

Effect of Conservative Vs Surgical Therapy on the Quality of Life of Patients with Maxillofacial Trauma: A Systematic Review

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ABSTRACT

Background: Selecting the best treatment strategy for maxillofacial trauma patients has grown challenging as a result of the continuous discussion on how different therapies affect these patients' quality of life. The purpose of this research is to methodically evaluate how conservative care and surgical care affect patients with maxillofacial trauma's quality of life. **Methods:** A systematic search was undertaken using PubMed, Cochrane Library, and Wiley Online Library to locate the most recent 20 years of research comparing the effects of various treatments on the quality of life of patients with maxillofacial injuries. We also looked through relevant researchers' references to find further studies. Articles were selected by applying a search strategy based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. **Results:** This systematic review comprised 9 comparison studies with 944 individuals in total. The findings show that patients with maxillofacial trauma had lower quality of life initially, but that after receiving therapy, their quality of life increased to varying degrees, depending on the type of treatment. **Conclusion:** The majority of research revealed that patients who received MMF or ORIF did not significantly vary in terms of quality of life; however, those who were treated conservatively reported a notable improvement when compared to those who received surgical treatment (MMF/ORIF). **Keywords:** Maxillofacial trauma, quality of life, surgical treatment, MMF, ORIF, conservative treatment.

INTRODUCTION

The occurrence of maxillofacial trauma has been rising recently due to an increase in etiologies, including drug and alcohol abuse, car crashes, and violent crimes in cities. Because patients frequently endure physical and functional problems after the trauma, this can be considered a life-changing event. To properly evaluate the patient's quality of life, it is crucial to diagnose and treat patients holistically, taking into account both their physical and psychological conditions.^{1,2}

Maxillofacial trauma has an impact on a physiological component that affects life quality. The World Health Organization defines quality of life as understanding one's place in life in relation to expectations, norms, ambitions, and anxieties, as well as in the framework of one's culture and value systems.^{1,2}

Depending on the kind and extent of the injury, there are many treatment options for maxillofacial trauma. These include of conservative treatment, miniplates for open reduction, screws, lag screws, and other hardware, and closed reduction using occlusal acrylic splints or maxillomandibular fixation. Unfortunately, quality of life evaluations for individuals who have experienced maxillofacial trauma are rarely carried out by professional practices. Because of this, clinical normative signs are the only criteria used to determine if reduction and fixation treatment is effective for these injuries. Moreover, there are few reliable research and data about the quality of life that people with craniofacial injuries suffer.

The aims of this study is to compare the studies between closed reduction/conservative treatment and open reduction for treatment of maxillofacial

trauma, focusing on the quality life of patient on its post-treatment phase.

MATERIALS AND METHODS

The study used PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) to assess the information of each article.

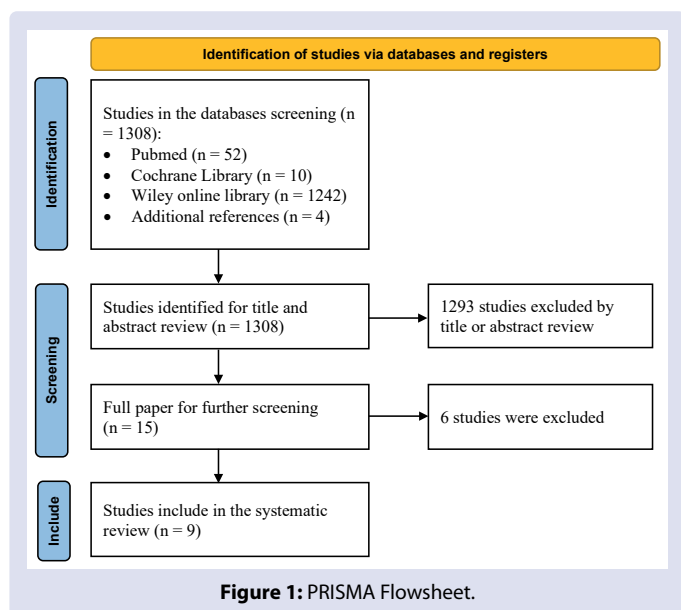
Literature search

We searched the latest 20 years studies using PubMed, the Cochrane Library, and Wiley Online Library database. The search terms were: (Facial trauma OR facial fracture OR maxillofacial fracture OR maxillofacial trauma OR mandibular fracture OR mandibular trauma OR orofacial injury) AND (Open reduction OR Miniplate OR screw devices OR Titanium plate OR Resorbable plate OR internal fixation OR ORIF OR osteosynthesis) AND (Conservative OR closed reduction OR immobilization OR Arch bar OR Close observation OR non-invasive treatment OR IMF OR MMF) AND (quality of life OR psychosocial wellbeing OR anxiety OR depression). To identify additional studies, we also searched references of relevant researches.

