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WHALE TAIL TECHNIQUE- A literature review

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Abstract

Bone grafts are commonly used to treat periodontal bone abnormalities. Studies indicate that using graft materials in directed tissue regeneration is effective. However, treating deep and extensive bony defects can result in a large area that lacks blood flow from the periodontal ligament or alveolar bone. This poses a risk of wound failure when an incision of the defect-associated papilla is performed. (17)
Bianchi and Basetti developed a new surgical technique called the "Whale's Tail" to address this issue. This approach can effectively regenerate broad intrabony defects in the esthetic zone while preserving interdental tissues over grafting material. The proposed procedure entails the elevation of a sizeable flap from the buccal to the palatal side, thereby providing an unobstructed view and access to the intrabony defect in question. (8)

Keywords- intrabony defect, diastema, Whale's tail.

Introduction-

Guided tissue regeneration (GTR) has been widely used to manage vertical osseous defects over the past two decades. Numerous studies have shown that GTR can create new attachments(1-3)
and is more effective in improving attachment levels than traditional treatments such as open flap debridement (4,5)

Periodontal therapy maintains healthy and functional teeth. When periodontal disease destroys the attachment system, the optimal treatment aims to restore the periodontium to its pre-disease condition (6).
Bone grafting is a popular treatment approach for correcting periodontal osseous abnormalities, and complete and predictable healing of the periodontium following damage or infection is still a crucial goal in periodontics (7).

The Whale's Tail technique is a surgical approach designed to regenerate wide intrabony defects in the maxillary incisor region. Ensuring the health and functionality of natural dentition are of utmost importance, and periodontal treatment aims to achieve precisely that. The emphasis is on maintaining the periodontium's

integrity after disease-related attachment loss. With the "Whale's Tail" technique, wide intrabony defects in the esthetic zone can be regenerated using GTR while effectively preserving interdental tissue above the grafting material. The "Whale's Tail" technique regenerates wide intrabony defects in the esthetic zone with GTR while maintaining interdental tissue. This technique elevates a flap from the buccal to the palatal side for better access to the intrabony defect. The interdental papilla is mobilized to preserve the vascularization of the buccal flap (10).

History-

Takei et al. (1985) proposed a surgical technique called the papilla preservation technique, which aims to protect interdental soft tissue during surgical intervention to correct proximal osseous abnormalities.(8)
This technique ensures maximum soft tissue coverage post-surgery. Later, Cortellini et al. (1993) modified the flap design for regenerative procedures, introducing a simplified and modified papilla preservation flap.(3,9)

In 2009, Bianchi and Bassetti introduced the "Whale's Tail" technique for extensive intrabony defects in the esthetic zone. This technique enables regeneration while preserving interdental tissue over grafting material. The procedure involves elevating a large flap from the buccal to the palatal side to access and visualize the intrabony defect.

A novel surgical method for guided tissue regeneration was developed to protect interdental tissue during the regeneration of wide intrabony defects in the esthetic zone. This technique aims to improve precision during the regeneration process. (10)

Indications-

Wide intrabony defect in the esthetic zone

Deep periodontal pocket

Vertical bone loss


Midline diastema of 4mm or more

Contraindications


High frenal attachment


Recession


Diastema less than 2mm

Procedure-(12,10)

1. The surgical site was anaesthetized with a 2% local anaesthetic solution accompanied by 1:80,000 epinephrine, infiltrated on the buccal and palatal surfaces of teeth 11 and 21.
2. Two vertically releasing incisions were performed on the distal side of the teeth using a #15 blade on the buccal aspect. Subsequently, a horizontal incision was made at the apical margins of the first two incisions, followed by an intracrevicular incision on the buccal and palatal sides using blade #12 (Figure 3).

3. To facilitate defect visualization, granulation tissue was removed. The defect was exposed (Figure 4), and three incisions were made using Blade #12 - two vertical and one horizontal, interconnecting the apical margins of the vertical incisions.
4. The membrane was trimmed to cover the defect and adapted to the palatal side with a suture. It was then passed buccally, and after slight reflection, the bone graft was packed into the defect (Figure 5). The membrane was then covered over the graft (Figure 6).
5. Subsequently, the flap was moved from the palate to the cheek and sutured without tension using an interrupted technique (Figure 7).
6. The following steps were taken during the procedure:

1. Pre-procedural measurements were taken and recorded.

2. Additional pre-procedural measurements were taken and recorded.

3. Two vertical incisions were made.

4. The defect was exposed and made visible.

5. Bone graft was filled in the defect

6. The GTR membrane was adapted and placed over the bone graft.

7. Interrupted sutures were placed.

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8. the sutures were removed, and the area was checked

Periodontal surgery is a procedure that aims to treat various types of gingival diseases. However, like any other surgical procedure, it has its limitations and complications.

