

To Determine Mean Change In Weight Of Patients Undergoing Maxillomandibular Fixation

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Abstract

Objective: Optimum management of patient needs is the most important step for the restoration of form and function. Maxillomandibular fixation is one of the treatment modalities used very frequently in maxillofacial surgery. This study aims to determine the mean change in weight in patients undergoing Maxillomandibular Fixation.

Methods: This observational cross-sectional study was conducted at the Department of Oral and Maxillofacial Surgery Foundation University Medical College from 27th April 2018 to 22nd January 2019.

This study included patients male and female, who presented with maxillofacial trauma, orthognathic surgery and procedures in which MMF (Maxillomandibular fixation) was indicated were included in this study. Pre-operative weight was measured in kilograms with an analogue weight machine and designated as W1. Patients were advised to a liquid diet and kept on follow-up. After four weeks of MMF again weight of the patient was measured and designated as W2. Follow-up was done through the patient's contact number.

Results: In this study, the mean weight of patients preoperatively was 59.46±12.23 Kg. The postoperative mean weight of patients was 57.81±11.58 Kg. A decrease of 1.65 Kg was seen in the patient's weight postoperatively. No significant difference was seen for weight change in patients postoperatively with age, gender, educational status, occupational status, socioeconomic status and an indication of MMF.

Conclusion: Results of this study showed weight loss in patients who underwent maxillomandibular fixation. This factor should be considered during the perioperative period to prevent postoperative complications, postoperative weight loss, and malnutrition of patients undergoing maxillomandibular surgery and reflect the need for guidance on diet postoperatively, mainly directed to frequency of feeding and high protein liquid diet and nutritional supplements.

Keywords: Body mass index, Facial trauma, Maxillomandibular Fixation, Mandibular fracture, Open reduction internal fixation, Orthognathic surgery, Weight loss.

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1. Introduction

Maxillomandibular Fixation (MMF) also commonly known as Intermaxillary Fixation is an important technique in Oral and Maxillofacial Surgery in which the maxilla and mandible are fixed together using wires based on the occlusion of the patient as a guide.¹ It helps in assisting the treatment of maxillofacial trauma by restoring the patient's pre-morbid occlusion by closed reduction as a sole treatment modality or as an adjunct in open reduction and internal fixation.^{2,3} It also plays an important role in orthognathic surgery by restoring maxillomandibular relation during the single jaw or bi-jaw surgery.⁴

By securing them into the best possible pre-trauma occlusion, the fracture will temporarily be both reduced to the correct position and stabilized.⁵

Different methods are used for achieving MMF most notably of which are eyelet wires and Erich arch bars.^{1,6} Because of the inherent risk of needle stick injuries, increased operative time, and pre-morbid malocclusions, newer methods have been devised including the use of cortical screws, embrasure wires, Leonard buttons, resin bonded arch bars and Dimac wires.^{7,8} In cases where patients' clinical condition is unsuitable for the administration of general anaesthesia or hematologic disorders that do not allow for surgical interventions, unavailability of hardware, financial shortcomings and lack of skill of surgeons are some of the reasons for closed reduction.⁶ The advantages of MMF are that this procedure is possible to perform under local anaesthesia with the help of stainless-steel wires. Despite many advantages like easy technique, cost-effectiveness, and ability to perform in an outdoor setting, this simple method also

has some disadvantages.⁹ As the patient is dependent on a liquid diet for the period of MMF, nutritional deficiency and weight loss are paramount concerns besides psychological issues related to inadequate verbal communication.^{9,11}

Adequate nutritional support is very important especially because of the catatonic state immediately following trauma or surgical insult. The normal adult requires 1800 to 2000 calories per day.¹² Patients who undergo surgical management of maxillofacial trauma are unable to take a normal diet during the healing phase for a significant amount of time. Such patients are mostly bound to take only a liquid diet.¹³ Unfortunately, there is a lack of noticeable concern by the maxillofacial surgeons towards the inadequate diet due to MMF and resulting changes in patient weight in the follow-up visits. These patients who have had orthognathic surgery or who have fractured their jaws are unable to take a normal diet for 6 to 8 weeks.¹

This study aims to assess weight loss in patients undergoing maxillomandibular fixation at 4th-week follow-up and compare it with the pre-treatment weight to take conducive steps to address the weight loss. These include referral to a nutritionist, proper counselling, formulation of a diet plan, and close monitoring of the patient's weight and general health on the follow-up visits.

