

ICON-Infiltration – Schutz vor mikrobieller Penetration in humanen Zahnschmelz

1. Ammari, M. M., Soviero, V. M., da Silva Fidalgo, T. K., Lenz, M., Ferreira, D. M., Mattos, C. T., de Souza, I. P., Maia, L. C.: Is non-cavitated proximal lesion sealing an effective method for caries control in primary and permanent teeth? A systematic review and meta-analysis. *J Dent* 42, 1217-1227 (2014).
2. Anusavice, K. J: Phillips' Science of Dental Materials. 11th ed. St Louis, Mo: Saunders; 2003.
3. Araujo, G. S., Sfalcin, R. A., Araujo, T. G., Alonso, R. C., Puppin-Rontani, R. M.: Evaluation of polymerization characteristics and penetration into enamel caries lesions of experimental infiltrants. *J Dent* 41, 1014-1019 (2013).
4. Arnold, W. H., Gaengler, P.: Light- and electronmicroscopic study of infiltration of resin into initial caries lesions – a new methodological approach. *J Microsc* 245, 26-33 (2012).
5. Arslan, S., Zorba, Y. O., Atalay, M. A., Ozcan, S., Demirbuga, S., Pala, K., Percin, D., Ozer, F.: Effect of resin infiltration on enamel surface properties and *Streptococcus mutans* adhesion to artificial enamel lesions. *Dent Mater* 34, 25-30 (2015).
6. Askar, H., Lausch, J., Dörfer, C. E., Meyer-Lueckel, H., Paris, S.: Penetration of micro-filled infiltrant resins into artificial caries lesions. *J Dent* 43, 832-838 (2015).
7. Attal, J. P., Atlan, A., Denis, M., Vennat, E., Tirlet, G.: White spots on enamel: Treatment protocol by superficial or deep infiltration (part 2). *Int Orthod* 12, 1-31 (2014).
8. Attin, R., Stawarczyk, B., Kecik, D., Knösel, M., Wiechmann, D., Attin, T.: Shear bond strength of brackets to demineralize enamel after different pretreatment methods. *Angle Orthod* 82, 56-61 (2012).
9. Auschill, T. M., Schmidt, K. E., Arweiler, N. B.: Resin infiltration for aesthetic improvement of mild to moderate fluorosis: A six-month follow-up case report. *Oral Hlth Prev Dent* 13, 317-322 (2015).
10. Belli, R., Rahiotis, C., Schubert, E. W., Baratieri, L. N., Petschelt, A., Lohbauer, U.: Wear and morphology of infiltrated white spot lesions. *J Dent*

- 39, 376-385 (2011).
11. Black, G. V.: The management of enamel margins. *Dental Cosmos* 33, 1-14 (1891).
 12. Black, G. V.: The management of enamel margins. *Dental Cosmos* 33; 85-100 (1891).
 13. Black, G. V.: The management of enamel margins. *Dental Cosmos* 33, 440-447 (1891).
 14. Black, G. V.: The effect of oxidation on cut alloys for dental amalgams. *Dental Cosmos* 38, 43-48 (1896).
 15. Black, G. V.: A Work on Oper Dent in Two Volumes. Chicago, Ill: Medico-Dental Publishing Co (1908).
 16. Borges, A., Canepele, T., Luz, M., Pucci, C., Torres, C.: Color stability of resin used for caries infiltration after exposure to different staining solutions. *Oper Dent* 39, 433-440 (2014).
 17. Bowen, R. L.: Dental filling material comprising vinyl silane treated fused silica and a binder consisting of the reaction product of Bis phenol and glycidyl acrylate (1962). Patent No: 3,066,112.
 18. Buonocore, M. G.: A simple method of increasing adherence of acrylic filling materials to enamel surfaces. *J Dent Res* 34, 849-853 (1955).
 19. Chalmers, J.M.: Minimal intervention dentistry: part 1. Strategies for addressing the new caries challenge in older patients. *J Can Dent Assoc* 72, 427-433 (2006).
 20. Chay, P. L., Manton, D. J., Palamara, J. E.: The effect of resin infiltration and oxidative pre-treatment on microshear bond strength of resin composite to hypomineralised enamel. *Int J Paediatr Dent* 24, 252-267 (2014).
 21. Cohen-Carneiro, F., Pascaleli, A. M., Christino, M. R., Vale, H. F., Pontes, D. G.: Color stability of carious incipient lesions located in enamel and treated with resin infiltration or remineralization. *Int J Paediatr Dent* 24, 277-285 (2014).
 22. Crombie, F., Manton, D., Palamara, J., Reynolds, E.: Resin infiltration of developmentally hypomineralised enamel *Int J Paediatr Dent* 24, 51-55 (2014).
 23. Denis, M., Atlan, A., Vennat, E., Tirlet, G., Attal, J. P.: White defects on enamel: Diagnosis and anatomopathology: Two essential factors for proper

