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Research Article

COMPARATIVE EVALUATION BETWEEN 20% EDTA-S & ORNIDAZOLE GEL AS ROOT BIOMODIFICATION AGENT ASEM STUDY

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ABSTRACT

Background: It should be well understood that the root surface receptiveness to clot formation & initial periodontal wound healing decides the nature of the connective tissue attachments. This study was carried out to assess the initial wound healing events after the application of 20% EDTA-S & Ornidazole gel and assess the formation of fibrin network following blood. **Material& Method:** Thirty multi-rooted teeth indicated for extraction due to periodontal disease were selected & divided into group A (20%EDTA-S), group B (Ornidazole gel (1% W/V)), group C (7.4pH phosphate buffer saline), group D (20%EDTA-S+ Blood), group E (Ornidazole gel+ Blood), group F (7.4pH) phosphate buffer saline+ Blood). Following root planning, the root surface was cut using diamond disc under copious irrigation. Samples from each group were subjected for root conditioning agent application by passive method. Specimens were then subjected to scanning electron microscopic study. Smear layers removal were analysed by Sampaia et al index. **Results:** 20%EDTA-S removed the smear layer better than ornidazole gel. Fibrin network formation was seen with specimen treated with 20% EDTA-S + Blood. **Conclusion:** Use of 20% EDTA-S as root conditioning agent has a beneficial effect on initial wound healing events, which are important for periodontal regenerative therapies.

Keywords: Root bio-modification, 20% EDTA-S, Ornidazole gel, Fibrin network formation

INTRODUCTION

The purpose of periodontal therapy is to re-establish the tooth supporting tissue affected by periodontal illness to their unique architectural form. Conventional surgical & non-surgical therapies plan at arresting periodontal illness by elimination of plaque from illness affected roots. Sufficient elimination of plaque, calculus and cytotoxic substances from the diseased root surface appears to be necessary for periodontal rejuvenation.[1] Howevertotalelimination with only mechanical debridement is not always sufficient.[2]

Instrumentation of the root surface has been exposed to direct development of smear layer of mutually organic & inorganic matter. [3]This layer is supposed to be physical barricades to periodontal rejuvenate. The demineralised root surface may also provide as a reservoir and preservation site for biologically dynamic extracellular medium proteins and development factors that could certainly have an effect on the wound curingatmosphere.[4,5] To triumph over the above precincts of using only mechanical root instrumentation, chemical root surface conditioning has been introduced. Root surface conditioning by topical application of acidic solutions has been shown to remove the smear layer resulting from root instrumentation.[6,7] For chemical root

surface management, a variety of compounds have been used: Sulphuric acid, Hydrochloric acid, Lactic acid, Maleic acid, Phosphoric acid, Citric acid, Ethylenediaminetetraaceticacid (EDTA), and Tetracycline hydrochloride.

In an in vitro study Islik et al compared the usefulness of dissimilar application techniques of tetracycline Hcl on root surfaces & examined the resultant surface under SEM. STERRETT and BAIN revealed a "shag carpet" look of intensely tufted fibrils, using a burnishing method by rubbing the dentin surface with a cotton pellet drenched in citric acid, more intertubular fibrils were uncovered and dentinal tubules widened to a superior level compared to passive application of the acid.[8]

Ideally, the demineralization step should have an even-handedfierceness to eradicate all instrumentation debris and to dissolve the smear layer and the Mineral stage, properly exposing dentin matrix proteins although not changing the structural and biochemical properties of the exposed proteins.[6]

In endodontology, EDTA is used to unlock calcified canals, to remove smear layer with likely infection[9] and to reduce potential microleakage[10]. Smear layer elimination is achieved with dissimilar arrangements of EDTA, such as liquid, paste[11]or gel application forms. [12] The aim of this study was to build up a root conditioning agent that can demineralize and detoxify root surfaces.

MATERIAL&METHOD

Thirty multi-rooted teeth indicated for extraction due to periodontal disease were obtained from the department of oral surgery at the Late Shri Yashwantrao Chavan Memorial Medical& Rural Development Foundation's Dental College &Hospital, Ahmednagar. After extraction teeth were stored in container with normal saline to avoid dehydration of specimens. All the selected teeth were caries free & were not subjected to scaling & root planning. Then all selected teeth were subjected to scaling & root planning. After scaling & root planning teeth were divided into three groups (Group A-20% EDTA-S, Group B-Ornidazole gel & Group C- 7.4pH phosphate buffer saline {control}). Each group contains ten teeth.

