

ZMK 7-8/2023 (39), 371

Schadensminderung beim Rauchen

Philip Morris

[1] DEBRA-Studie: <https://www.debra-study.info> (Stand Mai 2023): Prävalenz aktueller Tabak-Raucher:innen in Deutschland.

[2] DGZMK und Bundeszahnärztekammer (2022): Faltblatt Rauchen und Mundgesundheit. https://www.bzaek.de/fileadmin/PDFs/pati/FzR_Mundgesundheit_.pdf

[3] Psyma im Auftrag der Philip Morris GmbH (07.01.2021): Smoking Cessation – Raucherentwöhnung - Konkrete Wahrnehmung und Erfahrungen von Zahnärzten beim Thema Raucherentwöhnung.

[4] DEBRA-Studie: <https://www.debra-study.info> (Stand Mai 2023): Prävalenz aktueller Tabak-Raucher:innen in Deutschland

[5] Barrieren des Rauchstopp Studie 2022,
<https://pmi.berlin/files/gfkbroschucc88re2022.pdf>

[6] Barrieren des Rauchstopp Studie 2022,
<https://pmi.berlin/files/gfkbroschucc88re2022.pdf>

[7] „Harm Reduction (deutsch: Schadensminderung, Risikoreduktion) ist eine Strategie aus Medizin und Sozialpolitik zur Minimierung der Schädigung von Individuen und/oder der Bevölkerung durch schädliche Verhaltensweisen, die nicht vollständig vermieden oder verhindert werden können. Das Prinzip der Harm Reduction im Kontext einer Nikotinabhängigkeit argumentiert, dass, weil der Großteil der Schädlichkeit des Rauchens nicht auf dem Nikotin, sondern auf anderen Bestandteilen des Tabakrauches basiert, die Gesundheit und Lebenserwartung heutiger Raucher:innen signifikant verbessert werden könnten, indem man so viele von ihnen wie möglich ermutigt, auf eine rauchfreie Nikotinquelle umzusteigen.“ Royal College of Physicians, 2016: Nicotine without smoke – tobacco harm reduction. A report by the Tobacco Advisory Group of the Royal College of Physicians. London: Royal College of Physicians (<https://www.rcplondon.ac.uk/projects/outputs/nicotine-without-smoke-tobacco-harm-reduction-0>).

[8] Psyma im Auftrag der Philip Morris GmbH (07.01.2021): Smoking Cessation – Raucherentwöhnung - Konkrete Wahrnehmung und Erfahrungen von Zahnärzten beim Thema Raucherentwöhnung.

Tabakkonsum und Implantate: Was gibt es Neues?

