



## Glass Hybrids

Cost-effective, long-term restorative alternative



# GC's Glass Hybrids

Building on the extensive and positive clinical evidence of EQUIA restorative system, GC introduced in 2015 the first Glass Hybrid, and offer an unprecedented option for long-term restorations.

Combining a self-cure bulk –fill restorative - EQUIA Forte and EQUIA Forte HT - with a highly filled, light-cure resin coating agent - EQUIA Forte COAT, Glass Hybrids are an **Easy , Quick, Unique, Intelligent, Aesthetic restorative alternative**.

Furthermore, several clinical studies have proven the **cost-effectiveness** of this new class of material.

Backed by **years of extensive research and academically reviewed publications**, this literature list provides clinicians with the unwavering confidence in glass hybrid restorative systems as an optimal **cost-effective, long-term restorative alternative**.



Strong



Fast bulk-fill placement



Moisture tolerant





Long-term performance




# Table of contents





 Long-term performance 5,6,7,8


 Cost-effectiveness scientifically proven 9

 New class of long-term restorative 10

 Mechanical performance 11

 Fluoride release 12

 Aesthetics: translucency and color stability 13

 Eco-friendly 14

 Articles in dental magazines 15



## Long-term performance

<b>TITLE</b>	<b>Comparative evaluation of postoperative sensitivity in bulk fill restoratives: A randomized controlled trial</b>
<b>REFERENCE</b>	Hirani RT <i>et al.</i> 2018. J Int Soc Prev Community Dent. 8(6):534-539. <a href="https://doi.org/10.4103/jispcd.jispcd_218_18">https://doi.org/10.4103/jispcd.jispcd_218_18</a>
<b>Patients treated with EQUIA Forte and Activa Bioactive presented lower POS when compared to groups restored with Cention N. Follow-up period: 24 h, 1 week and 1 month.</b>	
Number of Patients evaluated: 144 patients	

<b>TITLE</b>	<b>Glass hybrid restorations as an alternative for restoring hypomineralized molars in the ART model</b>
<b>REFERENCE</b>	Grossi J <i>et al.</i> , 2018. BMC Oral Health. 18(1):65. <a href="https://doi.org/10.1186/s12903-018-0528-0">https://doi.org/10.1186/s12903-018-0528-0</a>
<b>EQUIA Forte restorations showed a success rate of 98.3% after 6 and 12 months. The only failure occurred in a restoration involving three or more surfaces presenting the breakdown of all cusps.</b>	
Number of Patients evaluated: 44 patients Number of restorations: 60 restorations	

<b>TITLE</b>	<b>Multi-center clinical evaluation of bulk-fill glass hybrid restorations: One-year report</b>
<b>REFERENCE</b>	Turkun S <i>et al.</i> 2018. J Dent Res Vol 97(Spec Iss B): 1972. <a href="https://iadr.abstractarchives.com/abstract/18iags-2953131/multi-center-clinical-evaluation-of-bulk-fill-glass-hybrid-restorations-oneyear-report">https://iadr.abstractarchives.com/abstract/18iags-2953131/multi-center-clinical-evaluation-of-bulk-fill-glass-hybrid-restorations-oneyear-report</a>
<b>In this split-mouth study design, EQUIA Forte and the composite Tetric EvoCeram were equally successful in moderate to large size Class II restorations</b>	
Number of Patients evaluated: 180 patients Number of restorations: 360 restorations	

<b>TITLE</b>	<b>Does the depth of the cavity and the activity of the lesion in primary molars influence in the success of the restoration?</b>
<b>REFERENCE</b>	Baumotte L <i>et al.</i> 2019. J Dent Res Vol 98 (Spec Iss A): 0605. <a href="https://iadr.abstractarchives.com/abstract/19iags-3186371/does-the-depth-of-the-cavity-and-the-activity-of-the-lesion-in-primary-molars-influence-in-the-success-of-the-restoration">https://iadr.abstractarchives.com/abstract/19iags-3186371/does-the-depth-of-the-cavity-and-the-activity-of-the-lesion-in-primary-molars-influence-in-the-success-of-the-restoration</a>
<b>EQUIA Forte showed a success rate of 94% after a mean evaluation time of 13.3 months. Cavity depth and caries lesion activity did not influence the restoration's survival.</b>	
Number of Restorations: 45 restorations	



