

Introducing the restorative innovation of glass hybrid technology

A COMPREHENSIVE GUIDE TO EQUIA FORTE

EQUIA
FORTE

GC

Inside EQUIA Forte

BULK FILL GLASS HYBRID RESTORATIVE FOR PATIENTS FROM 7 UNTIL 77 AND BEYOND

EQUIA Forte is the next innovation in GC's glass ionomer and resin technologies with EQUIA Forte Fil and EQUIA Forte Coat, working in synergy. United they build a stronger, superior posterior bulk fill material. This unique restorative system for all age groups will impress you on all levels. Compared to other restorative options, EQUIA Forte gives a substantial time advantage. The impressive aesthetics widen your posterior restorative options to fulfil your patient's expectations.

EQUIA FORTE AT A GLANCE:

- EQUIA Forte doesn't require any layering, is non sticky and packable, and adapts nicely to the cavity walls
- With hardly any no shrinkage stress, EQUIA Forte can be called a real bulk fill material even for deep cavities
- The use of a rubber dam is optional and the chemical adhesion eliminates complicated bonding procedures
- No need for any complex finishing and polishing since only a single application of EQUIA Forte Coat is required

- Brilliant shine and smooth surfaces with a durable, natural gloss easier than ever before
- Total procedure time of around 3,5 minutes*
- Increased strength of the glass ionomer over time due to the unique maturation effect, attributed to saliva
- Extended indications of use compared with EQUIA

EQUIA Forte builds on the impressive clinical trial performance of the original EQUIA system and presents as a viable alternative for the restoration of posterior teeth. With its new glass hybrid technology, EQUIA Forte extends the recommendation of use in Class II cavity preparations (without cusps - as per the IFU).

* Processing times are based on experiences of the manufacturer



Around the world, clinicians have enjoyed good results with EQUIA and EQUIA Forte and this is what some of them have to say about these restorative systems.

Recommended by experts



"I am truly impressed with the material after 9 years of experience in my clinical practice. The

material is strong, reliable and patients find the procedure quick and easy.

I am using it besides of composites for Class I, some Class II and many Class V cavities, with good clinical success. But even to day in Germany there is a lot of amalgam still being used, I believe that EQUIA or EQUIA Forte can offer a good alternative restorative solution in the indications as recommended by the manufacturer."

[Prof. Dr. Elmar Reich, private practitioner Germany](#)



"For more than 20 years the Fuji GICs have been part of my daily practice. Year after year, the

products improved in performance as we improved our experience in indications and settings. In our particular practice (high caries risk patients, or non invasive periodontal treatment) GIs have become

THE solution.

I am sure that using EQUIA or EQUIA Forte in daily dental practice, is a clever alternative restorative solution as soon as the patient is caries-active, if the indications of the manufacturer are respected."

[Dr. Michel Blique, Nancy University, France](#)



"EQUIA allows me to place restorations that chemically fuse to teeth, with a simple two-step

technique (prepare and condition), bulk filling my preparations and creating margins that resist future decay. With the complimentary EQUIA Forte and EQUIA Forte Coat in unit dosing, the system is close to perfection. I don't understand how anyone can practice without it, and I can't imagine a more versatile material."

[Dr. Brian B. Nový, DDS President, DentaQuest Oral Health Center, Director of Practice Improvement, USA](#)



"I have found EQUIA Forte Fil and Coat to be invaluable asset in the minimally invasive

management of root caries in the ageing patient. The combination of adhesion, root surface protection and durability make it an ideal restorative material for these patients."

[Dr. Ian Meyers, private practitioner, Australia](#)



"EQUIA Forte is a remarkable innovative biomimetic restorative material and a great

advancement to its predecessor Fuji IX Extra. Having grown up with the Fuji family for the past eighteen years, it is my key material for cores, dentine substitute and as a final restoration for many posterior cavity configurations. It is easy to handle, use, adapt and sculpt, making placement faster with great results. Its high-strength coupled with its ability to chemically bond to tooth structures gives me the confidence and predictability in providing successful direct restorations."

