

Erfolgreiche Periimplantitistherapie 3.0 – Fake News oder Good News?

Dr. Benjamin Hundeshagen

ZMK 9 (24) 2019, 562-568

[1] Derks, J. & Tomasi, C. (2014) Peri-implant health and disease. A systematic review of current epidemiology. J Clin Periodontol

[2] Jepsen, S., Berglundh, T., Genco, R., Aass, A. M., Demirel, K., Derks, J., Figuero, E., Giovannoli, J. L., Goldstein, M., Lambert, F., Ortiz-Vigon, A., Polyzois, I., Salvi, G. E., Schwarz, F., Serino, G., Tomasi, C. & Zitzmann, N. U. (2015) Primary prevention of peri-implantitis: managing peri-implant mucositis. J Clin Periodontol 42 Suppl 16: S152-157

[3] Koldstad, O. C., Scheie, A. A. & Aass, A. M. (2011) The association between selected risk indicators and severity of peri-implantitis using mixed model analyses. J Clin Periodontol 38: 285-292

[4] Ladwein, C., Schmelzeisen, R., Nelson, K., Fluegge, T. V. & Fretwurst, T. (2015) Is the presence of keratinized mucosa associated with periimplant tissue health? A clinical cross-sectional analysis. International Journal of Implant Dentistry

[5] Lang, N. P., Berglundh, T. & Working Group 4 of Seventh European Workshop on, P. (2011b) Periimplant diseases: where are we now? Consensus of the Seventh European Workshop on Periodontology. J Clin Periodontol 38 Suppl 11: 178-181.

[6] Lin, G. H., Chan, H. L. & Wang, H. L. (2013) The Significance of Keratinized Mucosa on Implant Health: A Systematic Review. J Periodontol

[7] Linkevicius, T., Puisys, A., Vindasiute, E., Linkeviciene, L. & Apse, P. (2012) Does residual cement around implant-supported restorations cause peri-implant disease? A retrospective case analysis. Clin Oral Implants Res

[8] Presseinformation, DGI e.V. 2018

[9] Renvert, S. & Polyzois, I. (2014) Risk indicators for peri-implant mucositis: A systematic literature review. J Clin Periodontol

[10] Salvi, G. E. & Ramseier, C. A. (2014) Efficacy of patient-administered mechanical and/or chemical plaque control protocols in the management of peri-implant mucositis. A systematic review. J Clin Periodontol

[11] Schwarz, F. & Becker, J. (2015) Periimplantäre Infektionen. Ein Update zur Epidemiologie, Ätiologie, Diagnostik, Prävention und Therapie. Quintessenz Implantologie 23: 1-13

[12] Schwarz, F., Sahm, N. & Becker, J. (2012b) Impact of the outcome of guided bone regeneration in dehiscence-type defects on the long-term stability of peri-implant health: clinical observations at 4 years. Clin Oral Implants Res 23: 191-196

[13] Schwarz, F., Becker, K. & Sager, M. (2015b) Efficacy of professionally administered plaque removal with or without adjunctive measures for the treatment of peri-implant mucositis. A systematic review and meta-analysis. J Clin Periodontol 42 Suppl 16: S202-213

[14] Schwarz, F., Becker, K., Sahm, N., Horstkemper, T., Rousi, K. & Becker, J. (2015d) The prevalence of peri-implant diseases for two-piece implants with an internal tube-in-tube connection: a cross-sectional analysis of 512 implants. Clin Oral Implants Res.

