

## Admira Fusion x-tra – 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. The Admira Fusion brand represents the combination of two outstanding innovations: nano-hybrid and ORMOCER® 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 the bulk-fill material Admira Fusion x-tra with Admira Fusion.<sup>[1]</sup> The results are presented in this Scientific Report.

### Study design

The aim of this two-year study was the clinical evaluation of Class II restorations produced with the nano-hybrid ORMOCER® bulk-fill material Admira Fusion x-tra (VOCO) and the nano-hybrid ORMOCER® restorative Admira Fusion (VOCO). In addition, the study also evaluated the times required for the application of the individual restorative materials. This Scientific Report presents the results for the bulk-fill material Admira Fusion x-tra and the comparison of the applications times for the conventional incremental and the bulk-fill techniques. The clinical results for Admira Fusion are presented in a separate Scientific Report.<sup>[2]</sup>

In this study, a total of 30 patients were selected, who received both a Class II restoration with Admira Fusion x-tra and a Class II restoration with Admira Fusion. 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 U (VOCO, self-etch mode) was used as the adhesive in all cases. Admira Fusion was applied in the Class II cavities in increments of 2 mm and cured in accordance with the manufacturer's specifications. Admira Fusion x-tra was applied in one increment of 4 mm; in cavities deeper than 4 mm, the bulk-fill material was applied in two layers. The time required for the two techniques was recorded using a standard stopwatch in order to allow evaluation of the required application times.

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>[3][4]</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 x-tra	30	28	28	25
Admira Fusion	30	28	28	25
Total	60	56	56	50

