

Parodontitis und ihre Wechselwirkung mit dem Gesamtorganismus

Risikofaktor Parodontitis

Ein Beitrag von Dr. Alexander Müller-Busch MSc und Dr. Nadja Tzinis MSc



Literaturangabe

- [1] Chapple ILC, Bouchard P, Cagetti MG, Campus G, Carra M-C, Cocco F, Nibali L, Hujoel P, Laine ML, Lingström P, Manton DJ, Montero E, Pitts N, Range H, Schlueter N, Teughels W, Twetman S, Van Loveren C, Van der Weijden F, Vieira AR, Schulte AG. Interaction of lifestyle, behaviour or systemic diseases with dental caries and periodontal diseases: consensus report of group 2 of the joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases. *J Clin Periodontol* 2017; 44 (Suppl. 18): S39-S51.
- [2] Consensus report. Periodontal diseases: pathogenesis and microbial factors. *Ann Periodontol.* 1996 Nov;1(1):926-32. doi: 10.1902/annals.1996.1.1.926.
- [3] Darveau RP. Periodontitis: a polymicrobial disruption of host homeostasis. *Nat Rev Microbiol* 2010; 8(7):481-490.
- [4] DMS V
- [5] Dommisch H, Jepsen S. Diverse functions of defensins and other antimicrobial peptides in periodontal tissues. *Periodontol* 2000 2015; 69: 96-110.
- [6] Dommisch H, Kebschull M, Jepsen S. Allgemeine Gesundheit und Parodontitis. *ZM* 2017; 107: 46-54.
- [7] Dorfer, C. E., Becher, H., Ziegler, C. M., Kaiser, C., Lutz, R., Jorss, D., . . . Grau, A. J. (2004). The association of gingivitis and periodontitis with ischemic stroke. *J Clin Periodontol*, 31(5), 396-401. doi:10.1111/j.1600-051X.2004.00579.x
- [8] Dortbudak, O., Eberhardt, R., Ulm, M., & Persson, G. R. (2005). Periodontitis, a marker of risk in pregnancy for preterm birth. *J Clin Periodontol*, 32(1), 45-52. doi:10.1111/j.1600-051X.2004.00630.x
- [9] Franceschi C, Bonafè M, Valensin S, Olivieri F, De Luca M, Ottaviani E, De Benedictis G. Inflamm-aging. An evolutionary perspective on immunosenescence. *Ann N Y Acad Sci* 2000; 908:244-254.
- [10] GBD 2015. Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016; 388:1545–1602
- [11] Guo, Y., Nguyen, K. A., & Potempa, J. (2010). Dichotomy of gingipains action as virulence factors: from cleaving substrates with the precision of a surgeon's knife to a meat chopper-like brutal degradation of proteins. *Periodontol* 2000, 54(1), 15-44. doi:10.1111/j.1600-0757.2010.00377.x
- [12] Henderson, B., Nair, S. P., Ward, J. M., & Wilson, M. (2003). Molecular pathogenicity of the oral opportunistic pathogen *Actinobacillus actinomycetemcomitans*. *Annu Rev Microbiol*, 57, 29-55. doi:10.1146/annurev.micro.57.030502.090908
- [13] Holt, S. C., & Ebersole, J. L. (2005). *Porphyromonas gingivalis*, *Treponema denticola*, and *Tannerella forsythia*: the „red complex“, a prototype polybacterial pathogenic consortium in periodontitis. *Periodontol* 2000, 38, 72-122. doi:10.1111/j.1600-0757.2005.00113.x
- [14] Hujoel PP, Lingström P. Nutrition, dental caries, and periodontal disease: a practical overview. *J Clin Periodontol* 2017; 44(Suppl.18):79-84.
- [15] Hujoel P. Dietary carbohydrates and dental-systemic diseases. *J Dent Res* 2009; 88:490-502.
- [16] Ishihara K. Virulence factors of *Treponema denticola* *Periodontol* 2000 2010 Oct;54(1):117-35. doi: 10.1111/j.1600-0757.2009.00345.x.
- [17] Iwasaki M, Yoshihara A, Moynihan P, Watanabe R, Taylor GW, Miyazaki H. Longitudinal relationship between dietary omega-3 fatty acids and periodontal disease. *Nutrition* 2010; 26:1105-1109.
- [18] Jepsen K, Jepsen S. Antibiotics/antimicrobials: systemic and local administration in the therapy of mild to moderately advanced periodontitis. *Periodontology* 2000 2016; 71(1):82-112.
- [19] Jepsen S, Dommisch H. Die parodontale Entzündung. *ZM* 2014; 104:32-40.
- [20] Jockel-Schneider, Y., Bechtold, M., Haubitz, I., Stork, S., Fickl, S., Harks, I., . . . Schlagenhauf, U. (2018). Impact of anti-infective periodontal therapy on parameters of vascular health. *J Clin Periodontol*, 45(3), 354-363. doi:10.1111/jcpe.12849
- [21] Jockel-Schneider, Y., Harks, I., Haubitz, I., Fickl, S., Eigenthaler, M., Schlagenhauf, U., & Baulmann, J. (2014). Arterial stiffness and pulse wave reflection are increased in patients suffering from severe periodontitis. *PLoS One*, 9(8), e103449. doi:10.1371/journal.pone.0103449
- [22] Jordan, R. A., Bodechtel, C., Hertrampf, K., Hoffmann, T., Kocher, T., Nitschke, I., . . . Group, D. V. S. I. (2014). The Fifth German Oral Health Study (Fünfte Deutsche Mundgesundheitsstudie, DMS V) - rationale, design, and methods. *BMC Oral Health*, 14, 161. doi:10.1186/1472-6831-14-16