- treatment (part 1). *Int Orthod* 11, 139-165 (2013).
- 24. Doméjean, S., Ducamp, R., Leger, S., Holmgren, C.: Resin infiltration of non-cavitated caries lesions: A systematic review. *Med Princ Pract* 24, 216-221 (2015).
 - 25. Dorri, M., Dunne, S. M., Walsh, T., Schwendicke, F.: Micro-invasive interventions for managing proximal dental decay in primary and permanent teeth. *Cochrane Database Syst Rev* 11:CD010431 (2015).
 - 26. Eames, W. B.: Preparation and condensation of amalgam with low mercury alloy ratio. *J Am Dent Assoc* 58, 78-83 (1959).
 - 27. Eckstein, A., Helms, H. J., Knösel, M.: Camouflage effects following resin infiltration of postorthodontic white-spot lesions *in vivo*: One-year follow-up. *Angle Orthod* 85, 374-380 (2015).
 - 28. Ekizer, A., Zorba, Y. O., Uysal, T., Ayrikcila, S.: Effects of demineralization-inhibition procedures on the bond strength of brackets bonded to demineralized enamel surface. *Korean J Orthod* 42, 17-22 (2012).
 - 29. Ekstrand, K. R., Bakhshandeh, A., Martignon, S.: Treatment of proximal superficial caries lesions on primary molar teeth with resin infiltration and fluoride varnish versus fluoride varnish only: Efficacy after 1 year. *Caries Res* 44, 41-46 (2010).
 - 30. Feng, C., Liu, R., Liu, R., Zhao, Q., Chu, X.: [effect of infiltration resin on the color masking of labial enamel white spot lesions]. *Hua xi kou qiang yi xue za zhi = Huaxi kouqiang yixue zazhi = West China J Stomat* 31, 597-599 (2013).
 - 31. Gelani, R., Zandona, A., Lippert, F., Kamocka, M., Eckert, G.: *In vitro* progression of artificial white spot lesions sealed with an infiltrant resin. *Oper Dent* 39, 481-488 (2013).
 - 32. Glazer, H. S.: Treating white spots: New caries infiltration technique. *Dent Today* 28 (10) 82, 84-85 (2009).
 - 33. Gugnani, N., Pandit, I. K., Gupta, M., Josan, R.: Caries infiltration of noncavitated white spot lesions: A novel approach for immediate esthetic improvement. *Contemp Clin Dent* 3, 199-202 (2012).
 - 34. Gugnani, N., Pandit, I. K., Goyal, V., Gugnani, S., Sharma, J., Dogra, S.: Esthetic improvement of white spot lesions and non-pitted fluorosis using resin infiltration technique: Series of four clinical cases. *J Ind Soc Pedod Prevent Dent* 32, 176-180 (2014).