[Dr. Akit Patel, private practitioner, UK](#)



"The micro-laminated EQUIA

Restorative System was developed with the idea to create options for economical yet durable fillings and as an alternative for amalgam. It was received with great interest and acceptance amongst the dental profession throughout the world.

Furthermore, we can say that there is scientific evidence presented at International conferences and published in the International Journals showing that EQUIA can be used as long-term restorative alternative for the posterior region when it is used according manufacturer instructions. The development of this material opens the option to the dentist to save time and cost for the patients."

Mr. Henri Lenn, Executive Vice President, GC International AG

The direction of restorative dentistry

BY PROFESSOR STEFFEN MICKENAUTSCH, RESEARCH PROGRAMME LEADER OF THE SYSTEM INITIATIVE, DEPARTMENT OF COMMUNITY DENTISTRY, FACULTY OF HEALTH SCIENCES, UNIVERSITY OF THE WITWATERSRAND, SOUTH AFRICA.

Restorative dentistry has come a long way: from the preventive extraction of decayed and painful teeth (in order to prevent further pain or subsequent complications in the mouth) in the middle ages to GV Black's 'extension for prevention' and the preparation of the retention form for dental amalgam fillings over 100 years ago, to the minimally invasive micro-retention of adhesive composite fillings and chemically bonded restorations on glass ionomer (GI) basis. In this process, restorative treatment has become more and more patient friendly, while tooth restorations require now less and less removal of healthy tooth structure and are therefore comparatively smaller with a subsequently longer survival time or at least longer re-restoration cycle.

THE IMPACT OF THE MINAMATA CONVENTION

The Minamata convention was held in 2013 and its declaration was signed by the EU and 86 other countries. Its aim is to protect the environment and human health against the toxic effect of mercury, which is also contained in dental amalgam. The second part of the convention's declaration provides for the phasing down of dental amalgam. Because many countries have signed the declaration it can be assumed that its impact will be the disappearance of dental amalgam from daily dental practice and the fading of dental amalgam restorations as current gold standard for posterior, load-bearing tooth restorations. However, I think it will still take some years

until its complete eradication worldwide.

In terms of alternative options to amalgam, I see currently only two options: one are composite resin restorations and the other are high-viscosity GI based restorations, such as EQUIA Forte.

GI AS IDEAL ALTERNATIVE FILLING OPTION

High-viscosity GI materials are most suitable than other materials for tooth restoration after minimally-invasive cavity preparation. Such restorative treatment has been clinically shown to generate smaller tooth restorations at the same clinical indications that would result in larger dental fillings, if amalgam had been placed by use of conventional cavity preparation



“DENTISTRY IS A COMPLEX, MULTI-FACETTED DISCIPLINE, WITH PATIENT EXPECTATIONS, CARE PROVIDER DEMANDS, CARE FUNDER INTERESTS, INDUSTRY-DRIVEN INNOVATION AND MARKETING GOALS, PLUS THE EMERGING SCIENTIFIC EVIDENCE-BASE FROM DENTAL ACADEMIA BEING ONLY SOME OF ITS INFLUENCING FACTORS.

with high-speed drilling instead. The smaller high-viscosity GI restorations have further been associated with less pain during placement in comparison to conventional amalgam restorations and thus higher patient comfort during treatment with subsequent reduced levels of dental patient anxiety in adults. A reduced level of patient anxiety may be associated with low operator stress levels, as high patient anxiety has been shown as one of the main stressors in daily dental practice.

A MINIMALLY INVASIVE SOLUTION

EQUIA Forte is a good example of a restorative option that reflects this evolution in dentistry. It was developed on the basis of high-viscosity GI that has been shown to be as equally effective as amalgam restorations in posterior load-bearing teeth. High-viscosity GIs allow placement without the need for invasive tooth preparation by drill and therefore enable, by the same clinical indication, for smaller tooth restorations that even the placement of micro-retentive composites require. This is important; as it has been shown that the restoration size is directly related to the restoration's survival span

that means from date of placement to the date when repair or even replacement of that restoration is needed.

Because EQUIA is in principle a high-viscosity GI material, its long-term results and satisfactory clinical merits are directly reflected by systematic review results in regard to high-viscosity GI materials, in general. Recent results of trials that compared the EQUIA directly with amalgam or composite resin restorations are confirmatory.

