

BÖLÜM 3

SABİT PROTETİK RESTORASYONLARDA ADEZİV SİMANTASYON PROTOKOLÜ

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GİRİŞ

Hastaların estetik sebeplerle diş hekimlerine başvurma sıklığı son yıllarda artmaktadır. Bu durum günümüzde kozmetik diş hekimliğini yaygın bir hale getirmiş ve diş hekimliğinde yeni bakış açıları, protokoller ve prosedürler ortaya çıkmasını sağlamıştır (1). Diş hekimliğinde son yıllara kadar sabit protez tedavilerinde geleneksel simantasyon yöntemi kullanılmıştır (2). Geleneksel simantasyon yöntemi; tamamen mekanik retansiyona bağlıdır ve simantasyon protokolü doğru izlenmediğinde uygulanan simanın yıllar içinde çözünmesine ve sekonder çürük gelişmesine neden olabilmektedir (3). Minimal invaziv prosedürlerde mekanik adezyonun yanında kimyasal adezyona da duyulan ihtiyaç rezin içerikli simanların piyasada kendilerine yer bulmalarını sağlamıştır.

1. ADEZYON

Adezyon, farklı fiziksel ve kimyasal özelliklerdeki iki materyalin kimyasal olarak bağlanmasıdır. Adezyon ile ağız içindeki kuvvetlere dayanabilecek kadar güçlü ve tatmin edici estetiğe sahip bir restorasyon oluşturmak amaçlanır. Geleneksel simantasyon yöntemi mekanik retansiyona dayanmaktadır ve dişte daha fazla preparasyon gerektirir (4). Adeziv materyalin, yüzeylerdeki nemi absorbe ederek iki farklı materyali yakın temasa getirebilmesi gerekir. Diş hekimliğinde kullanılan