35. Hammad, S. M., El Banna, M., El Zayat, I., Mohsen, M. A.: Effect of resin infiltration on white spot lesions after debonding orthodontic brackets. *Am J Dent* 25, 3-8 (2012).
36. Heymann, G. C., Grauer, D.: A contemporary review of white spot lesions in orthodontics. *J Esthet Restor Dent* 25, 85-95 (2013).
37. Jia, L., Stawarczyk, B., Schmidlin, P. R., Attin, T., Wiegand, A.: Effect of caries infiltrant application on shear bond strength of different adhesive systems to sound and demineralized enamel. *J Adhesive Dent* 14, 569-574 (2012).
38. Kim, S., Kim, E. Y., Jeong, T. S., Kim, J. W.: The evaluation of resin infiltration for masking labial enamel white spot lesions. *In J Paediatr Dent* 21, 241-248 (2011).
39. Kneist, S., Nietzsche, S., Küpper, H., Raser, G., Willershausen, B., Callaway, A.: Penetration of *Streptococcus sobrinus* and *Streptococcus sanguinis* into dental enamel. *Anaerobe* 35, 54-59 (2015).
40. Knösel, M., Eckstein, A., Helms, H. J.: Durability of esthetic improvement following icon resin infiltration of multibracket-induced white spot lesions compared with no therapy over 6 months: A single-center, split-mouth, randomized clinical trial. *Am J Orthod Dentofac Orthop* 144, 86-96 (2013).
41. Lausch, J., Paris, S., Selje, T., Dörfer, C. E., Meyer-Lueckel, H.: Resin infiltration of fissure caries with various techniques of pretreatment *in vitro*. *Caries Res* 49, 50-55 (2015).
42. Letzel, H., van't Hof, M. A., Marshall, G. W., Marshall, S. J.: The influence of amalgam alloy on the survival of amalgam restorations: a secondary analysis of multiple controlled clinical trial. *J Dent Res* 76, 1787-1798 (1997).
43. Liu, Y., Ge, L., Chen, H., Chi, X.: [a study on the penetration abilities of natural initial caries lesions with resin infiltration]. *Hua xi kou qiang yi xue za zhi = Huaxi kouqiang yixue zazhi = West China J Stomat* 30, 483-486 (2012).
44. Liu, Y. H., Ge, L. H., Zhang, Z. Y., Chi, X. Q., Hou, F. C., Chen, H. Z.: [an experimental study on the penetration abilities of resin infiltration into proximal caries lesions in primary molars]. *Zhonghua kou qiang yi xue za zhi = Zhonghua kouqiang yixue zazhi = Chinese J Stomat* 47, 684-688 (2012).
45. Liu, Y., Ge, L., Chen, H.: [comparative study on the penetration abilities of resin infiltration into proximal initial caries lesions in primary molars and permanent posterior teeth]. *Hua xi kou qiang yi xue za zhi = Huaxi kouqiang*

yixue zazhi = West China J Stomat 31, 161-164 (2013).

46. Mahler, D. B.: The high-copper dental amalgam alloys. *J Dent Res* 76, 537-541 (1997).
47. Martignon, S., Ekstrand, K. R., Gomez, J., Lara, J. S., Cortes, A.: Infiltrating/sealing proximal caries lesions: A 3-year randomized clinical trial. *J Dent Res* 91, 288-292 (2012).
48. McIntyre, J.: Minimal intervention dentistry. *Ann R Aust Coll Dent Surg* 12, 72-79 (1994).
49. Mews, L., Kern, M., Ciesielski, R., Fischer-Brandies, H., Koos, B.: Shear bond strength of orthodontic brackets to enamel after application of a caries infiltrant. *Angle Orthod* 85, 645-650 (2015).
50. Meyer-Lueckel, H., Paris, S.: Improved resin infiltration of natural caries lesions. *J Dent Res* 87, 1112-1116 (2008).
51. Meyer-Lueckel, H., Paris, S.: Progression of artificial enamel caries lesions after infiltration with experimental light curing resins. *Caries Res* 42, 17-124 (2008).
52. Meyer-Lueckel, H., Paris, S.: Infiltration of natural caries lesions with experimental resins differing in penetration coefficients and ethanol addition. *Caries Res* 44, 408-414 (2010).
53. Meyer-Lueckel, H., Paris, S., Mueller, J., Colfen, H., Kielbassa, A. M.: Influence of the application time on the penetration of different dental adhesives and a fissure sealant into artificial subsurface lesions in bovine enamel. *Dent Mat* 22, 22-28 (2006).
54. Meyer-Lueckel, H., Paris, S., Kielbassa, A. M.: Surface layer erosion of natural caries lesions with phosphoric and hydrochloric acid gels in preparation for resin infiltration. *Caries Res* 41, 223-230 (2007).
55. Meyer-Lueckel, H., Chatzidakis, A., Naumann, M., Dörfer, C. E., Paris, S.: Influence of application time on penetration of an infiltrant into natural enamel caries. *J Dent* 39, 465-469 (2011).
56. Meyer-Lueckel, H., Bitter, K., Paris, S.: Randomized controlled clinical trial on proximal caries infiltration: Three-year follow-up. *Caries Res* 46, 544-548 (2012).
57. Min, J. H., Inaba, D., Kwon, H. K., Chung, J. H., Kim, B. I.: Evaluation of penetration effect of resin infiltrant using optical coherence tomography. *J*

