

Efficacy of Bone Marrow Aspirates in Bone Regeneration Compared to Conventional Bone Grafts- A Systematic Review

Hannah Kadic, Shilpa Bhandi, Kamran H. Awan, Frank W. Licari, Shankargouda Patil
College of Graduate Studies, Roseman University of Health Sciences

INTRODUCTION

Bone Marrow Aspirates Concentrates (BMACs) are biological derivatives obtained from the bone marrow that has proven efficacious and may be clinically more applicable than culture-grown mesenchymal stem cells. The aim of the present systematic review is to explore and analyze the literature on the efficacy of bone marrow aspirates in new bone formation.

METHODS

The present systematic review was conducted in accordance with the PRISMA guidelines.¹¹ The review was conducted with the focused question, "Can bone marrow aspirates enhance bone regeneration compared to conventional bone grafts alone?"

Inclusion Criteria:

Population (P)- Patients undergoing bone regeneration
Intervention (I)- Bone marrow aspirates
Control (C)- Conventional Bone grafts
Outcome (O)- New bone formation

Studies (S)- Human clinical trials, prospective studies

Exclusion criteria:

Letters to the editor, commentaries, reviews including narrative and systematic reviews, case reports, and case series were excluded from the present systematic review. Articles in languages other than English were excluded.

Database	Search terms	Articles
Pubmed	("bone marrow"[MeSH Terms] OR ("bone"[All Fields] AND "marrow"[All Fields]) OR "bone marrow"[All Fields]) AND ("aspirant"[All Fields] OR "aspirants"[All Fields] OR "aspirate"[All Fields] OR "aspirated"[All Fields] OR "aspirates"[All Fields] OR "aspirating"[All Fields] OR "aspiration"[All Fields] OR "aspirational"[All Fields] OR "aspirations, psychological"[MeSH Terms] OR ("aspirations"[All Fields] AND "psychological"[All Fields]) OR "psychological aspirations"[All Fields] OR "aspirations"[All Fields] OR "aspirative"[All Fields] OR "aspirator"[All Fields] OR "aspirators"[All Fields] OR "aspire"[All Fields] OR "aspired"[All Fields] OR "aspire"[All Fields] OR "aspiring"[All Fields]) AND ("dental health services"[MeSH Terms] OR ("dental"[All Fields] AND "health"[All Fields] AND "services"[All Fields]) OR "dental health services"[All Fields] OR "dental"[All Fields] OR "dentally"[All Fields] OR "dentals"[All Fields] AND ("regenerability"[All Fields] OR "regenerable"[All Fields] OR "regenerant"[All Fields] OR "regenerants"[All Fields] OR "regenerate"[All Fields] OR "regenerated"[All Fields] OR "regenerates"[All Fields] OR "regenerating"[All Fields] OR "regeneration"[MeSH Terms] OR "regeneration"[All Fields] OR "regenerations"[All Fields])	56
Scopus	(bone AND marrow AND aspirates AND dental AND regeneration)	24
Web of Science	ALL=(bone marrow aspirates dental regeneration)	70

Figure 1: Keywords used for the search

RESULTS

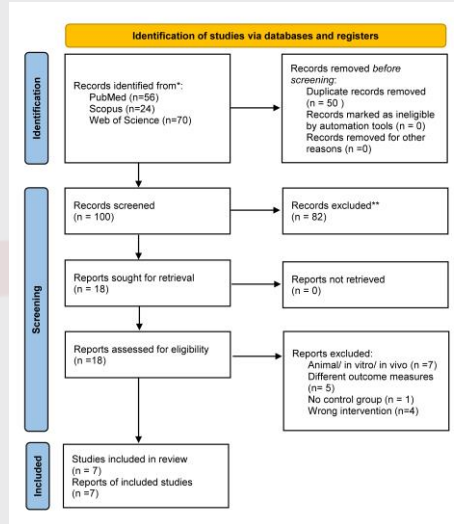


Figure 2: PRISMA diagram

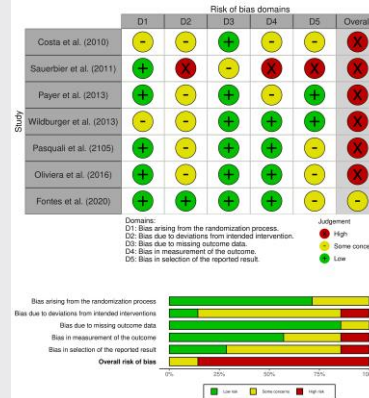


Figure 3. Summary of the risk of bias for randomized studies

CONCLUSION

The present systematic review suggests that adding bone marrow aspirates results in comparable results as bone graft alone. The results must be interpreted cautiously owing to its 'low quality' GRADE assessment. Future research with greater sample size, homogenous populations, and comparable digital imaging and software may provide results that can be aptly applied to broader populations.

References

Payer M, Lohberger B, Strunk D, Reich KM, Acham S, Jakse N. Effects of directly autotransplanted tibial bone marrow aspirates on bone regeneration and osseointegration of dental implants. *Clin Oral Implants Res.* 2014;25(4):468-474.
Martins LCF, de Oliveira ALSC, Aloise AC, et al. Bone marrow aspirate concentrate and platelet-rich fibrin in fresh extraction sockets: A histomorphometric and immunohistochemical study in humans. *J Cranio-Maxillofacial Surg.* 2021;49(2):104-109.