- [23] Kebschull et al., 2017, Zahnärztliche Mitteilungen Nr. 01-02, S. 72-79
- [24] Kebschull M, Papapanou PN. Periodontal microbial complexes associated with specific cell and tissue responses. *J Clin Periodontol* 2011; 38 (Suppl 11):17-27.
- [25] Keijsers, B. J., Zaura, E., Huse, S. M., van der Vossen, J. M., Schuren, F. H., Montijn, R. C., . . . Crielaard, W. (2008). Pyrosequencing analysis of the oral microflora of healthy adults. *J Dent Res*, 87(11), 1016-1020. doi:10.1177/154405910808701104
- [26] Khader, Y. S., & Ta'ani, Q. (2005). Periodontal diseases and the risk of preterm birth and low birth weight: a meta-analysis. *J Periodontol*, 76(2), 161-165. doi:10.1902/jop.2005.76.2.161
- [27] Kilian M, Chapple IL, Hannig M, Marsh PD, Meuric V, Pedersen AM, Tonetti MS, Wade WG, Zaura E. The oral microbiome - an update for oral healthcare professionals. *Br Dent J* 2016; 221(10):657-666.
- [28] Kolenbrander, P. E., & London, J. (1993). Adhere today, here tomorrow: oral bacterial adherence. *J Bacteriol*, 175(11), 3247-3252. doi:10.1128/jb.175.11.3247-3252.1993
- [29] Koziel, J., Karim, A. Y., Przybyszewska, K., Ksiazek, M., Rapala-Kozik, M., Nguyen, K. A., & Potempa, J. (2010). Proteolytic inactivation of LL-37 by karilysin, a novel virulence mechanism of *Tannerella forsythia*. *J Innate Immun*, 2(3), 288-293. doi:10.1159/000281881
- [30] Leira, Y., Seoane, J., Blanco, M., Rodriguez-Yanez, M., Takkouche, B., Blanco, J., & Castillo, J. (2017). Association between periodontitis and ischemic stroke: a systematic review and meta-analysis. *Eur J Epidemiol*, 32(1), 43-53. doi:10.1007/s10654-016-0170-6
- [31] Listl S, Galloway J, Mossey PA, Marcenes W. Global economic impact of dental diseases. *J Dent Res* 2015; 94:1355-1361.
- [32] Meyle J, Chapple I. Molecular aspects of the pathogenesis of periodontitis. *Periodontol* 2000. 2015; 69(1):7-17.
- [33] Mira A, Simon-Soro A, Curtis MA. Role of microbial communities in the pathogenesis of periodontitis and caries. *J Clin Periodontol* 2017; 44(Suppl.18):23-38.
- [34] Offenbacher, S., Katz, V., Fertik, G., Collins, J., Boyd, D., Maynor, G., . . . Beck, J. (1996). Periodontal Infection as a Possible Risk Factor for Preterm Low Birth Weight. *J Periodontol*(October), 1103-1113.
- [35] Sanz M, Beighton D, Curtis MA, Cury J, Dige I, Dommisch H, Ellwood R, Giacaman R, Herrera D, Herzberg MC, Könönen E, Marsh PD, Meyle J, Mira A, Molina A, Mombelli A, Quirynen M, Reynolds E, Shapira L, Zaura E. Role of microbial biofilms in the maintenance of oral health and in the development of dental caries and periodontal diseases. Consensus report of group 1 of the Joint EFP/ORCA workshop on the boundaries between caries and periodontal disease. *J Clin Periodontol* 2017; 44(Suppl 18):5-11.
- Schlagenhauf U. Probiotika für die PAR-Therapie. *ZM* 2017; 107: 40-45.
- Socransky, S., Haffajee, A., Cugini, M., Smith, C., & Kent Jr, R. (1998). Microbial complexes in subgingival plaque. *Journal of Clinical Periodontology*, 25(2), 134-144.
- van der Velden U, Kuzmanova D, Chapple ILC. Micro-nutritional approaches to periodontal therapy. *J Clin Periodontol*. 2011;38 (Suppl. 11):142-158.
- Wölber JP, Bremer K, Vach K, König D, Hellwig E, Ratka-Kruger P, Al Ahmad A, Tennert C. An oral health optimized diet can reduce gingival and periodontal inflammation in humans - a randomized controlled pilot study. *BMC Oral Health* 2016; 17(1):28.
- Wölber J & Tennert C. Parodontitis und Ernährung. *ZM* 2017; 107: 32-39.