SUBSTANTIAL CLINICAL EVIDENCE

Glass ionomers have evolved from the earlier, rather brittle 'low-viscosity' materials to the modern high-viscosity GIs. Clinical evidence shows that the Odds for failure of the latter are 53% lower than that of the former. The results of a systematic review in 17 English and non-English databases accepted 38 clinical controlled trials that included more than 10 000 placed tooth restorations and showed no statistically significant difference in the failure rates between modern high-viscosity GIs and amalgam restorations in single- and multiple surface tooth cavities after a maximum study period of six years.

PERFORMANCE OF GI MATERIALS IN-VITRO

It's important to note that the in-vitro measured lower physical strength of high-viscosity GIs in comparison to e.g. that of amalgam might not translate into any clinically higher fracture rate, because placed glass-ionomer restorations are generally smaller than amalgam fillings, adhere to the tooth structure on basis of ion exchange between carboxylate and phosphate ions and thus do not require the preparation of macroretention areas in tooth cavities, like amalgam. Furthermore, high-viscosity GIs placed in tooth cavities may abrade out of contact due to its potentially lower wear resistance. For these reasons, high-viscosity GIs restoration may not be exposed to the same extent of daily masticatoric forces in the oral cavity than amalgam restorations are. Therefore, while in the laboratory measured material properties such as compressive strength, fracture toughness or microleakage of high-viscosity GIs may indeed be inferior to that of silver amalgam, these may not be sufficiently strong enough to translate into clinically meaningful differences, due to other influencing factors that are not present during laboratory trials.

Our department conducted a systematic search of the current dental literature for laboratory and controlled clinical trials that directly compared the efficacy of high-viscosity GIs with amalgam. These trials were identified through the search of main international data sources. After literature search, the laboratory and clinical results of the identified trials were analysed and their joint effect magnitudes and effect direction statistically compared. While the laboratory trials indicated inferiority of high-viscosity GIs to amalgam, no significant differences between both types of tooth restorations using either material were found in clinical trials.

The established evidence shows that laboratory results concerning high-viscosity GIs versus amalgam for tooth restorations have no similar effect direction and magnitude than that of controlled clinical trials. The reasons remain unclear but may be due to multifactor influences and confounding, particularly due to the lack of clinical factors that are absent in laboratory trials. Hence, while laboratory trial results may provide valuable explanations for observed clinical phenomena and may serve during the hypothesis development process, they appear not be suitable as

basis for clinical inference and clinical recommendations concerning high-viscosity GIs in daily dental practice.

EMERGING TRENDS

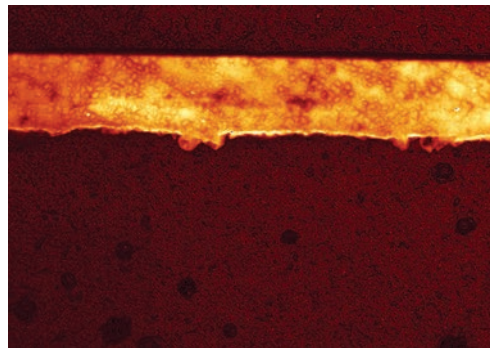
Dentistry is a complex, multi-faceted discipline, with patient expectations, care provider demands, care funder interests, industry-driven innovation and marketing goals, plus the emerging scientific evidence-base from dental academia being only some of its influencing factors. Predictions of such complexity's future have to be necessarily inaccurate and are often too far off the mark, in order to justify making them. I personally hope that any new developments in dentistry today will be long enough on the market, perhaps for at least the next four to five years, in order to have a chance being investigated through high-quality clinical trials – or even better through systematic reviews of such trials. The results of these will be our best indication for what will be most effective for our patients and thus what will shape the future of dentistry to come.

