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RESEARCH ARTICLE

MINIMALY INVASIVE SURGICAL TECHNIQUE USING CHORION MEMBRANE IN THE TREATMENT OF INTRABONY DEFECTS – CASE REPORT.

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Abstract

The main purpose of periodontal treatment is to eliminate inflammatory processes in order to arrest the progression of the disease and keep the dentition in a state of the health. Thus the ultimate goal of periodontal therapy is to prevent further attachment loss and predictably restore the periodontal supporting structures that were lost because of disease or trauma in a way that the architecture and function of the lost structures can be re-established. Minimally invasive surgery (MIS) in the periodontal literature is used as a method of surgical access that minimizes flap reflection and tissue trauma, resulting in maintenance of critical blood supply, stability of the blood clot within the wound site, and less postoperative recession over time.Demineralized Bone Matrix (DBM) is an allograft with proven osteoinductive properties and biocompatibility. Chorion membrane has gained importance because of its ability to reduce scarring and inflammation; enhance wound healing; and serve as a scaffold for cell proliferation and differentiation as a result of its antimicrobial properties. The aim of this is to study was to clinically and radiographically evaluate the chorion membrane as a gtr membrane using minimally inavasive surgical technique. Within the limits of this study we reported that the use of chorion membrane in combination with DBM in minimally invasive surgical technique resulted in significant reductions in clinical parameters such as in PPD and CAL.

Introduction:-

Periodontitis is a globally prevalent inflammatory disease characterized by periodontal tissue destruction.The main purpose of periodontal treatment is to eliminate inflammatory processes in order to arrest the progression of the disease and keep the dentition in a state of the health (Cortellini et al. 1993). Thus the ultimate goal of periodontal therapy is to prevent further attachment loss and predictably restore the periodontal supporting structures that were lost because of disease or trauma in a way that the architecture and function of the lost structures can be re-established. Successful periodontal regeneration relies on the reformation of an epithelial seal, deposition of new acellular extrinsic fiber cementum and insertion of functionally oriented connective tissue fibers into the root surface, and restoration of alveolar bone height (Caton and Greenstein 1998).[1]

Demineralized Bone Matrix (DBM) is an allograft with proven osteoinductive properties and biocompatibility. Demineralised bone matrix (DBM) Xenograft is a bone inductive sterile bio-resorbable Xenograft composed of

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Type I collagen. It is prepared from bovine cortical samples, resulting in non-immunogenic flowable particles of approximately 250µm that are completely replaced by host bone in 4-24 Weeks.[2]

The concept that the cells that repopulate the exposed root surface after periodontal surgery define the nature of the attachment that will form was extensively investigated (Melcher 1976; Gottlow et al. 1984The barrier membranes recommended for use in GTR, regardless of the material used, must be safe, biocompatible, non-toxic, not induce any inflammatory response, and be designed for clinical applicability based on the morphology of the osseous defects (Gottlow 1982). The barrier function must be maintained for a period sufficient to guide the tissue regeneration, preferably without creating gingival recession (Scantlebury 1993).[1]

One of the oldest biomaterials used for scaffolds is the foetal membrane. The foetal membrane was first used for the transplantation of skin in 1910. It is useful in the management of burns; creation of surgical dressings; as well as reconstruction of oral cavity, bladder and vagina; tympanoplasty; and arthroplasty (Kothiwale and Anuroopa 2009). It has gained importance because of its ability to reduce scarring and inflammation; enhance wound healing; and serve as a scaffold for cell proliferation and differentiation as a result of its antimicrobial properties. In addition, the chorionic membrane (CM) a foetal membrane is abiomaterial that can be easily obtained, processed and transported.[1,3]

Harrel and Rees first introduced minimally invasive surgery (MIS) in the periodontal literature as a method of surgical access that minimizes flap reflection and tissue trauma, resulting in maintenance of critical blood supply, stability of the blood clot within the wound site, and less postoperative recession over time. This is accomplished through the use of tiny incisions, sharp dissection of soft tissue to gain access to the defect, and minimal suturing to avoid trauma to papillary tissues. Other minimally invasive approaches to achieve periodontal regeneration include periodontal microsurgeryand the minimally invasive surgical technique (MIST) and modified MIST (M-MIST) described by Cortellini and Tonetti. MIST is a modification of MIS that uses elements of papilla preservation procedures and small incision designs for surgical access. M-MIST was subsequently introduced as an even less invasive modification of MIST; it attempts to leave the interproximal tissue attached to the tooth root surface, thereby introducing an added dimension of stability. Reported advantages of M-MIST include less trauma, increased flap and wound stability, better primary closure, faster completion of surgery, and minimized patient discomfort during and after treatment.[4,5]

The aim of this is to study was to clinically and radiographically evaluate the chorion membrane as gtr using minimally inavasive surgical technique.

Case Report:-
An apparently healthy 28 year old male patient reported to the Department of Periodontics,College of Dental Sciences , Davngere, Karnataka, with the chief complaint of food impaction in the lower right back tooth region since 2 years. Periodontal examination revealed periodontal pockets in multiple areas measuring 6-8 mm in relation to first and second molars in all the quadrants. Orthopantomograph and full mouth Intra-oral periapical radiographs taken showed vertical bony defects in relation to 26, 36, and 46. Routine hematological investigations – revealed normal blood picture. Probing Pocket depth (PPD) and Clinical attachment level (CAL) measurements were using a Williams periodontal probe.

The treatment plan consisted of scaling and root planing followed by flap surgery with use of regenerative materials for intrabony defects. Patient was advised 0.2 % chlorhexidine mouth rinse twice daily.