- [1] <https://de.statista.com>, Zugriff am 23.11.2022.
- [2] https://de.wikipedia.org/wiki/Liste_der_Länder_nach_Zigarettenkonsum, Zugriff 23.11.2022
- [3] WHO Report on the global tobacco epidemic 2021: Addressing new and emerging products. WHO: Geneva, Switzerland 2021; p.212.
- [4] Ramseier CA, Walter C. Tabakkonsum und orale Implantate. Implantologie. 2007; 15: 153-164
- [5] Ramseier CA, Warnakulasuriya S, Needleman IG, Gallagher JE, Lahtinen A, Ainamo A, Alajbeg I, Albert D, Al-Hazmi N, Antohé ME, Beck-Mannagetta J, Benzian H, Bergström J, Binnie V, Bornstein M, Büchler S, Carr A, Carrassi A, Casals Peidró E, Chapple I, Compton S, Crail J, Crews K, Davis JM, Dietrich T, Enmark B, Fine J, Gallagher J, Jenner T, Forna D, Fundak A, Gyenes M, Hovius M, Jacobs A, Kinnunen T, Knevel R, Koerber A, Labella R, Lulic M, Mattheos N, McEwen A, Ohrn K, Polychronopoulou A, Preshaw P, Radley N, Rosseel J, Schoonheim-Klein M, Suvan J, Ulbricht S, Verstappen P, Walter C, Warnakulasuriya S, Wennström J, Wickholm S, Zoiopoulos L. Consensus Report: 2nd European Workshop on Tobacco Prevention and Cessation for Oral Health Professionals. Int Dent J. 2010; 60: 3-6
- [6] Krüll M, Walter C, Saxer UP, Bornstein MM, Ramseier CA. Effekte des Tabakkonsums auf die Allgemeingesundheit: relevante Kenntnisse für die Zahnmedizin (I). Schweiz Monatsschr Zahnmed. 2008; 118: 525-40.
- [7] Krüll M, Bornstein MM, Saxer UP, Walter C, Ramseier CA. Effekte des Tabakkonsums auf die Allgemeingesundheit: relevante Kenntnisse für die Zahnmedizin (II). Schweiz Monatsschr Zahnmed. 2008; 118: 405-20.
- [8] Ramseier CA, Christen A, McGowan J, McCartan B, Minenna L, Öhrn K, Walter C. Tobacco Use Prevention and Cessation in Dental and Dental Hygiene Undergraduate Education. Oral Health Prev Dent. 2006; 4: 49-60.
- [9] Saxer UP, Walter C, Bornstein MM, Klingler K, Ramseier CA. Einfluss des Tabakkonsums auf das Parodont – ein Update (II) Teil 2: Klinische und radiologische Veränderungen des Parodonts sowie Folgen auf die Parodontaltherapie und orale Implantologie. Schweiz Monatsschr Zahnmed. 2007; 117: 153-169
- [10] Bornstein MM, Klingler K, Saxer UP, Walter C, Ramseier CA. Tabakassoziierte Veränderungen der Mundschleimhaut. Schweiz Monatsschr Zahnmed. 2006; 116: 1261-1274
- [11] Ramseier CA, Mattheos N, Needleman I, Watt R, Wickholm S, Co-Authors of the first European workshop`s position papers. Consensus Report. First European Workshop on Tobacco Use Prevention and Cessation for Oral Health Professionals. Oral Health Prev Dent. 2006; 4: 7-18
- [12] Walter C, Saxer UP, Bornstein MM, Klingler K, Ramseier CA. Einfluss des Tabakkonsums auf das Parodont – ein Update (I) Teil 1: Epidemiologische und pathogenetische Aspekte tabakbedingter Schädigungen am Parodont. Schweiz Monatsschr Zahnmed. 2007; 117: 45-60.
- [13] <https://pubmed.ncbi.nlm.nih.gov/>; Zugriff am 25.11.2022
- [14] Naseri R, Yaghini J, Feizi A. Levels of smoking and dental implants failure: A systematic review and meta-analysis. J Clin Periodontol. 2020; J Clin Periodontol. 2020; 47 (4): 518-528.

- [15] Mustapha AD, Salame Z, Chrcanovic BR. Smoking and Dental Implants: A Systematic Review and Meta-Analysis. *Medicina (Kaunas)*. 2021; 58 (1): 39.
- [16] Chrcanovic BR, Albrektsson T, Wennerberg A. Smoking and dental implants: A systematic review and meta-analysis. *J Dent*. 2015; 43 (5): 487-98.
- [17] Moraschini V, Barboza Ed. Success of dental implants in smokers and non-smokers: a systematic review and meta-analysis. *Int J Oral Maxillofac Surg*. 2016; 45 (2): 205-15.
