



Evidence-based Dentistry Newsletter

GCI AG, March 2021

'GCI'

'GCI'



G2-BOND Universal

The new standard
of 2-bottle
Universal Bonding

Key Map	
	Strong
	Durable
	Aesthetic
	Time-saving
	Cost-efficient



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Impact of HEMA Formulation on 2-Step Self-etch Bonding Agent Performance.

Hirano K, Yamashita M, Fujimori K, Arita A, Kumagai T. 2020. 98th General Session & Exhibition of the IADR. 0188.



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Effect of HEMA blending ratio on bonding performance of novel 2-step adhesive

Yamashita M, Arita A, Kumagai T. 2020. The 152nd Meeting of the Japanese Society of Conservative Dentistry. P20. (available only in Japanese)



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Improvement of dentin bonding effectiveness using the next generation 2-step system with a newly developed hydrophobic bonding agent

Yamanaka A, Mine A, Hagino R, Matsumoto M, Yamada-Tajiri Y, Ishida M, Higashi M, Ishigaki S, Van Meerbeek B, Yatani H. 2020. Adhes Dent. 38(3):112. (available only in Japanese)



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Microtensile bond strength of novel two-step bonding agent to dentin

Ohara N, Ono S, Shibuya K, Yoshiyama M. 2020. Adhes Dent. 38(3):113. (available only in Japanese)



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Evaluation of bonding layer durability on 2-step self-etch adhesive

Fujimori K, Hirano K, Fusejima F. 2020. The 68th Annual Meeting of Japanese Association for Dental Research. Poster 002.



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Water Sorption and Solubility of an Experimental Bonding Resin

Islam M, Alam A, Yamauti M, Chowdhury A, Sano H. 2020. 31st SAADE & 34th IADR-SEA Scientific Meeting. P022.



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Adhesion performance of novel 2-step adhesive

Ohara Y, Arita A, Kumagai T. 2019. The 151st Meeting of the Japanese Society of Conservative Dentistry. P17. (available only in Japanese)



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Evaluation of bond strength of multi-step adhesives

Minamisawa H, Fujimori K, Hirano K, Fusejima F. 2021. 99th General Session & Exhibition of the IADR. 0729.



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Bonding effectiveness of the multi-step self-etching adhesive to dentin

Suyama Y, Mizukami H, Yamada T, Sugizaki J. 2021. 99th General Session & Exhibition of the IADR. 0730.

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Postoperative sensitivity evaluation of a new two-step bonding system

Ferrari Cagidiaco E, Corsentino G, Ferrari M. 2021.99th General Session & Exhibition of the IADR. 2304.

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Dentin Shear Bond Strength of Novel Two-Bottle Multimode Adhesive

Abdel-Gawad S, Francois P, Le-Goff S, Dursun E, Attal JP. 2021. 99th General Session & Exhibition of the IADR. 1256.

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Bond strength of different adhesive systems to indirect restorative materials

Khandelwal P, Hirano K, Fusejima F. 2021. 99th General Session & Exhibition of the IADR. 1969.

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[A Multifaceted Evaluation of a Novel HEMA-Free Two-Step Self-Etch Adhesive](#)

Tichy A, Hosaka K, Yang Y, Motoyama Y, Sumi Y, Nakajima M, Tagami J. 2021. 99th General Session & Exhibition of the IADR. 1971.



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[Effect of Air Blow Pressure at Multi-step Adhesive Application on Bond Strength](#)

Yamashita M, Hrano K, Fusejima F.2021. Abstracts of the 10th Virtual Conseuro 2021 Congress . Clin Oral Invest 25, 4185-4238 (2021). EP-027



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[Bond durability of a novel two-step bonding agent to dentin](#)

Ohara N, Ono S, Shibuya K, Yokoyama A, Matsuazaki K, Yamaji K, Yoshiyama M. 2021. The 154th Meeting of the Japanese Society of the Japanese Society of Conservative Dentistry. P18.



