DETERMINATION OF WEIGHT LOSS IN MANDIBULAR FRACTURE PATIENTS AFTER MAXILLOMANDIBULAR FIXATION

Dr. Syed Wahib Asif Zaidi, Dr. Sufyan Ahmed, Dr. Mehwash Kashif, Dr. Amna Rehman, Dr. Samir Azeem, Dr. Afshan Qamar.

Dr. Syed Wahib Asif Zaidi
FCPS, BDS,
Consultant Oral and Maxillofacial Surgeon,
Karachi.
Consultant's Medical & Dental Clinic
Email:wahibasif@hotmail.com

Dr. Sufyan Ahmed
FCPS, BDS,
Associate Professor,
Department of Oral and Maxillofacial Surgery,
Karachi Medical and Dental College
Email: drsufyanahmed@hotmail.com

Dr. Mehwash Kashif (Corresponding author)
FCPS, BDS,
Associate Professor,
Department of Oral Pathology
Karachi Medical and Dental College
Email**:**mehwashkashif@gmail.com
ORCID ID: 0000-0002-3125-8616

Dr. Amna Rehman
FCPS, BDS,
Assistant Professor,
Department of Oral and Maxillofacial Surgery,
Liaquat College of Medicine and Dentistry Karachi

Email: ramna8382@gmail.com

Dr. Samir Azeem

MCPS, BDS,
Assistant Professor
Department of Oral Medicine
Liaquat College of Medicine and Dentistry Karachi
Email:dr.samir09@gmail.com

Dr. Afshan Qamar

MCPS, BDS,
Assistant Professor
Department of Oral Pathology
Liaquat College of Medicine and Dentistry Karachi
Email: omesek_7@hotmail.com

ABSTRACT

OBJECTIVE

The objective of the study was to determine weight loss in patients after four weeks of maxillomandibular fixation and its association with risk factors.

METHODS:

It was a Quasi-experimental design. The study was conducted in the Maxillofacial Department of Abbasi Shaheed Hospital. The data was collected from all adult patients that reported in the Abbasi Shaheed hospital outpatient department. All having mandibular fractures that undergo maxillomandibular fixation as a part of their treatment based on inclusion and exclusion criteria, after verbal informed consent recruited in the study. After taking a thorough history and clinical examination patients' weight was measured on the analog weighing machine before maxillomandibular fixation. Patients were recalled after four weeks of treatment with maxillomandibular fixation and the weight of the patient was measured again. All findings were recorded on a predesigned questionnaire. Data was analysed on SPSS version 23.00.

RESULTS:

A total of 70 patients were recruited .The mean age of the patient is age was 27.36$\pm$9.53 years . There were 71.4% (50) males and 28.6% (20) females. The mean weight change was -

2.57 ±1.765 kg. The mean change in weight in males was -2.5 ± 1.868 kg and in females was -2.750 ± 1.508 kg. Change of weight was compared with different socioeconomic statuses which revealed that patient with an income of less than 10000 had mean weight loss of -1.40 ± 1.837 kg with an income of 10000-20000 had -2.416 ± 1.786 kg and greater than 20000 had 3.291 ± 1.413 kg. The p-value was significant i.e. 0.011(<0.05). Comparison of change of weight with different age groups revealed that the mean change of weight in young patient was -2.47 ± 2.24 kg, in middle age patients it was -2.720 ± 1.225 kg and in elderly patients it was -2.55 ± 0 .527 kg.

CONCLUSION:

This study showed that there was significant weight loss after 4 weeks of maxillomandibular fixation. Although no statistical significant difference was observed in comparison with gender and age however, a significant change in weight loss was seen in a patient with different socioeconomic status. A healthy diet is essential for rehabilitation, so a supplemental nutrition planning strategy should be taken into account when close reduction procedures are used as the treatment plan in the craniofacial region.

