Repetitive Coronal Polishing Yields Minimal Enamel Loss

Sandra D. Pence, MS, RDH; Doyle A. Chambers, DMD; Ian G. van Tets, PhD; Randall C. Wolf, DDS; David C. Pfeiffer, PhD

Abstract

Purpose: The American Dental Hygienists' Association recommends selective polishing because of risk of enamel removal and lack of documented therapeutic value. The initial study documenting enamel loss from polishing used methods not acceptable for clinical use, while results from other studies are inconsistent. This study examines the effect of simulated life–time polishing on enamel thickness. Enamel loss from polishing is compared to the enamel thickness just coronal to the cementoenamel junction (CEJ) to relate results to clinical application.

Methods: Eight premolars and 18 molars were polished 150 times with coarse prophy paste, then pre– and post–polishing micrometer measurements were compared. Eight unpolished premolars and 18 unpolished molars were used as control groups. Average enamel thickness from 10 premolars and 10 molars just coronal to the CEJ was chosen to represent minimal enamel thickness, and was calculated using digital radiography. T–tests were used to compare group means.

Results: The mean measurement difference was significantly higher for the premolar treatment group than the control group, but no difference was noted between molar treatment and control groups. Neither treatment group demonstrated significant abrasion when compared to average minimal enamel thickness. Root abrasion was noted on 5 molars.

Conclusion: The results of our study indicate that polishing may remove enamel, but the quantity removed is unlikely to be clinically relevant. Root surface abrasion seen on molars is disturbing, considering stain often occurs on exposed mandibular anterior root surfaces and may cause repeated and prolonged polishing. Further investigation into alternative stain removal methods is recommended.

Keywords: polishing, enamel, abrasion, root, premolars, molars

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Introduction

Many dental offices provide routine, traditional dental polishing as part of the dental prophylaxis. This procedure involves polishing all accessible tooth surfaces to remove plaque and stain.[1] However, the American Dental Hygienists' Association endorses selective polishing, limiting polishing to areas of stain that cannot be removed by other methods.[2] Prominent dental hygiene textbooks support it as well, and the majority of dental hygiene programs teach selective polishing in their curricula.[3–5] This position is partially based on research indicating a loss of enamel from polishing procedures. However, the common perception is that licensed dental hygienists and dentists are reluctant to employ selective polishing in their clinical practice.[6–8] The dichotomy between education and clinical practice indicates a need for further scientific investigation.

Many studies have demonstrated that polishing procedures and materials can abrade enamel, cementum and dentin. However, the reported tissue loss is inconsistent from study to study, and clinical significance has not been established.[9–16]

When comparing the previous studies, it becomes apparent that each one used a separate set of parameters. Variation in methods and materials include in vivo versus in vitro experiments, bovine versus human specimens, number of specimen, exposure time, pressure, revolutions per minute and abrasivity of polishing agents. Table I contains a summary of the parameters and results from each study.

While Table I reveals a wide range of variation in material/methods and results, other differences exist. For example, Vrbic et al,[9] Biller et al[10] and Rűhling et al[11] pre–polished their specimens to smooth them prior to treatment. Vrbic et al investigated fluoride uptake in teeth and pre–polished as a cleansing step.[9] Biller et al[10] and Rűhling et