Limitations-

- The occurrence of recession: Gingival recession is when the tissue pulls back from the tooth surface, exposing the root. Ignoring it can lead to dental issues like tooth sensitivity, decay, and loss. A surgical procedure may not effectively prevent it. Take necessary measures to avoid further complications.(13)

- Technique sensitivity: The success of the surgical procedure depends on the technique used and the surgeon's skill. Improper technique may result in incomplete removal of the diseased tissue, leading to incomplete healing and the recurrence of the disease.(12)
- Elevation of a sizable buccal flap: This surgical technique involves elevating a large flap of gingival tissue to access the affected area. This technique may be challenging for some patients, particularly those with thin gingival phenotype or a high risk of complications.(17)

Complications(14)

A. General complications that may arise after periodontal surgery include:
1. Bleeding: This is a common side effect of the surgery, but excessive bleeding may require medical attention.
2. Swelling: Swelling after surgery is normal, but excessive swelling may interfere with healing.
3. Post-operative pain: It is expected to experience pain following a surgical procedure; however, effective management of this pain can be achieved through the administration of suitable pain medication.
4. Root hypersensitivity: The exposed root surface may become sensitive to hot or cold temperatures, making eating and drinking uncomfortable.
5. Increased tooth mobility: The surgery may cause some movement of the affected tooth, but this is usually temporary.
6. Delayed wound healing: Sometimes, the surgical site may take longer than expected.
7. Trismus: This is a condition where the jaw muscles become stiff and may limit the opening of the mouth.
8. Post-operative bacteremia: The surgery may cause bacteria to enter the bloodstream, leading to infections in other parts of the body.
9. Taste changes: Some patients may experience a difference in their sense of taste after the surgery.
10. Bruising: Bruising may occur at the surgical site but is usually temporary.

B. Complications that may arise due to the surgical procedure employed:
1. Local anaesthesia-related complications, such as toxicity, syncope, allergy, trismus, and paraesthesia (15)
2. Flap-related complications, such as improper incisions and improper debridement (16)
3. Graft-related complications
4. GTR-related complications
5. Suture-related complications
6. Periodontal pack-related complications

Proper patient selection, communication, and post-operative care can minimize complications.

Discussion-

This study used a surgical technique that elevated a large flap of soft tissue from the buccal to the palatal region, allowing for tissue preservation and easier closure. To prevent bacterial colonization of the biomaterials, incisions were placed far from the interdental area, and sutures were kept away from the regenerated defects.

Bianchi and Bassetti et al. found that this approach produced outcomes similar to those of earlier clinical investigations regarding clinical attachment level (CAL) gain and probing pocket depth (PPD) reduction.(10) Achieving optimal aesthetic outcomes in periodontal surgery is challenging, particularly in the maxillary anterior region, where a diplomatic approach is necessary to prevent adverse aesthetic effects such as loss of interdental papilla or increased tooth length.

Mrunal et al. 2016 reported a gain of 3 mm in CAL and a mean reduction of 4 mm in PPD. The systematic use of incisions far from the flaws and biomaterial borders significantly reduced the proportion of flap dehiscence, resulting in primary closure of the interdental gap in all treated locations over the follow-up period.(13)
Rath et al. 2018 reported positive clinical results with a 2 mm increase in CAL and a 3 mm decrease in PPD using this technique. Patients experienced no scarring, felt more comfortable, and reported no post-operative pain(17)

In 2019, Doiphode et al. demonstrated similar results, with a 5 mm reduction in PPD. Bianchi and Bassetti reported a mean attachment level gain of 4.9 ± 1.8 mm and a 5.8 ± 2.5 mm reduction in PPD.(11)

Conclusion-

In conclusion, the "whale's tail" flap is a surgical technique that provides considerable soft tissue preservation and facilitates a strong primary closure. The procedure effectively regenerates significant interdental diastemas and extensive intrabony defects involving the maxillary anterior teeth while preserving interproximal tissue. The study results showed significant clinical and statistical improvements in the hard and soft tissue conditions of wide intrabony defects with favorable aesthetic outcomes. (10)

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