

Initial Plaque Score as an Indicator of Patient Appointment Compliance

David J. Crippen; A. Jeffrey Wood, DDS; and David W. Chambers, EdM, MBA, PhD

Abstract

High plaque score is widely recognized as predicting patients' likely restorative needs and future caries risk. This study evaluated high plaque scores as predictors of patient appointment compliance behavior. It was found that high initial plaque scores can predict poor compliance with subsequent recall appointments.

Preventive treatment is a hallmark of the dental profession; however, the efficacy of this prevention lies not only in dentists' ability to educate their patients about preventive measures but also in patients' acceptance and degree of compliance with these measures. Research has shown oral hygiene to be a prime risk indicator of restorative needs.¹ Furthermore, the association between the presence of dental plaque and future caries risk has been clearly shown.²⁻⁴

This study was conducted in a university-based clinic to examine pediatric patient compliance with oral hygiene regimens and to investigate possible correlation between patients' oral hygiene, as measured by plaque score, and appointment compliance levels.

The study was carried out in the University of the Pacific School of Dentistry's Pediatric Dental Clinic in San Francisco. The clinic is an 11-chair facility dedicated solely to patient treatment by undergraduate dental students. Approximately 90 percent of the patients seen in the clinic receive state-funded dental care through the Dental (Medicaid) program or other government-subsidized care (Healthy Families, Healthy Kids, etc.). The remaining patients have private dental insurance or pay for care themselves.

Patient scheduling is managed by a full-time clinic staff member using an established recall system. Patient care is provided by students assigned to the clinic on a rotational basis. All new patients to the clinic receive preventive evaluation and education based upon their preventive needs as determined by students and supervising faculty members. Preventive education is provided at each subsequent recall visit.

Methods and Materials

The data for this project were collected from 50 individual patient charts, which were randomly selected from current active charts filed in the clinic. For each patient, three plaque scores were recorded using the plaque indexing protocol outlined by Loe⁵



Authors / David J. Crippen is a second-year dental student at the University of the Pacific School of Dentistry in San Francisco.

A. Jeffrey Wood, DDS, is an associate professor and chairperson of the Department of Pediatric Dentistry at UOP School of Dentistry.

David W. Chambers, EdM, MBA, PhD, is a professor and associate dean for academic affairs and scholarship at UOP School of Dentistry.

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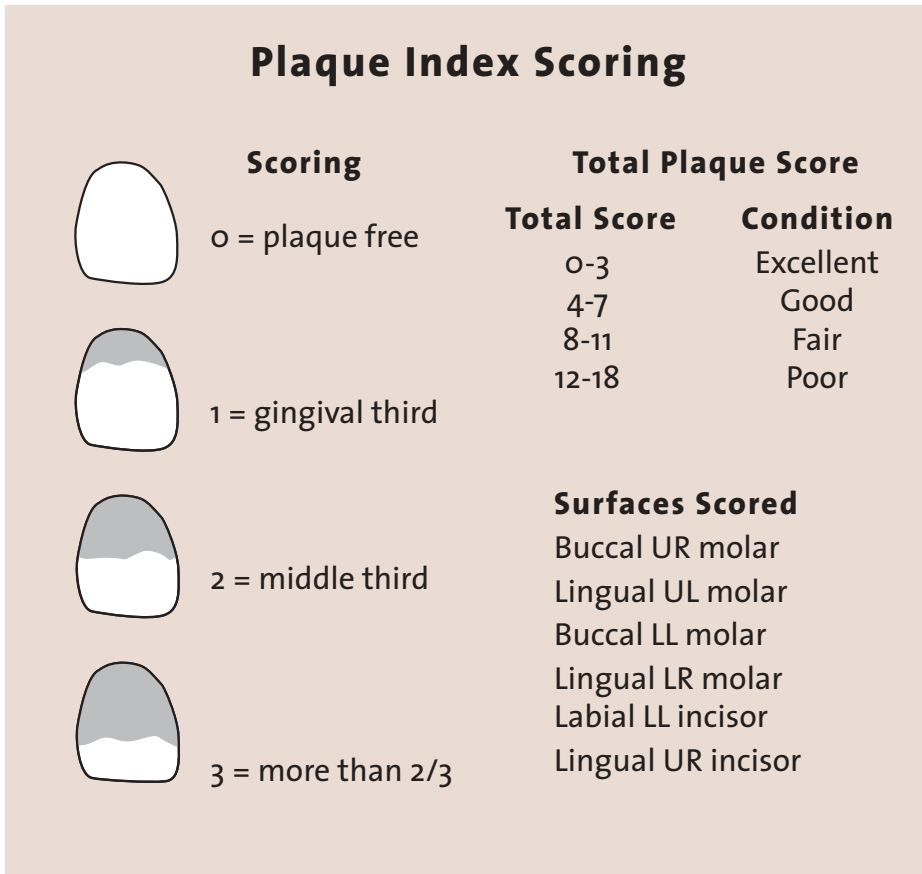
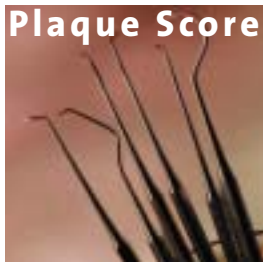


