Original Article

"Assessment of Nutritional Status in Patients Undergoing Intermaxillary Fixation in the Management of Maxillofacial Trauma - A Prospective Study"

Kho Chai Chiang, Bhyri Harika, N. V. V. Satya Bhushan, U. Siva Kalyan, K. Ravindranath, T. Sunil

Department of Oral and Maxillofacial Surgery, GITAM Dental College and Hospital, Rushikonda, Visakhapatnam, Andhra Pradesh, India.

Abstract

Background: Many studies evaluated the effects of intermaxillary fixation (IMF) on anthropometric measurements, which are markers for malnutrition. Because nutritional habits are different in every region and society, it is necessary to evaluate the effects of closed reduction on people in each region. The study aims to assess the nutritional status of the patients undergoing IMF. **Materials and Methods**: A total of 24 patients were taken to assess the percentage of changes in weight and nutritional status in patients undergoing IMF by giving diet charts postoperatively who reported to the outpatient Department of Oral and Maxillofacial Surgery, with Maxillofacial fractures. **Observations and Results**: In anthropometric analysis, weight, body mass index, and mid-upper arm circumference decreased significantly, and the percentage of weight loss decreased considerably. Clinical measurements such as grip strength and in dietary assessment, the number and quantity of feeding both increased significantly. **Conclusion**: The dietary chart prescribed can be recommended to the patients who undergo closed reduction following maxillofacial trauma as the nutritional assessment done by observing parameters such as anthropometric, clinical, laboratory, and diet showed positive results.

Keywords: Intermaxillary fixation, Anthropometric analysis, Diet chart, Haematological investigations, Grip strength.

Introduction

Maxillofacial significant damage occurs in approximately 5–33% of people who survive severe trauma.[1] In total maxillofacial trauma, the most common fracture[2] (48.6%) was an isolated mandibular fracture, followed by an isolated maxilla fracture (27.6%), a combined maxilla-mandibular fracture (16.43%), a nasal fracture complex (4.3%), orbital fractures (2%), and frontal bone fractures(0.7%).[3,4] Maxillofacial injuries are frequently sustained in motor vehicle collisions, falls, insults, and sports-related mishaps.[5,6] The primary goal of fractures management is to the reestablishment of function.[7] These fractures are treated either by open reduction and internal fixation (ORIF) or by closed reduction, i.e intermaxillary fixation (IMF).[7]

In the closed reduction procedure, the mandible and maxilla will be immobilized by maxillomandibular fixation either by the arch bar or IMF screws or other methods that heal fractured segments.[6] Duration of IMF is about 2–6 weeks, and it depends on the type, location of the fracture, patient's health condition, age, and some other factors. Although it has a long success rate, the patient will be on a liquid diet during this period.[8] It results in airway problems, malnutrition, weight loss, and poor oral hygiene, affecting the body's healing process. Some studies have demonstrated how IMF reduces body weight and other indexes like body mass index (BMI).[9-11] Many studies evaluated the effects of IMF on anthropometric measurements, which are markers for malnutrition. Because nutritional habits are different in every region and society, it is necessary to evaluate the effects of closed reduction on people in each region.

The study goal is to evaluate the nutritional status of the patients under IMF during treatment of maxillofacial fractures preoperatively by giving diet chat and analyzing the patient's weight and nutrition effects during the period of immobilization.

A prospective clinical trial was conducted on 24 patients treated with IMF for maxillomandibular fractures, with preoperative, 2nd-

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Address for correspondence: Dr. Bhyri Harika, GITAM Dental College, Rushikonda, Visakhapatnam - 530 045, Andhra Pradesh, India. E-mail: haribhanu22@gmail.com

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week postoperative, and 4th-week postoperative anthropometric measurements, blood tests, and clinical parameters monitored.

