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RESEARCH ARTICLE

Treatment of Thin Tissue Biotype Around An Implant Using Subepithelial Connective Tissue Graft: A Case Report.

Dr. Mayur Kaushik[1], Dr. Sakshi Khattar[2], Dr. Amit Wadhawan[3], Dr. Nitin Tomar[3], Dr. Sumit Makkar[4].

1. Professor, Department of Periodontology and Implantology, Subharti Dental College and Hospital, Swami Vivekanand Subharti University, Subhartipuram. Delhi – Haridwar Bypass Road, Meerut, NH-58, Meerut-250005.
2. Final year post graduate student, Department of Periodontology and Implantology, Subharti Dental College and Hospital, Swami Vivekanand Subharti University, Subhartipuram. Delhi – Haridwar Bypass Road, Meerut, NH-58, Meerut-250005.
3. Reader, Department of Periodontology and Implantology, Subharti Dental College and Hospital, Swami Vivekanand Subharti University, Subhartipuram. Delhi – Haridwar Bypass Road, Meerut, NH-58, Meerut-250005.
4. Reader, Department of Prosthodontics, Subharti Dental College and Hospital, Swami Vivekanand Subharti University, Subhartipuram. Delhi – Haridwar Bypass Road, Meerut, NH-58, Meerut-250005.

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****Corresponding Author***

Dr. Mayur Kaushik.

Abstract

Implant dentistry has come a long way since 1965, with great improvements made to achieve primary implant stability and to improve bone-to-implant contact with the introduction of the concept of osteointegration. The focus has been shifted towards creating an esthetic restoration that is indistinguishable from natural teeth and is stable over time. Just as bone volume is crucial for ideal positioning of the implant, soft tissue volume predicts the ideal emergence profile and esthetics of the eventual implant restoration. The correct recognition of gingival biotypes is important for the treatment of planning process in restorative and implant dentistry. Patients with thin biotype are more prone to recession, inflammation, and compromised soft tissue response. This paper presents a case of management of the thin gingival biotype over the implant surface to a more favourable one using the subepithelial connective tissue graft to achieve a more stable and esthetic result.

Introduction:-

The successful use of dental implant to replace missing teeth has been one of the most popular, exciting and evolving areas of clinical dentistry. **(Mantzikos T et al)** Successful implant therapy can no longer be judged by whether or not the implant simply osseointegrates. Even precise ceramic duplication of the shade, contour and translucency of natural dentition may still result in an esthetic failure if the gingival profile, colour and texure are inadequate. (**Rompen E et al)** Previously, much emphasis was placed on the macroscopic and microscopic design of the implant in attaining primary stability and osseointegration was fundamental to the survival and success of implant. **(Wennerberg A et al)** Today, with the high survival and success rates of implant therapy, the focus has shifted towards creating an esthetic restoration that is indistinguishable from natural teeth and is stable over time. **(Fu JH et al)**

Therefore, fuctional and esthetic success of implant treatment depends not only on the quality of the restoration but also on the contour and stability of the marginal gingiva and the proximal papilla which should be in harmony with the adjacent teeth.[2] This is particularly important in the anterior maxilla, also known as “esthetic zone” of the oral environment. **(Higginbottom F et al)**

The periodontal and periimplant mucosa along with interproximal papillae must keep the same peculiarity of shape and color with one other. The attached gingiva, which is attached firmly to the underlying buccal and lingual alveolar bone, varies in thickness between individuals and between teeth. It has been hypothesized that gingival biotype is one of several useful predictors of gingival recession and implant soft tissue esthetics. **(Belser UC et al)**

The term periodontal biotype was introduced by Seibert and Lindhe. They categorized the gingiva into "thick-flat" and "thin-scalloped" biotypes. Later Siebert and Lindhe categorized the gingiva into ''thick - flat'' and ''thin – scalloped'' biotypes. A gingival thickness of ≥ 2 mm (measurements of 1.6–1.9 mm were not accounted for) was considered as thick tissue biotype and a gingival thickness of <1.5 mm was referred as thin tissue biotype. **(Claffey N et al)**
A clinician's knowledge in identifying gingival biotypes is paramount in achieving optimal treatment outcomes. Various invasive and non invasive methods were proposed to measure tissue thickness. Various methodologies have been documented for measurement of the gingival tissue form. This includes visual inspection, ultrasonic devices, trans gingival probing, and Cone beam computerized tomography imaging(CBCT). **(Bhatt V et al)** Placing a periodontal probe in the gingival sulcus and observing the transparency is a simple method to determine tissue thickness. **(Kan JY et al)**

