



Quality comparison between two impression materials

Differences between a direct intra-oral and extra-oral digitalisation after taking impressions with different materials; a case study based upon a quadrant preparation carried out at an independent dental practice.

The following preparations were produced in the fourth quadrant: a gold inlay for tooth 47, an all-ceramic crown for tooth 46 and an all-ceramic inlay for tooth 45 (picture 1). Impressions were taken from the preparations in three different ways (picture 2), which were then compared with each other. Exocad®DentalCAD software, Darmstadt, was used for that purpose. The intra-oral scan provided the baseline again. The model scans of the impressions were then overlaid, after which the software was used to establish the differences.



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The coloured pictures (table 1) show the differences between the preparations. All differences between 0 and $\geq 50 \mu\text{m}$ are rendered in colours.

Red = differences $\geq 50 \mu\text{m}$ as compared to the reference data record (intra-oral scan). Here, the ranges are more significant than those of the reference data record. Blue = $\geq 0 \mu\text{m}$ as compared to the reference data record (intra-oral scan). Here, the ranges are less significant than those of the reference data record, or equal to them. Green/yellow shows an average difference in respect of the reference data record.



Picture 1: preparation in situ

1. Average to high similarities can be established within the area of the preparation boundaries. The most significant difference was found with the cavity of tooth 47; the most significant similarities were established with teeth 45 and 46.
2. Average to high similarities can be established within the area of the preparation boundaries, although - in part - more significant differences in respect of the reference data record could be established as well. The cavities of teeth 45 and 46 also show more significant differences.
3. Red = differences $\geq 50 \mu\text{m}$ from the reference data record of the model scan of the A-silicone impression towards the alginate. Here, the ranges are more significant than those of the reference data record (A-silicone). Blue $\geq 0 \mu\text{m}$ as compared to the reference data record (A-silicone). Here, the ranges are less significant than those of the reference data record (A-silicone), or equal to them. Green/yellow shows an average similarity with the reference data record (A-silicone). Here too, we see average similarities within the area of the preparation boundaries. There are significant differences in the area of the cavities and in the mesial and distal planes for tooth 46.

On the whole, significant similarities could be established for tooth 46. The cavities of teeth 45/47 showed more significant differences. Alginate could be suitable as an impression material for minor restorations, whereby the complexity of the restoration limits the indication area.



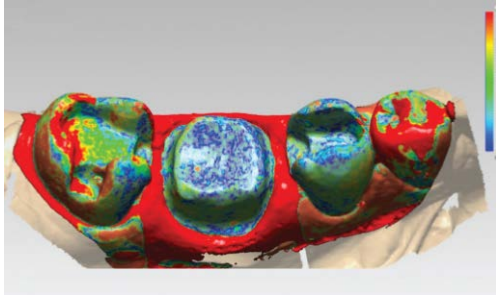
Picture 2: Model of A-silicone imprint (beige) and model of alginate impression (blue)



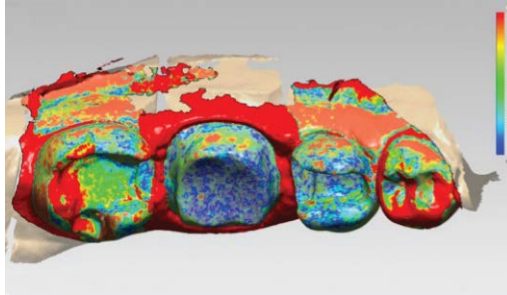
CAVEX

Match 1

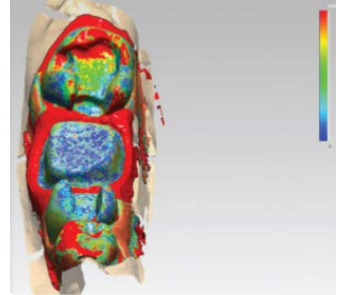
Intra-oral digitalisation/A-silicone (3M™ True Definition Scanner/Zhermack Hydrorise Maxi Heavy & Extra Light)



Vestibular aspect



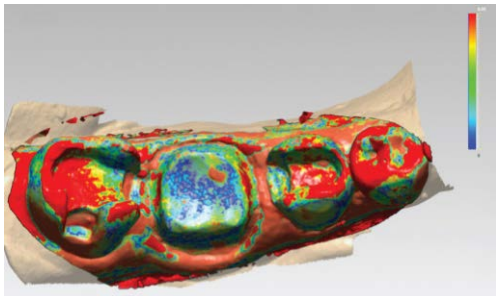
Lingual aspect



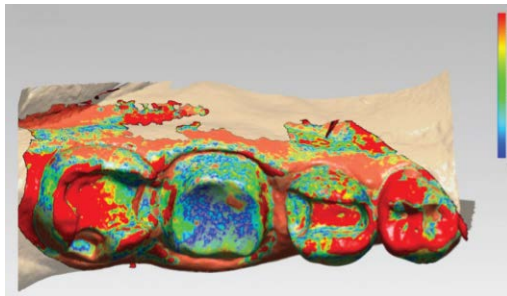
Mesial aspect

Match 2

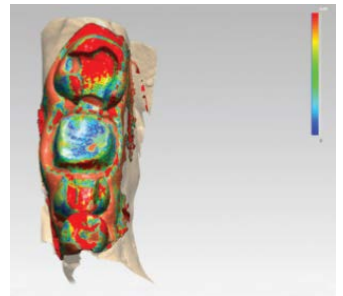
Intra-oral digitalisation/alginate (3M™ True Definition Scanner/Cavex Cream Alginate)



Vestibular aspect



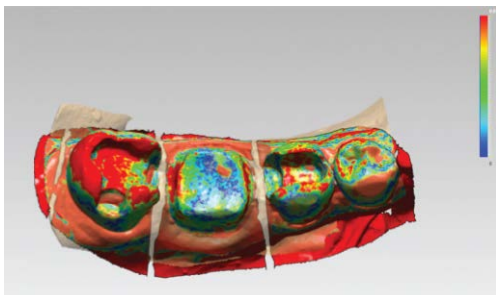
Lingual aspect



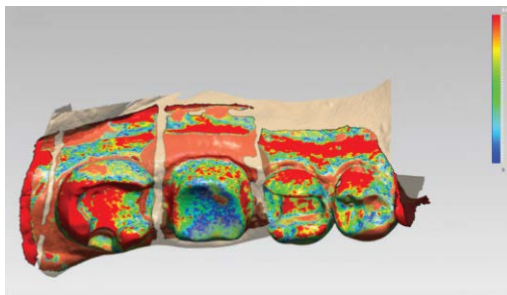
Mesial aspect

Match 3

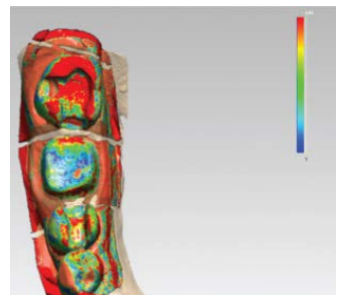
A-silicone/alginate (Zhermack Hydrorise Maxi Heavy & Extra Light/Cavex Cream Alginate)



Vestibular aspect



Lingual aspect



Mesial aspect

Table 1: Overlay of several model data records through Exocad®DentalCAD software, Darmstadt. Differences are rendered by colours. Images courtesy of Scharnau Zahntechnik GmbH