Innovative Wasseraufbereitung für die Zahnarztpraxis

Dr. Christian Ehrensberger

ZMK 9 (35), S 606-608

Literatur

- [1] Walker JT, Bradshaw DJ, Bennett AM, Fulford MR, Martin MV, Marsh PD: Microbial biofilm formation and contamination of dental-unit water systems in general dental practice. *Appl Environ Microbiol* 66 (8), 3363–3367 (2000).
- [2] Barbeau J: Lawsuit against a dentist related to serious ocular infection possibly linked to water from a dental handpiece. *JCDA* 73 (7), 618–622 (2007).
- [3] Singh TS, Bello B, Mabe OD, Renton K, Jeehay MF: Workplace determinants of endotoxin exposure in dental healthcare facilities in South Africa. *Ann Occup Hyg* 54 (3), 299–308 (2010).
- [4] Siang MM, Yunus Z, Yunus ARM, Ahmad Z, Toosa H: The microbiological quality of water from dental unit waterlines in Malaysian Armed Forces dental centres. *Arch Orofac Sci* 7 (1), 14–20 (2012).
- [5] Ankjærgaard SK, Nielsen GA: Ich habe den Sensenmann schon vor der Tür stehen sehen. *TANDLÆGEBLADET* 121 (6), 542–546 (2017).
- [6] Muschinsky N: Problematik der Keimbelastung wasserführender Dentaleinheiten in der Universitätsmedizin Göttingen unter besonderer Berücksichtigung von *Legionella pneumophila* – Bestandsaufnahme und Möglichkeiten der Keimreduzierung. Inaugural-Dissertation zur Erlangung des Doktorgrades der Medizinischen Fakultät der Georg-August-Universität zu Göttingen. Göttingen (2014).
- [7] Leoni E, Dallolio L, Stagni F, Sanna T, D'Alessandro G, Piana G: Impact of a risk management plan on *Legionella* contamination of dental unit water. *Int J Environ Res Public Health* 12, 2344–2358 (2015).
- [8] Wie zitiert in: Dr. Rainer Uhl: Wasserhygiene in der Zahnarztpraxis – Gestern und heute. Manuskript liegt dem Autor vor.
- [9] Dr. med. dent. Simonis, Projektleiterin „Wirksamkeitsüberprüfung des BacTerminator in zahnärztlichen Behandlungseinheiten“. Untersuchungszeitraum: 2013 bis 2016.

Literatur

- [1] Gorur A., Lyle D.M., Schaudinn C., Costerton J.W.: Biofilm removal with a dental water jet. *Compend Cont Educ Dent.* 2009;30(Special issue 1):1-6. <https://www.ncbi.nlm.nih.gov/pubmed/19385349>.
- [2] Barnes C.M., Russell C.M., Reinhardt R.A., et al.: Comparison of irrigation to floss as an adjunct to tooth brushing: Effect on bleeding, gingivitis and supragingival plaque. *J Clin Dent.* 2005;16:71-77. <https://www.ncbi.nlm.nih.gov/pubmed/16305005>.
- [3] Sharma N.C., Lyle D.M., Qaqish J.G., et al.: Effect of a dental water jet with orthodontic tip on plaque and bleeding in adolescent patients with fixed orthodontic appliances. *Am J Orthod Dentofacial Orthop.* 2008;133:565-571. <https://www.ncbi.nlm.nih.gov/pubmed/18405821>.
- [4] Rosema, N.A.M., Hennequin-Hoenderdos, N.L., Berchier, C.E., et al.: The effect of different interdental cleaning devices on gingival bleeding. *J Int Acad Periodontol.* 2011;13:2-10. <https://www.ncbi.nlm.nih.gov/pubmed/21387981>.
- [5] Magnuson B., Harsono M., Stark P.C., et al.: Comparison of the effect of two interdental cleaning devices around implants on the reduction of bleeding. A 30-day randomized clinical trial. *Compend of Contin Educ in Dent.* 2013; 34(Special Issue 8):2-7. <https://www.ncbi.nlm.nih.gov/pubmed/24568169>
- [6] Jolkovsky, D.L. et al.: *Compendium of Continuing Education in Dentistry* 2015; 36(2):2-5. <https://www.waterpik.com/oral-health/pro/clinical-research/water-flosser-proven-safe-review-2015/>.
- [7] Waterpik Water Flosser first in its class to earn ADA Seal; *ADA News*, Februar, 2017 (abgerufen im November 2018).

