Original Article

Comparing the Clinical Efficacy of *Plantago Major* with Chlorhexidine Mouthwash in Patients with Gingivitis - A Clinical Study

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ABSTRACT

Background: India has a very long history of using herbal drugs for treating a number of diseases. The herbal drugs have made their importance felt in the past few decades whose prevalence is continuously increasing in both developing and developed countries due to their natural origin and lesser side effects. Therefore, the aim of the present study was to evaluate and compare the clinical efficacy of *Plantago major* with chlorhexidine mouthwash in patients with gingivitis. **Materials and Method**: 30 medically healthy individuals with gingivitis reporting to the Dental College was randomly selected. Scaling was performed for the patients and they were randomly allotted to control and test groups respectively. Group-I (Control) 15 patients were advised to rinse with Chlorhexidine mouthwash (0.2%- 2ml+6ml water (1:3 dilution) =8ml) for 21 days. Group-II (Test) 15 patients were advised to rinse with *Plantago major* (Mother tincture 1M- 2ml+ 6ml distilled water (1:3 dilution) =8ml) for 21 days. Plaque index, gingival index and gingival bleeding index was recorded at baseline and after 21 days. **Results:** On Intragroup comparison, statistically significant result was obtained when baseline and 21 days clinical parameters where evaluated. On Intergroup comparison the results obtained were not statistically significant. This shows that Plantago major is as effective as Chlorhexidine in reducing inflammation. **Conclusion:** *Plantago major* promises to be an effective alternative for chlorhexidine mouthwash. Further long term studies must be conducted to evaluate its effects on systemic health.

Key words: *Plantago major*, Chlorhexidine mouthwash, Gingivitis, Herbal, Homeopathy

India has a very long record of using herbal drugs for treating a number of diseases. The herbal drugs have made their importance felt in the past few decades whose prevalence is continuously increasing in both developing and developed countries due to their natural origin and lesser side effects.[1] *Plantago major* is the most commonly used medicine in Europe, Japan and North America. In India, it is found in temperate and alpine Himalayas, Assam, Konkan, Western Ghats and Nilgiris. In Hindi, it is known as Luhuriya. It is a perennial herb that belongs to the family Plantaginaceae.[2]

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Homoeopathic drug *Plantago major* is made from the whole plant. It was proved by Dr. Alfred Heath it has a considerable clinical reputation in the treatment of earache, toothache and enuresis. Leaves and roots are astringent and are applied to treat bruises. Greek physician described the traditional use of *Plantago* in wound healing in the first century AD (Roca-Garcia 1972). This plant enhances the production of nitric oxide and tumour necrosis factor alpha, which protect the host against the development of infection and tumours. This tumour necrosis factor alpha is one of the essential mediators of host inflammatory responses in natural immunity.[3]

Whole plant of *Plantago major* possess anti-inflammatory, antiulcer, anaesthetic, analgesic, anti-oxidant,

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immunomodulatory, anti-microbial properties (de Souza AP et al 2000). [4] Plantago is found effective against periodontal pathogens such as Aggregatibacter actinomycetemcomitans, Porphyromonas gingivalis, Prevotela intermedia and Fusobacterium nucleatum (Reddy PR et al 2018). [5] The aim of this study was to evaluate and compare the clinical efficacy of *Plantago major* and chlorhexidine mouthwash in patients with gingivitis.

MATERIALS AND METHODS

30 medically healthy individuals with gingivitis reporting to the Department of Periodontics at Vivekananda Dental College was randomly selected. Ethical committee approval was obtained from the Institutional Ethical board (VDCW/IEC/265/2021). Written consent was obtained from the participants before the commencement of the study. The inclusion criteria for the study were patients within the age of 30 to 50 years, medically healthy individuals, patient with gingival inflammation and probing depth - ≤ 3 mm. Patients with the habit of smoking or tobacco use in any form, patient under any medication and/or undergone periodontal surgery and Pregnant/lactating patients were excluded from the study.

