SCIENTIFIC REPORT

Admira Fusion – Clinical study over 2 years (II)

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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® 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 of the Admira Fusion and the bulk-fill material Admira Fusion x-tra. The results are presented in this Scientific Report.[1]

Study design

The aim of this two-year study was the clinical evaluation of Class II restorations produced with the nano-hybrid ORMOCER® restorative Admira Fusion (VOCO) and the nano-hybrid ORMOCER® bulk-fill material Admira Fusion x-tra (VOCO).
In this study, a total of 30 patients were selected, who received both a Class II restoration with Admira Fusion and a Class II restoration with Admira Fusion x-tra. 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) was used as the adhesive in all cases and applied in the self-etch mode in accordance with the manufacturer's specifications. 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 clinical evaluations of the restorations were performed by two independent experts. The FDI criteria published by Hickel were used as the evaluation criteria.[2][3] 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	28	28	25
Admira Fusion x-tra	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.

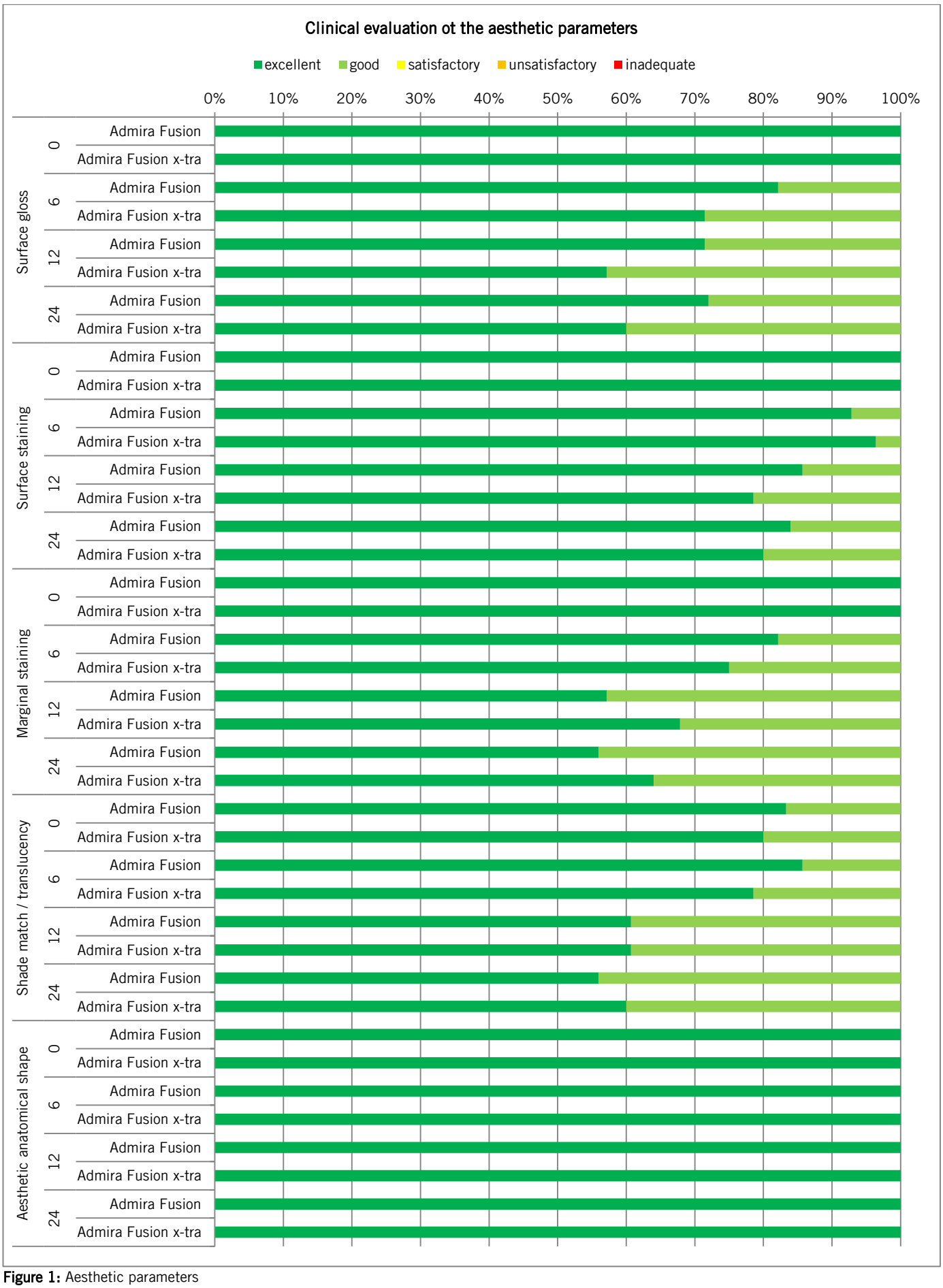

Figure 1: Aesthetic parameters

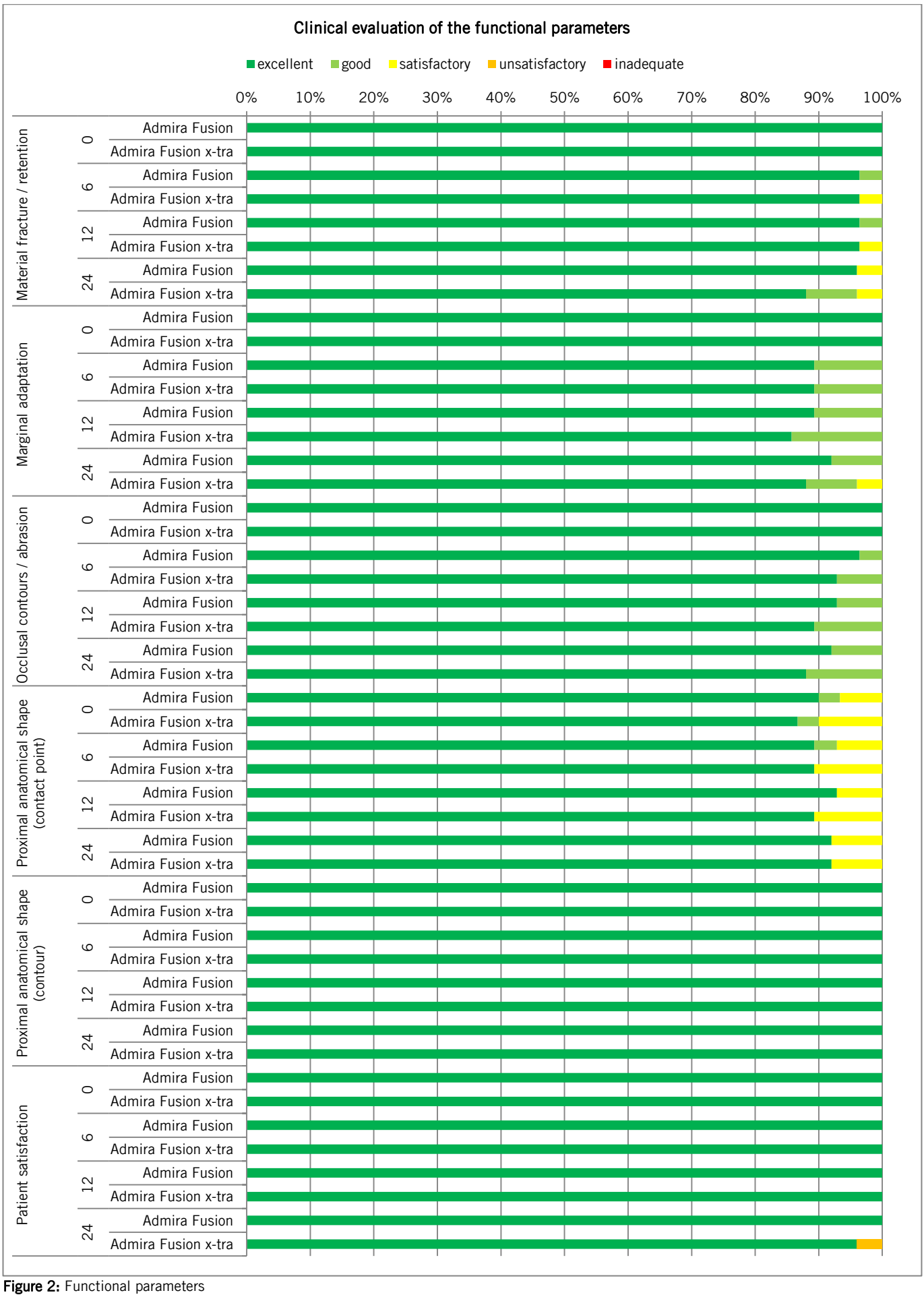

Figure 2: Functional parameters

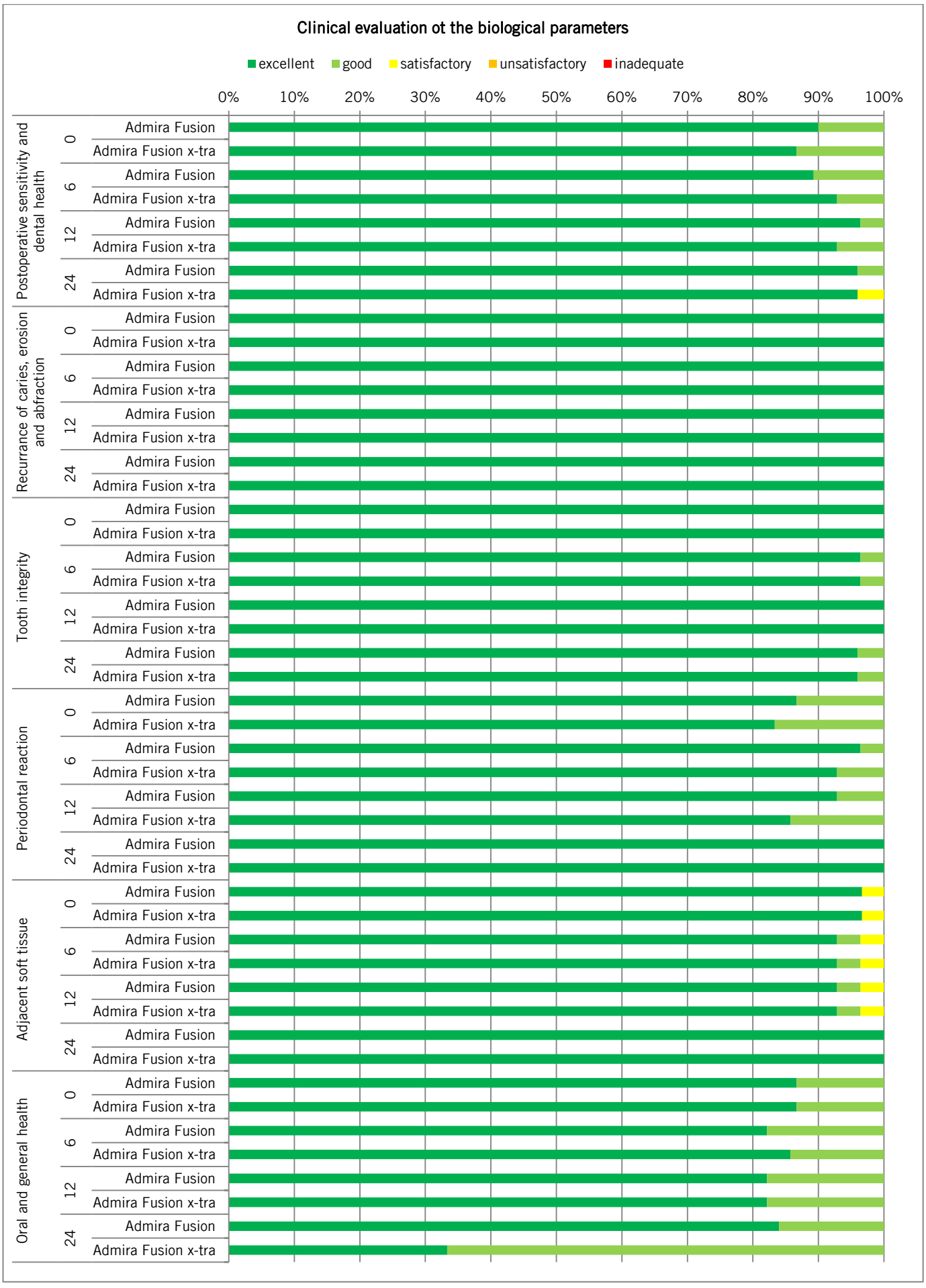

Figure 3: Biological parameters

The study revealed that the ORMOCER®-based restoratives Admira Fusion and Admira Fusion x-tra achieved outstanding long-term results. Minor limitations were only observed for the two materials in terms of the proximal anatomical shape. One patient was not satisfied with one 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, as clearly revealed by this study. In terms of the aesthetic parameters, Admira Fusion and Admira Fusion x-tra were assessed as good and excellent across the board.

Conclusion: The nano-hybrid ORMOCER® restorative materials Admira Fusion and Admira Fusion x-tra achieve outstanding results after two years *in vivo*. The assessed parameters for aesthetics, functionality and biology provide a comprehensive and reliable picture of the clinical performance of the restorative materials used.

[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 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.