Eligibility Criteria

The following inclusion criteria applied to the final selection of studies: (1) English language article; (2) original comparative study; (3) evaluating the quality of life of the patient following the occurrence of maxillofacial trauma and contrasting open reduction of maxillofacial trauma with closed reduction or conservative therapy after treatment. Meanwhile, the following exclusion criteria: (1) article review, descriptive studies, preliminary studies, or poster; (2) pediatrics or animal studies; (3) studies utilizing non-validated questionnaire.

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Data extraction

The initial search yielded 1308 studies, but only 9 studies included in the final analysis based on eligibility criteria. The flowchart of the study is shown in Figure 1. Systematically, data regarding the design of the study, size of sample, length, frequency of findings, kinds of treatments administered, kind of injury received, and changes in quality of life were retrieved.

RESULTS

We identified 1308 studies from the keyword hits, after screening and eligibility assessment of those study 1299 studies were excluded for various reason, we found 9 potentially relevant studies with the purpose of this systematic review from 7 countries include California, UK, Australia, Nigeria, Mississippi, and Brazil. Out of 9 potentially relevant studies, 3 studies were prospective RCT, 4 study was Cohort prospective, 1 study was cross sectional, and 1 study was cohort retrospective study. Out of 944 participants included in this systematic review, participants undergo closed reduction are 478 participants, open reduction are 397 participants, and conservative treatment are 69 participants (Table 1).

In the nine publications that were examined, data were gathered using a total of six validated questionnaires. The employed questionnaires can be categorized based on the particular quality of life evaluated: OHIP-14, GOHAI, and 10 cm VAS are the questionnaires specific to dentistry or oral function that have been used in research; HADS is the questionnaire for anxiety and depression; MHI-5 is the questionnaire for psychiatry; and WHOQOL-BREF is the questionnaire for general health (Table 2).

The General dental Health Assessment Index (GOHAI) comprises three elements, namely pain, psychological factors, and physical aspects of the patient's dental health. GOHAI comprises three elements, namely pain, psychological factors, and physical aspects of the patient's dental health. The evaluation of eating, speaking, and swallowing functions falls under the physical domain. The psychosocial domain looks at anxiety, self-consciousness about one's dental health, worry about appearance, unhappiness with appearance, and avoidance of social situations. Oral pain management with medications is evaluated in the "pain" area. The 12-item survey has a score range of 12 to 60. Therefore, improved oral health is indicated by a higher GOHAI score.⁴

There are four studies that compare patients with maxillofacial injuries treated conservatively, with open reduction and internal fixation (ORIF), with maxilla-mandibular fixation (MMF) using GOHAI. In all four investigations, there were no statistically significant differences in GOHAI ratings between the ORIF and closed reduction/MMF groups at any time during the analysis of variance using repeated measures.⁴⁻⁶ The study conducted by Omeje et al. revealed that there were no noteworthy distinctions between the MMF and ORIF groups during any of the review dates. However, individuals who got closed reduction/MMF therapy had much less noticeable teeth, gums, and jaws at 8 weeks postoperatively ($p=0.04$).⁴ Patients treated with MMF exhibited significantly higher levels of discomfort in the psychosocial, physical, and pain dimensions as compared to patients treated with ORIF; the latter group, on the other hand, demonstrated a perceptible improvement in all three categories.