- [18] Chambrone L, Preshaw PM, Ferreira JD, Rodrigues JA, Cassoni A, Shibli JA. Effects of tobacco smoking on the survival rate of dental implants placed in areas of maxillary sinus floor augmentation: a systematic review. *Clin Oral Implants Res*. 2014; 25 (4): 408-16
- [19] Alfadda SA. Current Evidence on Dental Implants Outcomes in Smokers and Nonsmokers: A Systematic Review and Meta-Analysis. *J Oral Implantol*. 2018; 44 (5): 390-399.
- [20] Dietrich T, Hoffmann K. A comprehensive index for the modeling of smoking history in periodontal research. *J Dent Res*. 2004; 83 (11): 859-863.
- [21] Ramseier CA, Mirra D, Schütz C, Sculean A, Lang NP, Walter C, Salvi GE. Bleeding on Probing as it relates to smoking status in patients enrolled in supportive periodontal therapy for at least 5 years. *J Clin Periodontol*. 2015; 42: 150-9.
- [22] Berglundh T, Lindhe J, Marinello C, Ericsson I, Liljenberg B. Soft tissue reaction to de novo plaque formation on implants and teeth. An experimental study in the dog. *Clin Oral Implants Res*. 1992; 3 (1): 1-8.
- [23] Zitzmann NU, Berglundh T, Marinello CP, Lindhe J. Experimental peri-implant mucositis in man. *J Clin Periodontol*. 2001; 28 (6): 517-523.
- [24] Tonetti MS. Risk factors for osseodisintegration. *Periodontology* 2000 1998; 17: 55-62.
- [25] Tsai CC, Chen HS, Chen SL, Ho YP, Ho KY, Wu YM, Hung CC. Lipid peroxidation: A possible role in the induction and progression of chronic periodontitis. *J Periodont Res*. 2005; 40 (5): 378-384.
- [26] Zhang J, Liu Y, Shi J, Larson DF, Watson RR. Side-stream cigarette smoke induces dose-response in systemic inflammatory cytokine production and oxidative stress. *Exp Biol Med (Maywood)*. 2002 ;227 (9) :823-829.
- [27] Hanioka T, Tanaka M, Takaya K, Matsumori Y, Shizukuishi S. Pocket oxygen tension in smokers and non-smokers with periodontal disease. *J Periodontol*. 2000; 71 (4): 550-554.
- [28] Teughels W, van Eldere J, van Steenberghe D, Cassiman JJ, Fives-Taylor P, Quirynen M. Influence of nicotine and cotinine on epithelial colonization by periodontopathogens. *J Periodontol*. 2005; 76 (8): 1315-1322.
- [29] Walter C, Purucker P, Bernimoulin JP, Suttorp N, Meyer J, Weiger R. Critical assessment of microbiological diagnostics in periodontal diseases with special focus on *Porphyromonas gingivalis*. *Schweiz Monatsschr Zahnmed*. 2005; 115 (5) :415-424.
- [30] Hollinger JO, Schmitt JM, Hwang K, Soleymani P, Buck D. Impact of nicotine on bone healing. *J Biomed Mater Res*. 1999; 45 (4): 294-301.
- [31] Nociti FH jr, Nogueira-Filho GR, Tramontina VA, Machado MA, Barros SP, Sallum EA, Sallum AW. Histometric evaluation of the effect of nicotine administration on periodontal breakdown: An in vivo study. *J Periodont Res*. 2001; 36 (6): 361-366.
- [32] Cesar Neto JB, de Souza AP, Barbieri D, Moreno H jr, Sallum EA, Nociti FH jr. Matrix metalloproteinase-2 may be involved with increased bone loss associated with experimental periodontitis and smoking: A study in rats. *J Periodontol*. 2004; 75 (7): 995-1000.
- [33] Sewon L, Laine M, Karjalainen S, Doroguinakaia A, Lehtonen-Veromaa M. Salivary calcium reflects skeletal bone density of heavy smokers. *Arch Oral Biol*. 2004 ;49 (5): 355-358.
- [34] Krall EA, Dawson-Hughes B. Smoking increases bone loss and decreases intestinal calcium absorption. *J Bone Miner Res*. 1999; 14 (2): 215-220.
- [35] Tanaka H, Tanabe N, Shoji M, Suzuki N, Katono T, Sato S, Motohashi M, Maeno M.