## Long-term performance

<b>TITLE</b>	<b>Clinical performance of a glass hybrid restorative in extended size class II cavities</b>
<b>REFERENCE</b>	Gurgan S <i>et al.</i> 2020. Oper Dent. 45(3):243-254. <a href="https://doi.org/10.2341/18-282-C">https://doi.org/10.2341/18-282-C</a>
<b>EQUIA Forte performed as good as the micro-hybrid composite (G-ænial Posterior), with a success rate of 100% at the 24-month recall.</b>	
Number of Patients evaluated: 37 patients Number of restorations: 108 restorations	

<b>TITLE</b>	<b>Clinical performance of a glass-hybrid system compared with a resin composite in the posterior region: Results of a 2-year multicenter study</b>
<b>REFERENCE</b>	Miletic I <i>et al.</i> 2020. J Adhes Dent. 2020. 22(3):235-247. <a href="https://doi.org/10.3290/j.jad.a44547">https://doi.org/10.3290/j.jad.a44547</a>
<b>In this split-mouth study design, EQUIA Forte performed as good as the nanohybrid resin composite (Tetric EvoCeram) in moderate to large two-surface class II restorations.</b>	
Number of Patients evaluated: 180 patients Number of restorations: 360 restorations	

<b>TITLE</b>	<b>Twenty-four-month clinical performance of a glass hybrid restorative in non-carious cervical lesions of patients with bruxism: a split-mouth, randomized clinical trial</b>
<b>REFERENCE</b>	Vural U <i>et al.</i> 2020. Clin Oral Investig. 24(3):1229-1238. <a href="https://doi.org/10.1007/s00784-019-02986-x">https://doi.org/10.1007/s00784-019-02986-x</a>
<b>EQUIA Forte showed good performance for the restoration of NCCLs when compared to Ceram.X One Universal. Cumulative survival rates was 84.1%</b>	
Number of Patients evaluated: 25 patients Number of restorations: 148 restorations	



## Long-term performance

<b>TITLE</b>	<b>ART restorations in MIH severely affected molars: 4 years follow-up</b>
<b>REFERENCE</b>	Marques M <i>et al.</i> 2020. J Dent Res Vol 99 (Spec Iss A): 2384. <a href="https://iadr.abstractarchives.com/abstract/20iags-3328771/art-restorations-in-mih-severely-affected-molars-4-years-follow-up">https://iadr.abstractarchives.com/abstract/20iags-3328771/art-restorations-in-mih-severely-affected-molars-4-years-follow-up</a>
<b>The survival rate was 61.9% after a 48 months. EQUIA Forte is a trustable option for treating severely MIH affected teeth.</b>	
Number of Patients evaluated: 44 patients Number of restorations: 60 restorations	

<b>TITLE</b>	<b>48-Month clinical performance of a glass hybrid in extended size class II cavities</b>
<b>REFERENCE</b>	Gurgan S <i>et al.</i> 2020. J Dent Res Vol 99 (Spec Iss A): 1389. <a href="https://iadr.abstractarchives.com/abstract/20iags-3327309/48-month-clinical-performance-of-a-glass-hybrid-in-extended-size-class-ii-cavities">https://iadr.abstractarchives.com/abstract/20iags-3327309/48-month-clinical-performance-of-a-glass-hybrid-in-extended-size-class-ii-cavities</a>
<b>EQUIA Forte and the micro-hybrid composite (G-ænial Posterior) presented acceptable surface and marginal adaptation characteristics, rendering the glass hybrid a trustable permanent material for large Class II cavities.</b>	
Number of Patients evaluated: 32 patients Number of restorations: 90 restorations	