FURTHER READING

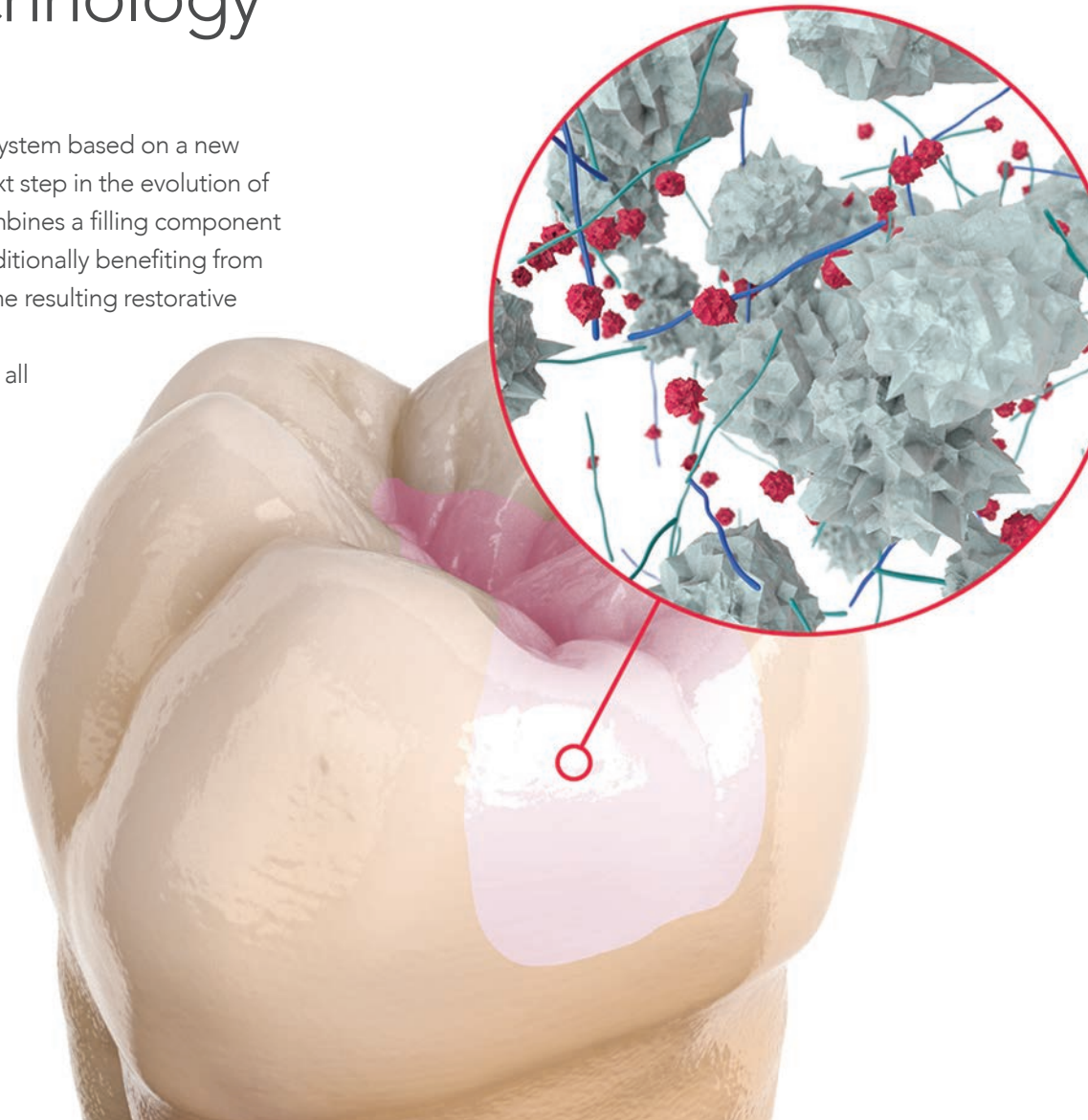
- Mickenautsch S. High-viscosity glass-ionomer cements for direct posterior tooth restorations in permanent teeth: The evidence in brief. *J Dent.* 2016 Dec;55:121-123.
- Mickenautsch S. Are high-viscosity glass-ionomer cements inferior to silver amalgam as restorative materials for permanent posterior teeth? A Bayesian analysis. *BMC Oral Health.* 2015 Oct 8;15(1):118.
- Mickenautsch S, Yengopal V. Do Laboratory Results Concerning High-Viscosity Glass-Ionomers versus Amalgam for Tooth Restorations Indicate Similar Effect Direction and Magnitude than that of Controlled Clinical Trials? – A Meta-Epidemiological Study. *PLoS One.* 2015 Jul 13;10(7):e0132246.
- Mickenautsch S, Yengopal V. Failure Rate of Direct High-Viscosity Glass-Ionomer Versus Hybrid Resin Composite Restorations in Posterior Permanent Teeth - a Systematic Review. *Open Dent J.* 2015 Dec 22;9:438-48.