Nicotine and lipopolysaccharide stimulate the formation of osteoclast-like cells by increasing macrophage colony-stimulating factor and prostaglandin E2 production by osteoblasts. *Life Sci.* 2006; 78 (15): 1733-1740.

- [36] Jorde R, Stunes AK, Kubiak J, Grimnes G, Thorsby PM, Syversen U. Smoking and other determinants of bone turnover. *PLoS ONE.* 2019; 14 (11): e0225539.
- [37] Bergstrom J, Preber H. The influence of cigarette smoking on the development of experimental gingivitis. *J Periodont Res.* 1986; 21 (6): 668-676.
- [38] Dietrich T, Bernimoulin JP, Glynn RJ. The effect of cigarette smoking on gingival bleeding. *J Periodontol.* 2004; 75 (1):16- 22.
- [39] Amerio E, Blasi G, Valles C, Blanc V, Álvarez G, Arredondo A, Nart J, Monje A: Impact of smoking on peri-implant bleeding on probing. *Clin Implant Dent Relat Res.* 2022; 24 (2): 151-165.
- [40] van Winkelhoff AJ, Bosch-Tijhof CJ, Winkel EG, van der Reijden WA. Smoking affects the subgingival microflora in periodontitis. *J Periodontol.* 2001; 72 (5): 666-671.
- [41] Haffajee AD, Socransky SS. Relationship of cigarette smoking to the subgingival microbiota. *J Clin Periodontol.* 2001; 28 (5): 377-388.
- [42] Mirbod SM, Ahing SI, Pruthi VK. Immunohistochemical study of vestibular gingival blood vessel density and internal circumference in smokers and non-smokers. *J Periodontol.* 2001; 72 (10): 1318-1323.
- [43] Rezavandi K, Palmer RM, Odell EW, Scott DA, Wilson RF. Expression of ICAM-1 and E-selectin in gingival tissues of smokers and non-smokers with periodontitis. *J Oral Pathol Med.* 2002; 31 (1): 59-64.
- [44] Lindeboom JA, Mathura KR, Harkisoen S, van den Akker HP, Ince C. Effect of smoking on the gingival capillary density: assessment of gingival capillary density with orthogonal polarization spectral imaging. *J Clin Periodontol.* 2005; 32 (12): 1208-1212.
- [45] Mirbod SM, Ahing SI, V K Pruthi VK *J Periodontol* Immunohistochemical study of vestibular gingival blood vessel density and internal circumference in smokers and non-smokers. *J Periodontol.* 2001; 72 (10): 1318-23.
- [46] Güntsch A, Erler M, Preshaw PM, Sigusch BW, Klinger G, Glockmann E. Effect of smoking on crevicular polymorphonuclear neutrophil function in periodontally healthy subjects. *J Periodont Res.* 2006; 41 (3): 184-188.
- [47] Ryder MI, Wu TC, Kallaos SS, Hyun W. Alterations of neutrophil f-actin kinetics by tobacco smoke: implications for periodontal diseases. *J Periodont Res.* 2002; 37 (4): 286-292.
- [48] Pauletto NC, Liede K, Nieminen A, Larjava H, Uitto VJ. Effect of cigarette smoking on oral elastase activity in adult periodontitis patients. *J Periodontol.* 2000; 71 (1): 58-62.
- [49] Qiu F, Liang CL, Liu H, Zeng YQ, Hou S, Huang S, Lai X, Dai Z. Impacts of cigarette smoking on immune responsiveness: Up and down or upside down? *Oncotarget.* 2017; 8 (1): 268-284.
- [50] Michalowicz BS, Aeppli DP, Kuba RK, Bereuter JE, Conry JP, Segal NL, Bouchard TJ jr, Pihlstrom BL. A twin study of genetic variation in proportional radiographic alveolar bone height. *J Dent Res.* 1991; 70 (11): 1431-1435.
- [51] Michalowicz BS, Wolff LF, Klump D, Hinrichs JE, Aeppli DM, Bouchard TJ jr, Pihlstrom BL. Periodontal bacteria in adult twins. *J Periodontol.* 1999; 70 (3): 263-273.
- [52] Zitzmann NU, Walter C, Berglundh T. Ätiologie, Diagnostik und Therapie der Periimplantitis – eine Übersicht. *Dtsch Zahnärztl Z.* 2006; 61: 642-650.
- [53] Feloutzis A, Lang NP, Tonetti MS, Burgin W, Brägger U, Buser D, Duff GW, Kornman KS. IL-1 gene polymorphism and smoking as risk factors for peri-implant bone loss in a well-maintained population. *Clin Oral Implants Res.* 2003; 14 (1): 10-17.
- [54] Gruica B, Wang HY, Lang NP, Buser D. Impact of IL-1 genotype and smoking status on the prognosis of osseointegrated implants. *Clin Oral Implants Res.* 2004; 15 (4): 393-400.

- [55] Santiago Junior JF, Bigueti CC, Matsumoto MA, Abu Halawa Kudo G, Parra da Silva RB, Pinto Saraiva P, Fakhouri WD. Can Genetic Factors Compromise the Success of Dental Implants? A Systematic Review and Meta-Analysis. *Genes (Basel)*. 2018; 9 (9): 444.
- [56] Fiore MC: US public health service clinical practice guideline: treating tobacco use and dependence. *Respir Care*. 2000 ; 45: 1200-1262.
- [57] Caton JG, Armitage G, Berglundh T, Chapple ILC, Jepsen S, Kornman KS, Mealey BL, Papapanou PN, Sanz M, Tonetti MS. A new classification scheme for periodontal and peri-implant diseases and conditions - Introduction and key changes from the 1999 classification. *J Clin Periodontol*. 2018; 45 Suppl 20: S1-S8.