<b>TITLE</b>	<b>Clinical Performance of Restorations in Teeth Affected by MIH</b>
<b>REFERENCE</b>	Kaya R <i>et al.</i> 2021. J Dent Res Vol 100 (Spec Iss A): 0584. <a href="#">Clinical Performance of Restorations in Teeth Affected by MIH IADR Abstract Archives</a>
<b>Retention rate at 12-month was 100% for GH restorations, while marginal integrity was 89.2%, suggesting that EQUIA Forte HT is a good restorative option for MIH affected teeth.</b>	
Number of Patients evaluated: 28 patients Number of restorations: 67 restorations	



## Long-term performance

<b>TITLE</b>	<b>Sixty-Month Follow-up of a Glass Hybrid in NCCLs</b>
<b>REFERENCE</b>	Gurgan S <i>et al</i> , 2022. Dent Res Vol 101 (Spec Iss C): P319 <a href="#">Abstract_Book.pdf (per-iadr2022.com)</a> page307 (link to abstract not available yet)
<b>EQUIA Forte and the resin composite Ceram.X One Universal showed similar clinical performance and survival rates in NCCLs after 5 year.</b>	
Number of Patients evaluated: 15 patients Number of restorations: 97 restorations	

<b>TITLE</b>	<b>4-Years Clinical Performance of Glass-Hybrid and Composite in Multi-Center Trial</b>
<b>REFERENCE</b>	Miletic I <i>et al</i> , 2022. Dent Res Vol 101 (Spec Iss C): P350 <a href="#">Abstract_Book.pdf (per-iadr2022.com)</a> page309 (link to abstract not available yet)
<b>In this split-mouth study design, EQUIA Forte performed as good as the nanohybrid resin composite (Tetric EvoCeram) in moderate to large two-surface class II restorations.</b>	
Number of Patients evaluated: 180 patients Number of restorations: 360 restorations	



## Cost-effectiveness scientifically proven

<b>TITLE</b>	<b>Glass Hybrid Versus Nanocomposite for Restoration of Sclerotic Non-carious Cervical Lesions: 18-Month Results of a Randomized Controlled Trial</b>
<b>REFERENCE</b>	Schwendicke F <i>et al.</i> 2021. J Adhes Dent. Dec 3;23(6):487-496. <a href="https://doi.org/10.3290/j.jad.b2287831">https://doi.org/10.3290/j.jad.b2287831</a>
<b>EQUIA Forte may be a suitable alternative to Filtek Supreme XTE for restoring sNCCLs, without any significant difference in survival between the materials. GH restorations required less chairtime than did placing RC restorations.</b>	
Number of Patients evaluated: 88 patients Number of restorations: 175 restorations	

<b>TITLE</b>	<b>Glass hybrid versus composite for non-carious cervical lesions: Survival, restoration quality and costs in randomized controlled trial after 3 years</b>
<b>REFERENCE</b>	Schwendicke F <i>et al.</i> 2021. J Dent. Jul; 110:103689. <a href="https://doi.org/10.1016/j.jdent.2021.103689">https://doi.org/10.1016/j.jdent.2021.103689</a>
<b>EQUIA Forte was significantly less costly both, initially and long-term, than Filtek Supreme XTE for restoring non-carious cervical lesions. Survival was not significantly different.</b>	
Number of Patients evaluated: 88 patients Number of restorations: 175 restorations	

<b>TITLE</b>	<b>Cost-effectiveness of glass hybrid versus composite in a multi-country randomized trial</b>
<b>REFERENCE</b>	Schwendicke F <i>et al.</i> 2021. J Dent. 107:103614. <a href="https://doi.org/10.1016/j.jdent.2021.103614">https://doi.org/10.1016/j.jdent.2021.103614</a>
<b>EQUIA Forte was less costly than Tetric EvoCeram both initially and over 3 years. Efficacy differences were extremely limited.</b>	
Number of Patients evaluated: 180 patients Number of restorations: 360 restorations	

