Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(5), 2785-2792 | ISSN:2251-6727

Conventional Fixation versus Right-Angle Fixation among Mandibular Angle Fractures: A Retrospective Comparative Study

[1]Shalini Muthuraj, [2]Kathiravan Selvarasu*, [3]Murugesan Krishnan, [4]Santhosh P. Kumar

[1] Post Graduate Student, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai, Tamil Nadu, India
[2] Senior Lecturer, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai, Tamil Nadu, India
[3] Professor, Head of Department, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai, Tamil Nadu, India
[4] Professor & Research Head, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai, Tamil Nadu, India

(Received: 25 August 2025 Revised: 27 September 2025 Accepted: 14 October 2025)

KEYWORDS

Mandibular angle fracture, Conventional fixation, Right-angle fixation, Intermaxillary fixation (IMF), Nerve injury, Functional efficiency.

ABSTRACT:

Introduction: Mandibular angle fractures present a unique challenge due to their anatomical complexity and high prevalence, often associated with significant morbidity. Traditional management involves conventional fixation techniques using miniplates, which, while effective, have certain limitations such as the need for intermaxillary fixation (IMF) and risk of nerve injury. Right angled fixation technique offers an ergonomic and minimally invasive approach for mandibular angle fracture repair by allowing perpendicular screw placement with reduced soft tissue trauma. This retrospective comparative study aimed to evaluate and compare the clinical outcomes of conventional fixation versus right-angle fixation in the management of mandibular angle fractures.

Methodology: A retrospective comparative study was conducted on 30 patients with mandibular angle fractures treated between 2022 and 2024. Patients were stratified into two groups: conventional fixation (n= 15) and right-angled fixation (n = 15). Key clinical outcomes included incidence of nerve injury, need for IMF (Fracture Stabilization) z, functional restoration (mastication and speech), postoperative swelling, trismus, and overall patient comfort. Data were analyzed using descriptive statistics and unpaired t-tests, with significance set at $p < 0.05$.

Results: Right-angle fixation required significantly longer operative time (86.57 vs. 74.87 minutes, $p<0.05$). However, it demonstrated superior outcomes in terms of reduced IMF requirement (27% vs. 53%), fewer nerve injuries (27% vs. 47%), better fracture stabilization, earlier functional recovery, reduced swelling (27% vs. 80%), greater mouth opening (34.7 mm vs. 28.9 mm), and improved postoperative comfort.

Conclusion: Despite increased operative time, right-angle fixation provides superior patient-centered outcomes compared to conventional fixation, supporting its role as an efficient alternative for mandibular angle fracture management.

1. Introduction

Mandibular fractures rank among the most common facial skeletal injuries, with the mandibular angle being a frequent site of fracture due to its anatomical, biomechanical, and functional characteristics. The mandibular angle forms a critical structural region that acts as a lever arm during mastication, making it susceptible to traumatic forces. The prevalence of mandibular angle fractures is attributed to the thinner cross-sectional bone area relative to other mandibular regions and the frequent presence of third molars in the region, which further weakens the bone and predisposes it to fracture. Additional contributing factors include the complex muscular attachments around the angle, primarily the masseter and medial pterygoid muscles, which can cause displacement or rotation of fracture segments after trauma.[1]

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(5), 2785-2792 | ISSN:2251-6727

The epidemiology of mandibular fractures shows a predominance in young males, most frequently caused by motor vehicle accidents, assaults, falls, industrial accidents, and sports-related injuries. The majority of these injuries involve combined etiologies, with motor vehicle collisions and interpersonal violence accounting for up to 75% of mandibular angle fractures reported in clinical series. This high incidence necessitates continued research into efficacious management strategies aimed at optimizing patient outcomes while minimizing complications.[1,2]

The management of mandibular angle fractures is complex and requires precise anatomical reduction and stable fixation to restore functional occlusion and normal mandibular movement. Traditionally, open reduction and internal fixation (ORIF) using miniplates placed along the mandibular borders has been the standard of care [3]. This approach, extensively characterized and popularized since the late 20th century, involves the application of one or more small plates along the superior and/or inferior mandibular borders. The principle behind ORIF fixation is to provide rigid stabilization that supports early mobilization, reduces postoperative immobilization, and facilitates rapid healing under stable conditions[4,5].

