Bölüm 6

Oklüzal Veneerler

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1. Diş Aşınmaları

Dişlerde en fazla görülen ve bilinen hastalık diş çürüğü olmasına karşın yapılan epidemiyolojik çalışmalar, çürüksüz diş sert doku kayıplarında bir artış olduğunu göstermektedir (1-3). Ağızda kalma süreleri boyunca dişler, çeşitli ölçülerde diş sert dokularının aşınmasına ve yıpranmasına katkıda bulunan fiziksel ve kimyasal saldırılara maruz kalmaktadır. Diş aşınmaları çiğneme, diş fırçalama, dişlerle çeşitli aletleri tutma sırasında diş üzerine sürtmesinin etkisini (abrazyon), antagonist dişlerin etkisini (atrizyon), dişin bükülmesi sırasında çekme ve sıkıştırma kuvvetlerinin etkisini (abfraksiyon) ve diş yapısının kimyasal çözünmesini (erozyon) içermektedir. Bu faktörlerin tümü az ya da çok miktarda dişlerde meydana gelmekte ve dişlerdeki aşınma bu süreçlerin eş zamanlı ve sinerjistik etkisinden kaynaklanmaktadır (4).

Aşınmanın morfolojisi baskın etiyolojik faktöre bağlı olarak değişebilmektedir. Erozyon, dişlerde bulunan mineral yapının dişi çevreleyen sıvılardaki asitler tarafından çözünmesi olarak tanımlanabilir (5). Asit atakları uzun süre etki ettiğinde klinik olarak gözle görülür kusurlar oluşur. Yüzeylerde dişin orijinal parlaklığı matlaşır. Zamanla dış bükey alanlar düzleşir veya çoğunlukla mine-sement birleşiminin koronalinde yer alan sığ iç bükeylikler ortaya çıkar. Oklüzal yüzeylerde, çıkıntılar yuvarlaklaşır veya çukurlaşır ve restorasyonların kenarları, bitişiklerindeki diş yüzeylerinin seviyesinin üzerine çıkıyormuş gibi görünür.

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oklüzyonun dikey boyutunu artırarak diş aşınması olan hastalarda oklüzal veneer restorasyonlar, teknik komplikasyonları en aza indiren, estetik, dayanıklı ve tatmin edici klinik sonuçları ile güvenilir bir tedavi seçeneği olarak görünmektedir. Adeziv sistemlerin ve CAD/CAM materyallerin geliştirilmesiyle ultra ince oklüzal veneer restorasyonlar kullanılmaya başlanmıştır. Bu restorasyonların sağ kalımını ve klinik performansını değerlendiren daha çok *in vivo* ve *in vitro* çalışmaya ihtiyaç duyulmaktadır.