2. Materials & Methods

This observational cross-sectional study was conducted at the Department of Oral and Maxillofacial Surgery Foundation University Medical College from 27th April 2018 to 22nd September 2018. The research was approved by an ethics committee with reference no. The sample size was calculated with a WHO calculator with non-probability consecutive sampling which came out to be 30 patients.

Inclusion criteria comprised patients of both genders from age 12 to 65 years who were planned for orthognathic surgery and fractures of the jaws planned for closed reduction with MMF or a combination of open reduction internal fixation and MMF. Exclusion criteria comprised Patients with uncontrolled systemic metabolic diseases, immuno-compromised conditions and those unwilling for treatment and follow-up. An informed consent form was signed by every patient to be included in the study. Preoperative weight was measured

in kg with an analogue weight machine. This was designated as W1. Patients were advised to a liquid diet and kept on follow-up. On the fourth week follow-up, the weight of the patient was measured and designated as W2.

Data collected were entered and analyzed in SPSS version 21.0. Descriptive statistics were used for qualitative and quantitative variables. Qualitative variables were gender and indication for MMF. Quantitative variables were pre-op weight (W1), weight after four weeks of MMF (W2), and net weight loss which is the difference between W1 and W2 (W3). Effect modifiers like age, gender, socioeconomic status, an indication of MMF, education, and occupation were controlled by stratification. Post-stratification independent sample t-test was applied on age. P value <0.05 was considered significant.

3. Results

A total of 30 patients were recruited. The minimum age of the patient was 12 years and the maximum age of the patient in this study was 65 years. The mean age of patients was 25.40 with SD \pm 12.90. In this study 56.7% (n = 17) were male and 43.3% (n=13) were females. The educational status of patients showed that 93.3% (n=98) patients were educated and 6.7% (n=2) were uneducated. As per socioeconomic status, 33.3% (n=10) were in the group <20,000, 36.7% (n=11) were in the group 20,000-50,000 and 30% (n=9) patients were in the group >50,000. Among 13.3% (n=4) MMF was indicated due to Pan facial trauma, 43.4% (n=13) patients MMF was indicated due to fracture of the mandible, 36.7% (n=11) patients MMF was indicated due to condyle fracture and 6.7% (n=2) patients had MMF due to Bi max orthognathic surgery (Table 2) The mean preoperative weight (W1), mean weight of patients after 4 weeks postoperative (W2) and the mean weight change (W3) in patients postoperatively has been described in Table 1.

Table 1: Mean Change in weight (N= 30)

Variables	Mean	S.D
Pre Op Weight (W1)	59.46	12.23
Post-op weight (W2)	57.81	11.58
Change in weight (W3)	-1.65	1.74

Maximum weight loss among patients was 5 Kg and minimum weight loss in patients was 2.50 Kg respectively. No statistically significant difference was seen in the weight of patients in the age groups postoperatively. The postoperative weight loss concerning education, socioeconomic status and condition treated has been documented in Table 2.

Table 2: Post Stratification change in weight concerning variables (N = 30)