Table I: Summary of previous research on abrasive effects of polishing

Date	Author	Specimen	n	Time (sec)	Pressure (grams)	RPM	Agent	Number of reps	Quantity of tissue removed/results
1967	Vrbic et al	Human in vitro	5	30	200	3000	Coarse pumice	1	3–4 µm enamel
1975	Koch et al	Human in vitro	5–10	30	200	1200	Varies	1	0.6–1.7 µm
1978	Stookey	Human in vitro	8	10	150	1500	Grade 4F pumice	9	1.57 µm dentin/repetition
1978	Stookey	Human in vitro	8	10	250	1500	Grade 4F pumice	9	0.08 µm enamel/repetition
1979	Swan	Human in vitro	1	15	140	1100 3000 4000	Prophy paste	1	4.83 root tissue 11.43 root tissue 29.21 root tissue
1979	Swan	Human in vitro	1	30	140	1100 3000	Prophy paste	1	9.14 root tissue 14.73 root tissue
1980	Biller et al	Human in vitro	12	30	Human: light medium heavy	2000	Coarse prophy paste	1	1.0 µm cuspal en. 2.4 µm cerv. en. Enamel prisms smeared
1980	Biller et al	Bovine in vitro	6	30	Human: light medium heavy	2000	Coarse prophy paste	1	4–5 µm enamel
1981	Thompson and Way	Human in vitro	40	30	300	20 psi	Varies	1	5.5–8.7 µm enamel
1987	Christensen and Bangarter	Human in vivo	28	5	150	2500	Varies	1	0.24 µm enamel Speculate: outer 3–4 µm disturbed
2004	Rűhling et al	Bovine	3	15	150	2500	Varies	40	14.11 µm enamel
2004	Rűhling et al	Bovine	3	15	150	2500	Varies	40	5.06 µm cementum

al[11] used bovine teeth that have distinct longitudinal surface ridges that interfere with experimental procedures. Biller et al did not pre–polish their human teeth.[10]

Three methods of measurement were used to detect abrasion. Most studies employed chemical assays.[9,10,13–15] The most probable explanation for the use of chemical assays is the ability to obtain the most accurate measurement for small values, since all these methods used few polishing repetitions on enamel. Rűhling et al[11] and Swan[12] used physical measuring gauges. Swan measured in inches $x10^{-4}$, which is converted to µm (Table 1).[12] Swan measured root structure, which abrades much faster than enamel, and Rűhling et al performed 40 repetitions.[11,12] Swan measured cementum, which abrades much faster than enamel.[12] Both of these procedures resulted in greater tissue loss that could be detected by physical measurements. Thompson et al used a profile projector to magnify and measure extremely small differences from just 1 polishing.[16]

Critical Examination of Previous Research

Only 1 study attempted to simulate effects of long–term polishing, and the specimens were bovine teeth.[11] Biller et al noted differences in polishing abrasion between human and bovine teeth, finding bovine teeth to be more susceptible to abrasion.[10] Because of this, abrasion conclusions developed from bovine experiments may not be suitable for human application.

All remaining research was conducted with limited polishing repetitions. Stookey's[14] 9 procedures represented the only study other than Rűhling et al[11] with more than 1 polish. Stookey noted that abrasion per polishing decreased as the number of polishings increased.[14] Therefore, studies with only 1 polishing event probably cannot be extrapolated for long–term effects.

Vrbic et al is the study most commonly referenced in literature as evidence of enamel abrasion from polishing.[3,4,9,17] This group investigated fluoride uptake from various fluoride modalities and

looked for ways to increase fluoride concentration in enamel. Polishing procedures were used as a method of fluoride delivery. Coarse, laboratory–grade pumice mixed with fluoride solution was used for the fluoride uptake procedures. Laboratory–grade pumice is inappropriate for clinical human use due to its abrasivity.[3,4,18] The experimental method also included 30 seconds of polishing.[9] Vrbic et al admitted that 30 seconds is an "unreasonably long period of treatment from a clinic standpoint."[19] When coarse pumice and long polishing duration are combined, the resulting enamel loss exceeds the expected loss in actual clinical practice.

Twenty years after Vrbic et al[9] published their study, Christensen et al investigated clinical parameters that are actually practiced in dental offices.[15] They earlier determined that 2,500 rpm, 150 g pressure and 5 second duration were realistic polishing parameters.[20] The resulting enamel loss from 1 polish in their study was 0.24 µm, approximately 6 to 8% that of the Vrbic et al[9] findings.[15]

Even allowing the Vrbic et al[9] parameters to be clinically acceptable, a worst–case scenario can be examined by applying the aforementioned methods to the clinical situation. For patients receiving 2 dental prophylaxes a year beginning at age 5 and continuing until age 80, we could expect a total of 150 polishing procedures. Multiplying 4 µm by 150 provides 600 µm, or 0.6 mm enamel loss. Therefore, in the extremely abrasive conditions of the Vrbic et al[9] study, a little over half a millimeter of enamel would be removed over a 75 year period of time. If the parameters found in Christensen et al[15] are used for the same situation, 36 µm of enamel loss would be expected. The clinical relevance of either amount of tissue loss has not been evaluated.