However, Atchison et al. revealed that the MMF group (29.67) has the higher intercept than ORIF group (25.38). Implicitly, individuals with MMF have a less problem after intra-arch wire insertion than ORIF patient. Meanwhile, the GOHAI score development over time for the ORIF group was noticeably higher than the MMF group. Consequently, even though each treatment arm's GOHAI ratings differed prior to discharge, they remained comparable after six months.⁷ OHIP looks at functional patterns from many angles. These dimensions include, for example, functional restrictions (difficulty chewing), pain (tooth sensitivity), psychological discomfort (embarrassment), physical disabilities (dietary changes), psychological disabilities (decreased concentration), social disabilities (avoid the contact with the other), and incapacitation (unproductive life).²

Two investigations made use of the OHIP-14 survey. Patients receiving conservative and surgical treatment were compared by Conforte et al.² When comparing the quality of life of the surgical group at T1 (immediately after trauma diagnosis), T2 (30 days after surgery or trauma), and T3 (90 days after surgery or trauma), there was no statistically significant change in instances with zygomatic, Le Fort I, or nasal fractures. On the other hand, there was a statistically significant difference in the quality of life for multiple facial fractures ($P=0.0097$) and mandibular fractures ($P=0.0102$) at time three (T3) between the observation periods. The conservative treatment group's quality of life was significantly higher during each of the three periods of observation when compared to the other group. Another study utilized OHIP-14 is study by Magalhaes et al. that showed a improvement in the post-treatment period of sample, but no difference between treated group.⁸

A 10-cm visual analog scale (VAS) questionnaire was utilized in two investigations to rate the postoperative patient-centered outcomes. These included subjective occlusal and bite alterations, pain from the MMF screws, and quality of life. A study by West et al. demonstrated that, when measured by the capacity to perform daily tasks including speaking, chewing, and swallowing, self-reported QOL was generally good.⁹ The value of 2.2 was the average score (0 being excellent function, 10 being bad function). MMF group showed a statistically significant decline in QOL ($P < .001$) beside oof ORIF group. The scores were 5.1 and 0.3, respectively. However, when it came to the subjective disfigurement (10 cm VAS) assessments, a study by Islam et al. found no difference between the groups (ORIF vs. non-surgical group) with statistics data.¹⁰

Additionally, Islam et al. (2012) used the Hospital Anxiety and sadness Scale (HADS) to document each patient's symptoms of sadness and anxiety. A well-researched 14-item psychometric screening instrument including subscales for depression and anxiety is called 10 HADS. The primary symptom of depression, according to theory, is anhedonia, which is the emphasis of the HADS-D subscale. On the other hand, the HADS-A subscale primarily measures negative affectivity and

Table 1: Framework and PICO Analysis.

Title	Effect of Conservative vs Surgical Therapy on the Quality of Life of Patients with Maxillofacial Trauma: A Systematic Review
Population	Adult patient with maxillofacial trauma
Intervention	Surgical Therapy (ORIF/MMF)
Comparison	Conservative (observation only)
Outcomes	Quality of life
Keywords	(Facial trauma OR facial fracture OR maxillofacial fracture OR maxillofacial trauma OR mandibular fracture OR mandibular trauma OR orofacial injury) AND (Open reduction OR Miniplate OR screw devices OR Titanium plate OR Resorbable plate OR internal fixation OR ORIF OR osteosynthesis) AND (Conservative OR closed reduction OR immobilization OR Arch bar OR Close observation OR non-invasive treatment OR IMF OR MMF) AND (quality of life OR psychosocial wellbeing OR anxiety OR depression)
Inclusion Criteria	<ul style="list-style-type: none"> Original comparative study Evaluating the quality of life of patients following maxillofacial trauma and contrasting closed reduction/conservative treatment with open reduction of maxillofacial trauma after treatment. Language limited to English
Exclusion criteria	<ul style="list-style-type: none"> Posters, descriptive studies, preliminary investigations, and article reviews Pediatric or animal studies Studies utilizing non-validated questionnaire
Databases searched	PubMed, the Cochrane Library, Wiley Online Library, among references

Table 2: Characteristic of Included Studies.

