

- [17] Rosentritt M, Behr M, Strasser T, Schmid A. Pilot in-vitro study on insertion/removal performance of hand-cast, milled and 3D printed splints. *J Mech Behav Biomed Mater* 2021;121:104612. <https://doi.org/10.1016/j.jmbbm.2021.104612>.
- [18] Alharbi N, Osman R, Wismeijer D. Effects of build direction on the mechanical properties of 3D-printed complete coverage interim dental restorations. *J Prosthet Dent* 2016;115:760–7. <https://doi.org/10.1016/j.prosdent.2015.12.002>.
- [19] Väyrynen VOE, Tanner J, Vallittu PK. The anisotropy of the flexural properties of an occlusal device material processed by stereolithography. *J Prosthet Dent* 2016;116:811–7. <https://doi.org/10.1016/j.prosdent.2016.03.018>.
- [20] Perea-Lowery L, Gibreel M, Vallittu PK, Lassila L. Evaluation of the mechanical properties and degree of conversion of 3D printed splint material. *J Mech Behav Biomed Mater* 2021;115:104254. <https://doi.org/10.1016/j.jmbbm.2020.104254>.
- [21] Reymus M, Stawarczyk B. In vitro study on the influence of postpolymerization and aging on the Martens parameters of 3D-printed occlusal devices. *J Prosthet Dent* 2021;125:817–23. <https://doi.org/10.1016/j.prosdent.2019.12.026>.
- [22] Wada J, Wada K, Gibreel M, Wakabayashi N, Iwamoto T, Vallittu PK et al. Effect of 3D Printer Type and Use of Protection Gas during Post-Curing on Some Physical Properties of Soft Occlusal Splint Material. *Polymers (Basel)* 2022;14. <https://doi.org/10.3390/polym14214618>.
- [23] Grymak A, Aarts JM, Ma S, Waddell JN, Choi JJE. Comparison of hardness and polishability of various occlusal splint materials. *J Mech Behav Biomed Mater* 2021;115:104270. <https://doi.org/10.1016/j.jmbbm.2020.104270>.
- [24] Grymak A, Aarts JM, Ma S, Waddell JN, Choi JJE. Wear Behavior of Occlusal Splint Materials Manufactured By Various Methods: A Systematic Review. *J Prosthodont* 2021. <https://doi.org/10.1111/jopr.13432>.
- [25] Hickl V, Strasser T, Schmid A, Rosentritt M. Effects of storage and toothbrush simulation on color, gloss, and roughness of CAD/CAM, hand-cast, thermoforming, and 3D-printed splint materials. *Clin Oral Invest* 2022. <https://doi.org/10.1007/s00784-022-04391-3>.
- [26] Orgev A, Levon JA, Chu T-MG, Morton D, Lin W-S. The effects of manufacturing technologies on the surface accuracy of CAD-CAM occlusal splints. *J Prosthodont* 2022. <https://doi.org/10.1111/jopr.13610>.
- [27] Marcel R, Reinhard H, Andreas K. Accuracy of CAD/CAM-fabricated bite splints: milling vs 3D printing. *Clin Oral Invest* 2020;24:4607–15. <https://doi.org/10.1007/s00784-020-03329-x>.
- [28] Palazzo G, Ronsivalle V, Oteri G, Lo Giudice A, Toro C, Campagna P et al. Comparison between Additive and Subtractive CAD-CAM Technique to Produce Orthognathic Surgical Splints: A Personalized Approach. *J Pers Med* 2020;10. <https://doi.org/10.3390/jpm10040273>.

ZMK 2024; 40 (5) S. 282-287

Prof. Dr. Etyenne Schnurr, Dr. Gregor Hocevar, Dr Ulrich Volz

Ästhetik und Funktionalität von Implantaten aus Zirkoniumdioxid im Seitenzahnbereich auf Gewebeniveau

- [1] Sales PHDH, Barros AWP, Oliveira-Neto OB, de Lima FJC, Carvalho AAT, Leão JC. Do zirconia dental implants present better clinical results than titanium dental implants? A systematic review and