KAYNAKÇA

1. Lussi A, Schaffner M, Hotz P, Suter P. Dental erosion in a population of Swiss adults. Community Dent Oral Epidemiol. 1991;19(5):286-90.
2. Khan F, Young WG, Law V, Priest J, Daley TJ. Cupped lesions of early onset dental erosion in young southeast Queensland adults. Aust Dent J. 2001;46(2):100-7.
3. Jaeggi T, Lussi A. Prevalence, incidence and distribution of erosion. Monogr Oral Sci. 2014;25:55-73.
4. Lussi A, Jaeggi T. Dental erosion from diagnosis to therapy. Monogr Oral Sci. 2006;20:77-87.
5. Larsen MJ. Chemical events during tooth dissolution. J Dent Res. 1990;69 Spec No:575-80; discussion 634-6.
6. Meurman JH, Frank RM. Scanning electron microscopic study of the effect of salivary pellicle on enamel erosion. Caries Res. 1991;25(1):1-6.
7. Featherstone JD, Rodgers BE. Effect of acetic, lactic and other organic acids on the formation of artificial carious lesions. Caries Res. 1981;15(5):377-85.
8. Eisenburger M, Hughes J, West NX, Shellis RP, Addy M. The use of ultrasonication to study remineralisation of eroded enamel. Caries Res. 2001;35(1):61-6.
9. Hara AT, Ando M, Cury JA, Serra MC, González-Cabezas C, Zero DT. Influence of the organic matrix on root dentine erosion by citric acid. Caries Res. 2005;39(2):134-8.
10. Schroeder G, Rosch P, Kunzelmann KH. Influence of the preparation design on the survival probability of occlusal veneers. Dent Mater. 2022;38(4):646-54.
11. Zero DT, Lussi A. Erosion--chemical and biological factors of importance to the dental practitioner. Int Dent J. 2005;55(4 Suppl 1):285-90.
12. Lussi A, Carvalho TS. Erosive tooth wear: a multifactorial condition of growing concern and increasing knowledge. Monogr Oral Sci. 2014;25:1-15.
13. O'Sullivan EA, Curzon ME. A comparison of acidic dietary factors in children with and without dental erosion. ASDC J Dent Child. 2000;67(3):186-92, 60.
14. Eccles JD. Dental erosion of nonindustrial origin. A clinical survey and classification. J Prosthet Dent. 1979;42(6):649-53.
15. Smith BG, Knight JK. An index for measuring the wear of teeth. Br Dent J. 1984;156(12):435-8.
16. Lussi A. Dental erosion clinical diagnosis and case history taking. Eur J Oral Sci. 1996;104(2 (Pt 2)):191-8.
17. Nunn JH, Gordon PH, Morris AJ, Pine CM, Walker A. Dental erosion -- changing prevalence? A review of British National childrens' surveys. Int J Paediatr Dent. 2003;13(2):98-105.

18. Loomans B, Opdam N, Attin T, Bartlett D, Edelhoff D, Frankenberger R, et al. Severe Tooth Wear: European Consensus Statement on Management Guidelines. J Adhes Dent. 2017;19(2):111-9.
19. Gillings B, Buonocore M. Thickness of enamel at the base of pits and fissures in human molars and bicuspids. J Dent Res. 1961;40:119-33.
20. Braem M, Lambrechts P, Vanherle G. Stress-induced cervical lesions. J Prosthet Dent. 1992;67(5):718-22.
21. Turner KA, Missirlian DM. Restoration of the extremely worn dentition. J Prosthet Dent. 1984;52(4):467-74.
22. Attin T, Filli T, Imfeld C, Schmidlin PR. Composite vertical bite reconstructions in eroded dentitions after 5·5 years: a case series. J Oral Rehabil. 2012;39(1):73-9.
23. Manhart J. Temporäre Anhebung der Vertikaldimension mit Komposit in einem vereinfachten direkten Spritzgussverfahren. Swiss Dent J. 2017;127(5):413-44.
24. Angerame D, De Biasi M, Agostinetto M, Franzò A, Marchesi G. Influence of preparation designs on marginal adaptation and failure load of full-coverage occlusal veneers after thermomechanical aging simulation. J Esthet Restor Dent. 2019;31(3):280-9.
25. Magne P, Schlichting LH, Maia HP, Baratieri LN. In vitro fatigue resistance of CAD/CAM composite resin and ceramic posterior occlusal veneers. J Prosthet Dent. 2010;104(3):149-57.
26. Bindl A, Lüthy H, Mörmann WH. Strength and fracture pattern of monolithic CAD/CAM-generated posterior crowns. Dent Mater. 2006;22(1):29-36.
27. Johnson AC, Versluis A, Tantbirojn D, Ahuja S. Fracture strength of CAD/CAM composite and composite-ceramic occlusal veneers. J Prosthodont Res. 2014;58(2):107-14.
28. Vailati F, Belser UC. Full-mouth adhesive rehabilitation of a severely eroded dentition: the three-step technique. Part 1. Eur J Esthet Dent. 2008;3(1):30-44.
29. Schlichting LH, Maia HP, Baratieri LN, Magne P. Novel-design ultra-thin CAD/CAM composite resin and ceramic occlusal veneers for the treatment of severe dental erosion. J Prosthet Dent. 2011;105(4):217-26.
30. Valenzuela EBS, Andrade JP, da Cunha P, Bittencourt HR, Spohr AM. Fracture load of CAD/CAM ultrathin occlusal veneers luted to enamel or dentin. J Esthet Restor Dent. 2021;33(3):516-21.
31. Zamzam H, Olivares A, Fok A. Load capacity of occlusal veneers of different restorative CAD/CAM materials under lateral static loading. J Mech Behav Biomed Mater. 2021;115:104290.
32. Fasbinder DJ. Materials for chairside CAD/CAM restorations. Compend Contin Educ Dent. 2010;31(9):702-4, 6, 8-9.
33. Edelhoff D, Ahlers MO. Occlusal onlays as a modern treatment concept for the reconstruction of severely worn occlusal surfaces. Quintessence Int. 2018;49(7):521-33.
34. Al-Akhali M, Chaar MS, Elsayed A, Samran A, Kern M. Fracture resistance of ceramic and polymer-based occlusal veneer restorations. J Mech Behav Biomed Mater. 2017;74:245-50.
35. Yazigi C, Kern M, Chaar MS. Influence of various bonding techniques on the fracture strength of thin CAD/CAM-fabricated occlusal glass-ceramic veneers. J Mech Behav Biomed Mater. 2017;75:504-11.