Studies	Location	Study Method	Number of Data Collection Times	Questionnaire utilized	Type of treatment done	Type of injury sustained	Participants (n)		
							Closed reduction	Open reduction	Non-surgical treatment
Atchison et al. (2006) ⁷	California	Prospective Cohort	4	GOHAI MHI-5	MMF vs ORIF group	Mandible fractures	207	129	-
Shetty et al (2008) ⁵	California	Prospective RCT	5	GOHAI	MMF vs ORIF group	Mandible fractures	93	49	-
Islam et al. (2012) ¹⁰	UK Australia	Cross Sectional	1	HADS 10 cm VAS	Non-surgical vs ORIF group	Mandible fracture, Zygomatic complex fracture, Maxillary fracture, Orbital complex fracture, Facial soft tissue injury	-	71	31
Omeje et al. (2014) ⁶	Nigeria	Prospective RCT	4	GOHAI	MMF vs ORIF group	Mandible fractures	28	28	-
West et al. (2014) ⁹	Mississippi	Prospective RCT	2	10 cm VAS	MMF vs ORIF group	Mandible fractures	9	11	-
Omeje et al. (2015) ⁴	Nigeria	Prospective Cohort	4	GOHAI	MMF vs ORIF vs non-surgical group	Mandible fractures	100	43	5
Conforte et al. (2016) ²	Brazil	Prospective Cohort	3	OHIP-14	Non-surgical vs ORIF group	Mandible fracture, Zygomatic complex fracture, Nasal bone fractures, Le Fort type 1 fracture, Multiple fractures Of the facial bone	-	33	33
Magalhaes et al. (2018) ⁸	Brazil	Retrospective Cohort	2	OHIP-14	MMF vs ORIF group	Condylar fracture	12	12	-
Somoye et al. (2021) ³	Nigeria	Prospective Cohort	3	WHOQOL-BREF	MMF vs ORIF group	Mandibular fracture, Le Fort fractures, Zygomatic complex fracture, Naso-orbito-ethmoidal fractures, Multiple fractures of the facial bone	29	21	-
Total							478	397	69
								944	

GOHAI= General Oral Health Assessment Index, MHI-5= Mental Health Inventory, MMF= maxillomandibular fixation, ORIF= Open-reduction and rigid internal fixation, HADS= Hospital Anxiety and Depression Scale, VAS= visual analog scale, OHIP-14= Oral Health Impact Profile-14, WHOQOL-BREF= World Health Organization Quality of Life BREF

autonomic arousal, two characteristics of generalized anxiety. According to this study, the patients in the operatively managed group had median anxiety subscale scores that higher than patients in conservatively managed group.

The Mental Health Inventory was used in one study to assess emotional well-being. Five distinct emotions are covered in the five-item MHI questionnaire: joyous, blue, calm, anxious, and depressed. According to Atchison et al., six important predictors of the MHI-5 were identified

Table 3: Classification of Quality-of-Life Questionnaire.

Type of quality of life	Questionnaire
dental or oral function specific	<ul style="list-style-type: none"> Oral Health Impact Profile-14 (OHIP-14), General Oral Health Assessment Index (GOHAI) 10 cm visual analog scale (10 cm VAS);
anxiety and depression	<ul style="list-style-type: none"> Hospital Anxiety and Depression Scale (HADS)
Psychiatric	<ul style="list-style-type: none"> Mental Health Inventory (MHI-5)
general health	<ul style="list-style-type: none"> World Health Organisation Quality of Life Instruments (WHOQOL-BREF)

in the 10-day follow-up data: fracture number, age, gender, pain level, therapy, and GOHAI.⁷ The older age group's mental health scores were higher than the younger age group's ($P=0.0074$). Higher mental health ratings were found in males ($P=0.0069$) and ORIF patients ($P=0.0007$). There was a significant connection ($P=0.0288$) between better mental health self-assessments and fewer fractures as well as higher GOHAI scores at 10 days following discharge.⁷

Last, study by Somoye et al. used World Health Organization Quality of Life BREF (WHOQOL-BREF) questionnaire to assessing of the general health.³ This brief assessment instrument is a general tool intended for use in a variety of mental and physical health conditions. It employs a five-point Likert-type answer scale with 26 items. According to this study, patients who received ORIF had better life scores than people with closed reduction six weeks following treatment, across all WHOQOL-BREF domains. Twelve weeks after treatment, those who had closed reduction and those who got ORIF had the same quality of life (Table 3).

DISCUSSION

Overall, the research demonstrated that maxillofacial trauma has a deleterious effect on quality of life, associated with increased incidence of social and psychological issues.^{3,7,8,10} However, the kind of treatment received determines how different the effects of maxillofacial trauma are on quality of life. Unfortunately, clinical practice does not routinely examine the life of craniofacial trauma patient.³ In order to treat maxillofacial trauma, our systematic review attempted to determine the most effective method among closed reduction (MMF), conservative treatment (Observation only), and open reduction (ORIF), with a particular emphasis on the patient life.