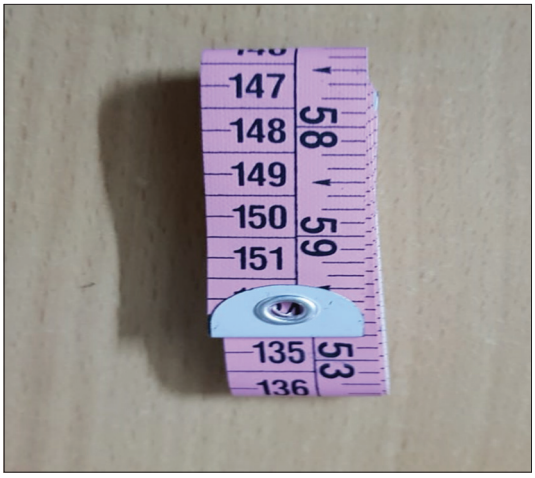
Materials and Methods

A prospective clinical study in 24 patients who visited the Department of Oral and Maxillofacial Surgery indicated an IMF for treatment of maxillofacial fractures. Healthy patients of ASA 1 category, Patients willing to participate in the study by signing the informed consent, patients with mandible or maxilla fracture or both that require IMF were included in the study. Medically compromised individuals, Patients who express a lack of interest in participating in the study, and malnourished patients were excluded from the study.

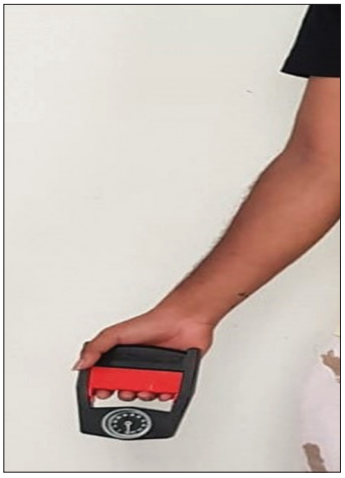
After detailed case history and informed consent, the procedure was clearly explained to the patient. Anthropometric analysis is done preoperatively, the 2nd week, the 4th week postoperatively by assessing the weight of the patient in kg using the digital weighing machine (Photograph 1), height is measured using tape in cm (Photograph 2), BMI is measured by weight/height (kg/m^2), and muscle wastage is assessed by measuring mid-upper arm circumference in cm (Photograph 3) using a measuring tape by asking the patient to stand straight and the dominant hand is taken, measured at the midpoint between the acromion process and olecranon process, and the percentage of weight loss is measured by weight loss in kg divided by initial weight in kg multiplied by hundred at the end of the 2nd and 4th week postoperatively. Clinical assessment is done by quantifying the grip strength using a dynamometer (Photograph 4) asking the patient to stand straight and legs extended apart taking the dynamometer in the dominant hand and pressing the dynamometer as strong as possible three times with a 30 s interval and the average value is noted preoperatively, 2nd and 4th week postoperatively. Hematological assessment is done by advising the patient to do investigations of hemoglobin (Hb%), C-reactive protein (CRP), serum albumin, and creatinine preoperatively before doing IMF on that day, at the end of the 2nd and 4th week postoperatively. Number and quantity of feeds are noted at the end of 2nd and 4th weeks during follow-ups postoperatively by giving a diet plan (Table 1) on the day of IMF.

Photograph 1: Measuring the weight of the patient by the digital weighing machine

Photograph 3: Measuring Mid upper arm circumference using a measuring tape



Photograph 2: Measuring tape



Photograph 4: Measuring grip strength by using dynamometer

Data will be entered in Microsoft Excel and analyzed using SPSS Version 25. Descriptive statistics will be represented by mean with standard deviation. Paired *t*-test was applied based on the nature of the distribution. $P < 0.05$ will be considered as statistical significance.

Results and Findings

Blood Investigations

From the result of Table 1 and Figure 1, the blood investigations such as HB%, CRP value, serum albumin, and serum creatinine were compared between pre-operative and 2nd-week post-operative. There is a statistical significance difference between mean pre-operative and 2nd week post-operative of CRP value ($P = 0.016$). There is no statistical significance difference between HB%, serum albumin and serum creatine was observed pre-operative and 2nd-week post-operative.

Anthropometric Analysis

From the result of Table 2 and Figure 2 Anthropometric analysis of pre-operative and 2nd week post-operative were compared that is weight, height, BMI, mid-upper arm circumference, and weight loss during 2nd week. There is a statistical difference seen in weight ($P = 0.000$), BMI ($P = 0.000$), and mid-upper arm circumference ($P = 0.029$). It can be inferred from the above result that weight, BMI, and mid-upper arm circumference in 2nd week post-operative values decreased compared to pre-operative.

Clinical Parameters

From the result of Table 3 and Figure 3 clinical parameters grip strength is compared pre-operative and 2nd-week post-operative, there is no statistical significance is observed.

blood Investigations Pre-operative and 4th Week Post-operative

From the result Table 4 and Figure 4 Blood investigations of pre-operative and 4th-week post-operative were compared, there is no statistical difference is seen in HB%, serum albumin, and serum creatinine in pre-operative and 4th week post-operative. CRP values have decreased in the 4th week compared with the pre-operative value.