KEYWORDS : Maxillomandibular fixation, intermaxillary fixation, weight loss, nutrition fracture

Introduction

One of the regions where fractures occur most frequently is the maxillofacial region. This is due to its particularly frequent effects on the mandible relative protuberance with the facial skeleton as a whole. These fractures must be managed efficiently so that the function and aesthetics can be resumed as it was before accident. Reconstruction that is both functional and aesthetically pleasing is crucial in the treatment of maxillofacial injuries.[1]

There are two approaches to treat mandible and midface fractures, which are common in maxillofacial trauma. The first course of treatment is open reduction procedures, which involve making surgical incisions and securing the fractured segments with various tools like screws, plates, and wires. The second alternative is closed reduction with intermaxillary fixation (IMF), which involves immobilizing the broken segments next to one another and bringing the divided segments back together. [2] It is the most prevalent and essential procedure for managing and

treating patients with maxillofacial fractures is maxillomandibular fixation (MMF). It uses an easy strategy which involves fixation of teeth with the bone and among both arches on either side of the fractured mandible and the fracture is reduced to proper location and fixed by locking them into occlusion with the healthy maxilla. [3]

MMF is utilized frequently when necessary despite the possibility of side effects such as malunion, nonunion, malnutrition, and periodontal inflammation. The length of MMF varies according to the kind and location of the fracture, the patient's health, and other considerations, but is typically 2 to 6 weeks.[4]

MMF carries some inherent risk, particularly in the initial postoperative phase. Vomiting is a possibility for patients, and oral bleeding following surgery might not be noticed. Patients under general anesthesia frequently need to spend their first postoperative night in an intensive care or high-dependency bed as a result. The patient's weight could drop [5]. During orthognathic surgeries, closed fracture therapy, and open reduction internal fixation (ORIF), MMF is used intraoperatively as support.[6] Weight loss has been reported as one of the main negative effects when intermaxillary fixation (IMF) is used to treat patients with mandibular fractures, and patients have trouble maintaining a normal diet. [7] When compared to their pre-surgical weights, individuals in the study by Kayani et al. lost an average of 6.0 kg in the first week after surgery and 5.0 kg in the fourth week.[8]

The intermaxillary fixation has an impact on the patient's food intake during the MMF phase. Numerous studies have linked proper nutrition to the body's ability to recover it; as a result, MMF therapy may have an impact on this process. MMF has been shown in several trials to lower body weight and other indices like BMI. Even the treatment of severe obesity employs MMF. Various signs and symptoms of malnutrition include losing more than 10% of body weight, neurologic changes, skin changes, subcutaneous fat volume changes, hair loss, decreased serum proteins and lipid components, loss of muscle mass, etc.[9]

After in depth search of data very few studies have been found on the topic, therefore, this study was planned in order to determine weight loss in patients after four weeks of maxillomandibular fixation and its association with risk factors.

.

Research Elaborations /Materials and methods:

The Quasi-experimental design with non-probability consecutive sampling was used to collect data for the study. The study was conducted in the Maxillofacial Department of Abbasi Shaheed Hospital. The Duration of the study was six months. The sample size was calculated by using the stats given by kayani et al[7] mean weight of 80.57 with SD $\pm$ 9.995 on the first day and a mean weight of 76.47 $\pm$ 10.244 on the 4th week the mean change of 4.1 $\pm$ 0.249 on the calculated sample size was 70 at confidence interval 95% and power of the test 80%. The Sample was selected with the inclusion criteria of adult patients ranging from 12 to 65 years, undergoing MMF as part of their treatment and reporting to the outpatient department in Abbasi Shaheed Hospital. The exclusion criteria were patients with bi-maxillary or complex facial fractures (diagnosed on history and medical records), MMF for reasons other than trauma like TMJ Problems, and patients having uncontrolled systemic metabolic diseases like uncontrolled diabetes and hypertension were excluded from the study. Patients with habits of the pan, gutka, betel nut chewing, and smoking and patients with a prediagnosed nutritional deficiency were also excluded from the study. Verbal informed consent was taken from the patients to be included in the study.

All the patients having mandibular fractures that were planned to undergo MMF as a part of their treatment based on inclusion and exclusion. After taking a thorough history and clinical examination patients' weight was measured on the analog weighing machine before MMF. Patients were instructed to take liquid and semisolid diet. Patients were recalled after four weeks of treatment with MMF and the weight of the patient was measured again. All the findings were recorded on a predesigned proforma.