Pro-Arch-Versorgung mit dem neuen BLX-Implantatsystem

Dr. Jonas Lehner, Eberhard Donhauser

ZMK 9 (35) 588-592

1. Nickenig HJ, Wichmann M, Terheyden H, Kreppel M: Oral health-related quality of life and implant therapy: A prospective multicenter study of preoperative, intermediate, and posttreatment assessment. *J Craniomaxillofac Surg.* 2016 Mar 4. pii: S 1010-5182 (16) 00068-8.
2. Retrospective Evaluation of the first 100 Straumann ProArch cases vs. The last 100 Nobel all-on-4 cases performed at the Minneapolis ClearChoice clinics, Dr. Eckert, USA (laufende Studie)
3. Papaspyridakos P et al. Implant loading protocols for edentulous patients with fixed prostheses: a systematic review and meta-analysis. *Int J Oral Maxillofac Implant* (2014)
4. Maló P, Rangert B, Nobre M.: "All-on-Four" immediate-function concept with Brånemark System implants for completely edentulous mandibles: a retrospective clinical study. *Clin Implant Dent Relat Res.* 2003;5 Suppl 1:2-9.
5. Polido W et al. Number of implants placed for complete arch fixed rehabilitation. A systemic review and meta-analysis. Submitted and accepted for publication by Clinical Oral Implants Research. *Clinical Oral Implants Research.* 2018 June.
6. Carames J. A comprehensive classification to full arch implant rehabilitation. Submitted to BMC Oral Health, October 2017.
7. Wei-Shao Lin1 | Steven E. Eckert Clinical performance of intentionally tilted implants versus axially positioned implants: A systematic review *Clin Oral Impl Res.* 2018; 29 (Suppl. 16): 78–105.
8. Patil MS, Patil SB.: Geriatric patient - psychological and emotional considerations during dental treatment. *Gerodontology.* 2009 Mar; 26(1): 72-7.
9. Heitz-Mayfield LJ et al. History of treated periodontitis and smoking as risks for implant therapy, *Int J Oral Maxillofac Implants* (2009)
10. B Pommer, L Fürhauser, Sofortversorgung mit provisorischen Implantatbrücken, Sonderausgabe Zahnkrone – Das Sofortimplantat; 2015: S. 17-19
11. CRESPI R, VINCI R, CAPPARE P, ROMANOS GE , GHERLONE E. A clinical study of edentulous patients rehabilitated according to the "all on four" immediate function protocol. *Int J Oral Maxillofac Implants* 2012; 27: 428-434
12. Ikarashi Y, Toyoda K., Kobayashi E, Doi H., Yoneyama T.: Improved Biocompatibility of Titanium--Zirconium (Ti--Zr) Alloy: Tissue Reaction and Sensitization to Ti--Zr Alloy Compared with Pure Ti and Zr in Rat Implantation Study (2005). *Materials Transactions* 46 (10): 2260-2267.
13. Kobayashi E, Matsumoto S, Doi H, Yoneyama T, Hamanaka H: Mechanical properties of the binary titanium-zirconium alloys and their potential for biomedical materials. *J Biomed Mater Res.* 1995 Aug; 29(8): 943-50.