Anthropometric Analysis of Pre-operative and 4th Week Post-operative

From the result Table 5 and Figure 5 Anthropometric analysis of pre-operative and 4th-week post-operative were compared, It can be inferred from the above result that weight value and BMI value have decreased in the 4th week compared to pre-operative values. The other observations in the anthropometric analysis observed have not shown any difference between pre-operative and 4th week post-operative.

Clinical Parameters of Pre-operative and 4th Week Post-operative

From the above Table 6 and Figure 6 clinical parameter grip strength compared between pre-operative and 4th week post-operative. there is no statistical significance is observed.

Blood Investigations

From the result Table 7 and Figure 7 It can be inferred from the above result that serum creatinine values have decreased in the 4th-week post-operative when compared with the 2nd-week post-operative value. The other observations in the blood investigations observed have not shown any difference between the 2nd-week post-operative and the 4th week post-operative.

Anthropometric Analysis of 2nd and 4th Week Post-operative

From the result Table 8 and Figure 8, It can be inferred from the above result that the percentage of weight loss value is decreased in the 4th week post-operative when compared with the 2nd week post-operative value. The other observations in the anthropometric analysis observed have not shown any difference between the 2nd week post-operative and the 4th week post-operative.

Grip Strength of 2nd and 4th Week Post-operative

From the result Table 9 and Figure 9 Grip strength of 2nd week and 4th week post-operative were compared, It can be inferred from the above result that grip strength values have increased in the 4th week when compared to the 2nd week post-operative value.

Number and Quantity of Feeds for 14 Days in 2nd and 4th Post-operative

From the result Table 10, Figures 10 and 11, It can be inferred from the above result that there is an increase in the number and quantity of feeds values in the 4th week when compared with the 2nd week post-operative values.

Discussion

Maxillofacial injuries occur in 5–33% of individuals who have suffered severe trauma, which can be a single injury or in conjunction with other serious injuries.[1] The primary goal for repairing maxillofacial fractures is reduction, fixation, and immobilization.[2] Fractures management in the orofacial region necessitates a variety of treatment modalities, including closed reduction,[12] ORIF, or a combination of the two. In

Table 1: Comparison of mean blood investigations at pre-operative and 2nd week post-operative

Parameters		Pre-operative		2nd-week post-operative		*P*-value
		Mean	SD	Mean	SD	
Blood investigations	Hb%	14.23	2.10	14.07	2.26	0.329
	CRP mg/dl	15.70	24.01	4.72	9.73	0.016*
	Ser alb gm/dl	4.59	0.58	4.45	0.59	0.115
	Secr mg/dl	0.91	0.20	0.92	0.15	0.739

*Statistical Significance

Table 2: Comparison of mean anthropometric analysis at pre-operative and 2nd week post-operative

Parameters		Pre-operative		2nd-week post-operative		*P*-value
		Mean	SD	Mean	SD	
Anthropometric analysis	Wt kg	59.64	9.74	57.63	9.65	0.000*
	Ht cm	166.42	9.05	166.42	9.05	-
	BMI wt/m^2	22.28	3.31	21.31	3.32	0.000*
	MIDarm cm	27.60	2.79	27.44	2.78	0.029*
	%wt loss	-		3.51	1.54	-

*Statistical Significance

Table 3: Comparison of mean clinical parameters at pre-operative and 2nd week post-operative

Parameters		Pre-operative		2nd-week post-operative		*P*-value
		Mean	SD	Mean	SD	
Clinical parameters	Grip strength kg	30.33	17.24	31.13	14.62	0.599

Table 4: Comparison of mean blood investigations at pre-operative and 4th week post-operative

Parameters		Pre-operative		4th-week post-operative		*P*-value
		Mean	SD	Mean	SD	
Blood investigations	Hb%	14.23	2.10	14.45	1.96	0.481
	CRP mg/dl	15.70	24.01	3.96	9.55	0.018*
	Ser alb gm/dl	4.59	0.58	4.30	0.50	0.100
	Secr mg/dl	0.91	0.20	0.85	0.13	0.062

*Statistical Significance

Table 5: Comparison of mean anthropometric analysis at pre-operative and 4th week post-operative