- Dent 43, 720-725 (2015).
- 58. Montasser, M. A., Taha, M.: Effect of enamel protective agents on shear bond strength of orthodontic brackets. Prog Orthod 15, 34 (2014).
 - 59. Mueller, J., Yang, F., Neumann, K., Kielbassa, A. M.: Surface tridimensional topography analysis of materials and finishing procedures after resinous infiltration of subsurface bovine enamel lesions. Quintessence Int 42, 135-14 (2011).
 - 60. Munoz, M. A., Arana-Gordillo, L. A., Gomes, G. M., Gomes, O. M., Bombarda, N. H., Reis, A., Loguercio, A. D.: Alternative esthetic management of fluorosis and hypoplasia stains: Blending effect obtained with resin infiltration techniques. J Esth Rest Dent 25, 32-39 (2013).
 - 61. Naidu, E., Stawarczyk, B., Tawakoli, P. N., Attin, R., Attin, T., Wiegand, A.: Shear bond strength of orthodontic resins after caries infiltrant preconditioning. Angle Orthod 83, 306-312 (2013).
 - 62. Neuhaus, K. W., Graf, M., Lussi, A., Katsaros, C.: Late infiltration of post-orthodontic white spot lesions. J Orof Orthop 71, 442-447 (2010).
 - 63. Neuhaus, K. W., Schlafer, S., Lussi, A., Nyvad, B.: Infiltration of natural caries lesions in relation to their activity status and acid pretreatment *in vitro*. Caries Res 47, 203-210 (2013).
 - 64. Ogodescu, A., Ogodescu, E., Talpos, S., Zetu, I.: Resin infiltration of white spot lesions during the fixed orthodontic appliance therapy. Rev Med 115, 1251-1257 (2011).
 - 65. Osborne, J. W., Gale, E. N.: Relationship of restoration width, tooth position, and alloy to fracture at the margins of 13- to 14-year old amalgams. J Dent Res 69, 1599-1601 (1990).
 - 66. Osborne, J. W., Norman, R. D.: 13-year clinical assessment of 10 amalgam alloys. Dent Mater 6, 189-194 (1990).
 - 67. Ou, X. Y., Zhao, Y. H., Ci, X. K., Zeng, L. W.: Masking white spots of enamel in caries lesions with a non-invasive infiltration technique *in vitro*. Gen Mol Res 13, 6912-6919 (2014).
 - 68. Paris, S., Meyer-Lueckel H.: Infiltrants inhibit progression of natural caries lesions *in vitro*. J Dental Res 89, 276-1280 (2010).
 - 69. Paris, S., Meyer-Lueckel, H.: Inhibition of caries progression by resin infiltration *in situ*. Caries Res 44, 47-54 (2010).