The apical third of the root &the crown portion below the cement - enamel junction was cut & discarded. The remaining mid root portion of each tooth was sectioned longitudinally bucco-lingually with diamond disc under copious irrigation with normal saline. All the teeth were stored in small containers filled with 7.4 pH phosphate buffer saline at 4^0C until further use.

The samples sectioned mid-root was segregated into six treatment groups (TABLE 1). EDTA-S treatment done using a burnishing technique which involved the application of 20% EDTA-S solution with the help of cotton pellet to the external surfaces of mid root.

The cotton pellet changed every 30 seconds for three minutes. Ornidazole gel treatment also made using a burnishing technique. Phosphate buffered saline treatment was done by immersing the teeth for 5 minutes in phosphate buffered saline.

Some samples from group A,B,C were subjected to 3-5 minutes washes in phosphate buffered saline. Fresh human whole peripheral blood obtained from a healthy human donor with informed consent was applied & allowed to clot on the blocks for 20 minutes. Following samples were subjected to scanning electron microscope study.

TABLE 1:- Table listing the different treatment group from A-F

Group	TREATMENT
A	20% EDTA-S
B	Ornidazole gel (1% W/V)
C	7.4 pH Phosphate buffered saline
D	20% EDTA-S + Blood
E	Ornidazole gel 1% W/V + Blood
F	7.4 pH Phosphate buffered saline + Blood

Immediately after final rinsing, samples were fixed in 1% formaldehyde phosphate buffer saline solution for 15 minutes. Then all samples were rinsed & incubated for 10 minutes in 0.02M glycine in phosphate buffered saline. Sample were post fixed in 2.5% glutaraldehyde in phosphate buffered saline for 30 minutes & dehydrated through a graded ethanol series 25%, 50%, 75%, 95% & finally 100% alcohol. Samples were dried overnight using silica gel crystals.

Data Analysis: Smear layer removal was evaluated according to Sampio et al index.[3]

1. Root surface without smear layer, with the dentinal tubules completely opened, without evidence of smear layer in the dentinal tubules.
2. Root surface without smear layer, with the dentinal tubules completely opened, but with

some evidence of smear layer in the dentinal tubules entrance.

3. Root surface without smear layer, with the dentinal tubules partially opened.
4. Root surface covered by a uniform smear layer with evidence of dentinal tubules opening.
5. Root surface covered by a uniform smear layer without evidence of opening the dentinal tubules.
6. Root surface covered by an irregular smear layer, with the presence of grooves & or scattered debris

RESULTS

In group in which 20% EDTA-S was used, there was an increased smear layer removal compared to the associated groups (Fig.1), in which ornidazole gel (group B; Fig.2), 7.4 pH phosphate buffered saline (group C;Fig3) used. For smear layer removal according to Sampiaoet al[3]

Group A: 4, Group B:6, Group C:6

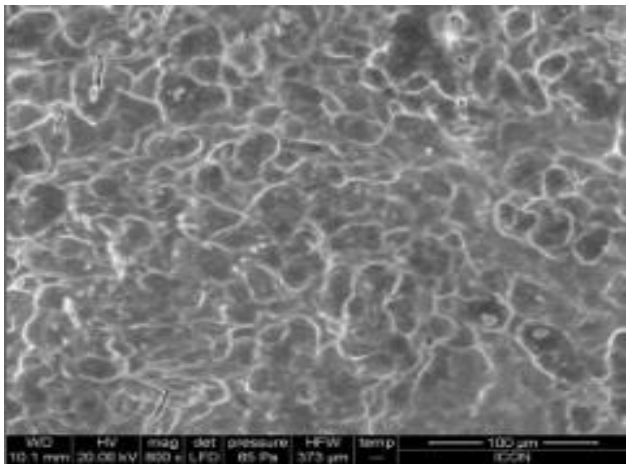

Fig 1: 20% EDTA-S passive application for 5 min root surfaces were covered by smear layer with evidence of dentinal tubules opening.