## 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

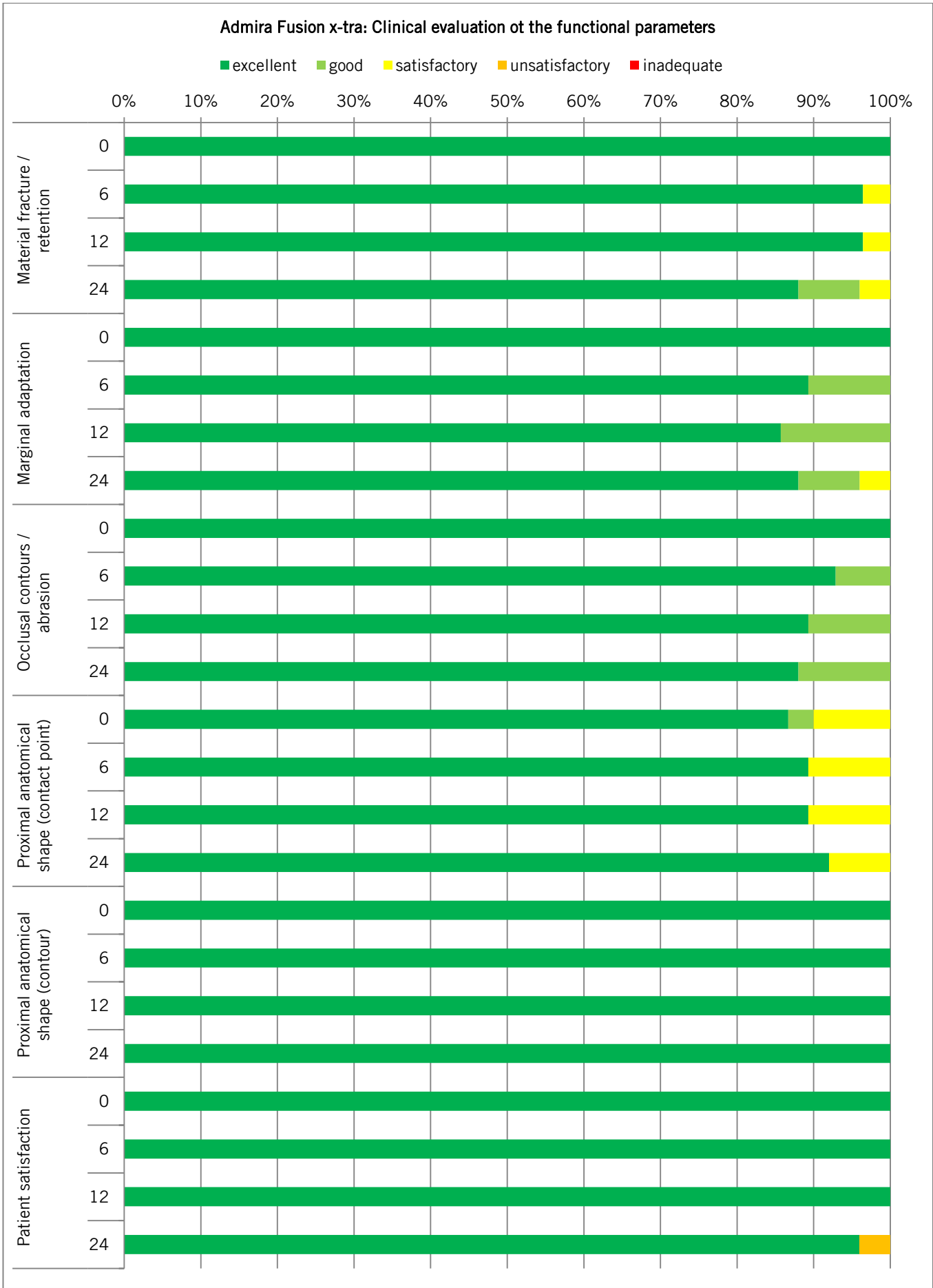


Figure 2: Functional parameters

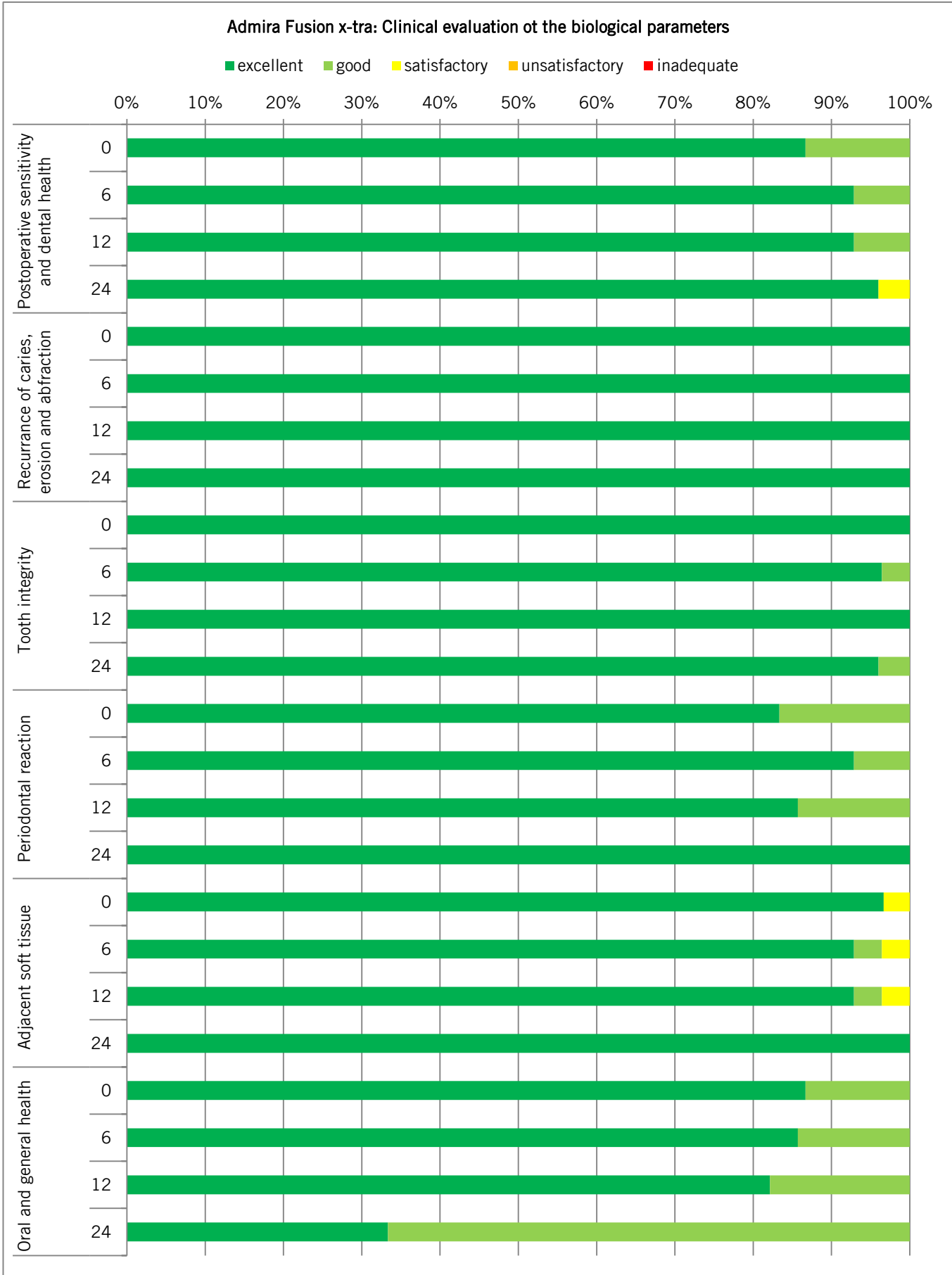
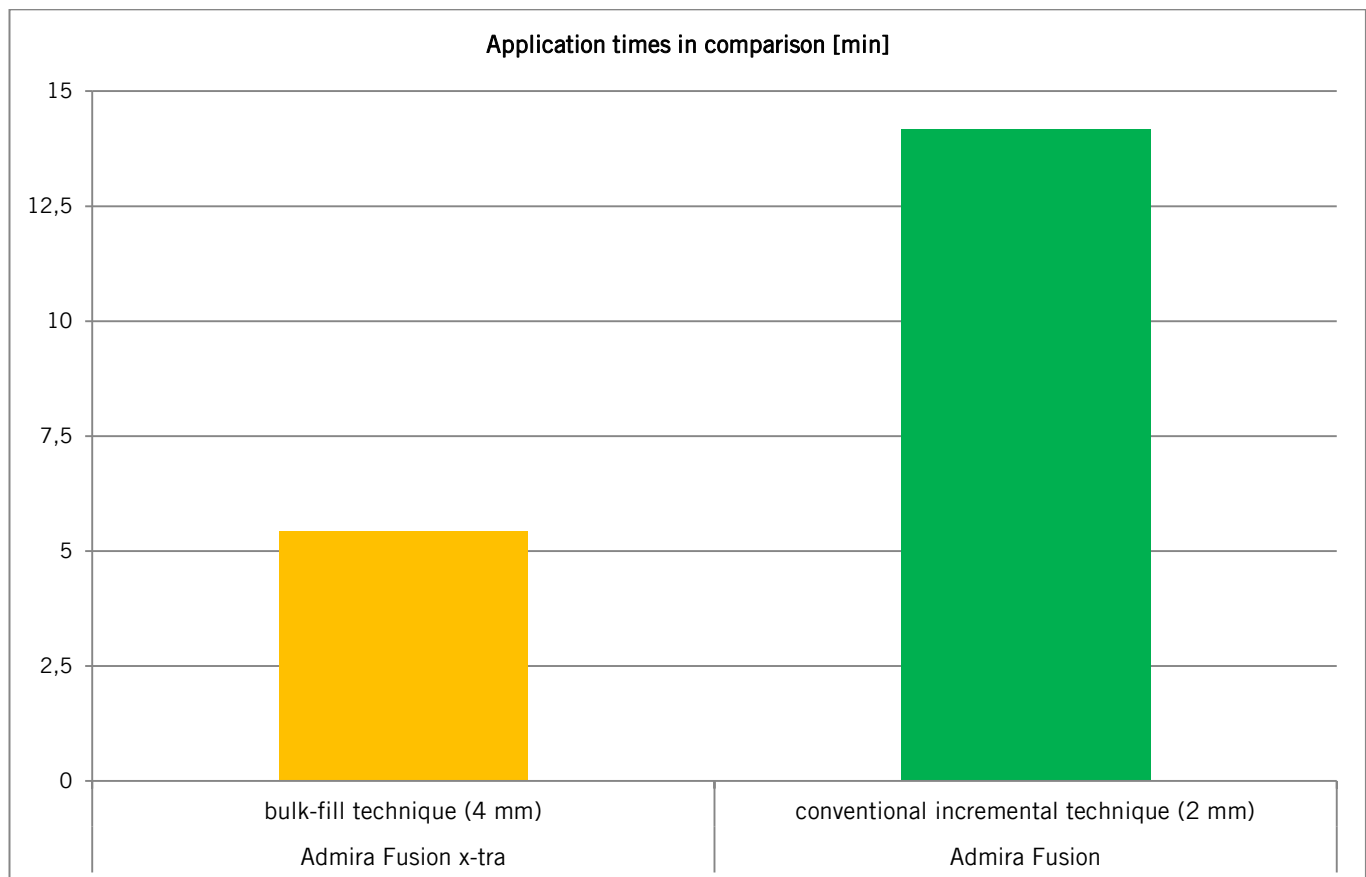