GC EQUIA Forte – new restorative system with glass hybrid technology

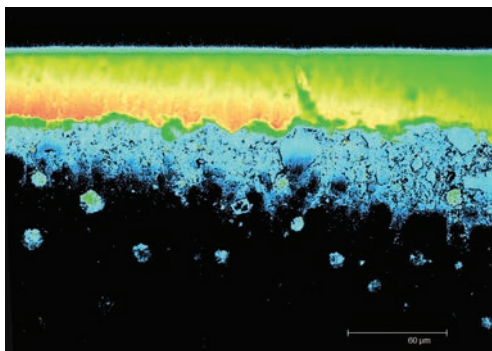
GC EQUIA Forte is an innovative restorative system based on a new glass hybrid technology. Representing the next step in the evolution of the proven EQUIA concept, EQUIA Forte combines a filling component with a protective composite coating while additionally benefiting from a newly developed hybrid filler technology. The resulting restorative offers further improved performance in tooth-coloured posterior restorations for patients of all generations.



Uniform thickness of EQUIA Forte coat improves the smoothness and the aesthetics of EQUIA Forte Fil



The new system makes use of the advantages of combined different size filler technologies – in a way similar to hybrid composites. The more voluminous glass fillers of EQUIA Forte Fil were supplemented by smaller, highly reactive fillers that strengthen the restoration. Its impressive performance parameters can be documented not only descriptively but also quantitatively: The filling component EQUIA Forte Fil by itself achieves 10%

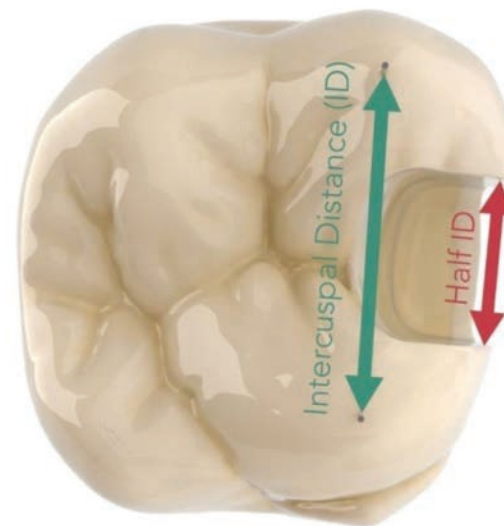


EQUIA Forte Coat penetrates the surface porosities, thus increasing the strength of the overall EQUIA filling.

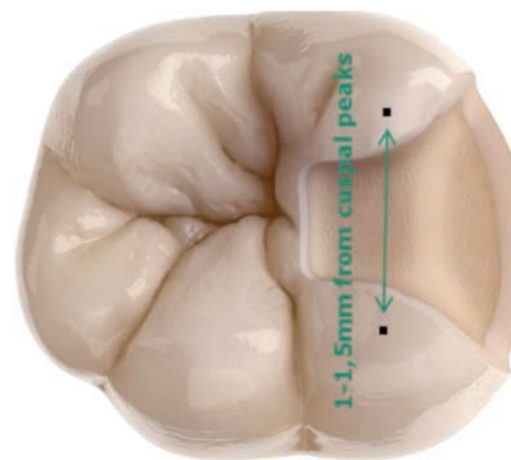
more flexural strength than the standard combo of EQUIA Fil plus EQUIA Coat*. In combination with the EQUIA Forte Coat composite coating, the flexural strength increases by 17% and flexural energy by almost 30%, compared to standard EQUIA*.

Adding a multifunctional monomer to EQUIA Forte Coat increases surface hardness by almost 35% and wear resistance by more than 40% compared to EQUIA Coat*. In addition to the physical properties, the handling of the material has been further optimised for the dental practitioner.