Implantatgetragene Frontzahnversorgung bei einer Herz-Kreislauf-Patientin

Dr. Gewalt Muhle

ZMK 9 (35), S. 582-586

- 1 Robert Koch-Institut (Hrsg.), Gesundheit in Deutschland. Gesundheitsberichterstattung des Bundes. Gemeinsam getragen von RKI und Destatis. RKI, Berlin 2015. Online abrufbar unter: https://www.destatis.de/DE/Publikationen/Thematisch/Gesundheit/Gesundheitszustand/GesundheitInDeutschlandPublikation.pdf?__blob=publicationFile (Letzter Zugriff: 21.02.2019).
- 2 Reichart P, Wagner W, Deutsche Gesellschaft für Zahn-, Mund- und Kieferheilkunde, Stellungnahme der DGZMK 5/95, V 2.0, Die Messung des Blutdruckes in der zahnärztlichen Praxis, Stand 5/95. https://www.dgzmk.de/uploads/tx_szdgmkdokumente/Die_Messung_des_Blutdrucks_in_der_zahnaerztlichen_Praxis.pdf (Letzter Zugriff: 20.02.2019).
- 3 Sanofi, Fachinformation Ultracain® D-S, Ultracain® D-S forte, Dezember 2018.
- 4 Kämmerer PW, Al-Nawas B, AWMF online (Hrsg.), S3-Leitlinie (Langversion): Zahnärztliche Chirurgie unter oraler Antikoagulation/Thrombozytenaggregationshemmung, August 2017. https://www.awmf.org/uploads/tx_szleitlinien/083-018I_S3_Zahn%C3%A4rztliche-Chirurgie-Antikoagulation-Thrombozytenaggregationshemmung_2018-05.pdf (Letzter Zugriff: 19.06.2019).
- 5 Halling F, Leitfaden zur Lokalanästhesie: Immer individuell dosieren. Zahnärztliche Mitteilungen 19:2015. Online abrufbar unter: <https://www.zm-online.de/archiv/2015/19/zahnmedizin/immer-individuell-dosieren/seite/alle/>
- 6 Sanofi, Fachinformation Ultracain® D ohne Adrenalin, April 2017.
- 7 Kern JS et al., AWMF online (Hrsg.), S3-Leitlinie (Langversion) Implantatprothetische Versorgung des zahnlosen Oberkiefers, November 2014. https://www.awmf.org/uploads/tx_szleitlinien/083-010I_S3_Implantatprothetische-Versorgung_zahnloser-Oberkiefer_2017-03.pdf (Letzter Zugriff: 19.06.2019)
- 8 Chappuis V et al., Medication-related dental implant failure: Systematic review and meta-analysis. Clin Oral Implants Res. 2018 Oct;29 Suppl 16:55-68.

Implantate bei Antiresorptiva-Patienten

Dr. Tim F. Wolff, Prof. Dr. Dr. Knut A. Grötz

ZMK 9 (35, S. 569-575)

1. Walter C et al.: Zahnimplantate bei medikamentöser Behandlung mit Knochenantiresorptiva (inkl. Bisphosphonate) – S3-Leitlinie (Langversion), Stand: Juli 2016. Available from: <http://www.awmf.org/leitlinien/detail/II/083-026.html>. 2016.
2. Marx RE: Pamidronate (Aredia) and zoledronate (Zometa) induced avascular necrosis of jaws: a growing epidemic. J Oral Maxillofac Surg 61 (9), 1115–1117 (2003).
3. Grötz KA, Schiegnitz E, Wolff TF: Handbuch ZMK 2015: ZMK-Update 2015 Risikopatienten in der ZMK (inkl. Impl. bei Risikopatienten), Wiesbaden Grötz K. A.; Frankfurt Lauer H.-C.; Freiburg Hellwig E., ISBN 9783863021450. 2015.
4. Grötz KA, Piesold J-U, Al-Nawas B: S3-Leitlinie: Bisphosphonat-assoziierte Kiefernekrose (BP-ONJ) und andere Medikamenten-assoziierte Kiefernekrosen. AWMF 007-091 (2012).
5. Smith MR et al.: Denosumab and bone-metastasis-free survival in men with castration-resistant prostate cancer: results of a phase 3, randomised, placebo-controlled trial. Lancet 379 (9810), 39–46 (2012).
6. Qi WX et al.: Risk of osteonecrosis of the jaw in cancer patients receiving denosumab: a meta-analysis of seven randomized controlled trials. Int J Clin Oncol 19 (2), 403–410 (2014).
7. Guarneri V et al.: Bevacizumab and osteonecrosis of the jaw: incidence and association with bisphosphonate therapy in three large prospective trials in advanced breast cancer. Breast Cancer Res Treat 122 (1), 181–188 (2010).
8. Christodoulou C et al.: Combination of bisphosphonates and antiangiogenic factors induces osteonecrosis of the jaw more frequently than bisphosphonates alone. Oncology 76 (3), 209–211 (2009).
9. zm-online. Rote-Hand-Brief für Zaltrap. Available from: http://www.zm-online.de/hefte/Rote-Hand-Brief-fuer-Zaltrap_344687.html (2016).
10. Pilanci KN et al.: Is administration of trastuzumab an independent risk factor for developing osteonecrosis of the jaw among metastatic breast cancer patients under zoledronic acid treatment? Medicine (Baltimore) 94 (18), e671 (2015).
11. Ponzetti A et al.: Jaw osteonecrosis associated with aflibercept, irinotecan and fluorouracil: attention to oral district. Tumori 0(0): 0 (2015).
12. Walter C et al.: Prevalence of bisphosphonate associated osteonecrosis of the jaws in multiple myeloma patients. Head Face Med 6 (1), 11 (2010).
13. Walter C et al.: Prevalence and risk factors of bisphosphonate-associated osteonecrosis of the jaw in prostate cancer patients with advanced disease treated with zoledronate. Eur Urol 54 (5), 1066–1072 (2008).
14. Rahimi-Nedjat RK et al.: Diabetes mellitus and its association to the occurrence of medication-related osteonecrosis of the jaw. Dentistry Journal 4 (2), 1–7 (2016).
15. Grötz KA, Al-Nawas B. Laufzettel Biophosphonate Risiko-Evaluation bei antiresorptiver Therapie vor Implantation. Available from: <https://www.dginet.de/web/dgi/laufzettel-bisphosphonate> (2013).
16. Walter C et al.: Dental implants in patients treated with antiresorptive medication - a systematic literature review. Int J Implant Dent 2 (1), 9 (2016).

