IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 24, Issue 6 Ser.5 (June 2025), PP 51-56
www.iosrjournals.org

Quality of life following surgical management of Mandibular Fracture -A Comprehensive Review

Ajay Kumar Pillai[1], Shaji Thomas[2], Neha Jain[3], Shivangini Nayak[4], Dheeraj Sharma [5], Abdul Rajjak khandakar [6]

1. *Prof & HOD, Dept of OMFS, Peoples Dental Academy.Peoples University Bhopal*
2. *Prof & HOD, Dept of OMFS, Peoples college of Dental sciences & Research Centre*
3. *Professor, Dept of OMFS, Peoples Dental Academy. Peoples University Bhopal*
4. *Sr Lecturer, , Dept of OMFS, Peoples Dental Academy. Peoples University Bhopal*
5. *Resident , Dept of OMFS, Peoples Dental Academy. Peoples University Bhopal*
6. *Resident , Dept of OMFS, Peoples Dental Academy. Peoples University Bhopal*

Abstract-
Mandibular fractures are among the most common maxillofacial injuries, attributing to road traffic accidents, assaults, or falls. While surgical advancements have improved functional and aesthetic outcomes, the impact of such trauma and its long-term effect on patients' quality of life (QoL) remains comparatively unexplored. This review aims to summarise the parameters that determine the post-operative quality of life in patients who underwent surgical treatment for mandibular fractures, considering functional recovery, nerve integrity, and psychological well-being.

Keywords- *Mandibular Fracture, Mandibular fracture treatment, Open reduction and internal fixation, Quality of life.*

Date of Submission: 06-06-2025 Date of Acceptance: 16-06-2025

I. Introduction

Trauma to the Maxillofacial bones ,might be one of the most distressing event one could have the misfortune of enduring .Out of the numerous bones which make up the craniofacial unit, mandible is one of the common bone to be involved likely because of its prominent placement on the face. Although modern science has revolutionised treatment of facial fractures, be it functional or aestheticone cannot simply overlook the life long impact it can have on the patient. The life long influence could invite itself in the form of physiological distress resulting fromderanged occlusion, Temporomandibular disorders (TMDs) or neurological deficit to name a fewand psychological anguish ranging from self-image issues, post-traumatic stress disorder (PTSD) or depression. All this adding to theexisting list of endless woes of a modern man, especially in a bustling country as India where an average citizen in living a fast-paced life in a city, driving faster vehicles, making road traffic accidents (RTA) one of the leading cause of facial fractures, followed by fall ,assaults and sports injury [1] . Out of all the maxillofacial bones mandible (47.2%) seems to be commonly affected. Men (89%) rangingfrom 20-40 years of age are most common victims of facial fractures[1]. Several treatmentsexist to treat and rehabilitate the patients to their pre-incidental form and function. Fracture segments are reduced with either close and open reduction methods. Each of these treatment modalities comes with its own pros and cons.This article aims at reviewing the quality of life of these patients following the surgery and what parameters maxillofacial surgeons all around the world are using to assess the same.

Method of data collection

Articles were searched through Pubmed database and google scholar with keywords and Boolean operators like "Mandibular Fracture treatment" AND "Quality of life". The relevant articles where then shortlisted to be included in this review. The parameters used by the surgeons in different studies were analysed and compared with each other to draw conclusion.

Prevalence, Demographic, Aetiology, and anatomical site of Mandibular Fractures-

Singaram M et alconducted a retrospective study to assess the prevalence of maxillofacial trauma in a developing nation, they found that the leading cause of maxillofacial injuries was road traffic accidents (RTAs) (73.8%), with falls (18%) and assaults (6.7%) being less frequent, and sports-related injuries (1.5%) being relatively rare. Among RTAs, motorized two-wheelers (MTWs) (90.9%) were the primary mode of injury [2].

