### Admira Fusion – Clinical study over 2 years

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With the introduction of the Admira Fusion product range, VOCO launched the first purely ceramic-based restorative materials on the dental market. Admira Fusion represents the combination of two outstanding innovations: nano-hybrid and ORMOCER<sup>®</sup> technology. One of the fundamental features of the Admira Fusion products is the pure silicate technology – all of the components are silicate-based. As such, no conventional methacrylate monomers are employed.

Prof. Torres et al. at the University of São José dos Campos in Brazil conducted a clinical study over a period of two years comparing Admira Fusion with the established nano-hybrid composite GrandioSO. The results are presented in this Scientific Report.<sup>[1]</sup>

#### Study design

The aim of this two-year study was the clinical evaluation of Class II restorations produced with either the nano-hybrid ORMOCER<sup>®</sup> restorative Admira Fusion (VOCO) or the nano-hybrid composite GrandioSO (VOCO).

A total of 30 patients were selected, who received both a Class II restoration with Admira Fusion and a Class II restoration with GrandioSO. Very deep cavities were firstly filled with a calcium hydroxide cement (Dycal, Dentsply) and then with a thin layer of a conventional glass ionomer cement (Meron, VOCO). Deep cavities were lined with a conventional glass ionomer material (Meron, VOCO). Futurabond M+ (VOCO) was used as the adhesive in all cases and applied in the self-etch mode in accordance with the manufacturer's specifications. The restorative materials were applied in the Class II cavities in increments and light-cured in accordance with the manufacturer's specifications. The restoratives. The clinical evaluations of the restorations were performed by two independent experts. The FDI criteria published by Hickel were used as the evaluation criteria.<sup>[2](3]</sup> The intervals chosen for the evaluations were: initial (after 7 days), after 6 months, after 12 months and after 24 months.

#### Table 1: Recall overview

Restorative material used	Number of assessed restorations			
	Initial	6 months	12 months	24 months
Admira Fusion	30	30	26	23
GrandioSO	30	30	26	23
Total	60	60	52	46

#### Results

The assessed criteria were subdivided into the three groups of "aesthetic, functional and biological parameters". The results of the evaluations are displayed in figures 1 to 3. Restorations assessed as being "Unsatisfactory" and "Inadequate" (bars in orange and red in figures 1 to 3) inevitably needed to be replaced.





Figure 1: Aesthetic parameters





Figure 2: Functional parameters





Figure 3: Biological parameters



The clinical results after two years in position are thoroughly positive for both Admira Fusion and GrandioSO. Minor limitations were only observed for the two materials in terms of the proximal anatomical shape and marginal integrity. One failure was recorded for a GrandioSO restoration with regard to the tooth integrity after 24 months (Fig. 3): a cusp fracture was observed. All in all, the study clearly confirmed that the ORMOCER<sup>®</sup>-based Admira Fusion achieves the same excellent results as the established nano-hybrid composite GrandioSO. In addition to the excellent biocompatibility and low shrinkage, ORMOCER<sup>®</sup>-based restorative materials also impress with improved colour stability simultaneously. This aesthetic advantage is essentially evident from the results presented here: Admira Fusion achieves better results than GrandioSO in the majority of cases for the criteria of surface staining and marginal staining.

Finally, the overview compiling the individual aspects from the three groups of aesthetic, functional and biological parameters is displayed in Figure 4. As already evident from the previous figures, there was a decrease in the number of restorations assessed at the recall appointments. However, this was down to failure of the patients to attend the appointment and not loss of the filling. The means of retention was not lost for any of the restorations placed within the two-year period. Altogether, only one Admira Fusion and three GrandioSO restorations needed replacing.



Figure 4: Overview

Conclusion: The results of this two-year study reveal outstanding clinical results for both the nano-hybrid ORMOCER<sup>®</sup> restorative Admira Fusion and the established nano-hybrid composite GrandioSO, with Admira Fusion showing slight advantages. The assessed parameters for aesthetics, functionality and biology provide a comprehensive and reliable picture of the clinical performance of the restoratives used.

- [1] Torres CRG, *Clinical evaluation of class II pure ORMOCER and methacrylate composite restorations*, University of São José dos Campos, Brazil, report for VOCO, **2015**.
- [2] Hickel R, Roulet JF, Bayne S, Heintze SD, Mjor IA, Peters M, *Recommendations for conducting controlled clinical studies of dental restorative materials*, Clin Oral Invest, **2007**;11(1):5-33.
- [3] Hickel R, Peschke A, Tyas M, Mjor I, Bayne S, Peters M, *FDI World Dental Federation: clinical criteria for the evaluation of direct and indirect restorations-update and clinical examples*, Clin Oral Invest, **2010**;14(4):349-66.