Figure 1. Loe Plaque Index

(Figure 1). The initial plaque score was recorded at the patients' first appointments to the clinic, prior to any oral hygiene instruction by students, faculty, or staff. The second measurement was the plaque score recorded at patients' first six-month recall visits. The third plaque score was recorded at patients' second six-month recalls, which typically occurred approximately one year after patients' initial visits. At all three of these appointments, patients and their parents were shown proper brushing and flossing techniques,⁶ following determination of patients'

plaque indexes.

In addition to plaque scores, the following patient data were collected: date of birth, gender, and number of failed appointments between initial visit and second recall. Time lapsed in days between recall visits was also recorded because the clinic does not document appointments canceled with more than 24 hours notice as "failed" appointments. Lastly, restorative treatment rendered in dollar amount was recorded. This recorded restorative treatment included all fixed intra- and extracoronal restorations (e.g., amal-

gams, composites, stainless steel crowns, and composite strip crowns) while excluding preventive treatment (e.g., sealants), extractions, or elective sedation (e.g. nitrous oxide).

In the event a patient had an active, yet uncompleted treatment plan, restorative work was briefly placed on hold at six-month intervals to allow for a recall appointment and thus a re-assessment of patients' needs. At such recall appointments, patients' plaque indexes were determined; and patients were subsequently given oral hygiene instructions. Thus, recall appointments were not delayed based upon ongoing treatment, but solely because of lack of patient appointment compliance.

Initial descriptive tests were performed to ensure the accuracy of the data input. Means; standard deviations; and two-tailed, zero-order, Pearson correlation coefficients were calculated.

Results

Of the 50 charts reviewed, 54 percent were for female patients (n = 27) and 46 percent were for male patients (n = 23). The mean age of participants was 6.5 years with a standard deviation of 2.8 years.

The mean initial plaque index was 8.2 (fair) on a scale from 0 to 18 with a standard deviation of 3.0. The mean first and second recall plaque scores were 7.0 and 7.3 respectively, with corresponding standard deviations of 2.9 and 2.8. The mean number of failed appointments per patient between initial visit and second recall was 0.4 with a standard deviation of 0.9. Further analysis of data revealed the mean time between initial visit and first recall (Gap 1) to be 9.4 months with a standard deviation of 5.6 months, while the

Table 1

Means, Standard Deviation and Correlation Among Plaque Scores, Appointment Failures, Time Gaps Between Recall Visits, and Cost of Restorative Needs Among a Group of Pediatric Patients

	Mean	SD	Plaque Scores		Failed appts	Recall (yrs)		Restorative \$
			Recall 1	Recall 2		Gap 1	Gap 2	
Initial plaque	8.24	3.01		.265	.307		.387	.451
Recall 1 plaque	6.96	2.86						
Recall 2 plaque	7.34	2.81			.345			.275
Failed appts	0.42	0.86					.346	
Recall Gap 1	0.78	0.47					.384	
Recall Gap 2	0.77	0.42						.542
Restorative \$	173.44	304.60						

Only correlation coefficients statistically significant at $p < 0.05$ or smaller are shown.

mean time between the first recall and the second recall (Gap 2) was 9.2 months with a standard deviation of 5.0 months.

