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INTRODUCTION:

The toothbrush is a simple and effective tool for removing plaque and preventing tooth decay and periodontal diseases¹. However, it brings difficulty of use in some populations, namely in cerebral palsy individuals. In many cases, the difficulty of grasping the brush, will prevent correct access to all dental surfaces and thus increase the presence of plaque in the oral cavity, leading to a decline in oral health².

Many devices have been designed to help these patients to preserve their ability to perform daily tasks, modifying commonly used items and making use of stronger or unaffected muscles. By improving the ergonomic properties of these items, the efficiency and performance of daily tasks will also improve with positive impacts on users' health and satisfaction³.

AIM: Assess the effectiveness of the Inava 20/100 brush with an adapter (Inava System)[®] in removing plaque.

METHODS:

A cross-over study was conducted in 2 phases of 4 weeks each. Sixteen participants with cerebral palsy that gave informed consent and met the inclusion criteria were randomly allocated into groups A (8) and B (8). In phase 1: group A was assigned with Inava toothbrush 20/100 without the adapter (T1) and group B was assigned with the same toothbrush with the adapter Inava System[®](T2). Tooth brushing was advised twice daily for 2 minutes using the same dentifrice in both groups. At baseline, 4 weeks and 8 weeks the Turesky plaque index modified by Quigley Hein(QH) was recorded. In phase 2 group A was assigned T2 and group B was assigned T1 following the same study protocol.

RESULTS:

Plaque scores were reduced significantly at phase 1 as compared to baseline in both groups ($p = 0.017$) but not in phase 2 ($p=0.426$) regardless the order of use of the INAVA System[®] and either group reached baseline scores after 2 months (Figure 1).

Intra-group comparisons revealed that QH mean differences were not statistically significant ($p=0.368$) in Group A but statistically significant ($p=0.036$) in Group B (Figure 2).

QH mean score using the adapter was lower than without it ($p=0,215$) (Figure 3), suggesting a better performance in plaque control with the use of the adapter.

Figure 1 - Comparison of plaque index scores between study phases at baseline T1 and T2

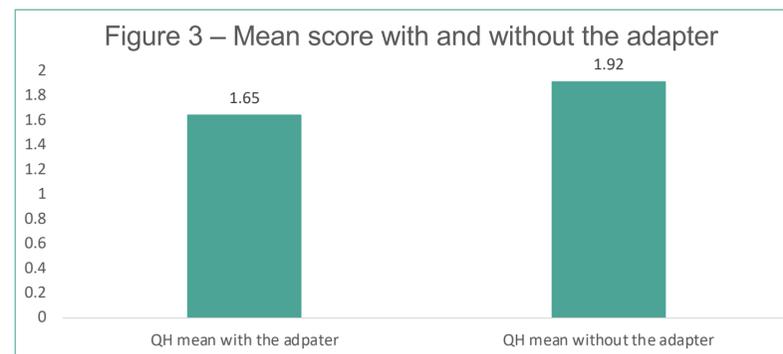
	T0	T1	T2	p value†
	Mean(±sd)	Mean(±sd)	Mean(±sd)	
Phase 1	2.24 ±0.86	1.53±0.60		0.017*
Phase 2		1.53±0.60	2.02±0.63	0.426

†Wilcoxon test; * Statistically significant

Figure 2 - QH Mean intra-group comparisons

	T0	T1	T2	p value†
	Mean(±sd)	Mean(±sd)	Mean(±sd)	
Group A	1.94 ±0.88	1.59±0.65	1.74±0.62	0.368
Group B	2.55±0.77	1.47±0.58	2.22±0.66	0.036*

†Friedman Test; * Statistically significant T0- Baseline; T1 - 1st period; T2- 2nd period



DISCUSSION AND CONCLUSION

In cerebral palsy patients manual dexterity poses a problem with the use of manual tooth brushes, resulting in inefficient plaque removal. The use of adapters for several daily living activities results, including, toothbrushes results in a better grasp and control of the toothbrush^{3,4}. The present study results showed that plaque scores were better using the adapter, although only significative reductions were achieved when the adapter was used in phase 1. As in another study an individually modified toothbrush appears to be an effective mean to improve the oral hygiene and gingival health of cerebral palsy patients^{5,6}.

The results of this study suggest a slight better performance in plaque control with the use of the adapter. Given the difficulties that the study sample find in toothbrushing improving the ergonomic properties of the toothbrush can also increase the efficiency and performance of toothbrushing.

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