Studies have been done to determine the influence of tissue biotype on the morphology of periimplant esthetics and on its long term stability. The gingival or periodontal biotype in humans have been classified as thin or thick. **(Siebert J et al)** The thick biotype consists of flat soft tissue and thick bony architecture and is most often found to be prevalent in the population. This type of tissue form is dense and fibrotic with large zone of attachment, thus making them more resistant to gingival recession. **(Kao RT et al)** On a contrary, ''thin'' gingival biotype is delicate, thin with highly scalloped soft tissue with thin bony architecture characterized by bony dehiscence and fenestrations. Such type is more prone to recession, bleeding, and inflammation. **(Bhat V et al)**

Various treatment modalities have been used to improve the gingival biotype. Some of them include: 1.Connective tissue autografts, 2.Subepithelium connective tissue graft using single incision surgical technique, two incision surgical technique and pouch technique,3.Free subepithelium connective tissue graft, 4 Vascularized Interpositional Periosteal Connective tissue flap, 5. Modified palatal roll technique, 6. Epithelized palatal graft. **(Batal H et al)**

Among various treatment modalities, variations of subepithelial connective tissue graft procedures have demonstrated the highest success rates with the greatest amount of predictability. **(Bouchard P et al)** The technique was originally described by Langer and Langer in 1985 and has had several variations in the surgical procedure described since. **(Langer B et al)**

Connective tissue graft has been used in many cases for treating gingival recession or for thickening periimplant soft tissues around implant. Various techniques for harvesting of subepithelial connective tissue grafts have been described. The main variation between them is in the number and type of surface incisions. In the present case pouch technique has been used. The pouch technique is commonly used for augmentation of soft tissue in buccal area. It is ideal for augmentation at the time of immediate implant placement, or correction of soft tissue defect around nonsubmerged or restored implants. This technique is extremely technique sensitive and dependent on operator variability. **(Batal H et al)**

The aim of the present case report was to present a clinical case with the connective tissue grafting procedure around implant to augment the gingival tissue using pouch technique.

Case report:-

A 32year old male patient reported to the department of Periodontology, Subharti dental college and hospital with the chief compliant of gingivitis. On examination it was seen that there was missing # 11. Patient was a nonsmoker and agreed to follow the oral hygiene instructions. Radiographic examination was done which included CBCT and RVG. X-ray revealed adequate bone morphology. According to the situation and patient's willingness, implant placement was planned in the area of missing teeth.

He was anesthetized using 2 % lidocaine with 1:100,000 epinephrine. Crestal incision was given followed by a full thickness flap reflection. (fig 1 and fig 2) Drilling was done using sequential drills and an Alpha Bio DFI implant

with the dimensions 3.5*11.5 mm was inserted in the area of missing anterior teeth. Cover screw was placed and the flap was sutured. (Fig 3-fig 5). Patient was recalled after one month for re evaluation.

However, four months after the implant placement, at the time of second surgery sufficient reduction in the soft tissue was noticed on the buccal aspect of implant placed. Though, osteointegration was proper at that time. (Fig7).

Hence, a surgey was planned where connective tissue was used to augment the buccal soft tissue defect. LA was injected similar to the previous surgery. Undermining was done using no.15 blade to create a pouch . The incision was made at right angles to the epithelium and dissection was carried in a supraperiosteal fashion to allow for dual blood supply to the graft. The pouch had enough thickness to decrease the incidence of flap perforation, sloughing, or tearing during tunneling of the graft. It was better to create a thicker pouch even if the level of dissection is subperiosteal.(Fig 8). The dissection was extended laterally to allow for increased blood supply to the graft. The dissection was extended beyond the mucogingival junction to facilitate the subsequent tunneling of the graft. The connective tissue graft was harvested from the palate and trimmed to match the size of the created pouch.