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[Changes in Initial Bond Strength of Two-step Bonding System Over Time](#)

Yabe A, Irie A, Okada M, Takayoshi N, Taketa H, Torii Y, Matsumoto T. 2021. The 154th Meeting of the Japanese Society of the Japanese Society of Conservative Dentistry. P26.



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Improvement of Bonding Effectiveness Using a New Hydrofobic bonding Material

Yamanaka A, Mine A, Hagino R, Ban S, Matsumoto M, Van Meerbeek B, Yatani H, Ishigaki A. 2021. CED-IADR/NOF Oral Health Research Congress. J Dent Res 100 (Spec Iss B): abstract number 0089.

 15

Evaluation of Durability of Bonding Layer in Multi-Step Adhesives

Yamashita M, Hirano K, Fusejima F. 2021. CED-IADR/NOF Oral Health Research Congress. J Dent Res 100 (Spec Iss B): abstract number 0196.

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Evaluation of Bond Strength in Multi-Step Adhesives Under Salivary Contamination

Yamashita M, Hirano K, Fusejima F. 4th Biennial Meeting Int Acad for Adh Dent –IAAD 2021.

New

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Bond strength of multi-step adhesive in intra-oral repair

Yamashita M, Hirano K, Fusejima F. The Academy of Dental Materials 2021 Meeting.

New

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Bond strength of G2-BOND Universal

New


Cowen M, Graham D, Powers JM. DENTAL ADVISOR Biomaterials Research Center, number 147 – February 2022.

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
High-resolution mechanical mapping of the adhesive-dentin interface: The effect of co-monomers in 10-methacryloyloxydecyl dihydrogen phosphate

Takahashi S, Zhou J, Wurihan, Shimomura N, Kataoka Y, Watanabe C, Shibata Y, Funatsu T, Gao P, Miyazaki T. 2021. Journal of the mechanical behavior of biomedical materials. 117:104389.

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Characterization of an Experimental Two-Step Self-Etch Adhesive’s Bonding Performance and Resin-Dentin Interfacial Properties.

Chowdhury AFMA, Alam A, Yamauti M, Álvarez Lloret P, Saikaew P, Carvalho RM, Sano H. 2021. Polymers. 13:1009.

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Back to the multi-step adhesive system: A next-generation two-step system with hydrophobic bonding agent improves bonding effectiveness.

Yamanaka A, Mine A, Matsumoto M, Hagino R, Yumitate M, Ban S, Ishida M, Miura J, Van Meerbeek B, Yatani H. 2021. Dent Mater J. In press.

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
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Microleakage of three different combinations of adhesive and composite resins.

Ferrari Cagidiaco E, Karafili D, Verniani G, Zucca G, Ferrari M. 2021. J Osseointegr 2021;13(3):115-120.

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Can a new HEMA-free Two-step Self-etch Adhesive Improve Dentin Bonding Durability and Marginal Adaptation?

Tichy A, Hosaka K, Yang Y, Motoyama Y, Sumi Y, Nakajima M, Tagami J. 2021. J Adhes Dent 23(6): 505-512.


New

 18

Full report: Bond strength of G2-BOND Universal

Cowen M, Graham D, Powers JM. DENTAL ADVISOR Biomaterials Research Center, number 147 – February 2022.

New



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

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Abstracts

G2-BOND Universal

TITLE	Impact of HEMA Formulation on 2-Step Self-etch Bonding Agent Performance
REFERENCE	Hirano K, Yamashita M, Fujimori K, Arita A, Kumagai T. 2020. 98th General Session & Exhibition of the IADR. J Dent Res 99 (Spec Iss A):abstract number 0188. https://iadr.abstractarchives.com/abstract/20iaqs-3304772/impact-of-hema-formulation-on-2-step-self-etch-bonding-agent-performance
	Bond strength was 25% lower for both experimental products: +HEMA and +MDP. Flexural strength was 13% lower for +HEMA and 39% lower for +MDP.
	The premise of a two-step adhesive system is to be applied in layers to go from hydrophilic property, like dentin, to hydrophobic, like composite. Reducing chemicals such as HEMA minimizes breakdown in clinical situations.