The clinical relevance of polishing abrasion is directly related to enamel thickness. Thickness of enamel varies from surface to surface and from tooth to tooth, but ranges from approximately 2.5 mm on occlusal cusp tips to a "knife edge" thickness at the cementoenamel junction (CEJ).[21–24] A minimal acceptable thickness of enamel over dentin has not been determined. After searching literature and conversing with dental professionals, one might conclude that any amount of enamel, if present, may be sufficient to provide dentinal protection. The enamel layer feathers down to an indeterminate thickness at the CEJ, the thinnest area of enamel on a tooth. Enamel thickness just coronal to the CEJ provides an acceptable estimate of minimal enamel thickness that can be removed before becoming relevant in the clinical situation.

The aim of this study was to investigate the realistic abrasive effect of polishing by simulating 75 years of semi–annual, 5 second polishing, and to compare enamel loss with enamel thickness just coronal to the CEJ to ascertain clinical relevance of the abrasion.

Methods and Materials

Specimen Collection

This work was reviewed and approved by the Institutional Review Board of the University of Alaska Anchorage. Extracted teeth were collected over a 6 month period at a local oral surgery office from patients previously referred for extractions. The initial attempt to collect only impacted third molars that had never been polished produced few specimens, so collection criteria were broadened and included all extracted teeth. Patient informed consent was obtained and specimens were steam sterilized before retrieving them from the oral surgery office. Research has shown enamel hardness is unaffected by steam sterilization.[25] Because of limited availability, whole, unrestored premolars were chosen for the pilot study and whole, unrestored third molars were chosen for the larger study. During the 18 month tooth collection and equipment preparation phase, teeth were individually stored in 0.9% sodium chloride solution. Mineral loss as each tooth/saline unit reached equilibrium was limited by using only a small quantity of solution to cover each tooth. Multiple teeth from individual donors were equally distributed between treatment and control groups, and other teeth were randomly assigned to minimize bias.

Study Design

A crimp height micrometer (#342–371, Mitutoyo USA, Aurora, Illinois) was chosen for measurements because of the manufacturer's stated 1 µm resolution and 3 µm accuracy. Using epoxy putty and standard zip ties, the micrometer was attached onto a compound microscope (GALEN™ III, Leica Inc., Buffalo, New York) in the nose piece position, with the nose piece removed (Figure 1). To provide stability for handling purposes, teeth were mounted in blocks of Corian® (DuPont™, Buffalo, New York) countertop material. Three separate 0.5" diameter holes were drilled in 1" by 3" blocks of Corian®. Teeth were mounted in each block with epoxy putty. To increase retention, grooves were placed in the tooth roots prior to mounting using a #7406 12–bladed high speed friction grip burr.

The lingual surfaces of the teeth were prepared with a #35 inverted cone carbide burr and an

Figure 1: Measuring apparatus

Micrometer is mounted on microscope in nosepiece position. Teeth are mounted in blocks which are placed on stage. Microscope adjustment knobs allow precise positioning.

Figure 2: Polishing apparatus

Polisher is held in position by a pin and can be moved forward, backward, or pivoted as needed. Lead weights provide consistent pressure, ~150 gm. Handpiece allows selection of cup rotation speed; 2500 rpm was used.

amalgam restoration (Dispersalloy® regular set, DENTSPLY International Inc., Milford, Delaware) was placed. With the amalgam material in the putty stage, the Corian® block was positioned onto the microscope stage and the micrometer point was pressed into the restoration, forming an impression to guide the micrometer point for accurate measurements. Each Corian® block was labeled with a number, and each tooth was designated with a letter (A, B or C). Half the blocks (8 premolars and 18 molars) received treatment and the other half (8 premolars and 18 molars) served as controls. Mounted teeth were stored in distilled water.