Kommentar [AK1]: ??

17. Grötz KA, Al-Nawas B: Persisting alveolar sockets-a radiologic symptom of BP-ONJ? J Oral Maxillofac Surg 64 (10), 1571–1572 (2006).
18. Kumar MN, Honne T: Survival of dental implants in bisphosphonate users versus non-users: a systematic review. Eur J Prosthodont Restor Dent 20 (4), 159–162 (2012).
19. Grötz KA, Schiegnitz E, Wolff TF: Handbuch MKG 2016: MKG-Update 2016 ONKO II: SUPPORTIVE TU-BETREUUNG. Wiesbaden: Groetz, Knut A., Wiesbaden; Haßfeld, Stefan, Dortmund; Schmidt-Westhausen, Andrea M, Berlin; ISBN 978-3-86302-290-7. (2016).
20. Kasai T, Pogrel MA, Hossaini M: The prognosis for dental implants placed in patients taking oral bisphosphonates. J Calif Dent Assoc 37 (1), 39–42 (2009).
21. Grötz KA, Al-Nawas B, Terheyden H: Implantate und Bisphosphonat-Therapie. Implantologie 21 (1), 53–59 (2013).
22. Chadha GK et al.: Osseointegration of dental implants and osteonecrosis of the jaw in patients treated with bisphosphonate therapy: a systematic review. J Oral Implantol 39 (4), 510–520 (2013).

Mechanische Biofilamentfernung: Was, womit und wie funktioniert's?