Parameters		Pre-operative		4th-week post-operative		*P*-value
		Mean	SD	Mean	SD	
Anthropometric analysis	Wt kg	59.64	9.74	57.87	9.45	0.000*
	Ht cm	166.42	9.05	166.42	9.05	-
	BMI wt/m^2	22.28	3.31	21.37	3.12	0.001*
	MIDarm cm	27.60	2.79	27.42	2.76	0.059
	%wt loss	-		0.89	1.33	-

*Statistical Significance

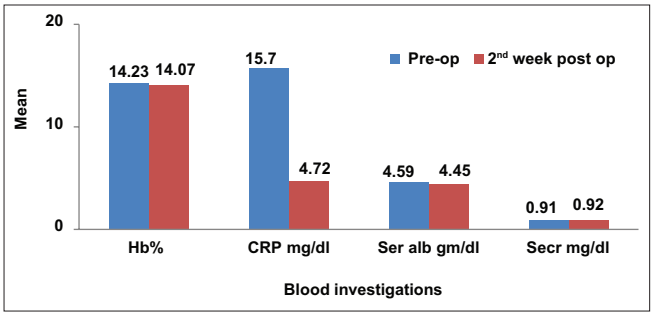


Figure 1: Comparison of mean blood investigations at pre-operative and 2nd week post-operative

1881, Gilmer[5] of Chicago became the first modern surgeon to suggest IMF treat complex maxillomandibular fractures. Closed reduction with IMF[6] is a procedure in which the shattered segments are immobilized adjacent to each other, resulting in the reunion of the divided segments. However, IMF can cause complications such as malnutrition, and periodontal inflammation. The duration of IMF varies depending on the kind and location of the fracture, the patient's health, and other considerations. However, it is typically 2–6 weeks in which the patient's intake is affected.[6]

During the IMF phase,[12] a liquid diet will be required, Cooked foods can be blended to the desired consistency with a thinner such as juice, milk, water, or broth[12,13] and then filtered to eliminate particles and food fiber to maintain oral hygiene. Airway concerns, poor nutrition, weight loss, poor oral hygiene, phonation difficulties, insomnia, social annoyance, patient discomfort, work loss, and trouble restoring normal jaw function have all been associated with IMF, which can last up to 6 weeks.[12]

Nutrition is the science of how the human body consumes food

to meet its developmental, growth, healing, and maintenance needs. The "womb to tomb" effect, which influences the trajectory of various health outcomes, is a significant driver of health status. Each nutrient plays a distinct role in maintaining the integrity of general health. Carbohydrates, protein, fat, vitamins, minerals, and water are fundamental nutrients essential for everyone to exist, live a healthy life, and heal properly. The body requires sufficient carbs to avoid protein catabolism and fatty acid metabolism.[12]

When measuring nutritional status during the period of IMF, unintentional weight loss is an essential factor to consider. The percentage of body weight dropped over time is used to estimate the severity of the process.[14]

Nutritional status can be assessed by anthropometric measures and laboratory investigations.[14] Anthropometry is the science of defining physical measurements of a person's size, shape, and functional characteristics. This covers the triceps skinfold (TSF), the mid-arm, the muscle circumference, the body weight, the degree of weight loss, and the rate of weight loss.[12]

Appropriate anthropometric measurements were used to determine the extent to which body fat and protein stores have been depleted by comparing them to typical values for age and gender.[12] TSF measurement with calipers is used to quantify body fat percentage. Protein stored in skeletal muscle can be quantified by measuring the circumference of the mid-upper arm and modifying the measurement to account for the presence of subcutaneous fat. The resulting measurement is referred to as the arm muscle circumference.[14]

Diagnostic investigations, such as hematological examinations, might shed light on the etiology of oral or other chronic complications. To know the immunological response, a complete blood count should be performed.[12,15] Electrolytes, serum

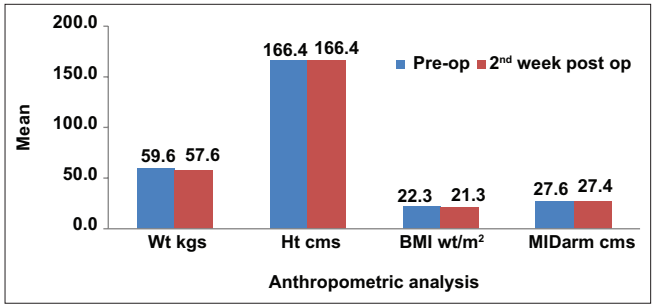


Figure 2: Comparison of mean anthropometric analysis at pre-operative and 2nd week post-operative