A wooden polishing apparatus was made to hold a HygienePro™ Air portable prophylaxis polisher (NSK America Corp., Schaumburg, Illinois). A slot at the opposite end held the individual Corian® blocks, orienting the teeth horizontally (Figure 2). NUPRO® Prophylaxis Paste with Fluoride, coarse grit (DENTSPLY International Inc., Milford, Delaware) and DENSCO® Prophy Cups (soft, blue, ribbed, Water Pik, Inc., Fort Collins, Colorado) were used for polishing because many hygienists select coarse grit paste, and also to simulate a maximally–abrasive clinical scenario.[6] Paste cups came from 2 boxes, 1 for premolars and 1 for molars, thereby eliminating any batch–related variations within each group. Lead strips wrapped around the handpiece provided a consistent polishing pressure of 150 g (±10 g), as measured on an Acculab Sartorius Group EC–211 electronic scale (Bohemia, New York), with periodic re–measurements during the study to ensure consistent pressure was maintained. The handpiece design allowed selection of a 2,500 rpm rotational speed used throughout the study. These parameters match those of Christensen et al.[15] Each tooth in the treatment group was subjected to a 5 second polishing 150 times on the buccal surface to simulate 75 years of semi–annual polishing. The slot on the polishing apparatus was slightly larger than the thickness of the Corian® blocks, allowing slight back and forth movement of the blocks. By moving the block back and forth during polishing, the cup was oscillated approximately 1 to 2 mm in a cervical–occlusal direction and distributed the rim pressure over the polished area. Each tooth was rinsed with distilled water after 5 polishes. Treatments were performed in sets of 50 polishing cycles per tooth, using new polishing cups and prophy paste for each set on every tooth. This was considered acceptable because each cup and paste unit is designed for clinical use on multiple–surfaces of a full dentition. Because of the broad buccal surface on molars, guide marks were placed on the occlusal and proximal surfaces to ensure the polished areas covered the area measured by the micrometer.

Tooth Measurement

Since 1 person completed all the measurements, each Corian® block was numbered on the underside to provide a means of tracking and still allow for unbiased measurements. Two blind buccal to lingual width measurements were taken on each tooth before polishing, as well as 2 blind measurements afterwards. A mean measurement was calculated for each tooth from each pair of measurements, rounded to a hundredth of a millimeter

(10 µm). The micrometer's tongue ratchet ensured a constant measuring force. Post–polishing measurements were subtracted from pre–polishing measurements. The mean changes in width for the 2 groups, treatment and control, were compared using a 1–tailed t–test.[26]

Radiographic Enamel Measurement

Dental researchers have used digital radiography to measure endodontic canals and periodontal/peri–implant bone loss.[27–31] In this study, digital radiography was used to measure the minimum enamel thickness of buccal surfaces on 10 premolars and 10 molars just coronal to the CEJ. Photostimulable phosphor plates were exposed (66 KV, 8 mA, 0.080 seconds) with a proximal surface of each tooth against the plate. To limit distortion, orthodontic wax was used to position the buccal surface as parallel as possible to the position indicator device. A Scan X® digital scanner (Air Techniques, Inc., Melville, New York) was used to input images into PatientGallery digital imaging software (Raster Builders, Inc., Greenbrae, California). A grid with 1 mm markings (X–Ray Grid Posterior, Medidenta International, Inc., Woodside, New York) placed between the tooth and phosphorous plate during exposure allowed measurement calibration. Measurements were calculated to the hundredth of a millimeter at 0.1 mm coronal to the CEJ. Only the most radioopaque region was measured to limit distortion from overlap along the entire buccal surface. Mean enamel thickness for each group was compared to mean enamel loss in the respective treatment group using a 2–tailed t–test.[26]

