



SYSTEMATIC REVIEW

REVISED Complications following miniplate insertion in maxillofacial fractures: a systematic review

[version 3; peer review: 3 approved]

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Abstract**Background**

Maxillofacial fractures, frequently arising from road traffic incidents, falls, and acts of interpersonal aggression, are a considerable public health issue, exhibiting diverse epidemiological patterns according to demographic factors. The application of miniplates for fracture stabilization is a recognized technique, with innovative methods such as 3D plate systems emerging. Nonetheless, consequences including infections and hardware malfunctions persist. This systematic review seeks to present current evidence regarding the complications linked to miniplate placement in maxillofacial fractures over the last ten years.

Methods

A systematic review was performed in accordance with PRISMA principles. Databases such as the Cochrane Library, PubMed, and Scopus were examined from September 2014 to September 2024. Studies documenting problems related to miniplate placement were included, without language constraints. The ROBINS-I tool was utilized for non-randomized studies, whereas the Cochrane risk of bias tool was applied to randomized controlled trials.

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Any reports and responses or comments on the article can be found at the end of the article.

Results

From 2,289 initially found studies, 56 satisfied the inclusion criteria. Among these, 28 employed interventional designs, whilst the remaining 28 were observational research. The predominant problems documented in several investigations encompassed infection, wound dehiscence, malocclusion, paraesthesia, malunion/non-union, segment movement, hardware failure, and palpable hardware. Advanced methodologies such as 3D plate systems and locking mechanisms were linked to diminished complication rates.

Conclusion

This systematic analysis presents a decade of updated research about problems associated with miniplate placement in maxillofacial fractures. Novel methodologies such as 3D plate systems and locking mechanisms demonstrate promise in mitigating problems relative to conventional techniques. These findings can facilitate informed decision-making in clinical practice. Additional study utilizing standardized outcomes and prospective designs is essential to enhance comprehension of the long-term effects of miniplate utilization.

Keywords

systematic review; miniplate; complications; maxillofacial fractures.

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REVISED Amendments from Version 2

We updated the funding statement.

Any further responses from the reviewers can be found at the end of the article

Introduction

Maxillofacial fractures represent a considerable public health issue, frequently arising from road traffic accidents (RTAs), falls, and interpersonal violence, with RTAs being the primary cause in many countries, including Jordan and India.^{1,2} The epidemiology of these fractures differs by demographics, exhibiting a greater occurrence in males, especially within the 21-30 age range.² In Germany, there is a discernible increase in the frequency of maxillofacial trauma procedures, underscoring the necessity for efficient surgical interventions.³ In low- and middle-income countries, enhancing surgeon training is essential for improving care and outcomes in cranio-maxillofacial injuries.⁴ A multidisciplinary approach is crucial for the proper management of these complicated injuries.

Miniplate insertion is widely used in surgery, particularly in orthodontics and fracture stabilization. The insertion procedure generally requires 25 to 30 minutes, with research indicating an overall success rate of 95.5% for miniplates utilized in orthodontic treatments.⁵ The stability of these miniplates is greatly affected by the quality and amount of cortical bone at the insertion site, rendering them advantageous in regions with restricted bone availability.⁶ Three-dimensional imaging has improved miniplate placement accuracy, leading to better surgical outcomes and reduced operation time.⁶ Miniplate fixation is a dependable technique for establishing solid skeletal anchoring and promoting healing.^{5,7}

The available literature reveals a research gap concerning problems associated with miniplate implantation in craniofacial and orthognathic operations, indicating a necessity for more comprehensive studies. Systematic reviews highlight complications such as infections, plate exposure, and removal preference, with reported complication rates varying up to 32.5%.⁸ The average removal time is variable, spanning from 5.5 to 10.7 months, which suggests the absence of defined monitoring techniques.⁹ Most studies are retrospective, limiting conclusions on long-term outcomes and risk factors of miniplate use.⁹ This highlights the need for future research with more substantial, prospective cohorts and standardized outcome measures to further understanding of the implications of miniplate insertion and related problems in clinical practice.¹⁰

This systematic review updates evidence on complications of miniplate insertion in maxillofacial fractures. Additionally, the results of this study could benefit healthcare practitioners and patients in making an informed decision regarding the applicability and potential complications.

Methods

Data Sources and Searches

This systematic review was performed based on PRISMA guidelines on systemic reviews and meta-analyzes (PROSPERO: CRD42024612052).¹¹ The Cochrane Library, PubMed, and Scopus were examined from September 1, 2014, to September 1, 2024. We implement a decade-long trend to guarantee the innovative technique. We utilize the keyword combinations as follows: miniplate AND complications AND maxillofacial. **Table 1** delineated a combination of various search techniques. Furthermore, relevant papers that satisfied the inclusion criteria were manually identified within each retrieved study.