- [1] Buser D, Martin W, Belser UC. Optimizing esthetics for implant restorations in the anterior maxilla: anatomic and surgical considerations. *Int J Oral Maxillofac Implants*. 2004; 19 Suppl: 43-61.
- [2] Pjetursson BE, Bragger U, Lang NP, Zwahlen M. Comparison of survival and complication rates of tooth-supported fixed dental prostheses (FDPs) and implant-supported FDPs and single crowns (SCs). *Clin Oral Implants Res*. 2007; 18 Suppl 3: 97-113.
- [3] Misch K, Wang HL. Implant surgery complications: etiology and treatment. *Implant Dent*. 2008; 17: 159-68.
- [4] Sadid-Zadeh R, Kutkut A, Kim H. Prosthetic failure in implant dentistry. *Dent Clin North Am*. 2015; 59: 195-214.
- [5] Vercruyssen M, Fortin T, Widmann G, Jacobs R, Quirynen M. Different techniques of static/dynamic guided implant surgery: modalities and indications. *Periodontol 2000*. 2014; 66: 214-27.
- [6] Raico Gallardo YN, da Silva-Olivio IRT, Mukai E, Morimoto S, Sesma N, Cordaro L. Accuracy comparison of guided surgery for dental implants according to the tissue of support: a systematic review and meta-analysis. *Clin Oral Implants Res*. 2017; 28: 602-12.
- [7] Jung RE, Schneider D, Ganeles J, Wismeijer D, Zwahlen M, Hammerle CH, et al. Computer technology applications in surgical implant dentistry: a systematic review. *Int J Oral Maxillofac Implants*. 2009; 24 Suppl: 92-109.
- [8] D'Haese J, Ackhurst J, Wismeijer D, De Bruyn H, Tahmaseb A. Current state of the art of computer-guided implant surgery. *Periodontol 2000*. 2017; 73: 121-33.
- [9] Panchal N, Mahmood L, Retana A, Emery R, 3rd. Dynamic Navigation for Dental Implant Surgery. *Oral Maxillofac Surg Clin North Am*. 2019; 31: 539-47.
- [10] Block MS. Static and Dynamic Navigation for Dental Implant Placement. *J Oral Maxillofac Surg*. 2016; 74: 231-3.
- [11] Aydemir CA, Arisan V. Accuracy of dental implant placement via dynamic navigation or the freehand method: A split-mouth randomized controlled clinical trial. *Clin Oral Implants Res*. 2020; 31: 255-63.
- [12] Pinter GT, Decker R, Szenasi G, Barabas P, Huszar T. Dynamic Navigation for Dental Implant Placement. *J Vis Exp*. 2022.
- [13] Mediavilla Guzman A, Riad Deglow E, Zubizarreta-Macho A, Agustin-Panadero R, Hernandez Montero S. Accuracy of Computer-Aided Dynamic Navigation Compared to Computer-Aided Static Navigation for Dental Implant Placement: An In Vitro Study. *J Clin Med*. 2019; 8 (12): 2123.
- [14] Lopes A, de Araujo Nobre M, Santos D. The Workflow of a New Dynamic Navigation System for the Insertion of Dental Implants in the Rehabilitation of Edentulous Jaws: Report of Two Cases. *J Clin Med*. 2020; 9 (2): 421.
- [15] Jorba-Garcia A, Gonzalez-Barnadas A, Camps-Font O, Figueiredo R, Valmaseda-Castellon E. Accuracy assessment of dynamic computer-aided implant placement: a systematic review and meta-analysis. *Clin Oral Investig*. 2021; 25: 2479-94.
- [16] Keßler A, Dosch M, Reymus M, Folwaczny M. Influence of 3D-printing method, resin material, and sterilization on the accuracy of virtually designed surgical implant guides. *J Prosthet Dent*. 2021; 128 (2).

