Is Autogenous Bone Still The Gold Standard? A Systematic Review

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Introduction

Despite advances, severe alveolar ridge deficiencies requiring block bone grafting remain challenging to treat. Autogenous bone has long been considered the gold standard[1]. However, harvesting autogenous bone can result in increased complication rates and patient morbidity[2]. Consequently, non-autogenous grafts may offer a viable alternative.

The aim of this systematic review was to evaluate whether non-autogenous bone block grafts have as favourable clinical and histomorphometric outcomes as autogenous bone blocks grafts when used for alveolar ridge augmentation.

Review question

Population: Adult patients with alveolar bone deficiency/atrophy following tooth loss or hypodontia in either the maxilla and/or mandible.

Intervention and comparator: Alveolar ridge augmentation with autogenous and non-autogenous bone block grafts.

Primary histomorphometric outcomes: Newly formed bone (NB)%, residual graft (RG)% and soft tissue component (ST)% based on a bone biopsy taken at time of implant placement.

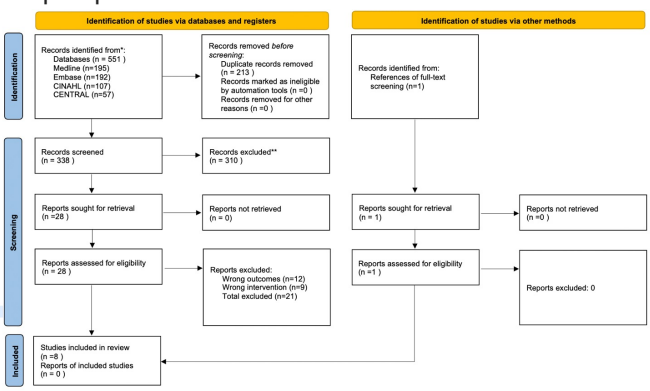
Secondary clinical outcomes: Implant survival rate (%), resorption (mm/%), graft success rate (%) and complications (type and rate).

Methods

- A topic specific search strategy was developed for the aims of the review with an information specialist.
- The review protocol was registered on PROSPERO[3].
- MEDLINE, CINAHL and Cochrane Register of Controlled Trials (CENTRAL) were searched – end date January 2023.
- Studies were selected, data extracted and appraised.
- A meta-analysis was not possible due to significant methodological heterogeneity between studies.

Results

- Eight studies were included in this review.
- Study selection process is shown below.
- Studies included randomised controlled trials, non-randomised controlled trials and uncontrolled prospective studies.



199 patients aged 18-85 years old underwent alveolar ridge augmentation in the following areas:

- Posterior mandible (n=3)
- Maxilla (n=2)
- Combination mandible/maxilla (n=3)

Studies included primarily females of good general health.

Autogenous vs Xenograft (Bovine)

- No differences in NB%
- Higher RG% with bovine bone blocks (p=0.008, 3.36 16.51).
- Complication rates higher for autogenous grafts.
- No difference in implant survival rate.

Low certainty of evidence

Autogenous vs Allograft

- Inconsistent findings.
- Histomorphometric outcomes
  - One study found no difference in NB%.
  - Another study found NB% higher in autogenous grafts (p=0.002).
- Higher complication rate with allograft bone blocks.
- Implant survival rate
  - One study found no difference
  - One detailed higher survival in autogenous grafts

Very low certainty of evidence

Interpretation of findings

Insufficient high-quality evidence exists to support the use of xenografts or allografts over traditional autogenous bone blocks, although outcomes do appear to be comparable. Therefore, they may be suitable alternatives for patients where harvesting autogenous bone blocks may not be appropriate or possible. The choice of graft should be based on individual treatment needs, patient choice and clinical judgement.

Limitations of review

- Inclusion of studies other than randomized controlled trials meant a meta-analysis was not appropriate to synthesize data.
- Low quality and quantity of studies.
- Review process conducted by one individual.

Further research

Randomized controlled trails which allow direct comparisons to be made are needed. These may consider the use of subgroups, patient reported outcomes and economic perspectives. There are currently no trials registered in this area.

References: 1. Sakkas A, Wilde F, Heufelder M, Winter K, Schramm A. Autogenous bone grafts in oral implantology—is it still a "gold standard"? A consecutive review of 279 patients with 456 clinical procedures. International Journal of Implant Dentistry. 2017;3(1):23. Reininger D, Cobo-Vázquez C, Monteserín-Matesanz M, López-Quiles J. Complications in the use of the mandibular body, ramus and symphysis as donor sites in bone graft surgery. A systematic review. Med Oral Patol Oral Cir Bucal. 2016;21(2):e241-9. 3. Pav Chana, Julian Yates, Lucy O'Malley. Clinical and histomorphometric outcomes of bone block grafts used for alveolar bone regeneration: a systematic review. PROSPERO 2023 CRD42023396783.