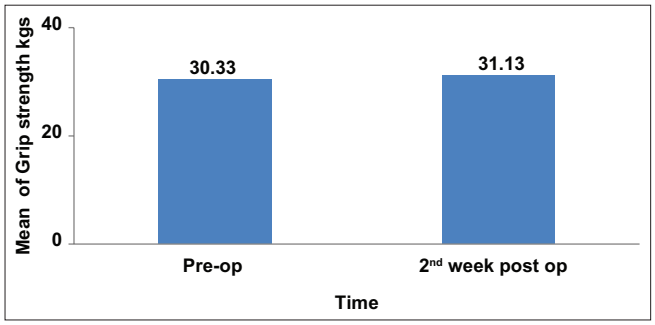


Figure 3: Comparison of mean clinical parameters at pre-operative and 2nd week post-operative

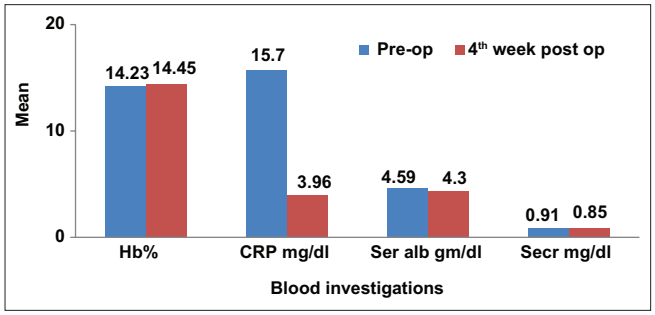


Figure 4: Comparison of mean blood investigations at pre-operative and 4th week post-operative

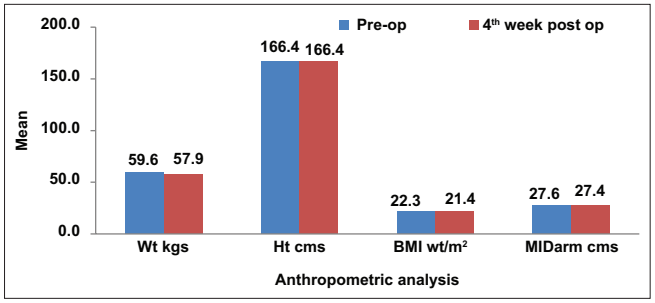


Figure 5: Comparison of mean anthropometric analysis at pre-operative and 4th week post-operative

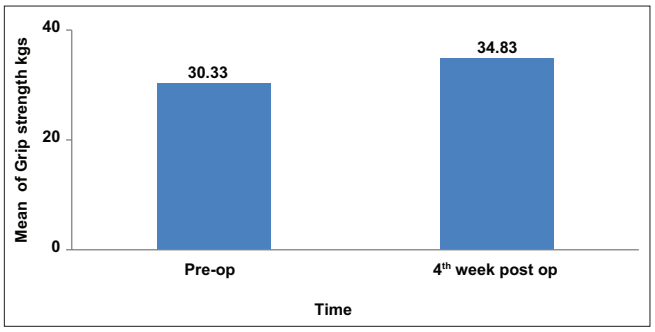


Figure 6: Comparison of mean clinical parameters at pre-operative and 4th week post-operative

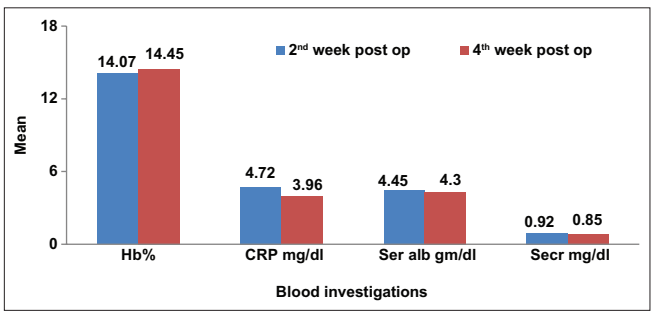


Figure 7: Comparison of mean blood investigations at 2nd and 4th week post-operative

Table 6: Comparison of mean clinical parameters at pre-operative and 4th week post-operative

Parameters		Pre-operative		4th-week post-operative		*P*-value
		Mean	SD	Mean	SD	
Clinical parameters	Grip strength kg	30.33	17.24	34.83	16.41	0.599