Most individuals affected were young adult males in the 20 to 40-year age group [1,2].Aetiology and prevalence differ from region to region like for instance, In the United States, most adult mandibular fractures are attributed to interpersonal violence, particularly among men aged 18 to 24 years. Likewise, men are four times more likely to experience mandibular fractures, with nearly half resulting from assaults. Whereas, women are more likely to sustain mandibular fractures due to motor vehicle accidents (MVAs) and falls. Approximately 25% of mandibular fractures in women are linked to falls; often reported cause and fracture site may not align with accidental trauma, in such cases possibility of domestic violence is suspected.[3].Conversely, similar study in central India reveals that Mandibular fractures were most frequently observed in individuals aged 21 to 30 years, accounting for 37.5% of cases. Road traffic accidents (RTAs) were the leading cause, responsible for 68.8% of the injuries, followed by falls at 16.8% and assaults at 11%.[4]

Mandibular fractures have been classified based on several metrics. One of the widely used criteria is based on the anatomic site of the fracture line.Various researchers over the years have analysed the distribution of fracture lines across different anatomical regions of the mandible, some of them have been summarised below (Table 1). It is to be noted that there is no uniformity in the frequency of one site being affected more that than the other. However, fracture of symphysis and para-symphysis seem frequent and fracture of coronoid process seems to be the rarest. [1,4,5,6,7]

Author &Year	Frequency	Symphysis	Para symphysis	Body	Angle	Ramus	Condyle	Coronoid	Dento-alveolar	Multiple site/Unspecified
S Kanala et al (2021) [1]	660	108 (17%)	188 (28%)	103 (16%)	113 (17%)	11 (2%)	133 (20%)	4 (1%)	-	NA
Barde, et al (2014) [[4]	751	159 (21.1%)	480 (63.9%)	134 (17.8%)	258 (49.5%)	84 (11.1%)	270 (35.9%)	12 (0.01%)	98 (0.13%)	NA
Kaukola et al. (2015) [5]	45	-	-	2(4.4%)	16 (35.6%)	-	-	-	-	27 (60%)
Morris C et al (2015) [6]	4143	882 (21.3%)	-	696 (16.8%)	1120 (27%)	225 (5.4%)	761 (18.4%)	42(1%)	122 (2.9%)	295 (7.1%)
Demir U et al 2025 [7]	171	79(46.2%)		23 (13.5%)	10 (5.8%)	20 (11.7%)	32 (18.7%)	4 (2.3%)	3 (1.8%)	NA

Table 1 – Distribution of mandibular fracture based on anatomical site

Treatment-

At present, both non-surgical (Figure 1) and surgical approaches (Figure 2(a), 2(b)) are recommended for managing mandibular fractures. In one study, 16 condylar fractures were treated conservatively. These cases involved minimal or no displacement and maintained stable occlusion, with only minor occlusal changes. While some occlusal alterations were noted post-treatment, they did not impair the function of the temporomandibular joint (TMJ) With appropriate case selection conservative treatment enables effective patient recovery, minimizes surgical-related complications, and lowers overall treatment expenses [8]. Open reduction and internal fixation (ORIF) is typically indicated for most fractures of the symphysis and Para symphysis, as well as displaced fractures of the mandibular body and angle, and specific cases of condylar fractures [9].

Figure 1 Close Reduction using Erich archbar and MMF

Figure 2 (a) Fracture site exposure

Fig 2 (b) Open reduction and fixation

Assessing post-operative quality of life-

1. Close vs Open reduction-

A cross-sectional study divided the patients in 2 groups one group wherein patients were treated with MMF only and the other group underwent ORIF. The patientstook General Oral Health Assessment Index questionnaire (GOHAI) to determinethe quality of life post operatively.At 8 weeks post-operatively, patients who underwent ORIF recordeda significantly greater scorein paincompared to psychosocial or physical distress. Although, the study did not find any statistical difference in QoL between patients of ORIF and MMF group [10], which differs from the results in the study conducted by Naik Ket al which showed significantly lower overall pain scores, reduced masticatory pain and headaches at 2 weeks post op for patients who underwent ORIF. Furthermore, improved range of motion was evident at 3 months post op, additionally patients experienced less treatment-related weight loss and Enhanced ease in performing physical and work-related activities [11].

Anotherstudy by Conforte JJ et al utilised OHIP (Oral Health Impact Profile) questionnaire to assess the impact on quality of life following thesurgery of facial fractures.Patients with mandibular and multiple facial fractures showed significant improvement in quality of life at 90 days post-surgery [12]. This outcome agrees with a similar study by Anggayanti NA and colleagues which reveal that OHIP scores were higher before surgical intervention compared to within 14 days' time mark post op and reduced further at 60th day on follow up. Furthermore, the scores were higher in psychological discomfort domain in the younger population (17-30 yrs) and the score in physical disability domains were higher for the 31-50 years age group[13].Patients undergoing Conservative treatment reported a better quality of life at every time points, likely due to less severe fractures and as for patients who underwent surgical treatment the initial few days were more distressing because of hospital admission, the psychological stress of undergoing surgery and immediate post operative discomfort in regards to swelling , pain dietary restrictions but this group of patients showed substantial long-term improvement in terms of form and functionality [12].

