Author’s response to reviews

Title: Comparison of the abrasive properties of two different systems for interproximal enamel reduction: oscillating versus manual strips

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Replies to Reviewers’ comments (ALL CHANGES IN THE TEXT AND TABLES WERE HIGHLIGHTED IN RED FONT).

Reviewer 1:

Suleyman Kutalmış Buyuk, D.D.S., Ph.D:

I have evaluated the original article "Comparison of the abrasive properties of two different IPR systems: oscillating versus manual strips" and my comments are below:

1. IPR in the title should be explained as interproximal reduction; abbreviations were not preferred in the title.

Thank you for the comment. “IPR system” in the title has been changed in “Systems for Interproximal enamel reduction”.

2. In Abstract, Methods section not '3 oscillating…' It should be corrected as Three oscillating…' Also, first sentence of abstract (background) may be written as 'The aim of present study was to evaluate…..' Moreover, the model names Universal Testing Machine and SEM devices should be omitted from Abstract. Abstract methods section, which one of the t test you use? These are statements that do not suit the academic literature. And other parts of the abstract should be checked carefully in terms of English and academic writing rules.

I would like to thank you the reviewer for his/her comment.

The Abstract has been modified as follow: “Background: The aim of the present investigation was to evaluate enamel reduction efficiency, abrasive property decay, and enamel effects between oscillating mechanical and manual systems for interproximal enamel reduction (IPR). Methods: three oscillating strips and three manual strips were tested on twelve freshly extracted premolars blocked in an acrylic cylinder pot by means of a material testing machine. Eight cyclic tests of thirty seconds were performed. Both abrasive tracks and teeth surfaces were qualitative evaluated before and after IPR by means of SEM analysis. Efficiency and abrasive property decay of both IPR systems were investigated by the amount of enamel reduction within the eight-cycle testing. Indipendent t-test was used to evaluate differences in variables between the two systems. Results: mechanical IPR system showed higher efficiency in terms of enamel reduction (p < 0.005) when compared with manual IPR system (0.16 mm and 0.09 mm, respectively). Quantity of removed enamel decreased throughout the 8 cycles for both systems. Less presence of enamel debris and detachment of abrasive grains were observed on mechanical strips rather than manual strips. SEM analysis revealed more regular surface of teeth undergone mechanical IPR procedures. Conclusion: oscillating diamond strips showed more controlled efficiency when compared with the manual IPR system leading to a more regular enamel surface.

3. Authors should add a photo about oscillating strips and manual strips for better understanding readers.

Thank you for the suggestion. An additional photo and the following Legend were added in the text “Figure 1. Oscillating diamond strip and the contra-angle adapted on the Instron Universal Testing Machine for the experimental analysis.”
4. There are only two references after 2015. Authors should add more recently references from 2018, also 2019. Moreover, there are many old references such as ‘-Hudson AL. A study of the effects of mesiodistal reduction of mandibular anterior teeth. Am J 291 Orthod 1956; 42: 615-624, -Ballard ML. Asymmetry in tooth size: a factor in the etiology, diagnosis and treatment of 317 malocclusion. Angle Orthod 1944; 14:67-70.’

We would like to thank you the reviewer for his/her comment. The few papers published in last two years mostly investigated techniques of enamel protection after stripping procedures. As suggesting by the reviewer, the following latest comparative study was cited in the text in Discussion section: “In vivo enamel stripping: A macroscopic and microscopic analytical study. Kaaouara Y, Mohind HB, Azaroual MF, Zaoui F, Bahije L, Benyahia H. Int Orthod. 2019 Jun;17(2):235-242”.

5. The Table 1 is not compatible with statistical design. P values should be added.

Thank you for your comment. According to your observations, we edited the Table 1.

6. In Page 7, Line 150, 'This calculation was based on previous pilot test considering a significance level of 0.05 and test power of 80%.' What is your reference parameter and effect size? They should be added.

Thanks to the reviewer for the comment. The following references has been added in the “statistical analysis” paragraph of Material section: “For a standardized effect size of 1 (a clinically relevant change of 0.20 mm with a combined SD of 0.05 derived from a primary pilot test) for the outcome variable enamel reduction in mm, a sample size of 3 strips per group was required for a significance level of 0.05 and test power of 80%.

7. The English of the article must be edited by the professional Edit Service or native English speakers.

Thanks to the authors for his/her comments. The article has been edited and corrected by a native English speaker.
8. All references in the text and the reference section should be checked, carefully. Authors should read the Journal Author Guidelines.

Thanks to the authors for his/her comments. All references have been carefully checked and corrected following the Journal Author Guidelines.