Figure 3: Biological parameters

The ORMOCER®-based bulk-fill material Admira Fusion x-tra achieved outstanding long-term results in this study. Minor limitations were only observed in terms of the proximal anatomical shape. One patient was not satisfied with the Admira Fusion x-tra filling and asked for it to be replaced. In addition to the excellent biocompatibility and low shrinkage, ORMOCER®-based restoratives also display outstanding colour stability. In terms of the aesthetic parameters, Admira Fusion x-tra was assessed as good and excellent across the board.

Figure 4 shows the total time required for placement of the filling (application, modelling, curing and finishing). The advantages of the bulk-fill technique are obvious: It is possible to achieve the same results with Admira Fusion x-tra (4 mm layering) as with a conventional restorative material applied in layers of 2 mm<sup>[2]</sup>, but in a much shorter period of time. On average, just over 5 minutes were required to place a filling using the bulk-fill technique, whereas placement of restorations using increments of 2 mm took around 14 minutes.



**Figure 4:** Comparison of application times

**Conclusion:** The two-year study revealed outstanding clinical results for the nano-hybrid ORMOCER® bulk-fill material Admira Fusion x-tra. The assessed parameters for aesthetics, functionality and biology provide a comprehensive and reliable picture of the clinical performance of the restorative used. In addition, the study also illustrates the time savings for bulk-fill users, which translate to approx. 60 % in comparison with the conventional incremental technique.

- [1] Torres CRG, *Clinical evaluation of Admira fusion vs. Admira Fusion x-tra in posterior teeth restorations*, University of São José dos Campos, Brazil, report to VOCO, **2015**.
- [2] *Admira Fusion – Clinical study over 2 years*, Scientific Report, VOCO GmbH, **2018**.
- [3] 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.
- [4] 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.