

ICE CREAM CONE TECHNIQUE : A FLAPLESS BONE REGENERATION TECHNIQUE

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Abstract:

The extraction of teeth is inevitably associated with distinctive changes in the surrounding hard and soft tissues. The alteration of ridge contour may compromise the position of implant which requires optimal support and stability. To facilitate bone regeneration The Ice Cream Cone Technique" was introduced. It uses a collagen membrane in the form of an ice cream cone and bone filler material placed into it, to regenerate the buccal plate of a fresh socket without elevating a flap. This ice cream cone technique help to overcome the dilemmas which could otherwise result in loss of bone graft materials, gingival tissue collapse and invasion of graft by connective tissue.

INTRODUCTION

Reabsorption of alveolar process occurs after the dental extraction. The form of the tooth, their axis of eruption and eventual inclination determines the shape and volume of the alveolar process⁷. Due to loss of bundle bone and the nutrient supply by the periodontal ligament there will be bone loss in the lingual and buccal plate of a post extraction socket.

The vertical and horizontal bone loss cause

aesthetic defect in the anterior zone. So it is important to perform correct extraction technique. For that atraumatic technique is performed using traditional methods, specialized extractors, periostomes and endodontic files or piezo surgery for the removal of radicular elements⁸.

Buccal wall socket defect or loss can be due to many factors with a common factor being periodontal lesion. Periodontal lesions can cause bone resorption and destruction during lesion expansion, leading to sinus discharge or chronic swelling⁶. Socket collapse will occur after the extraction of a tooth with periodontal lesion, which will lead to fibrous tissue formation and narrowing of the alveolar ridge.

Tarnow, invented his technique (ice cream cone) to augment the socket with buccal dehiscence, but his technique is only recommended for simple dehiscence and not a wall defect. In this technique it involves shaping the collagen membrane into an ice cream cone shape and placing it inside the extraction socket. It will cover the dehiscence site and the socket occlusally at the same time. This technique is not applicable for a completely defective or missing bone wall unless a flap is raised and a guided bone regeneration (GBR) procedure is performed.

Elian et al, developed a post-extraction fresh socket classification system².

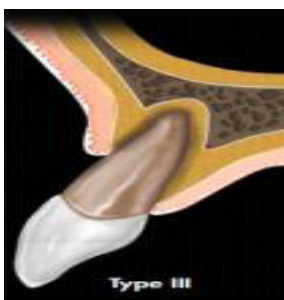
Type 1: The facial soft tissue and buccal plate of bone are at normal levels in relation to the cement enamel junction of the pre-extracted tooth and remain intact post extraction.



Type 2: Facial soft tissue is present but the buccal plate is partially missing following extraction of the tooth.



Type 3: The facial soft tissue and the buccal plate of the bone are both markedly reduced after tooth extraction.

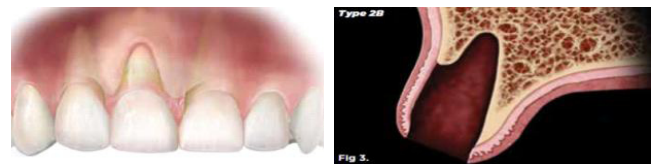


This classification enabled ordering and classifying of post-extraction sockets. A recently published sub-classification of type 2, now allows even greater clarity to plan regeneration; type 2 presents intact facial soft tissue³.

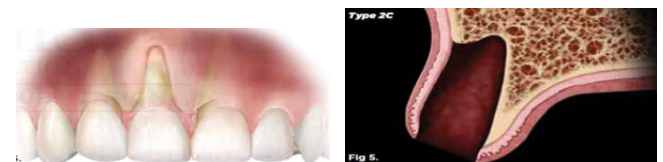
Type 2 A: Absence of the coronal one-third of labial bone plate of the extraction socket 5mm to 6mm from the free gingival margin.



Type 2 B: Absence of the middle to coronal two-thirds of the labial bone plate of the extraction socket approximately 7mm to 9mm from the free gingival margin.



Type 2 C: Absence of the apical one-third of the labial bone plate of the extraction socket 10 mm or more from the free gingival margin



With the evolution of socket preservation and socket grafting, many grafting materials and techniques have been reported. Many reports agree that socket grafting preserves the socket collapse and it is better than a non-grafted socket or a socket that underwent normal healing. Other studies have found that covering the grafted socket with a collagen membrane or soft tissue graft

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provided better results than uncovered grafted or non-grafted sockets in terms of the amount of bone formation⁶.

One reason for this result is that the collagen membrane preserves the blood clot, maintains the space and prevents soft tissue migration into the socket.