5-0 black silk sutures were placed using 12mm reverse cutting needle. Suture material was passed from the area beyond the mucogingival through the sulcus and then through the connective tissue graft. The graft was then secured manually by pulling the suture through the connective tissue graft and then through the pouch on both sides. Simultaneously, the graft was pushed down into the pouch. Crossed linked sutures were given to coronally reposition the epithelium over the connective tissue graft. The pressure was then applied for 10 min. (Fig 9, Fig 10, Fig 11). The gingival former was placed after the soft tissue augementation. The patient was recalled after 2 weeks for suture removal. Post operative instructions were given to the patient.

After one month, sufficient increase in the soft tissue adjacent to the implant was noticed. (Fig 12, Fig 13). The patient was referred to the department of Prosthodontics for the placement of crown.

Abdument was placed and impressions were taken using the elastomeric impression material for the crown preparation. Crown was placed and the patient was recalled after a week for the permanent prosthesis. Patient was followed up after every three months for 1year. There was sufficient stability in the soft tissue bulk after one year. (Fig 14)
Post operative RVG was also taken.

Discussion:-

Today with the high survival rates and success of implant therapy, the objective has been to create an esthetic restoration that is indistinguishable from the natural tooth and that is stable through years **(Fu JH et al)**. In this context, it has been studied the influence of the tissue biotype on the morphology of peri implant esthetics and its long term stability. **(Kan JY et al)** The thin biotype has been related to a higher risk of recessions in buccal area,(**Nisapakultorn K et al)** greater difficulty to papillary filling, **(Chow YC et al)** translucency creating transgingival metallic appearance, greater susceptibility of bone loss, fenestration and dehiscence. **(Bhatt V et al)** The gingival biotype has also been described as one of the key elements for the success of restorations on implants. **(Kois JC)**

Claffey and Shanley defined the thickness not more than 1.5 mm as a thin biotype while more than 2 mm as a thick biotype. **(Claffey N et al)** The importance of the clinical identification of the tissue biotype helps in better determination of the treatment outcome. The thinner periodontal biotype needs more attention when extraction is carried out owing to their thin alveolar plate. **(Kao RT et al)**

Linkevicius et al studied the influence of soft tissue thickness on crestal bone changes around implant and documented significant peri implant bone loss in sites with thin tissue compared to thick tissues. **(Linkevicius T et al)**

Nisapakultorn et al in his study on 40 patients documented a thin biotype being significantly associated with increased risk of facial mucosal recession. They performed a transverse study to determine the factors that may affect the facial marginal mucosal level and papilla level around single implant on the anterior maxilla and concluded that there is a strong association between periimplant biotype and facial marginal mucosal level and that there is greater risk of recession of peri implant mucosa on thin biotype. **(Nisapakultorn K et al)**

The use of dental implant to replace a tooth is considered a predictable and successful treatment. Periimplant recession around implants can be prevented by overbuilding of the site and the addition of the bone on the buccal cortical plate before in conjunction with implant placement. In addition, connective tissue grafts can be added in combination with implant placement or during the integration phase and/or at the abutment connection/ temporary restoration. **(Rathod SR et al)**

A thick biotype with a large amount of attached gingiva will have greater resistance to traumatic or inflammatory recession whereas a thin biotype is more susceptible to periimplant recession induced by the resorption of thin labial cortical plate. An adequate zone of attached gingiva may also be necessary around implant to conceal the implant collar and abudment/ restoration interface interproximally. **(Saadoun AP et al)** The connective tissue converts a thin biotype into thick biotype. Thus, in the present case the soft tissue augmentation was planned to prevent the risk of recession and for the long term stability of the implant.

The subepithelial connective tissue graft procedure is a single and most effective way to achieve the predictable result with the high degree of cosmetic enhancement. The results obtained using the subepithelial connective tissue graft is extremely stable and hence this procedure is considered to be the gold standard while evaluating the efficacy of other techniques. (**Dadlani H et al)**

Yoshino et al conducted a randomized controlled prospective study to compare the facial gingival level (FGL) changes following single immediate implant placement and provisionalization procedures in patients with and without Subgingival connective tissue graft in the maxillary esthetic zone. The implant success rate and peri-implant tissue response were also evaluated. They concluded that subjects who underwent immediate implant placement and provisionalization with a subepithelial connective tissue graft experienced less facial gingival level change than those who did not receive a subepithelial connective tissue graft. **(Yoshino S et al)**

High degree of gingival cosmetics is obtained from the secondary intention healing of the connective tissue graft. Thus, considering the high esthetic demand of the patient the use of connective tissue graft was planned in the present case.