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KAYNAKLAR

1. Varlı Uzun G. Konvansiyonel Rezın Bazlı Simanlar ve Self Adeziv Rezın Simanların Bağlanma Mekanizmaları ve Klinik Uygulamalarının Değerlendirilmesi. Sipahi OC, editör. Protetik Diş Tedavisi Alanında Kullanılan Konvansiyonel ve Yeni Nesil Yapıştırıcı Ajanlar. Ankara: Türkiye Klinikleri; 2018. p.33-44.
2. Panian Z., (2020), "Digitalni otisak u fiksno protetskoj terapiji", Bitirme Tezi, Zagreb Üniversitesi Diş Hekimliği Fakültesi, Zagreb
3. Korkmaz FM, Tüzüner T, Bağış B, et al. Antibakteriyel İçeren Geleneksel Yapıştırıcı Simanların Su Emilimi, İstanbul Üniversitesi Diş Hekimliği Fakültesi Dergisi. Cilt: 47, Sayı: 2 Sayfa: 11-19, 2013
4. De la Macorra JC, Pradies G. Conventional and adhesive luting cements. Clinical Oral Investigations. 2002;6:198-204. doi:10.1007/s00784-002-0184-1
5. Gürel G. The Science and Art of Porcelain Laminate Veneers, Berlin, Quintessence Books; 2003.
6. Sofan E, Sofan A, Palaia G, et al. Classification review of dental adhesive systems: from the IV generation to the universal type. Ann Stomatol (Roma). 2017 Jul 3;8(1):1-17.
7. Magne P, Belser U. Biomimetic Restorative Dentistry, Volume 1: Fundamentals and Basic Clinical Procedures, Second edition, Batavia, IL: Quintessence Publishing Co.; 2018.
8. Diaz-Arnold AM, Vargas MA, Haselton DR. Current status of luting agents for fixed prosthodontics. Journal of Prosthetic Dentistry. 1999;81:135-141. doi: 10.1016/s0022-3913(99)70240-4
9. Kumbuloğlu O, Lassila LVJ, User A, et al. Shear bond strength of composite resin cements to lithium disilicate ceramics. Journal of Oral Rehabilitation. 2005;32:128-133. doi: 10.1111/j.1365-2842.2004.01400.x
10. Anusavice KJ. Bonding. P. Rudolph. Ed Philips' Science of Dental Materials. Missouri: Elsevier Science; 2003. p. 381-396.
11. Anusavice KJ. Informatics to assess and apply clinical research on dental restorative materials. Advances in Dental Research. 2003;17: 43-48. doi: 10.1177/154407370301700111
12. Anusavice KJ. Dental Ceramics. P. Rudolph E. Philips' Science of Dental Materials. Missouri: Elsevier Science; 2003 p. 657-719
13. Lung CYK, Matinlinna JP. Aspects of silane coupling agents and surface conditioning in dentistry: An overview. Dental Materials Journal, 2012;28:467-477. doi:10.1016/j.dental.2012.02.009
14. O'Brien WJ. Dental Materials and Their Selection. 2nd ed, Chigaco: Quintessence Publishing Co Inc; 1997. p.150-151.
15. Rosenstiel SF, Land MF, Crispin BJ. Dental luting agents: A review of the current literature. Journal of Prosthetic Dentistry. 1998;80:280-301.
16. White SN, Sorensen JA, Kang SK, et al. Microleakage of new crown and fixed partial denture luting agents. Journal of Prosthetic Dentistry. 1992;67:156-161.
17. Gladwin M, Bagby M. Clinical Aspects of Dental Materials. Philadelphia: Wolters Kluwer Co; 2000. p.41-91.
18. Chen JC, Matsumura H, Atsuta M. Effect of etchant etching period and silane priming on bond strength to porcelain of composite resin. Operative Dentistry. 1998;23:250-257.
19. Blatz MB, Sadan A, Kern M. Resin-ceramic bonding: a review of literature. Journal of Prosthetic Dentistry. 2003;89:268-274. doi: 10.1067/mpr.2003.50
20. Bottino MA, Valandro LF, Scotti R, et al. Effect of surface treatments on the resin bond to zirconium-based ceramic. The International Journal of Prosthodontics. 2005;18:60-65.
21. Anusavice KJ. Dental Ceramics. P. Rudolph E. Philips' Science of Dental Materials. Missouri: Elsevier Science; 2003 p. 443-494.
22. Hofmann N, Papsthart HB, Klaiber B. Comparison of photo-activation versus chemical or dual-curing of resin-based luting cements regarding flexural strength, modulus and surface hardness. Journal of Oral Rehabilitation. 2001;28:1022-1028. doi: 10.1046/j.1365-2842.2001.00809.x
23. Türk AG, Ulusoy M, Önal B. İndirekt restorasyonlarda kullanılan kompozit rezin simanlar. Erciyes Üniversitesi Diş Hekimliği Fakültesi Dergisi. 2014;35(2):1:95-107
24. Ferrari M, Vichi A, Feilzer A. Operatif dişhekimliğinde gelişmeler: Güncel pratik uygulamalar, Quintessence yayıncılık. 2006;1: 95-107.
25. Üşümez A, Aykent F. Bond strengths of porcelain laminate veneers to tooth surfaces prepared with acid and Er,Cr:YSGG laser etching. Journal of Prosthetic Dentistry. 2003;90:24-27. doi: 10.1016/s0022-3913(03)00235-x
26. Christensen GJ. Buonocore memorial lecture tooth-colored posterior restorations. Operative Dentistry. 1997; 22:146-148.
27. Silva e Souza MH, Jr., Carneiro KG, Lobato MF, et al. Adhesive systems: Important aspects