- [17] Kessler A, Le V, Folwaczny M. Influence of the tooth position, guided sleeve height, supporting length, manufacturing methods, and resin E-modulus on the in vitro accuracy of surgical implant guides in a free-end situation. *Clin Oral Implants Res.* 2021; 32: 1097-104.
- [18] Le V, Kessler A, Folwaczny M. Influence of DLP and SLA printer technology on the accuracy of surgical guides for implant dentistry in free-end situations. *Int J Comput Dent.* 2023; 0: 0. doi: 10.3290/j.ijcd.b3774115. Online ahead of print.
- [19] Vercruyssen M, Laleman I, Jacobs R, Quirynen M. Computer-supported implant planning and guided surgery: a narrative review. *Clin Oral Implants Res.* 2015; 26 Suppl 11: 69-76.
- [20] Cassetta M, Altieri F, Giansanti M, Bellardini M, Brandetti G, Piccoli L. Is there a learning curve in static computer-assisted implant surgery? A prospective clinical study. *International journal of oral and maxillofacial surgery.* 2020; 49: 1335-42.
- [21] Kuhl S, Zurcher S, Mahid T, Muller-Gerbl M, Filippi A, Cattin P. Accuracy of full guided vs. half-guided implant surgery. *Clin Oral Implants Res.* 2013; 24: 763-9.
- [22] Bover-Ramos F, Vina-Almunia J, Cervera-Ballester J, Penarrocha-Diago M, Garcia-Mira B. Accuracy of Implant Placement with Computer-Guided Surgery: A Systematic Review and Meta-Analysis Comparing Cadaver, Clinical, and In Vitro Studies. *Int J Oral Maxillofac Implants.* 2018; 33: 101-15.
- [23] Van Assche N, Vercruyssen M, Coucke W, Teughels W, Jacobs R, Quirynen M. Accuracy of computer-aided implant placement. *Clin Oral Implants Res.* 2012; 23 Suppl 6: 112-23.
- [24] Arisan V, Karabuda CZ, Ozdemir T. Implant surgery using bone- and mucosa-supported stereolithographic guides in totally edentulous jaws: surgical and post-operative outcomes of computer-aided vs. standard techniques. *Clin Oral Implants Res.* 2010; 21: 980-8.
- [25] Fortin T, Bosson JL, Isidori M, Blanchet E. Effect of flapless surgery on pain experienced in implant placement using an image-guided system. *Int J Oral Maxillofac Implants.* 2006; 21: 298-304.
- [26] Hultin M, Svensson KG, Trulsson M. Clinical advantages of computer-guided implant placement: a systematic review. *Clin Oral Implants Res.* 2012; 23 Suppl 6: 124-35.
- [27] Divakar TK, Gidean Arularasan S, Baskaran M, Packiaraj I, Dhineksh Kumar N. Clinical Evaluation of Placement of Implant by Flapless Technique Over Conventional Flap Technique. *J Maxillofac Oral Surg.* 2020; 19: 74-84.
- [28] Flanagan D. Flapless dental implant placement. *J Oral Implantol.* 2007; 33: 75-83.
- [29] Malo P, de Araujo Nobre M, Lopes A. Three-Year Outcome of Fixed Partial Rehabilitations Supported by Implants Inserted with Flap or Flapless Surgical Techniques. *J Prosthodont.* 2016; 25: 357-63.
- [30] Jesch P, Jesch W, Bruckmoser E, Krebs M, Kladek T, Seemann R. An up to 17-year follow-up retrospective analysis of a minimally invasive, flapless approach: 18 945 implants in 7783 patients. *Clin Implant Dent Relat Res.* 2018; 20: 393-402.
- [31] Cassetta M, Giansanti M, Di Mambro A, Stefanelli LV. Accuracy of positioning of implants inserted using a mucosa-supported stereolithographic surgical guide in the edentulous maxilla and mandible. *Int J Oral Maxillofac Implants.* 2014; 29: 1071-8.
- [32] Widmann G, Bale RJ. Accuracy in computer-aided implant surgery--a review. *Int J Oral Maxillofac Implants.* 2006; 21: 305-13.
- [33] D'Haese J, Van De Velde T, Elaut L, De Bruyn H. A prospective study on the accuracy of mucosally supported stereolithographic surgical guides in fully edentulous maxillae. *Clin Implant Dent Relat Res.* 2012; 14 :293-303.

- [34] Marliere DAA, Demetrio MS, Picinini LS, Oliveira RG, Netto H. Accuracy of computer-guided surgery for dental implant placement in fully edentulous patients: A systematic review. *Eur J Dent*. 2018; 12: 153-60.
- [35] Schelbert T, Gander T, Blumer M, Jung R, Rucker M, Rostetter C. Accuracy of Computer-Guided Template-Based Implant Surgery: A Computed Tomography-Based Clinical Follow-Up Study. *Implant Dent*. 2019; 28: 556-63.
- [36] Tahmaseb A, Wismeijer D, Coucke W, Derksen W. Computer technology applications in surgical implant dentistry: a systematic review. *Int J Oral Maxillofac Implants*. 2014; 29 Suppl: 25-42.
- [37] Ozan O, Turkyilmaz I, Ersoy AE, McGlumphy EA, Rosenstiel SF. Clinical accuracy of 3 different types of computed tomography-derived stereolithographic surgical guides in implant placement. *J Oral Maxillofac Surg*. 2009; 67: 394-401.
- [38] Pozzi A, Polizzi G, Moy PK. Guided surgery with tooth-supported templates for single missing teeth: A critical review. *Eur J Oral Implantol*. 2016; 9 Suppl 1: S135-53.
- [39] El Kholy K, Janner SFM, Schimmel M, Buser D. The influence of guided sleeve height, drilling distance, and drilling key length on the accuracy of static Computer-Assisted Implant Surgery. *Clin Implant Dent Relat Res*. 2019; 21: 101-7.
- [40] Balaguer-Marti JC, Canet-Lopez A, Penarrocha-Diago M, Romeo-Rubio M, Penarrocha-Diago M, Garcia-Mira B. Influence of Splint Support on the Precision of Static Totally Guided Dental Implant Surgery: A Systematic Review and Network Meta-analysis. *Int J Oral Maxillofac Implants*. 2023; 38: 157-68.
- [41] Kessler A, Dosch M, Reymus M, Folwaczny M. Influence of 3D- printing method, resin material, and sterilization on the accuracy of virtually designed surgical implant guides. *J Prosthet Dent*. 2021; 128 (2). DOI:10.1016/j.prosdent.2020.08.038.
- [42] Probst FA, Schweiger J, Stumbaum MJ, Karampinos D, Burian E, Probst M. Magnetic resonance imaging based computer-guided dental implant surgery-A clinical pilot study. *Clin Implant Dent Relat Res*. 2020; 22: 612-21.