However, using bone graft material alone without a collagen membrane or soft tissue coverage may result in a lower percentage of bone formation.

A study conducted by Bozidar et al. showed that sites that were grafted with a membrane demonstrated a more uniform bone structure in both the apical and coronal regions of the sockets⁶.

ICE CREAM CONE TECHNIQUE

STEP 1

Once the tooth is diagnosed as hopeless, it is removed atraumatically, it is performed utilizing flapless extraction with care not to disturb the interproximal papillae and labial soft tissue.



STEP 2

Socket is debrided with surgical curette and any infected tissues is removed.

A finger should be placed over the buccal tissue when curetting the buccal part of the socket to prevent perforation of soft tissue

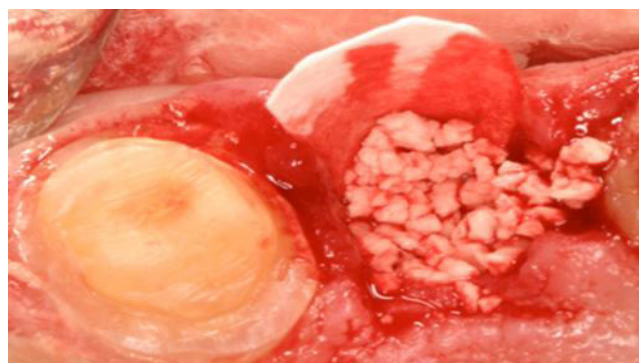
STEP 3

A collagen membrane is contoured into a modified V shape/ice cream cone shape. The narrow part of the membrane is placed into the socket and wide enough to extend laterally. Wider part of the membrane should be trimmed and be able to cover the opening of the socket.



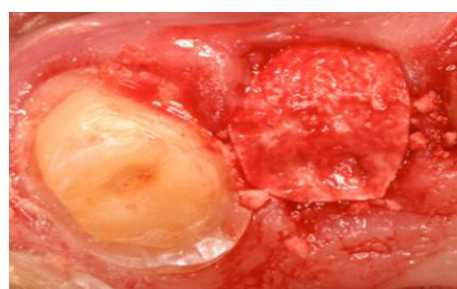
STEP 4

The socket is then filled with a bone graft and the pressure from the graft against the membrane will help to keep it in place.



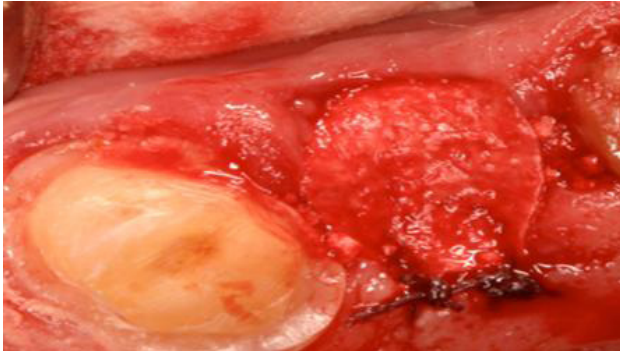
STEP 5

The top part of the membrane is extended over the opening of the socket.



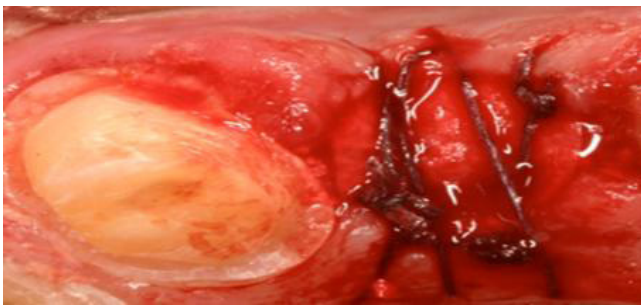
STEP 6

The membrane is then sutured with two or three absorbable sutures to the palatal tissue.



STEP 7

It is then finished with a continuous suture.



ADVANTAGES OF THIS TECHNIQUE

- No change in the mucogingival junction (MGJ) position.
- Prevents invasion of soft tissue into the socket.
- The periosteum is not detached from the remaining buccal plate
- The buccal tissue contours are not compromised.

DISADVANTAGES

- Shallowing or decrease in the depth of the buccal vestibule at the end of healing period.

- Not used when there is socket wall defect.
- Difficulty in placing the membrane as it become softened when exposed to fluid.

CONCLUSION

This is an minimally invasive socket repair technique which resulted in smaller contour changes compared with flap elevation and nontreated extraction sites with type 2 sockets.

This technique offers repair with less soft tissue manipulation while allowing for secondary wound healing⁵.

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