- related to their composition and clinical use. *Journal of Applied Oral Science: revista FOB*. 2010;18(3): 207-214. doi: 10.1590/s1678-77572010000300002
28. Vrochari AD, Eliades G, Hellwig E, et al. Curing efficiency of four self-etching, self-adhesive resin cements. *Academy of Dental Materials*. 2009;25(9):1104-1108.
 29. Carville R, Quinn F. The selection of adhesive systems for resin-based luting agents. *Journal of the Irish Dental Association*. 2008;54(5): 218-222.
 30. Peumans M, Van Meerbeek B, Lambrechts P, et al. Porcelain veneers: a review of the literature. *Journal of dentistry*. 2000;28(3):163-177. doi: 10.1016/s0300-5712(99)00066-4
 31. Cavalcante LM, Peris AR, Amaral CM, et al. Influence of polymerization technique on microleakage and microhardness of resin composite restorations. *Operative dentistry* 2003;28(2):200-206.
 32. Kilinc E, Antonson SA, Hardigan PC, et al. Resin cement color stability and its influence on the final shade of all-ceramics. *Journal of dentistry*. 2011;39 (1):30-36. doi: 10.1016/j.jdent.2011.01.005
 33. May LG, Kelly JR. Influence of resin cement polymerization shrinkage on stresses in porcelain crowns. *Dental Materials*. 2013;29(10):1073-1079. doi: 10.1016/j.dental.2013.07.018
 34. Degrange M, Cheylan JM, Samama Y. Prosthodontics of the future: Cementing or bonding? In: Roulet JF, Degrange M, eds. *Adhesion The Silent Revolution in Dentistry*. Chicago: Quintessence Publishing Co. Inc; 2000. p.277-301.
 35. Dikicier S, Korkmaz C, Atay A. Güncel Adeziv Rezin Simanların Bağlanma Dayanımının Değerlendirilmesi. Sipahi OC, editör. *Protetik Diş Tedavisi Alanında Kullanılan Konvansiyonel ve Yeni Nesil Yapıştırıcı Ajanlar*. Ankara: Türkiye Klinikleri; 2018. p.26-32.
 36. Tay FR, Pashley DH. Have dentin adhesives become too hydrophilic? *Journal of Canadian Dental Association*. 2003;69(11):726-731.
 37. Gracis S, Thompson VP, Ferencz JL, et al. A new classification system for all-ceramic and ceramic-like restorative materials. *International Journal of Prosthodontics* . 2015;28:227-235. doi: 10.11607/ijp.4244
 38. Kelly JR, Benetti P. Ceramic materials in dentistry: historical evolution and current practice. *Australian Dental Journal*. 2011;56(1):84-96. doi: 10.1111/j.1834-7819.2010.01299.x
 39. Anusavice KJ. Informatics systems to assess and apply clinical research on dental restorative materials. *Advances in Dental Research*. 2003;17:43-48. doi: 10.1177/154407370301700111
 40. Santos MJ, Costa MD, Rubo JH, et al. Current all-ceramic systems in dentistry: a review. *Compendium of Continuing Education in Dentistry*. 2015;36:31-38.
 41. Lambert H, Durand JC, Jacquot B, et al. Dental biomaterials for chairside CAD/CAM: State of the art. *The Journal of Advanced Prosthodontics*. 2017;9(6): 486-495. doi: 10.4047/jap.2017.9.6.486
 42. Reich S. Tooth-colored CAD/CAM monolithic restorations. *International Journal of Computerized Dentistry*. 2015;18:131- 146
 43. Tysowsky GW. The science behind lithium disilicate: A metal-free alternative. *Dentistry Today*. 2009;28:112-113.
 44. Bajraktarova-Valjakov E, Grozdanov A, Gugucovski L, et al. Acid etching as surface method for luting glass-ceramic restorations, part 1: Acids, application protocol and etching effectiveness. *Open Access Macedonian Journal of Medical Sciences*. 2018;6(3), 568-573. doi:10.3889/oamjms.2018.147
 45. Murillo-Gómez F, Palma-Dibb RG, De Goes MF. Effect of acid etching on tridimensional microstructure of etchable CAD/CAM materials. *Dental Materials*. 2018;34(6), 944-955. doi:10.1016/j.dental.2018.03.013
 46. Prochnow C, Venturini AB, Guilardi LF, et al. Hydrofluoric acid concentrations: Effect on the cyclic load-to-failure of machined lithium disilicate restorations. *Dental Materials*. 2018;34(9), 255-263. doi:10.1016/j.dental.2018.06.028
 47. Sundfeld D, Palialol ARM, Fugolin APP, et al. The effect of hydrofluoric acid and resin cement formulation on the bond strength to lithium disilicate ceramic. *Brazilian oral research*. 2018;32, e43-undefined. doi:10.1590/1807- 3107bor-2018.vol32.0043
 48. Steinhäuser HC, Turssi CP, França FMG, et al. Micro-shear bond strength and surface micro-morphology of a feldspathic ceramic treated with different cleaning methods after hydrofluoric acid etching. *Journal of Applied Oral Science*. 2014;22(2), 85-90. doi:10.1590/1678-775720130339
 49. Awad MM, Alqahtani H, Al-Mudahhi A, et al. Adhesive bonding to computer aided design/computer aided manufacturing esthetic dental materials: An overview. *Journal of Contemporary Dental Practice*. 2017;18(7):1-5
 50. Spitznagel FA, Vuck A, Gierthmuhlen PC, et al. Adhesive bonding to hybrid materials: An overview of