Apriza E et al conducted a study on patients with mandibular fracture who were treated with ORIF usingminiplates. The post operative assessment was carried out utilising mandibular mobility index (MMI) consisting of mouth opening assessment, left and right lateral mandibular excursion, and mandibular protrusive movement and GOHAI. The study revealed that individuals with single fracture had lower MMI and GOHAI score when compared to individuals with multiple fractures in the mandible, likely due to greater morbidity, pain and psychosocial consequences associated with the later group also to be noted that the younger individuals with single fracture showed to have better QoL [14].

Boljevic T et al conducted a study on patients with mandibular fracture who were treated with ORIF. Post- op QoL was assessed with UW-QOL (The University of Washington Quality of Life questionnaire)which entails questions related Pain, Appearance, Activity, Recreation, Swallowing, Speech, Taste, Saliva ,Mood and Anxiety. It was noted that patients who had shown complications following treatment(malocclusion, reduced mouth opening, mal union, non-union) had higher scores compared to the paitents who had an uneventful post op phase indicative of poor QoL [15].

2. Nerve Function-

The inferior alveolar nerve (IAN) and mental nerve, branches of the mandibular division of the trigeminal nerve, runs through the mandible inside the inferior alveolar canal and thus is prone to injury from mandibular trauma or during surgical handling of the nerve. Injuries can result from compression, stretching, or transection by bone fragments. Figure 3 shows mental nerve being isolated to prevent it from damage during ORIF. Damage to the IAN can lead to neurosensory disturbances, manifesting as altered or diminished sensation

around the chin, lower lip, and gums around the mandibular teeth. Patients complain of discomfort, numbness, or tingling sensations following mandibular fractures or following ORIF. These sensory impairments can significantly impact daily activities and overall quality of life [16]. Daily activities such as speaking, eating, shaving, applying makeup, tooth brushing, and drinking are affected, contributing to psychological issues like anxiety and depression[17]. Paitentsare mostly evaluated objectively by clinical neuro-sensory testing (CNST)and subjectively with the help of questionairesand visual analogue scale (VAS) scoring system [16].
The findings of the study conducted by Schenkel JS et al revealed that 27% of patients experienced hypoesthesia prior to surgery due to trauma itself, while 46% developed hypoesthesia postoperatively, likely due to intraoperative handling of the nerve and post operative oedema. The patients who reported preoperative hypoesthesia continued to exhibit symptoms even after surgery. Complete recovery was observed in 70% of cases, partial recovery in 20%, and less than 10% experiencing permanent nerve damage after 12 months.Elderly patients, presence of preoperative hypoesthesia, and communited fractures near the inferior alveolar nerve (IAN) wereall linked to poorrecovery rates[18]. Chandan S N and colleagues also studied inferior alveolar nerve dysfunction using clinical neurosensory testings. Pre op nerve dysfunction was 56.3% and post op was at 57% immediately following surgery and its reduced significantly and stood at 23.9% at 6 month followup[19]. They also assessed the quality of life (QoL) in patients experiencing long-term inferior alveolar nerve dysfunction (IAND) following mandibular fractures. Using the Oral Impacts on Daily Performances (OIDP) questionnaire. Activities like speaking clearly (98.1%) and eating food (96.2%) were affected more severely. Relaxing and performing major work were the least affected, and was reported by only 9.6% of patients.The study also showed younger patients had greater difficulties with smiling, social interactions and showed overall impact on their emotional wellbeing ascompared to older individuals.Patients also faced notable challenges in performing daily activities like cleaning teeth, engaging in light physical activity, going out, sleeping, and relaxing [20].