- meta-analysis. *J Stomatol Oral Maxillofac Surg.* 2023 Feb;124(1S):101324. doi: 10.1016/j.jormas.2022.10.023. Epub 2022 Oct 29. PMID: 36330865.
- [2] Schoenbaum TR, Karateew ED, Schmidt A, Jadsadakraisorn C, Neugebauer J, Stanford CM. Implant-Abutment Connections and Their Effect on Implant Survival Rates and Changes in Marginal Bone Levels (Δ): A Systematic Review and Meta-Analysis of 45,347 Oral Implants. *Int J Oral Maxillofac Implants.* 2023 May-Jun;38(suppl):37-45. doi: 10.11607/jomi.10411. PMID: 37436948.
 - [3] Taheri Otaghsara SS, Joda T, Thieringer FM. Accuracy of dental implant placement using static versus dynamic computer-assisted implant surgery: An in vitro study. *J Dent.* 2023 May;132:104487. doi: 10.1016/j.jdent.2023.104487. Epub 2023 Mar 21. PMID: 36948382.
 - [4] Schnurr E, Hocevar G, Volz U. Weichgewebemanagement bei sofortbelasteten Zirkonoxidimplantaten: was ist wichtig? *Dentale Implantologie.* 2023;27:156–161.
 - [5] Ghanaati S, Choukroun J, Volz KU, Hueber R, Mourão CFAB, Sader R, Kawase-Koga Y, Mazhari R, Amrein K, Meybohm P, Al-Maawi S. One hundred years after Vitamin D discovery: is there clinical evidence for supplementation doses? *Int J Growth Factors Stem Cells Dent.* 2020;3(1):3–11.
 - [6] Swiss Biohealth Academy. The Swiss Biohealth Concept®. Available at: https://www.swiss-biohealth.com/wp-content/uploads/2021_Swiss-Biohealth-Concept-de-web.pdf. Accessed July 27, 2023.
 - [7] Schnurr E, Volz KU. Die Beziehung zwischen oralen Infektionen, Biokorrosion und systemischer Gesundheit: ein Behandlungskonzept. Available at: <https://sportaerztezeitung.com/rubriken/therapie/13828/oralen-infektionen-biokorrosion-und-systemischer-gesundheit/>. Accessed April 17, 2023.
 - [8] Ghanaati S, Booms P, Orlowska A, Kubesch A, Lorenz J, Rutkowski J, Landes C, Sader R, Kirkpatrick C, Choukroun J. Advanced platelet-rich fibrin: a new concept for cell-based tissue engineering by means of inflammatory cells. *J Oral Implantol.* 2014;40(6):679–689. doi: 10.1563/aaid-joi-D-14-00138
 - [9] Misch CE, Perel ML, Wang HL, et al. Implant success, survival, and failure: the International Congress of Oral Implantologists (ICOI) Pisa Consensus Conference. *Implant Dent.* 2008;17(1):5–15. doi: 10.1097/ID.0b013e3181676059
 - [10] Atieh MA, Payne AG, Duncan WJ, de Silva RK, Cullinan MP. Immediate placement or immediate restoration/loading of single implants for molar tooth replacement: a systematic review and metaanalysis. *Int J Oral Maxillofac Implants* 2010;25:401-15.
 - [11] Smith RB, Tarnow DP. Classification of molar extraction sites for immediate dental implant placement: technical note. *Int J Oral Maxillofacial Implants* 2013;28:911-6. <https://doi.org/10.11607/jomi.2627>
 - [12] Ananda GK, Nambiar P, Mutalik S, Shanmuhasuntharam P. Anatomical considerations for implant placements in first maxillary molar extracted sites in East Asian patients. *Surg Radiol Anat* 2015;37:1099-108. <https://doi.org/10.1007/s00276-015-1473-0>
 - [13] Ketabi M, Deporter D, Atenafu EG. A systematic review of outcomes following immediate molar implant placement based on recently published studies. *Clin Implant Dent Relat Res* 2016;18:1084-94. <https://doi.org/10.1111/cid.12390>
 - [14] Fugazzotto PA. Implant placement at the time of maxillary molar extraction: treatment protocols and report of results. *J Periodontol* 2008;79:216-23. <https://doi.org/10.1902/jop.2008.070338>
 - [15] Ragucci GM, Elnayef B, Criado-Cámara E, Del Amo FS, Hernández-Alfaro F. Immediate implant placement in molar extraction sockets: a systematic review and meta-analysis. *Int J Implant Dent* 2020;6:40. <https://doi.org/10.1186/s40729-020-00235-5>

