

Admira – In-vivo tests

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The measurable material properties, such as abrasion resistance, compressive and transverse strength or polymerization shrinkage, have a significant influence on the longevity of a restorative. These in-vitro tests are important for development and allow comparison to competitive products. Carrying out in-vivo studies, however, can ultimately provide a more accurate rating of quality and durability. The following in-vivo studies substantiate the excellent suitability of Admira as a durable restorative.

University of Bologna 3-year Findings of Admira Class II In-vivo Study

The University of Bologna is currently conducting a randomized 5 year study to clinically compare filling systems of different manufacturers in the posterior tooth region.^[1] A total of 300 restorations were performed on 100 patients between the ages of 22 and 61 of which 120 were restored with Admira / Admira Bond. 40 fillings each were placed without *rewetting*, with *rewetting* and with Admira Flow in CBF-technique and rated according to modified USPHS criteria. The 3-year findings are given below (Fig. 1).

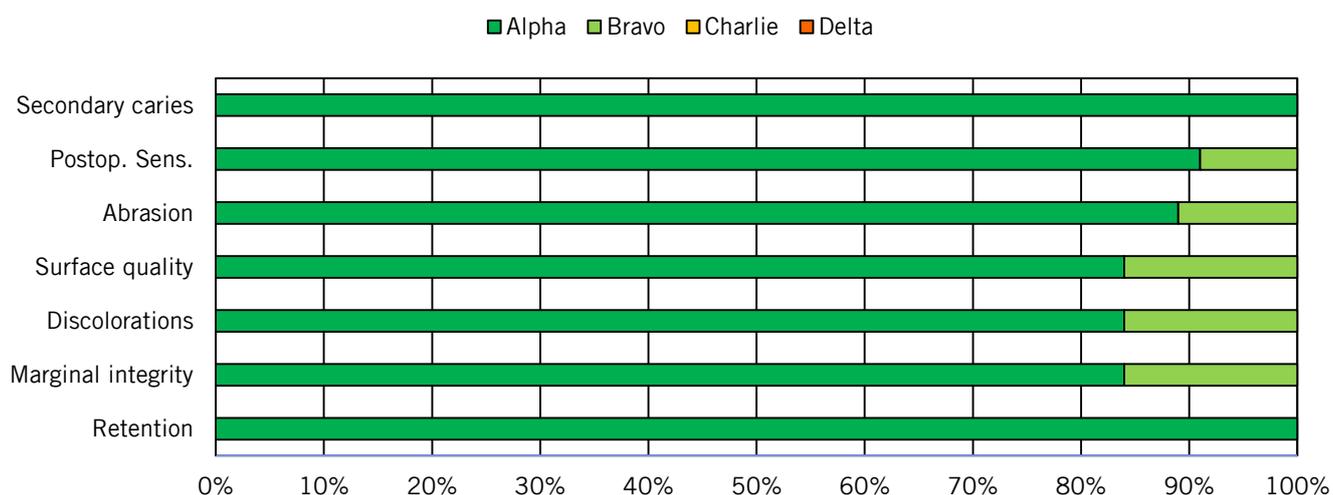


Figure 1: Clinical testing of Admira/Admira Bond Class II posterior tooth fillings (n=100), summary value (with/without rewetting and CBF) after three years.^[1]

It was possible to examine 100 fillings after 3 years. As illustrated in figure 1, all restorations were intact and predominantly clinically faultless. The 100% retention rate after 3 years proves that Admira is a durable restorative. Moreover, the study shows that Admira, even without using Admira Flow for the liner, achieves clinical results that traditional composites only achieve with the CBF-technique. The application of Admira, Admira Bond and Admira Flow in the CBF-technique delivered the best results out of all of the tested systems.

University of Leipzig 2-year Findings of Admira Class I and II In-vivo-Study

In 2002, a 3-year study began at the University of Leipzig to rate Admira as a plastic filling material for the posterior tooth area. A total of 52 restorations were placed in 38 patients. Hypersensitivity tests were conducted in addition to the evaluation criteria such as retention, marginal integrity and discoloration (Fig. 2).