Despite the established effectiveness of conventional miniplate fixation, this technique is not without challenges. Complications such as postoperative infection, malocclusion, nerve injury—most notably involving the inferior alveolar nerve—and the necessity for intermaxillary fixation (IMF) have been recurrently reported. Intermaxillary fixation, though effective in stabilizing fractures, can cause significant patient discomfort, restrict oral intake, prolong hospitalization, and reduce quality of life during recovery [6]. Moreover, the technical demands of placing miniplates in an anatomically complex and functionally critical area require surgical precision, experience, and optimal hardware adaptation to avoid mechanical failure and to ensure fracture stability[5].

In the last decade, alternative fixation strategies have been explored to address these limitations and to improve clinical outcomes. One such innovative technique is right-angled fixation, which involves the use of right-angled miniplates designed to provide enhanced three-dimensional stability at the fracture site. This method aims to reduce the need for IMF by offering superior primary stability to the fracture segments, thereby enabling earlier mobilization and improved patient comfort. The right-angled fixation technique has also been theorized to decrease the incidence of nerve injury by minimizing hardware placement adjacent to the inferior alveolar nerve.

Initial biomechanical studies support the concept that right-angled plate fixation can provide superior resistance to functional loading during mastication compared to conventional single or double miniplate strategies. These biomechanical advantages suggest that right-angled fixation could accelerate fracture healing, reduce postoperative complications, and improve functional recovery. However, clinical evidence comparing the two fixation methods remains scarce, with limited patient-centered outcome data evaluating parameters such as postoperative swelling, trismus, functional efficiency (e.g., speech and mastication), the duration of IMF, and overall quality of life.

The current study aims to bridge the gap between biomechanical innovation and clinical application by providing evidence-based outcomes on right-angled fixation as an alternative to the conventional approach. The findings are expected to advance understanding regarding the ideal fixation method for mandibular angle fractures and to guide surgeons toward optimal treatment protocols that balance surgical efficacy, functional recovery, and patient-centered care. This retrospective comparative study aimed to evaluate and compare the clinical outcomes of conventional fixation versus right-angle fixation in the management of mandibular angle fractures, focusing on operative time, postoperative quality of life, functional efficiency, and nerve injury.

2. Methodology

Study Design and Setting

This retrospective comparative study was conducted at Saveetha Dental College and Hospitals, involving patients diagnosed with mandibular angle fractures. The study was designed to compare the clinical efficacy, functional outcomes, and complication rates between two fixation techniques: conventional open reduction and internal fixation (ORIF) using miniplates and right-angled fixation. The study included data collection from

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(5), 2785-2792 | ISSN:2251-6727

past medical records, radiographs, operative notes, and follow-up evaluations.

Participants

A total of 30 patients with confirmed mandibular angle fractures were included in the study. Inclusion criteria comprised patients of all ages and genders presenting with isolated mandibular angle fractures suitable for surgical fixation. Exclusion criteria included edentulous patients, comminuted or pathological fractures, patients with systemic conditions contraindicating surgery (such as osteoporosis, osteopetrosis), and those with a history of chemotherapy or radiotherapy affecting bone healing. Patients with associated fractures in other regions of the mandible were included only if the angle fracture was the primary site treated by the fixation method under study.

Grouping and Treatment Allocation

The 30 patients were divided into two groups based on the fixation technique used. Group 1 (n=15) underwent conventional fixation with standard miniplates placed along the superior and/or inferior border of the mandibular angle. Group 2 (n=15) underwent right-angled fixation using specifically designed right-angled plates aimed at providing enhanced three-dimensional stabilization.

