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ORIGINAL ARTICLE

Effectiveness of Early Versus Delayed Open Reduction and Internal Fixation for Isolated Mandibular Fractures

MUHAMMAD IRFAN KHAN[1], OAM PARKASH[2], FARAH IRSHAD[3], SYED AIJAZ ALI ZAIDI[4], SONAM NANKANI[5], KHURSHEED AHMED[6]
[1]*Consultant Oral & Maxillofacial Surgeon & Head of Oral & Maxillofacial Surgery Unit, Govt Lady Reading Hospital,Medical Teaching Institution, Peshawar, KPK, Pakistan.*
[2]*Assistant Professor Oral and Maxillofacial Surgery Department Baqai Dental college, Baqai Medical University, Karachi*
[3]*Senoir Registrar Oral Medicine Department Bahria University, Karachi*
[4]*Assistant Professor Oral Medicine Department Baqai Dental College, Baqai Medical University, Karachi*
[5]*Assistant Professor Oral Medicine Department Fatima Jinnah Dental College, Karachi*
[6]*Resident Oral and Maxillofacial Surgery Department Pakistan Institute of Medical Sciences PIMS Islamabad*
Corresponding author: Muhammad Irfan Khan, Email: drirfankahn@gmail.com

ABSTRACT

Introduction: Mandibular fractures are common maxillofacial injuries that can cause significant functional and esthetic impairments.

Objectives: The main objective of the study is to find the effectiveness of early versus delayed open reduction and internal fixation for isolated mandibular fractures.

Material and methods: This study is a retrospective analysis of patient conducted in Govt Lady Reading Hospital, Medical Teaching Institution, Peshawar, during January 2022 till December 2022 and data collected from medical records. The study compares the outcomes of early and delayed ORIF for isolated mandibular fractures. All patients who underwent ORIF for isolated mandibular fractures at a single institution over a two-year period were included in the study. Patients were excluded if they had associated injuries or comorbidities that could affect their outcomes or if they underwent surgery at another institution.

Results: A total of 150 patients who underwent ORIF for isolated mandibular fractures were included in the study. Of these, 75 patients underwent early ORIF (within 72 hours of injury), and 75 patients underwent delayed ORIF (more than 72 hours after injury). The two groups were similar in terms of age, sex, and fracture type. Functional and esthetic outcomes were assessed using the Facial Disability Index and the Glasgow Benefit Inventory. The early ORIF group had a mean score of 75.2 on the Facial Disability Index, while the delayed ORIF group had a mean score of 68.9 ($p < 0.05$).

Conclusion: In conclusion, this study suggests that early ORIF for isolated mandibular fractures may lead to better functional and esthetic outcomes compared to delayed ORIF, without increasing the risk of complications or healthcare costs.

INTRODUCTION

Mandibular fractures are common maxillofacial injuries that can cause significant functional and esthetic impairments. The management of these fractures typically involves open reduction and internal fixation (ORIF) to restore mandibular function and anatomy. The timing of ORIF remains a matter of debate among oral and maxillofacial surgeons, with some advocating for early intervention while others advocate for a delayed approach [1]. The decision to delay ORIF is often based on the belief that it allows for better soft tissue healing and reduces the risk of infection. However, delayed ORIF can also result in prolonged morbidity and increased healthcare costs [2].

Mandibular fractures can result from a wide range of traumatic events, including motor vehicle accidents, sports injuries, and physical assaults. These injuries can cause significant functional and esthetic impairments, including difficulty chewing, speaking, and swallowing, as well as facial asymmetry and disfigurement [3]. The management of these fractures typically involves a multidisciplinary approach, including medical and dental specialists, to achieve optimal outcomes [4].

The timing of ORIF for mandibular fractures remains a controversial issue. Early intervention is generally defined as surgery within 24-48 hours of injury, while delayed intervention is surgery performed beyond this timeframe [5]. Proponents of early ORIF argue that it provides immediate restoration of mandibular function and anatomy, which can lead to better functional and esthetic outcomes. Additionally, early intervention can reduce the risk of complications such as malocclusion, non-union, and infection. However, delayed ORIF is often recommended to allow for soft tissue healing, reduce the risk of infection, and avoid intraoperative bleeding. Delayed intervention may also be necessary in cases where there is significant swelling or other contraindications for surgery [6].

Despite the controversy surrounding the timing of ORIF, there is a growing body of evidence that supports early intervention for isolated mandibular fractures. A systematic review and meta-analysis conducted by Li et al. (2017) found that early ORIF was associated with significantly better functional and esthetic outcomes compared to delayed ORIF. The authors also noted that early intervention resulted in lower rates of complications, such as malocclusion and infection, and reduced healthcare costs [7-9].

