Orthobiologic Augmentation of ACL Reconstruction: Systematic Review and Meta-regression with MIBO Compliance Analysis

BACKGROUND

Re-rupture is a significant risk following ACL reconstruction. Orthobiologics may improve graft healing and recovery but evidence is inconclusive and methodology reporting is poor. The **Minimum Information for Studies Evaluating Biologics in Orthopaedics (MIBO)** guidelines were released to standardise methodological reporting which is important because **preparation methods have a direct impact on mechanism of action and healing.**

AIMS

1. Do orthobiologics improve clinical outcomes?
2. If so, which ones provide the greatest benefit?
3. **How well have our studies adhered to the MIBO guidelines?**

METHODS

Registration: PROSPERO (CRD42025646549).

Identification

Records from:
Databases (3257)
EMBASE (1586)
PubMed (1062)
MEDLINE (609)

Prospective clinical:
- ✔ **Re-rupture**
- ✔ **Knee function**
- ✔ **Knee pain**
- ✔ **Time/proportion to return to sport**
- ✔ **Activity level**

Included

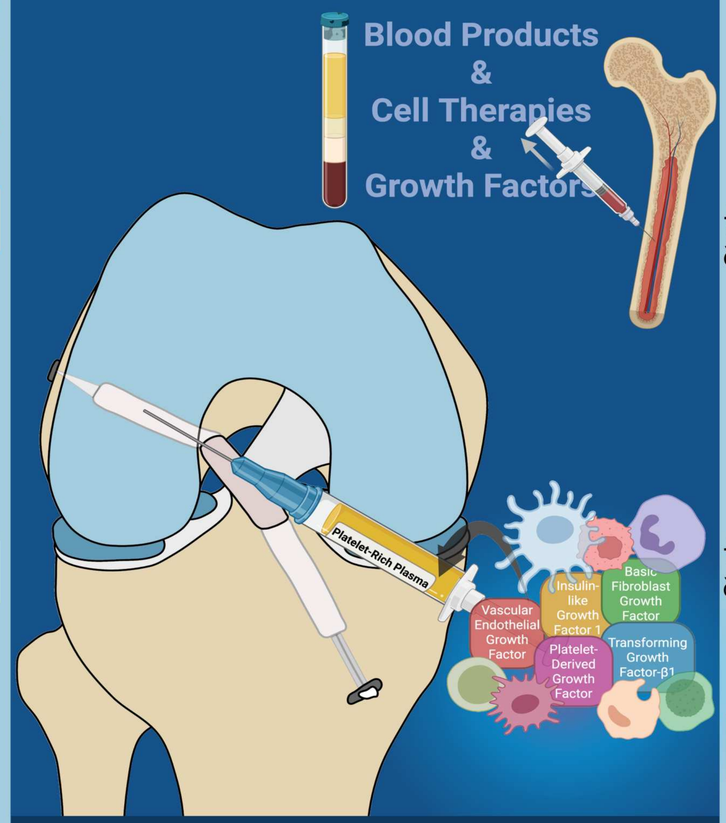
2008-2024, 9 RCTs, **855 patients**, 21.5% female

13 studies included in review

- ✔ Cochrane risk of bias: ROB-2 (randomised) and ROBINS-I V2 (non-randomised)
- ✔ Compliance with MIBO checklists
- ✔ Random-effects **meta-analyses** for statistical and clinical significance
- ✔ **Subgroup analysis** for aim 2
- ✔ **Meta-regression** for heterogeneity sources

R

Orthobiologic studies must follow the MIBO guidelines to determine clinical efficacy and safety for augmentation of ACL reconstruction



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Please scan barcode to see the MIBO guidelines

Questions

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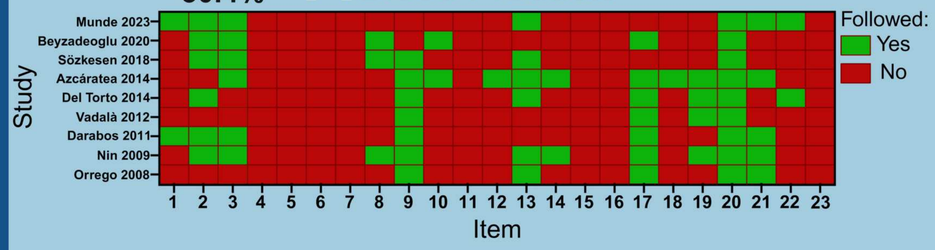
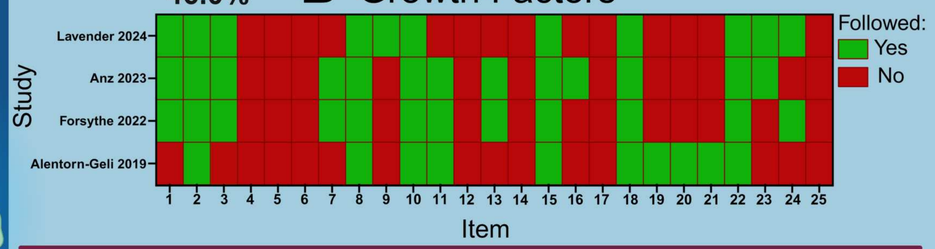
RESULTS

1. **Orthobiologics improved postoperative knee function by 2.76%** compared to standard reconstruction, though **clinical significance was low.**
2. **Platelet-rich plasma** alone provided a 2.70% increase in knee function.
3. **Average adherence to the MIBO guidelines was poor.** 30.4% in blood products and 46.0% in cell therapies/growth factors checklists. Stratification by type of checklist and timing of publication (pre-/post-MIBO) showed no trends with low adherence throughout.

Average Compliance: 30.4% **A** Blood Products



Average Compliance: 46.0% **B** Cell Therapies & Growth Factors



DISCUSSION

Orthobiologic data remains heterogeneous. At a time where **interest in orthobiologics has never been higher,** this is of concern.

Why?

Non-adherence may stem from **limited awareness** and **insufficient access to the equipment** required to follow the guidelines, likely due to exaggerated initial enthusiasm and resultant heavy marketing.

Action

Journals should require full adherence before publication. **Research grants should score MIBO-adhering proposals higher or provide higher monetary rewards** for orthobiologic characterisation equipment.