Patient was recalled 6 weeks after phase-I therapy and the clinical parameters were re-evaluated. 46 had a PPD of 7mm & CAL of 9mm[Fig.1]. Vitality test using electric pulp tester revealed 46 as vital.

The CM 3 x 3 cm was obtained from, Tata Memorial Hospital Tissue Bank, Mumbai, India. The tissue was dispatched for the clinical use to us from the tissue bank. The processing procedures used are based on the International Atomic Energy Agency (IAEA) recommendations and the Asia Pacific Association of Surgical Tissue Banks (APASTB) standards (Fig. 5). (The placenta was procured under full informed consent from mothers who donate their placenta during delivery. The donors were screened for any history or presence of infection and transmissible diseases. Donor's blood was tested for HIV, hepatitis B, hepatitis C and VDRL. The chorion was cleaned of blood, pasteurized at 60 _C in saline, treated with 70 % alcohol, washed, lyophilized, packed and

sterilized by gamma radiation at a dose of 25 kGy.) Thereby surgical intervention was necessary and open flap debridement with regenerative therapy using a combination of chorion membrane, Bone graft (BG)-Demineralized bone matrix was planned in relation to 46,47 tooth region.

Surgical phase:-
Patients was seated comfortably on the dental chair and then asked to rinse the mouth with 10 ml of 0.2% chlorhexidinedigluconate solution. The extraoral surfaces of the patient were swabbed with 0.5% povidone iodine solution. The operative site was anaesthetized with 0.2% Lignocaine HCI with adrenaline (1:80,000) using block and infiltration techniques.Thecrevicular and interdental incisions were given using the Bard Parker handle with blade No12 and No.15.A full thickness mucoperiosteal flap was reflected using the periosteal elevator taking care to retain the interdental papillary tissue as far as possible. After reflection of the flap and exposure of osseous defect, a thorough surgical debridement of soft and hard tissue was done using area specific Gracey curettes. After completion of debridement the surgical site was irrigated copiously with 0.9% normal saline and carefully inspected to ensure that the procedure had been completed. Presuturing was done at the experimental group and the control group through the buccal and lingual flap before the placement of lyophilised irradiated Chorion membrane and Bone graft DBM(Demineralized bone matrix, osseomoldTM). And the site was sutured with a sling suture. Periodontal dressing (Non-eugenol pack) was placed [Fig.1- Fig8].
Postsurgical instructions were given. Amoxicillin 500 mg, tds for 5 days, Analgesic – Aceclofenac+ Paracetamol (100 + 500 mg), Chlorhexidine 0.2 % rinse thrice a day, were prescribed.

Following surgery, patient was re-evaluated for 9 subsequent months [Fig.9]. Radiographically a defect fill of approximately 60-70% was achieved [Fig.9]. There was a reduction in the PPD from 7mm (Pre-operative) to 3mm and CAL from 9 mm (Pre-operative) to 5 mm.

Discussion:-
The most favourable outcome for periodontal therapy is to regenerate the lost supporting tissues advocated, which include, open flap debridement; open flap debridement with bone grafts/bone substitutes, and guided tissue regeneration (GTR). In our case report, the patient was treated with minimally invasive surgical technique with lyophilised irradiated chorion membrane in combination with DBM to attempt regeneration in intrabony defects in relation to 46,47.

Rohit Khurana et al concluded that the Introduction of Minimally invasive surgery highlights various advantages such as less invasive surgery, shorter duration, favoured healing due to improved wound stability of minimally mobilized flaps, and benefiting the patient with reduced intra-operative and postoperative morbidity. [3]

There are a many studies that have proved the efficacy of DBM as a successful regenerative material.[6] In a study by Mahantesha et al clinical and radiographic evaluation of DBM was done and the authors have achieved significant reduction in clinical parameters As epithelial cells quickly migrate across the CM barrier, they form a seal over the underlying bone graft and do not apically migrate into the defect. [6] Histologic studies by Wallace and Cobb (2011), demonstrated this concept by the fact that when amnion CM was used as a barrier in site preservation, trephined bone core samples from healed surgical sites demonstrated new bone, residual bone graft, and connective tissue percentages comparable to those found in prior studies utilizing traditional GTR barriers. Additionally, this study found no events of adverse healing or epithelial invasion of the grafted sites. CM is available in different length and width, sufficient to adapt at the site on both buccal and lingual aspect of the quadrant in a single strip with trimming at interdental sites. The barrier is placed dry and quickly hydrates with blood, becomes very pliable, and closely adapts to the contours of the underlying surface. It's thin, selfadherent nature do not compromise blood flow. CM will not easily displace from underneath the over laying flap and does not need to be fixed into placeusing sutures or tacks. Collectively, CM's unique biologic and physical attributes reduce the complexityof trimming, suturing and placement of barriers,minimizing the chances of post-operative complications(Holtzclaw and Toscano 2012).[7]

Conclusion:-
Within the limits of this study we report that use of chorion membrane in combination with DBM in minimally invasive surgical technique resulted in significant reductions in clinical parameters such as in PPD and CAL.More randomized controlled clinical trials with larger sample size and longer follow up are needed in order to further

confirm the regenerative potential of lyophilised irradiate Chorion membrane in conjunction with DBM(Demineralized bone matrix, osseomoldTM) in the treatment of intrabony defects.

Fig 1:- Pre-operative

Fig 2:- Placement of Incision

Fig 3:- Flap reflection

Fig 4:- Graft placement

Fig 5:- Chorion Membrane

Fig 6:- Placement of chorion membrane

Fig 7:- Sutures placed

Fig 8:- Pre-operative radiograph

Fig 9:- Post-operartive radiograph

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