The surgical method choice was made by the operating surgeon based on clinical judgment and availability of fixation hardware. Given the retrospective nature of the study, patients were not randomized; however, baseline demographic and clinical characteristics were statistically analyzed to ensure comparability between groups.

Surgical Procedure

All surgical interventions were performed under general anesthesia following standard aseptic protocols. Both groups underwent open reduction and internal fixation of the mandibular angle fracture via intraoral or extraoral approaches based on fracture complexity and surgeon preference.

- Conventional Fixation Group: Fixation involves the placement of one or two standard miniplates (typically 2.0 to 2.5 mm thickness) contoured and secured with monocortical screws along the superior and/or inferior border of the mandible to achieve rigid stabilization.
- Right-Angled Fixation Group: Fixation was performed using specialized right-angled miniplates designed to directly counteract mechanical forces in multiple planes, theoretically offering superior biomechanical stability. Plates were contoured to fit the anatomical angulation and secured with monocortical screws.

Intermaxillary fixation (IMF) was applied intraoperatively with arch bars or elastics as necessary for occlusal stability, with the duration and necessity of IMF documented throughout postoperative care.

3. Data Collection and Outcome Measures

Institutional dental archiving software was utilised for data extraction. In addition, patient demographics, fracture classification, and preoperative neurological assessments were meticulously gathered to ensure comprehensive data analysis.

Outcome Parameters analysed were Post Operative Mouth Opening (Trismus), Nerve injury (e.g., Paresthesia), Fracture Stabilization (Clinical & X - ray), Functional efficiency (e.g., Mastication, Speech), Postoperative Swelling, Overall Patient Comfort.

4. Statistical Analysis

Data were entered in a Microsoft Excel and analysed in SPSS software version 27.0. Descriptive statistics were calculated to summarize demographic and clinical characteristics of the study population. Means and standard deviations were reported for continuous variables, while frequencies and percentages were presented for categorical data. Comparative analysis between the two groups was conducted using unpaired t-tests for continuous variables such as operative time, IMF requirements, Nerve injury, Postoperative swelling, and Maximal mouth opening. A significance level of $p < 0.05$ was used to determine statistical significance.

Ethical Considerations

The study was conducted in compliance with ethical standards for retrospective research. Institutional ethical committee approval was obtained prior to data collection. Patient confidentiality was maintained by anonymizing records and securing data access. Due to the retrospective design, informed consent was waived; however, patient care followed established clinical protocols ensuring safety and standard treatment.

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(5), 2785-2792 | ISSN:2251-6727

5. Results

This study shows a direct comparison between Conventional Fixation and Right-Angle Fixation techniques, focusing on surgical and postoperative outcomes. Operative time was notably longer in the Right-Angle Fixation group (86.57 minutes) compared to the Conventional Fixation group (74.87 minutes), suggesting the procedure is more technically demanding or requires additional steps when employing the right-angle technique.

A significant reduction in intermaxillary fixation (IMF) requirement was observed in the Right-Angle Fixation group (27%) as opposed to the Conventional Fixation group (53%). This indicates that patients treated with the right-angle approach generally achieve greater postoperative stability and require less supplementary fixation. Furthermore, the frequency of nerve injury was lower in the Right-Angle Fixation group (27%) compared to the Conventional group (47%), reflecting a potentially safer profile regarding neurovascular complications.

Postoperative swelling was also substantially reduced with Right-Angle Fixation (27%) versus Conventional Fixation (80%), which may translate to improved recovery dynamics and patient comfort in the early postoperative period. In terms of functional outcomes, patients who underwent Right-Angle Fixation demonstrated greater maximal mouth opening (34.7 mm) compared to those with Conventional Fixation (28.9 mm). This suggests enhanced restoration of mandibular mobility and possibly better long-term function when the right-angle technique is utilized.