Table 1. Search strategy.

Database	Keywords
PubMed	("miniplate"[All Fields] OR "miniplates"[All Fields] OR "miniplateing"[All Fields]) AND ("complicances"[All Fields] OR "complicate"[All Fields] OR "complicated"[All Fields] OR "complicates"[All Fields] OR "complicating"[All Fields] OR "complication"[All Fields] OR "complication s"[All Fields] OR "complications"[MeSH Subheading] OR "complications"[All Fields]) AND "maxillofacial"[All Fields]
Scopus	(ALL (miniplate) AND ALL (complications) AND ALL (maxillofacial))
Cochrane Library	miniplate AND complications AND maxillofacial

Study Selection

We included a comprehensive original study detailing the complications associated with miniplate placement in maxillofacial fractures. No linguistic constraints were imposed. Studies were considered irrespective of the languages utilized, provided that English translations were accessible. Two reviewers (B.P.S. and A.K.) conducted separate evaluations of the titles and abstracts of possibly qualifying articles. All differences were deliberated with the third investigator (T.H.).

Data Extraction

Two independent assessors (B.P.S. and A.K.) extracted data and resolved discrepancies. We incorporated the subsequent data: 1) Attributes of the included studies (e.g., first author's name and publication year); 2) demographic attributes of the patient population (e.g., age, male percentage, and participant count in each group); 3) intervention attributes (e.g., type); and 4) outcomes. Disputes were settled by dialogue with the corresponding author (T.H.) until a consensus was achieved.

Descriptions of outcome Measures

The reported outcome was complications following miniplate insertion in maxillofacial fractures. We endeavored to reach the original authors to acquire further or missing information through email.

Risk of Bias Assessment

The quality of the included studies was evaluated according to the criteria outlined in the Cochrane Handbook for Systematic Reviews of Interventions.¹² The Cochrane risk of bias assessment was utilized for the randomized control trials.¹³ We evaluated the risk of bias in non-randomized studies utilizing the checklist for prevalence studies.¹⁴ All studies were evaluated by two independent reviewers (B.P.S. and A.K.). All disputes have been resolved during the consensus meeting.

Data Synthesis and Analysis

This systematic review emphasizes the synthesis and analysis of data to summarize and interpret findings from individual studies. The review initially delineates attributes, including design, sample size, interventions, and outcomes. The synthesis entails a critical evaluation of the research' quality, addressing methodological rigor and identifying any biases or limitations.

Results

Search Result

Figure 1 illustrates the electronic search procedure. We initially detected 2,289 articles. Of these, 2,196 duplicate papers or irrelevant studies were eliminated. Ninety-one papers were identified for additional investigation. Thirty-seven research were omitted from this list due to insufficient relevant data (Appendix Table 1). Two additional papers were acquired: one from a prior literature review and the other from a website search. We incorporated a total of 56 studies that fulfilled the inclusion criteria.^{15–70}

Study Characteristics

The attributes of the studies included have been captured in Table 2. Out of 56 investigations, 28 utilized an interventional design, including randomized controlled trials (RCTs), whereas the other 28 were observational studies, comprising cohort designs. India was the most prevalent country of study origin. This distribution represents a balance between experimental and observational research methodologies within the dataset, offering a comprehensive foundation for analyzing the investigated phenomena.

The majority of research contrasted conventional miniplate types with innovative methods, including 3D plate systems. Additionally, several studies investigated the effectiveness of locking compared to non-locking strategies in similar interventions. The most commonly reported complications included infection, wound dehiscence, malocclusion, paraesthesia, malunion/non-union, segment movement, hardware failure, and palpable hardware. These results underscore the variety of potential complications linked to the use of miniplates in clinical practice. Other details of results is provided in Table 2 extended data.

Risk of Bias Assessment of Included Studies

Result of risk of bias assessment were described in **Table 3** for RCTs studies. Twelve and ten studies addressed concerns about sufficient randomization and incomplete outcome data. five studies used adequate concealment of allocation. Participants and personnel in four studies were blind to treatment assignment, while assessors were unaware in four studies.

