Assessment of Efficiacy 0.12% Chlorhexidine and Tumeric as Subgingival Irrigants in Patients of Chrnoic Periodoniitis: A Comparative Study

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ABSTRACT

Introduction: Gingival and periodontal diseases in their various forms have afflicted mankind since the dawn of the history**.** A number of neutraceuticals like aloe vera, neem, turmeric, green tea, chamomile, acacia arabica, honey, guava, mango, cloves, eucalyptus oil, thyme, cinnamon, ginger, fennel, oats etc. are currently being used in the prevention and treatment of periodontal disease. This study aims towards the comparison of the clinical efficacy of 0.12% Chlorhexidine and Turmeric as subgingival irrigants in patients of chronic periodontitis.

Material and Methods: 60 patients (both males and females) showing clinical evidence of chronic periodontitis were selected amongst the patients visiting the Department of Dentistry. A total of 60 patients suffering from chronic periodontitis were enrolled in the study. Before irrigation, complete scaling and root planing was done. Total of 60 patients were randomly and equally divided into 3 test groups. Test group 1comprised of Patients irrigated with 0.12% Chlorhexidine digluconate. Test group 2 comprised of Patients irrigated with freshly prepared 10%Turmeric solution. Test group 3 comprised of Patients irrigated with distilled water (control). All clinical parameters- Plaque index (Turesky-Gilmore-Glickman Modification of the Quigley Hein Plaque Index), Gingival index (Loe and Silness gingival index) and Periodontal pocket depth were assessed on day 0 after complete oral prophylaxis and again on day 7, 21 and 42.

Results: Irrigating solutions Chlorhexidine, Turmeric and distilled water were used. Out of the three subgingival irrigating solutions, good results were seen with Chlorhexidine, then with Turmeric and then for distilled water as an irrigating solution.

Conclusion: Chlorhexidine has shown to be a potent therapeutic agent which has the properties of improving the periodontal status significantly.

Keywords: Chlorhexidine, Gingival, Periodontal

INTRODUCTION

Gingival and periodontal diseases in their various forms have afflicted mankind since the dawn of the history.[1] Periodontal diseases result from interaction between plaque bacteria and a susceptible host. The susceptibility of the host is partly hereditary (such as inadequate or unregulated immune response) but can be influenced by environmental and behavioral factors such as viral infections, smoking and stress. Since it is impossible, so far, to alter the genetic makeup of the patients susceptibility, the success of periodontal therapy primarily depends upon dealing with the reduction or elimination of periodontal pathogens in combination with the re-establishment of a more suitable environment in which both the pathogenic and non-pathogenic bacteria exists in harmonious relationship.[2,3]

There are a number of treatment modalities for the management of diseases related to periodontium. The treatment of periodontal diseases focuses on the prevention of periodontal tissue destruction by elimination of some pathogenic bacteria present in the periodontal pocket routinely performed by mechanical scaling and root planing. Variation in the ability of the dentist to gain access in deep and tortuous pockets, as well as bacterial invasion into gingival and dental tissues often results in substantial variation in effectiveness of scaling and root planing. Because of the locally invasive nature of the bacteria, administration of drugs by local drug delivery such as subgingival irrigation, gels, hollow fibers, mouth rinses etc. are seen as an alternative method.[4]

This led to the search for chemotherapeutic agents, both local such as Chlorhexidine, Listerine etc. and systemic such as Metronidazole, Doxycycline, Tetracycline etc. a few to name, in conjugation with mechanical removal of subgingival biofilms and calculus.[5]

A number of neutraceuticals like aloe vera,[5] neem,[6] turmeric,[7] green tea, chamomile, acacia arabica, honey, guava, mango, cloves, eucalyptus oil, thyme, cinnamon, ginger, fennel, oats etc. are currently being used in the prevention and treatment of periodontal disease.[8]

This study aimed towards the comparison of the clinical efficacy of 0.12% Chlorhexidine and Turmeric as subgingival irrigants in patients of chronic periodontitis.

MATERIAL AND METHODS

60 patients (both males and females) showing clinical evidence of chronic periodontitis were selected amongst the patients visiting the Department of Dentistry.