Table II: Differences in pre– and post–polishing measurements

Results: µm Enamel Loss from Polishing				
Difference in pre– and post–polishing measurements (µm)	Premolar Treatment	Premolar Control	Molar Treatment	Molar Control
	20	10	–3	11.5
	15	0	–3.5	–2
	40	5	14	–0.5
	20	5	49.5	–1.5
	20	5	3	–5
	10	15	–3	–1.5
	5	15	–17	–4
	30	–5	43.5	5.5
			–23	–4
			22.5	–7
			–2	–8.5
			0	–7.5
			2.5	1.5
			6.5	–7
			–1.5	2
			3.5	–1
			–18.5	–1
			25	5
Mean	20.00	6.25	5.47	–1.39
Std Dev	11.02	6.94	19.40	5.16
Std Error	3.90	2.45	6.86	1.83

Results

Visual examination of all teeth used in this study revealed no discernible demineralization, and minor to no damage from extraction procedures. Methods of this study were unaffected in cases where forceps damage, such as small fracture lines was detected.

Actual micrometer accuracy was observed to be slightly less than the manufacturer's stated accuracy of 3 µm. An automotive mini–blade gauge set (Powerbuilt, Longbeach, California) was used to determine micrometer accuracy. Average variation in micrometer measurements from the known thickness of the automotive blades was found to be ±7 µm, which is over twice the manufacturer's claimed accuracy. The experimental design included rounding measurements to the nearest 0.01 mm (10 µm) and averaging 2 readings to provide reliable and valid micrometer readings.

Pilot Premolar Study

There was a significant ($p<0.05$) difference between pre– and post–polishing measurements (Table II). The mean difference for the control was 6.25 µm±2.45 (standard error) and was attributed to the ±7 µm limitation of measurement accuracy. The mean difference for the treatment was 20 µm±3.90 (Figure 3). This demonstrated an abrasive effect of polishing.

The mean minimal enamel thickness measured

at 0.1 mm coronal to the CEJ was shown by radiographic analysis to be 81 µm±8.07. This was significantly greater ($p<0.05$), approximately 4 times greater than the mean enamel loss caused by the treatment (Figure 4). These results indicated the study design was adequate and a larger study could be performed. A minimal sample size of 16 was calculated based on the variation found in the treatment group and assuming a power level of 0.75 and delta value of 10 µm.

Molar Study

There was no significant difference between pre– and post–polishing measurements. The mean difference for the control was –1.39 µm±1.83 (standard error) and was attributed to the ±7 µm limitation of measurement accuracy. The mean difference for the treatment was 5.47 µm±6.86, therefore no abrasive effect was demonstrated (Table II).

The mean minimal enamel thickness for molars as determined by radiographic analysis was 82 µm±4.01. This value is similar to that found with the premolars, and again, is significantly greater than the mean enamel loss of the treatment group. These results suggest that a lifetime of routine polishing within our study's parameters is likely to have a minimal effect, if any, on enamel thickness.

Additionally, small semi–circular indentations were observed post–treatment on the buccal surface of 5 molars just apical to the CEJ. These indentations are adjacent to the areas of polished enamel and are approximately the diameter of a prophy cup.

Discussion

Many previous studies on enamel abrasion from polishing used chemical analysis of 1 polishing event to calculate enamel loss.[9,10,12,15] Because this study involved repeated polishing, direct measurement of accumulated polishing abrasion was possible. By comparing enamel loss with minimal enamel thickness, this study was designed to provide dentists and hygienists with informative data to consider when making patient–related decisions.

The degree of variation observed was higher than expected. The small measurement differences in this study approach the limit of the micrometer's accuracy and could contribute to the variation. Dissimilarities between tooth types may have introduced unaccounted factors that increase the degree of variation. Additionally, the fluoride content of individual teeth may have varied, as well as previous exposure to polishing. Either of these factors could affect abrasion. While a larger sample size would strengthen the data, the results obtained still provide valuable insights.