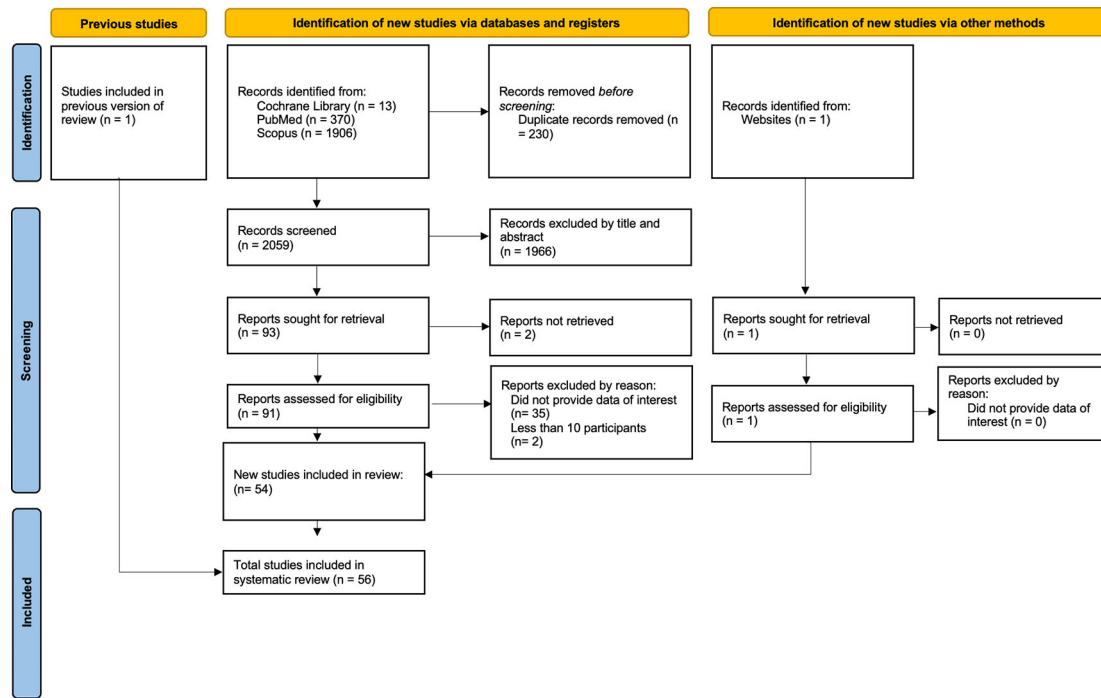


Figure 1. PRISMA flow diagram.

Table 3. Risk of bias RoB 1.0.

No.	First Authors, year	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data addressed
1	Adhikari, 2021	L	U	U	U	L
2	Agarwal, 2014	U	U	U	U	U
3	Agnihotri, 2014	L	U	U	U	U
4	Al-Moraissi, 2015	L	L	L	L	L
5	Camino Junior, 2017	L	U	U	U	L
6	Kanubaddy, 2016	L	U	U	U	L
7	Kumar, 2023	L	L	L	L	L
8	Mannan, 2018	L	L	L	L	U
9	Mathew, 2022	L	U	U	U	L
10	Rai, 2018	L	U	U	U	L
11	Sehgal, 2014	L	L	L	L	L
12	Tiwari, 2019	L	U	U	U	L
13	Yang, 2015	L	L	U	U	L

L = Low risk; H = High risk; U = Unclear risk of bias.

The quality assessment of risk of bias for non-randomized studies can be seen in [Table 4](#). overall studies yielded low risk of bias.

Table 4. Risk of bias checklist for prevalence studies.

No.	First Authors, year	1	2	3	4	5	6	7	8	9
1	Aggarwal, 2017	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Amjad, 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	Bhagat, 2021	Y	Y	Y	Y	Y	Y	Y	Y	Y
4	Bhatt, 2015	Y	Y	Y	Y	Y	Y	Y	Y	Y
5	Bohner, 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y
6	Burkhard, 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	Carricondo, 2018	Y	Y	Y	Y	Y	Y	Y	Y	Y
8	Daif, 2014	Y	Y	Y	Y	Y	Y	Y	Y	Y
9	Dediol, 2014	Y	Y	Y	Y	Y	Y	Y	Y	Y
10	Fani, 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y
11	Ferrari, 2018	Y	Y	Y	Y	Y	Y	Y	Y	Y
12	Fernandes, 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y
13	Gamit, 2024	Y	Y	Y	Y	Y	Y	Y	Y	Y
14	Ghezta, 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y
15	Graillon, 2021	Y	Y	Y	Y	Y	Y	Y	Y	Y
16	Kaushik, 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y
17	Kerdoud, 2021	Y	Y	Y	Y	Y	Y	Y	Y	Y
18	Khan, 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y
19	Khandelwal, 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y
20	Kreutzer, 2023	Y	Y	Y	Y	Y	Y	Y	Y	Y
21	Mishra, 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y
22	Mondal, 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y
23	Palani, 2021	Y	Y	Y	Y	Y	Y	Y	Y	Y
24	Pfister, 2024	Y	Y	Y	Y	Y	Y	Y	Y	Y
25	Rahpeyma, 2014	Y	Y	Y	Y	Y	Y	Y	Y	Y
26	Rai, 2021	Y	Y	Y	Y	Y	Y	Y	Y	Y
27	Ribeiro-Junior, 2018	Y	Y	Y	Y	Y	Y	Y	Y	Y
28	Rohit, 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y
29	Saha, 2015	Y	Y	Y	Y	Y	Y	Y	Y	Y
30	Sakong, 2021	Y	Y	Y	Y	Y	Y	Y	Y	Y
31	Sarepally, 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y
32	Shaik, 2014	Y	Y	Y	Y	Y	Y	Y	Y	Y
33	Sikora, 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y
34	Singh, 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y
35	Singh, 2020a	Y	Y	Y	Y	Y	Y	Y	Y	Y
36	Singh, 2020b	Y	Y	Y	Y	Y	Y	Y	Y	Y
37	Spinelli, 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y
38	Sukegawa, 2019a	Y	Y	Y	Y	Y	Y	Y	Y	Y
39	Sukegawa, 2019b	Y	Y	Y	Y	Y	Y	Y	Y	Y
40	Sukegawa, 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y
41	Sweta, 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y
42	Vashistha, 2017	Y	Y	Y	Y	Y	Y	Y	Y	Y
43	Yadav, 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y

