



Frequency of Lower Lip Paresthesia in Patients Receiving Implant-Supported Mandibular Dentures in Tabriz, Iran in 2017-2018

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Abstract

Background: Widespread use of dental implants in the past 15 years has resulted in an increase in complications associated with implant surgeries. The aim of the present study was to determine the frequency of lower lip paresthesia in patients receiving implant-supported mandibular overdentures.

Methods: In this descriptive, cross-sectional study, 63 patients receiving implant-supported mandibular overdentures were evaluated. For clinical examination, the two-point discrimination test (2DP) was used before surgery and at 1-, 3- and 6-month postoperative intervals. Data was analyzed using descriptive statistical tests and chi-square test.

Results: The results showed frequency rates of 19%, 4.8% and 4.8% for lower lip paresthesia at 1-, 3- and 6-month postoperative intervals. At 1-month postoperative interval, female patients exhibited a significantly higher rate of paresthesia compared to male patients ($P = 0.035$).

Conclusions: Lower lip paresthesia was highly prevalent (19%) one-month after implant surgery; however, its frequency decreased over time. After 3 months, the frequency of paresthesia decreased by about 3 quarters (4.8%) and remained constant until 6 months after surgery. During the 1-month period after surgery, female patients had a high rate of paresthesia compared to male patients.

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Background

Widespread use of dental implants in the past 15 years has resulted in an increase in complications associated with implant surgeries. Several studies have addressed these complications, of which traumas to the inferior alveolar nerve due to implant surgeries are the most frequently reported complications. Injuries to the inferior alveolar nerve are one of the worst and most unpleasant events experienced by patients, which can range from mild paresthesia to anesthesia or spontaneous pain. In such cases, apart from an unpleasant feeling, functions such as speaking or eating too are disrupted (1-3).

Paresthesia is a type of sensory change, which is associated with some clinical signs such as burning sensation, tingling and itching, anesthesia or any other change relative to the normal condition (1,3,4).

Paresthesia and anesthesia of the inferior alveolar nerve occur after oral surgeries and procedures such as injection of local anesthetic agents, third molar surgeries, orthognathic surgery and dental implant surgeries (5,6).

Traumas to the inferior alveolar nerve after implant surgery may result from injuries during surgery such as traumatic injuries or injuries after surgery such as

Highlights

- ▶ One, 3 and 6 months after implant surgery, respectively, 19%, 4.8% and 4.8% of the patients had paresthesia of the lower lip.
- ▶ During the 1-month period after surgery, female patients had a high rate of paresthesia compared to male patients.
- ▶ Lower lip paresthesia was highly prevalent after implant surgery; however, its frequency decreased over time.

ischemia and peri-implant infections. The duration of paresthesia and sensory changes has been reported to be a few days, a few weeks and even several months. Even in some cases there is permanent paresthesia, which may be due to cutting of the nerve, exertion of long-term pressure on the nerve and exposure to toxic agents (1,3,4,7).

Diagnosis of paresthesia and anesthesia is made based on clinical examination and medical history of the patient (6). To help confirm the diagnosis of paresthesia and anesthesia, the suspected area is subjected to thermal, mechanical, electrical and chemical stimuli and then the patient's response to these stimuli is evaluated (8).

In the previous studies, the frequency of transient injuries of the inferior alveolar nerve after implant

surgery, has been reported to range from 0% to 24%, with a range of 0%–11% for permanent injuries (9).

Given the above-mentioned and since no studies have yet been undertaken on this issue in Iran, it appears necessary to evaluate the frequency of paresthesia in patients receiving implant-supported overdentures due to the problems caused by paresthesia in these patients. Knowledge about the incidence rate of this condition and its clinical course after surgery may contribute to the success rate of treatment, patient cooperation and an increase in the patients' satisfaction rate. Therefore, the present study was undertaken to evaluate the frequency of paresthesia in the lower lip area in patients receiving implant-supported overdentures.

Materials and Methods

Study Design

The participants in this descriptive, cross-sectional study were patients receiving implant-supported overdentures in Tabriz, Iran in 2017-18.

