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## Effect of intermaxillary fixation on paraclinical indexes

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### Abstract

Among trauma cases, maxillofacial injuries have a very high incidence. Data suggests that the leading causes of maxillofacial fractures in developed countries are falling and insult, on the other hand road traffic accidents is the main reason in case of developing nations. For mandibular or midface fractures, various treatment modalities can be employed. One of them is closed reduction via intermaxillary fixation (IMF).

**Materials and Methods:** This study was conducted in the department of Oral and Maxillofacial Surgery, from 1st July 2020 to 30<sup>th</sup> September 2021. This study comprised patients of all ages and both. All patients were aged 15-50 years and had a BMI of 18-30 kg/m<sup>2</sup>. We included only the patients whom undergone 4 weeks of IMF and excluded patients who had any systemic problems such as diabetes, kidney or heart diseases.

**Results:** A total of 80 patients were included in this study (56 male and 24 female) with an age average of 28 years. In this study, the mean of TC of patients at the start point of the study was 157.6mg/dl which ended up 149. mg/dl after the 4 weeks of IMF period. The HDL of the serum of the patients before the treatment had a mean of 54.1 mg/dl. After the IMF period, the mean decreased about 1.1 mg/dl and reached 53.0. The average of LDL was 86.4 mg/dl, which also decreased during the IMF period about 3.3 mg/dl and reached 83.1 mg/dl.

**Conclusion:** We could show according to patients lipid indexes treatment with IMF can result in decrease in total cholesterol levels as the diet is restricted.

**Keywords:** Elastic modulus, flexural strength, provisional restorative materials

### Introduction

Among trauma cases, maxillofacial injuries have a very high incidence. Data suggests that the leading causes of maxillofacial fractures in developed countries are falling and insult, on the other hand road traffic accidents is the main reason in case of developing nations<sup>[1-4]</sup>.

In maxillofacial trauma, The most common affected bones are maxilla and mandible. For mandibular or midface fractures, various treatment modalities can be employed. One of them is closed reduction via intermaxillary fixation (IMF). In this technique, the occlusion is established, and jaws are maintained in the same relation to ensure that the fracture segments could fuse in their original positions<sup>[1, 5, 6]</sup>.

Close reduction via IMF is a very popular technique but one should be mindful of the fact that sometimes it could lead to complications like malnutrition, malunion, nonunion, gingival and periodontal inflammation<sup>[7-10]</sup>.

IMF hampers patient's normal diet intake and nutrition. Nutrition has an important role to play in the healing process<sup>[11-16]</sup>. IMF affects body weight, BMI, and other nutrition indices<sup>[17-20]</sup>.

Extreme obesity is known to be treated with IMF<sup>[21-25]</sup>.

Signs and symptoms of malnutrition include losing more than 10% of body weight, neurologic changes, hair loss, reduction of serum protein, changes in skin, loss of muscle mass, etc.

In this study, effects of IMF on several paraclinical factors such as protein profile and lipid profile have been evaluated. These factors are markers for malnutrition condition and thus help us in deciding how to prevent malnutrition by using various supplements. Also, every society and region has its distinct nutrition and diet habits; therefore it is compulsory to evaluate effects of closed reduction on people in each region to find the best possible solution to deal with it.

## Materials and Methods

This study was approved by the Research Ethics Committee of Government Dental College & Hospital. This is a major trauma centre in Kashmir. This study was conducted in the department of Oral and Maxillofacial Surgery, from 1st July 2020 to 30<sup>th</sup> September 2021. This study comprised patients of all ages and both.

All patients were aged 15-50 years and had a BMI of 18-30 kg/m<sup>2</sup>. We included only the patients whom undergone 4 weeks of IMF and excluded patients who had any systemic problems such as diabetes, kidney or heart diseases.

Blood sample was obtained from all patients before treatment and lipid profile factors [total cholesterol (TC), low-density lipoprotein (LDL), high-density lipoprotein (HDL), triglyceride (TG)] were measured and protein profile factors [hemoglobin (Hb), albumin (Alb)] were measured. All patients had a mandibular fracture which needed treatment. All patients were treated with a 4 weeks period of IMF. None of the patients received any supplements during the treatment period. After 4 weeks, a blood sample was obtained again, and all the measurements were redone.

## Results

A total of 80 patients were included in this study (56 male and 24 female) with an age average of 28 years. In this study, the mean of TC of patients at the start point of the study was 157.6mg/dl which ended up 149. mg/dl after the 4 weeks of IMF period. The HDL of the serum of the patients before the treatment had a mean of 54.1 mg/dl. After the IMF period, the mean decreased about 1.1 mg/dl and reached 53.0. The average of LDL was 86.4 mg/dl, which also decreased during the IMF period about 3.3 mg/dl and reached 83.1 mg/dl. The last index of lipid profile which was evaluated was TG, the average of it decreased.

In this study, for evaluating the protein profile, two indexes were measured, Alb of the serum and Hb. Alb's average before the treatment was 4.53 g/dl among the patients and had a range of 3.6-5.9 g/dl, which reduced significantly 0.23 g/dl during the treatment and got to 4.30 g/dl by the end of the treatment.

The average of Hb before the treatment was 12.4 mg/dl which increased during the IMF period about 0.32 mg/dl and reached 12.72 mg/dl.

**Table 1:** Hb before the treatment was 12.4 mg/dl which increased during the IMF period about 0.32 mg/dl and reached 12.72 mg/dl

Variable	Before IMF (mean)	After IMF (mean)	Change (mean)
Albumin	4.53g/dl	4.3g/dl	0.23g/dl(decreased)
Heamoglobin	12.4mg/dl	12.72mg/dl	0.32mg/dl(increased)
Total Cholesterol	157.6mg/dl	149.0mg/dl	8.6mg/dl (decreased)
High Density Lipoprotein	54.1mg/dl	53.0mg/dl	1.1mg/dl (decreased)
Low Density Lipoprotein	86.4mg/dl	83.1mg/dl	3.3mg/dl (decreased)
Triglyceride	101mg/dl	96mg/dl	5mg/dl (decreased)

## Discussion

The effects of IMF on biochemical indices were evaluated. Alb is an important protein and it was reduced by 0.23mg/dl during the IMF period. Alb is a long term index for malnutrition, has a half life of 20 days, so isn't affected by short term changes

IMF period in the study was 28 days, so Alb was a suitable marker for malnutrition [26]. This reduction implied insufficient nourishment, which wasn't at all a surprise due to occluded jaws and inability to ingest a normal diet by the patients.

Hb was another protein marker evaluated in the study. The mean of this index witnessed a rise of 0.32mg/dl, although this change seems strange but is justifiable. During the IMF period, the patient's mouth is occluded tightly which affects breathing through mouth. 8-53% of population is mouth breathers and 70% of oxygenation in some cases is supplied through it [27-31]. Our patients had encountered trauma in the facial region which would have impaired normal nasal breathing. Hence the affected nasal and mouth breathing would lead to some degree of hypoxia and the body raises the Hb levels as a response to this insult. This is also seen in smokers and mountaineers [32]. Therefore increase in Hb is a physiological reaction.

4 indices of lipid profile were also evaluated. All indices (TG, TC, HDL, LDL) showed a slight decline after IMF period.

## Conclusion

We could show according to patients lipid indexes treatment with IMF can result in decrease in total cholesterol levels as the diet is restricted. Good nutrition is vital for recovery, so when close reduction techniques are used as the treatment plan in maxillofacial region, a supplemental nutrition planning should be considered.

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