All the data were analyzed on the SPSS version 23.00. Descriptive statistics were calculated for age and weight baseline difference after 4 weeks. Frequency and percentage were calculated for gender and socioeconomic status.

The pre and post-readings were compared by paired t-test. The effect modifiers (age, gender, and socioeconomic status) were addressed. Through stratification. Post-stratification independent t-test or ANOVA was applied. P-value less than and equal ≤ 0.05 was taken as significant.

Results:

A total of 70 patients were recruited .The mean age of the patient is age was 27.36$\pm$9.53 years . There were 71.4% (50) males and 28.6% (20) females (Figure- I). The mean weight change was

-2.57 ±1.765 kg. The mean change in weight in males was -2.5 ± 1.868 kg and in females was -2.750 ± 1.508 kg as shown in table 1.

Change of weight was compared with different socioeconomic statuses which revealed that patient with an income of less than 10000 had mean weight loss of -1.40 ± 1.837 kg with an income of 10000-20000 had -2.416 ± 1.786 kg and greater than 20000 had 3.291 ± 1.413 kg. The p-value was significant i.e. 0.011(<0.05). Comparison of change of weight with different age groups revealed that the mean change of weight in young patient was -2.47 ± 2.24 kg, in middle age patients it was -2.720 ± 1.225 kg and in elderly patients it was -2.55 ± 0 .527 kg.

The mean weight change was -2.57 ±1.76 kg as shown in table 2.

