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**Research article**

# Investigating the Relationship of Body Mass Index with Surgical Complications of Impacted Mandibular Third Molar

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## ABSTRACT

**Introduction**:Obesity is considered as a risk factor for diseases.Giving the high prevalence of obesity and its possible association with surgicalcomplications of impacted mandibular third molar, if it not addressed,it can endanger the success of the surgery. Therefore, the aim of this study was to investigate the relationship of body mass index with surgical complications of impacted mandibular third molar, in Dental Branch of Islamic Azad University in 92-91.

**Materials and Methods:** This study was a cohort study,and the case group was consisted of 20 subjects who had BMI> 25 and an indication of impacted third molar surgery, and the control group was consisted of 20 subjects who had BMI ≤ 25 and an indication of impacted third molar surgery, and they were similar to case group regarding the age, gender, systemic disease and etc. Then, surgical complications including the onset of anesthesia, hard access to the surgical spot, the incidenceof dry socket and damage to the lingual nerve were examined in two groups, and data were analyzed by SPSS ver.19 software.

**Findings:**The onset time for anesthesia in the control group was90.3 ± 52.2, and in the case group was 178 ± 68.9 (P<…). Hard access to the surgical spot was not observed in the control group and in the case group it was 25% (P<0.03). however, the incidenceof dry socket and damage to the lingual nerve were similar in both groups (P<0.9).

**Conclusion:** It seems that in obese people there is a risk of delayed onset of anesthesia, lack of long-term anesthesia and hard access to surgical spot.

**Keywords:**BMI / impacted mandibular third molar / surgical complications

## INTRODUCTION:

Obesity is considered as a risk factor for diseases and conditions such as diabetes, cardiovascular diseases, hypertension, infarction, and osteoarthritis (1-4). In the United States, over 35% of men and women are overweight, which represents a high prevalence of obesity in the society (5-7).Recent studies have shown that there is a relationship between obesity and the possibility of impacted third molar (8, 9). Body Mass Index BMI is one of the most important indicator of obesity and it is the body mass index orbody fat index, which is obtained using weight and height ratios (10).Giving the high prevalence of obesity and its possible association with surgical complications of impacted mandibular third molar, if it not addressed, it can endanger the success of the surgery (11). Surgery of impacted third molar is the most common surgery performed on oral cavity. Knowing the complexities associated with it, enables the surgeon to recognize high-risk patients andcontrol these complications in the best way (12, 13). Complex complications of this surgery includesharp pulsating pains of alveolar osteitis due to dry socket,primary post-surgical infections due to high variation of oral flora,excessive hemorrhage due to coagulation disorders and vascular perforation,problems in wound healing

due to tobacco use, the placement of ulcer in not so desirableperiodontium, and eventually,inferior alveolar and lingual nerve damage. The not-so-common complications are jaw fractures, damage to adjacent tooth, periodontal lesions, fistula formation, and displacement of tooth into anatomic spaces (13-16). If we get to answer the question of whether there is a relationship between obesity and surgical complications of impacted third molar, we will have more successful surgical results by increasing the awareness of community about this problem and improving it (11). In the study by Waisath et al. (2009) at Cincinnati University and Western Reserve University, they examined the relationship between body mass index and post-surgery complications of dental-bone surgeries. The result of this study showed that there was no significant difference in post-surgery complicationsin patients with different BMIs (8).

In the study by Akinbami et al. (2010) in the University of Port Harcourt, Nigeria, the relationship between BMI and mandible and dental arch factors with the possibility of impacted mandibular third molar was examined. The result of this study showed that the BMI does not cause any significant difference between the two groups,the probability of the impacted mandibular third molar depends on two factors of length of the mandible arch and its difference with the total size of the teeth (9).Due to the lack of studies in this area and the high prevalence of this social problem (obesity) and the lack of such a study in this unit, and possibly even in Iran, in order to achieve the above answer,this study was conducted with aim to investigate the relationship of body mass index with surgical complications of impacted mandibular third molar, in Dental Branch of Islamic Azad University in 92-91.

## MATERIALS AND METHODS:

This study was a cohort study, and interviewing, observation, clinical examination, and information form filling techniques were used. People referred to surgery Dental Branch of Islamic Azad University of Tehran formed the study population.The sample size was designed based on experimental studies, and by comparing the magnitude and severity of surgical complications of impacted mandibular third molar in two groups and test power of 80% and 5% error in first stage in each groups of 20, in total 40 people were examined. All people in the study population had inclusion criteria that included no systemic diseases, lack of high blood pressure and no drug use. After justifying the plan and obtaining written consent, information about age, gender, ...were recorded in the information form.based on $\frac{Weight\,(kg)}{Height\,(m)^2}$, the qualified people were placed into two groups of normal ($18.5 < BMI \leq 25$) and overweight ($BMI > 25$), and cases of the incidence of surgical complications of impacted third molar, which itself includeslack of proper access by questioning the surgeon, anesthesia problems during surgery based on the onset time of anesthesia (which is considered normal for up to 5 minutes), post-surgery pains by questioning the patientandusing $10^{th}$ scale VAS (24)(which is considered normal for up to 48), and then incidence possibility of dry socket was raised, and finally, the damage to lingual nerve by questioning the patient weather he/she has constant tingling lipsor not in the1 week follow up, were examined in them (11).