Criteria for selection of patients

Inclusion criteria

- Patients between age group of 30-55 years.
- Patients suffering from chronic periodontitis.
- Patients with pocket depth ≥4mm.

Exclusion criteria

- Patients who are immunocompromised or on any long term immunosuppressant drugs.
- Patients having any type of uncontrolled systemic illness

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like cardiovascular diseases, uncontrolled diabetes, chronic respiratory disorders, bleeding disorders, allergy etc.
- Patients on any anticoagulant therapy or undergoing radiotherapy.
- Pregnant and lactating patients.
- Smokers.

Solutions used for subgingival irrigation
- 0.12% Chlorhexidine
- 10% Turmeric solution
- Distilled Water

A total of 60 patients suffering from chronic periodontitis were enrolled in the study. Before irrigation, complete scaling and root planing was done.

Group formation:
Total of 60 patients were randomly and equally divided into 3 test groups.
Test group 1: Patients irrigated with 0.12% Chlorhexidine digluconate
Test group 2: Patients irrigated with freshly prepared 10%Turmeric solution
Test group 3: Patients irrigated with distilled water (control).

Application of Irrigating Solutions
The patients were subjected to complete scaling and root planing before irrigation was performed. Subgingival irrigation was done with 26 gauge needle with 2 ml of disposable syringe.1 ml of each irrigant solution was used for irrigating the pocket site for 30 seconds and the process was repeated 2 times over 5 minutes.

Recall Visits of patients
Subgingival irrigation was performed on day 0 and patients were recalled on 7, 14 and 21 respectively for subgingival irrigation. All clinical parameters- Plaque index (Turesky-Gilmore-Glickman Modification of the Quigley Hein Plaque Index), Gingival index (Loe and Silness gingival index) and Periodontal pocket depth were assessed on day 0 after complete oral prophylaxis and again on day 7, 21 and 42.

STATISTICAL ANALYSIS

All the results were analyzed by SPSS software. Student t test and chi-square test was used for the assessment of level of significant. P-value of less than 0.05 was taken as significant.

RESULTS

The purpose of this study was to the compare the clinical efficacy of 0.12% Chlorhexidine and Turmeric as subgingival irrigants in patients of chronic periodontitis. The present study was undertaken in the 60 patients showing clinical evidence of chronic periodontitis (20- Chlorhexidine group, 20- Turmeric group, 20- Distilled Water group) selected amongst the patients visiting the department of dentistry.
Table 1 shows comparison of Mean Plaque Scores between Group 1 and Group 2 at different time intervals. Significant results were obtained while comparing the mean plaque scores in between the two study groups. Table 2 shows comparison of Mean Plaque Scores between Group 1 and Group 3 at different time intervals. While comparing in between the two study groups, highly significant results were obtained. Table 3 shows comparison of Mean Plaque Scores between Group 2 and Group 3 at different time intervals. Non-significant results were obtained while comparing the mean plaque scores in between group 2 and group 3. Table 4 shows comparison of Mean Gingival Scores between Group 1 and Group 2 at different time intervals. Significant results were obtained while comparing the mean gingival score in between study group 1 and 2. While comparing the mean gingival scores in between group 1 and group 3 subjects, significant results were obtained (Group 5). Significant results were obtained while comparing the mean gingival scores in between in group 2 and 3 subjects (Table

Group	N	Mean ± S.D				P- Value	S
		Day 0	Day 7	Day 21	Day 42		
1	20	1.3±0.3	1.1±0.2	1.0±0.2	0.9±0.2	0.017	S
2	20	1.4±0.50	1.3±0.43	1.0±0.28	1.0±0.21		

Table-1: Showing comparison of Mean Plaque Scores between Group 1 and Group 2 at different time intervals

Group	N	Mean ± S.D				P- Value	S
		Day 0	Day 7	Day 21	Day 42		
1	20	1.3±0.3	1.1±0.2	1.0±0.2	0.9±0.2	0.001	HS
3	20	1.4±0.50	1.2±0.3	1.3±0.3	1.2±0.3		

Table-2: Showing comparison of Mean Plaque Scores between Group 1 and Group 3 at different time intervals