Currently, there is no validation of disease-specific questionnaire available for people with craniofacial trauma. As a result, questions about anxiety, depression, overall quality of life, and oral and dental health are found on most surveys. Several studies evaluating the effects of various therapy for maxillofacial injuries employ quality of life questionnaires specialized to dental health.^{2,4-10} After therapy, the quality life ratings gradually increased from pre-trauma values. A similar pattern is found in studies that use questionnaires relating to psychiatry, anxiety, depression, and general health.^{3,7,10}

Most studies examining closed versus open reduction therapy for craniofacial trauma did not find any appreciable difference in the quality of life between those receiving ORIF or MMF.^{3,5,6,8} Individuals with MMF and ORIF had similar overall quality of life; this might be because both groups do not move interfragmentarily, which can result in non-union, mal-union, infection, and lower quality of life. ORIF restricts interfragmentary motion during function, whereas closed reduction eliminates the mandible's ability to masticate and move interfragmentally. This lack of variation may also be explained by the fact that both groups' patients followed their post-operative instructions, which produced better results.³

Different findings by Atchison et al. (2006) show that compared to patients with ORIF, individuals with MMF has a fewer problems during the initial days following intra-arch wire implantation.⁷ This could be

because patients receiving closed reduction therapy had less severe injuries than those receiving open reduction and internal fixation, who have significant craniofacial trauma requiring more involved medical care.

West et al. discovered that the MMF group has a different with ORIF group ($P < .001$).⁹ Additionally, patients who had ORIF had a greater quality of life six weeks after treatment than those who got closed reduction, according to a research by Somoye et al.³ The results of closed reduction treatment, which might limit dietary alternatives and result in weight loss, poor dental hygiene, a decrease in social interaction, and absence from work, could account for the psychological and social effects of this discovery. However, following therapy, ORIF participants experienced fewer limitations on their everyday activities. Nevertheless, following a 12-week course of therapy, this study similarly found no differences between ORIF and MMF patients.³ This implies that quality of life is also determined by the duration of follow-up after treatment.

Omeje et al. note that although patients treated with MMF scored higher in these areas, those treated with ORIF reported considerably increased discomfort in the psychosocial, physical, and pain aspects.⁴ Conversely, individuals who underwent conservative care (observation only) saw a significant improvement in all categories when compared to surgical treatment (ORIF/MMF).^{2,4} Additionally, compared to the operatively managed group, the conservatively managed patients had considerably lower median anxiety subscale ratings, according to a research by Islam et al. This shows that among individuals who have had facial injuries, there may be a clinically meaningful relationship between the existence of anxiety disorders and surgical intervention.¹⁰ The fact that the fractures were straightforward, undisplaced fractures that were treated conservatively may account for this notable discrepancy. Additionally, these patients were spared the extra strain of a procedure. It should be mentioned that the conservative group's fractures were less severe than those in the surgical group.^{2,4} Atchison et al. provided an example of this when they found that smaller displacement fractures ($P=0.0168$) shows the association within MHI-5 scores and fewer fractures with high self-assessment.⁷

It is challenging to compare the results of articles that employ similar questions because, aside from the use of different questionnaires, which causes issues with analysis, follow-up times vary. Furthermore, there is inconsistency in the analysis, interpretation, and patient care provided. It is important to note the wide variety of the articles that were reviewed. There are notable variations in the kind of trauma, type of fracture, extent of injury, rehabilitation regimen, and length of follow-up because all the studies has used different inclusion criteria.

CONCLUSIONS

Maxillofacial trauma survivors have a higher propensity to have a lower quality of life following their trauma, albeit for most, this improves with time and therapy. Regarding the various options for treating maxillofacial trauma, the majority of research revealed that patients who received MMF or ORIF did not significantly differ in terms of quality of life; however, patients who were treated conservatively reported a notable improvement when compared to those who received surgical treatment (MMF/ORIF).

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CONFLICTS OF INTEREST

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ETHICS STATEMENT

All author act with integrity, responsibility involved in substantive work leading to the manuscript and declare that the article has not been published in part elsewhere.

INFORMED CONSENT

None.

DATA AVAILABILITY

All supporting data in this paper are included in the published article and its supplementary files.

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