Weiterführende Literatur:

Boillot A, El Halabi B, Batty GD, Range H, Czernichow S, Bouchard P. Education as a predictor of chronic periodontitis: a systematic review with meta-analysis population-based studies. *PLoS ONE* 2011; 6: e21508.

Chambrone L, Preshaw PM, Rosa EF, Heasman PA, Romito GA, Pannuti CM, Tu YK. Effects of smoking cessation on the outcomes of non-surgical periodontal therapy: a systematic review and individual patient data meta-analysis. *J Clin Periodontol* 2013; 40(6):607-615.

Cho I, Blaser MJ. The human microbiome: at the interface of health and disease. *Nat Rev Genet* 2012; 13(4):260-270.

Costa FO, Cota LO, Lages EJ, Cyrino RM, Oliveira AM, Oliveira PA, Cortelli JR. Associations of duration of smoking cessation and cumulative smoking exposure with periodontitis. *J Oral Sci* 2013; 55(3):245-253.

Dietrich T, Walter C, Oluwagbemigun K, Bergmann M, Pischon T, Pischon N, Boeing H. Smoking, Smoking Cessation, and

Risk of Tooth Loss: The EPIC-Potsdam Study. *J Dent Res* 2015; 94(10):1369-75.

Divaris K, Monda K, North KE, Olshan AF, Lange EM, Moss K, Barros SP,

Ebersole JL, Graves CL, Gonzalez OA, Dawson D 3rd, Morford LA, Huja PE, Hartsfield JK Jr, Huja SS, Pandruvada S, Walle SM. Aging, inflammation, immunity and periodontal disease. *Periodontol* 2000 2016; 72(1):54-75

Fiorini T, Musskopf ML, Oppermann RV, Susin C. Is there a positive effect of smoking cessation on periodontal health? A systematic review. *J Periodontol* 2014; 85(1):83-91.

Genco RJ, Borgnakke WS. Risk factors for periodontal disease. *Periodontol* 2000 2013; 62(1):59-94.

Hajishengallis G. Immunomicrobial pathogenesis of periodontitis: keystones, pathobionts, and host response. *Trends Immunol* 2014a; 35(1):3-11.