Wiesner et al on a randomized clinical trial evaluated the effectivity of conjunctive tissue grafts used on the placement of implants on the increase of volume of the periimplant soft tissue. On one side implant was installed along with conjunctive tissue graft from palate to increase the soft tissue while on other side there was only installation of implant without the graft. Their results showed that there was sufficient increase in the thickness of soft tissue obtained with the use of connective tissue graft along with the improved esthetics. **(Wiesner G et al)**

In the present case a pouch technique was used. Indications of this technique include:1. Converting thin biotype into thick biotype, 2. Increasing the soft tissue thickness, 3.Correction of soft tissue defects around restored implants. However, this technique cannot be used for the vertical augmentation.(**Bouchard P et al**)Various other studies have been done where connective tissue graft have been used to increase the thickness of soft tissue, for treating the recession defect, for increasing the width of attached gingiva. However, to the best of authors knowledge this is the first case report describing the use of autologous connective tissue for increasing the bulk of soft tissue at stage two surgery.

Fig 1- Crestal Incision given

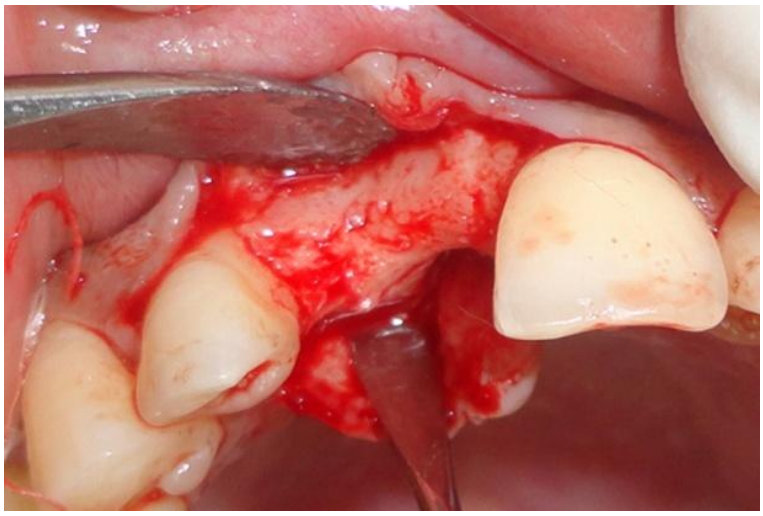

Fig 2: Full thickness flap reflection

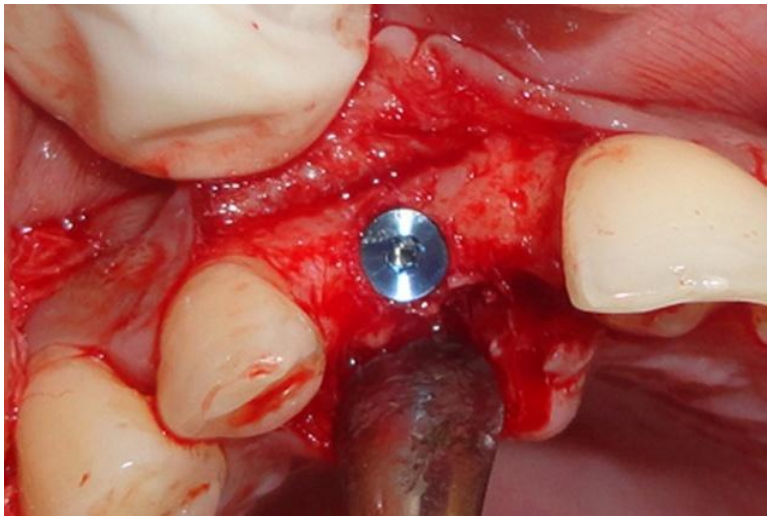

Fig3: Implant placed

Fig4: Sutues placed.

