Planimetrical Plaque Assessment of In-between Oral Hygiene Products

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Objectives:

To assess the plaque removal efficacy of a new chewing foam, developed as an in-between tooth cleaning product, by a modified planimetrical index based on the Navy-Plaque-Index (Claydon and Addy 1995).

Methods:

Two polyurethane foam cleaning forms of quadratic (Q) and U-shape (U), developed for in-between tooth cleaning, were clinically tested. 16 highly trained subjects received a professional dental cleaning prior to 3-day-plaque-regrowth-interval. Plaque was stained and photographically documented before and after 120s of chewing (30s/quadrant) in a crossover design.

Earlier assessments by Navy-Plaque-Index did not reveal discrimination between the two chewing foam forms. Therefore, the scoring of the planimetrical index was modified (9 fields at buccal and oral tooth sites; 0=no plaque, 1=partial plaque layers/field, 2=full plaque layers/ field).

Two calibrated examiners were blinded and assessed the residual plaque on buccal and oral sites of teeth number 11,16,25,31,36,45 simultaneously.

All data underwent statistical analysis by t- and U-test.

Results:

The scoring consistency of the two blinded examiners was as high as 87% at baseline after 3-day-plaque regrowth and 88% after chewing foam from U vs. 80% after chewing foam form Q.

The plaque removal efficiency of cleaning foam form U is superior to form Q. The buccal sites were more effectively cleaned then the oral sites. This plaque reduction was highly significant and more pronounced in incisors compared to posterior teeth. Plaque removal at oral sites was insignificant for both foam forms except for tooth 16 and 25 with form Q, and tooth 45 with from U.
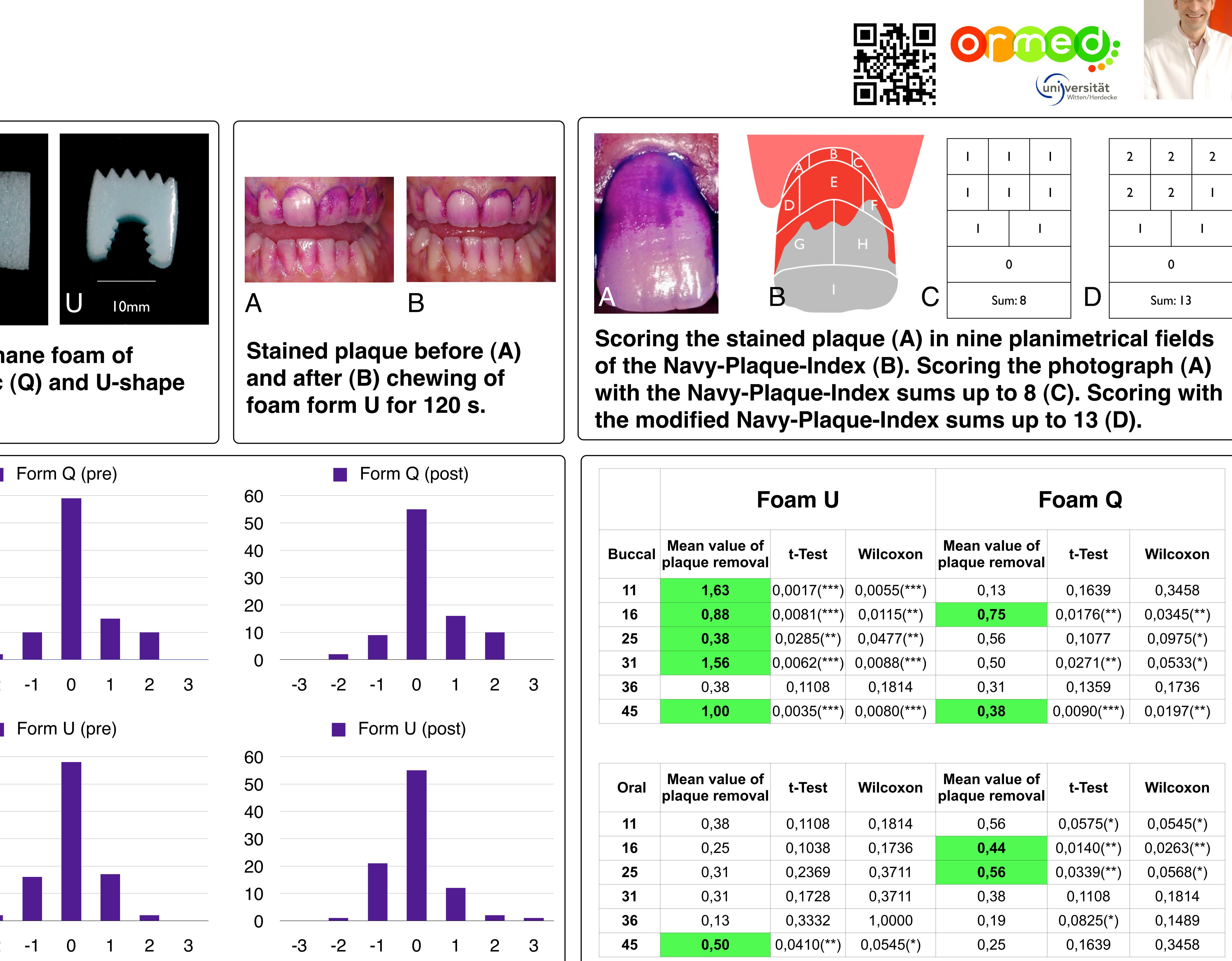
Conclusions:

The modified planimetrical index with a range of 54 possible scores (compared to 36 scores of the traditional Navy-Plaque-Index) is discriminating even little plaque reduction on smooth surfaces using novel in-between oral hygiene products.

This sensitive modification of the Navy-Plaque-Index shows high scoring consistency of two blinded examiners.

The novel chewing foam, used in the U-Form, exhibited plaque reduction efficacy especially at buccal sites of incisors and posterior teeth.

Polyurethane foam of quadratic (Q) and U-shape (U).

Stained plaque before (A) and after (B) chewing of foam form U for 120 s.

Scoring the stained plaque (A) in nine planimetrical fields of the Navy-Plaque-Index (B). Scoring the photograph (A) with the Navy-Plaque-Index sums up to 8 (C). Scoring with the modified Navy-Plaque-Index sums up to 13 (D).

Scoring consistency of two blinded examiners using the Navy-Plaque-Index. Absolute number (n=96) of no scoring differences (0) or positive vs. negative scoring differences (-3 to 3) at baseline (pre) and after chewing the two foam forms (post).

Buccal	Foam U			Foam Q		
	Mean value of plaque removal	t-Test	Wilcoxon	Mean value of plaque removal	t-Test	Wilcoxon
11	**1,63**	0,0017(***)	0,0055(***)	0,13	0,1639	0,3458
16	**0,88**	0,0081(***)	0,0115(**)	**0,75**	0,0176(**)	0,0345(**)
25	**0,38**	0,0285(**)	0,0477(**)	0,56	0,1077	0,0975(*)
31	**1,56**	0,0062(***)	0,0088(***)	0,50	0,0271(**)	0,0533(*)
36	0,38	0,1108	0,1814	0,31	0,1359	0,1736
45	**1,00**	0,0035(***)	0,0080(***)	**0,38**	0,0090(***)	0,0197(**)

Oral	Mean value of plaque removal	t-Test	Wilcoxon	Mean value of plaque removal	t-Test	Wilcoxon
11	0,38	0,1108	0,1814	0,56	0,0575(*)	0,0545(*)
16	0,25	0,1038	0,1736	**0,44**	0,0140(**)	0,0263(**)
25	0,31	0,2369	0,3711	**0,56**	0,0339(**)	0,0568(*)
31	0,31	0,1728	0,3711	0,38	0,1108	0,1814
36	0,13	0,3332	1,0000	0,19	0,0825(*)	0,1489
45	**0,50**	0,0410(**)	0,0545(*)	0,25	0,1639	0,3458

Plaque removal efficiency of foam form Q and U (n=16). Significant values are printed in green (p< 0.05). (*): p<0.1 , (**):p<0.05, (***):p<0.01.