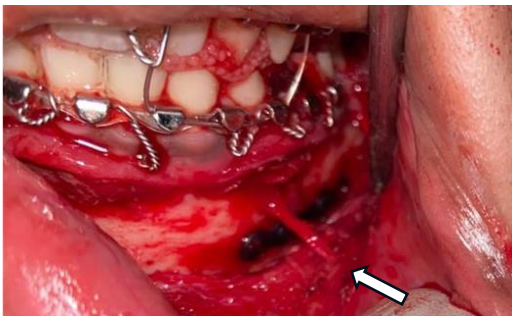

Figure 3 Mental nerve (marked with white arrow)

3 Psychological aspect-

Facial trauma often results in disfigurement, leading to significant psychological distress, including depression and anxiety, which can slow down the healing process. Visible facial scars can affect self-esteem and social interactions. Recovery from such trauma has to be addressed in a holisticmanner , including timely medical intervention, community support, personal resilience, and emotional well-being. Surgical intervention must be backed up with psychological support to enhance overall quality of life [21].

Kishore J et al assessed psychological outcomes in maxillofacial trauma patients using the Hospital Anxiety and Depression Scale (HADS) and the Trauma Screening Questionnaire (TSQ). The study found that 84% of patients exhibited psychological stress at baseline, which decreased to 24% after one month and further to 22% at six months [21]. Another study by Nayak SS et al utilised IES-R for initial screening at 1–3 months post-trauma and CAPS-5 (Clinician-Administered PTSD Scale - DSM-5) for definitive PTSD diagnosis It was reported that patients with visible facial scars and Avulsed/luxated anterior teeth were at significantly higher risk for developing PTSD [22]. Gironda et al studied the predictors of depressive behaviour inpatients with mandibular fracture post-surgery, using a shortened CES-D scale at 1-month post-surgery. Social support and Pre-existing dental problems were also taken into consideration. It was reported that 21% of participants presented with depressive symptoms at 1-month follow-up. Symptoms were significantly elevatedduring immediate post op period and strongly linked to post op pain and compromised oral function [23].

Psychological aspect due to facial injury and laceration

II. Conclusion

Mandibular fractures can have disastrous consequences, not only on a physical level but as well on the patient's psyche. Even when treatment is provided in due time, the process of hospitalisation, surgical exposure can leave a lifelong impact on the patients. The site, cause, andseverity of fracture as well as the timing of definitive treatment and the type of treatment decided by the surgeon all dictates the patient's recovery from the unforeseen event. The surgical outcome is often considered as an objective metric when the success of treatment is concerned. The post operative life of the patientonce he/she is discharged from the hospital and rejoins the society is often not taken into regard. Hence, its paramount for the surgical team to make decisions taking into consideration, patientsage, socioeconomicstanding,and his/her emotional well-being to provide with the best of results.

References

[1]. Kanala S, Gudipalli S, Perumalla P, Jagalanki K, Polamarasetty PV, Guntaka S, Gudala A, Boyapati RP. Aetiology, prevalence, fracture site and management of maxillofacial trauma. The Annals of The Royal College of Surgeons of England. 2021 Jan;103(1):18-22.

[2]. Singaram M, Udhayakumar RK. Prevalence, pattern, etiology, and management of maxillofacial trauma in a developing country: a retrospective study. Journal of the Korean Association of Oral and Maxillofacial Surgeons. 2016 Aug 1;42(4):174-81.

[3]. Pickrell BB, Serebrakian AT, Maricevich RS. Mandible fractures. InSeminars in plastic surgery 2017 May (Vol. 31, No. 02, pp. 100-107). Thieme Medical Publishers.

[4]. Barde D, Mudhol A, Madan R. Prevalence and pattern of mandibular fracture in Central India. National journal of maxillofacial surgery. 2014 Jul 1;5(2):153-6.

[5]. Kaukola L, Snäll J, Lindqvist C, Roine R, Sintonen H, Törnwall J, Thorén H. Health-related quality of life after surgical treatment of mandibular fracture. Oral surgery, oral medicine, oral pathology and oral radiology. 2015 Apr 1;119(4):402-7.

[6]. Morris C, Bebeau NP, Brockhoff H, Tandon R, Tiwana P. Mandibular fractures: an analysis of the epidemiology and patterns of injury in 4,143 fractures. Journal of Oral and Maxillofacial Surgery. 2015 May 1;73(5):951-e1.

