Effect of tissue glue application on microhardness of mineral trioxide aggregate setting in various solutions - a pilot study

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AIM

The aim of this study was to examine the impact of tissue glue application on the surface of freshly mixed MTA on its microhardness after setting when exposed to moisture and human blood.

MATERIALS AND METHODS

Micro Mega MM-MTA material was mixed according to the manufacturer's instructions and applied in custom made teflon molds, 6 mm in diameter and 4 mm in height. Four experimental groups (n=4) were as follows: control group (MTA+Phosphate buffered saline solution - PBS) (n=4), MTA coated with tissue glue (PerioAcryl)+PBS (n=4), MTA+blood+PBS (n=4) and MTA coated with tissue glue+blood+PBS (n=4). Experimental groups with blood exposure were exposed for 15 minutes, then rinsed and stored in PBS. Prior to the micro-hardness testing, all materials were incubated in PBS for seven days. The microhardness of samples was measured using a Vickers microhardness testing machine. Five measurements were performed for each sample (20 measurements per experiment group). For statistical analysis of microhardness, Kolmogorov-Smirnov normality test and analysis of variance was used.

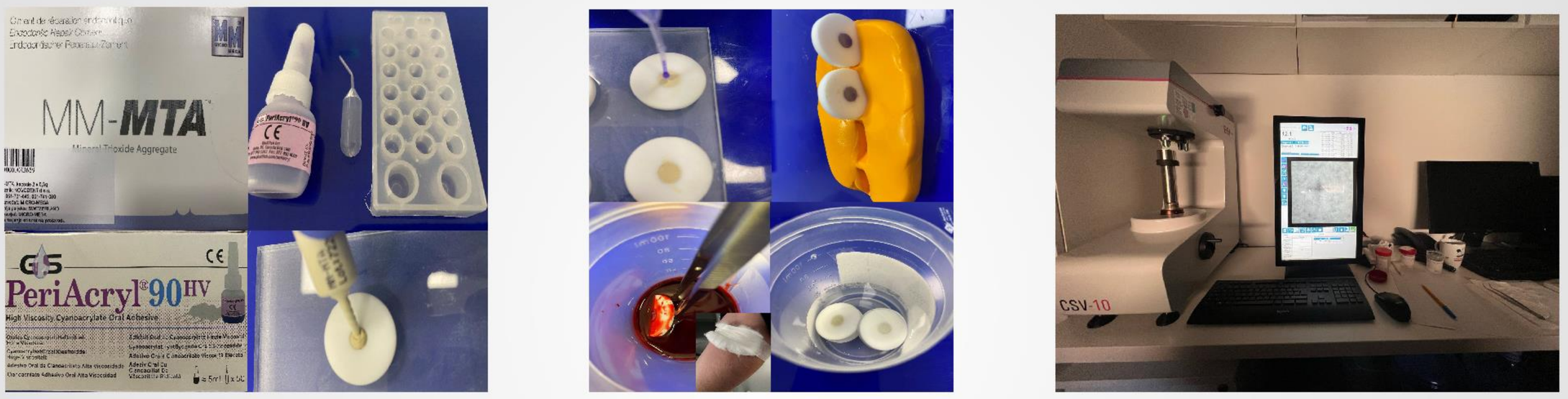

Figure 1. MTA and PeriAcryl tissue glue used in research, sample preparation and microhardness testing of the samples

RESULTS

Data distribution was normal in all groups. The results of the ANOVA test (df=3, F=28.965, p<0.001) with post hoc Tukey test showed statistically significant differences between the groups with and without tissue glue treatment, both in samples exposed to blood and in those that were not.

Group	Mean	N	Std. Deviation	Std. Error of Mean
MTA+PBS	7,745	20	3,0932	0,6917
MTA+blood+PBS	7,320	20	2,9962	0,6700
MTA+glue+PBS	15,190	20	3,5458	0,7929
MTA+blood+glue+PBS	16,715	20	5,9418	1,3286

Figure 2. Descriptive statistics of microhardness of tested groups.

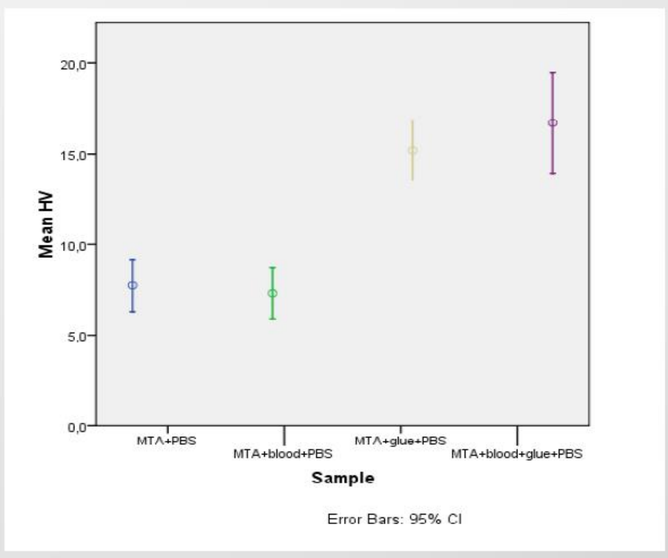

Figure 3. Mean change in microhardness of tested groups.

CONCLUSIONS

Protection of the MTA using a tissue glue during the setting of the material significantly influences microhardness when exposed to blood and phosphate buffered saline solution. This indicates that tissue glue protection of the MTA material may be clinically used in situations when it is exposed to moisture.

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