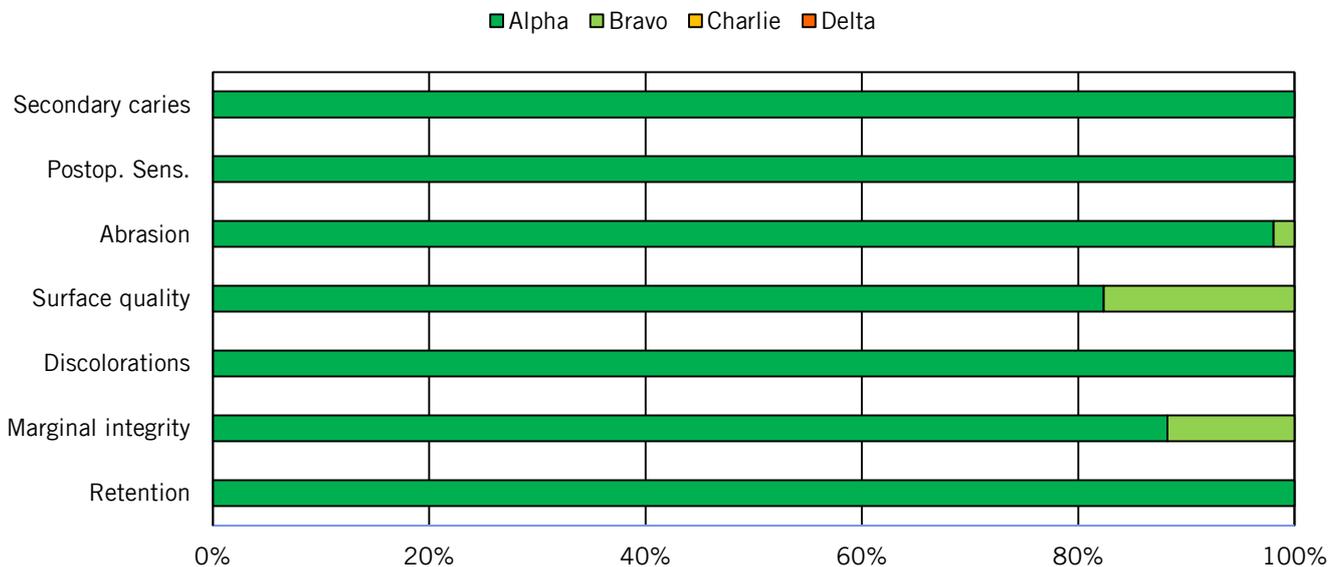


Figure 2: Clinical study 2-year findings of Admira/Admira Bond Class I and II restorations (n=51).^[2]

Once again, the results yielded a retention rate of 100 % after two years for the 51 restorations that could be subsequently examined. Moreover, the ADA standard of quality for unrestricted application of adhesive restorations of class I and II cavities was surpassed. The limited post-operative sensitivities listed in the initial findings were all reversible and did not reoccur after the six month follow-up examination.

University of Würzburg 2-year Findings of Admira Class I and II In-vivo Study

The Admira/Admira Bond system was tested in a 4 year study at the University of Würzburg. The clinical evaluation was conducted according to modified USPHS criteria. The available 2-year results confirm the obtained findings in the previous studies and are depicted in figure 3.