PD. Dr. Christian Grätz, Dr. Miriam Seidel

ZMK 9 (35) 554-560

Literatur

1. Schweizerische Zahnärzte-Gesellschaft Qualitätsleitlinien in der Zahnmedizin. Bern: Schweizerische Zahnärzte-Gesellschaft, 2000.
2. Schätzle M, Faddy MJ, Cullinan MP, Seymour GJ, Lang NP, Bürgin W, Anerud A, Boysen H, Loe H. The clinical course of chronic periodontitis: Predictive factors in periodontal disease. *J Clin Periodontol* 2009; 36:365-371.
3. Lang NP, Schätzle MA, Loe H. Gingivitis as a risk factor in periodontal disease. *J Clin Periodontol* 2009; 10:3-8.
4. Slots J. Subgingival microflora and periodontal disease. *J Clin Periodontol* 1979; 6:351-382.
5. Kocher T, König J, Hansen P, Rühling A. Subgingival polishing compared to scaling with steel curettes: a clinical pilot study. *J Clin Periodontol* 2001; 28:194-199.
6. Kopic TJ, O'Leary TJ, Kafrawy AH. Total calculus removal: an attainable objective? *J Periodontol* 1990; 61:16-20.
7. Nevins M, Becker W, Kornman K. Proceedings of the world workshop in clinical periodontics. Princeton, New Jersey: American Academy of Periodontology, 1989.
8. Low SB, Mott A. Laser technology to manage periodontal disease: a valid concept? *J Evid Based Dent Pract* 2014; 14:154-159.
9. Graetz C, Schwendicke F, Plaumann A, Rauschenbach S, Springer C, Kahl M, Sälzer S, Dörfer CE. Subgingival instrumentation to remove simulated plaque in vitro: influence of operators' experience and type of instrument. *Clin Oral Investig* 2015; 19:987-995.
10. Rühling A, Schlemme H, König J, Kocher T, Schwahn C, Plagmann HC. Learning root debridement with curettes and power-driven instruments. Part I: a training program to increase effectivity. *J Clin Periodontol* 2002; 20:622-629.
11. Leppäniemi J. et al. The influence of PVD coatings on the wear performance of steel dental curettes. *Key Engineering Materials* 2016; 674:289-295.
12. Smith EM, Sonstegard DA, Anderson WH, Jr. Carpal tunnel syndrome: contribution of flexor tendons. *Arch Phys Med Rehabil* 1977; 58:379-385.
13. McAtamney L, Nigel Corlett E. RULA: a survey method for the investigation of work-related upper limb disorders. *Appl Ergon* 1993; 24:91-99.
14. Schmidlin PR, Beuchat M, Busslinger A, Lehmann B, Lutz F. Tooth substance loss resulting from mechanical, sonic and ultrasonic root instrumentation assessed by liquid scintillation. *J Clin Periodontol* 2001; 28:1058-1066.
15. Trenter SC, Landini G, Walmsley AD. Effect of loading on the vibration characteristics of thin magnetostrictive ultra-sonic scaler inserts. *J Periodontol* 2003; 74:1308-1315.
16. Sanz M, Teughels W. Innovations in non-surgical periodontal therapy: Consensus Report of the Sixth European Workshop on Periodontology. *J Clin Periodontol* 2008; 35:3-7.