Figure 1A Chlorhexidine mouthwash

Figure 1B Mother tincture Plantago major

Clinical parameters like Plaque index (Silness and Loe 1964), Gingival index (Loe and Silness 1963), Gingival bleeding index (Mombelli et al 1987) was recorded at baseline. Scaling was done for the patients after recording the parameters. Control and test group patients were randomized using coin toss method. The control group or group I patients were advised to use Chlorhexidine mouthwash (0.2%- 2ml+6ml water (1:3 dilution =8ml) twice daily for 21 days after scaling (Fig 1A). The test/group II patients consisted of using Plantago Major. After scaling the patients were advised to use *Plantago major Fig 1B* (Mother tincture 1M- 2ml+ 6ml water (1:3 dilution)=8ml) for 21 days. [6] Clinical parameters were recorded at follow up after 21 days for control and test group.

STATISTICAL ANALYSIS

Student't' test was done to compare results between two groups. ANOVA was done to evaluate the results at different time periods within the group.

RESULTS

The mean plaque index (PI) score of control group at baseline was 2.47±0.33 which reduced to 1.72±0.26 at 21 days. In the Test group, mean PI score at baseline was 2.69±0.31 which reduced to 1.63±0.23 at 21 days (Figure 2). The mean gingival index (GI) of control group at baseline was 2.64±0.20 which reduced to 1.73±0.23 at 21 days. In the Test group, mean GI at baseline was 2.50±0.40 which reduced to 1.70±0.33 at 21 days (Figure 3). The mean GBI of control group at baseline was 2.52±0.37which reduced to 1.68±0.31at 21 days. In Test group mean GBI at baseline was 2.31±0.36 which reduced to 1.70±0.23 at 21 days (Figure 4). Compared to baseline, the PI, GI, and GBI at baseline and 21 days were statistically significant with the p-value < 0.001. The intergroup comparison showed that the results obtained were not statistically significant. The result suggests that *Plantago major* is as effective as Chlorhexidine in reducing inflammation.