Collectively, the findings demonstrate that while Right-Angle Fixation is associated with a longer operative duration, it provides clinically meaningful benefits, including reduced needs for IMF, fewer nerve injuries, decreased postoperative swelling, and improved mouth opening. These improved outcomes have the potential to impact both short-term recovery and long-term function, making Right-Angle Fixation a valuable alternative to conventional methods in appropriate cases.

6. Discussion

The management of mandibular angle fractures remains a complex issue in maxillofacial surgery due to the unique anatomical and biomechanical demands of the angle region[7]. This study compared conventional miniplate fixation versus right-angled fixation in patients with mandibular angle fractures, focusing on operative time, intermaxillary fixation (IMF) requirement, nerve injury, functional efficiency, postoperative swelling and trismus, patient comfort, and cost efficiency. The findings suggest that while right-angled fixation offers significant clinical and patient-centered advantages over the conventional method, each modality has unique benefits and limitations that must be carefully considered[8][9].

It was observed that right-angled fixation required a longer operative time compared to conventional fixation. The operative time in our study was significantly longer in the right-angled fixation group compared to conventional fixation[10]. This finding aligns with the study by Bhushan et al. (2021), who reported that mandibular fracture repair with intraoperative intermaxillary fixation (IMF) took significantly longer (mean 85.5 minutes) compared to without IMF (mean 50 minutes), largely due to the additional steps and technical demands imposed by IMF placement[11]. This result aligns with prior reports in the literature, which attribute increased operative duration to the technical sensitivity of the right-angled approach and the need for more precise adaptation and placement of the hardware[12]

One of the most notable findings in this study was the reduced requirement and duration of IMF in patients treated with right-angled fixation. The reduced reliance on IMF can be attributed to the superior primary stability achieved through the right-angled plate configuration, which provides enhanced resistance to torsional and shearing forces at the angle. This finding is strongly supported by biomechanical studies, including a recent human cadaveric analysis by Squier et al., which demonstrated that advanced plating designs such as 3D and two-plate systems outperform single plate configurations in terms of load resistance, thus reducing the need for supplementary immobilization. Clinical studies have similarly reported that improved mechanical stability translates to decreased necessity for rigid IMF, facilitating earlier return to normal functions and enhancing patient quality of life.[2][3][4]

Gamit et al. (2024), who demonstrated that newer non-compression titanium miniplates significantly improved postoperative masticatory efficiency and reduced

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(5), 2785-2792 | ISSN:2251-6727

reliance on IMF compared to conventional miniplates. Their study supports the biomechanical superiority of advanced fixation techniques to provide enough primary stability to allow early function without prolonged immobilization, which enhances patient comfort and recovery [13].

Reduced incidence of nerve injury, particularly involving the inferior alveolar nerve, is a significant benefit identified in patients managed with right-angled fixation. The lower rate of paresthesia and anesthesia in this cohort can be explained by the hardware's placement, which avoids close proximity to the mandibular canal—a limitation of conventional miniplate fixation. This outcome is corroborated by reports in the surgical literature indicating that nerve injury incidence is highly dependent on the positional relationship of the fixation device and the underlying neurovascular structures. [3][14]

The incidence of nerve injury was lower in the right-angled fixation group in our study, a trend consistent with Pavithra et al. (2023), who reported reduced nerve paresthesia rates with right-angled fixation compared to transoral and transbuccal techniques in mandibular angle fractures. This improvement is attributed to less invasive plate positioning avoiding proximity to the inferior alveolar canal, which decreases the risk of nerve trauma during plate placement.[14]

Functional efficiency was assessed in terms of time to resume normal mastication and speech, as well as clinical and radiographic evidence of fracture stabilization. This study found that right-angled fixation resulted in faster restoration of function and more robust fracture healing than conventional fixation. Pavithra et al. also reported comparable results, with the right-angled fixation technique yielding improved postoperative maximal mouth opening compared to transoral and transbuccal approaches. The biomechanical superiority of three-dimensional plate designs and innovative configurations, as documented by Guastaldi et al., further supports these clinical findings by demonstrating better resistance to functional loading and fatigue, both critical for effective fracture stabilization and accelerated recovery.[14]

Kerdoud et al. (2021) compared single and two mini-plate fixation systems and found better functional outcomes, including mouth opening and chewing ability, with the use of double plating or combined fixation methods, which parallels our findings on the beneficial effect of enhanced fixation geometry on early postoperative function. Their observations reinforce the clinical importance of stable fixation for early functional rehabilitation[15][16].