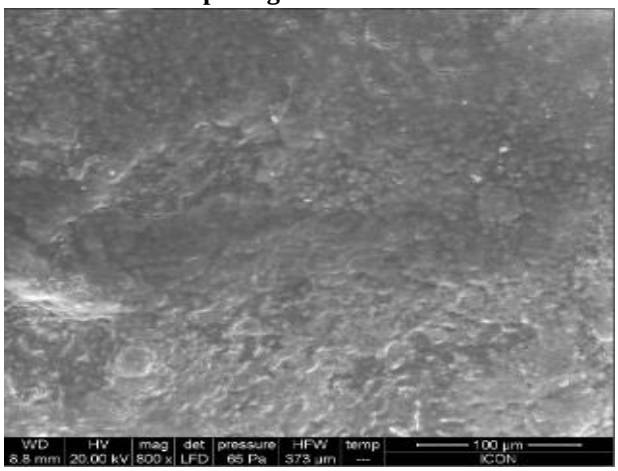

Fig 2:Ornidazolegel passive application for 5 min presence of heavy smear layer.

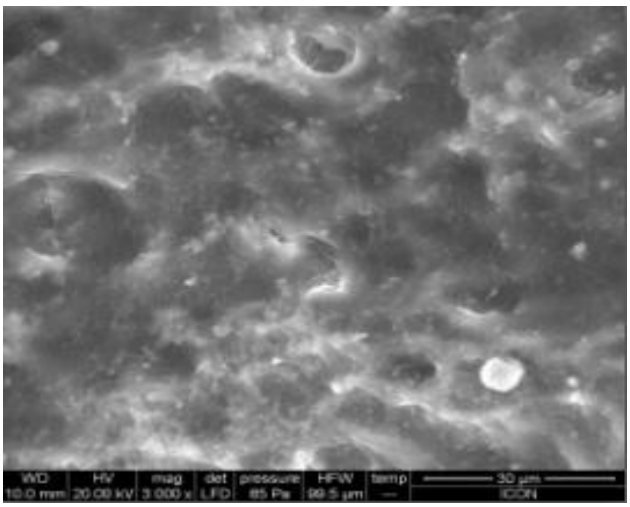

Fig3: PBS (Control) passive application for 5 min, presence of smear heavy smear layer.

There was fibrin network formation with 20% EDTA-S(Fig.4). There were no fibrin network formation seen with ornidazolegel(Fig.5)& 7.4 ph phosphate buffered saline(Fig.6).

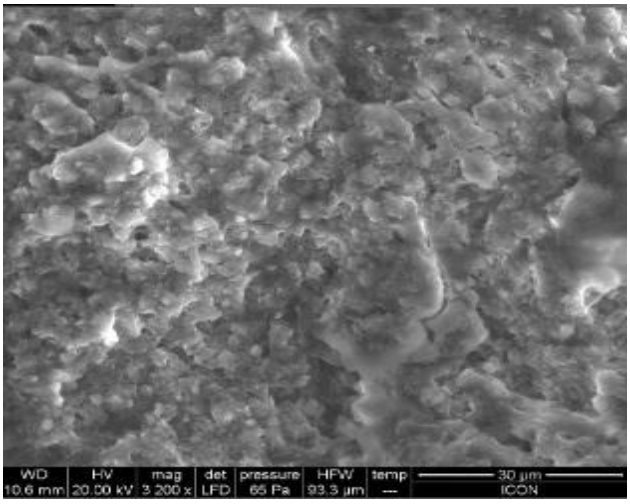

Fig 4: The root surfaces treated with 20%EDTA-S + blood, there was fibrin network formation

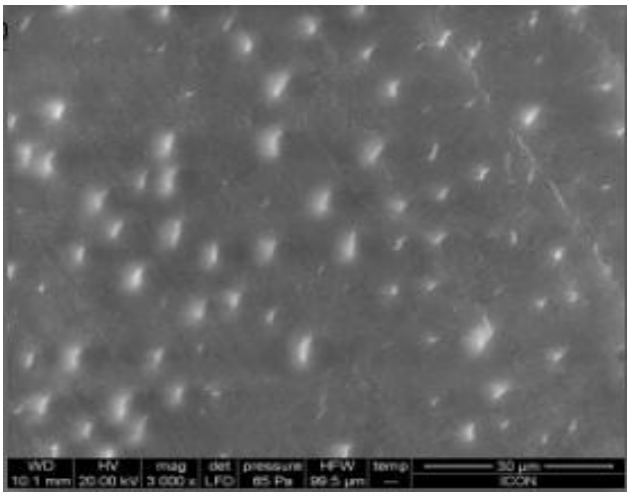

Fig 5: The root surfaces treated withOridazole gel+ blood, there was no fibrin network formation