TITLE	Effect of HEMA blending ratio on bonding performance of novel 2-step adhesive
REFERENCE	Yamashita M, Arita A, Kumagai T. 2020. The 152nd Meeting of the Japanese Society of Conservative Dentistry. P20. (available only in Japanese)
	Compared to Clearfil SE BOND 2, shear bond strength and Vickers Hardness of G2-BOND Universal were 21% and 30% higher respectively.
	The premise of a two-step adhesive system is to be applied in layers to go from hydrophilic property, like dentin, to hydrophobic, like composite. Reducing chemicals such as HEMA minimizes breakdown in clinical situations. Increased hardness may also provide a better clinical outcome.



TITLE	Improvement of dentin bonding effectiveness using the next generation 2-step system with a newly developed hydrophobic bonding agent
REFERENCE	Yamanaka A, Mine A, Hagino R, Matsumoto M, Yamada-Tajiri Y, Ishida M, Higashi M, Ishigaki S, Van Meerbeek B, Yatani H. 2020. Adhes Dent. 38(3):112. (available only in Japanese)
	Microtensile bond strength of G2-Bond Universal was 28% higher than Clearfil SE Bond 2. No interface failure was registered in the G2-BOND group.
	This study supports the premise that 2-step G2-BOND Universal with a hydrophilic layer adjacent to dentin plus a hydrophobic layer adjacent to composite, can result in a better clinical outcome.





Abstracts

G2-BOND Universal

TITLE	Microtensile bond strength of novel two-step bonding agent to dentin
REFERENCE	Ohara N, Ono S, Shibuya K, Yoshiyama M. 2020. Adhes Dent. 38(3):113. (available only in Japanese)
	Microtensile bond strength of G2-BOND Universal was 16% higher than Clearfil SE Bond, with lower rate of failure in the adhesive interface.
	This study supports the premise that the two-step G2-BOND Universal with a hydrophilic layer adjacent to dentin plus a hydrophobic layer adjacent to composite can result in a better clinical performance.

TITLE	Evaluation of bonding layer durability on 2-step self-etch adhesive
REFERENCE	Fujimori K, Hirano K, Fusejima F. 2020. The 68th Annual Meeting of Japanese Association for Dental Research. Poster 002.
	Initial bond strength of G2-BOND Universal was maintained overtime while for Clearfil SE Bond 2 and Optibond FL it decreased 17% and 33% respectively.
	By not containing the very hydrophilic HEMA monomer, the water uptake of G2-BOND Universal is reduced, this may increase the durability of the bond to both, dentin and composite.


TITLE	Water Sorption and Solubility of an Experimental Bonding Resin
REFERENCE	Islam M, Alam A, Yamauti M, Chowdhury A, Sano H. 2020. 31st SEAAD & 34th IADR-SEA Scientific Meeting. J Dent Res 99 (Spec Iss B):abstract number P022. https://iadr.abstractarchives.com/abstract/sea-iadr2020-3467112/water-sorption-and-solubility-of-an-experimental-bonding-resin
	G2-BOND Universal presented 52% lower water sorption compared to Clearfil SE Bond 2.
	By not containing the very hydrophilic HEMA monomer, the water uptake of G2-BOND Universal is reduced, this may increase the durability of the bond to both, dentin and composite.









Abstracts

G2-BOND Universal

TITLE	Adhesion performance of novel 2-step adhesive
REFERENCE	Ohara Y, Arita A, Kumagai T. 2019. The 151st Meeting of the Japanese Society of Conservative Dentistry. P17. (available only in Japanese)
	Bond strength of G2-BOND Universal was not affected by the different air blow pressures indicating that this product is less technique sensitive than Clearfil SE Bond 2. This may be important to help ensure clinical success.


