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Does Scaffold Augmentation Improve Patient-Reported Outcomes in Bone Marrow Stimulation?: A Systematic Review

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Background

- Bone marrow stimulation (BMS) is widely considered the first line treatment osteochondral lesions of the talus (OLTs), ideally in smaller lesions
- Tissue-engineering utilizing bioavailable scaffolds have been explored.
  - Employed after unsuccessful MFx treatment or to treat large primary lesions considered less amenable to microfracture
- Studies have shown greater cellular differentiation and maturation potential, improving reparative hyaline cartilage quality, but **available comparative studies with BMS techniques are limited in the literature.**

Objective

- Compare patient-reported outcome measures (PROMs) and complication rates of scaffold-based cartilage repair techniques versus bone marrow stimulation (BMS) in treating focal osteochondral lesions of the talus (OLTs).

Methodology

- Systematic review of PubMed, Embase, and Scopus databases up to November 1st, 2021.
- Clinical studies comparing PROMs and complications of scaffold-based techniques versus bone marrow stimulation techniques were eligible

Eligibility Criteria

- Published in English or Spanish
- Evaluated PROMs with/without complications
- A minimum 6-month follow-up

Methodological quality was assessed using the Modified Coleman Methodology Score (mCMS)

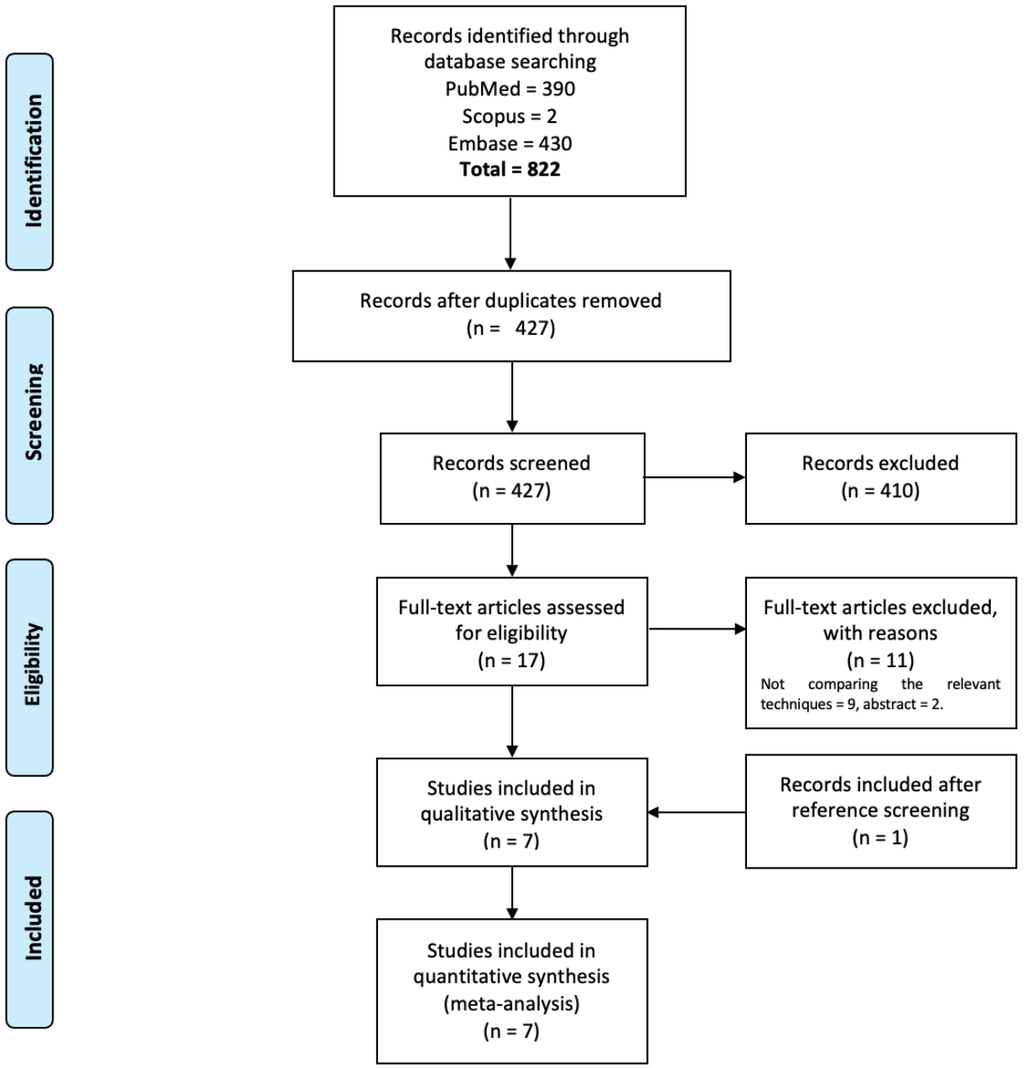
STUDY	Becher et al. 2018	Camurcu et al. 2020	Doğar et al. 2021	Eren et al. 2021	Lee et al. 2020	Migliorini et al. 2021	Tahta et al. 2017
LOE	III	III	I	III	I	II	III
mCMS							
Study size	4	7	7	7	4	7	7
Mean follow up	7	4	4	4	4	7	7
Therapeutical approach	7	7	7	7	7	7	7
Type of study	0	0	15	0	15	10	0
Description of diagnosis	0	5	5	5	5	5	0
Description of technique	10	10	10	10	10	10	10
Description of rehabilitation	5	5	5	5	5	0	0
Outcome criteria	5	5	7	5	7	10	5
Procedure of assessing outcomes	0	5	5	9	9	9	5
Description of subject selection process	5	5	5	5	5	5	5
TOTAL SCORE	**43**	**53**	**70**	**57**	**71**	**70**	**46**

LOE, level of evidence; mCMS, modified Coleman Methodology Score.