Reviewer 2

Mohammad Khursheed Alam, PhD: Dear Sir Greetings. I read your article with great interest. However, In vitro and in vivo results are different. Statistics part need revision thus results may alter.

Thank you very much.

We would to thanks to the reviewer for his/her comments. As suggested, we have edited the Table 1 with all statistical information to clarify the results obtained. Moreover, limitations of the present in-vitro study were explained at the end of the “Discussion” section as follow: “A limitation of the present study design was the likelihood of spurious inferences that could affect the results, such as the access to the interproximal point, the severity of crowding, variability in tooth morphology and the bias related to operator ability”.

Reviewer 3

Christian Kirschneck, DDS, Ph.D., Ph.D: The authors present an in-vitro study investigating the effects of mechanical versus manual interproximal enamel reduction systems on enamel surface properties, abrasive capabilities of the systems themselves and degree of enamel reduction. The study topic is clinically relevant and has not been sufficiently addressed before. The methodology used seems to be sound and the manuscript is written consistently.
There are, however, several aspects, which should be revised by the authors:

1.) The manuscript shows several errors in English language, grammar and style and should be revised accordingly by a proficient speaker of English.

We would to thanks the authors for his/her comments. The article has been edited and corrected by a native English speaker.

2.) "The use of medium and fine manual metallic strips followed by polishing and topical fluoride application were introduced in 1956 by Hudson in order to reduce enamel irregularities produced by IPR. Recently, Bonetti et al. suggested topical applications of casein phosphopeptide-amorphous calcium phosphate to enhance enamel remineralization after IPR." => As IPR has been associated with an increased risk for enamel demineralisation, the application of fluoride varnishes and similar remineralizing agents such as casein phosphopeptide-amorphous calcium phosphate has been suggested. As their efficiency to actually protect enamel from demineralisation has been shown to be heavily dependent on the frequency of application with a 6 week-interval shown to be effective [1] and a 6-month-interval shown to be not effective [2] and thus their protective effects being limited, the importance of smooth enamel surfaces after IPR for additional prevention of demineralization should be properly introduced and discussed by the authors, also referring to and citing the before-mentioned studies and aspects.

Thanks to the reviewer for his/her comment. The suggested articles were cited in the text (References number 12, 13).

3.) "Each strip was tested for eight times on two teeth" => The authors need to specify in more detail type, retrieval, storage until testing and processing of teeth.

We would to thanks the authors for his/her comments. The sentence has been removed because confusing. The experimental setting has been better explained in the Evaluation of enamel reduction efficiency section:” Each strip underwent the cyclic test for 8 times. Each cycle was performed on an untreated tooth surface rotating of 90° around the cylinder pot in the metallic clamp support. The down displacement of the movable rig from T0 to T1 position was recorded at the end of each cycle and calculated by Bluehill software. The displacement difference recorded at T3 and T1 was reasonably the dimension of the reduced enamel.”
4.) A figure of the experimental setup(s) and a scheme detailing the timeline of events T0 to T3 in illustration would be helpful.

Thanks for the comment. An additional photo of the experimental set up was added in the text as Figure 1.

5.) Limitations of in-vitro testing and generalizability to the patient situation should be properly discussed.

A limitation to the present study design was the likelihood of spurious inferences that could affect the results, such as the access to the interproximal point, the severity of crowding, variability in tooth morphology and the bias related to operator ability.

6.) "The t-test was used to evaluate differences in variables between the two systems." => Requirements for parametrical testing (normality, homogeneity of variance) and thus applicability of t tests should be checked and reported by the authors. Alternatively, nonparametric tests such as Mann Whitney U tests should be used.

We would to thank you the reviewer for his/her comment. The following sentences have been added in the Statistical Analysis section: “Exploratory statistics revealed that the variable was normally distributed (Kolmogorov- Smirnov test) with equality of variances (Levene’s test)”.

7.) Table 1. Apart from mean and SD, the 95% confidence interval of the mean as well as the recorded minimum and maximum should be reported. Also, the sample size the means are based on should be specifically stated in the Table legend.

Thank you for your comment. We edited the Table 1 according to your observations.

8.) Figures 1 and 2: statistically significant differences should be noted as asterisms indicating the degree of significance (* p<0.05, **p<0.01, ***p<0.001). Furthermore, standard deviations should be added to all bars and a statement added to the legend that means and standard deviations are shown in the figures. Also, the sample size the means (each bar) are based on should be specifically stated in the Figure legend.

Dear reviewer, we edited Table 1 with all statistical information in order to better explain and clarify the results obtained. The images are only for readers’ visualization.
9.) Exact p values should be reported for all t tests performed and either incorporated into figure 1 and 2 or into the manuscript text or a table.

Thanks to reviewer for the comment. All the statistical information are now detailed in table 1.

References