The samples size was estimated with the following formula (according to the proportion of the population) considering $z=1.96$, $P=0.2$ (sample proportion) and $d=0.1$ (margin of error). Therefore a total of 63 samples were included in the study.

$$n = \frac{z^2 p(1-p)}{d^2}$$

Inclusion Criteria

1. Signing an informed consent form to participate in the study;
2. Receiving an implant-supported overdenture in the private offices of maxillofacial surgeons in Tabriz;
3. Receiving 4 implants in the anterior mandible in each patient using crestal or envelope incision; and
4. Presence of appropriate alveolar bone in the implant placement area (presence of D1, D2 or D3 bone) (Misch and Judy classification) in terms of bone quality and presence of type A and B bone (Lekholm and Zarb classification) in terms of bone height and width (10).

Exclusion Criteria

5. A history of surgery of the inferior alveolar nerve area and the mandible;
6. Presence of pathologic lesions in the inferior alveolar nerve area and the mandible;
7. Fixtures inserted through flapless technique;
8. A history of neuropathologic conditions; and
9. A history of receiving bone grafts in the implant surgery area.

To collect data, 63 patients receiving implants were randomly selected from the private offices of maxillofacial surgeons in Tabriz and clinically examined once before implant surgery and at 1-, 3- and 6-month intervals after receiving implants for the presence of paresthesia. To

conduct clinical examinations, the 2-point discrimination test (2DP) (7,11) was used. To this end, the patient was seated with his/her eyes closed in a quiet room. Clinical examinations of all the participants in all stages of the study were carried out by one operator using a pair of drafting compasses with 2 similar tips which were placed perpendicular to the skin surface by exerting mild pressure and removed from the skin surface after one second. The participants were asked whether they felt one point or 2 points in this junction. Since a normal person can make a distinction between 2 points <6 mm apart (9, 12), the test was carried out with the 2 points 5 mm apart. The test was repeated 10 times; normal individuals are expected to provide a correct response 7 times. Subjects who were unable to make a distinction between two points for ≥ 3 times were diagnosed as having paresthesia of the lower lip (7,11,13). The results were recorded on a checklist and analyzed using statistical tests.

All patients received 3 capsules of amoxicillin 500 mg/d and 4 pearls of ibuprofen 400 mg/d for 1 week. Patients with paresthesia also received oral dexamethasone 4 mg (2 tablets per day) or oral prednisolone (1 mg/kg/d to a maximum of 80 mg) for 6 days and B vitamins (Neurorubine™ forte Lactab™ once per day for 2 weeks) (4).

Statistical Analysis

Data was analyzed using descriptive statistical tests (frequency, percentage) and chi-square test (for comparison of the frequencies of the lower lip paresthesia in men and women) in SPSS 21. Significance level (P) was considered to be <0.05.

Results

Of the participants, 33 (52.4%) were male and 30 (47.6%) were female. The mean age of the participants was 61.2 ± 11.8 (range; 35–85) years.

Clinical examinations before dental implant surgery showed that none of the participants had lower lip paresthesia (Table 1).

In addition, the results of clinical examinations one month after implant placement showed that 51 participants (81%) had no symptoms and signs of paresthesia. In contrast, 12 ones (19%) had lower lip paresthesia.

Clinical examinations 3 months after implant placement showed that 60 participants (95.2%) had no symptoms and signs of lip paresthesia. In contrast, clinical examinations showed that 3 ones (4.8%) had lower paresthesia.

Six months after implant placement the patients once again underwent clinical examinations. The results showed that 60 individuals (95.2%) had no symptoms and signs of lower lip paresthesia. In contrast, 3 ones (4.8%) had lower lip paresthesia.

As shown in Table 2, one month after implant surgery 30% of female patients and 9% of male patients reported paresthesia in their lower lip. At 3- and 6-month

Table 1. The Frequency of Paresthesia 1, 3 and 6 Months After Implant Surgery

	Before Surgery	1 Month	3 Months	6 Months
Normal lip sensation	63(100%)	51(81%)	60 (92.5%)	60 (92.5%)
Paresthesia	0	12(19%)	3 (4.8%)	3 (4.8%)

Table 2. Comparison of the Frequencies (Percentages) of Paresthesia in the Lower Lip Between Men and Women

		Gender		P Value
		Female	Male	
1 month	Normal lip sensation	21 (70%)	30 (91%)	0.035
	Paresthesia	9 (30%)	3 (9%)	
3 months	Normal lip sensation	27 (90%)	33 (100%)	0.065
	Paresthesia	3 (10%)	0 (0%)	
6 months	Normal lip sensation	27 (90%)	33 (100%)	0.065
	Paresthesia	3 (10%)	0 (0%)	

postoperative intervals, none of the male participants reported lip paresthesia; however, 10 female participants still had lip paresthesia. Chi-square test showed that the difference was significant in the first month after surgery ($P<0.05$).