With the new EQUIA Forte, GC has recommended its use in wider Class II fillings compared to the current EQUIA.



Recommended Class II Cavity size as per EQUIA IFU



Recommended Class II Cavity size as per EQUIA Forte IFU

Clinical step by step

- 1 Apply petroleum jelly or GC Cocoa Butter inside the matrix
- 2 Use anatomically shaped wedges for better adaptation and contact points
- 3 Use tight rings from sectional matrix systems to act as separator of teeth to ensure good contact points
- 4 OPTIONAL STEP: Apply GC Cavity Conditioner (10 sec.) or Dentin Conditioner (20 sec.)
- 5 Rinse and gently dry, do not desiccate
- 6 Shake or tap. Depress plunger
- 7 Insert on Capsule Applicator. Click once to activate.
- 8 Mix for 10 sec. Working time is 1 min. 15 sec. from start of mix
- 9 Insert on Capsule Applicator. Click twice to prime capsule
- 10 IMMEDIATELY dispense within 10 sec.
- 11 Pack and contour. avoid moisture
- 12 Ensure complete set of EQUIA Forte Fil and carefully remove the ring. Use a probe to separate the bond between matrix and EQUIA Forte Fil
- 13 Final finishing after 2 min 30 sec. from start of mix
- 14 Finish the restoration by applying the EQUIA Forte Coat. Do not air blow
- 15 Light cure for 20 sec.



Easy solutions even in difficult situations

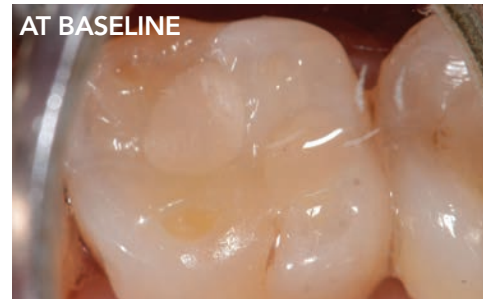
CASE 1: EQUIA, Class V, Dr. José Zalba, private practitioner, Spain



CASE 2: EQUIA Forte, Class II, Professor Ivana Milečić, Zagreb University, Croatia



CASE 3: EQUIA, Class I, Professor Matteo Basso, Milan University, Italy



Summary of EQUIA clinical studies

TITLE	Clinical performance of a new glass-ionomer based restoration system: A retrospective cohort study
REFERENCE	K. FRIEDL, K.A. HILLER & K.H. FRIEDL Dent Mater (2011) 27(10):1031-7
DESIGN	Retrospective cohort study with 151 restorations
WHAT IS BEING TESTED?	The suitability of a glass-ionomer system (EQUIA) as a permanent restoration material in posterior cavities. After 2 years and about 150 restorations were evaluated, it was concluded that EQUIA may be used as a permanent restoration material for any size of Class I and in smaller Class II cavities.

TITLE	7 Years, Multi- centre, Clinical Evaluation on 154 Permanent Restorations Made With a Glass ionomer-based Restorative System
REFERENCE	M. BASSO, J. GONE BENITES, A. IONESCU, C. TASSERA IADR- APR abstract 0446, Seoul 2016
DESIGN	154 restorations were performed in 124 patients. 149 restorations evaluated at 7 years (42 Class I, 70 Class II, 37 Class V; 9 incisors, 11 canines, 50 premolars and 79 molars)
WHAT IS BEING TESTED?	To evaluate the clinical performance of a restorative system based on a high-viscosity, coated glass-ionomer cement (i.c. EQUIA) for Class I, II and V permanent dental restorations. After 7 years, Highest number of failures were reported in class II (21) in respect to Class I (no failures) and Class V (12). In molars, incidence of lost restorations seems to be influenced by numbers of walls involved by cavity preparation. Optimal performances for Class I (no failures over 42 restorations) suggest that EQUIA is a reliable choice for permanent dental restorations, even in load bearing tooth surfaces of molars and premolars.