Patients in the right-angled fixation group reported superior postoperative comfort, reflected in lower scores for swelling and trismus. Enhanced comfort and reduced facial morbidity are likely consequences of both improved biomechanical stability and a less invasive surgical approach, minimizing tissue manipulation and trauma. Importantly, improved comfort and earlier functional recovery are consistent with the trend in modern maxillofacial surgery towards minimally invasive techniques that promote rapid rehabilitation and patient satisfaction[17].

Our study also observed decreased postoperative swelling and trismus with right-angled fixation, which is consistent with Elsayed et al. (2022), who demonstrated reduced postoperative morbidity and cosmetic satisfaction with angled plate fixation compared to conventional approaches. Minimizing soft tissue dissection and micro-movement at the fracture site likely contribute to reduced inflammation and faster recovery, which enhances overall patient satisfaction[18].

While the right-angled plates used in this study may be inherently more expensive than standard miniplates, the overall cost efficiency favored the right-angled fixation group due to shorter hospital stays, fewer complications, and diminished need for extended IMF and follow-up interventions. This balance of up-front material cost against downstream resource utilization and improved outcomes has been highlighted in practical cost-effectiveness studies by Kim et al., reinforcing the conclusion that initial investments in advanced hardware may ultimately yield net savings for healthcare systems.[5][19]

The cost efficiency advantage noted for right-angled fixation agrees with economic analyses such as those referenced by Bhushan et al. (2021), who emphasized that longer operative times (as with IMF placement) and additional equipment increase overall treatment cost without clear clinical benefit. Advanced plating may have higher upfront costs, but these can be offset by shorter hospitalization, fewer follow-ups, and reduced

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(5), 2785-2792 | ISSN:2251-6727

complication management, providing better value in the longer term[20].

The results of this study are broadly supported by contemporary research comparing fixation modalities for mandibular angle fractures. Multiple authors have demonstrated, across both clinical and biomechanical models, that advanced plating systems—including right-angled, three-dimensional, and double miniplate designs—provide superior resistance to functional loads, accelerate rehabilitation, and reduce the risk of complications that historically challenged conventional approaches[16]. Al-Tairi et al., for example, found three-dimensional plates to be at least equivalent if not superior to double miniplate systems in fixation of unfavorable mandibular angle fractures, with benefits in both stability and complication rates. These published findings reinforce the movement in surgical practice toward selection of fixation methods that emphasize patient-centered outcomes, anatomical preservation, and rapid restoration of normal function.[21]

Despite the strengths of this study, several limitations must be considered when interpreting the results. The retrospective design inherently introduces the possibility of selection bias, recall bias (especially regarding subjective patient-reported outcomes), and inconsistencies in the documentation of clinical variables. The relatively small sample size of 30 patients limits the statistical power of the study and restricts the generalizability of the findings to broader populations. Surgeon experience and technique variance were not standardized, potentially influencing operative time, complication rates, and outcomes in ways difficult to quantify retrospectively.[3]

Furthermore, the duration of follow-up may not have been sufficient to capture long-term complications such as late-onset infection, non-union, or hardware failure—outcomes that require extended observation to accurately assess. Other confounding factors, such as differences in trauma severity, comorbidities, and compliance with postoperative care, might also have impacted clinical results. Additionally, while the economic assessment demonstrated favorable trends for right-angled fixation, a full cost–benefit analysis would require larger-scale, prospective data collection, including sensitivity analyses around hardware prices, hospital resource allocation, and rehabilitation costs.