Table 1. Modified Coleman methodology scores of included studies.

Results

- Six studies met the eligibility criteria, and an additional study was included after citation screening in the systematic review
- Four retrospective cohort studies, two RCTs, and a prospective cohort study



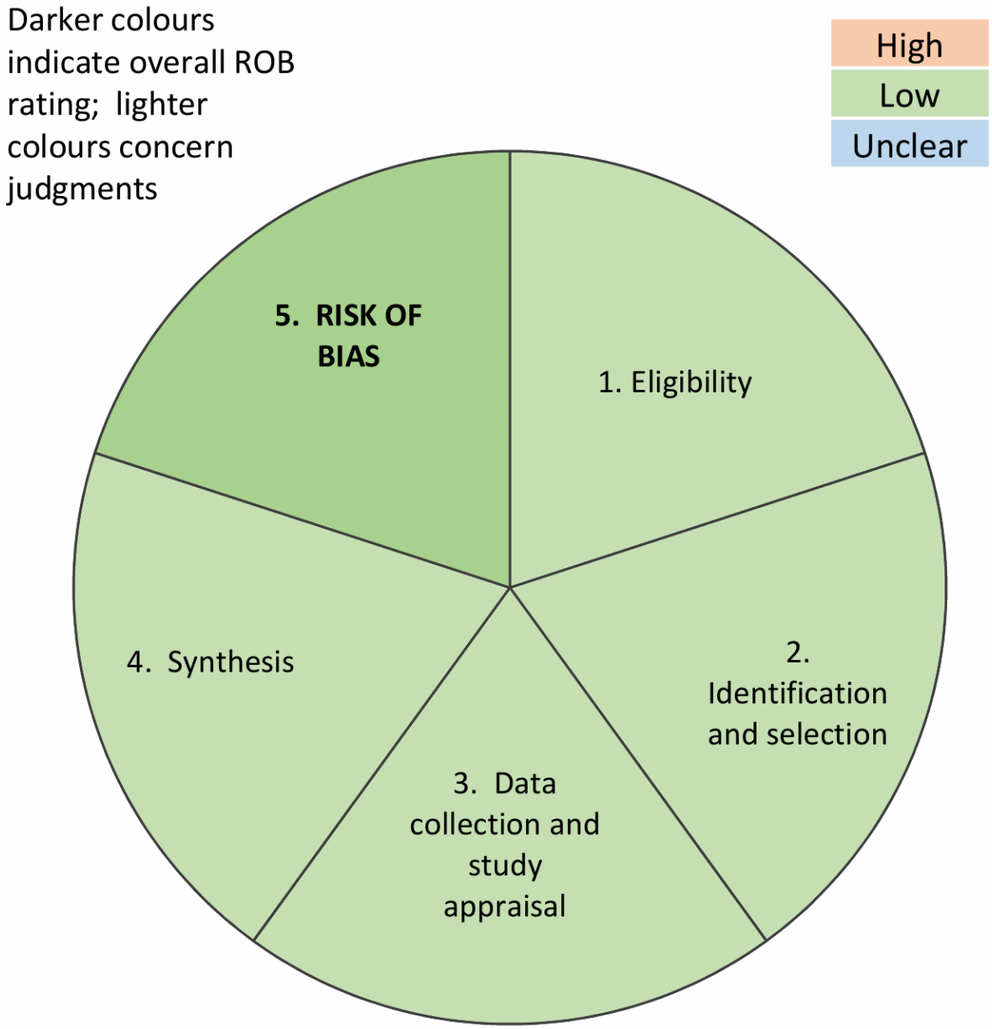
Results

- All included studies compared a BMS technique versus scaffold-augmented BMS.
- Three studies implanted collagen scaffolds, two utilized chitosan scaffolds, and two hyaluronan scaffolds.

Results

- The main finding of this systematic review is that both MFx and MFx augmented with scaffolds yield good to excellent short- and medium-term PROMs improvement.
- That improvement is significantly better in the scaffold-based techniques in larger or uncontained lesions and at longer follow-up.
- Both techniques show comparable complication rates and profiles.

The risk of bias in the review was low in all four domains



Discussion

- A limited number of studies compare MFx relative to augmented MFx with scaffold-based techniques
  - MFx and MFx augmented with scaffolds yield good to excellent short- and medium-term PROMs improvement
- The analyzed evidence relies mainly on retrospective cohort studies with a limited number of patients.
- No long-term follow-up studies were available, which may reveal striking differences once MFx outcomes start deteriorating

Conclusion

- Scaffold-augmented MFx appears safe and yields satisfactory short- and medium-term clinical improvement, especially in large or uncontained lesions and at longer follow-up

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