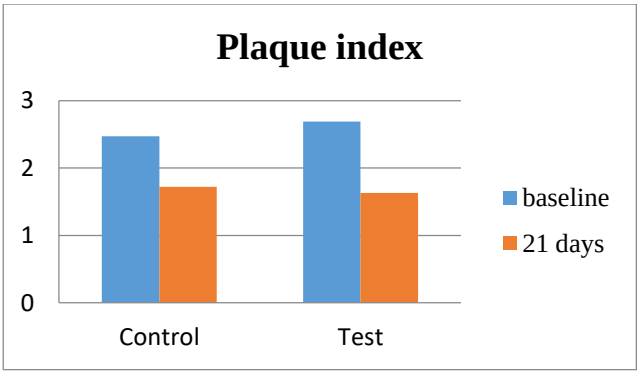

Figure 2: Comparison of Plaque Index between the control and test groups

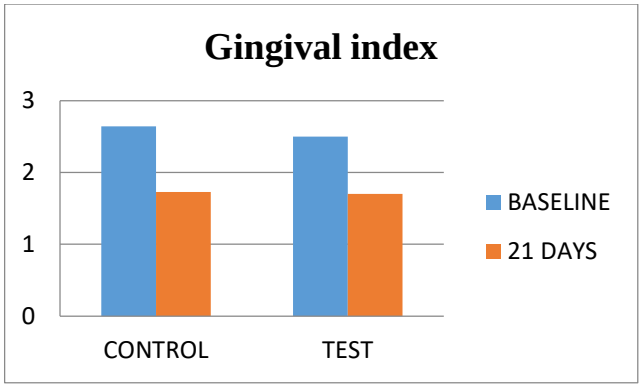

Figure 3: Comparison of Gingival Index between the control and test groups

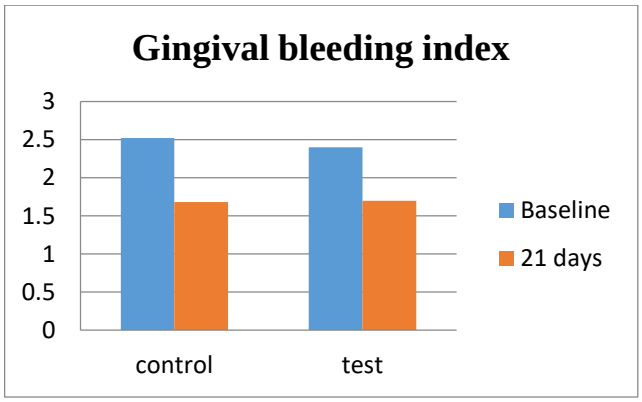

Figure 4: Comparison of Gingival Bleeding Index between the control and test groups

DISCUSSION

Gingivitis is a chronic inflammatory disease of gingiva. The prevention of gingivitis by daily and effective supragingival plaque control is necessary to arrest its progression into periodontitis. The increasing number of cases of periodontal disease and the current trend towards the use of natural products as treatment for various conditions have increasingly centred on finding new natural phytotherapy based therapeutic alternatives.Therefore, the control of gingivitis with herbal medicines is very important in day-to-day life. In the present study, there was a significant reduction in PI, GI, and GBI values in both Chlorhexidine group (Group 1) and *Plantago major* group (Group 2).

In our study, there was a significant reduction in the mean plaque index score .This was in accordance with the study done by Ravn H et al 1988 showed that the extracts made from Plantago possessed antibacterial activity against periodontal pathogens. [7] Tatjana et al in 2020 evaluated the anti-inflammatory activity of *Plantago major* that was determined using lipooxygenase assay. The study results showed that the enzyme catalyses arachidonic acid to produce leukotrienes**.** [8] In our study there was significant reduction in the mean GI and GBI. This was in accordance with the study done by Sandra et al., 2020 in which *Plantago major* has antibacterial effect against periodontal pathogens such as Porphyromonas gingivalis and Fusobaterium nucleatum. This was achieved by denaturing the proteins of microorganisms because of its active elements like mucilages, pectins, flavonoids, tannins, and glycosides such as aucubin and catalpol. [9]

Gomez et al in 2000 stated that the *Plantago major* extract enhanced the host immunity and our study exhibited improvement in gingival index from baseline due to adequate defense mechanism and betterment in inflammatory response. [10] Reddy et al 2018 investigated the efficacy of Plantago as toothpaste in reduction of plaque and gingival inflammation in gingivitis patients which was in concordance with our study where plantago major was used as mouthwash. [11] Basavaraj S Adi et al 2021 compared the *Plantago major* and *Calendula officinalis* mother tinctures as a mouthwash in gingivitis patients and showed significant improvement in gingival and plaque indices, while our study has shown comparable results to chlorhexidine mouthwash in terms of clinical improvements in gingivitis patients. [12]

As, chlorhexidine is recognized as a gold standard antimicrobial agent and it is most widely used mouthwash there was also significant reduction in the PI, GI and GBI in control group. Nevertheless, *Plantago major* possess anti-inflammatory, antioxidant, antinociceptive, immunomodulatory, anti-microbial properties which was reflected in the results and proved that it was as effective as Chlorhexidine in reducing gingivitis.

CONCLUSION

The researches on the antibacterial activity of medicinal plants against anaerobic and facultative aerobic bacteria causing periodontal infections in the oral cavity are very scarce. Therefore, it is suggested that more studies must be designed to find out the exact antibacterial and anti-inflammatory effects of *Plantag*o on gingivitis and periodontal diseases. From this study, the results showed that the plantago major possess anti-inflammatory and antimicrobial effect. Plantago major promises to be an effective alternative for chlorhexidine mouthwash. Further long-term studies must be conducted to evaluate its effects on systemic health.

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