Y = yes; N = no; U = unclear; NA = not applicable.

Discussion

This systematic review presents updated ten-year evidence about complications associated with miniplate insertion in maxillofacial fractures. The results of our study may assist healthcare practitioners and patients in making informed decisions about the applicability and potential difficulties associated with miniplate deployment. This study employed a rigorous methodology, ensuring high-confidence findings.

Infection is a notable problem subsequent to the placement of miniplates in maxillofacial surgery. Consistent with prior research, the overall infection rate linked to miniplates is roughly 13.3%, which is the primary reason for their removal, representing about 2.9% of cases in one meta-analysis.^{9,71} A study on orthodontic anchorage miniplates revealed that 17.3% of the placed miniplates developed infections, influenced significantly by the proximity to the mucogingival junction and the frequency of dental hygiene.⁷² In addition, one study reported the microbiological research indicated that *Staphylococcus aureus* was the primary pathogen at infected locations, underscoring the necessity for regular microbial evaluations to inform therapy.⁷³ These findings highlight the necessity of monitoring and mitigating infection risks associated with miniplate utilization.

The utilization of 3D miniplates in managing mandibular fractures has been associated to a reduced incidence of complications relative to traditional systems. Studies demonstrate that 3D miniplates enhance stability and diminish operational duration, resulting in superior intraoperative results and markedly fewer problems, including enhanced biting force and fracture stability.⁷⁴ A retrospective investigation of 336 patients indicated that merely 8.03% encountered minor problems, whereas significant difficulties arose in only 1.49% of instances.⁷⁵ A study on patient-specific 3D-printed miniplates exhibited exceptional precision in fixing and effective osseous union, devoid of material fractures or plate exposure.⁷⁶ The adaptability and effectiveness of 3D miniplates enhance their successful application in the treatment of mandibular fractures, underscoring their advantages compared to conventional techniques.⁷⁷

Several limitations must be acknowledged. First, a meta-analysis was not performed owing to the heterogeneity of the included studies. Secondly, the patient demographics and treatment durations differed among research, highlighting the necessity for meticulous evaluation when selecting protocols to pay attention to. Third, we include less prospective study. The evaluation encompasses a decade-long range to concentrate on the most recent methodologies in this field of research.

Conclusion and implications

This study's findings indicate that the majority of research has concentrated on contrasting conventional miniplate types with more advanced ways, such as 3D plate systems, while also assessing the efficacy of locking versus non-locking procedures. The extensive range of documented complications—such as infection, wound dehiscence, malocclusion, paraesthesia, malunion or non-union, segment movement, hardware failure, and palpable hardware—illustrates the clinical difficulties associated with miniplate implantation. Careful selection of miniplate technology and surgical techniques is crucial for minimizing complications and improving outcomes.

Author contributions

Conceived and designed the experiments: BPS TH. Analyzed the data: BPS AK. Wrote the paper: BPS TH. Designed search strategies: BPS AK TH. Critically reviewed the manuscript for important intellectual content: BPS AK MGW TH. Read and approved the final version: BPS AK MGW TH. Guarantors: BPS TH.

Ethics and consent

Ethical approval and consent were not required.

Data availability

Underlying data- No data are associated with this article.

Extended Data

Zenodo: Supplementary data, [10.5281/zenodo.14064447](https://doi.org/10.5281/zenodo.14064447).⁷⁸

This project contains the following underlying data:

1. Reporting guidelines, PRISMA checklist
2. Appendix Table 1. List of the excluded studies

Data are available under the terms of the Creative Commons Zero “No rights reserved” data waiver (Creative Commons Attribution 4.0 International).