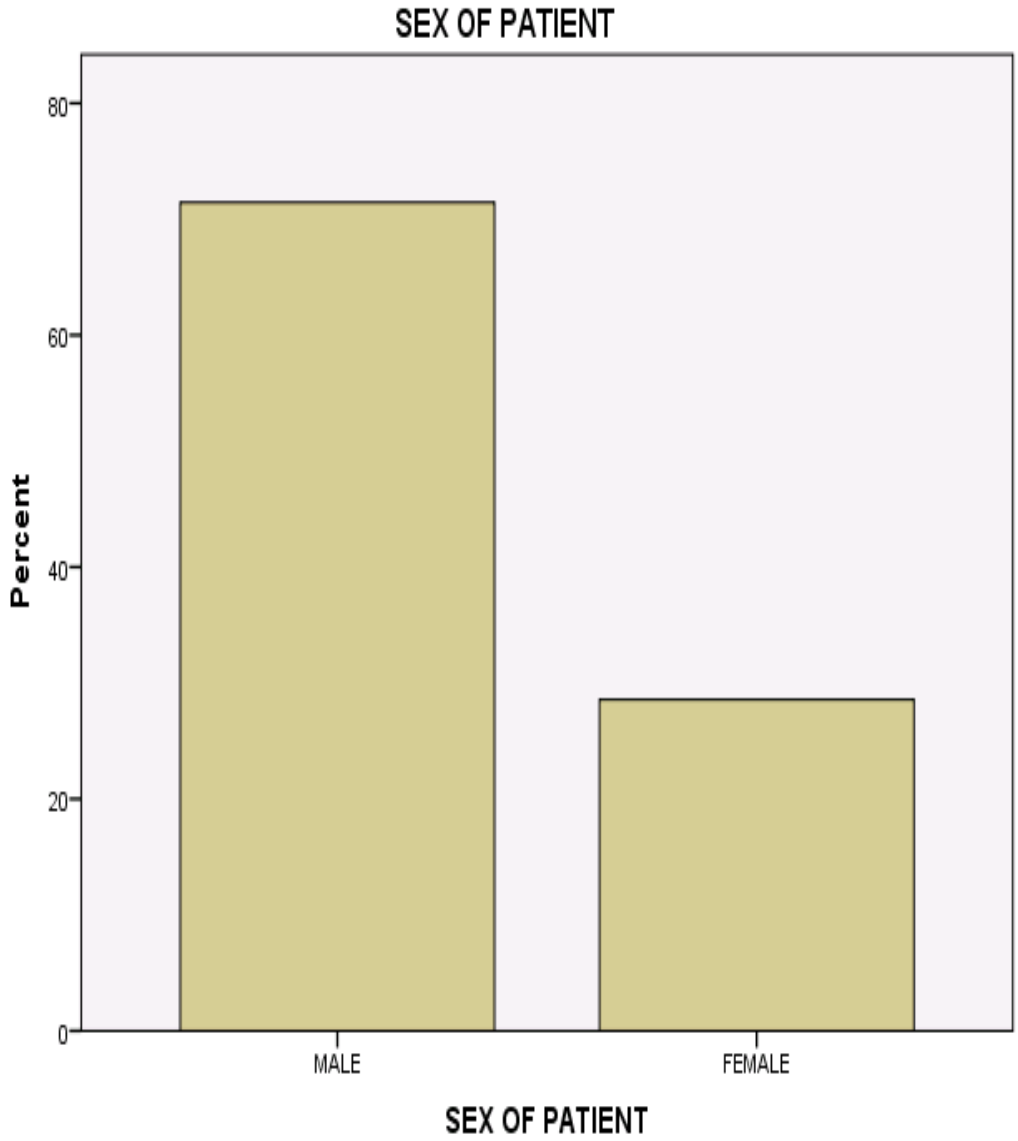

Figure 1 gender distribution of participants

Table 1: Mean weight change with respect to gender

	N	Minimum	Maximum	Mean	Std. Deviation	P value
Overall change In weight	70	-5.00	3.00	-2.571	1.765	0.563
Change In weight Male	50	-	-	-2.500	1.868	
Change In weight Female	20	-	-	-2.750	1.508	

Table 2: Mean weight change with respect to age and Scocioeconomic status

	N	Mean	Std. Deviation	Minimum	Maximum	P value
Change in weight with different Scocioeconomic status						
Less than 10000	10	-1.40	1.83	-3.00	2.00	0.011
10000-20000	36	-2.41	1.78	-5.00	3.00	
Greater than 20000	24	-3.29	1.41	-5.00	-1.00	
Total	70	-2.57	1.76	-5.00	3.00	
Change in weight with different age group						
Age	70	27.36	9.533	15	53	
Young	36	-2.472	2.242			0.868
Middle Age	25	-2.720	1.225			
Elderly	9	-2.55	0.527			
Total	70	-2.571	1.765			

Discussion:

Patients sometimes have many fractures in the craniofacial region, requiring a variety of treatments, such as internal fixation, close reduction, or a combination of the two. [10]

The early postoperative period of almost all oral and maxillofacial trauma procedures impairs patients' capacity to eat and drink, and the time frame can fluctuate depending on the type and size of the operation. For the first one to two days after uncomplicated dentoalveolar surgery, most patients find it difficult to eat properly, but they soon get used to it and can resume their normal diet. [11]Many studies reported the loss of weight after MMF. It has been reported that after 4 to 6 weeks of intermaxillary fixation, discernible weight loss was seen in other investigations of a similar nature. Although a study that employed MMF to treat obesity revealed that ongoing usage of MMF had no discernible impact on the subject's weight.[12]A normal diet cannot be consumed for 6 to 8 weeks by people who have undergone orthognathic surgery or who have fractured their maxilla and mandible.[13]All dietary needs must be addressed during this time for recovery to continue normally; otherwise, patients risk becoming malnourished and dehydrated. [14]

In this study, the mean age ranged from 27.36 ± to 9.533 years. (15-53) years; however, a study by Yazdani and coworkers in 2016 reported that approximately 28 years was the mean age observed in the study among patients with MMF. [15]

This study's sample size was 70 individuals, 50 males and 20 females. The mean weight difference after maxillomandibular fixation was -2.57 +1.76 kg, which was further differentiated as a change in weight in male and change in weight in female population after maxillomandibular fixation, coming out as mean -2.5 +1.86 kg and mean -2.75 + 1.50 kg respectively in male and female, which has not previously been reported. Additionally,when weight change was compared to various socioeconomic statuses, patients with incomes of less than $10,000 had a mean weight change of -1.40 + 1.83 kg.The average weight change for patients with incomes between $10,000 and $20,000 was -2.416 + 1.786 kg.