ZMK 7-8/2023 (39), 338-346

Prof. Dr. Clemens Walter

Modernes Biofilmmangement – sind Pulver-Wasserstrahl-Gemische eine Alternative?

- 1) Abdulbaqi HR, Shaikh MS, Abdulkareem AA, Zafar MS, Gul SS, Sha AM (2022). ["Efficacy of erythritol powder air-polishing in active and supportive periodontal therapy: A systematic review and meta-analysis."](#) Int J Dent Hyg **20**(1): 62-74.
- 2) Axelsson, P., B. Nystrom, et al. (2004). "The long-term effect of a plaque control program on tooth mortality, caries and periodontal disease in adults. Results after 30 years of maintenance." J Clin Periodontol **31**(9): 749-57.
- 3) Badersten, A., R. Nilveus, et al. (1981). "Effect of nonsurgical periodontal therapy. I. Moderately advanced periodontitis." J Clin Periodontol **8**(1): 57-72.
- 4) Badersten, A., R. Nilveus, et al. (1984). "Effect of nonsurgical periodontal therapy. II. Severely advanced periodontitis." J Clin Periodontol **11**(1): 63-76.
- 5) Badersten, A., R. Nilveus, et al. (1984). "Effect of nonsurgical periodontal therapy. III. Single versus repeated instrumentation." J Clin Periodontol **11**(2): 114-24.
- 6) Badersten, A., R. Nilveus, et al. (1985). "Effect of nonsurgical periodontal therapy. V. Patterns of probing attachment loss in non-responding sites." J Clin Periodontol **12**(4): 270-82.
- 7) Badersten, A., R. Nilveus, et al. (1985). "Effect of nonsurgical periodontal therapy. VII. Bleeding, suppuration and probing depth in sites with probing attachment loss." J Clin Periodontol **12**(6): 432-40.
- 8) Badersten, A., R. Nilveus, et al. (1987). "Effect of nonsurgical periodontal therapy (VIII). Probing attachment changes related to clinical characteristics." J Clin Periodontol **14**(7): 425-32.
- 9) Banerjee, A., G. Paolinelis, et al. (2008). "An in vitro investigation of the effectiveness of bioactive glass air-abrasion in the 'selective' removal of orthodontic resin adhesive." Eur J Oral Sci **116**(5): 488-92.
- 10) Berger, S. B., A. S. Coelho, et al. (2008). "Enamel susceptibility to red wine staining after 35% hydrogen peroxide bleaching." J Appl Oral Sci **16**(3): 201-4.

- 11) Braun A., J. S., Deimling D., Ratka-Krüger P. (2010). "Subjective intensity of pain during supportive periodontal treatment using a sonic scaler or an Er:YAG laser." J Clin Periodontol **37**: 340-345.
- 12) Bühler J, Schmidli F, Weiger R, Walter C (2015). „Analysis of the effects of air polishing powders containing sodium bicarbonate and glycine on human teeth.“ Clin Oral Investig **19**(4): 877-85.
- 13) Bühler J, Amato M, Weiger R, Walter C (2016). „A systematic review on the effects of air polishing devices on oral tissues.“ Int J Dent Hyg **14**(1):15-28.
- 14) Bühler J, Amato M, Weiger R, Walter C. (2016) „A systematic review on the patient perception of periodontal treatment using air polishing devices.“
i) Int J Dent Hyg **14**(1):4-14.
- 15) Janaphan K, Hill RG, Gillam D (2020). "Air-Polishing in Subgingival Root Debridement during Supportive Periodontal Care: A Review." J Orthod Craniofac Res **2**: 113. DOI: 10.29011/JOCR-113.100113
- 16) Eberhard, J., P. M. Jervoe-Storm, et al. (2008). "Full-mouth treatment concepts for chronic periodontitis: a systematic review." J Clin Periodontol **35**(7): 591-604.
- 17) Farman, M. and R. I. Joshi (2008). "Full-mouth treatment versus quadrant root surface debridement in the treatment of chronic periodontitis: a systematic review." Br Dent J **205**(9): E18; discussion 496-7.
- 18) Fux, C. A., P. Stoodley, et al. (2003). "Bacterial biofilms: a diagnostic and therapeutic challenge." Expert Rev Anti Infect Ther **1**(4): 667-83.
- 19) Lang, N. P., W. C. Tan, et al. (2008). "A systematic review of the effects of full-mouth debridement with and without antiseptics in patients with chronic periodontitis." J Clin Periodontol **35**(8 Suppl): 8-21.
- 20) Meyle J, Chapple I (2015). "Molecular aspects of the pathogenesis of periodontitis." Periodontol 2000 **69**(1):7-17.
- 21) Michalowicz, B. S., S. R. Diehl, et al. (2000). "Evidence of a substantial genetic basis for risk of adult periodontitis." J Periodontol **71**(11): 1699-707.
- 22) Moene, R., F. Decaillet, et al. (2010). "Subgingival plaque removal using a new air-polishing device." J Periodontol **81**(1): 79-88.
- 23) Onisor F, Mester A, Mancini L, Voinea A (2022). Effectiveness and Clinical Performance of Erythritol Air-Polishing in Non-Surgical Periodontal Therapy: A Systematic Review of Randomized Clinical Trials.
i) Medicina (Kaunas) **28**;58(7):866.