Zenodo: Characteristics of included studies, [10.5281/zenodo.14207706](https://zenodo.org/record/14207706).⁷⁹

This project contains the following underlying data:

- Table 2 Characteristics of included studies

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Current Peer Review Status:   

Version 2

Reviewer Report 03 March 2025

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Mohammad Adhitya Latief

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I appreciate the time and effort you have taken to address my comments and improve the quality of the manuscript. After careful evaluation, I am pleased to inform you that your manuscript has fulfilled my request for correction as per my expectation. The revisions have satisfactorily addressed the concerns raised during the review process that I suggested, and no further modifications are required at this stage.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: trauma and fractures management in oral maxillofacial

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 26 February 2025

<https://doi.org/10.5256/f1000research.178440.r368384>

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Mohamed Jaber 

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I reviewed the modified version of the manuscript, the authors incorporated all my suggestions

for improvements, thus I have no further comments to make.
Final recommendation: Approve.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Maxillofacial injuries, Oral cancer and precancer, dental education

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 14 February 2025

<https://doi.org/10.5256/f1000research.174686.r348231>

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Indra Mulyawan 

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This article is quite good and complete, has met the requirements of a good article, only needs to be sharpened in the background regarding the intent and direction of the purpose of this research. only a few articles reviewed are confirmed to be in accordance with the theme of the article.

Just need to provides more references to have a strength reason why we have to use the miniplate, how the best way to use the miniplates and also how to take care the complications. It is very useful for an oral maxillofacial surgeon to decide the best therapy in maxillofacial fractures.

Are the rationale for, and objectives of, the Systematic Review clearly stated?

Yes

Are sufficient details of the methods and analysis provided to allow replication by others?

Yes

Is the statistical analysis and its interpretation appropriate?

Yes

Are the conclusions drawn adequately supported by the results presented in the review?

Yes

If this is a Living Systematic Review, is the 'living' method appropriate and is the search schedule clearly defined and justified? ('Living Systematic Review' or a variation of this term should be included in the title.)

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: oral and maxillofacial surgery

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 18 Feb 2025

bramasto purbo sejati

Response: Thank you for review and acknowledgement.

Competing Interests: none

Reviewer Report 22 January 2025

<https://doi.org/10.5256/f1000research.174686.r348230>

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Mohammad Adhitya Latief

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Power:

1. Comprehensive Review: The paper systematically reviews complications associated with miniplate insertion in maxillofacial fractures over a decade, providing a broad and updated perspective, as mentioned in methods that data examined from September 1, 2014, to September 1, 2024.
2. Diverse Data Sources: It utilizes multiple databases (Cochrane Library, PubMed, Scopus) and includes studies without language constraints, ensuring a wide range of data as mentioned in methods section, data source and searches.
3. Methodological Rigor: The review follows PRISMA guidelines and employs robust tools (ROBINS-I, Cochrane risk of bias tool) for assessing study quality, enhancing the reliability of findings.
4. Balanced Study Designs: The inclusion of both interventional and observational studies offers a comprehensive analysis of the phenomena. This distribution represents a balance

between experimental and observational research methodologies within the dataset, offering a comprehensive foundation for analyzing the investigated phenomena.

5. Focus on Novel Techniques: The paper highlights advanced methodologies like 3D plate systems and locking mechanisms, which show promise in reducing complications.

Weakness:

1. Heterogeneity: The included studies exhibit significant variability in patient demographics, treatment durations, and methodologies, which limits the ability to perform a meta-analysis. One of the example is decision to include the use of miniplate in orthognatic surgery, Because the title is focussing in complication of miniplate in maxillofacial fractures, but the samples used in this research also include miniplate in orthognatic surgery which is very different in outcomes or surgery result.
2. Lack of Standardization: The absence of standardized outcome measures across studies makes it challenging to compare results directly. Although I cant find table 2 as result in the article, I could tell that it is challenging since there will be differences outcome because the different usage in fracture cases and orthognatic cases
3. Limited Prospective Data: There is a need for more prospective studies to better understand the long-term effects of miniplate utilization. As mention in article that Additional study utilizing standardized outcomes and prospective designs is essential to enhance comprehension of the long-term effects of miniplate utilization
4. Potential Bias: Despite using robust tools, the risk of bias in some studies remains unclear, which could affect the overall conclusions. We might correct this by using statistic to eliminate any factor that has potential bias, but unfortunately I cant find any of them in this article.

Overall, the paper provides valuable insights but also highlights the need for more standardized and prospective research to fully understand the implications of miniplate insertion in maxillofacial fractures. However, In my opinion the article provides a comprehensive exploration of the role and applications of miniplates in craniofacial surgery and Oral and maxillofacial field procedures. It delves into their potential complications, offering insights into their effectiveness in stabilizing fractures, facilitating orthodontic surgery, and supporting reconstructive surgeries. This article broadens our understanding of miniplate application, guiding clinicians in selecting appropriate systems and optimizing outcomes. By addressing both benefits and limitations, it serves as a valuable resource for advancing knowledge in the field and improving patient care.