36. Krummel A, Garling A, Sasse M, Kern M. Influence of bonding surface and bonding methods on the fracture resistance and survival rate of full-coverage occlusal veneers made from lithium disilicate ceramic after cyclic loading. Dent Mater. 2019;35(10):1351-9.
37. Öztürk E, Bolay Ş, Hickel R, Ilie N. Shear bond strength of porcelain laminate veneers to enamel, dentine and enamel-dentine complex bonded with different adhesive luting systems. J Dent. 2013;41(2):97-105.
38. Heck K, Paterno H, Lederer A, Litzenburger F, Hickel R, Kunzelmann KH. Fatigue resistance of ultrathin CAD/CAM ceramic and nanoceramic composite occlusal veneers. Dent Mater. 2019;35(10):1370-7.
39. Rekow ED, Harsono M, Janal M, Thompson VP, Zhang G. Factorial analysis of variables influencing stress in all-ceramic crowns. Dent Mater. 2006;22(2):125-32.
40. Andrade JP, Stona D, Bittencourt HR, Borges GA, Burnett LHJ, Spohr AM. Effect of Different Computer-aided Design/Computer-aided Manufacturing (CAD/CAM) Materials and Thicknesses on the Fracture Resistance of Occlusal Veneers. Oper Dent. 2018;43(5):539-48.
41. Sasse M, Krummel A, Klosa K, Kern M. Influence of restoration thickness and dental bonding surface on the fracture resistance of full-coverage occlusal veneers made from lithium disilicate ceramic. Dent Mater. 2015;31(8):907-15.
42. Gierthmuehlen PC, Jerg A, Fischer JB, Bonfante EA, Spitznagel FA. Posterior minimally invasive full-veneers: Effect of ceramic thicknesses, bonding substrate, and preparation designs on failure-load and -mode after fatigue. J Esthet Restor Dent. 2022;34(1):145-53.
43. Albelasy EH, Hamama HH, Tsoi JKH, Mahmoud SH. Fracture resistance of CAD/CAM occlusal veneers: A systematic review of laboratory studies. J Mech Behav Biomed Mater. 2020;110:103948.
44. Dirxen C, Blunck U, Preissner S. Clinical performance of a new biomimetic double network material. Open Dent J. 2013;7:118-22.
45. Coldea A, Swain MV, Thiel N. Mechanical properties of polymer-infiltrated-ceramic-network materials. Dent Mater. 2013;29(4):419-26.
46. Spitznagel FA, Scholz KJ, Strub JR, Vach K, Gierthmuehlen PC. Polymer-infiltrated ceramic CAD/CAM inlays and partial coverage restorations: 3-year results of a prospective clinical study over 5 years. Clin Oral Investig. 2018;22(5):1973-83.
47. Magne P, Knezevic A. Influence of overlay restorative materials and load cusps on the fatigue resistance of endodontically treated molars. Quintessence Int. 2009;40(9):729-37.
48. Egilmez F, Ergun G, Cekic-Nagas I, Vallittu PK, Lassila LVJ. Does artificial aging affect mechanical properties of CAD/CAM composite materials. J Prosthodont Res. 2018;62(1):65-74.
49. Della Bona A, Corazza PH, Zhang Y. Characterization of a polymer-infiltrated ceramic-network material. Dent Mater. 2014;30(5):564-9.
50. Ruggiero MM, Soares Gomes R, Pedroso Bergamo ET, Freitas MIM, Bonfante EA, Del Bel Cury AA. Resin-matrix ceramics for occlusal veneers: Effect of thickness on reliability and stress distribution. Dent Mater. 2021;37(3):e131-e9.
51. Magne P, Stanley K, Schlichting LH. Modeling of ultrathin occlusal veneers. Dent Mater. 2012;28(7):777-82.