Positive correlations were found between poor plaque score (12-18) and poor patient compliance (Table 1). Incidence of failed appointments showed a strong correlation not only with high initial plaque scores ($r = 0.307$, $p = 0.030$) but also with high second recall plaque scores ($r = 0.345$, $p = 0.014$). An even stronger correlation was found between initial plaque score and time lapsed between first and second recalls (Gap 2) ($r = 0.387$, $p = 0.006$) (Figure 2). The data also showed a notable correlation between the length of Gap 1 and the length of Gap 2 ($r = 0.384$, $p = 0.006$), consistent with the chronic nature of patient appointment noncompliance.

The most significant correlation was found between patient noncompliance and restorative dollars spent. High ini-

tial plaque score was predictive of more restorative dollars spent ($r = 0.451$, $p = 0.001$) (Figure 3). A longer Gap 2 was also highly correlated with more restorative dollars spent ($r = 0.542$, $p = 0.001$).

Simple and multivariate linear regression models were performed with time between first and second recalls (Gap 2) as the dependent variable. Restorative dollars of dental work required predicts recall gap ($R^2 = 0.293$, $p < 0.001$). The regression equation is $\text{Gap 2} = 0.64 \text{ years} + 740 * \text{Restorative Care Needed}$, or approximately one additional year for each \$740 of care needed. Initial plaque score also predicts recall gap ($R^2 = 0.149$, $p < .05$). The regression equation is $\text{Gap 2} = 0.330 \text{ years} + 0.053 * \text{Initial Plaque Score}$, or approximately 13 additional days for each one-point increase in plaque score. The R^2 for the multiple regression equation with all three significant predictors (Restorative Care

Needed, Initial Plaque Score, and No Shows) was 0.366, or approximately one-third of the total variance.

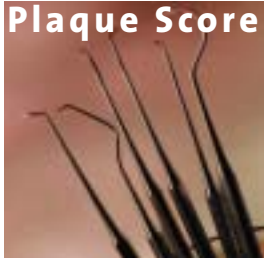
Discussion

This study indicated positive correlations between patients with poor plaque scores and other patient compliance indicators. Specifically, initial plaque scores can be interpreted predicting other likely compliance behaviors.

Patients with high initial plaque scores showed poor appointment compliance, as indicated by a statistically significant correlation with both failed appointments and longer than optimal time lapses between recall appointments.

Patients with high initial plaque scores also tended to need more restorative care, as indicated by restorative dollars spent between their initial visit and second recall appointments. This relationship would seem logical because plaque is an accepted etiological factor in the dental caries process,²⁻⁴

Plaque Score



Correlation between initial plaque score and gap between initial and second recall visits
($r + .345$, $p = .014$)