Finally, while biomechanical studies clearly inform trends and provide important evidence to guide clinical practice, they must ultimately be corroborated with well-conducted prospective randomized trials to establish definitive treatment guidelines and clarify the "gold standard" approach for mandibular angle fracture fixation.[22][23]

7. Conclusion

This study demonstrates that right-angled fixation offers a superior alternative to conventional miniplate fixation for managing mandibular angle fractures by providing enhanced functional outcomes, including reduced need and duration of intermaxillary fixation, decreased nerve injury, improved postoperative comfort, and faster restoration of mastication and speech, despite requiring longer operative time. Although the initial surgical complexity and costs may be higher, the overall efficiency of treatment is improved through shorter hospital stays and reduced postoperative morbidity. These findings are consistent with current literature favoring anatomically optimized fixation systems that prioritize patient-centered outcomes. However, the retrospective design, small sample size, and limited follow-up underscore the need for larger prospective randomized trials to confirm these results and establish standardized treatment guidelines for mandibular angle fracture fixation.

References:

1. Cheema M, Irshad K, Musarrat M, Hassan S, Haroon M, Haroon E. Epidemiological pattern of mandibular fractures in Islamabad. J Popl Ther Clin Pharmacol. 2024 Jun 3;31(6):139–45.
2. Natu SS, Pradhan H, Gupta H, Alam S, Gupta S, Pradhan R, et al. An Epidemiological Study on Pattern and Incidence of Mandibular Fractures. Plastic Surgery International. 2012 Nov 8;2012: 834364.
3. Nahata B, Maiti S, Ganesh MK, Heboyan A, Sai L, Paulraj J. Sulfonated polyether ketone ketone (SPEKK) implant as an alternative to titanium implant-in vivo study on Wistar Albino rat mandible. BMC Oral Health. 2025 Apr 13;25: 557.
4. Ebenezer V, Ramalingam B. Three-Dimensional Miniplate Fixation in Mandibular Angle Fractures [Internet]. [cited 2025 Sep 5]. Available from:

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(5), 2785-2792 | ISSN:2251-6727

https://www.proquest.com/openview/fbd703287a2c02e46677a915308295be/1?pq-origsite=gscholar&cbl=1316336