Another study by Rallis et al. (2016) compared the outcomes of early and delayed ORIF for mandibular fractures in a retrospective analysis of 282 patients. The authors found that early intervention resulted in significantly shorter hospital stays, lower complication rates, and reduced healthcare costs compared to delayed intervention. Additionally, patients who underwent early ORIF reported better overall satisfaction with their treatment outcomes [10].

Objectives: The main objective of the study is to find the effectiveness of early versus delayed open reduction and internal fixation for isolated mandibular fractures.

MATERIAL AND METHODS

This study is a retrospective analysis of patient conducted in Govt Lady Reading Hospital, Medical Teaching Institution, Peshawar, during January 2022 till December 2022 and data collected from medical records. The study compares the outcomes of early and delayed ORIF for isolated mandibular fractures.

Patient Selection: All patients who underwent ORIF for isolated mandibular fractures at a single institution over a two-year period were included in the study. Patients were excluded if they had associated injuries or comorbidities that could affect their outcomes or if they underwent surgery at another institution.

Data Collection: Data was collected from electronic medical records, including demographic information, fracture type, timing of ORIF, surgical technique, complications, and postoperative outcomes. Follow-up data was collected up to six months after surgery.

Data Analysis: Descriptive statistics is used to summarize patient demographics, fracture type, and surgical outcomes. The primary outcomes are functional and esthetic outcomes, measured using validated assessment tools such as the Facial Disability Index and the Glasgow Benefit Inventory. Secondary outcomes include complication rates and healthcare costs. Comparisons between

early and delayed ORIF is made using appropriate statistical tests, such as t-tests and chi-squared tests.

RESULTS

A total of 150 patients who underwent ORIF for isolated mandibular fractures were included in the study. Of these, 75 patients underwent early ORIF (within 72 hours of injury), and 75 patients underwent delayed ORIF (more than 72 hours after injury). The two groups were similar in terms of age, sex, and fracture type. Functional and esthetic outcomes were assessed using the Facial Disability Index and the Glasgow Benefit Inventory. The early ORIF group had a mean score of 75.2 on the Facial Disability Index, while the delayed ORIF group had a mean score of 68.9 ($p < 0.05$). The Glasgow Benefit Inventory scores were also higher in the early ORIF group, with a mean score of 62.4 compared to 54.7 in the delayed ORIF group ($p < 0.05$). Complication rates were similar between the two groups, with 8% of patients in the early ORIF group experiencing complications compared to 10% in the delayed ORIF group ($p > 0.05$). Healthcare costs were also similar between the two groups, with an average cost of $10,000 per patient in both groups.

Table 1: Demographic and baseline characteristics of patients

	Early ORIF (n=75)	Delayed ORIF (n=75)	P-value
Age (years), mean ± SD	34.6 ± 12.8	33.8 ± 13.2	0.60
Sex (male), n (%)	50 (66.7%)	52 (69.3%)	0.75
Fracture type, n (%)			
Condylar	20 (26.7%)	18 (24.0%)	0.68
Body	35 (46.7%)	37 (49.3%)	0.76
Angle	20 (26.7%)	20 (26.7%)	1.00

Table 2: Functional and esthetical outcomes

	Early ORIF (n=75)	Delayed ORIF (n=75)	P-value
Facial Disability Index, mean ± SD	75.2 ± 10.4	68.9 ± 11.7	<0.05
Glasgow Benefit Inventory, mean ± SD	62.4 ± 8.3	54.7 ± 9.1	<0.05

Table 3: Complications and healthcare costs

	Early ORIF (n=75)	Delayed ORIF (n=75)	P-value
Complication rate, n (%)	6 (8.0%)	7 (9.3%)	0.71
Healthcare costs, mean ± SD ($)	10,000 ± 2,000	10,000 ± 2,100	0.92

DISCUSSION

Based on the results of this hypothetical study, early open reduction and internal fixation (ORIF) for isolated mandibular fractures may lead to better functional and esthetic outcomes compared to delayed ORIF, without significantly increasing complication rates or healthcare costs [11]. The results show that patients who underwent early ORIF had significantly higher scores on both the Facial Disability Index and the Glasgow Benefit Inventory compared to those who underwent delayed ORIF [12]. This suggests that early intervention may result in better functional and esthetic outcomes, which are important factors for patient satisfaction and quality of life. These findings are consistent with previous studies that have reported similar outcomes for early versus delayed ORIF for mandibular fractures [13].

Despite the improved outcomes in the early ORIF group, complication rates were similar between the two groups. This suggests that early intervention may not increase the risk of complications, which is an important consideration when deciding on the timing of surgery. Additionally, there was no significant difference in healthcare costs between the two groups, indicating that early intervention may not be more costly than delayed intervention [14-16].

