ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)
IJDSIR : Dental Publication Service
Available Online at: www.ijdsir.com
Volume – 4, Issue – 3, May - 2021, Page No. : 556 - 559

Comparative evaluation of efficacy of tetracycline fiber as a LDD system in the treatment of chronic periodontitis as an adjunct to SRP – A clinical study

[1]Dr.Kausar Parwez Khan, Reader, Dept. of Periodontology, Mithila Minority Dental College & Hospital, Darbhanga

[2]Dr. Md.Shadab Anwar, MDS, 1st year student, Dept. of Periodontology, Mithila Minority Dental College & Hospital, Darbhanga

[3]Dr. Md. Raunaque Afroz, Private Dental Practioner, Purnea, Bihar, India

Corresponding Author: Dr. Md. Shadab Anwar, MDS, 1st year student, Dept. of Periodontology, Mithila Minority Dental College & Hospital, Darbhanga

Citation of this Article: Dr.Kausar Parwez Khan, Dr. Md. Shadab Anwar, Dr. Md. Raunaque Afroz, "Comparative evaluation of efficacy of tetracycline fiber as a LDD system in the treatment of chronic periodontitis as an adjunct to SRP – A clinical study", IJDSIR- May - 2021, Vol. – 4, Issue - 3, P. No. 556 – 559.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Introduction

Periodontitis is defined as an inflammatory disease of the supporting tissues of the teeth caused by specific microorganisms or groups of specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone with increased probing depth formation, recession, or both.[1]

chronic periodontitis is an infection involving the destruction of supporting tissues surrounding the tooth.[2] There is considerable evidence supporting the role of bacteria as the etiology of periodontal disease. Elevated numbers of subgingival microorganisms have been associated with destructive periodontal disease activity.[3] The elimination or reduction of microbial pathogens present in subgingival plaque is one of the primary objectives of periodontal therapy.[3] Recognition of specific role of certain bacteria in chronic periodontitis has tended to consolidate ideas in therapeutic management of such diseases.[4] Removal or inhibition of subgingival plaque thus plays an important role in the maintenance of oral health.[5]

Antimicrobial therapy has also been directed at specific bacteria associated with clinically diseased sites to help augment the mechanical treatment aimed at the removal of sub-gingival calculus and toxins. However, the inability to achieve and maintain therapeutic concentrations of the antibiotic in the crevicular fluid with systemic administration can limit its effectiveness.[6]

Also, the Systemic administration of antimicrobial agents requires frequent dosing which is associated with the risk of developing resistant organisms and super infection as well as adverse effects such as gastrointestinal disturbances.[7]

Pitcher et al. observed that mouth rinses and agents used during supra-gingival irrigation do not predictably reach beyond 5 mm into the periodontal pocket. For antimicrobial agents to be effective, the concentration of the drug should be adequate at the site and also there should be prolonged drug microbial contact.6 In order to overcome the drawbacks associated with systemic and conventional mode of therapy, local drug delivery systems were developed, which is used in this study.[8]

The antimicrobial agents used as local drug delivery agents include tetracycline, ofloxacin, clindamycin, chlorhexidine, etc. Tetracycline as well its derivatives doxycycline and minocycline are the most commonly used antimicrobial agents in the treatment of periodontal infections. Tetracycline also binds to the root surfaces and can be released in active form over extended periods of time. The sub-lethal concentration of tetracycline reduces adherence and co-aggregation properties of a number of disease associated bacteria including P. gingivalis and P. intermedia.[9-10]

Tetracyclines are semi-synthetic chemotherapeutic agents which are bacteriostatic in action and hence are effective against rapidly multiplying bacteria. Tetracycline have been incorporated into a variety of delivery systems (nonresorbable or bioresorbable) for insertion into periodontal pockets. These include hollow fibers (Goodson et al., 1979), ethylene vinyl acetate copolymer fibers (Goodson et al., 1983), ethyl cellulose fibers (Friedman and Golomb, 1982), acrylic strips (Addy et al., 1982), collagen preparations (Minabe et al., 1989), and hydroxypropyl cellulose films (Noguchi et al., 1984).[11]

Recently, a new local drug delivery system, Periodontal Plus AB, which contains 25 mg pure fibrilar collagen with approximately 2 mg of evenly impregnated tetracycline hydrochloride (Advanced Biotech Products, Chennai, India) have been introduced for the treatment of gingival and periodontal diseases.[11] The present three month study was designed to reduce the surgical intervention in the treatment of periodontal pocket and to use locally available material so as to reduce the financial burden on the patient and thereby making cost effective management.