Table 7: Comparison of mean blood investigations at 2nd and 4th week post-operative

Parameters		2nd-week post-operative		4th-week post-operative		*P*-value
		Mean	SD	Mean	SD	
Blood investigations	Hb%	14.07	2.26	14.45	1.96	0.144
	CRP mg/dl	4.72	9.73	3.96	9.55	0.226
	Ser alb gm/dl	4.45	0.59	4.30	0.50	0.336
	Secr mg/dl	0.92	0.15	0.85	0.13	0.022*

*Statistical Significance

Table 8: Comparison of mean anthropometric analysis at 2nd and 4th week post-operative

Parameters		2nd-week post-operative		4th-week post-operative		*P*-value
		Mean	SD	Mean	SD	
Anthropometric analysis	Wt kg	57.63	9.65	57.87	9.45	0.433
	Ht cm	166.42	9.05	166.42	9.05	-
	BMI wt/m^2	21.31	3.32	21.37	3.12	0.568
	MID arm cm	27.44	2.78	27.42	2.76	0.824
	%wt loss	3.51	1.54	0.89	1.33	0.000*

* Statistical Significance

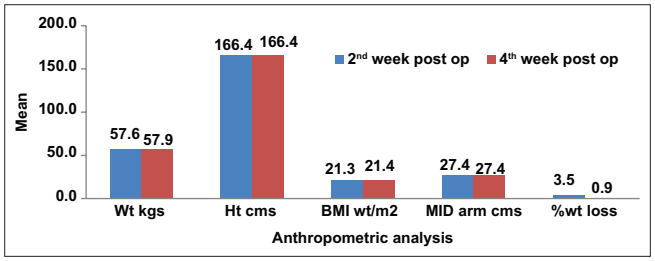


Figure 8: Comparison of mean anthropometric analysis at 2nd and 4th week post-operative

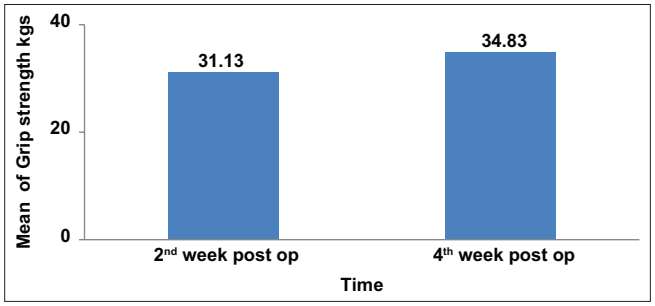


Figure 9: Comparison of mean clinical parameters at 2nd and 4th week post-operative

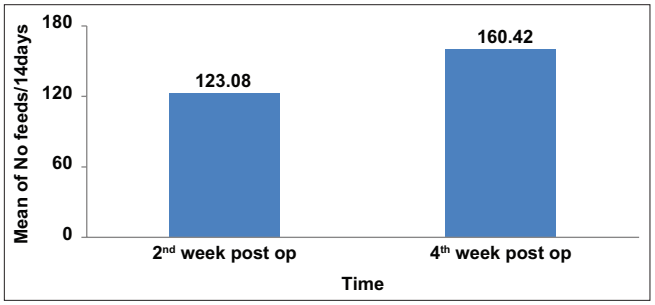


Figure 10: Comparison of mean number of feeds at the end of 2nd and 4th week post-operative

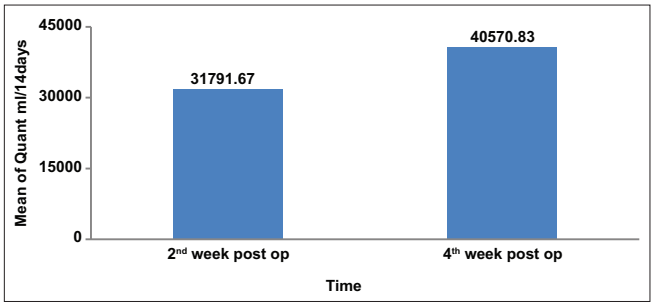


Figure 11: Comparison of mean quantity of feeds at the end of 2nd and 4th week post-operative

proteins, trace elements, glucose, lipids, organ function, and other laboratory measurements.[13] Nitrogen/creatinine blood urea levels are used to assess overall clinical and fluid volume status and must be collected if parenteral (intravenous) feeding is instituted. Iron levels should be determined in patients with unexplained anemia, as should specific vitamin levels when clinically warranted (e.g., B12/folate in macrocytic anemias, others dependent on