Are the rationale for, and objectives of, the Systematic Review clearly stated?

Partly

Are sufficient details of the methods and analysis provided to allow replication by others?

No

Is the statistical analysis and its interpretation appropriate?

No

Are the conclusions drawn adequately supported by the results presented in the review?

Partly

If this is a Living Systematic Review, is the 'living' method appropriate and is the search schedule clearly defined and justified? ('Living Systematic Review' or a variation of this term)

should be included in the title.)

Not applicable

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: trauma and fractures management in oral maxillofacial

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 18 Feb 2025

bramasto purbo sejati

Reviewer 2:

Power:

Comprehensive Review: The paper systematically reviews complications associated with miniplate insertion in maxillofacial fractures over a decade, providing a broad and updated perspective, as mention on methods that data examined from September 1, 2014, to September 1, 2024.

Diverse Data Sources: It utilizes multiple databases (Cochrane Library, PubMed, Scopus) and includes studies without language constraints, ensuring a wide range of data as mentioned in methods section, data source and searches.

Methodological Rigor: The review follows PRISMA guidelines and employs robust tools (ROBINS-I, Cochrane risk of bias tool) for assessing study quality, enhancing the reliability of findings.

Balanced Study Designs: The inclusion of both interventional and observational studies offers a comprehensive analysis of the phenomena. This distribution represents a balance between experimental and observational research methodologies within the dataset, offering a comprehensive foundation for analyzing the investigated phenomena.

Focus on Novel Techniques: The paper highlights advanced methodologies like 3D plate systems and locking mechanisms, which show promise in reducing complications.

Response: Thank you for your review and acknowledgment.

Weakness:

Heterogeneity: The included studies exhibit significant variability in patient demographics, treatment durations, and methodologies, which limits the ability to perform a meta-analysis. One of the example is decision to include the use of miniplate in orthognatic surgery, Because the title is focussing in complication of miniplate in maxillofacial fractures, but the samples used in this research also include miniplate in orthognatic surgery which is very different in outcomes or surgery result.

Response: Thank you for review. We acknowledge this in our limitation of study.

Lack of Standardization: The absence of standardized outcome measures across studies makes it challenging to compare results directly. Although I cant find table 2 as result in the article, I could tell that it is challenging since there will be differences outcome because the different usage in fracture cases and orthognatic cases

Response: We agree with your suggestion. Due to the significant heterogeneity of the included studies, we were unable to conduct a meta-analysis; therefore, we can only perform a systematic review.

Limited Prospective Data: There is a need for more prospective studies to better understand the long-term effects of miniplate utilization. As mention in article that Additional study utilizing standardized outcomes and prospective designs is essential to enhance comprehension of the long-term effects of miniplate utilization

Response: We acknowledge this as the limitation of the study.

Potential Bias: Despite using robust tools, the risk of bias in some studies remains unclear, which could affect the overall conclusions. We might correct this by using statistic to eliminate any factor that has potential bias, but unfortunately I cant find any of them in this article.

Response: We utilize the risk of bias assessment tool based on the Joanna Briggs Institute assessment scale. According to the grading scale, we cannot draw an overall conclusion; instead, we will categorize each item with responses of "yes," "no," and "unclear."

Overall, the paper provides valuable insights but also highlights the need for more standardized and prospective research to fully understand the implications of miniplate insertion in maxillofacial fractures. However, In my opinion the article provides a comprehensive exploration of the role and applications of miniplates in craniofacial surgery and Oral and maxillofacial field procedures. It delves into their potential complications, offering insights into their effectiveness in stabilizing fractures, facilitating orthodontic surgery, and supporting reconstructive surgeries. This article broadens our understanding of miniplate application, guiding clinicians in selecting appropriate systems and optimizing outcomes. By addressing both benefits and limitations, it serves as a valuable resource for advancing knowledge in the field and improving patient care.

Response: We sincerely appreciate the reviewer's favorable remarks and perceptive recommendations. In accordance with the given comments, we have meticulously revised the manuscript to improve clarity and coherence.

Competing Interests: none

Reviewer Report 16 January 2025

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Review Report for Manuscript Submitted to F1000Research

Title: Complications following miniplate insertion in maxillofacial fractures: A systematic review. The manuscript is relevant to the field of maxillofacial surgery and explores an important area: complications associated with miniplate insertion. It aligns with the interests of F1000Research, particularly in presenting evidence-based insights useful for clinical practice. However, significant improvements are required for it to meet the journal's standards of rigor and clarity.