<b>TITLE</b>	<b>Long-term cost-effectiveness of glass hybrid versus composite in permanent molars</b>
<b>REFERENCE</b>	Schwendicke F <i>et al.</i> 2021. J Dent. Sep; 112:103751. <a href="https://doi.org/10.1016/j.jdent.2021.103751">https://doi.org/10.1016/j.jdent.2021.103751</a>
<b>This study used data provided by a multi-country randomized trial comparing EQUIA Forte to Tetric EvoCeram (Miletic <i>et al</i>, 2020) . Microsimulations models translated the data into a long-term horizon, concluding that glass-hybrid is likely a cost-effective option for restoring permanent molars.</b>	
Number of Patients evaluated: 180 patients Number of restorations: 360 restorations	





## New class of long-term restorative

<b>TITLE</b>	<b>Cariou Lesions and First Restorative Treatment</b>
<b>REFERENCE</b>	Adopted by FDI General Assembly September, 2019 in San Francisco, United States of America <a href="https://www.fdiworlddental.org/cariou-lesions-and-first-restorative-treatment">https://www.fdiworlddental.org/cariou-lesions-and-first-restorative-treatment</a> International Dental Journal 2020; 70: 5–6. <a href="https://doi.org/10.1111/idj.12551">https://doi.org/10.1111/idj.12551</a>
This FDI policy statement gives guidance on treatment of caries in deciduous and permanent teeth differentiating the concepts of caries arrest and minimally invasive restorative concepts.	
<b>Glass Hybrids are recognized by FDI a class of restorative materials for permanent teeth, suitable for single surface and Class II cavities.</b>	

<b>TITLE</b>	<b>Commercially Available Ion-Releasing Dental Materials and Cavitated Cariou Lesions: Clinical Treatment Options</b>
<b>REFERENCE</b>	Slimani A <i>et al</i> ,2021. Materials, 14, 6272. <a href="https://doi.org/10.3390/ma14216272">https://doi.org/10.3390/ma14216272</a>
<b>Glass Hybrids are bio-interactive restorative materials, with antibacterial effects, capacity to remineralize hard tissues and with bulk-fill reaction.</b>	



## Mechanical performance

TITLE	Bond strength to tooth structure and flexural properties of a new precapsulated glass-ionomer cement for filling
REFERENCE	Irie M <i>et al</i> , 2018. The J of the Jap Soc for Dent Mater and Devices Vol. 37 Special Issue 72, p.89.
EQUIA Forte HT (named EQUIA 3 in this study) presented higher shear bond strength to enamel (11.4 MPa) and to dentin (13 Mpa), greater flexural strength (36.6 MPa) and modulus of elasticity (16.8 GPa) when compared to Ketac Universal.	

TITLE	Compression fracture resistance of four different glass-ionomer cements
REFERENCE	Glavina D <i>et al</i> , 2020. J Dent Res Vol 99 (Spec Iss A): 1284. <a href="https://iadr.abstractarchives.com/abstract/20iags-3315894/compression-fracture-resistance-of-four-different-glass-ionomer-cements">https://iadr.abstractarchives.com/abstract/20iags-3315894/compression-fracture-resistance-of-four-different-glass-ionomer-cements</a>
EQUIA Forte HT presented significantly higher fracture resistance than other materials (EQUIA Forte HT 245,3N; Ketac Molar 140,7N; IonoStar Molar 114,5N).	