TITLE	Evaluation of bond strength of multi-step adhesives
REFERENCE	Minamisawa H, Fujimori K, Hirano K, Fusejima F. 2021. 99th General Session & Exhibition of the IADR. J Dent Res 100 (Spec Iss A):abstract number 0729. Evaluation of Bond Strength of Multi-Step Adhesives IADR Abstract Archives
	Shear bond strength of G2-BOND Universal was 10% and 34% higher than Clearfil SE Bond 2 and Optibond FL respectively.
	This study supports the premise that 2-step G2-BOND Universal, with a hydrophilic layer adjacent to dentin plus a hydrophobic layer adjacent to composite, can result in a better clinical performance overtime.



TITLE	Bonding effectiveness of the multi-step self-etching adhesive to dentin
REFERENCE	Suyama Y, Mizukami H, Yamada T, Sugizaki J. 2021. 99th General Session & Exhibition of the IADR. J Dent Res 100 (Spec Iss A):abstract number 0730. Bonding Effectiveness of the Multi-Step Self-Etching Adhesive to Dentin IADR Abstract Archives
	Microtensile bond strength of G2-BOND Universal was 13% and 36% higher than Clearfil SE Bond 2 and Optibond FL respectively.
	This study supports the premise that 2-step G2-BOND Universal, with a hydrophilic layer adjacent to dentin plus a hydrophobic layer adjacent to composite, can result in a better clinical performance.





Abstracts

G2-BOND Universal

TITLE	Postoperative sensitivity evaluation of a new two-step bonding system
REFERENCE	Ferrari Cagidiaco E, Corsentino G, Ferrari M. 2021. 99 th General Session & Exhibition of the IADR. J Dent Res 100 (Spec Iss A):abstract number 2304. Postoperative Sensitivity Evaluation of a new two-Step Bonding System. IADR Abstract Archives
	Sensitivity may occur due to dental tubule fluid movement. Lack of sensitivity in the case of this study may suggest the tubules have been blocked.



TITLE	Dentin Shear Bond Strength of Novel Two-Bottle Multimode Adhesive
REFERENCE	Abdel-Gawad S, Francois P, Le-Goff S, Dursun E, Attal JP. 2021. 99 th General Session & Exhibition of the IADR. J Dent Res 100 (Spec Iss A):abstract number 1256. Dentin Shear Bond Strength of Novel Two-Bottle Multimode Adhesive IADR Abstract Archives
	
	Shear bond strength of G2-BOND Universal was equal to that of Clearfil SE Bond 2 and 39% higher than Optibond FL.
	This study supports the premise that the 2-step G2-BOND Universal, with a hydrophilic layer adjacent to dentin plus a hydrophobic layer adjacent to composite, can result in a better clinical performance.



TITLE	Bond strength of different adhesive systems to indirect restorative materials
REFERENCE	Khandelwal P, Hirano K, Fusejima F. 2021. 99 th General Session & Exhibition of the IADR. 1969. Bond Strength of Different Adhesive Systems to Indirect Restorative Materials IADR Abstract Archives
	G2-BOND Universal presented high bond strength to all the indirect restorative materials tested.
	High bond strength to indirect materials suggests that G2-BOND Universal is a trustable material for clinical repair cases.





Abstracts

G2-BOND Universal

TITLE	A Multifaceted Evaluation of a Novel HEMA-Free Two-Step Self-Etch Adhesive
REFERENCE	Tichy A, Hosaka K, Yang Y, Motoyama Y, Sumi Y, Nakajima M, Tagami J. 2021. 99th General Session & Exhibition of the IADR. J Dent Res 100 (Spec Iss A): abstract number 1971. A Multifaceted Evaluation of a Novel HEMA-Free Two-Step Self-Etch Adhesive IADR Abstract Archives
	Compared to Clearfil SE Bond 2, G2-BOND Universal presented equal microtensile bond strength and acid-based resistance zone. Lower gap formation and water sorption were also detected.
	By not containing very hydrophilic HEMA monomer, the water uptake of G2-BOND Universal is reduced, this may increase the durability of the bond to both, dentin and composite.