The average weight reduction of patients with incomes over $20,000 was -3.29 + 1.413 kg, a finding that has never been made in a prior study revealing considerable weight loss in patients with incomes over $20,000 following maxillomandibular fixation. The patients were split into young, middle-aged, and senior age groups to explore the relationship between weight and age, and the results were negligible. A study conducted by S.P. Popat in 2021 reported that overall 50 patients were randomly assigned to receive the nutritional intervention (Group 1) or no intervention (Group 2). Dietitians provided nutrition advice and diet plans to patients in Group 1. Patients in Group 2 were instructed to consume a liquid diet of their choosing, including protein

supplements and shakes, juices, and milk. At week four of the follow-up, patients in Group 1 lost considerably less weight than those in Group 2 (p=0.001). During the two weeks that MMF was administered, as well as two weeks after its withdrawal, Group 1 patients' oral health-related QoL in the "physical pain" and "physical discomfort" domains was significantly better. During the two weeks of the study, they experienced a considerably higher nutrition-related quality of life in every domain.[16]

Due to a reduction in protein and carbohydrate intake, patients in this trial lost an average of 2.57 kg after 4 weeks following surgery. All of the patients in this study suffered mandibular fractures and received just MMF treatment, it was noted. Immobilized jaws during MMF lead to transient malnutrition. To preserve the patient's nutritional condition, surgeons may take a variety of steps, such as giving diet protocols, dietitian counseling, or allowing patients to consume their preferred foods in blended form.[17]

It has been evident from the study that treatment with MMF can lower total cholesterol levels since the food is controlled, depending on the patients' lipid indexes. [18]Since it is true that "prevention is better than cure," treating patients with maxillofacial injuries includes both combined preventative and interventional efforts to lower the frequency of maxillofacial trauma in addition to managing the acute condition. Therefore, it is crucial to follow traffic laws, enhance vehicle safety measures, implement alcohol addiction education in schools, reduce physical assaults, safeguard athletes, and make protective headgear mandatory for construction and industrial employees. The direct and indirect effects of maxillofacial trauma can be reduced by preventing injuries.[19]It is also recommended in many studies that patients' diets must be adjusted, and foods high in complete protein, unsaturated fats, and nutrients such as vitamins and minerals should be included. Studies on patients are required to determine the optimal diet.[20]

Conclusion:

This study showed that there was significant weight loss after 4 weeks of maxillomandibular fixation. Although no statistical significant difference was observed in comparison with gender and age however, a significant change in weight loss was seen in a patient with different socioeconomic status. A healthy diet is essential for rehabilitation, so a supplemental nutrition planning strategy should be taken into account when close reduction procedures are used as the treatment plan in the craniofacial region.

References:

1. Iqbal S, Aslam A, Ahmed S, Khan N, Kashif M, Kazmi SM. Spectrum of mandibular fractures in a tertiary care hospital of Karachi. Int J Frontier Sci. 2020;4.

2. Andreasen JO, Storgård Jensen S, Kofod T, Schwartz O, Hillerup S. Open or closed repositioning of mandibular fractures: is there a difference in healing outcome? A systematic review. *Dent Traumatol.* 2008;24:17–21. doi: 10.1111/j.1600-9657.2006.00498.x.

3. Jain A, Taneja S, Rai A. What is a better modality of maxillomandibular fixation: bone-supported arch bars or Erich arch bars? A systematic review and meta-analysis. British Journal of Oral and Maxillofacial Surgery. 2021 Oct 1;59(8):858-66.

4. Eckelt U, Schneider M, Erasmus F, Gerlach KL, Kuhlisch E, Loukota R, Rasse M, Schubert J, Terheyden H. Open versus closed treatment of fractures of the mandibular condylar process–a prospective randomized multi-centre study. *J CraniomaxillofacSurg.* 2006;34:306–14. doi: 10.1016/j.jcms.2006.03.003.

5. Jain A, Rai A. Is the Use of Intermaxillary Fixation Screws an Alternative to Erich Arch Bars for Maxillomandibular Fixation During Management of Maxillofacial Fractures? A Systematic Review and Meta-Analysis. Craniomaxillofacial Trauma & Reconstruction. 2021 Sep;14(3):236-45.

