

Admira – 3-year clinical study: indirect restoration

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With the restorative material Admira, a product in the ormocer class, VOCO provides a restorative material that features minimal shrinkage, high biocompatibility and high aesthetics, amongst other convincing properties. Admira is indicated for Class I to V restorations, core build-ups, inlays and the veneering of anterior teeth. Various *in vitro* studies have examined the physical properties of an Admira inlay after completed indirect restoration. To what extent an Admira inlay applied under real conditions in the oral cavity also leads to a long-term intact restoration was investigated *in vivo* in a 3-year clinical study at the University of Zagreb.^[1]

Dukic et al. examined the properties of the ormocer Admira by means of indirect composite inlays in an *in vivo* study, which was carried out over a period of three years and under clinical conditions.^[1] In contrast to direct restorations, the indirect restoration of a tooth with an inlay has the major advantage that the shrinkage stress is substantially smaller for the affected tooth, as the inlay is manufactured outside of the mouth. The low shrinkage stress in turn reduces the risk of the occurrence of marginal deficiencies or micro-fractures, which can lead to discolouration and secondary caries, or to fracture of the inlay.

Details of the 3-year clinical study

Overall, 35 indirect restorations with Admira were produced and used for the 3-year study. All indirect restorations were carried out on Class I and II cavities. This involved the preparation of the cavity, manufacture of the inlay and the placement of the restoration, all by the same experienced dentist using standard procedures. To place the inlay after approx. seven days, the temporary cement was first removed, followed by the etching of the cavity surface with Vococid etching gel and rinsing with water. Solobond Plus was then applied as an adhesive. Bifix QM was used as the luting material for the indirect restorations, and was additionally light-cured for 40 s to complete the restoration. The 3-year study was evaluated using slightly modified USPHS criteria, which are shown in Table 1.

Table 1: Modified USPHS criteria for the evaluation of the properties during the 3-year clinical study

Modified criterion	USPHS criterion	Description
Excellent	Alpha	Perfect result
Good		Slight deviation from the ideal result; correction without destruction of tooth or restoration is possible.
Satisfactory	Bravo	Few defects; correction without destruction of tooth or restoration is not possible. No negative after-effects expected.
Unsatisfactory	Charlie	Severe defects; prophylactic renewal to prevent failure
Poor	Delta	Immediate renewal required

Results of the 3-year study

The 3-year study involved the observation of the following properties: surface roughness, shade matching, anatomical surface shape, marginal integrity, proximal contacts, marginal discolourations, integrity of the tooth, integrity of the restoration, occlusion, sensitivity, patient satisfaction and postoperative symptoms. The qualitative classification of the most important of these properties is shown in Figure 1 below.



Figure 1: Results of the 3-year clinical study of indirect restorations of the combination of Admira and Bifix QM/Solobond Plus after **three years**

All 35 of the indirect restorations remained intact over a period of three years, which equals a success rate of 100 %. The Admira inlays achieve excellent results three years after application, both in regard to patient sensitivity and satisfaction. The properties of the integrity of the tooth, the integrity of the restoration, the marginal discolourations and the proximal contacts were classified as excellent in around 85 to 90 % of the restorations (corresponds to 31 of 35 inlays). The results in regard to these properties were graded as “good” in only 10 to 15 %. This grade corresponds to slight deviations from the ideal result, which can be repaired with minimal corrections, but without the destruction of the tooth or indirect restoration. A decisive criterion for the evaluation of the total success of a restoration is the quality of its marginal integrity. In the present study, Admira achieved an excellent result after three years in 25 (72 %) of 35 indirect restorations. This marginal integrity, classified as excellent, means a minimal presence of micro-fractures or marginal deficiencies, which also minimises the risk of secondary caries or unaesthetic discolourations. Overall, the present 3-year study confirms the superior product quality of Admira. Dukic et al. have shown that the high-quality properties of Admira are also maintained over the long term and only produce minor deviations from the ideal result in few, exceptional cases.

Conclusion: In this 3-year clinical study, Admira inlays display properties of outstanding quality; 100 % of the 35 restorations placed were intact after three years. In regard to patient sensitivity and satisfaction, the indirect Admira restorations were classified as excellent in 100 % of cases. 72 % of the restorations were rated excellent in regard to marginal integrity, which minimises the risk of the occurrence of micro-fractures or marginal deficiencies coupled with unaesthetic discolouration or secondary caries. This 3-year study clinically confirms the results previously obtained *in vitro* regarding the superior quality product properties of Admira. Thus, in using Admira dentists not only make use of the significant advantages of minimal shrinkage and high biocompatibility, they also choose a material for indirect restorations that maintains its durability and integrity over many years and has constant, superior quality product properties. Dentists therefore gain the assurance of long-term satisfaction, both for their patients and themselves.

[1] W. Dukic, O. L. Dukic, S. Milardovic, B. Delija, *Oper. Dent.* **2010**, 35-2, 156-164.