TITLE	Effect of Air Blow Pressure at Multi-step Adhesive Application on Bond Strength
REFERENCE	Yamashita M, Hrano K, Fusejima F.2021. Abstracts of the 10th Virtual Conseuro 2021 Congress . Clin Oral Invest 25, 4185–4238 (2021). EP-027 https://doi.org/10.1007/s00784-021-03940-6
	Under different air-pressures, the shear bond strength of G2-BOND Universal remained the same.
	Bond strength of G2-BOND Universal was not affected by the different air blow pressures, suggesting this product is less technique sensitive than Clearfil SE Bond 2. This may be important to help ensure clinical success.



TITLE	Bond durability of a novel two-step bonding agent to dentin
REFERENCE	Ohara N, Ono S, Shibuya K, Yokoyama A, Matsuazaki K, Yamaji K, Yoshiyama M. 2021. The 154th Meeting of the Japanese Society of the Japanese Society of Conservative Dentistry. P18.
	Microtensile bond strength of G2-BOND Universal was 12% higher than Clearfil SE Bond 2 after 10k thermocycling.
	This study supports the premise that the 2-step G2-BOND Universal, with a hydrophilic layer adjacent to dentin plus a hydrophobic layer adjacent to composite, can result in a better clinical outcome overtime.









Abstracts

G2-BOND Universal

TITLE	Changes in Initial Bond Strength of Two-step Bonding System Over Time
REFERENCE	Yabe A, Irie A, Okada M, Takayoshi N, Taketa H, Torii Y, Matsumoto T. 2021. The 154th Meeting of the Japanese Society of the Japanese Society of Conservative Dentistry. P26.
	Shear bond strength to dentin was 18% higher for G2-BOND Universal compared to Clearfil SE Bond 2.
	This study supports the premise that the 2-step G2-BOND Universal with a hydrophilic layer adjacent to dentin plus a hydrophobic layer adjacent to composite can result in a better clinical outcome.

TITLE	Improvement of Bonding Effectiveness Using a new Hydrophobic Bonding Material
REFERENCE	Yamanaka A, Mine A, Hagino R, Ban S, Matsumoto M, Van Meerbeek B, Yatani H, Ishigaki A. 2021. CED-IADR/NOF Oral Health Research Congress. J Dent Res 100 (Spec Iss B): abstract number 0089. https://ced-iadr2021.com/wp-content/uploads/2021/09/Abstract-book_2021-9-20_Adjusted-version.pdf p.54
	G2-BOND Universal showed high bond strength to dentin after one year.
	This study supports the premise that the 2-step G2-BOND Universal with a hydrophilic layer adjacent to dentin plus a hydrophobic layer adjacent to composite can result in a better clinical outcome.



TITLE	Evaluation of Durability of Bonding Layer in Multi-Step Adhesives.
REFERENCE	Yamashita M, Hirano K, Fusejima F. 2021. CED-IADR/NOF Oral Health Research Congress. J Dent Res 100 (Spec Iss B): abstract number 0196. https://ced-iadr2021.com/wp-content/uploads/2021/09/Abstract-book_2021-9-20_Adjusted-version.pdf p.96
	The flexural strength of G2-BOND Universal was maintained after two different storage periods: after 1 month water storage and after 20,000 thermocycles.
	Less water sorption can be expected due to the HEMA-free composition of G2-BOND Universal, leading to a better durability over the time.





Abstracts

G2-BOND Universal



New

TITLE	Evaluation of Bond Strength in Multi-Step Adhesives Under Salivary Contamination.
REFERENCE	Yamashita M, Hirano K, Fusejima F. The International Academy for Adhesive Dentistry 2021 Meeting http://adhesivedentistry.org/2021abstractid/23/
	High bond strength of G2-BOND Universal was maintained even under saliva contamination.
	Bond strength of G2-BOND Universal was not affected by the saliva contamination, indicating this product is less technique sensitive than Clearfil SE Bond 2 and OptiBond FL. This may be important to help ensure clinical success.

