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REVIEWER'S REPORT

Manuscript No.: IJAR-56534

Title: Bone Regeneration Under Tension: Advances in Distraction Osteogenesis,

Recommendation:
Accept as it is .....
Accept after minor revision.....
Accept after major revision .....YES.....
Do not accept (*Reasons below*) .....

Rating	Excel.	Good	Fair	Poor
Originality		✓		
Techn. Quality			✓	
Clarity			✓	
Significance		✓		

Reviewer's ID: JPR-094

Detailed Reviewer's Report

Reviewer Report

1. Strengths of the Manuscript

Comprehensive topic coverage

The manuscript provides a broad overview of distraction osteogenesis (DO), including biological mechanisms, mechanotransduction pathways, clinical applications, complications, and emerging technologies.

Integration of recent literature (2018–2025)

The authors incorporate relatively recent studies discussing molecular pathways, regenerative medicine strategies, and digital surgical planning.

Clear clinical relevance

The review highlights practical applications in craniofacial surgery such as mandibular distraction, midface advancement, and alveolar ridge augmentation.

Well-structured organization

The manuscript follows a logical progression: biological mechanisms → clinical applications → technological advances → complications → future directions.

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Inclusion of emerging technologies

Discussion of artificial intelligence, digital surgical planning, and regenerative medicine adds contemporary relevance to the topic.

2. Weaknesses of the Manuscript

Lack of systematic methodology

The review does not describe a structured search strategy (e.g., database sources, keywords, inclusion/exclusion criteria). This limits transparency and reproducibility.

Limited critical analysis of literature

The manuscript primarily summarizes existing studies without critically evaluating their methodological quality, limitations, or conflicting evidence.

Insufficient comparative analysis

There is minimal comparison between distraction osteogenesis and alternative reconstructive approaches such as bone grafting or vascularized free flaps.

Some sections are overly descriptive

The biological mechanisms section contains extensive mechanistic descriptions but lacks integration with clinical implications.

Lack of figures, tables, or diagrams

Visual summaries (e.g., mechanotransduction pathways, phases of distraction osteogenesis, clinical indications) would improve readability and understanding.

Reference inconsistencies

Some references relate to limb lengthening or orthopedic applications rather than craniofacial distraction osteogenesis, which may reduce the specificity of the review.

Language and formatting issues

Minor grammatical errors, inconsistent citation formatting, and typographical symbols (e.g., quotation marks around tension-stress effect) require editing.

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3. Significance and Contribution

The manuscript addresses an important topic in craniofacial and maxillofacial surgery, as distraction osteogenesis remains a key technique for managing skeletal deficiencies and complex reconstructive challenges.

The review highlights recent advances in:

molecular biology of bone regeneration

digital surgical planning and 3D printing

biologic augmentation strategies

AI-based predictive modeling.

However, the overall scientific contribution is moderate, as similar narrative reviews already exist in the literature. The novelty lies mainly in integrating recent developments such as digital planning and regenerative medicine.

4. Recommendation

Decision: Major Revision

Reasons for Major Revision

The manuscript lacks a clearly defined literature search methodology.

Critical appraisal of cited studies is insufficient.

Comparative discussion with alternative reconstructive techniques should be expanded.

Figures, tables, or conceptual diagrams should be added.

Reference list should be revised to ensure relevance to craniofacial distraction osteogenesis.

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5. Specific Suggestions for Improvement

Add a **methodology section** describing database search strategy and study selection criteria.

Include **tables summarizing key clinical studies** on mandibular, midface, and alveolar distraction osteogenesis.

Provide **illustrative figures** explaining:

phases of distraction osteogenesis

mechanotransduction signaling pathways.

Expand discussion comparing DO with **bone grafting, free flap reconstruction, and orthognathic surgery**.

Revise language and formatting to improve clarity and readability.

Final Recommendation: Major Revision Required Before Publication.

Reviewer Justification for Major Revision

Manuscript Title: *Bone Regeneration Under Tension: Advances in Distraction Osteogenesis*

Below are the **major issues identified in the manuscript with justification for recommending major revision**.

1. Absence of a Clear Literature Search Methodology

Issue:
The manuscript claims to synthesize evidence from **2018–2025**, but it does not describe the **search strategy, databases used, keywords, inclusion/exclusion criteria, or study selection process**.

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Justification:

Without a defined methodology, the review lacks transparency and reproducibility. Readers cannot determine whether the literature selection was systematic or biased. High-quality reviews require at least a brief description of literature search methods.

2. Limited Critical Appraisal of the Literature

Issue:

Most sections summarize previous studies descriptively without discussing **study limitations, sample size, methodological quality, or conflicting findings**.

Justification:

A review article should not only summarize evidence but also critically evaluate it. The absence of critical analysis reduces the scientific depth and limits the manuscript's contribution to the field.

3. Inadequate Comparison With Alternative Reconstructive Techniques

Issue:

Although distraction osteogenesis is discussed extensively, the manuscript provides minimal comparison with other reconstructive options such as:

autogenous bone grafting

vascularized free flap reconstruction

conventional orthognathic surgery.

Justification:

A balanced review should compare advantages and disadvantages of different treatment modalities. Lack of comparative discussion weakens the clinical relevance and limits decision-making insights for clinicians.

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4. Overly Descriptive Biological Mechanism Section

Issue:

The sections describing **mechanotransduction pathways, osteoimmune regulation, and stem cell signaling** are highly descriptive and contain extensive molecular detail but limited clinical interpretation.

Justification:

The manuscript would benefit from linking molecular mechanisms more clearly to **clinical outcomes, treatment optimization, and therapeutic applications**. Excessive mechanistic detail without integration reduces readability.

5. Lack of Tables, Figures, or Illustrative Diagrams

Issue:

The manuscript contains no **visual elements** such as:

diagrams of distraction osteogenesis phases

pathway illustrations

tables summarizing clinical studies.

Justification:

Figures and tables are essential in review articles to summarize complex information and improve readability. Their absence makes the manuscript text-heavy and harder to interpret.

6. Inclusion of References Not Directly Relevant to Craniofacial Distraction

Issue:

Several cited references focus on **long bone lengthening and orthopedic applications** rather than craniofacial distraction osteogenesis.

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Justification:

While mechanistic similarities exist, excessive reliance on non-craniofacial studies may reduce the specificity and clinical focus of the review.

7. Language and Formatting Problems

Issue:

The manuscript contains several issues including:

minor grammatical errors

inconsistent punctuation and quotation marks

irregular citation formatting

typographical symbols in the text.

Justification:

These issues affect readability and professionalism of the manuscript and require editorial revision before publication.

8. Limited Discussion of Evidence Strength and Clinical Outcomes

Issue:

The manuscript discusses therapeutic advances but does not clearly evaluate:

strength of evidence

levels of clinical evidence

long-term outcomes or success rates.

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Justification:

Providing evidence hierarchy or summarizing key clinical outcomes would significantly strengthen the scientific value of the review.

Overall Reason for Major Revision

Major revision is recommended because the manuscript requires **substantial improvements in methodology description, critical analysis, literature organization, and presentation quality**. Addressing these issues will significantly enhance the scientific rigor and clinical relevance of the review.

Final Recommendation:

Major Revision Required Before Publication.