- Hajishengallis G. The inflammophilic character of the periodontitis-associated microbiota. *Mol Oral Microbiol* 2014b;29(6):248-257
- Hajishengallis G. Aging and its Impact on Innate Immunity and Inflammation: Implications for Periodontitis. *J Oral Biosci* 2014c; 56(1):30-37.
- Hajishengallis G, Lamont RJ. Dancing with the Stars: How Choreographed Bacterial Interactions Dictate Nososymbiocity and Give Rise to Keystone Pathogens, Accessory Pathogens, and Pathobionts. *Trends Microbiol* 2016; 24(6):477-489.
- Heasman L, Stacey F, Preshaw PM, McCracken GI, Hepburn S, Heasman PA. The effect of smoking on periodontal treatment response: a review of clinical evidence. *J Clin Periodontol*. 2006; 33: 241-253.
- Jepsen S, Blanco J, Buchalla W, Carvalho JC, Dietrich T, Dörfer C, Eaton KA, Figuero E, Frencken JE, Graziani F, Higham SM, Kocher T, Maltz M, Ortiz-Vigon A, Schmoekel J, Sculean A, Tenuta LMA, van der Veen MH, Machiulskiene V. Prevention and control of dental caries and periodontal diseases at individual and population level: consensus report of group 3 of joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases. *J Clin Periodontol* 2017; 44(Suppl 18):85-93.
- Kebschull M, Jepsen S, Dommisch H. Parodontitistherapie – invasiv/nicht-invasiv oder beides? *ZM im Druck*
- Laine M, Jepsen S, Loos BG. Progress in the Identification of Genetic Factors in Periodontitis *Curr Oral Health Rep* 2014; 1: 272-278.
- Lamont RJ, Hajishengallis G. Polymicrobial synergy and dysbiosis in inflammatory disease. *Trends Mol Med* 2015; 21(3):172-183.
- Loos BG, Roos MT, Schellekens PT, van der Velden U, Miedema F. Lymphocyte numbers and function in relation to periodontitis and smoking. *J Periodontol* 2004; 75:557-564.
- Loos BG, Papantonopoulos G, Jepsen S, Laine ML. What is the Contribution of Genetics to Periodontal Risk? *Dent Clin North Am* 2015; 59(4):761-780.
- Marsh PD. Are dental diseases examples of ecological catastrophes? *Microbiology* 2003; 149(Pt 2):279-94.
- Marsh PD, Zaura E. Dental plaque biofilm: ecological interactions in health and disease. *J Clin Periodontol* 2017; 44(Suppl. 18):12-22.
- Nibali L, Di Iorio A, Tu YK, Vieira AR. Host genetics role in the pathogenesis of periodontal disease and caries. *J Clin Periodontol* 2017; 44 Suppl 18:S52-S78.
- Nibali L, Di Iorio A, Onabolu O, Lin GH. Periodontal infectogenomics: systematic review of associations between host genetic variants and subgingival microbial detection. *J Clin Periodontol* 2016; 43(11):889-900.
- Nociti FH Jr, Casati MZ, Duarte PM. Current perspective of the impact of smoking on the progression and treatment of periodontitis. *Periodontology* 2000, 2015; 67:187-210.
- Palmer RM, Wilson RF, Hasan AS, Scott DA. Mechanisms of action of environmental actors–tobacco smoking. *J Clin Periodontol* 2005; 32 (Suppl. 6):180-195.
- Preshaw PM, Henne K, Taylor JJ, Valentine RA, Conrads G. Age-related changes in immune function (immune senescence) in caries and periodontal diseases: a systematic review. *J Clin Periodontol* 2017; 44 Suppl 18:S153-S177
- Rosa EF, Corraini P, Inoue G, Gomes EF, Guglielmetti MR, Sanda SR, Lotufo JP, Romito GA, Pannuti CM. Effect of smoking cessation on non-surgical periodontal therapy: results after 24 months. *J Clin Periodontol* 2014; 41(12):1145-1153.
- Schäfer A, Dommisch H, Jepsen S. Genetische Risikofaktoren *ZM* 2015; 105, Nr. 10 A, 16.5.2015
- Sender R, Fuchs S, Milo R. Are We Really Vastly Outnumbered? Revisiting the Ratio of Bacterial to Host Cells in Humans. *Cell* 2016; 164(3):337-340.
- Shiau HJ, Reynolds MA. Sex differences in destructive periodontal disease: a systematic review. *J Periodontol* 2010; 81:1379-1389.
- Tonetti MS, Jepsen S, Jin L, Otomo-Corgel J. Impact of the global burden of periodontal diseases on health, nutrition and wellbeing of mankind: A call for global action. *J Clin Periodontol*. 2017a;44(5):456-462.
- Tonetti MS, Bottenberg P, Conrads G, Eickholz P, Heasman P, Huysmans M-C, Lopez R, Madianos P, Müller F, Needleman I, Nyvad B, Preshaw PM, Pretty I, Renvert S, Schwendicke F, Trombelli L, van der Putten G-J, Vanobbergen J, West N, Young A, Paris S. Dental caries and periodontal diseases in the ageing population: call to action to protect and enhance oral health and well-being as an essential component of healthy ageing–Consensus report of group 4 of the joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases. *J Clin Periodontol* 2017b; 44(Suppl 18):135-144.
- Dorfer, C. E., Becher, H., Ziegler, C. M., Kaiser, C., Lutz, R., Jorss, D., . . . Grau, A. J. (2004). The association of gingivitis and periodontitis with ischemic stroke. *J Clin Periodontol*, 31(5), 396-401. doi:10.1111/j.1600-051x.2004.00579.x
- Dortbudak, O., Eberhardt, R., Ulm, M., & Persson, G. R. (2005). Periodontitis, a marker of risk in pregnancy for preterm birth. *J Clin Periodontol*, 32(1), 45-52. doi:10.1111/j.1600-051x.2004.00630.x
- Guo, Y., Nguyen, K. A., & Potempa, J. (2010). Dichotomy of gingipains action as virulence factors: from cleaving substrates with the precision of a surgeon's knife to a meat chopper-like brutal degradation of proteins. *Periodontol* 2000, 54(1), 15-44. doi:10.1111/j.1600-0757.2010.00377.x
- Henderson, B., Nair, S. P., Ward, J. M., & Wilson, M. (2003). Molecular pathogenicity of the oral opportunistic pathogen *Actinobacillus actinomycetemcomitans*. *Annu Rev Microbiol*, 57, 29-55. doi:10.1146/annurev.micro.57.030502.090908
- Holt, S. C., & Ebersole, J. L. (2005). *Porphyromonas gingivalis*, *Treponema denticola*, and *Tannerella forsythia*: the „red complex“, a prototype polybacterial pathogenic consortium in periodontitis. *Periodontol* 2000, 38, 72-122. doi:10.1111/j.1600-0757.2005.00113.x
- Jockel-Schneider, Y., Bechtold, M., Haubitz, I., Stork, S., Fickl, S., Harks, I., . . . Schlagenhauf, U. (2018). Impact of anti-infective periodontal therapy on parameters of vascular health. *J Clin Periodontol*, 45(3), 354-363. doi:10.1111/jcpe.12849
- Jockel-Schneider, Y., Harks, I., Haubitz, I., Fickl, S., Eigenthaler, M., Schlagenhauf, U., & Baulmann, J. (2014). Arterial stiffness and pulse wave reflection are increased in patients suffering