Figure 3: Enamel loss from polishing and enamel thickness at the CEJ on premolars

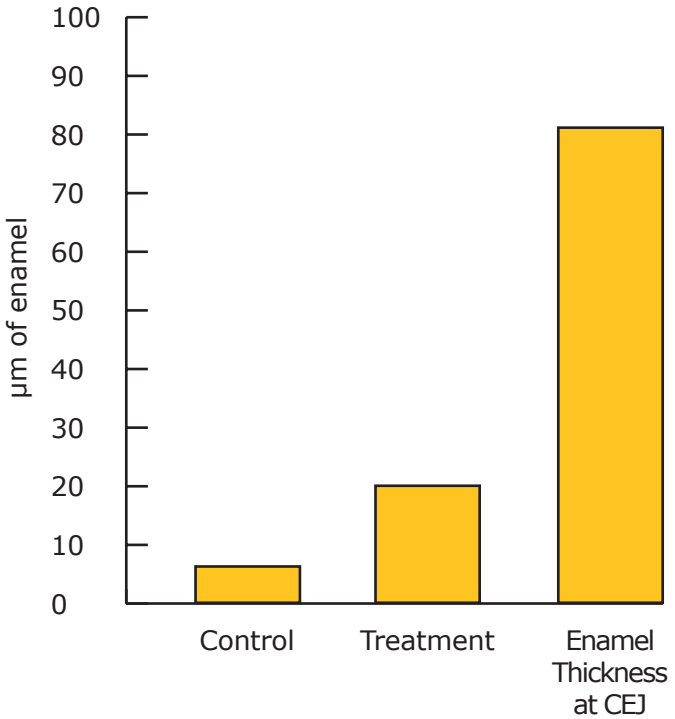
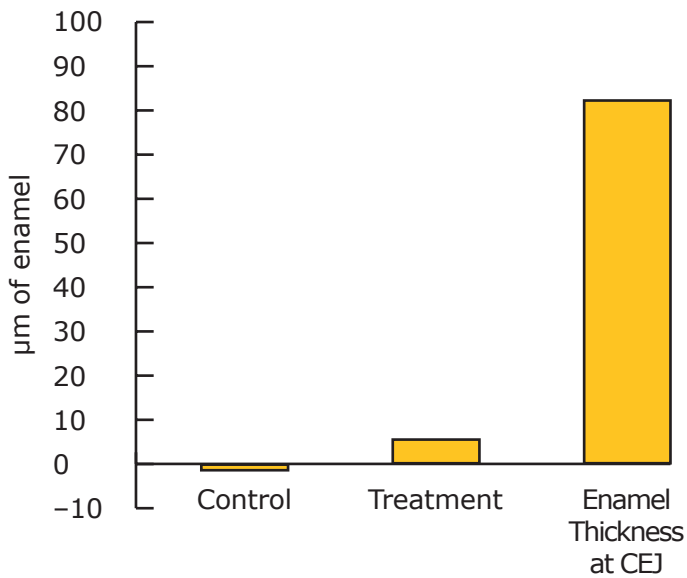


Figure 4: Enamel loss from polishing and enamel thickness at the CEJ on molars



Data from this study suggests that less enamel is lost during polishing than was previously indicated by Vrbic et al.[9] Even though current polishing guidelines recommend using the lowest speed possible that will allow the prophy cup to rotate, just enough pressure to make the cup flare slightly and 1 to 2 second duration,[4] this study was conducted using Christensen et al's[15] parameters, so abrasion

results could be compared. Christensen et al found that 0.24 µm of enamel was removed by one polishing event.[15] Dividing the premolar outcome by 150 results gives an average enamel loss of 0.13 µm per polish. The difference is most probably explained by Stookey's hypothesis that the first few polishes remove more enamel because of surface roughness.[14] As irregularities are smoothed, less enamel is removed.[14,19] It is unclear what effect may actually occur in vivo with cycles of demineralization and remineralization.

