TABLE 2

Patient Characteristics of Cases Where Crown Lengthening Needs Are Identified

Patient characteristic		Percent of patients (number)
Demographics	Age	45.5 +/− 16.2 years
	Male gender	37.5 % (219)
	Caucasian	32.8 % (192)
	Hispanic	39.4 % (228)
	African-American	7.7 % (45)
Medical conditions	Hypertension	18.3 % (107)
	Current tobacco use	10.5 % (61)
	Type 2 diabetes mellitus	7.53 % (44)
	Asthma	7.36 % (43)
	Gastric esophageal reflux disease	5.48 % (32)
	Former tobacco use	4.97 % (29)
Periodontal disease	Health	0% (0)
	Gingivitis	50.1 % (293)
	Mild chronic periodontitis	40.1 % (234)
	Moderate chronic periodontitis	7.5 % (44)
	Severe chronic periodontitis	1.4 % (8)

This table lists characteristics of patients who were identified by general dentists to need crown lengthening procedures. Average age is given with standard deviation. Patient characteristics do not differ significantly between initial recommendation of crown lengthening procedure by general dentist, referral to periodontist and the crown lengthening appointment as determined by chi-square method with Yates correction ($p > 0.05$).

digital radiographs were evaluated using drawing and measurement tools provided in MiPACS Dental Enterprise Viewer (Medicor Imaging, Charlotte, N.C.). The periodontist evaluating the radiographs began by outlining the planned restoration on the radiograph using the provisional restoration and margin as a guide, checking if there was at least 1.5 mm occlusal reduction and a preparation length of at least 3.5 mm.[8] If root canal treatment was planned for the tooth in question, a ferrule of at least 1 mm[9] needed to be present as additional criterion. If the tooth preparation did not meet any of these criteria, it was categorized as "restorative criteria not met." From the predicted restorative margin, the predicted new bone level was drawn 3 mm apical to the restorative margin[10–12] using a calibrated digital ruler and ramped to the existing bone level two teeth mesial and distal to the tooth with crown lengthening needs. If this predicted bone level was located apical to radiographic furcations in the area of the tooth in question and the two adjacent teeth mesial and distal to it, the tooth was categorized as "furcation exposure likely."[13] The predicted bone level was measured from the nearest cusp tip of the tooth mesial or distal to the tooth receiving crown lengthening and transferred to the periapical radiograph. If this predicted bone level resulted in poor crown-to-root ratios (length of tooth outside of bone greater than length of tooth still embedded in predicted bone level after surgery), the tooth was categorized as "poor crown-to-root ratio likely."[14] Furthermore, if this predicted bone level would require more than 5 mm bone removal as measured on the bitewing radiograph, it was categorized as "excessive bone removal needed." If a tooth lacked all those radiographic characteristics, was categorized as "conducive to crown lengthening" and possessed at least one of these characteristics, it was categorized as having "poor characteristics." We then determined for all teeth the eventual outcome (restored, extracted) and used this data for outcome analysis.

Data Analysis

Frequency tables were created for demographic, patient history and tooth-related factors for all patients at the initial determination of crown lengthening needs by a general dentist, at the presurgical evaluation visit by a periodontist, at the surgical appointment with the periodontist and after restoration by a general dentist. We correlated extraction and restoration of teeth with meeting radiographic criteria at the conclusion of each case using contingency tables. Records were kept for all teeth recording if teeth survived and were successfully restored for at least one year after restoration. Restoration was considered successful if, after at least one year of restoration placement, no records indicated patient dissatisfaction with the restoration or recurrent caries, open margin, open contact, other restorative defects noted, absence of bleeding on probing and probing depths less than 5 mm. One-year success rates of teeth restored after crown lengthening were compared with those of teeth where crown lengthening was considered, but not performed before restoration using the chi-square method with Yates correction. For comparison of patient and tooth characteristics between time points and the general clinic patient populations, comparisons were also made with the chi square with Yates correction and Fisher exact test methods, depending on the number of teeth or patients in each comparison group. All statistical calculations were performed using R: A Language and Environment for Statistical Computing (Vienna).