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Evaluation of the Antibacterial Efficiency of a Combination of 1% Alexidine and Sodium Hypochlorite on *Enterococcus faecalis* Biofilm Models: An *In Vitro* Study

Anchu R Thomas¹, Rekha Mani², Tripuravaram VK Reddy³, Ashwin Ravichandran⁴, Murali Sivakumar⁵, Shobana Krishnakumar⁶

ABSTRACT

Aim: The aim of the study was to assess the antibacterial efficiency of a combination of 1% alexidine (ALX) and 5.25% sodium hypochlorite (NaOCl) against *E. faecalis* biofilm using a confocal scanning electron microscopy.

Materials and methods: An estimated 120 human root dentin disks were prepared, sterilized, and inoculated with *E. faecalis* strain (ATCC 29212) to develop a 3-weeks-old biofilm. The dentin discs were exposed to group I—control group: 5.25% sodium hypochlorite (NaOCl) ($n = 20$); group II—1% ALX + 5.25% NaOCl ($n = 40$); group III—1% alexidine (ALX) ($n = 40$) (Sigma-Aldrich, Mumbai, India); group IV—negative control: saline ($n = 20$). After exposure, the dentin disks were stained with the fluorescent live/dead dye and evaluated with a confocal scanning electron microscope to calculate the proportion of dead cells. Statistical analysis was done using the Kruskal–Wallis and Mann–Whitney *U* test ($p < 0.05$).

Results: The maximum proportion of dead cells were seen in the groups treated with the combination of 1% ALX + 5.25% NaOCl (94.89%) and in the control group 5.25% NaOCl (93.14%). The proportion of dead cells presented in the 1% ALX group (51.79%) and negative control group saline (15.10%) were comparatively less.

Conclusion: The antibacterial efficiency of a combination of 1% ALX and 5.25% NaOCl was more effective when compared with 1% ALX alone.

Clinical significance: Alexidine at 1% could be used as an alternative endodontic irrigant to chlorhexidine, as alexidine does not form any toxic precipitates with sodium hypochlorite. The disinfection regimen comprising a combination of 1% ALX and 5.25% NaOCl is effective in eliminating *E. faecalis* biofilms.

Keywords: Alexidine, Biofilm, Confocal laser scanning microscope, *Enterococcus faecalis*.

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INTRODUCTION

Microorganisms play a primordial role in the pathogenesis of pulpal and periapical diseases. The success of endodontic treatment depends on complete elimination of microorganisms and their by-products from the root canal system through the combined action of mechanical instrumentation and chemical debridement.^{1–3} It has been observed that aerobic and facultative anaerobic microorganisms are found in higher counts in endodontic flare-ups and retreatment cases. *Enterococcus faecalis* has been found predominantly in failed cases than in primary infection.⁴ *E. faecalis* is highly resistant during the starvation phase and it is probable that the chlorhexidine resistance of the cells distinguishes retreatment cases from

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Recurrent Oral Submucous Fibrosis with Nil Mouth Opening Surgical Management and Reconstruction with Bilateral Nasolabial Flap: A Case Report and Review of Literature

Abstract

Oral submucous fibrosis [OSF] is a premalignant condition characterized by inflammation and progressive fibrosis of submucosal tissue, resulting in trismus. It is associated with chewing of areca nut in betel quid. Mortality rate is significant because it transforms into oral squamous cell carcinoma at a rate of 2.3%–7.6%. The aim of this article is to share our experience in managing a case of recurrent oral submucous fibrosis with nil mouth opening by surgical excision, coronoidotomy, and reconstruction of buccal defect using bilateral inferiorly based nasolabial flap, followed by active oral physiotherapy. The patient had reached an acceptable mouth opening with no further recurrence. The patient was observed closely for any malignant transformation. Surgical excision of bands and coronoidotomy followed by reconstruction with nasolabial flaps and active physiotherapy in the postoperative period remains a good option for recurrent and advanced cases of OSF with acceptable functional and cosmetic results.