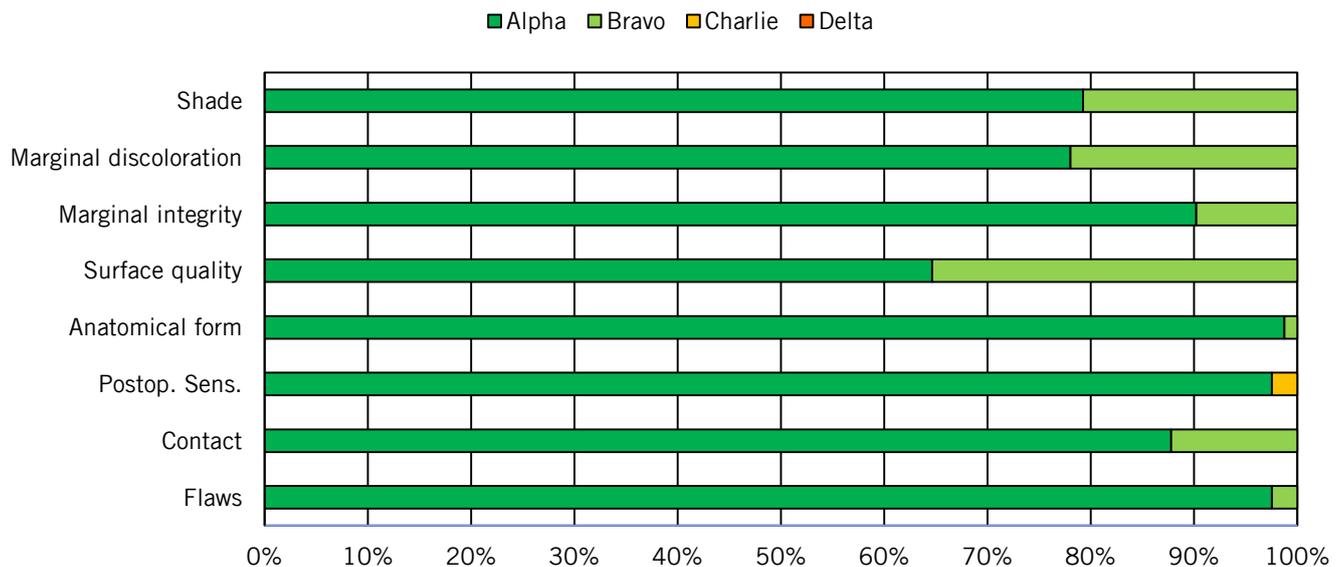


Figure 3: 2-year findings (n=82) of clinical evaluation of Admira / Admira Bond as a restorative in posterior teeth for Class I and II cavities.^[3]

A total of 95 fillings were placed in the study. After 12 months, 86 fillings could be evaluated in a follow-up examination. One filling required replacing at this time. At the 2-year recall, 82 restorations could be rated. The retention rate was 98.8 % and marginal integrity had a clinically faultless rating for more than 90 % of the restorations.

University of Dresden 2-year Findings of Admira Class V In-vivo-Study

The efficacy of Admira/Admira Flow for the treatment of carious and non-carious class V and mixed class cavities was rated in a two year study conducted by Prof. Klimm at the University of Dresden. Micro-morphological examinations were conducted on the SEM in addition to the actual clinical study.

Distinct hybrid zones were found here that accomplish a perfectly mixed layer of bonding and collagen, thus forming a tight adhesion of Admira/Admira Bond to the sclerotic dentine (Fig. 4a).

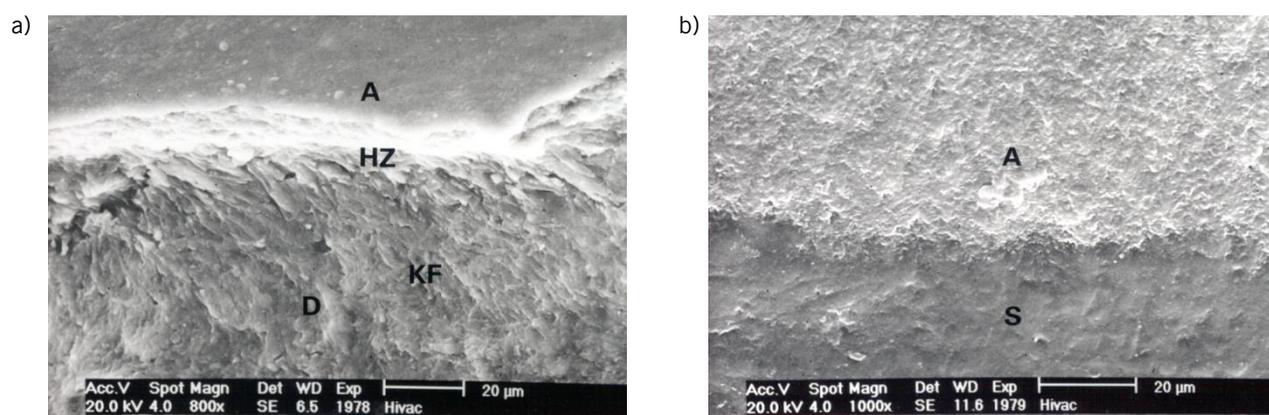


Fig. 4: SEM-micrograph of Admira/Admira Bond restorations.^[4] a) Section of a hybrid zone (HZ) between the filling (A) and collagen fibers (KF) of the radicular dentine (D); b) Seamless transition between filling (A) and enamel (S).

The seamless transition to enamel is recognizable in addition to the tight bond between Admira to the dentine (Fig. 4b). The SEM-micrograph demonstrates the good adhesion of Admira/Admira Bond to the tooth substance and accounts for the good clinical results.

Quotes from the final report:

“A perfect retention could be achieved with the material combination Admira/Admira Flow in cervical cavities of mixed classes and Admira Flow alone in smaller cervical defects.”

“The excellent polishability and stability of the polished surfaces distinguishes the material also in terms of reduced plaque accumulation.”

