Critically Appraised Topic (CAT)

Project Team:
Group 7A-4
Project Team Participants:
D4: Chelsie Morasko, D3: Mackenzie Dederich, D2: Kandace Williamson, D1's: Ibrahim Alwan & Jack Melms
Clinical Question:
In preparation for an implant, when is a socket preservation bone graft indicated?
PICO Format:
P:
Extraction socket site for implant
I:
Socket preservation grafting
C:
Natural bone healing
O:
Improve alveolar ridge preservation in preparation for an implant placement
PICO Formatted Question:
For an extraction socket where an implant is being planned, does the use of bone grafting socket preservation techniques improve the alveolar ridge preservation after extraction compared with not using any bone grafting materials and allowing the socket to heal naturally?
Clinical Bottom Line:
When planning to do implant placement where a tooth is to be extracted, having a sufficient volume of bone is critical. By having enough bone we have more freedom in implant placement and size selection. This allows us to meet necessary surgical and prosthetic criteria.
Date(s) of Search:
Sept 29, Oct 2
Database(s) Used:

PubMed

Search Strategy/Keywords:

Socket Preservation, Alveolar Bone, Bone Loss, Implant Placement

MESH terms used:

Alveolar Bone Loss
Tooth Extraction
Alveolar Process
Socket Preservation

Article(s) Cited:

1) Schropp L, Wenzel A, Kostopoulos L, Karring T. Bone healing and soft tissue contour changes following single-tooth extraction: a clinical and radiographic 12-month prospective study. Int J Periodontics Restorative Dent. 2003 Aug;23(4):313-23. PMID: 12956475. to enter text.

2) Avila-Ortiz G, Elangovan S, Kramer KW, Blanchette D, Dawson DV. Effect of alveolar ridge preservation after tooth extraction: a systematic review and meta-analysis. J Dent Res. 2014 Oct;93(10):950-8. doi: 10.1177/0022034514541127. Epub 2014 Jun 25. PMID: 24966231; PMCID: PMC4293706.

3) Tabrizi R, Mohajerani H, Ardalani B, Khiabani K. Does preservation of the socket decrease marginal bone loss in the mandible after extraction of first molars? Br J Oral Maxillofac Surg. 2019 Nov;57(9):886-890. doi: 10.1016/j.bjoms.2019.07.019. Epub 2019 Aug 9. PMID: 31402193.

Study Design(s):

1) Prospective Cross-sectional Study
2) Systematic Review
3) Prospective Cohort Study

Reason for Article Selection:

1) Quantifies the expected bone loss in a naturally healed extraction socket.
2) Quantifies the amount of ridge volume preserved after socket preservation
3) Quantifies the amount of marginal bone loss of around an implant placed in a site that had undergone socket preservation prior, and sockets that were allowed to heal naturally.

Article(s) Synopsis:

1)
Method:
46 patients: premolars ext: Max - 11 & Man - 10; molars ext: Max - 9 & Man - 16
Dimensions of alveolar ridge were measured on clinically via casts and radiographically at 3, 6, and 12 months following tooth extraction

Results:
All regions combined: Width: -6.1mm; Height (orally): -0.8mm; Height (buccal): 0.4mm
Two thirds of this bone loss occurred in the first 3 months post extraction.

2)
Method:
Meta analysis of 22 RCTs utilizing 9 total alveolar ridge preservation treatment (ARP) modalities. (ex. bovine bone vs allograft).
Outcomes of interest being clinical and radiographic dimensional changes of the alveolar ridge.

Results:
ARP in comparison to tooth extraction alone prevented:
Horizontal bone loss - 1.99mm
Vertical (mid buccal) bone loss - 1.72mm
Vertical (mid lingual) bone loss - 1.16mm

3)
Method:
implants placed in 3 groups (n=30/group):
6mo after socket preservation
8wks after tooth extraction
6mo after tooth extraction
Changes in marginal bone level (MBL) measured after loading at 12, 24, & 36 months.
Measured radiographically on the mesial & distal sides of the implant using long cone paralleling technique.

Results:
No significant difference between the three treatment groups.

Levels of Evidence: (For Therapy/Prevention, Etiology/Harm)
See http://www.cebm.net/index.aspx?o=1025

☐ **1a – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)**
☐ **1b** – Individual RCT
☐ **2a** – Systematic Review of Cohort Studies
☐ **2b – Individual Cohort Study**
☐ **3 – Cross-sectional Studies, Ecologic Studies, "Outcomes" Research**
☐ **4a** – Systematic Review of Case Control Studies
☐ **4b** – Individual Case Control Study
☐ **5** – Case Series, Case Reports
☐ **6** – Expert Opinion without explicit critical appraisal, Narrative Review
☐ **7** – Animal Research
☐ **8** – In Vitro Research

Strength of Recommendation Taxonomy (SORT) For Guidelines and Systematic Reviews
See article **J Evid Base Dent Pract 2007;147-150**

☐ **A – Consistent, good quality patient oriented evidence**
☐ **B** – Inconsistent or limited quality patient oriented evidence
☐ **C** – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening

Conclusion(s):

1) After tooth extraction the greatest boneless occurs in the horizontal dimension with about 50% of loss of ridge width after 12 months.
Vertical dimensions were much less affected.
2) Socket preservation results in a significant reduction of alveolar bone loss post tooth extraction in all dimension, but primarily in the horizontal (buccal-lingual) dimension.
3)Socket preservation showed no difference in MBL when compared to implants placed in sites that did not undergo socket preservation.
Mandibular posterior bone is mostly comprised of dense D2 bone, and is less susceptible to resorption.