- materials and recommendations. *Compendium of Continuing Education in Dentistry*. 2016;37:630-637.
51. Kapos T, Evans C. CAD/CAM technology for implant abutments, crowns and superstructures. *The International Journal of Oral&Maxillofacial Implants*. 2014;29 (1):117-136. doi: 10.11607/jomi.2014suppl.g2.3
 52. Liu D, Tsoi JK, Matinlinna JP, et al. Effects of some chemical surface modifications on resin zirconia adhesion. *Journal of the Mechanical Behaviors of Biomedical Materials*. 2015;46, 23–30. doi: 10.1016/j.jmbbm.2015.02.015
 53. Tzanakakis EG, Tzoutzas IG, Koidis PT. Is there a potential for durable adhesion to zirconia restorations? A systematic review. *Journal of Prosthetic Dentistry*. 2016;115, 9–19. doi: 10.1016/j.prosdent.2015.09.008
 54. Yenisey M, Dede DO, Rona N. Effect of surface treatments on the bond strength between resin cement and differently sintered zirconium-oxide ceramics. *Journal of Prosthodontic Research*. 2016;60, 36–46. doi: 10.1016/j.jpor.2015.09.001
 55. Yang L, Chen B, Xie H, et al. Durability of Resin Bonding to Zirconia Using Products Containing 10-Methacryloyloxydecyl Dihydrogen Phosphate. *Journal of Adhesive Dentistry*. 2018;20, 279–287. doi: 10.3290/j.jad.a40989
 56. Yagawa S, Komine F, Fushiki R, et al. Effect of priming agents on shear bond strengths of resin-based luting agents to a translucent zirconia material. *Journal of Prosthodontic Research*. 2018;62, 204–209. doi: 10.1016/j.jpor.2017.08.011
 57. Noda Y, Nakajima M, Takahashi M, et al. The effect of five kinds of surface treatment agents on the bond strength to various ceramics with thermocycle aging. *Dental Materials Journal*. 2017;36, 755–761. doi: 10.4012/dmj.2016-383
 58. Lopes GC, Spohr AM, De Souza GM. Different Strategies to Bond Bis-GMA-based Resin Cement to Zirconia. *The Journal of Adhesive Dentistry*. 2016;18, 239–246. doi: 10.3290/j.jad.a36137
 59. Ahn JS, Yi YA, Lee Y, et al. Shear Bond Strength of MDP-Containing Self-Adhesive Resin Cement and Y-TZP Ceramics: Effect of Phosphate Monomer-Containing Primers. *BioMed Research International*. 2015;2015:389234. doi: 10.1155/2015/389234
 60. Oba Y, Koizumi H, Nakayama D, et al. Effect of silane and phosphate primers on the adhesive performance of a tri-n-butylborane initiated luting agent bonded to zirconia. *Dental Materials Journal*. 2014;33(2), 226–232. doi: 10.4012/dmj.2013-346
 61. Bomicke W, Schurz A, Krisam J, et al. Durability of Resin-Zirconia Bonds Produced Using Methods Available in Dental Practice. *The Journal of Adhesive Dentistry*. 2016;18(1), 17–27. doi: 10.3290/j.jad.a35517
 62. Cheung GJ, Botelho MG. Zirconia Surface Treatments for Resin Bonding. *The Journal of Adhesive Dentistry*. 2015;17(6), 551–558. doi: 10.3290/j.jad.a35249
 63. Shin YJ, Shin Y, Yi YA, et al. Evaluation of the shear bond strength of resin cement to Y-TZP ceramic after different surface treatments. *Scanning*. 2014;36(5), 479–486. doi: 10.1002/sca.21142
 64. Yang L, Xie H, Meng H, et al. Effects of Luting Cements and Surface Conditioning on Composite Bonding Performance to Zirconia. *The Journal of Adhesive Dentistry*. 2018;20(6), 549–558. doi: 10.3290/j.jad.a41634
 65. Turker SB, Ozcan M, Mandali G, et al. Bond strength and stability of 3 luting systems on a zirconia-dentin complex. *General Dentistry*. 2013;61(7), e10–e13.
 66. Zimmerman M, Mehl A, Reich S. New CAD/CAM materials and blocks for chairside procedures. *International Journal of Computerized Dentistry*. 2013;16(2): 173-181.
 67. Uludamar A, Aygün Ş, Özkan Y. Tam Seramik Restorasyonların Simantasyonu, Atatürk Üniversitesi Diş Hekimliği Fakültesi Dergisi. 2011;21(2):150-162
 68. Segarra M, Segarra A. *A Practical Clinical Guide to Resin Cements*. Phillipines: Springer; 2015.
 69. Vargas AM, Bergeron C, Diaz-Arnold A. Cementing all-ceramic restorations: Recommendations for success. *The Journal of the American Dental Association*. 2011;142(2),20-24. doi: 10.14219/jada.archive.2011.0339
 70. Taguchi S, Komine F, Kubochi K, et al. Effect of a silane and phosphate functional monomer on shear bond strength of a resin-based luting agent to lithium disilicate ceramic and quartz materials. *Journal of Oral Science*. 2018;60(3):360-366. doi: 10.2334/josnusd.17-0383
 71. Pegoraro TA, da Silva NR, Carvalho RM. Cements for use in esthetic dentistry. *Dental Clinics of North America*. 2007; 51(2):453–471. doi: 10.1016/j.cden.2007.02.003