Discussion

Paresthesia which is a type of sensory alternation in association with burning sensation, tingling, itching and numbness (14) may occur after oral surgeries and procedures such as injection of local anesthetic agents, third molar surgeries, orthognathic surgery procedures and dental implant surgeries due to traumas to the oral cavity nerves, especially the inferior alveolar nerve (5,6).

The present study was undertaken to evaluate the frequency of paresthesia of the lower lip in patients receiving implant-supported overdentures in Tabriz, Iran. The results of the clinical examinations 1, 3 and 6 months after surgery for implant-supported mandibular dentures showed that, respectively, 81%, 95.2% and 95.2% of the patients had no symptoms and signs of paresthesia. During the first postoperative month, female patients exhibited a significantly higher rate of paresthesia compared to male patients.

Chiapasco et al followed up 81 patients receiving implant-supported mandibular overdentures for 3–8 years; they reported no traumas to the inferior alveolar nerve in the patients (15). Visser et al followed up their patients from 6 weeks to 5 years and reported no sensory changes in patients receiving implant-supported mandibular overdentures (16).

In a study by Walton et al, 24% of the patients receiving implants in the anterior mandible reported paresthesia in the mandibular symphysis area 2 weeks after surgery. All the patients recovered within 6 months after surgery and only 1% of the patients exhibited paresthesia within 1 year

after surgery (17).

In a case report by Elian et al, implants placed adjacent to the mental foramen resulted in irritation of the mental nerve and paresthesia in the lower lip of the patients. Removal of the implants resulted in the recovery of 40% of the patients (18).

In a study by Juodzbaly et al, 31% of the patients had hyperalgesia after surgery and 68% exhibited hypoalgesia. All the patients recovered after therapeutic intervention (4).

In a study by Scarano et al, one and 6 months after implant surgery, respectively, 23 (2.2%) and 2 (0.19%) of the 1065 patients presented paresthesia. Complete recovery was detected 13 months after surgery (1).

Based on the above-mentioned, it appears that the incidence of paresthesia after implant surgeries is a common clinical finding and patients receiving implant-supported mandibular overdentures are not an exception. Another important finding is the recovery of patients during the 6-month period after surgery. However, after 6 months, 3 patients (4.8%) still had paresthesia. In some reports the paresthesia of the inferior alveolar nerve persisted for more than 6 months or the nerve injury was permanent, which may be attributed to an incorrect surgical technique or incorrect placement angulation of the implant. Examination of patients for only 6 months is one of the limitations of this study. Another limitation of the present study was that implant surgery was performed by various oral and maxillofacial surgeons, which could affect the results of the study. We tried to avoid potential biases by considering well-thought inclusion and exclusion criteria according patients' conditions, proper alveolar bone (bone quality, height and width) and some other factors. Therefore, long-term studies are required to evaluate the recovery of patients' paresthesia over time after surgeries performed by one person to reduce the bias.

Conclusions

The results of the present study showed one, 3 and 6 months after implant surgery, respectively, 19%, 4.8% and 4.8% of the patients had paresthesia of the lower lip. During the 1-month period after surgery, female patients had a high rate of paresthesia compared to male patients.

Authors' Contribution

FF and FT are responsible for the design and conception of the study as well as for the revision of the manuscript. FF and RKK carried out the literature search and data collection. MG, RKK and FT analyzed the data and drafted the manuscript. All the authors have read and approved the final manuscript.

Ethical Statement

The present study was conducted in accordance with the Helsinki Declaration. The protocol of the study was approved by the Ethics Committee of the Tabriz University of Medical Sciences (IR.

TBZMED.REC.1395.620). The aim of the study was explained to all the participants and signed consent forms were obtained from them before their enrolment.

Conflict of Interest Disclosures

The authors declare that they have no conflict of interests.

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