

5-percent hydroalcohol) was conducted at the University of Maryland using the same protocol (Ref. 105). Of the 115 subjects, 107 completed the study; 60 percent were male, 40 percent were female; 17 percent were smokers and 83 percent were nonsmokers. Each subject

received a dental prophylaxis on the day the first rinse was given. Baseline gingival index scores were recorded prior to the prophylaxis and after 7 days of treatment. Fifty-four subjects (mean age 28.5 years) were in the essential oils group and 53 subjects (mean age 27.6

years) were in the 5-percent hydroalcohol control group. The analysis (*see* Table 6 below) was based on adjusted mean gingival index scores at 3 and 6 months.

TABLE 6.—ADJUSTED MEAN GINGIVAL INDEX SCORES FROM THE DEPAOLA STUDY

Group	Baseline 1	3 months	6 months
Essential Oils	2.288	1.522	0.918
5% hydroalcohol	2.200	1.576	1.385

Results included the distribution of gingival index scores in percentage at both baselines and at 6 months. No zero scores were recorded at baselines 1 and 2, but zero scores accounted for 38 percent of all scores in the essential oil group and 19 percent of all scores in the control group at 6 months.

The fourth study (Ref. 113), conducted at the University of Maryland, included a bleeding index (Ref. 114) in addition to the established inclusion criteria, assessments, and

regimen of supervised rinsing twice a day on weekdays. This study compared the fixed combination of essential oils to 0.12 percent chlorhexidine gluconate and a control solution of flavored, colored 5 percent alcohol. There were 41 subjects in the essential oils group (mean age 29.2 years), 41 subjects in the chlorhexidine gluconate group (mean age 29.2 years), and 42 subjects in the control group (mean age 28.6 years). Following baseline examination, all subjects were given a dental

prophylaxis. Assessments were made at 3 and 6 months. Two examiners were used, but only one examiner recorded gingivitis, plaque, and bleeding indices. Teeth used for a plaque collection at time of assessment were eliminated from statistical analysis for gingival, bleeding, and plaque indices. The specific teeth used were not cited in this report. Adjusted mean gingival scores (*see* Table 7 below) were presented for 3 and 6 months.

TABLE 7.—ADJUSTED MEAN GINGIVAL SCORES FROM THE OVERHOLSER STUDY

Group	Baseline	3 months	6 months
Essential Oils	2.234	1.328	0.748
Chlorhexedine Gluconate	2.281	1.032	0.810
5% Hydroalcohol Control	2.221	1.409	1.166

At 6 months, both active mouthrinses were statistically significantly different than the control in gingival index scores; the mean value of the essential oils score was 35.9 percent less than the mean value of the control score.

The distribution of gingival index scores at baseline and at 6 months for scores 0, 1, 2, and 3 were also presented

in percentages. No zero scores were recorded at baseline. At 6 months, the percentage of gingival units with zero scores was 26 percent for control, 46 percent for the essential oils and 43 percent for chlorhexidine gluconate. Scores 1 and 3 were comparable for the three study groups but score 2 differed, decreasing from baseline to 6 months

from 74 to 17 percent for the essential oils, 70 to 23 percent for chlorhexidine gluconate, and 74 to 34 percent for the control.

Bleeding index scores (*see* Table 8 below) declined for all groups and were not statistically significantly different at 6 months.

TABLE 8.—BLEEDING INDEX SCORES FROM THE OVERHOLSER STUDY

Group	Baseline	3 months	6 months
Essential Oils	.71	.40	.29
Chlorhexedine Gluconate	.72	.28	.25
5% Hydroalcohol Control	.66	.37	.33

Mankodi (Ref. 115) conducted a similar study using the Loe-Silness Gingival Index, thus adding a bleeding component. This study compared the combination of essential oils to the same formulation with the addition of mint flavor and a 5-percent water-alcohol

control. Each subject was given a prophylaxis on the day rinsing began. There were 42 subjects in the essential oils group (mean age 31.1 years), 44 subjects in the essential oils plus mint group (mean age 30.6 years), and 38 subjects in the control group (mean age

33.1 years). The percentage difference between mean gingival index scores (*see* Table 9 below) at 6 months showed a score for the essential oils (0.90) that was 22.4 percent less than the control score (1.16).