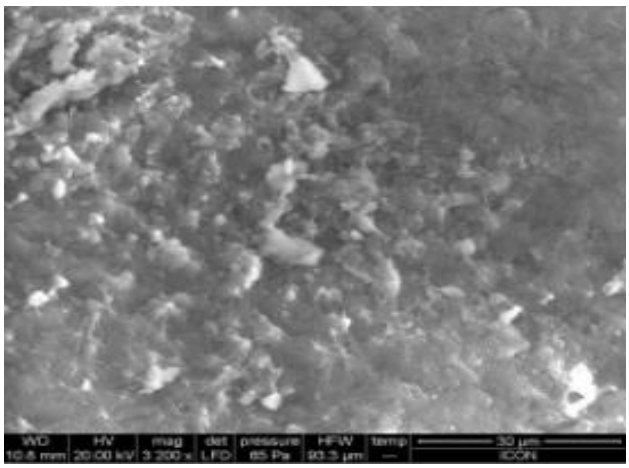

Fig 6: The root surfaces treated with PBS+ blood; there was no fibrin network formation

DISCUSSION

Scaling and root planning are widely used methods in periodontal therapy to eradicate irritants from the surfaces of the teeth and also to decrease tooth surface unevenness which may help the accumulation of irritants (Waerhaug1956). It has turned out to be gradually more apparent that the most vital feature of periodontal therapy is the elimination of all accretions from tooth surfaces exposed by periodontal illness (Aleo&Vandersall1980, Axelsson & Lindhe 1978, Caton et al. 1982, Hughes &Caffesse 1978, Lindhe et al. 1973, 1975, Listgarten et al. 1978, Rosling et al. 1976, Theilade et al. 1966, Waerhaug 1978b). Schaffer (1956) reported that teeth regularly scaled and root planed were established to have deposits residual, particularly in surface defects.

Fibroblasts do not affix & develop on diseased root surfaces, nor does new attachment form on them, due to presence of bacterial toxins.[13-16]It was recommended that a smooth root surface would be less prone to colonization by oral bacteria, thus delaying the development of a fresh biofilm on the treated root surfaces. This was based on a trial performed by Waerhaug in dogs. [17]The idea of this chapter was to measure the preliminary wound healing after the application of 20% EDTA-S & Ornidazole gel & calculate the fibrin arrangement pattern. Several authors have shown that 3 minutes etching with EDTA is enough for the elimination of smear layer compared to 10, 20, 30, 40 sec & 1 &2 minutes.[18]Soft soap broadly used in the medical ground to get rid of incrustation in scaly skin. Soft soap + water used as enema& this signifies its effect with mucous membrane & degree of protection. Hence effort was made to include the advantage of EDTA & detergent, decreases the surface strain.[3]Batista et al, obtained better results with 15% EDTA-T in comparison to plain EDTA.

This study also exposed that smear layer elimination after application of EDTA-S was valuable, which was in conjunction with the study by Pilatti et al (2005) &Shrirangrajan study et al (2012).

Pathogenic microorganisms may not be eliminated in deep periodontal pockets due to poor access for mechanical debridement, root anatomical difficulty[20, 21]& the capability of the microorganisms to infect & live in the periodontal tissue. [22]

Some patients do not initially express, or maintain, as enviable a clinical response as expected or desired. For such patients, the adjunctive use of an antibiotic, either simultaneously with scaling and root planning, or during another stage of therapy is essential to attain control of the disease. The assortment of a suitable antibiotic follows a diagnosis and clinician's decision to incorporate chemotherapeutic into management. A variety of antibiotics were identified that achievement levels in the gingival crevice fluid that exceeded the MICs of the objective bacteria, e.g. Amoxicillin and amoxicillin + clavulanic acid[23], the tetracyclines[24-26], clindamycin[27], metronidazole[28, 29].

Systemic antimicrobial agents might guide to possible side effects such as development of resistant bacteria[30]& gastrointestinal intolerance. [31]These drawbacks would be noticeably reduced if antimicrobial agents applied in the vicinity could be used. Recognition that subgingival plaque exists as a biofilm comparatively opposed to chemotherapeutic agents is a significant concept when considering the adjunctive use of an antibiotic or other antimicrobial agent in the treatment of periodontitis. Ornidazole have immune stimulatory activities, anticoagulant properties, antibacterial & antifungal action & for its action as a promoter of wound healing in the field of surgery. [32,33]

CONCLUSION

Though Ornidazole show antimicrobial & anti-coagulase activity; it does not help in smear layer removal as well as fibrin network formation. 20% EDTA-S is effective in both smear layer removal and fibrin network formation.

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