

Impact of a smartphone application on oral hygiene during orthodontic treatment : a controlled study.

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AIMS : To evaluate, in a controlled pilot study, the effects of the Dental Monitoring (DM) app on oral hygiene outcomes compared with those of the usual standards of care.

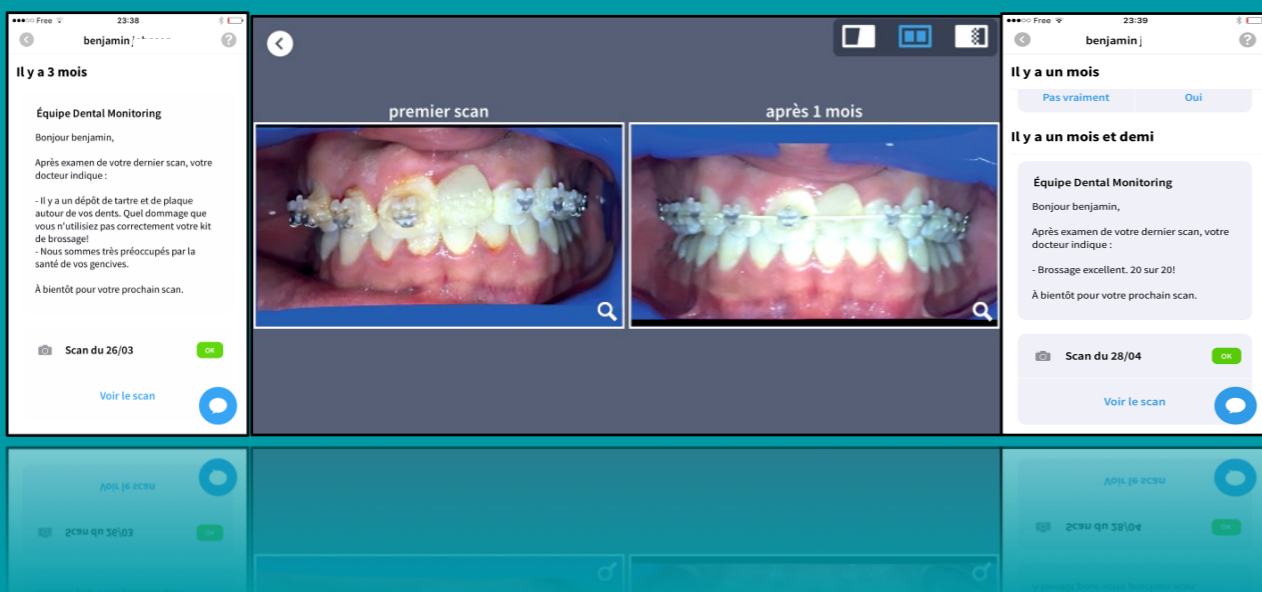


SUBJECTS AND METHODS :

Patients with poor hygiene treated with fixed appliances in the author's practice were included from 15/03/2019 to 03/04/2019 alternatively in the Intervention Group (IG) and in the Control Group (CG). Data were collected by the same observer (AC), on the labial face of the examined teeth, during 3 successive appointments : baseline (T0), after 1 month (T1) and after 2 months (T2). For each patient and each date, we defined 2 scores (from 0 to 3) :

- **Plaque Index (PI)** = total number of sites (mesial, labial and/or distal) with dental plaque/total number of examined teeth
- **Gingival Index (GI)** = total number of sites (mesial, labial and/or distal) with bleeding on marginal probing/total number of examined teeth

Patients of IG received the DM app in addition to usual care and recommendations, but only during the first month. From T0 to T1, they were invited to take intraoral videos every 4 days with their smartphone. Predefined short messages adapted to the hygiene condition, were sent to them, such as advice or congratulations. The Wilcoxon test with the R software was used for statistical analysis.



