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Socket Shield Technique: A Unique Theory for Ridge Preservation

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Abstract

Preservation of ridge after tooth extraction is an immense challenge to implant dentistry as it inhibits excellent optimal implant positioning along with esthetic results as well. A new approach called socket shield technique was introduced where a partial root fragment was sustained around an immediately placed implant with the purpose of evading tissue alterations after tooth extraction. This review article overviews the challenges of using socket shield technique in clinical routine.

Keywords - Immediate implant, socket shield technique, bone graft, osseointegration, guided tissue regeneration.

Introduction

Tooth extraction is pursued by horizontal as well as vertical dimensional changes in alveolar ridge and thereby leads to facial bone plate resorption as periodontal membrane chiefly vascularizes the bundle bone of the tooth.[1] So, ridge preservation after tooth extraction is a challenge to implant dentistry. So to overcome the unfavorable results of tooth extraction, numerous treatment access such as immediate implant placement, socket preservation and guided bone regeneration have been endorsed.[2] Clinical research have proved the theorem that root retention, either of vital or non-vital teeth may be able to evade tissue alterations after tooth extraction. Filippi et al, revealed that decoronation of an ankylosed tooth retains the alveolar bone before implant placement.[3] Root submergence technique is illustrated to assure the usual attachment of the tooth in the pontic site, which grants complete preservation of the alveolar bone frame and aids in the formation of esthetic results in adjoining multiple-tooth-reinstatement cases.[4] Periodontal reconstruction along with new attachment means, cementum, connective tissue, and bone could be developed over a submerged root whose surface was pathologically disclosed.[5] A new procedure called socket shield technique was introduced by Hurzeler et al (2010), in which a partial root portion was confined over an immediately placed implant with the intent of avoiding tissue modification after tooth extraction. This principle

endorses that buccal root retention in combination with immediate implant placement is able to attain osseointegration without inducing inflammation and resorption.[6]

Principle of Socket Shield Technique[7]

The ethic of socket shield technique is to form a safeguard (called buccal shield) by preparing the root of a tooth marked for extraction so that the facial root section remains situated with its physical relationship to the unscathed buccal plate. The periodontal attachment mechanism of tooth root is planned to stay vital and to prevent the post extraction alveolar bone loss and to hold the facial tissues.

Indications

1. To aid and protect buccofacial bone plate of tooth extraction socket in cases of immediate implants.

2. Determined in vertical fractures of teeth without pulpal pathologies, where tissue safety and aesthetics are a preference.

3. To secure papilla between the dental implants.

Contraindications

1. Local contraindications comprises

- Loss of buccal bone due to vertical fracture.
- Loss of buccal bone due to periodontitis.
- Caries on root portion to be maintained.

Equipments

- Periotome.
- Black's excavator.
- Gingival scissors.
- Needle holder.
- Surgical forceps.
- Diamond burs.

Clinical Steps of Surgical Procedure[8]

Under local analgesia, following procedure is carried out:

1. With a diamond bur, clinical crown of the tooth is separated above the gingival level.

2. The tooth is sectioned vertically using long tapered fissure diamond bur.

3. Cautious extraction of the palatal root portion is done with periotomes and forceps without putting stress on the buccal tissues and this results in an intact lamella of the root in the area of buccal bony socket.

4. Root portion is thinned out to a thickness of 2mm using round diamond bur along with saline irrigation.

5. If planned for an immediate implant placement, an osteotomy is planned and implant is placed palatal to the socket shield.

6. Gap between the shield and implant surface is left to permit blood clot formation.

7. Socket is then closed with sutures.

After the procedure, patient is then advised to rinse the mouth with 0.2% chlorhexidine mouthwash, two times a day regularly for one minute for at least ten days. During this time, mechanical oral hygiene is ward off in the surgically treated area and can only restart once suture removal is done. Anti-inflammatory drugs are prescribed.

Advantages

a. Assures safeguard of peri-implant tissues.

b. Helps to retain aesthetics.

c. Guides to place implants in proper location.

d. Complete osseointergration can be earned by this technique.

e. Avoids formation of fibrous tissue around the implant.

Disadvantages

a. Precise technique.

b. Shifting of buccal root portion or even buccal lamellar bone.

c. Long phrase behaviour of the buccal shield has not yet been fully analyzed.

Discussion

To plan the process and reduce treatment time, immediate implant protocols have been introduced. They can also add favorable esthetic result with good function in selected areas, this is where the socket shield technique was introduced in order to make a positive change.

Baumer et al (2015) stated that socket shield technique shows reduced invasiveness at the time of surgery and great esthetic results with preservation of facial tissue contours.[9]

Siormpas KD et al (2014) concluded that the intentional retention of buccal aspect of the root with its periodontal mechanism during immediate implant placement can lead to certain and continuous osseointegration of implants placed in the maxillary anterior region of healthy persons.[10]

Hurzeler et al (2010) concluded that retaining the buccal aspect of the root during implant placement does not appear to interfere with osseointegration and may be helpful in sustaining the buccal bone plate.[2]

Kan et al (2013) noted a case with a modified shield technique with the shield located in the interproximal areas rather than the buccal area for inter implant papilla preservation and drew good success in upholding the bone level and periodontium.[11]

Gluckman et al (2015) also used the modified socket shield technique for a situation with two implants besides each other and recorded esthetically good result by this method.[7]

Glocker et al (2014) did three cases using a modified method of socket shield technique and delayed implant placement. After six months, during re-entry the new bone forming in the alveolar bone and the residual ridge was clinically assessed and preserved with this method.[6]

Similar positive results have been disclosed by Chen et al (2013)[13], Mitsias et al (2015)[14], Lagas et al (2015)[15], Engelke et al (2015)[16] and Al Dary et al (2015)[17].

Anas B et al (2017) concluded that socket shield technique yields a promising treatment adjunct to better administer the risks of extraction and preserve post extraction tissue in aesthetically challenging cases.[8]

Cherel F (2014) enforced the socket shield technique on two adjacent teeth. However, instead of buccal root retention, proximal root fragments were left intact to sustain the papilla bone, in combination with immediate implant placement and immediate provisionalization.[12]

Conclusion

The socket shield technique not only supports but also preserves the labial and buccal bone structures and also restricts bone resorption after tooth extraction. The buccal shield yields to interpret as to place the implants appropriately. Any mode of destruction seen by other techniques such as tissue transposition, fibrous tissue formation etc. can be detached at its best and a complete consolidation of bones is possible to obtain. Few studies have used enamel matrix by-product to prompt cementum formation on inner side of root portion and to restrain its resorption. Thus, more provisional and long term follow up studies are required to confirm long term support of the treatment outcome.[18] Thus the socket shield technique adds up a remedy to better administer the risks of extraction and retain post extraction tissue in aesthetically challenging cases.

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