New

TITLE	Bond strength of multi-step adhesive at intraoral repair.
REFERENCE	Yamashita M, Hirano K, Fusejima F. The Academy of Dental Materials 2021 Meeting. (<i>link not available yet</i>)
	G2-BOND Universal showed a high bond strength to all indirect materials tested in this study.
	High bond strength to indirect materials suggests that G2-BOND Universal is a trustable material for clinical repair cases.

New

TITLE	Bond Strength of G2-BOND Universal.
REFERENCE	Cowen M, Graham D, Powers JM. DENTAL ADVISOR Biomaterials Research Center, number 147, March 2022. https://www.dentaladvisor.com/pdf-download/?pdf_url=wp-content/uploads/2022/03/RR147-Bond-Strength-of-G2-Universal_03-01-22.pdf
	G2-BOND Universal performed better than the competitors at all the different storage periods.
	This study supports the premise that 2-step G2-BOND Universal, with a hydrophilic layer adjacent to dentin plus a hydrophobic layer adjacent to composite, can result in a better clinical outcome over time.



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







Full Paper

G2-BOND Universal

TITLE	High-resolution mechanical mapping of the adhesive–dentin interface: The effect of co-monomers in 10-methacryloyloxydecyl dihydrogen phosphate
REFERENCE	Takahashi S, Zhou J, Wurihan, Shimomura N, Kataoka Y, Watanabe C, Shibata Y, Funatsu T, Gao P, Miyazaki T. 2021. Journal of the mechanical behavior of biomedical materials. 117:104389. https://doi.org/10.1016/j.jmbbm.2021.104389
	Rigidity of the adhesive-dentin interface was markedly lower in MDP containing HEMA than MDP containing 4-MET. Bonding layer was more deformable in the presence of HEMA.
	Removing HEMA inhibits its negative impact on adhesive dentistry. This can help improve bonding attributes for a successful restorative dentistry. Use of 4-MET co-monomer is likely a better complement than HEMA in MDP-based dental adhesives.



TITLE	Characterization of an Experimental Two-Step Self-Etch Adhesive’s Bonding Performance and Resin-Dentin Interfacial Properties.
REFERENCE	Chowdhury AFMA, Alam A, Yamauti M, Álvarez Lloret P, Saikaew P, Carvalho RM, Sano H. 2021. Polymers. 13:1009. https://doi.org/10.3390/polym13071009
	Bonding performance of G2-BOND Universal is comparable to that of Clearfil SE Bond 2. Both products presented similar and adequate elastic modulus of the adhesive layer, suggesting the adhesive layer is less prone to deformation under stress.
	Impact of G2-BOND Universal formula has led to excellent mechanical properties. Thickness of the bonding layer of G2-BOND Universal may also be advantageous for a good clinical outcome.

TITLE	Back to the multi-step adhesive system: A next-generation two-step system with hydrophobic bonding agent improves bonding effectiveness.
REFERENCE	Yamanaka A, Mine A, Matsumoto M, Hagino R, Yumitate M, Ban S, Ishida M, Miura J, Van Meerbeek B, Yatani H. 2021. Dent Mater J. In press. doi:10.4012/dmj.2020-272
	G2-BOND Universal showed a high bond strength to dentin and no decrease in bond strength was observed over the time.
	This study supports the premise that 2-step G2-BOND Universal with a hydrophilic layer adjacent to dentin plus a hydrophobic layer adjacent to composite can result in a better clinical outcome overtime.





Full Paper

G2-BOND Universal

TITLE	Microleakage of three different combinations of adhesive and composite resins.
REFERENCE	Ferrari Cagidiaco E, Karafili D, Verniani G, Zucca G, Ferrari M.2021. J Osseointegr 2021;13(3):115-120. https://doi.org/10.23805/JO.2021.13.03.3
	Microleakage to enamel and dentin was much lower when G2-BOND Universal was used.
	This study supports the premise that 2-step G2-BOND Universal with a hydrophilic layer adjacent to dentin plus a hydrophobic layer adjacent to composite can result in a better clinical performance overtime.