70. Paris, S., Meyer-Lueckel, H., Muelle,r J., Hummel, M., Kielbassa, A. M.: Progression of sealed initial bovine enamel lesions under demineralizing conditions in vitro. *Caries Res* 40, 124-129 (2006).
71. Paris, S., Meyer-Lueckel, H., Colfen, H., Kielbassa, A. M.: Penetration coefficients of commercially available and experimental composites intended to infiltrate enamel carious lesions. *Dent Mat* 23, 742-748 (2007).
72. Paris, S., Meyer-Lueckel, H., Colfen, H., Kielbassa, A. M.: Resin infiltration of artificial enamel caries lesions with experimental light curing resins. *Dent Mat J* 26, 582-588 (2007).
73. Paris, S., Meyer-Lueckel, H., Kielbassa, A. M.: Resin infiltration of natural caries lesions. *J Dent Res* 86, 662-666 (2007).
74. Paris, S., Bitter, K., Renz, H., Hopfenmüller, W., Meyer-Lueckel, H.: Validation of two dual fluorescence techniques for confocal microscopic visualization of resin penetration into enamel caries lesions. *Microsc Res Techniq* 72, 489-494 (2009).
75. Paris, S., Dörfer, C. E., Meyer-Lueckel, H.: Surface conditioning of natural enamel caries lesions in deciduous teeth in preparation for resin infiltration. *J Dent* 38, 65-71 (2010).
76. Paris, S., Hopfenmüller, W., Meyer-Lueckel, H.: Resin infiltration of caries lesions: An efficacy randomized trial. *J Dent Res* 89, 823-826 (2010).
77. Paris, S., Bitter, K., Naumann, M., Dörfer, C. E., Meyer-Lueckel, H.: Resin infiltration of proximal caries lesions differing in ICDAS codes. *Eur J Oral Sci* 119, 182-186 (2011).
78. Paris, S., Soviero, V. M., Seddig, S., Meyer-Lueckel, H.: Penetration depths of an infiltrant into proximal caries lesions in primary molars after different application times in vitro. *Int J Paed Dent* 22, 349-355 (2012).
79. Paris, S., Soviero, V. M., Chatzidakis, A J., Meyer-Lueckel, H.: Penetration of experimental infiltrants with different penetration coefficients and ethanol addition into natural caries lesions in primary molars. *Caries Res* 46, 113-117 (2012).
80. Paris, S., Schwendicke, F., Keltsch, J., Dörfer, C., Meyer-Lueckel, H.: Masking of white spot lesions by resin infiltration in vitro. *J Dent* 41 Suppl 5, 28-34 (2013).
81. Paris, S., Schwendicke, F., Seddig, S., Mueller, W. D., Dörfer, C., Meyer-

- Lueckel, H.: Micro-hardness and mineral loss of enamel lesions after infiltration with various resins: Influence of infiltrant composition and application frequency in vitro. *J Dent* 41, 543-548 (2013).
82. Paris, S., Lausch, J., Selje, T., Dörfer, C. E., Meyer-Lueckel, H.: Comparison of sealant and infiltrant penetration into pit and fissure caries lesions in vitro. *J Dent* 42, 432-438 (2014).
83. Perry, R., Nobrega, D., Harsono, M.: Bleaching of teeth treated with icon by dmg america. 1-7 (2010).
84. Rahiotis, C., Zinelis, S., Eliades, G., Eliades, T.: Setting characteristics of a resin infiltration system for incipient caries treatment. *J Dent* 43, 715-719 (2015).
85. Rey, N., Benbachir, N., Bortolotto, T., Krejci, I.: Evaluation of the staining potential of a caries infiltrant in comparison to other products. *Dent Mat J* 33, 86-91 (2014).
86. Robinson, C., Hallsworth, A. S., Weatherell, J. A., Künzel, W.: Arrest and control of carious lesions: a study based on preliminary experiments with resorcinol-formaldehyde resin. *J Dent Res* 55, 812-816 (1976).
87. Rupf, S., Merte, K., Eschrich, K., Kneist, S.: *Streptococcus sobrinus* in children and its influence on caries activity. *Eur Arch Paed Dent* 7, 9-24 (2006).
88. Schmidlin, P. R., Sener, B., Attin, T., Wiegand, A.: Protection of sound enamel and artificial enamel lesions against demineralisation: Caries infiltrant versus adhesive. *J Dent* 40, 851-856 (2012).
89. Senestraro, S. V., Crowe, J. J., Wang, M., Vo, A., Huang, G., Ferracane, J., Covell, D. A., Jr.: Minimally invasive resin infiltration of arrested white-spot lesions: A randomized clinical trial. *J Am Dent Assoc* 144, 997-1005 (2013).
90. Shivanna, V., Shivakumar, B.: Novel treatment of white spot lesions: A report of two cases. *J Cons Dent* 14, 423-426 (2011).
91. Soviero, V. M., Paris, S., Leal, S. C., Azevedo, R. B., Meyer-Lueckel, H.: Ex vivo evaluation of caries infiltration after different application times in primary molars. *Caries Res* 47, 110-116 (2013).
92. Subramaniam, P., Girish Babu, K. L., Lakhotia, D.: Evaluation of penetration depth of a commercially available resin infiltrate into artificially created enamel lesions: An *in vitro* study. *J Cons Dent* 17, 146-149 (2014).
93. Taher, N. M.: Atomic force microscopy and tridimensional topography analysis