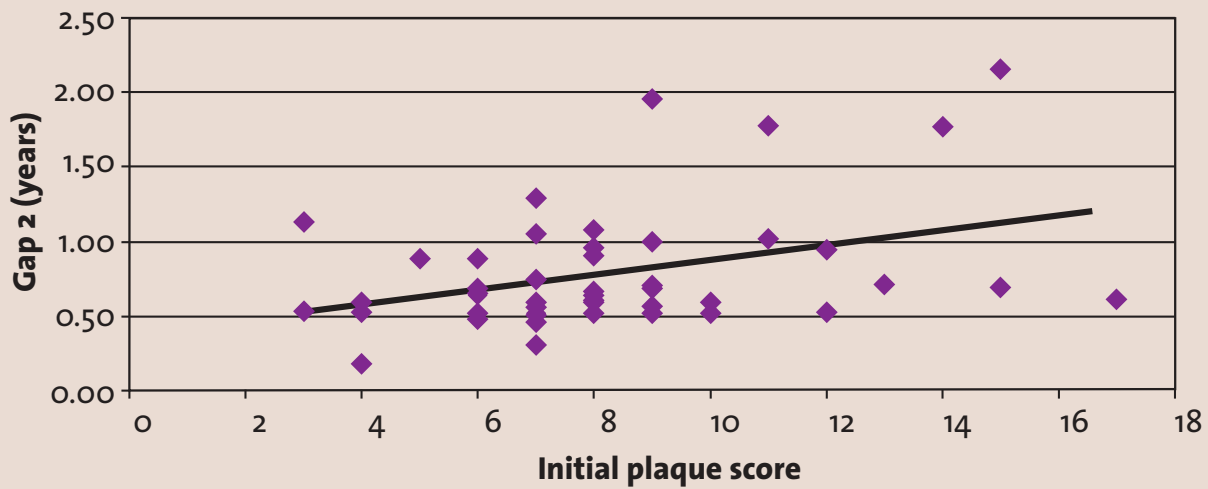


Figure 2.

Correlation between restorative dollars of treatment needed and gap between initial and second recall visits
($r + .542$, $p = <.001$)

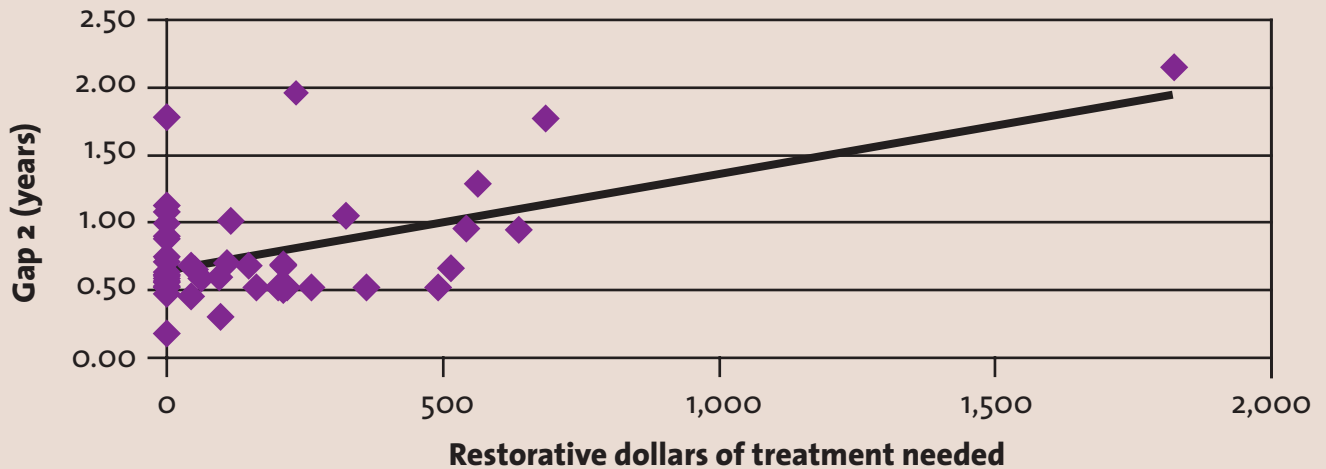


Figure 3.

and the presence of significant amounts of dental plaque would place these patients at high risk of caries¹ requiring restorative care.

Less intuitive are the findings that patients presenting for initial visits with high plaque scores tend to have poorer appointment compliance behaviors. Perhaps such patients or their parents' regard for oral care, as shown by high initial plaque scores, generalizes to overall regard for the oral care process, including the importance of being compliant with dental appointments.

Using initial plaque scores to identify patients who are more likely to be noncompliant may allow the dental practitioner to take additional steps or be more vigilant to improve patient compliance among this group of patients, who are also likely to have the highest oral care needs.

Conclusion

The information presented in this study may be perceived as intuitive knowledge among dental professionals, and perhaps it is. Patients with poor oral hygiene, as shown by their initial plaque scores, are likely to have greater restorative needs than patients with lower initial plaque scores. Additionally, these patients are more likely to show poor patient appointment compliance, including more failed appointments and longer lapsed time between recalls.

Awareness of the correlation between high initial plaque scores and poor appointment compliance may provide the dental practitioner with a predictive tool, allowing proactive encouragement of patient appointment compliance among patients more likely to be noncompliant and likely to have significant oral health care needs.

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To request a printed copy of this article, please contact / Jeffrey Wood, DDS, 2155 Webster St., Room 522-I, San Francisco, CA 94115 or jwood@uop.edu.