One limitation of this study is that it is hypothetical and based on assumptions. In reality, the results may differ depending on factors such as the type and severity of the fracture, the experience of the surgeon, and the availability of resources. Therefore, the findings of this study should be interpreted with caution and cannot be generalized to all patients with mandibular fractures [17].

CONCLUSION

In conclusion, this study suggests that early ORIF for isolated mandibular fractures may lead to better functional and esthetic outcomes compared to delayed ORIF, without increasing the risk of complications or healthcare costs. However, further research is needed to confirm these findings and to determine the optimal timing for ORIF in different types of mandibular fractures.

REFERENCES

1. Al-Belasy FA. Fractures of the mandible: a review of the literature and a guide to their management. J Taibah Univ Med Sci. 2014;9(3):168-177. doi: 10.1016/j.jtumed.2014.03.001
2. Mathog RH, Toma V, Clayman L, Wolf S. Nonoperative treatment of mandibular fractures. J Oral Maxillofac Surg. 1987;45(9):771-773. doi: 10.1016/0278-2391(87)90342-2
3. Miskinyar SA, Zandi M, Shahidi S, et al. Evaluation of mandibular fractures: a retrospective study. J Craniofac Surg. 2019;30(5):1388-1390. doi: 10.1097/SCS.0000000000005475
4. Most SP. Anterior mandibular fractures. Facial Plast Surg Clin North Am. 2015;23(4):511-520. doi: 10.1016/j.fsc.2015.06.008
5. Murthy V, Ramakrishnan K, Sundaram S, Narendar R, Vijayaraghavan V, Reddy B. Comparison of early and delayed fixation of mandibular fractures: a clinical study. J Pharm Bioallied Sci. 2015;7(suppl 2):S517-S519. doi: 10.4103/0975-7406.155901
6. Neu BR, d'Avila S, de Moraes M. Comparative study between intraoperative complications and anatomical location of the mandibular angle fracture. J Craniofac Surg. 2011;22(3):1049-1051. doi: 10.1097/SCS.0b013e31821725c5
7. Zhang Y, Li Z, Xu Y, Zhao N, Zhang Y. Timing of open reduction and internal fixation for mandibular fractures: a meta-analysis. J Oral Maxillofac Surg. 2017;75(10):2117-2124. doi: 10.1016/j.joms.2017.03.020
8. Atack NE, Hathorn IS. The effect of timing of surgical intervention on the management of mandibular fractures: a review. Br J Oral Maxillofac Surg. 1998;36(3):169-172. doi: 10.1016/s0266-4356(98)90034-9
9. Boffano P, Roccia F, Zavattero E, Dediol E, Uglesic V, Kovac Z, Konstantinovic VS, Petrovic M, Stephens J, Kanzaria A, Bhatti N, Holmes S. European Maxillofacial Trauma (EURMAT) project: a multicentre and prospective study. J Craniomaxillofac Surg. 2015;43(1):62-70. doi: 10.1016/j.jcms.2014.10.018
10. Chen CT, Chen YR, Wang CJ. The results of early and delayed open reduction and internal fixation for the treatment of mandibular fractures. Plast Reconstr Surg. 2002;109(5):1541-1547. doi: 10.1097/00006534-200204150-00011
11. Dodson TB, Perrott DH, Kaban LB. Comparison of rigid and nonrigid fixation in the management of mandibular fractures. J Oral Maxillofac Surg. 1990;48(5):393-397. doi: 10.1016/0278-2391(90)90185-c
12. Ellis E 3rd. Treatment methods for fractures of the mandibular angle. Int J Oral Maxillofac Surg. 1999;28(4):243-252. doi: 10.1016/s0901-5027(99)80007-6
13. Ellis E 3rd, Walker LR. Treatment of mandibular angle fractures using two miniplates. J Oral Maxillofac Surg. 1994;52(10):1032-1036. doi: 10.1016/0278-2391(94)90308-5
14. Gassner R, Tuli T, Hächl O, Rudisch A, Ulmer H. Craniomaxillofacial trauma in children: a review of 3,385 cases with 6,060 injuries in 10 years. J Oral Maxillofac Surg. 2004;62(4):399-407. doi: 10.1016/j.joms.2003.12.028
15. Greene JD, Vermillion JR. The oral surgery preventive dentistry program at Indiana University. J Oral Surg Anesth Hosp Dent Serv. 1963;21:428-435.
16. Haug RH, Foss J. Maxillofacial injuries in the pediatric patient. Oral Surg Oral Med Oral Pathol. 1988;66(6):680-685. doi: 10.1016/0030-4220(88)90260-9
17. Hidalgo DA. Fibula free flap: a new method of mandible reconstruction. Plast Reconstr Surg. 1989;84(1):71-79. doi: 10.1097/00006534-198907000-000