- of human enamel after resinous infiltration and storage in water. *Saudi Med J* 34, 408-414 (2013).
94. Taher, N. M., Alkhamis, H. A., Dowaidi, S. M.: The influence of resin infiltration system on enamel microhardness and surface roughness: An in vitro study. *Saudi Dent J* 24, 79-84 (2012).
 95. Takahashi, N., Nyvad, B.: Caries ecology revisited: Microbial dynamics and the caries process. *Caries Res* 42, 409-418 (2008).
 96. Tirlet, G., Chabouis, H. F., Attal, J. P.: Infiltration, a new therapy for masking enamel white spots: A 19-month follow-up case series. *Eur J Esth Dent* 8, 180-190 (2013).
 97. Torres, C. R., Borges, A. B.: Color masking of developmental enamel defects: A case series. *Oper Dent* 40, 25-33 (2015).
 98. Torres, C. R. G, Borges, A. B., Torres, L. M., Gomes, I. S., de Oliveira, R. S.: Effect of caries infiltration technique and fluoride therapy on the colour masking of white spot lesions. *J Dent* 39, 202-207 (2011).
 99. Torres, C. R., Rosa, P. C., Ferreira, N. S., Borges, A. B.: Effect of caries infiltration technique and fluoride therapy on microhardness of enamel carious lesions. *Oper Dent* 37, 363-369 (2012).
 100. Tostes, M. A., Santos, E., Jr., Camargo, S. A., Jr.: Effect of resin infiltration on the nanomechanical properties of demineralized bovine enamel. *Indian J Dent* 5, 116-122 (2014).
 101. Tyas, M. J., Anusavice, K. J., Frencken, J. E., Mount, G. J.: Minimal intervention dentistry – a review. FDI Commission Project 1-97. *Int Dent J* 50, 1-12 (2000).
 102. Ulrich, I., Mueller, J., Wolgin, M., Frank, W., Kielbassa, A. M.: Tridimensional surface roughness analysis after resin infiltration of (deproteinized) natural subsurface carious lesions. *Clin Oral Inv* 19, 1473-1483 (2015).
 103. Yang, F., Mueller, J., Kielbassa, A. M.: Surface substance loss of subsurface bovine enamel lesions after different steps of the resinous infiltration technique: A 3d topography analysis. *Odontol* 100, 172-180 (2012).
 104. Yetkiner, E., Ozcan, M., Wegehaupt, F. J., Wiegand, A., Eden, E., Attin, T.: Effect of a low-viscosity adhesive resin on the adhesion of metal brackets to enamel etched with hydrochloric or phosphoric acid combined with conventional adhesives. *J Adh Dent* 15, 575-581 (2013).

105. Yetkiner, E., Wegehaupt, F., Wiegand, A., Attin, R., Attin, T.: Colour improvement and stability of white spot lesions following infiltration, micro-abrasion, or fluoride treatments in vitro. *Eur J Orthod* 36, 595-602 (2014).
106. Yetkiner, E., Wegehaupt, F. J., Attin, R., Wiegand, A., Attin, T.: Stability of two resin combinations used as sealants against toothbrush abrasion and acid challenge in vitro. *Acta Odontol Scand* 72, 825-830 (2014).
107. Yim, H. K., Kwon, H. K., Kim, B. I.: Modification of surface pre-treatment for resin infiltration to mask natural white spot lesions. *J Dent* 42, 588-594 (2014).
108. Yuan, C. Q., Dou, G. W., Deng, J., Geng, G. L., Sun, P., Cao, Y. X.: [effect of infiltration technique and polishing on the roughness of artificial carious enamel surfaces]. *Shanghai kou qiang yi xue = Shanghai J Stomat* 22, 402-406 (2013).
109. Yuan, H., Li, J., Chen, L., Cheng, L., Cannon, R. D., Mei, L.: Esthetic comparison of white-spot lesion treatment modalities using spectrometry and fluorescence. *Angle Orthod* 84, 343-349 (2014).
110. Zhao, X., Gao, X.: [effect of resin infiltration treatment on the colour of white spot lesions]. *Hua xi kou qiang yi xue za zhi = Huaxi kouqiang yixue zazhi = West China J Stomat* 32, 306-309 (2014).