[7]. Demir U, Asirdizer M, Bingül MB. An evaluation of the demographic features and causes of mandible fractures and the relationships with the side, type, and anatomic location. Medicine. 2025 Mar 28;104(13):e41950.

[8]. Munante-Cardenas JL, Nunes PH, Passeri LA. Etiology, treatment, and complications of mandibular fractures. Journal of Craniofacial Surgery. 2015 May 1;26(3):611-5.

[9]. Stacey DH, Doyle JF, Mount DL, Snyder MC, Gutowski KA. Management of mandible fractures. Plastic and reconstructive surgery. 2006 Mar 1;117(3):48e-60e.

[10]. Omeje KU, Rana M, Adebola AR, Efunkoya AA, Olasoji HO, Purcz N, Gellrich NC, Rana M. Quality of life in treatment of mandibular fractures using closed reduction and maxillomandibular fixation in comparison with open reduction and internal fixation–A randomized prospective study. Journal of Cranio-Maxillofacial Surgery. 2014 Dec 1;42(8):1821-6.

[11]. Naik K, Lee KC, Torroni A. Does open reduction and internal fixation provide a quality-of-life benefit over traditional closed reduction of mandibular condyle fractures?. Journal of Oral and Maxillofacial Surgery. 2020 Nov 1;78(11):2018-26.

[12]. Conforte JJ, Alves CP, Ponzoni D. Impact of trauma and surgical treatment on the quality of life of patients with facial fractures. International journal of oral and maxillofacial surgery. 2016 May 1;45(5):575-81.

[13]. Anggayanti NA, Sjamsudin E, Maulina T, Iskandarsyah A. The quality of life in the treatment of maxillofacial fractures using open reduction: A prospective study. Age. 2020;2:13-33.

[14]. Apriza E, Rahardjo R, Hasan CY. Quality of life patients after treatment of mandibular fractures with ORIF in oral surgery departement of Dr. Sardjito general hospital. Majalah Kedokteran Gigi Indonesia. 2020;6(1):16-24.

[15]. Boljevic T, Vukcevic B, Pesic Z, Boljevic A. The quality of life of patients with surgically treated mandibular fractures and the relationship of the posttraumatic pain and trismus with the postoperative complications: A prospective study. Medicina. 2019 Apr 17;55(4):109.

[16]. Sulistyani L, Julia V, Noviantika D, Irfan I, Muskab M, Kawisana P. Evaluation of neuro-sensory disturbances of the inferior alveolar nerve after ORIF procedure in mandibular fracture: a systematic review. Journal of Stomatology. 2022 Mar 1;75(2):130-7.

[17]. Patel N, Ali S, Yates JM. Quality of life following injury to the inferior dental or lingual nerve–a cross-sectional mixed-methods study. Oral Surgery. 2018 Feb;11(1):9-16.

[18]. Schenkel JS, Jacobsen C, Rostetter C, Grätz KW, Rücker M, Gander T. Inferior alveolar nerve function after open reduction and internal fixation of mandibular fractures. Journal of Cranio-Maxillofacial Surgery. 2016 Jun 1;44(6):743-8.

[19]. Chandan SN, Shetty SK, Shetty SK, Shah AK. Inferior alveolar nerve dysfunction in mandibular fractures: a prospective cohort study. Journal of the Korean Association of Oral and Maxillofacial Surgeons. 2021 Jun 30;47(3):183-9.
[20]. Chandan C, Shetty SK, Shetty SK, Shah AK. Quality of life assessment in patients with long-term neurosensory dysfunction after mandibular fractures. Minerva dental and oral science. 2023 Apr;72(2):118-23.
[21]. Kishore J, Vatsa R, Singh J, Kumari M, Kumar T, Bandgar S. Psychological impact on maxillofacial trauma patients–an observational study. Journal of medicine and life. 2020 Oct;13(4):458.
[22]. Nayak SS, Kamath AT, Roy S, Nayak VS. Effect of oral and maxillofacial injuries on the development of post-traumatic stress disorder: A cross-sectional study. Pesquisa Brasileira em Odontopediatria e Clínica Integrada. 2021 Apr 2;21:e0119.
[23]. Gironda MW, Der-Martirosian C, Belin TR, Black EE, Atchison KA. Predictors of depressive symptoms following mandibular fracture repair. Journal of oral and maxillofacial surgery. 2009 Feb 1;67(2):328-34.