“In this context, Admira achieves very good results also from a caries prophylaxis standpoint. There were no incidences of secondary caries diagnosed during the entire study time period.”

University of Istanbul 2-year Findings of Admira Class V In-vivo Study

The minimal invasive restoration of non-carious cervical lesions (NCCL) with Admira/Admira Flow was evaluated according to modified USPHS criteria under the direction of Prof. Koray at the University of Istanbul. Most of the cavities were either molar or pre-molar. Half of them were prepared in a box shape and the other half wedge-shaped, but not shaped for mechanical retention. This places particularly high demands on the filling system since it is indirectly exposed to shear force through the flexibility of the tooth from the chewing load. All of the total 67 fillings placed in 19 patients could be examined after two years (Fig. 5).

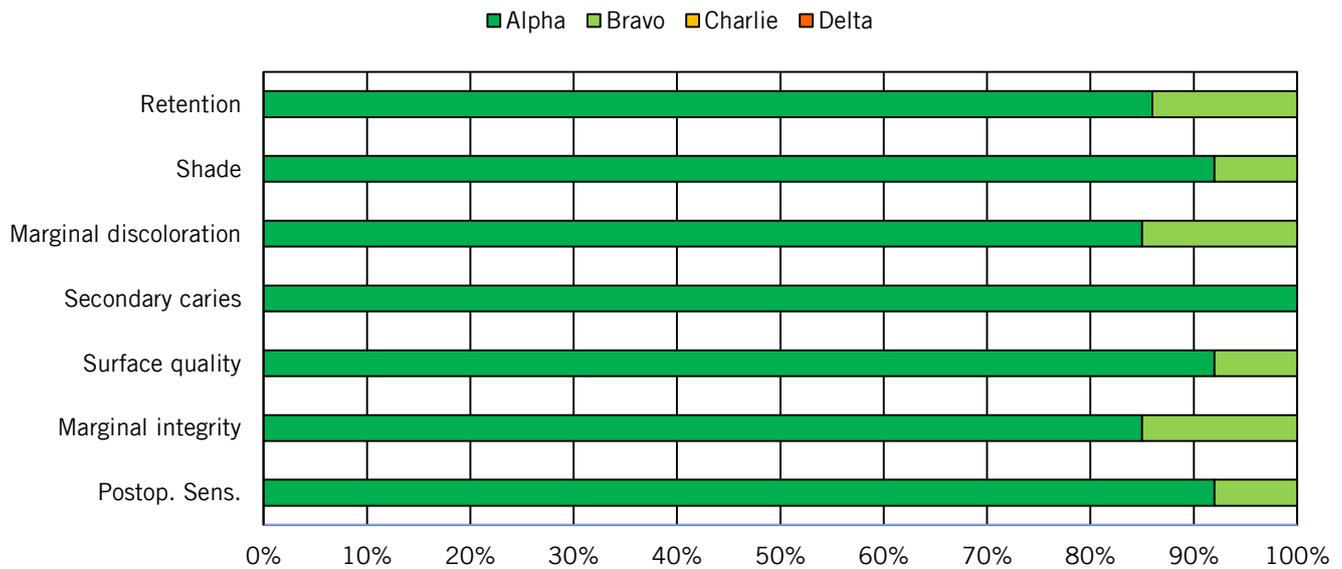


Fig. 5: 2-year finding of the clinical evaluation of the filling system Admira/Admira Bond as filling material for class V cavities.^[5]

The study showed that the box or wedge shaped preparation of the cavities did not have a significant effect on the longevity of the restoration with Admira. Moreover, the additional use of Admira Flow did not result in a significant difference here. None of the 67 examined fillings had secondary caries after 2 years.

Conclusion: All In-vivo tests confirm that Admira is additionally well-suited as a durable treatment in molars and pre-molars. Thus, Admira satisfies the high requirements for durable and aesthetic restorations.

[1] Dondi Dall'Orologio *et al.*; University of Bologna, 2005, IADR 2005 Baltimore, USA, Abstract #0582.

[2] Merte *et al.*; University of Leipzig, 2004, data on file, VOCO GmbH.

[3] Denner, Orth, Klaiber und Hugo, University of Würzburg, Jahrestagung DGZ 2004, Wuppertal, Vortrag #49.

[4] Klimm *et al.*; Schweiz. Monatsschr. Zahnmed. **2004**, *114*, 104-14.

[5] Koray *et al.*; University of Istanbul, 2004, data on file, VOCO GmbH