TITLE	Mechanical performance of a newly developed glass hybrid restorative in the restoration of large MO Class 2 cavities.
REFERENCE	Kutuk ZB <i>et al</i> , 2019. Niger J Clin Pract. Jun;22(6):833-841. <a href="https://doi.org/10.4103/njcp.njcp_628_18">https://doi.org/10.4103/njcp.njcp_628_18</a>
EQUIA Forte presented high values of compressive strength (164.62 ± 25.72 MPa) and fracture resistance (841.88 ± 74.57 N), suggesting it is a suitable restorative option for extensive cavities in posterior teeth.	

TITLE	In vitro investigation of antimicrobial effects, nanohardness, and cytotoxicity of different glass ionomer restorative materials in dentistry
REFERENCE	Cosgun A <i>et al</i> , 2019. Niger J Clin Pract. 2019 Mar;22(3):422-431. <a href="https://doi.org/10.4103/njcp.njcp_429_18">https://doi.org/10.4103/njcp.njcp_429_18</a>
EQUIA Forte presented superior nanohardness values compared to Argion and Zirconomer	

TITLE	Bond Strength of Glass-Hybrid and Glass-Ionomer Materials to Primary Dentine
REFERENCE	Peric T <i>et al</i> , J Dent Res Vol 101 (Spec issue C): P305. <a href="Abstract_Book.pdf(per-iadr2022.com)">Abstract_Book.pdf(per-iadr2022.com)</a> page 300
EQUIA Forte HT presented high bond strength to both, sound and caries-affected dentin in primary teeth.	

TITLE	Influence of Ionizing Radiation on Fluoride-Releasing Dental Restorative Materials.
REFERENCE	Turjanski S, Par M, Bergman L, Soče M, Grego T, Sever E. Polymers (Basel). 2023, 15, 632. DOI: <a href="https://doi.org/10.3390/polym15030632">10.3390/polym15030632</a>
Mechanical, chemical and surface properties of EQUIA Forte HT were not affected by therapeutic dose of radiotherapy.	



## Fluoride release

TITLE	<b>Comparative evaluation of the physical properties of a reinforced glass ionomer dental restorative material.</b>
REFERENCE	Moshaverinia M <i>et al</i> , 2019. J Prosthet Dent. Aug;122(2):154-159. <a href="https://doi.org/10.1016/j.prosdent.2019.03.012">https://doi.org/10.1016/j.prosdent.2019.03.012</a>
<b>EQUIA Forte is a promising restorative material with higher compressive strength, fluoride release and microhardness than ChemFil Rock.</b>	

TITLE	<b>Comparison of compressive strength and fluoride release of GIC restoratives</b>
REFERENCE	Mori D <i>et al</i> , 2020. J Dent Res Vol 99 (Spec Iss A): 1856. <a href="https://iadr.abstractarchives.com/abstract/20iags-3317914/comparison-of-compressive-strength-and-fluoride-release-of-gic-restoratives">https://iadr.abstractarchives.com/abstract/20iags-3317914/comparison-of-compressive-strength-and-fluoride-release-of-gic-restoratives</a>
<b>EQUIA Forte HT presented the highest strength and the highest amount of fluoride release when compared to other materials (Ketac Universal, Riva Self cure, Chemfil Rock) in different time intervals.</b>	



## Aesthetics: translucency and color stability

TITLE	<b>The influence of surface resin coating on the color stability of restorative glass-ionomer /glass hybrid cements</b>
REFERENCE	Menezes-Silva R <i>et al</i> , 2020. J Dent Res Vol 99 (Spec Iss A):1312. <a href="https://iadr.abstractarchives.com/abstract/20iags-3315372/the-influence-of-surface-resin-coating-on-the-color-stability-of-restorative-glass-ionomer--glass-hybrid-cements">https://iadr.abstractarchives.com/abstract/20iags-3315372/the-influence-of-surface-resin-coating-on-the-color-stability-of-restorative-glass-ionomer--glass-hybrid-cements</a>
<b>The surface coating improved color stability overtime. Ketac Universal presented significant color alterations when compared to EQUIA Forte HT.</b>	