TITLE	Clinical performance during 48 months of two current glass ionomer restorative systems with coatings: a randomized clinical trial in the field
REFERENCE	T. KLINKE, A. DABOUL, A. TUREK, R. FRANKENBERGER, R. HICKEL AND R. BIFFAR. Trials (2016) 17(1):239
DESIGN	Prospective, double blinded randomized control clinical trial
WHAT IS BEING TESTED?	The clinical performance of a GIC material (Fuji IX GP Fast, GC) versus a coated GIC system (EQUIA, GC) After 4 years, 782 fillings in 510 patients were evaluated. EQUIA and Fuji IX GP fast were used to restore permanent teeth, Class I, Class II mo/ od and Class II mod. Both systems performed similarly after 48 months in Class I cavities. For Class II mo/od fillings, EQUIA showed a better overall performance with fewer failures in the follow-up This suggests that EQUIA is a worthy alternative for an aesthetic and economical long-term filling.

TITLE	Clinical performance of a glass ionomer restorative system: a 6-year evaluation
REFERENCE	S. GURGAN, ZB. KUTUK, E. ERGIN, SS. OZTAS & FY. CAKIR Clin Oral Investig. 2016 Dec 20. doi: 10.1007/s00784-016-2028-4. [Epub ahead of print]
DESIGN	Clinical trial with 140 (80 Cl1 and 60 Cl2) fillings in 59 patients
WHAT IS BEING TESTED?	The clinical performance of a glass-ionomer restorative system (EQUIA, GC), compared with a microhybrid composite resin (Gradia Direct Posterior, GC).

After 6 years 115 fillings (70CL I and 45 CL II) in 47 patients were evaluated, both EQUIA and Gradia Direct Posterior showed significant differences regarding marginal adaptation and marginal discoloration ($p < 0.05$). The study showed that there was a significant decrease in color match in EQUIA restorations ($p = 0.01$). Only one Class 2 EQUIA restoration was missing at 3 years and one at 4, while there were no failures at 5- and 6-year controls.

Conclusion: both restorative materials exhibited a similar and clinically successful performance after 6 years.

TITLE	The effect of a nano-filled resin coating on the 3-year clinical performance of a conventional high-viscosity glass-ionomer cement
REFERENCE	V.T.K. DIEM, M.J. TYAS, H.C. NGO, L.H. PHUONG & N.D. KHANH Clin Oral Investig. 2014 18(3):753-9
DESIGN	Clinical trial with 198 evaluated restorations
WHAT IS BEING TESTED?	The respective clinical performances of a conventional GIC (GC Fuji IX GP Extra, GC), a resin-coated GIC (GC Fuji IX GP Extra + G-Coat Plus, GC) and a resin composite (Solare, GC) as a comparison material.

This study shows that although both GC Fuji IX GP Extra and GC Fuji IX GP Extra with G-Coat Plus (EQUIA restorative system) showed acceptable clinical performance in occlusal cavities in children, the application of G-Coat Plus gave some protection against wear.

Clinical Relevance: The application of G-Coat Plus to GC Fuji IX GP Extra glass-ionomer cement may be beneficial in reducing wear in occlusal cavities.

TITLE	A Prospective Six-Year Clinical Study Evaluating Reinforced Glass Ionomer Cements with Resin Coating on Posterior Teeth: Quo Vadis?
REFERENCE	L.S. TURKUN & O. KANIK Oper Dent. 2016;41(6):587-598
DESIGN	Clinical trial with 256 restorations in 54 patients
WHAT IS BEING TESTED?	The clinical performance of two reinforced glass ionomer cements (EQUIA, GC and Riva SC, SDI) and two surface coating material (G-Coat Plus, and Varnish, GC) combinations after 6 years

After a six-year clinical evaluation period, the Equia Fil system was more successful than Riva SC regarding color match, marginal adaptation, anatomic form, and retention rate.

Note: EQUIA Restorative Concept was launched in March 2007 bearing the components Fuji IX GP EXTRA + G-Coat PLUS. Since March 2011, it has been rebranded as a New Restorative System bearing the components EQUIA® Fil and EQUIA® Coat. All the products Fuji IX GP EXTRA, G-Coat PLUS and the EQUIA Restorative System co-exist in the market; These clinical papers are a selection of the available evidence on EQUIA. More supporting studies are available and can be delivered upon request.

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