Short messages and pictures comparison available on the smartphone of the patient a few hours after each DM scan (Patient IG3)

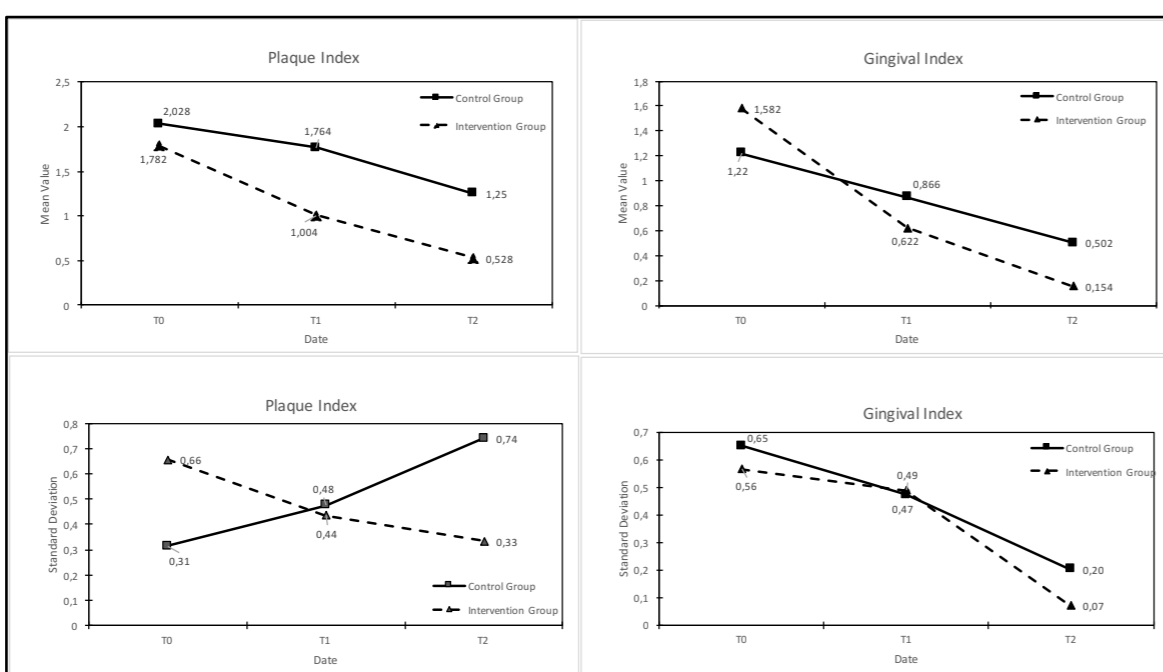
Control Group (Patient CG1)
Intervention Group (Patient IG5)



Evolution of oral hygiene from date T0 to T1 to T2 in the 2 groups

RESULTS :

The 2 groups were quite similar : 5 patients (3 girls, 2 boys), mean age of 15 years old, no statistical difference for PI and GI at T0 (p-value < 0,05). Both demonstrated an oral hygiene enhancement between T0 and T2, but the reduction in PI and GI were only statistically significant for IG. At T2, PI mean value was lower for IG but the difference was not statistically different from that of CG ; however, standard deviation reduced for IG and increased for CG. At T2, GI mean value was much lower with statistically relevance for IG.



Evolution over time for each group of :
- The mean values of PI et GI (upper graphs)
- The standard deviation of PI et GI (lower graphs)

		T0/T1	T1/T2	T0/T2
Control Group	Plaque index	0,3457	0,3095	0,1732
	Gingival Index	0,6004	0,1508	0,07491
Intervention Group	Plaque index	0,2087	0,1425	0,007937
	Gingival Index	0,03615	0,2433	0,01167

	Intervention Group / Control Group	
T0	Plaque Index	0,7533
	Gingival Index	0,5296
T2	Plaque Index	0,1508
	Gingival Index	0,02118

Comparison of p-values computed with Wilcoxon Test :
- from date T0 to T1, T1 to T2, and T0 to T2 for each group (upper table)
- at date T0 and T2 between IG and CG. (lower table)
Results in green - bold show us the comparisons where p-values are statistically significant (p-value < 0,05).

CONCLUSION :

Patients who benefited from the DM application during one month improved their plaque control with more predictability after 2 months. The reduction of gingival inflammation between date T0 and T2 was statistically significant in the Intervention Group (p-value < 0,05), while it was not in the Control Group (p-value > 0,05). Despite its small sample size, this study tends to show that remote monitoring used for a short period could be efficient to change hygiene habits and enhance oral conditions over time.

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