Key findings

- The manuscript reviews ten years of data on complications following miniplate insertion, providing valuable insights into trends and advanced methodologies.
- The focus on novel techniques such as 3D plate systems highlights advancements with potential to reduce complications.
- The authors adhere to PRISMA guidelines and employ robust tools like the ROBINS-I and Cochrane risk of bias tools to evaluate study quality.
- The discussion emphasizes the need for standardized outcomes and prospective studies, which is vital for advancing clinical practices.

Limitations and Suggestions for Improvement:

- The results and discussion sections could benefit from deeper statistical and comparative analyses. For example: provide quantitative comparisons between traditional and advanced methodologies. Detail the statistical significance of the findings related to complication rates.
- The search strategy appears robust, but details on the inclusion/exclusion criteria for studies are insufficient. A clearer explanation of why certain studies were excluded (e.g., irrelevance or quality issues) would enhance transparency.
- Some sections, particularly the introduction and discussion, are repetitive. Consolidating overlapping points and presenting a more concise narrative will improve readability.
- The inclusion of figures or summary tables (e.g., comparison of complication rates by technique) would better communicate the findings.
- While the PRISMA framework was followed, the authors did not conduct a meta-analysis. If heterogeneity precluded this, it should be explicitly stated and justified in the text.
- The language is generally clear but needs refinement to eliminate redundancy and improve flow. For example, the repeated mention of infection rates and their significance across sections could be consolidated.
- Certain sentences are overly technical, which might hinder accessibility for a broader audience. Simplifying terminology without losing accuracy is recommended.
- The manuscript lacks a detailed comparison of its findings with those of previous reviews or meta-analyses. Highlighting how this review advances knowledge or contradicts earlier work would enhance its contribution.
- A more robust discussion of study limitations is necessary, particularly concerning variability in patient demographics and differences in surgical expertise, healthcare infrastructure across studies, and retrospective study designs in many included papers.

Key Recommendations:

1. Include statistical analyses or at least a detailed qualitative comparison of complication rates.
2. Streamline the text, especially in sections with overlapping content.
3. Add summary tables or figures to improve data visualization.

4. Clarify methodological choices, particularly regarding the heterogeneity of included studies.
5. Expand on the implications of the findings, both clinical and research-oriented.

Suitability for indexing:

The manuscript has potential but requires revisions to strengthen its methodological rigor, depth of analysis, and presentation. With these changes, it could serve as a valuable resource for clinicians and researchers in maxillofacial surgery.

I recommend **major revisions** prior to indexing.

Thank you

Are the rationale for, and objectives of, the Systematic Review clearly stated?

Yes

Are sufficient details of the methods and analysis provided to allow replication by others?

Partly

Is the statistical analysis and its interpretation appropriate?

Partly

Are the conclusions drawn adequately supported by the results presented in the review?

Partly

If this is a Living Systematic Review, is the 'living' method appropriate and is the search schedule clearly defined and justified? ('Living Systematic Review' or a variation of this term should be included in the title.)

Not applicable

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Maxillofacial injuries, Oral cancer and precancer, dental education

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Author Response 18 Feb 2025

bramasto purbo sejati

Reviewer 1:

Review Report for Manuscript Submitted to F1000Research

Title: Complications following miniplate insertion in maxillofacial fractures: A systematic review.

The manuscript is relevant to the field of maxillofacial surgery and explores an important area: complications associated with miniplate insertion. It aligns with the interests of F1000Research, particularly in presenting evidence-based insights useful for clinical practice. However, significant improvements are required for it to meet the journal's

standards of rigor and clarity.

Key findings

The manuscript reviews ten years of data on complications following miniplate insertion, providing valuable insights into trends and advanced methodologies.

The focus on novel techniques such as 3D plate systems highlights advancements with potential to reduce complications.

The authors adhere to PRISMA guidelines and employ robust tools like the ROBINS-I and Cochrane risk of bias tools to evaluate study quality.

The discussion emphasizes the need for standardized outcomes and prospective studies, which is vital for advancing clinical practices.

Response: Thank you for your insightful assessment and constructive recommendations. We value your acknowledgment of the manuscript's significance to maxillofacial surgery and its prospective impact on clinical practice.

Limitations and Suggestions for Improvement:

The results and discussion sections could benefit from deeper statistical and comparative analyses. For example: provide quantitative comparisons between traditional and advanced methodologies. Detail the statistical significance of the findings related to complication rates.

Response: Thank you for your insightful feedback. We recognize the significance of comprehensive statistical and comparative analysis. Nonetheless, the heterogeneity of the included studies—characterized by differences in research design, patient demographics, intervention procedures, and outcome measures—precluded the possibility of conducting a meta-analysis or offering direct statistical comparisons between traditional and advanced approaches. We performed a systematic review to qualitatively synthesize the existing evidence. This limitation has been explicitly addressed in the manuscript's Limitation section to maintain transparency. We have meticulously analyzed the findings to offer significant insights into the trends and possible ramifications of the examined approaches.