All of the studied samples were matched in terms of type of impaction, age, gender, surgery severity, and anesthetics. Patients were evaluated during surgery, 24 hours after surgery, 3 days, 1 week, and finally 1 month after surgery by clinical examination and telephone call with the patient. The amounts of each of these indicators in two groups were analyzed by Fisher's exact test or Chi-square and using SPSS ver.19 software.

## FINDINGS:

This study was conducted on 40 subjects, 20 in the control group with $BMI \leq 25$, and 20 in the case group with $BMI > 25$.The distribution of subjects in regards to individual and social characteristics and illness differentiated by BMI is presented in Table 1, and it suggest that subjects in both groups

were similar in terms of age, gender, systemic disease, education anddrug use, and their difference was not statistically significant (P <0.2).

**Table 1.**Distribution of subjects based on individual and social characteristics and disease

| taking medication | | education | | Systemic disease | | Age | Sex | | Specifications |
|---|---|---|---|---|---|---|---|---|---|
| YES | NO | Diploma and less | Academic | YES | NO | | Female | male | *BMI |
| 1 | 19 | 12 | 8 | _ | 20 | 27.3 ± 8 | 12 | 8 | Normal $N_1$=20 |
| 4 | 16 | 14 | 6 | 1 | 19 | 32.9 ± 9.7 | 8 | 12 | Overweight $N_{2=}$20 |

*Body Mass Index

The data presented in Table 2 shows that the mean onset time of anesthesia in normal subjects was 90 seconds and in overweight subjects was 178 seconds,and the delay in the onset of anesthesia in the case group was approximately two times more than the control group (P<…). There was no hard access to surgical spot in the control group, but it occurred in 5 subjects (25%) in the case group, which was statistically significant (P<0.03). However, the incidence of dry socket and damage to the lingual nerve were similar in all patients and their differences were not statistically significant (P<0.9). (Table 2)

**Table 2.**the role of BMI in the outcome of impacted mandibular third molar surgery

| Damage to the lingual nerve | | Release of dry socket | | Hard access to the stand | | Time to start numbness | Outcome |
|---|---|---|---|---|---|---|---|
| YES | NO | YES | NO | YES | NO | | BMI |
| _ | 20 | 7 | 13 | _ | 20 | 90.3 ± 52.2 | normal$N_{1=}$ 20 |
| _ | 20 | 7 | 13 | 5 | 15 | 178 ± 68.9 | Overweight $N_{2=}$ 20 |
| P<0.9 | | P<0.9 | | P<0.03 | | P< … | Test result |

## DISCUSSION AND CONCLUSION:

The aim of this study was to evaluate the relationship between BMI and impacted mandibular third molar. In this study, 40 men and women were divided into 2 groups according to BMI:1. Normal with 18.5≤BMI≤25 and 2. Overweight with BMI> 25. The mean onset time of anesthesia in subjects in group 1 was 90.3 seconds, and in subjects in group 2 was 178 seconds, which suggests that the onset time of mandible anesthesia increases with increasing of the weight, however this time is in the normal rangeand none of the patients had a problem with the induction of anesthesia. This result can also be seen in thestudy by Adeyemo and Gbotolorun, they also had no problem with anesthetizing overweight people,but for obese patients with BMI>30, this was a problem (11, 17).

According to statistical studies, access to the surgical spot in overweight people is harder than the people with normal BMI, and onset time of anesthesia, incidence of dry socket and damage to lingual nerve are not different in normal and overweight people (10). Adeyemo et al. (2010) conducted a study to investigate the relationship between overweight people and complications during surgery. In this article, access to surgical spot was harder in obese people, and other factors did not differ significantly between normal and overweight individuals (11), which is consistent with the present study. The results of the study by Waisath et al. (2009) also confirm the same result (8).

This study also confirmed the results of the study by Cillo et al. (2006), entitled "Correlation and comparison of body mass index on hemodynamics in hypertensive and normotensive patients undergoing intravenous sedation". Because Cillo showed that there is a positive relationship between BMI and changes in hemodynamic measurements, and regardless of BMI, intravenous sedation for maxillofacial surgery produces stable hemodynamic conditions for all patients (18). However, this study rejects the results of the study by Akadiri et al. (2008) on "identifying the risk factors for causingshort-term complications of wisdom tooth surgery". Because, they concluded that some non-surgical parameters such as age, gender and BMImay be the most important risk factors in creating complication in impacted wisdom tooth surgery. However, Akadiri believes that more research is needed in this area (19). In the present study, men had a significantly higher BMI than women. However, in the study by Adeyemo et al., most of the overweight individuals were women (11).It was also shown in this study that with increasing of age, the weight of individuals and consequently, their BMI increases. As Waisath also came to this conclusion in his study (8).Access to the surgical spot was reported hard in only 5 patients, who were all overweight, and this is probably due to the large sizeof the cheek and high tonicity of the tongue and facial muscles, which do notexist in normal people. This result was consistent with the results of the study by Renton (20). The incidence of dry socket and prolong pain (more than 48 hours) was reported in 14 patients, which 7 of them were in group 1 and 7 were in group 2, and it shows that weight had no effect on its incidence. In the study by Contar et al. (2010) on "complications after impacted wisdom tooth surgery", prolong pain was observed in women more than men, and had no association with other factors (12). Fortunately, no damages to lingual nerve was seen in any of the patients, and none of the patients reported continuous tingling and numbness of lower lips.

In general: It seems that in obese people there is risks of delayed onset of anesthesia, lack of long-term anesthesia and hard access to the surgical spot.

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