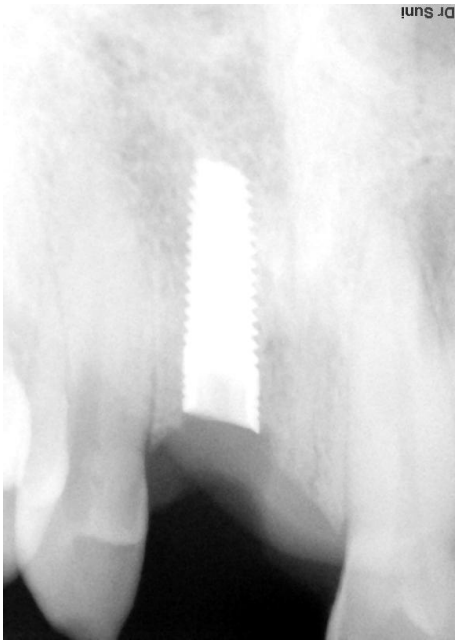

Fig5: Post op RVG showing implant placement

Fig 6: Healing after three months

Fig 7: Thin biotype observed after implant exposure

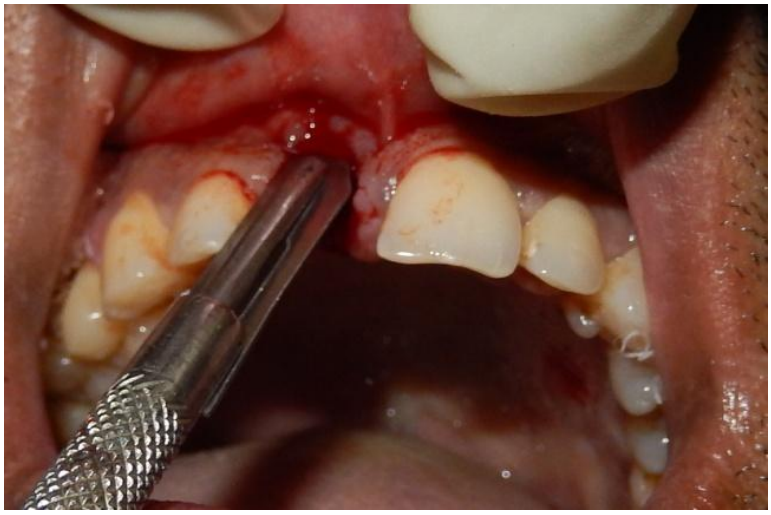

Fig 8: Pouch Creation for Connective tissue placement

Fig 9: Connective Tissue procured from palate.

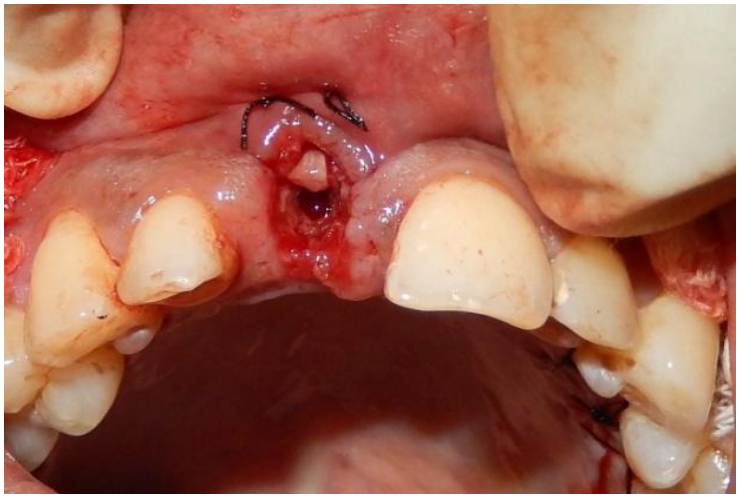

Fig 10: Connective tissue inserted and secured Inside the pouch using sling sutures

Fig 11: Gingival former placed

Fig12: Healing after one month

Fig 13: Gingival former removed.

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Fig 14. Final prosthesis after one year.

Conclusion:-

In clinical dentistry, specifically implant dentistry, the identification of the tissue biotype is essential as variation in it may significantly affect the treatment outcome. To maintain the implant stability and the esthetics of the patient various procedures have been described in literature to augment the soft tissue. However, the use of connective tissue is considered to be the gold standard because of its highly predictable results. Thus, in the present case report successful soft tissue augmentation has been achieved with the use of autologous connective tissue graft.

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