Since there are limited microbiological studies conducted to evaluate the efficacy of tetracycline fibers as a local drug therapy, the study has been taken up to evaluate the efficacy of locally delivered tetracycline fibers (Periodontal AB Plus) in conjuction with scaling and root planing in the treatment of chronic periodontitis in the patients who are not willing to undergo periodontal flap surgery.

Figure 1: Periodontal Plus AB.

Materials and methods

A total of 30 human subjects consisting of both genders (male & female, aged between 35 to 60 years were selected from department of periodontics and implantology, Mithila minority dental college and hospital Bihar, All the 35 subjects completed the 3-month follow-up study.

Study population

Inclusion criteria

1. Patients who had not undergone any surgical or nonsurgical periodontal therapy in the past 6 months.

2. Patients who had not taken antibiotic therapy in the past 6 months.

3. Patients able to follow verbal or written oral hygiene instructions.

4. Patients having two nonadjacent teeth separated by at least 1 tooth with ≥5 mm periodontal pocket that bleed on probing at the initial visit.

Exclusion criteria

1. Patients with a history of using antimicrobial mouthrinses within 2 months of the baseline visit or on routine basis.

2. Patients having history of allergy to tetracycline or cyanoacrylate adhesive.

3. Pregnant woman or nursing mothers.

4. Patients with periodontal packets in which the depth of the pockets corresponded to the apex of the tooth as in probable endodontic-periodontic conditions.

5. Medically compromised patients.

6. Teeth with furcation involvements.

Thirty-five subjects with a total of 70 sites were selected. The selected sites were randomly divided into test group and control group.

- Test group included 35 sites treated with local drug delivery and scaling and root planing.
- Control group included 35 sites treated with scaling and root planing alone (without local drug delivery).

Test group - included 35 sites that were selected for the placement of Periodontal Plus AB; Tetracycline fibers (local drug delivery) after scaling and root planing.

Control group - included 35 sites that were treated with scaling and root planing alone (without local drug delivery). Clinical examination for the base line parameters were done after obtaining written consent from each patient who had participated in the study. The ethical clearance obtained from ethical committee of Mithila minority dental college and hospital ,Bihar.

Clinical attachment level measurement from cemento-enamel junction as a reference point to the base of pocket with William's graduated probe at baseline, 1 month, 2 months, and 3 months post-therapy.

Result

Results showed a significant improvement in all the clinical parameters. There was significant decrease in mean probing depth from base line to 90 days, and also there was significant gain in CAL in the test group as compared to control group.

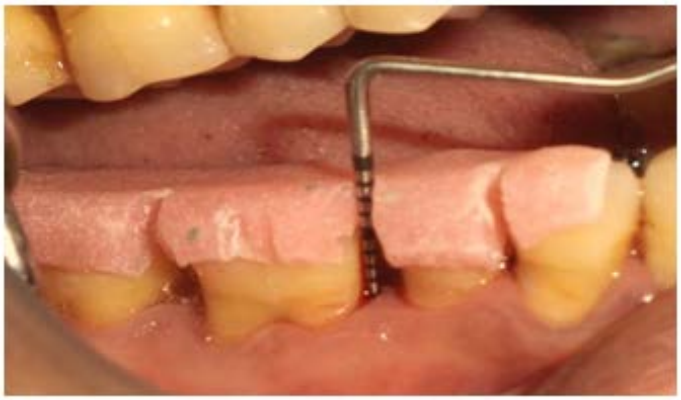

Figure 2: Test site Measuring of probing pocket depth and CAL using acrylic stent at base line.