The search strategy appears robust, but details on the inclusion/exclusion criteria for studies are insufficient. A clearer explanation of why certain studies were excluded (e.g., irrelevance or quality issues) would enhance transparency.

Response: Thank you for your input. We value your inquiry regarding the criteria for inclusion and exclusion. We wish to highlight that the justifications for study exclusion have already been detailed in Appendix Table 1.

Some sections, particularly the introduction and discussion, are repetitive. Consolidating overlapping points and presenting a more concise narrative will improve readability.

Response: We have carefully reviewed the manuscript and guaranteed that the updated version is more succinct, with superfluous points eliminated, especially in the Introduction

and Discussion sections. The revised version now offers a more coherent and concise narrative while preserving the requisite analytical depth. We value your recommendation and assert that these modifications improve the manuscript's general readability.

The inclusion of figures or summary tables (e.g., comparison of complication rates by technique) would better communicate the findings.

Response: To improve clarity and effectively convey our data, we have incorporated Table 2, which presents a comparative summary of complication rates by technique. Nonetheless, owing to the heterogeneity of the data—characterized by discrepancies in study designs, outcome definitions, and patient populations—we were unable to produce a forest plot or do a meta-analysis. The manuscript acknowledges this limitation.

While the PRISMA framework was followed, the authors did not conduct a meta-analysis. If heterogeneity precluded this, it should be explicitly stated and justified in the text.

Response: The manuscript acknowledges this limitation.

The language is generally clear but needs refinement to eliminate redundancy and improve flow. For example, the repeated mention of infection rates and their significance across sections could be consolidated.

Response: The document has been carefully reviewed and the text has been updated to remove redundancy and enhance overall coherence. We have synthesized redundant references to infection rates and their significance to provide a more concise and consistent presentation.

Certain sentences are overly technical, which might hinder accessibility for a broader audience. Simplifying terminology without losing accuracy is recommended.

Response: We have carefully reviewed the manuscript and refined excessively technical sentences to improve readability while preserving scientific precision. We have refined terminology when necessary to maintain accessibility for a wider audience while preserving the integrity of our analysis.

The manuscript lacks a detailed comparison of its findings with those of previous reviews or meta-analyses. Highlighting how this review advances knowledge or contradicts earlier work would enhance its contribution.

Response: To mitigate this risk, we have included citations of prior systematic reviews in the Introduction to contextualize our analysis. Furthermore, we have ensured that our discourse emphasizes how our findings correlate with and enhance the current body of research.

A more robust discussion of study limitations is necessary, particularly concerning variability

in patient demographics and differences in surgical expertise, healthcare infrastructure across studies, and retrospective study designs in many included papers.

Response: We have enhanced the Limitations section to offer a more comprehensive analysis of the probable sources of variability in our selected studies. We now examine variations in patient demographics, surgical proficiency, and healthcare infrastructure that may affect the reported outcomes. Furthermore, we recognize the influence of retrospective study designs in numerous included articles and its consequences for data dependability and bias.

Key Recommendations:

Include statistical analyses or at least a detailed qualitative comparison of complication rates.

Streamline the text, especially in sections with overlapping content.

Add summary tables or figures to improve data visualization.

Clarify methodological choices, particularly regarding the heterogeneity of included studies.

Expand on the implications of the findings, both clinical and research-oriented.

Response: I appreciate your valuable suggestions. We have carefully evaluated each point and updated the manuscript accordingly. To fulfill the requirement for statistical or qualitative comparisons, we have presented a comprehensive qualitative comparison of complication rates in Table 2, as a meta-analysis was impracticable due to data heterogeneity. We have refined the language, especially in the Introduction and Discussion, to remove redundancy and enhance clarity. Table 2 has been incorporated to summarize significant findings for improved data presentation; nevertheless, a forest plot could not be produced due to the diversity of the included research. Furthermore, we have elucidated our methodological selections, especially about the influence of sample heterogeneity, in the Methods and Limitations sections. We have broadened the discourse on the clinical and research ramifications of our findings to emphasize their importance and prospective research avenues. We value your astute recommendations, which have enhanced the manuscript.

Suitability for indexing:

The manuscript has potential but requires revisions to strengthen its methodological rigor, depth of analysis, and presentation. With these changes, it could serve as a valuable resource for clinicians and researchers in maxillofacial surgery.

I recommend major revisions prior to indexing.

Response: Thank you for your assessment and insightful feedback. We have carefully revised the manuscript to enhance its methodological rigor, analytical depth, and presentation, in accordance with your recommendations. The modifications have been emphasized in red for your convenience. We anticipate that the improvements align with your expectations and augment the manuscript's utility as a significant resource for physicians and researchers in maxillofacial surgery.

Competing Interests: none

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