New

TITLE	Can a New HEMA-free Two-step Self-etch Adhesive Improve Dentin Bonding Durability and Marginal Adaptation?
REFERENCE	Tichy A, Hosaka K, Yang Y, Motoyama Y, Sumi Y, Nakajima M, Tagami. J Adhes Dent. 2021 Dec 3,23 (6):505-512. https://pubmed.ncbi.nlm.nih.gov/34817966/
	Gap formation and microleakage were lower for G2-BOND Universal and its bond strength of was maintained overtime.
	Less water sorption can be expected due to the HEMA-free composition of G2-BOND Universal, leading to better durability over time.



Dental Advisor Report

G2-BOND Universal



Biomaterials Research Report

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Bond Strength of G2-BOND Universal

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Introduction:

G2-BOND Universal is the latest 2-bottle addition to GC's adhesive portfolio to compete with self-etch and etch and rinse system. The primer has optimal hydrophilic properties to increase dentin penetration for sealing, strength and self-etching properties, while the HEMA-free hydrophobic layer reduces hydrolytic degradation for increased durability and interfaces with composite. DENTAL ADVISOR tested the initial bond strength and bond strength after accelerated aging and 12 month water storage of this new system compared to gold-standard self-etching **Clearfil SE Bond 2**, and Etch and Rinse **Optibond FL**.

Experimental Design:

MATERIALS:

Bonding Agents: **G2-BOND Universal** (GC America), **Clearfil SE Bond 2** (Kuraray), **Optibond FL** (KaVo Kerr)
Composite: **G-aenial Universal Injectable** (GC America)

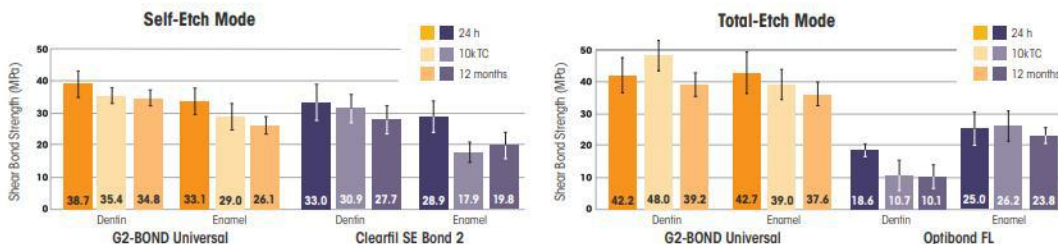
TEST PARAMETERS:

Substrates: Human Superficial Dentin, Human Ground Enamel
Etching Mode: Self-etch, Total-etch
Storage Conditions: 24 hours, 10000 Thermocycles (10k TC), 12 months



Methods:

Direct Shear Bond Strength [n=8] per bonding agent to dentin, enamel with self-etch and total-etch modes: Human adult molars, sterilized in a 1% Chloramine T solution, and stored in deionized water were embedded in acrylic resin discs and ground through 600-grit SiC paper to form bonding substrates of superficial dentin and ground enamel. Specimen surfaces were treated and bonding agent placed according to manufacturer instructions. **G-aenial Universal Injectable** was then placed on top of the bonding agent utilizing the Ultradent Shear Test mold and jig to produce a 2.38 mm diameter shear test cylinder according to ISO 29022:2013. The cylinder was light cured for 20 seconds while in the mold. The specimens were then transferred to a 37°C deionized water bath for 24 hours storage until testing or thermocycling. Thermocycling was performed by transferring specimens between a 5°C and 55°C water bath with a 20s dwell time for 10000 cycles. Specimens were also stored for 12 months in distilled water at 37°C with weekly water change.



Results:

No application issues were observed with **G2-BOND Universal** and achieving a consistent bonding film thickness was simple.

Conclusion:

G2-BOND Universal performed better than **Clearfil SE Bond 2** and **Optibond FL** tested in their respective etching modes to dentin and enamel in immediate 24h shear bond strength and after accelerated aging and 12 month storage.