6. Murakami K, Kimura Y, Minemura C, Yamamura K, Yokoe H. Rigid internal fixation of panfacial fractures without postoperative maxillomandibular fixation: A retrospective study of 25 cases. Advances in Oral and Maxillofacial Surgery. 2022 Jul 1;7:100322.

7. Choi JW, Kim HB, Jeong WS, Kim SC, Koh KS. Comparison between intermaxillary fixation with screws and an arch bar for mandibular fracture. Journal of Craniofacial Surgery. 2019 Sep 1;30(6):1787-9.

8. Ghafoor Kayani Sa, Ahmed W, Farooq M, Ur Rehman At, Nafees Q, Mushtaq Baig AM. Weight loss due to maxillomandibular fixation in mandibular fractures. Pakistan Oral & Dental Journal. 2015 Sep 1;35(3).

9. Yazdani J, Hajizadeh S, Ghavimi MA, Pourghasem Gargari B, Nourizadeh A, Kananizadeh Y. Evaluation of changes in anthropometric indexes due to intermaxillary fixation following facial fractures. J Dent Res Dent Clin Dent Prospects. 2016 Fall;10(4):247-250. doi: 10.15171/joddd.2016.039. Epub 2016 Dec 21. PMID: 28096951; PMCID: PMC5237672.

10. Weill P, Garmi R, Thobie A, Benateau H, Veyssiere A. Focus on the use of maxillomandibular fixation in mandibular fracture oseosynthesis. Journal of Stomatology, Oral and Maxillofacial Surgery. 2022 Jan 29.

11. Kumar M, Shah SF, Panjabi SK, Abdullah S, Shams S. Mandibular fracture management;: comparison of efficacy of maxillomandibular fixation of screws versus erich arch bar. The Professional Medical Journal. 2019 Apr 10;26(04):615-9.

12. Lone PA, Khaliq MI, Sharma M, Malik OA, Lone BA. Weight Changes (in kg) in Mandible Fracture Patients After IMF: A Prospective Study. The Traumaxilla. 2019 Apr;1(1):35-7.

13. Hino S, Yamada M, Iijima Y, Ohmuro M, Araki R, Kaneko T, Odaka A, Iizuka T, Horie N. Change of body composition, physical strength, and nutritional status of patients with mandibular fractures. Journal of Cranio-Maxillofacial Surgery. 2021 Apr 1;49(4):292-7.

14. Manzie T, David MC, Bobinskas A. Return to normal diet following mandibular fractures–how long is long enough?. British Journal of Oral and Maxillofacial Surgery. 2021 Nov 1;59(9):1050-5.

15. Yazdani J, Hajizadeh S, Ghavimi MA, Gargari BP, Nourizadeh A, Kananizadeh Y. Evaluation of changes in anthropometric indexes due to intermaxillary fixation following facial fractures. Journal of dental research, dental clinics, dental prospects. 2016;10(4):247.

16. Popat SP, Rattan V, Rai S, Jolly SS, Malhotra S. Nutritional intervention during maxillomandibular fixation of jaw fractures prevents weight loss and improves quality of life. British Journal of Oral and Maxillofacial Surgery. 2021 May 1;59(4):478-84.

17. Shetty V, Atchison K, Leathers R, Black E, Zigler C, Belin TR. Do the benefits of rigid internal fixation of mandible fractures justify the added costs? Results from a randomized controlled trial. Journal of Oral and Maxillofacial Surgery. 2008 Nov 1;66(11):2203-12.

18. Bhat MY, Bashir S, Ahmed I. Effect of intermaxillary fixation on paraclinical indexes.. Int.J.Appl.Dent.Sci.2022;8(2):381-383.
DOI: https://doi.org/10.22271/oral.2022.v8.i2f.1532

19. Chandra L, Deepa D, Atri M, Pandey SM, Passi D, Goyal J, Sharma A, Gupta U. A retrospective cross-sectional study of maxillofacial trauma in Delhi-NCR Region. Journal of family medicine and primary care. 2019 Apr;8(4):1453.

20. Xolmurodov A, Bobamuratova D. Sub-analysis of real nutrition of patients with jaw fractures. Journal of the Neurological Sciences. 2019 Oct 15;405:289.