Group	N	Mean ± S.D				P- Value	S
		Day 0	Day 7	Day 21	Day 42		
2	20	1.4±0.47	1.2±0.33	1.1±0.28	1.1±0.45	0.570	NS
3	20	1.6± 0.41	1.5±0.39	1.4±0.39	1.4±0.36		

Table-3: Showing comparison of Mean Plaque Scores between Group 2 and Group 3 at different time intervals

Group	N	Mean ± S.D				P- Value	S
		Day 0	Day 7	Day 21	Day 42		
1	20	1.2±0.3	0.9±0.2	0.8±0.2	0.7±0.1	0.035	S
2	20	1.6± 0.46	1.3±0.40	1.1±0.44	1.0±0.43		

Table-4: Showing comparison of Mean Gingival Scores between Group 1 and Group 2 at different time intervals

6). While comparing the mean pocket depth in between group 1 and group 2 subjects, non- significant results were obtained (Table 7). Table 8 shows comparison of Mean Periodontal Pocket Depth Scores (in mm) between Group 1 and Group 3 at different time intervals. While comparing the mean pocket depth in between group 2 and group 3 subjects, significant results were obtained (Table 9).

DISCUSSION

Periodontal disease is one of the most common diseases affecting the mankind characterized by inflammatory lesions in periodontal connective tissues, derangement of periodontal fibres, alveolar bone loss, proliferation, ulceration and apical migration of junctional epithelium.[9] Various pathogenic bacteria residing subgingivally, play an important role in helping the disease to occur. The importance of subgingival microflora is widely recognized. However, its therapeutic handling presents difficulties. Scaling and root planing has proved to be of limited value in deep pockets and anatomical variations. The local or systemic use of antibacterial agents constitute a promising therapeutic approach.[10]

So, to augment the effects of scaling and root planing either systemic or topical antibiotics or local irrigations with a variety of antimicrobial agents have been used.[11] The development of chemotherapeutic agents capable of inhibiting dental plaque formation has been of great interest to dental researchers and clinical dentists over the past decade.[12] The suppression of periodontal pathogens can be done with the local application of anti-microbial agents, which also increases the clinical and microbial benefit of mechanical debridement but with their own complications and side-effects like staining of teeth, taste alterations etc.[13]

The development of chemotherapeutic agents capable of inhibiting dental plaque formation has been of great interest to dental researchers and clinical dentists over the past decade. In the recent years, human pathogenic micro organisms have developed resistance to the indiscriminate and long term use of anti-microbial drugs commonly employed in the treatment of infectious diseases. Hence this limits the use of antimicrobial agents for oral care.[14]

This situation, the undesirable effects of certain antibiotics and the emergence of previously uncommon infections, has made the scientists to look for antimicrobial substances of alternate sources like plant origin.

During the last three decades, the activity of plant extracts against bacteria has been studied in a more intensified way.

Group	N	Mean ± S.D				P- Value	S
		Day 0	Day 7	Day 21	Day 42		
1	20	1.2±0.3	0.9±0.2	0.8±0.2	0.7±0.1	0.0	HS
3	20	1.4± 0.3	1.2±0.3	1.1±0.3	1.0±0.3		

Table-5: Showing comparison of Mean Gingival Scores between Group 1 and Group 3 at different time intervals

Group	N	Mean ± S.D				P- Value	S
		Day 0	Day 7	Day 21	Day 42		
2	20	1.6±0.46	1.3±0.40	1.1±0.44	1.0±0.43	0.012	S
3	20	1.2±0.33	1.1±0.29	1.1±0.32	1.0±0.35		

Table-6: Showing comparison of Mean Gingival Scores Between Group 2 and Group 3 at different time intervals

Group	Side	N	Mean±S.D			P- Value	S
			Day 0	Day 21	Day 42		
1	M	20	6.0±0.8	3.7±1.4	3.3±1.3	0.20	NS
2			6.0±0.8	3.9±1.0	4.1±1.0		
1	B	20	4.0±0.6	2.7±0.6	2.4±0.6	1.1	NS
2			3.8±0.8	2.5±0.8	2.3±0.9		

Table-7: Showing comparison of Mean Periodontal Pocket Depth Scores (in mm) between Group 1 and Group 2 at different time intervals

