Research & Table Clinic Day 2020 Structured Abstract

TITLE: Tooth Curvature and Enamel Loss/Resin Removal At Bracket Debonding

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OBJECTIVES: To measure and compare in vitro enamel loss and residual resin presence on extracted teeth of differing facial convexities.

METHODS:

Fifteen unrestored, sound, extracted human teeth (5 maxillary central incisors (least convex), 5 mandibular canines (moderately convex), and 5 maxillary premolars (most convex) were embedded horizontally in stone, in small 3D printed boxes, such that at least 2/3 of their facial, coronal surfaces were exposed. Shallow dimples were made at the top/bottom and right/left stone surfaces (Pink Snap Stone, Whipmix) to act as reference points for 3D image digital subtraction. Each tooth received a bonded orthodontic bracket of appropriate curvature (APC PLUS, Smartclip SL3, 3M Unitek), the brackets were debonded manually (Orthopli ligature cutter) the residual resin remnant was removed (Renew System Adhesive Removal Bur, Reliance Orthodontics), and the enamel was polished (Renew finishing system points (Reliance). Three individual optical scans of each tooth were obtained (ST400, Nanova): pre-bond, following bracket debonding, and following resin removal and enamel polishing. Using software (DigitalSurf, Taylor Hobson), the scans were oriented using their respective stone dimples, and the final scan (after resin removal/polishing) was subtracted from the pre-bond scan. From this difference, the volume of enamel removed and resin adhesive still present was determined for each tooth. Volume of enamel loss and presence of resin remnant were each evaluated for the influence of tooth curvature using 1-way ANOVAs (alpha=0.05).

RESULTS:

Table presents results. There was no significant influence on tooth facial curvature on volume of enamel lost (p=0.346) nor on the presence of residual resin remnant (p=0.395).

CONCLUSIONS:

Although no significant differences were found, visual trends do confirm that more enamel is lost with greater tooth convexity.

CURVATURE / TOOTH	MEASUREMENT	MEAN (mm^3)	STDEV
LEAST / INCISOR	ENAMEL LOSS	0.09	0.06
	RETAINED RESIN	0.09	0.05
MODERATE / CUSPID	ENAMEL LOSS	0.10	0.08
	RETAINED RESIN	0.19	0.16
MOST / PREMOLAR	ENAMEL LOSS	0.17	0.12
	RETAINED RESIN	0.19	0.15

LEARNING OBJECTIVES:

1. Understand the bond/de-bond orthodontic process

2. Understand the relevance of enamel removal during orthodontic treatment and why this aspect is a concern

3. Understand the effect of tooth curvature on iatrogenic enamel removal during bracket debonding/polishing.