5. Fedok FG, Van Kooten DW, DeJoseph LM, McGinn JD, Sobota B, Levin RJ, et al. Plating techniques and plate orientation in repair of mandibular angle fractures: an in vitro study. The Laryngoscope [Internet]. 1998 Aug [cited 2025 Sep 5];108(8 Pt 1). Available from: https://pubmed.ncbi.nlm.nih.gov/9707247/
6. Ravikumar C, Bhoj M. Evaluation of postoperative complications of open reduction and internal fixation in the management of mandibular fractures: A retrospective study. Indian journal of dental research : official publication of Indian Society for Dental Research [Internet]. 2019 Jan [cited 2025 Sep 5];30(1). Available from: https://pubmed.ncbi.nlm.nih.gov/30900664/
7. Treatment methods for fractures of the mandibular angle. International Journal of Oral and Maxillofacial Surgery. 1999 Aug 1;28(4): 243–52.
8. Open Reduction and Internal Fixation of Mandibular Angle Fractures: Does the Transbuccal Technique Produce Fewer Complications After Treatment Than the Transoral Technique? Journal of Oral and Maxillofacial Surgery. 2012 Nov 1;70(11):2620–8.
9. Kandamani J, Gouthaman SS, Ramakrishnan DS, Kumar MPS, Muthusekar MR. Evaluation of effect of submucosal administration of depomedrol in management of postoperative sequelae in mandibular fractures: A randomized clinical trial study. National journal of maxillofacial surgery [Internet]. 2022 Jan [cited 2025 Sep 5];13(1). Available from: https://pubmed.ncbi.nlm.nih.gov/35911819/
10. Ellis E. A randomised controlled trial comparing fixation of mandibular angle fractures with a single miniplate placed either transbuccally and intra-orally, or intra-orally alone. International Journal of Oral and Maxillofacial Surgery. 2009 Mar 1;38(3):241–5.
11. Bhushan K, Unakalkar S, Sahu R, Sharma ML. Compare the Efficacy of Open Reduction and Internal Fixation of Mandibular Fractures With and Without Use of Intra-Operative Inter-Maxillary Fixation. Indian Journal of Otolaryngology and Head & Neck Surgery. 2021 Sep 4;74(Suppl 3):4096.
12. Salavadi RK, Sowmya J, Mani KB, Kamath KP, Anand PS, Kumar NMR, et al. "Comparison of the efficacy of Erich arch bars, IMF screws and SMART Lock Hybrid arch bars in the management of mandibular fractures- A Randomized clinical study." Journal of stomatology, oral and maxillofacial surgery [Internet]. 2025 Sep [cited 2025 Sep 5];126(4S). Available from: https://pubmed.ncbi.nlm.nih.gov/39761851/
13. Gamit M, Patel Y, Sood R, Vadera H, Savjani K, Bhatti Z. Comparison of bite force evaluation for mandibular angle fracture fixation by conventional miniplates versus new design miniplates: a clinical study. Oral and maxillofacial surgery [Internet]. 2024 Jun [cited 2025 Sep 5];28(2). Available from: https://pubmed.ncbi.nlm.nih.gov/37740128/
14. Pavithra SK, Vivek N, Saravanan C, Karthik R, Prashanthi G, Scott C. Comparison of Conventional Versus Right Angled Fixation Technique in Management of Mandibular Angle Fractures - A Prospective Randomized Clinical Study. Journal of oral and maxillofacial surgery : official journal of the American Association of Oral and Maxillofacial Surgeons [Internet]. 2023 Aug [cited 2025 Sep 5];81(8). Available from: https://pubmed.ncbi.nlm.nih.gov/37160255/
15. Management of mandibular angle fractures through single and two mini-plate fixation systems: Retrospective study of 112 cases. International Journal of Surgery Case Reports. 2021 Mar 1;80:105690.
16. Agarwal S, Lakshmanan S, Krishnan M, Arularasan G, Kumar S. Comparison of Clinical Efficacy Between Two Straight Miniplate Systems Versus Three-Dimensional Plate in Treating the Parasymphysis of Mandible Fracture: A Prospective Clinical Study. Oral Surgery [Internet]. 2025 Jun 2 [cited 2025 Sep 5]; Available from: https://onlinelibrary.wiley.com/doi/abs/10.1111/ors.12994
17. Vyas A, Mazumdar U, Khan F, Mehra M, Parihar L, Purohit C. A study of mandibular fractures over a 5-year period of time: A retrospective study. Contemp Clin Dent. 2014 Oct;5(4):452–5.
18. Elsayed SAH, Reda HM, Awadd MM, Mourad SI, Shokeir HMR, Elsayed EH, et al. Transbuccal vs.

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(5), 2785-2792 | ISSN:2251-6727

Intraoral Approach using an Angulated Screwdriver in Fixation of a Mandibular Angle Fracture. The Open Dentistry Journal [Internet]. 2022 Aug 22 [cited 2025 Sep 5];16(1). Available from: https://opendentistryjournal.com/VOLUME/16/ELOCATOR/e187421062206200/PDF/

19. A comparison of three treatment methods for fractures of the mandibular angle. International Journal of Oral and Maxillofacial Surgery. 2016 Jul 1;45(7):878–83.
20. Fixation of mandibular angle fractures with a 2.0-mm 3-dimensional curved angle strut plate. Journal of Oral and Maxillofacial Surgery. 2005 Feb 1;63(2):209–14.
21. Comparison of three-dimensional plate versus double miniplate osteosynthesis for treatment of unfavorable mandibular angle fractures. Tanta Dental Journal. 2015 Jun 1;12(2):89–98.
22. Squier BR, Kongsong W, Cofield SS, Bignault S, Sittitavornwong S. Comparison of Strengths of Mandibular Angle Fractures Following Different Plate Designs: A Human Cadaver Study. Craniomaxillofacial trauma & reconstruction [Internet]. 2024 Dec [cited 2025 Sep 5];17(4). Available from: https://pubmed.ncbi.nlm.nih.gov/39553807/
23. Auctores. A review of biomechanical studies for mandibular angle fracture internal fixation [Internet]. Auctores. [cited 2025 Sep 5]. Available from: https://auctoresonline.org/article/123