Table 9: Comparison of mean clinical parameters at 2nd and 4th week post-operative

Parameters		2nd-week post-operative		4th-week post-operative		*P*-value
		Mean	SD	Mean	SD	
Clinical parameters	Grip strength kg	31.13	14.62	34.83	16.41	0.019*

*Statistical Significance

Table 10: Comparison of mean number and quantity of feeds at the end of 2nd and 4th week post-operative

Parameters	2nd-week post-operative		4th-week post-operative		*P*-value
	Mean	SD	Mean	SD	
No feeds/14 days	123.08	30.05	160.42	28.60	0.000*
Quant ml/14 days	31791.67	11641.94	40570.83	14555.78	0.000*

*Statistical Significance

specific physical indications). Serum calcium, magnesium, and phosphorous levels should also be monitored regularly, especially in inadequate oral intake or diarrhea.[14] Serum albumin and lymphocyte count are regarded as "critical" characteristics because they enable rapid assessment in emergency settings.[12]

In this study, weight is measured preoperatively, 2nd and 4th week postoperatively. Due to acute pain at the fracture site and to get accustomed to a liquid diet prescribed, it would take at least a week so there might be a decrease in weight from preoperative to 2nd week postoperative values, which is similar to the study done by Kayani *et al.*[7] As a normal adult requires about 1800–2000 calories per day which are not met due to the liquid diet, there will be weight loss from preoperative to the 4th post-operative week, which is similar to studies done by Worrall,[9] Yazdani *et al.,*[6] Hirsch *et al.,*[16] Ruslin *et al.,*[17] Behbehani[10] and Vassimon *et al.*[11]

One of the anthropometric parameters is the BMI for calculating an individual's body fat percentage.[3,14] It is estimated by dividing the body weight in kilograms by the height in meters: 18.5–24.9 is considered normal. Overweight: 25–29.9, Obesity: >30 (9). In this study, BMI is measured preoperatively, 2nd and 4th week postoperatively. BMI decreased ($P > 0.05$) significantly from preoperative to 2nd postoperative week and pre-operative to 4th post-operative week. As there is a decrease in weight decrease in BMI occurs. Similar results are seen in studies done by Hirsch *et al.,*[16] Worrall,[9] Yazdani *et al.,*[18] Hammond *et al.*[19] In the present study, there is no significant decrease in BMI from the 2nd postoperative week to the 4th postoperative week.

According to the studies done by Yazdani *et al.,*[6] the patient's subcutaneous fat determines the skinfold thickness which decreases as patient's subcutaneous fat decreases due to malnutrition during treatment.[20] When a person is malnourished, the body's protein reserves are depleted first, followed by fat reserves. As a result, patients in these conditions typically lose weight due to muscle catabolism, while skinfold thickness is reduced due to the body's fat reserves being depleted. As a result, it is reasonable to believe that 4 weeks of IMF treatment can reduce skinfold thickness. In this present study, the mid-upper arm circumference was measured pre-operatively, 2 and 4 weeks later. Because of IMF, there is a significant decrease ($P > 0.05$) in mid-upper arm circumference from pre-operative to 2nd-week postoperatively. As the body uses protein and fat reserves, there is a decrease in mid-upper arm circumference which is similar to the studies done by Hirsch *et al.,*[16] and Worrall,[9] Ellis *et al.*[21] There is no statistically significant difference in mid-upper arm circumference in the pre-operative to 4th week post-operative and 2nd–4th-week postoperative values.

In this study, the percentage of weight loss was decreased between 2nd and 4th week after surgery. all the patients followed the diet chart given properly, which may be attributed to the decrease in percentage of weight loss which is similar to the study done by Kondo *et al.*[22] This study is in contrast to many studies done by Ludwig *et al.,*[23] Christensen *et al.,*[24] Kim *et al.*[25] in which there is an increase in the percentage of weight loss.