The molar results indicate no significant loss from repetitive polishing, which differs from the premolar results. One cause may be that variation within the treatment group was larger than anticipated, thereby lowering the power level and increasing the likelihood of a Type II error, i.e. failure to detect an effect when an effect exists. Another possible explanation of the difference in results between the 2 treatment groups is that the polishing cup adapted better to the single–lobed buccal curvature of the premolars than the multiple–lobed buccal curvature of the molars. Suction was often created between the polishing cup and premolar, which may have exerted additional pressure, and thus abrasion, on the premolar enamel. It was also noted that the polishing cup tended to slip away from the target area and required more guidance on the molars than on the premolars. Any of these situations, or a combination of them, could explain the difference in results between the 2 studies.

Vrbic et al's research demonstrating enamel loss from polishing initiated concern about indiscriminate polishing.[9] Concern arose from not only quantity, but also quality of enamel lost because the outer layer of enamel has a relatively high fluoride content compared to inner layers.[9,32,33] Research has shown that polished teeth take up less fluoride than both untreated and brushed teeth following fluoride application.[9,33] Other research data reveal that unpolished and/or brushed teeth have similar fluoride levels as polished teeth following professional fluoride treatments.[34] Additionally, Stearns' research indicates a gain of fluoride after polishing with a fluoride paste when compared to pre–polished concentrations.[35] Vrbic et al's research demonstrated that the pre– versus post–polished enamel had similar fluoride concentrations due to fluoride uptake from the fluoridated pumice slurry.[9] It seems like these various studies show that, at a minimum, the fluoride–rich outer layer is replaced by a new outer layer that has similar fluoride content when using fluoridated paste.

The concern about removing fluoride–rich enamel, coupled with research indicating lack of therapeutic value, prompted professional organizations to question the practice of routine polishing.[34,36–38] An added benefit of selective polishing is improved patient education in home care. Working with patients on their plaque removal techniques instead of polishing to remove plaque uses chair time efficiently and productively.

Figure 5: Root surface abrasion seen apical to the mesiobuccal lobe

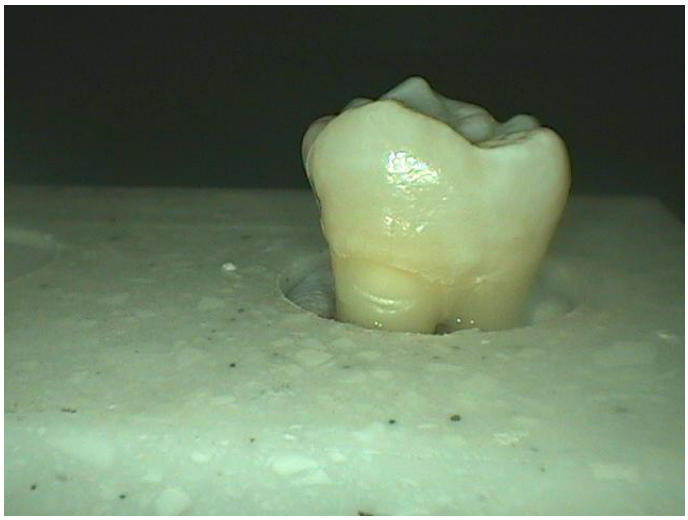
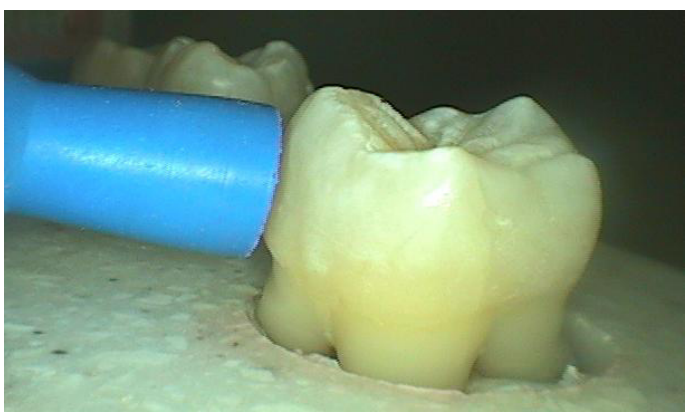