- 24) Paolinelis, G., A. Banerjee, et al. (2008). "An in vitro investigation of the effect and retention of bioactive glass air-abrasive on sound and carious dentine." J Dent **36**(3): 214-8.
- 25) Petersilka, G., C. M. Faggion, Jr., et al. (2008). "Effect of glycine powder air-polishing on the gingiva." J Clin Periodontol **35**(4): 324-32.
- 26) Petersilka, G. J., M. Bell, et al. (2003). "Root defects following air polishing." J Clin Periodontol **30**(2): 165-70.
- 27) Petersilka, G. J., D. Steinmann, et al. (2003). "Subgingival plaque removal in buccal and lingual sites using a novel low abrasive air-polishing powder." J Clin Periodontol **30**(4): 328-33.
- 28) Sanz M, Herrera D, Kebschull M, Chapple I, Jepsen S, Beglundh T, Sculean A, Tonetti MS; EFP Workshop Participants and Methodological Consultants (2020). Treatment of stage I-III periodontitis-The EFP S3 level clinical practice guideline. J Clin Periodontol **47** (Suppl 22): 4-60.
- 29) Sauro, S., T. F. Watson, et al. (2010). "Dentine desensitization induced by prophylactic and air-polishing procedures: an in vitro dentine permeability and confocal microscopy study." J Dent **38**(5): 411-22.
- 30) Slot, D. E., C. E. Dörfer, et al. (2008). "The efficacy of interdental brushes on plaque and parameters of periodontal inflammation: a systematic review." Int J Dent Hyg **6**(4): 253-64.
- 31) Socransky, S. S. and A. D. Haffajee (2002). "Dental biofilms: difficult therapeutic targets." Periodontol 2000 **28**: 12-55.
- 32) Stein JM, Yekta-Michael SS, Schittenhelm F, Reichert S, Kupietz D, Dommisch H, Kasaj A, Wied S, Vela OC, Stratul SI. (2021). "Comparison of three full-mouth concepts for the non-surgical treatment of stage III and IV periodontitis: A randomized controlled trial." J Clin Periodontol **48**(12):1516-1527.
- 33) Suvan J, Leira Y, Moreno Sancho FM, Graziani F, Derks J, Tomasi C (2020). "Subgingival instrumentation for treatment of periodontitis. A systematic review." J Clin Periodontol **47** Suppl 22:155-175.
- 34) von Troil, B., I. Needleman, et al. (2002). "A systematic review of the prevalence of root sensitivity following periodontal therapy." J Clin Periodontol **29** Suppl 3: 173-7; discussion 195-6.
- 35) Walter, C., G. Krastl, et al. (2008). "Step-wise treatment of two periodontal-endodontic lesions in a heavy smoker." Int Endod J **41**(11): 1015-23.

- 36)Walter, C., U. P. Saxer, et al. (2007). "[Impact of tobacco use on the periodontium--an update (I)--Part 1: Epidemiologic und pathogenetic aspects of tobacco-related periodontal diseases]." Schweiz Monatsschr Zahnmed **117**(1): 45-60.
- 37)Wennström JL, Tomasi C, Bertelle A, Dellasega E (2005). "Full-mouth ultrasonic debridement versus quadrant scaling and root planing as an initial approach in the treatment of chronic periodontitis". J Clin Periodontol **32**(8):851-9.
- 38)Zappa, U., B. Smith, et al. (1991). "Root substance removal by scaling and root planing." J Periodontol **62**(12): 750-4.