- [16] Müller-Heupt LK, Schiegnitz E, Kaya S, Jacobi-Gresser E, Kämmerer PW, Al-Nawas B. The German S3 guideline on titanium hypersensitivity in implant dentistry: consensus statements and recommendations. *Int J Implant Dent.* 2022;8(1):51. doi: 10.1186/s40729-022-00451-1
- [17] Thiem DGE, Stephan D, Kniha K, Kohal RJ, Röhling S, Spies BC, Stimmelmayer M, Grötz KA. German S3 guideline on the use of dental ceramic implants. *Int J Implant Dent.* 2022;8(1):43. doi: 10.1186/s40729-022-00445-z. Erratum in: *Int J Implant Dent.* 2023;9(1):2. doi: 10.1186/s40729-022-00465-9
- [18] Osman RB, Swain MV, Atieh M, Ma S, Duncan W. Ceramic implants (Y-TZP): are they a viable alternative to titanium implants for the support of overdentures? A randomized clinical trial. *Clin Oral Implants Res* 2014;25:1366–77.
- [19] Koller M, Steyer E, Theisen K, Stangnell S, Jakse N, Payer M. Two piece zirconia versus titanium implants after 80 months: Clinical outcomes from a prospective randomized pilot trial. *Clin Oral Implants Res* 2020;31:388–96.
- [20] Henao PAR, Queija LC, Mareque S, Pereira AT, Gonzalez AL, Carrión JB. Titanium vs ceramic single dental implants in the anterior maxilla: a 12-month randomized clinical trial. *Clin Oral Implants Res* 2021;32:951–61.
- [21] Cannizzaro G, Torchio C, Felice P, Leone M, Esposito M. Immediate occlusal versus non-occlusal loading of single zirconia implants. A multicenter pragmatic randomized clinical trial. *Eur J Oral Implantol* 2010;3:111–20.
- [22] Cionca N, Hashim D, Mombelli A. Two-piece zirconia implants supporting all ceramic crowns: six-year results of a prospective cohort study. *Clin Oral Implants Res* 2021;31:695–701.
- [23] Roehling S, Schlegel KA, Woelfler H, Gahlert M. Zirconia compared to titanium dental implants in preclinical studies-A systematic review and meta-analysis. *Clin Oral Implants Res.* 2019 May;30(5):365-395. doi: 10.1111/clr.13425. Epub 2019 Apr 16. PMID: 30916812.
- [24] Mustakim KR, Eo MY, Lee JY, Myoung H, Seo MH, Kim SM. Guidance, and rationale for the immediate implant placement in the maxillary molar. *J Korean Assoc Oral Maxillofac Surg.* 2023 Feb 28;49(1):30-42. doi: 10.5125/jkaoms.2023.49.1.30. PMID: 36859373; PMCID: PMC9985995.
- [25] Jensen OT, Shulman LB, Block MS, Iacono VJ. Report of the sinus consensus conference of 1996. *Int J Oral Maxillofac Implants* 1998;13 Suppl:11-45.
- [26] Parvini P, Mihatovic I, Sahin D, Becker J, Schwarz F. Lateral alveolar ridge augmentation using an equine-derived collagen-containing bone block: A prospective case series. *Clin Oral Implants Res.* 2022 Feb;33(2):142-149. doi: 10.1111/clr.13873. Epub 2021 Oct 30. PMID: 34679206.
- [27] Buser, D., Dula, K., Hirt, H. P., & Schenk, R. K. (1996). Lateral ridge augmentation using autografts and barrier membranes: A clinical study with 40 partially edentulous patients. *Journal of Oral and Maxillofacial Surgery*, 54, 420–432. [https://doi.org/10.1016/S0278-2391\(96\)90113-5](https://doi.org/10.1016/S0278-2391(96)90113-5)
- [28] Schwarz, F., Hazar, D., Becker, K., Sader, R., & Becker, J. (2018). Efficacy of autogenous tooth roots for lateral alveolar ridge augmentation and staged implant placement. A prospective controlled clinical study. *Journal of Clinical Periodontology*, 45, 996–1004. <https://doi.org/10.1111/jcpe.12977>