17. Graetz C, Plaumann A, Bielfeldt J, Tillner A, Salzer S, Dorfer CE. Efficacy versus health risks: An in vitro evaluation of power-driven scalers. *J Indian Soc Periodontol* 2015; 19:18-24.
18. Graetz C, Bielfeldt J, Tillner A, Plaumann A, Dörfer C. Spatter contamination in dental practices – how can it be prevented? *Rev Med Chir Soc Med Nat* 2014; 118:1122-1134.
19. Harrel SK, Barnes JB, Rivera-Hidalgo F. Aerosol and splatter contamination from the operative site during ultrasonic scaling. *J Am Dent Assoc* 1998; 129:1241-1249.
20. Harrel SK. Airborne spread of disease-the implications for dentistry. *J Calif Dent Assoc* 2004; 32:901-906.
21. Petersilka G, Stypmann J. Die Verwendung von Ultraschallscalern bei Patienten mit Herzschrittmachern und implantierten Defibrillatoren. Gemeinsame Wissenschaftliche Mitteilung der Deutschen Gesellschaft für Parodontologie (DG PARO) und der Deutschen Gesellschaft für Zahn-, Mund- und Kiefer-heilkunde (DGZMK). *Parodontologie* 2014; 25:325-328.
22. Moene R, Decaillet F, Mombelli A. Subgingivaes Airpolishing - Neue Perspektiven für die parodontale Erhaltungsphase. *Schweiz Monatsschr Zahnmed* 2010; 120:891-911.
23. Petersilka GJ, Bell M, Haberlein I, Mehl A, Hickel R, Flemmig TF. In vitro evaluation of novel low abrasive air polishing powders. *J Clin Periodontol* 2003; 30:9-13.
24. Barnes CM. An In-Depth Look at Air Polishing. *Dimensions of Dental Hygiene* 2010; 8:32, 34-36, 40.
25. Bühler J, Amato M, Weiger R, Walter C. A systematic review on the effects of air polishing devices on oral tissues. *Int J Dent Hyg* 2016; 14:15-28.
26. Muller N, Moene R, Cancela JA, Mombelli A. Subgingival air-polishing with erythritol during periodontal maintenance: randomized clinical trial of twelve months. *J Clin Periodontol* 2014; 41:883-889.
27. Sculean A, Bastendorf KD, Becker C, Bush B, Einwag J, Lanoway C, Platzer U, Schmage P, Schoeneich B, Walter C, Wennström JL, Flemmig TF. A paradigm shift in mechanical biofilm management? Subgingival air polishing: a new way to improve mechanical biofilm management in the dental practice. *Quintessence Int* 2013; 44:475-477.
28. Flemmig TF, Arushanov D, Daubert D, Rothen M, Mueller G, Leroux BG. Randomized controlled trial assessing efficacy and safety of glycine powder air polishing in moderate-to- deep periodontal pockets. *J Periodontol* 2012; 83:444-452.
29. Sahrmann P, Ronay V, Schmidlin PR, Attin T, Paque F. Three-dimensional defect evaluation of air polishing on extracted human roots. *J Periodontol* 2014; 85:1107-1114.
30. Bühler J, Schmidli F, Weiger R, Walter C. Analysis of the effects of air polishing powders containing sodium bicarbonate and glycine on human teeth. *Clin Oral Investig* 2015; 19:877-885.
31. Petersilka G, Faggion CM, Stratmann U, Gerss J, Ehmke B, Haeberlein I, Flemmig TF. Effect of glycine powder air-polishing on the gingiva. *J Clin Periodontol* 2008; 35:324-332.
32. Biazussi BR, Perrotti V, D'Arcangelo C, Elias CN, Bianchini MA, Tumedei M, de Vasconcellos DK. Evaluation of the effect of air polishing with different abrasive powders on the roughness of implant abutment surface: an in vitro study. J Oral Implantol. 2019; 45:202-206.

33. Bühler J, Amato M, Weiger R, Walter C. A systematic review on the patient perception of periodontal treatment using air polishing devices. Int J Dent Hyg. 2016; 1:4-14.
34. Neuenfeldt ES, Schmid B, Safi A, Haberlein I. Hypersensitivity Treatment: New Air-Polishing Powder for Occlusion of Dentinal Tubules. *J Dent Res* 2014; 93:1212.
35. Hashino E, Kuboniwa M, Alghamdi SA, Yamaguchi M, Yamamoto R, Cho H, Amano A. Erythritol alters micro-structure and metabolomic profiles of biofilm composed of *Streptococcus gordonii* and *Porphyromonas gingivalis*. *Mol Oral Microbiol* 2013; 28:435-451.
36. Petersilka G, Panitz W, Weresch R, Eichinger M, Kern U. Luftemphyseme im Rahmen der Parodontitistherapie. Eine Fallserie mit kritischer Literaturübersicht. *Parodontologie* 2010; 21:165-175.
37. Hochleitner S. Pulverstrahltechnik in der Parodontologie. *Plaque N Care* 2013; 1:14–17.
38. Ren C, McGrath C, Jin L, Zhang C, Yang Y. The effectiveness of low-level laser therapy as an adjunct to non-surgical periodontal treatment: a meta-analysis. *J Periodontal Res.* 2017; 52:8-20.
39. Azaripour A, Dittrich S, Van Noorden CJ F, Willershausen B. Efficacy of photodynamic therapy as adjunct treatment of chronic periodontitis: a systematic review and meta-analysis. *Lasers Med Sci* 2018, 33:407-423.
40. Graetz C, Bräuning A, Plaumann A, Springer C, Kahl M, Dörfer CE. Antinfektiöse Therapie – Instrumente zur Wurzeloberflächenbearbeitung im Fokus. *Parodontologie* 2016; 27:165–183.