Figure 6: Root surface abrasion matches prophy cup diameter



Some dental surfaces can be damaged by polishing. Demineralized white spot lesions abrade 3 times more than normal enamel. Additionally, stronger outer enamel may cover a decalcified inner layer. Removal of this outer layer can expose the more vulnerable layer beneath.[39] Exposed dentin is 20 times more susceptible to polishing abrasion than enamel.[14] Cementum, the least mineralized dental tissue, is obviously the most susceptible. It is interesting to note that cemental abrasion increases exponentially as rotational speed is increased.[12] Dental materials such as gold and composite can also be scratched by polishing.[11,40] Clinicians should take care when polishing any of

the aforementioned surfaces, consider the benefits and risks and choose appropriate pressure, speed and agents for the surfaces that are polished.

The abrasions on the root surfaces of 5 molars are troublesome. Post–polishing inspection revealed semi–circular indentations on the root surfaces of 5 molars (Figures 5, 6). In hindsight, pre–polishing photographs would have been helpful to compare root appearance before and after treatment, but these were not taken as root abrasion was not the focus of the study and was not anticipated to be noted. Because molars have a shorter crown than premolars, the polishing cup tended to extend past the CEJ when oscillated, thus allowing contact of the cup on the root. Considering the limited contact duration (only a fraction of the 5 second polishing time for each of the 150 repetitions), the extent of cementum/dentin abrasion is startling.

From a clinical perspective, stain present on exposed root surfaces of mandibular anterior teeth is often removed by polishing and may require significantly longer polishing duration than used in this study. Additionally, this stain generally recurs by the next prophylaxis appointment, and so the area is repeatedly polished at each recall. The long–term, summative effect on the root may be damaging to the tooth. Considering that other methods of stain removal such as hand and ultrasonic instrumentation also remove root structure, new methods of stain removal should be explored to prevent hard tissue loss.[11]

The American Dental Hygienists' Association has supported selective polishing for many years.[2] The American Dental Association's Commission on Dental Accreditation (CODA) used to recommend traditional coronal polishing instruction in dental hygiene curricula, then changed to selective polishing.[41,42] Recent CODA revisions now endorse evidence–based patient care.[43] The purpose of this study was to provide data that can be used by practicing clinicians and educators in making evidence–based decisions regarding polishing procedures.

Conclusion

Enamel removal as an argument for avoiding polishing is not supported by this study. The data demonstrate a significant loss of enamel on premolars when compared to the control group, and no evidence of significant loss on molars. However, neither treatment group demonstrated enamel loss that was equal to nor greater than the minimal enamel thickness measured in this study (Figures 3, 4). Further research should investigate the effect that mineral cycling in the oral cavity might have on cumulative polishing abrasion.

Very minimal polishing was shown to cause definitive abrasion on the root surface. Caution should be exercised when polishing at or beyond the CEJ. Considering stain that often recurs on mandibular anterior root surfaces, additional research into alternative, non–mechanical methods of stain removal might be helpful.

Individualized polishing has a place in dentistry – many dental surfaces can be damaged by polishing. Polishing is contradicted on some dental restorations, hypomineralized enamel and exposed root structure, as inadvertently demonstrated in this study on molar root surfaces.[11,12,14,39,40] We found, however, that very little sound enamel is actually removed by polishing. In today's climate of evidence–based dentistry, clinicians should be aware of this finding and make informed clinical decisions regarding patient treatment.

Sandra D. Pence, MS, RDH, is an associate professor and program director, Dental Hygiene Program. Doyle A. Chambers, DMD, is an adjunct professor and clinical dentist, Dental Hygiene and Dental Assisting Programs. Ian G. van Tets, PhD, is an associate professor, Department of Biological Sciences and WWAMI Biomedical Program. Randall C. Wolf, DDS, Diplomate of the American Board of Periodontology, is retired from private practice and an adjunct professor, Dental Hygiene Program. David C. Pfeiffer, PhD, is a professor, Department of Biological Sciences and WWAMI Biomedical Program. All are at the University of Alaska Anchorage.

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