Keywords: *Nasolabial flaps, nil mouth opening, recurrent oral submucous fibrosis, squamous cell carcinoma, surgical excision*

Introduction

Oral submucous fibrosis [OSF] is a premalignant condition characterized by inflammation and progressive fibrosis of submucosal tissue, resulting in trismus. It is associated with chewing of areca

not disappear after cessation of the habit but remains permanent.^[6,7]

The severity of trismus can be graded by measuring the interincisor opening. The mouth opening is categorized into stage I (>3 cm), stage II (2–3 cm), and stage III

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Journal publication with other Institutes in 2020

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DOI: 10.36648/2386-5180.8.2.312		
Biochemical Test of Serum Ceruloplasmin as a Biomarker for Early Detection of Oral Potentially Malignant Epithelial Lesions (PMELs) and Oral Squamous Cell Carcinoma (OSCC) ¹Dr.Ajay Chandran, ²Dr.S.Nachiappan, ³Dr. Sunil Chandra Tripuraneni, ⁴Dr.Maneesha Das, ⁵Dr.G.Manikandan, ⁶Dr. Karthik Reddy Kothakapu, ⁷Dr.Abhishek Singh Nayyar		
Abstract Context and Aim: Despite the recent advances in cancer treatments, the outcome and prognosis of the various oral cancers is still relatively poor. The lacuna for this lies in the delayed and late diagnosis of neoplasms when the tumor is already in advanced stages of the disease. An early enough diagnosis is, thus, highly warranted to initiate treatment in the initial stage itself to arrest the progression of the malignant process. Such measures, therefore, are of great help and desired fundamental for an early detection of this dreaded disease so as to ensue an early treatment. The purpose of the present study is to estimate and evaluate the efficacy of serum ceruloplasmin levels as a potential biomarker in the early detection of oral potentially malignant epithelial lesions (PMELs) and frank oral cancers. Materials and Methods: The present observational study was conducted over a period of 2 years wherein a total of 100 subjects aged between 18 to 60 years clinically diagnosed and histopathologically confirmed with oral leukoplakia, oral submucous fibrosis (OSMF) and oral squamous cell carcinoma (OSCC) between the age range of 20-60 years were included. The patients were subjected to incisional biopsy after routine hematological investigation. The same sera samples were, then, used for the analysis of serum ceruloplasmin levels. Statistical Analysis Used: The statistical analysis was carried-out using the Statistical Package for Social Sciences (SPSS version 17.0, EPI-INFO 6.0 version). Comparison of serum ceruloplasmin levels with the control group was performed using one ^{1,2} Department of Oral and Maxillofacial Surgery, Sathyabama Dental College and Hospital, Chennai, Tamil Nadu, India ³ Department of Prosthodontics and Crown and Bridge, Drs Sudha and Nageswara Rao Siddhartha Institute of Dental Sciences, Chinoutpalli, Gannavaram Mandal, Krishna District, Andhra Pradesh, India ⁴ Department of Conservative Dentistry and Endodontics, Saraswati Dhanwantari Dental College and Hospital and Post-graduate Research Institute, Parbhani, Maharashtra, India ⁵ Department of Dentistry, Shri Sathya Sai Medical College and Research Institute, Ammapettai, Nellikuppam Post, Chengalpattu District, Nellikuppam, Tamil Nadu, India ⁶ Department of Oral and Maxillofacial Surgery, Meghna Institute Of Dental Sciences, Nizamabad, Telangana, India ⁷ Department of Oral Medicine and Radiology, Saraswati Dhanwantari Dental College and Hospital and Post-graduate Research Institute, Parbhani, Maharashtra, India		



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FORM NO. – F / RES/ 016

Ref: Ph.D./Prov.Regtn/OMR/DS/Part Time/External/August-2019/0348/DS192D007

Date: 26.08.2019

To,

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Sub: Provisional registration-Ph.D./Part Time/Oral Medicine & Radiology – Intimation-
 reg

Ref: Joining report dated 05.08.2019

With reference to your application and joining report cited above I am by direction, to inform you that you are provisionally registered for doing research for the award of Ph.D. degree on Part Time basis from 05th August 2019.

You should work for a minimum total period of Four years after provisional registration under the guidance of the supervisor and should submit the thesis for the Ph.D. Degree before the completion of Seven years i.e on or before 04th August 2026.

The Candidate should submit half yearly progress reports periodically as per format given in Appendix II of the Ph.D. Regulations through the Supervisor and the Doctoral Committee.

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Abnormal Lipids and Acquired Immune Deficiency Syndrome: Association of Serum Lipids with HIV Status

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