Group	Side	N	Mean±S.D				P- Value	S
			Day 0	Day 21	Day 42			
1	M	20	5.9±0.8	3.7±1.4	3.0±1.0	0.001	HS	
3			5.8±1.3	4.7±1.0	4.8±1.1			
1	B	20	4.4±0.7	2.8±0.6	2.4±0.6	0.045	S	
3			3.9±0.9	3.1±0.8	3.1±0.9			

Table-8: Showing comparison of Mean Periodontal Pocket Depth Scores (in mm) between Group 1 and Group 3 at different time intervals

Group	Side	N	Mean±S.D				P- Value	S
			Day 0	Day 21	Day 42			
2	M	20	5.0±0.8	4.0±1.0	4.0±1.2	0.05	S	
3			5.8±1.3	4.3±1.2	4.8±1.0			
2	B	20	3.8±0.6	2.7±0.8	2.4±0.9	0.045	S	
3			3.9±0.8	3.0±0.8	3.2±0.5			

Table-9: Showing comparison of Mean Periodontal Pocket Depth Scores (in mm) between Group 2 and Group 3 at different time intervals

Working and researching along this way, numerous screening evaluations have been published based on the traditional use of chinese, african and asian plant – based drugs.[15]

Chlorhexidine is a cationic bisbiguanide with broad antibacterial activity, low mammalian toxicity and a strong affinity for binding to skin and mucous membranes. It was developed in 1940's by Imperial Chemical Industries, England. This compound was introduced for medical use in 1953 as an antiseptic cream for wounds. It's later applications included those of a presurgical skin cleanser, a surgical scrub, an obstretic cream and an instrument sterilization fluid.[16]

Chlorhexidine has been shown to reduce pellicle formation and plaque accumulation by binding to salivary glycoproteins and interfering with adsorption of bacteria to the tooth surface.[17]

Turmeric (curcuma longa) is extensively used as a spice, food preservative and as coloring material in India, China and South East Asia. It has been used in traditional medicine as a household remedy for various diseases including biliary disorders, anorexia, cough, diabetic wounds, hepatic disorders. Curcumin (diferuloylmethane), the main yellow bioactive component of turmeric has been shown to have a wide spectrum of biological actions. These include its anti-inflammatory, anti-oxidant, anti-carcinogenic, anti-mutagenic, anti-coagulant, anti-fungal, anti-protozoal, anti-diabetic. Clinically curcumin has been used to reduce post-operative inflammation.[18] In the present study, irrigating solutions Chlorhexidine, Turmeric and distilled water were used. Out of the three subgingival irrigating solutions, good results were seen with Chlorhexidine, then with Turmeric and then for distilled water as an irrigating solution.

Chlorhexidine digluconate, which is a cationic bisbiguanide with a broad antimicrobial spectrum, with very low toxicity.[19,20] It is used as an adjunct to mechanical cleaning procedures. It binds to soft and hard tissues in the mouth, enabling it to act over a long period after application of its formulation.[19] Chlorhexidine is substantive, thus reducing the levels of micro-organisms in saliva up to 90% for several hours.[20-22]

Curcumin, the main bioactive component of turmeric, has posed to be a good anti-inflammatory agent because it cause downregulation of cyclo-oxygenase pathway via arachidonic acid inhibition. It was found that the anti-inflammatory properties of curcumin are also mediated through their effects on cytokines, lipid mediators, eicosanoids and proteolytic enzymes. It also acts as an anti-oxidant agent by scavenging the superoxide radicals, hydrogen peroxide and nitric oxide from activated macrophages and inhibits lipid peroxidation.[18]

CONCLUSION

On the basis of this study and recent advances, it is concluded that Chlorhexidine has shown to be a potent therapeutic agent which has the properties of improving the periodontal status significantly. Chlorhexidine can be used as a local drug delivery system due to its antiplaque, antigingivitis effects and easy availability. But Chlorhexidine leads to various adverse reactions like increase in calculus formation, staining of teeth, taste alterations etc on prolonged use. Turmeric can be used as an irrigating solution and as a rinse because it leads to beneficial effects and does not leads to any side-effects. Such newer studies would help to guide and transform customized therapies to block the pathways responsible for periodontal tissue breakdown in the patients suffering from chronic periodontitis.

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