's measurement result | 1 (lateral cantus –angulus) | 0.6 (tragus-pogonion) | 0.6 (tragus-commissura) | 0.3 (lateral cantus-angulus) | 0.2 (tragus-pogonion) | 0.3 (tragus-commissura) |
| *p* | *p= 0.001* | *p= 0.001* | *p= 0.001* | *p=0.90* | *p=0.889* | *p=0.90* |

Table 1: Median and p values of the 2nd and 7th day evaluations of the patients and the physician

## 4. Discussion

Edema is one of the main indicators of the patient's comfort in the postoperative period (Pasqualini et al., 2005). Difficulty of the procedure depending on the depth and position of the tooth, excessive retraction of the flap, prolongation of the working time, and inadequate surgical technique are intraoperative factors that increase edema (Fonseca, 2009).

Many techniques have been used to monitor edema in the postoperative period. Although precise measurements are made with computed tomography, it is not preferred due to its cost and unnecessary radiation exposure to patients (Cathcart, 2015). Stereophotographic techniques are probably the most described, but they are too complex for clinical use. The routine use of this system is restricted due to the time-consuming data processing, the complex structure of the system and the cost of installing the system (Pedersen 1985).

Ultrasonography method is also used to evaluate edema after buried third molar surgery. However, the disadvantage of this method is that it causes mechanical irritation in the postoperative period (Pallagatti2012). The

craniometry method using a flexible tape for measuring edema has also been used in some studies (Osunde, 2012). However, it does not give as accurate results as other objective methods for sensitive measurement of the volume of facial soft tissue (Ustün et al., 2003).

VAS is often preferred because it is both effective and reliable in evaluating swelling. We did not use the VAS in our study because there are studies reporting that there are patients who think that VAS is difficult and discontinue the study (Al-Samman and Othman, 2017). Therefore, we compared the metric measurement with a scale that patients can read and score.

Afat et al. (2018) reported that there was a correlation between the VAS edema scale based on the self-assessment of the patients and the metric measurements made by the physician, and that this scale could be used in addition to other scales in the evaluation of edema in the postoperative period.

The aim was to evaluate whether it would be possible to enter data with the help of a scale in which patients could evaluate their edema without calling the patients to the clinic. The two measurement methods were not parallel to each other. There was no correlation between the values stated by the patients and the metric values measured by the physician. Patients have reported more swelling on their faces than they actually have. They may have exaggerated the swelling on their faces, especially on the 2nd day. Since patients were sensitive about their own images, the verbal expressions on the scale might confuse the patient. Expressions about loss of function in addition to edema on the scale may have caused patients to mark high scores. We think that this is the disadvantage of the scale. We think that the absence of explanations about trismus in the scales to be used in the evaluation of edema will give more reliable results.

While there was a statistically significant difference between the two measurement methods on the 2nd day, there was no statistically significant difference on the 7th day. In fact, if we had the chance to measure not only on the 2nd and 7th days, but also on other days, we could find out when the difference disappeared, but in this case, we had to call the patients to the clinic every day. This issue was a limitation of our study.

## 5. Conclusion

In the evaluation of edema in the postoperative period, the edema scale, which is filled in accordance with the subjective evaluation of the patient, is not sufficient alone. Edema should be evaluated by measuring the distance between two points on the face.

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**CONFLICT OF INTEREST**

The authors have no affiliations with or involvement in any organization or entity with any financial interest or non-financial in the subject matter or materials discussed in this manuscript.

**AUTHOR STATEMENT**

This study design was approved by the institutional review board of Necmettin Erbakan University, Faculty of Dentistry. (Expedited review approval number 2018-05). For this type of study, informed consent was obtained from all individual participants included in the study.

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