Reviewer's report

Title: Clinical Validation of Robot Simulation of Toothbrushing - Comparative Plaque Removal Efficacy

Version: 2 Date: 11 March 2014

Reviewer: Thomas Hoffmann

Reviewer's report:

The authors present an interesting study, where “Robot Simulation of Toothbrushing” is performed based on a preceding “Clinical Validation” trial. It seems that this study, at the first time, bridges clinical (human) data with robot-derived measurements.

Unfortunately the well designed study is hampered by quite a lot of trivial, however, annoying shortcomings:

1. Language: Needs some corrections before being published

Generally the English is quite good, but far from being perfect. For example this referee could not understand the meaning of some sentences, for example:

M&M, Robot programme: “The primary aim … clinical validation”. Moreover, is the “primary aim of the robot programme … the meticulous teaching” or is teaching a part of the clinical part?

Discussion: “And the cleaning efficacy … 2 tested toothbrushes.”

Authors’ Contribution: Please change: “PG was supervising the project” or “PG was supervisor of the project”; “All authors read and approved …”

2. Introduction: Discretionary Revisions

The historical perspective looks quite nice, however, should not be overdone – see later comments concerning the references.

3. Results: Minor Essential Revisions

Either there are “very little difference” or “minor differences”, which are not clinically relevant and statistically significant, or those are “statistically” relevant and have to be considered. Clear up and/or delete “statistical”.

“… residual plaque ranged from 1.96 to 3.81” is only true for ‘Horizontal’.

Please describe the different outcome of horizontal and rotating vs. vertical as well as oral vs. buccal (as seen in Figs. 4 and 5) also in the text.

“The Spearman rang correlation coefficient approved the high correlation of the tooth by tooth cleaning outcome of subjects and of the robot” – please specify.

4. Careless mistakes: Minor Essential Revisions
# M&M, Clinical programme: (a) “Fig. 3, A-C, D-E”, does that mean “Fig. 3, A-C, D-F”? (b) Brusheheads: Fig. 4 – isn’t it Fig. 1?

# Results: Robot vs. clinical plaque removal, “… in-between the teeth”. Is it “(D, F), Fig. 4 illustrates” or “(D-F)”?

# Results, Legend of Fig. 4: Please do not discriminate between “near” and “far” outliers, especially when these are not shown in the graphs.

# Results, Legend of Fig. 5: “(except for tooth 47 orally)”, isn’t it: “except for teeth 46 and 47 orally”?

5. References: Discretionary Revisions:

In spite of the fact that this referee likes the general idea of citing German (or French, Italian, Hungarian …) literature, the authors should keep in mind that those sources have to be available for the reader. Please check thoroughly which of the following citations should be omitted:

[2] This seems to be a 40 years old publication of the former GDR;

[6] is a German “Habilitationsschrift”. Therefore it is to assume that it contains some hundred pages and several hundred citations; it is an open question which part(s) of this convolute may be published on an international level. Please delete.

[11] is a German written publikation from Switzerland, because of references [12, 13] of the same authors it may be omitted;

[14] comprises a German Medical Thesis of unknown value,

[15] the same as [14].

[16] The “Zahnärzt Mitteil” (ZM) represents a mainly political (Dentists professional policies) German journal. This source should not be used on a scientific level.

[28] Please consider that this citation is nearly 45 years old, and that DZZ is not more listed in PubMed.

[29] This referee admits that the “The Sauerwein” has been a classic textbook in Germany. However, similar to [6] it is no support for the reader. Moreover, due to the danger of “Eminence Based Dentistry” it is scientifically questionable. Please delete.

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I do have not any competing interests