from severe periodontitis. *PLoS One*, 9(8), e103449. doi:10.1371/journal.pone.0103449

Jordan, R. A., Bodechtel, C., Hertrampf, K., Hoffmann, T., Kocher, T., Nitschke, L., . . . Group, D. V. S. I. (2014). The Fifth German Oral Health Study (Fünfte Deutsche Mundgesundheitsstudie, DMS V) - rationale, design, and methods. *BMC Oral Health*, 14, 161. doi:10.1186/1472-6831-14-161

Keijser, B. J., Zaura, E., Huse, S. M., van der Vossen, J. M., Schuren, F. H., Montijn, R. C., . . . Crielaard, W. (2008). Pyrosequencing analysis of the oral microflora of healthy adults. *J Dent Res*, 87(11), 1016-1020. doi:10.1177/154405910808701104

Khader, Y. S., & Ta'ani, Q. (2005). Periodontal diseases and the risk of preterm birth and low birth weight: a meta-analysis. *J Periodontol*, 76(2), 161-165. doi:10.1902/jop.2005.76.2.161

Kolenbrander, P. E., & London, J. (1993). Adhere today, here tomorrow: oral bacterial adherence. *J Bacteriol*, 175(11), 3247-3252. doi:10.1128/jb.175.11.3247-3252.1993

Koziel, J., Karim, A. Y., Przybyszewska, K., Ksiazek, M., Rapala-Kozik, M., Nguyen, K. A., & Potempa, J. (2010). Proteolytic inactivation of LL-37 by karilysin, a novel virulence mechanism of *Tannerella forsythia*. *J Innate Immun*, 2(3), 288-293. doi:10.1159/000281881

Leira, Y., Seoane, J., Blanco, M., Rodriguez-Yanez, M., Takkouche, B., Blanco, J., & Castillo, J. (2017). Association between periodontitis and ischemic stroke: a systematic review and meta-analysis. *Eur J Epidemiol*, 32(1), 43-53. doi:10.1007/s10654-016-0170-6

Offenbacher, S., Katz, V., Fertik, G., Collins, J., Boyd, D., Maynor, G., . . . Beck, J. (1996). Periodontal Infection as a Possible Risk Factor for Preterm Low Birth Weight. *J Periodontol*(October), 1103-1113.

Socransky, S., Haffajee, A., Cugini, M., Smith, C., & Kent Jr, R. (1998). Microbial complexes in subgingival plaque. *Journal of Clinical Periodontology*, 25(2), 134-144.