Figures:

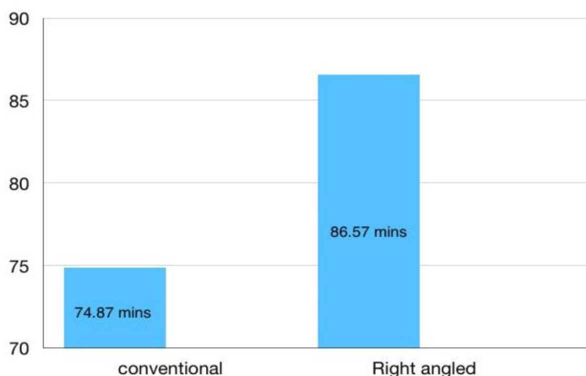

Figure 1: Operative time

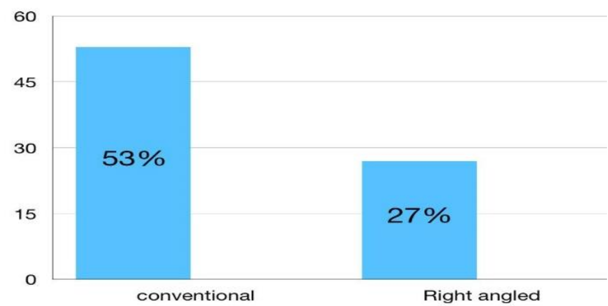

Figure 2: IMF Requirements

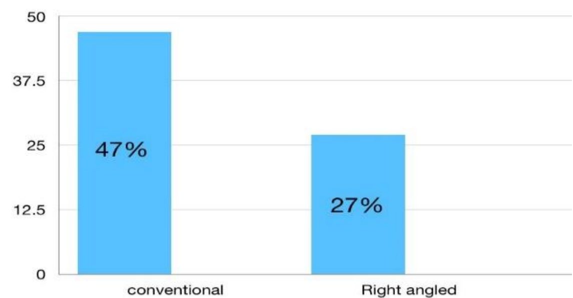

Figure 3: Nerve injury

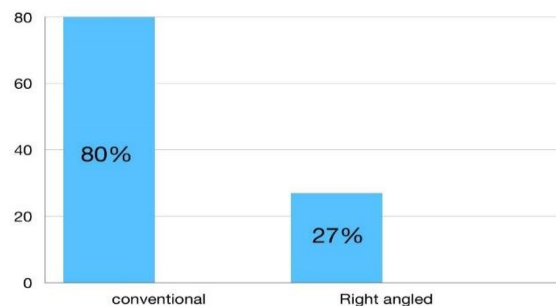

Figure 4: Postoperative Swelling

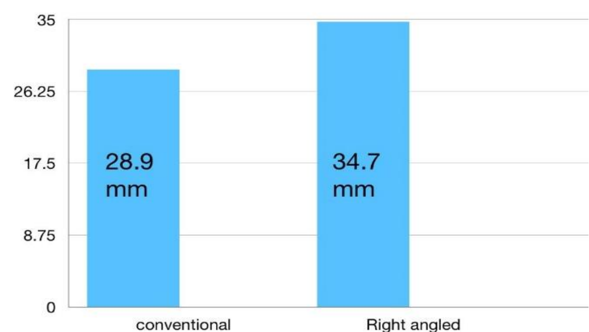

Figure 5: Maximal mouth opening