52. Schlichting LH, Resende TH, Reis KR, Magne P. Simplified treatment of severe dental erosion with ultrathin CAD-CAM composite occlusal veneers and anterior bilaminar veneers. J Prosthet Dent. 2016;116(4):474-82.
53. Fabbri G, Zarone F, Dellificorelli G, Cannistraro G, De Lorenzi M, Mosca A, et al. Clinical evaluation of 860 anterior and posterior lithium disilicate restorations: retrospective study with a mean follow-up of 3 years and a maximum observational period of 6 years. Int J Periodontics Restorative Dent. 2014;34(2):165-77.
54. Furtado de Mendonca A, Shahmoradi M, Gouvêa CVD, De Souza GM, Ellakwa A. Microstructural and Mechanical Characterization of CAD/CAM Materials for Monolithic Dental Restorations. J Prosthodont. 2019;28(2):e587-e94.
55. Ille C, Moaca EA, Pop D, Goguta L, Opris C, Pirvulescu IL, et al. Compressive strength evaluation of thin occlusal veneers from different CAD/CAM materials, before and after acidic saliva exposure. Odontology. 2022.
56. Al-Zordk W, Saudi A, Abdelkader A, Taher M, Ghazy M. Fracture Resistance and Failure Mode of Mandibular Molar Restored by Occlusal Veneer: Effect of Material Type and Dental Bonding Surface. Materials (Basel). 2021;14(21).
57. Yildiz C, Vanlıoğlu BA, Evren B, Uludamar A, Kulak-Ozkan Y. Fracture resistance of manually and CAD/CAM manufactured ceramic onlays. J Prosthodont. 2013;22(7):537-42.
58. Clausen JO, Abou Tara M, Kern M. Dynamic fatigue and fracture resistance of non-retentive all-ceramic full-coverage molar restorations. Influence of ceramic material and preparation design. Dent Mater. 2010;26(6):533-8.
59. Kim JW, Kim JH, Thompson VP, Zhang Y. Sliding contact fatigue damage in layered ceramic structures. J Dent Res. 2007;86(11):1046-50.
60. Singhatanadgit W, Junkaew P, Singhatanadgid P. Effect of bidirectional loading on contact and force characteristics under a newly developed masticatory simulator with a dual-direction loading system. Dent Mater J. 2016;35(6):952-61.
61. Bindl A, Mörmann WH. An up to 5-year clinical evaluation of posterior in-ceram CAD/CAM core crowns. Int J Prosthodont. 2002;15(5):451-6.
62. Pröbster L. Four year clinical study of glass-infiltrated, sintered alumina crowns. J Oral Rehabil. 1996;23(3):147-51.
63. Conrad HJ, Seong WJ, Pesun IJ. Current ceramic materials and systems with clinical recommendations: a systematic review. J Prosthet Dent. 2007;98(5):389-404.
64. Kükrer D, Gemalmaz D, Kuybulu EO, Bozkurt FO. A prospective clinical study of ceromer inlays: results up to 53 months. Int J Prosthodont. 2004;17(1):17-23.
65. Beier US, Kapferer I, Dumfahrt H. Clinical long-term evaluation and failure characteristics of 1,335 all-ceramic restorations. Int J Prosthodont. 2012;25(1):70-8.