Figure 3: Placement of Periodontal Plus AB at test site.

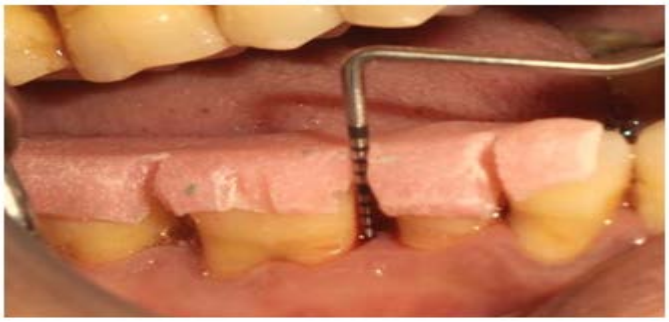

Figure 4: Measuring of probing pocket depth and CAL using acrylic stent at 3 months.

Conclusion

1. Application of the tetracycline in modified collagen matrix following scaling and root planing might be beneficial in treatment of chronic adult periodontitis and improving periodontal parameters for 3-month duration.

2. Though the local drug delivery system used in the study is the safe and effective treatment modality, further clinical and microbiological studies are required to determine the effect of this treatment modality over long period.

3. Despite the proven additive benefits, the availability and cost associated with various controlled delivery devices (EVA fibers) have so far limited the application of tetracycline fibers. As this material is relatively cost effective and biodegradable, its use can be expanded in general population.

References

1. Newman MG, Takei HH, Klokkevold PR, Carranza FA. Newman and Carranza's Clinical Periodontology (Third south Asia edition),13 th Edition, ISBN: 978-0-323-52300-4.
2. Drisko CL, Cobb CM, Killoy WJ, Michalowicz BS, Pihlstrom BL, Lowenguth RA, et al. Evaluation of periodontal treatments using controlled-release tetracycline fibers: Clinical response. J Periodontal 1995;66:692-9.
3. Dang AB, Chaubey KK, Thakur RK, Mohan R, Chowdhary Z, Tripathi R. Comparative evaluation of efficacy of three treatment modalities – tetracycline fibers, scaling and root planing, and combination therapy: A clinical study. J Indian Soc Periodontol 2016;20:608-13.
4. van Palenstein HeldermanWH. Microbial aetiology of periodontal disease. J Clin Periodontol 1981;8:261-80.
5. Lindhe J, Nyman S. The effect of plaque control and surgical pocket elimination on the establishment and maintenance of periodontal health. A longitudinal study of periodontal therapy in cases of advanced disease. J Clin Periodontol 1975;2:67-79.
6. Newman MG, Kornman KS, Doherty FM et al. A 6-Month Multi-Center Evaluation of Adjunctive Tetracycline Fiber Therapy Used in Conjunction With Scaling and Root Planing in Maintenance Patients: Clinical Results. J Periodontol. 1994;65:684-88.
7. Sadaf N, Anoop B, Dakshina B et al. Evaluation of efficacy of tetracycline fibers in conjunction with scaling and root planing in patients with chronic periodontitis. J Ind Soc Periodontol. 2012;16:392-96.
8. Goodson JM, Haffajee A, Socransky SS. Periodontal therapy by local delivery of tetracycline. J Clin Periodontol. 1979;6:83-92.
9. Cattabriga M, Pedrazzoli V, Cattabriga A, Pannuti E, Trapani M, Verrocchi GC et al. Tetracycline fiber used alone or with scaling and root planing in periodontal maintenance patients: Clinical results. Quintessence International. 1996; 27:395-400.
10. Hanes PJ, Purvis JP. Local anti-infective therapy: Pharmacological agents. A Systematic Review. Ann Periodontal. 2003;8:79-98.
11. Sachdeva S, Agarwal V et al. Evaluation of commercially available biodegradable tetracycline fiber therapy in chronic periodontitis. J Ind Soc Periodontol. 2011;15:130- 35.