TITLE	<b>Mechanical and Optical Properties of a Novel Bulk Fill Glass Hybrid Restorative Dental Material</b>
REFERENCE	Sharrooz S <i>et al</i> , 2020. J Dent Res Vol 99 (Spec Iss A): 3382, <a href="https://iadr.abstractarchives.com/abstract/20iags-3322102/mechanical-and-optical-properties-of-a-novel-bulk-fill-glass-hybrid-restorative-dental-material">https://iadr.abstractarchives.com/abstract/20iags-3322102/mechanical-and-optical-properties-of-a-novel-bulk-fill-glass-hybrid-restorative-dental-material</a>
<b>EQUIA Forte HT presented high values of flexural strength and good translucency.</b>	

## Eco-friendly



<b>TITLE</b>	<b>Capsule Waste Evaluation for Restorative Materials</b>
<b>REFERENCE</b>	Cowens M, Powers JM. DENTAL ADVISOR Biomaterials Research Center, number 164 – March 2023. <a href="https://www.dentaladvisor.com/pdf-download/?pdf_url=wp-content/uploads/2023/03/RR-164-GC-Capsule-Waste-Evaluation-for-Restorative-Materials.pdf">https://www.dentaladvisor.com/pdf-download/?pdf_url=wp-content/uploads/2023/03/RR-164-GC-Capsule-Waste-Evaluation-for-Restorative-Materials.pdf</a>
<b>The overall waste generated by EQUIA Forte HT capsules is lower compared with that generated by similar products.</b>	



## Articles in dental magazines

TITLE	<b>Glass hybrids versus composite: Efficacy and cost-effectiveness in a multicentre clinical study</b>
REFERENCE	Schwendicke F <i>et al</i> , Dental Tribune International, March 2021. <a href="https://www.dental-tribune.com/2021/03/glass-hybrids-versus-composite-efficacy-and-cost-effectiveness-in-a-multicentre-clinical-study/">Glass hybrids versus composite: Efficacy and cost-effectiveness in a multicentre clinical study (dental-tribune.com)</a>

TITLE	<b>Glashybrid vs. Komposit: Wirksamkeit und Wirtschaftlichkeit in einer multizentrischen Studie</b>
REFERENCE	Schwendicke F <i>et al</i> , Dental Tribune International, April 2021. <a href="https://www.dental-tribune.com/2021/04/glass-hybrids-versus-composite-efficacy-and-cost-effectiveness-in-a-multicentre-clinical-study/">Glass hybrids versus composite: Efficacy and cost-effectiveness in a multicentre clinical study (dental-tribune.com)</a>

TITLE	<b>Cost-effectiveness of glass hybrids as restorative alternative proved for cervical lesions</b>
REFERENCE	Schwendicke F <i>et al</i> , Dental Tribune International, Jun 2021. <a href="https://www.dental-tribune.com/2021/06/glass-hybrids-proven-as-alternative-for-cervical-lesions/">Glass hybrids proven as alternative for cervical lesions (dental-tribune.com)</a>

TITLE	<b>The stamp technique: Quick and effective restoration with glass hybrids</b>
REFERENCE	Marcano, R. Dental Tribune International, Feb 2022. <a href="https://www.dental-tribune.com/2022/02/the-stamp-technique-quick-and-effective-restoration-with-glass-hybrids/">The stamp technique: Quick and effective restoration with glass hybrids (dental-tribune.com)</a>

TITLE	<b>Interview: “Glass hybrids [...] are quite forgiving and tolerant regarding clinical challenges”</b>
REFERENCE	Miletic I . Dental Tribune International. June 2020. <a href="https://www.dental-tribune.com/2020/06/interview-on-glass-hybrids-and-their-clinical-use/">Interview on glass hybrids and their clinical use (dental-tribune.com)</a>

TITLE	<b>Amalgam: Gone for good?</b>
REFERENCE	Schwendicke F. GC Get Connected, Oct 2022.