According to studies done by Bellace *et al.,*[26] Flood *et al.,*[27] Handgrip strength (HGS) is a commonly used test in clinical settings for assessing muscle function. HGS has received much interest as a nutritional status indicator. It is measured with Jamar hydraulic hand dynamometers for assessment of HGS which was used in the present study. They observed a link between muscle function and food consumption malnutrition in an undernourished state. HGS should be investigated further as a malnutrition screening and monitoring tool because it provides nutritional status information earlier than existing methodologies, similar to this study, where grip strength is measured in preoperative, at the end of 2nd and 4th week postoperatively. Grip strength values have increased from 2nd week to 4th week postoperatively which is statistically significant. In this study, due to the diet chart given to the patients during the IMF period, muscles protein stores will respond rapidly to the restored nutrition loss during the immobilization period.

Creatinine height index (CHI)[14] measures the amount of protein lost from a person's body cell mass. According to the study done by Hari *et al.,*[28] the serum creatinine levels in malnourished boys were significantly less than ordinarily nourished boys which are in coherence with the present study, where serum creatinine values in the post-operative 4th week are less than 2nd week postoperative value. The low creatinine levels in malnourished individuals were most likely due to reduced muscle mass and low creatinine production.

According to the studies conducted by Sheet *et al.*,[29] serum albumin is the most abundant plasma protein and it is needed

to maintain the osmotic pressure needed for proper fluid circulation between intravascular compartments and bodily tissues.[19] According to the studies conducted by Jessica *et al.,*[30] Bharadwaj *et al.,*[31] despite severe malnutrition, serum albumin levels remained stable until the point of starvation. In the present study, serum albumin is measured pre-operatively and at the end of the 2nd and 4th week postoperatively in which no statistically significant difference is observed.

In the studies conducted by Umed *et al.,*[32] dietary fiber consumption is inversely related to CRP levels in the blood and these values decreases in those who consumed more dietary fiber. It is an inflammatory marker found in many disorders. In this study, CRP values in the postoperative 2nd and 4th week are less compared to preoperative values which are statistically significant ($P < 0.05$). This is due to a decrease in inflammation 1 week postoperatively and the patient is on a liquid and nutritious diet in the present study during IMF.

According to the studies conducted by Laskin,[14] Hemoglobin levels may be reduced in protein and calorie malnutrition as a result of decreased globulin synthesis, which is used to identify iron deficiency anemia. In this study, there is no significant change in the 2nd and 4th-week postoperative Hb% which is similar with the studies done by Brian *et al.*[24]

In the present study, the number of feeds and quantity of feeds was recorded every 2 weeks, which was not done in any studies in the literature. There is an increase in the number and quantity of feed values in the 4th week compared to 2nd week postop values. This is because the patients were counseled and a diet chart was given, and they got accustomed to a new liquid diet after a few days of IMF.

The strength of the study includes that it is conducted throughout the period of IMF, measuring the number and quantity of feeds for every 2 weeks, which is not described in any of the previous literature and recruiting healthy participants for the study. It is a cost-effective trial where patients are given homemade feeds as part of their dietary chart. The proportion of percentage of weight loss dropped dramatically due to the dietary counseling provided to the patients. The nutritional assessment laboratory tests that were prescribed to the patients were affordable.

More research should be conducted in the future to address these issues by employing a large sample size and providing a uniform meal plan that includes calorie intake to prevent malnutrition during the IMF period.

Conclusion

In conclusion, the diet chart given to the patient to be followed during the immobilization period for the management of maxillofacial trauma has given encouraging results as there was less percentage of weight loss in anthropometric analysis, increased grip strength in clinical assessment, decreased CRP values in hematological assessment and good compliance in the number and quantity of feeds.

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1. Diet chat to be followed during the period of IMF

- Start fluids at 50 ml per hour and gradually increase to 150–200 ml 2nd hourly depending on patient's tolerance.

Diet Chart	
7 AM	High protein milk (1 tablespoon milk powder added to 200 ml of milk)
9 AM	Thin Ragi Java (Thin cooked, strained, and diluted with buttermilk)
11 AM	Milk+Banana Milkshake/Fruit Juice/Coconut Water
1 PM	Rice+Red Gram Dhal+Carrot java (Equal portions of rice and dhal cooked in 1:6 water ratio , blended and filtered
3 PM	Coconut Water/Glucose Water
5 PM	Lassi (Sweet)/Buttermilk/Dhal Water
7 PM	Rice+Dhal+Carrot Java/Clear chicken or Mutton soup
9 PM	Buttermilk
11 PM	High protein milk

Note

- All feeds should be as thin as milk consistency.
- All feeds should be filtered in a tea strainer before consumption.
- Add sugar or glucose where possible and take fruit juices with milkshakes.