Variables		N	Mean	SD	P value (t test)	Chi sq P value
Gender	Male	17	-2.02	1.12	0.250	0.178
	Female	13	-1.15	2.28		
Age	12 - 17	10	-1.25	1.31	0.980	0.627
	18-25	12	-1.87	2.39		
	26-35	2	-2.25	0.35		
	36-45	4	-1.25	0.95		
	46-55	1	-1.50	-		
	55-65	1	-3.5-	-		
Educational status	Educated	28	-1.57	1.77	0.366	0.885
	Uneducated	2	-2.75	1.06		
Occupational status	Employed	8	-2.00	0.65	0.518	0.458
	Unemployed	22	-1.52	2.00		
Socioeconomic status of patient	< 20,000	10	-2.15	1.74	0.717	0.369
	20,000 - 50,000	11	-1.45	1.70		
	>50,000	9	-1.33	1.87		
Indication	Pan facial trauma	4	-2.00	1.41	0.112	0.197
	Fracture Mandible	13	-0.65	1.81		
	Condyle fracture	11	-2.36	1.12		
	Bi max OGS	2	-3.50	2.12		

4. Discussion

The process of anaesthesia and required surgery for maxillofacial procedure disrupt the metabolic steady state and initiate a catabolic process which is intensified by periods of decreased nutritional intake. Muscle catabolized itself for the production of glucose (gluconeogenesis) early in this phase, with additional protein breakdown from the metabolically active tissues that have been wounded surgically.¹⁰

In a recent study by Kayani et al, there was an average weight loss of 6 kilograms in the first week followed by a further 5 kilograms at the end of four weeks. 30 patients were entered into the study. The pre-operative

weight ranged from 52 to 96 kilograms (kg) with a mean weight of 80.57 kg. The post-operative weight ranged from 50 to 91 with a mean weight of 76.47 kg. However, a sample size of 30 patients was inadequate for a better understanding of the weight loss during the MMF period.¹¹

Preoperative patient weight in this study was 59.23Kg on average. Patients' postoperative mean weight range was 57.81 on average. Postoperatively, the patient's weight dropped by 1.65 kg. Patients' postoperative weight change did not significantly differ by age, gender, educational attainment, employment level, socioeconomic standing, or an indication of MMF. According to the findings of a local study, patients who had maxillomandibular fixation owing to trauma generally lost 5 kg of weight in the second postoperative week.¹⁰ Moshood F. Adeyemi and his colleagues found that weight loss in patients at 4-6 weeks after IMF was much higher.²⁰ This study's results are comparable to those of other studies.

For the closed reduction technique, patients who undergo IMF procedures are restricted to a liquid diet or semisolid diets associated with weight loss and have a longer hospital stay, and their return to work is often delayed, thus causing an economic disadvantage.²¹

Worrall data showed a total weight loss of 4.5kg throughout 06 weeks 22 in addition, Behbahani et al concluded in their research that an average weight loss of 4.1kg was seen in patients during 3.5 weeks of treatment duration.²³ In another study that was performed in the year 2004 on obese patients, IMF was used as a treatment option for patients who were suffering from obesity; they lost an average weight of 7.4 kg using this technique.²⁴ Although the average weight loss of patients showed in this study was less than that in other similar studies.

The results of an Indian study suggested that around 84% of the surgeons said that their patients experienced weight loss after the treatment of facial trauma by IMF, even after having used it for one week.⁸ Many maxillofacial procedures compromise patients' ability to eat and drink in the early postoperative period and the period of inability to eat varies with the nature and extent of the procedure. Most of the patients who undergo simple dentoalveolar surgery find it uncomfortable to take food intraorally for the first 24 to 48 hours but after that are soon able to resume a normal diet.^{25,17,23} Conversely, patients who undergo orthognathic surgery or patients with fractured jaws are unable to take a

normal diet for 6 to 8 weeks.²⁶ If healing is to proceed normally, all nutritional requirements must be met throughout this healing period otherwise patients may become nutritionally deficient and dehydrated.¹⁷

5. Conclusion

In our study, there was non-significant weight loss postoperatively after 4 weeks of intermaxillary fixation. No significant difference was seen for weight change in patients postoperatively with age, gender, educational status, occupational status, socioeconomic status and an indication of MMF.

CONFLICTS OF INTEREST- None

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Contributions:

O.M - Conception of study

M.A - Experimentation/Study Conduction

E.S - Analysis/Interpretation/Discussion

A.H - Manuscript Writing

M.A.A - Critical Review

M.S - Facilitation and Material analysis

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