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Thema: Er,Cr:YSGG-Laser und radial abstrahlende Faserspitzen: Lasereinsatz in stark geschädigten endodontischen Szenarios

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Literatur

- 1) Kakehashi S, Stanley HR, Fitzgerald RJ (1965) The Effects of Surgical Exposures of Dental Pulps in Germ-Free and Conventional Laboratory Rats. *Oral Surg Oral Med Oral Pathol* 20:340-349
- 2) Bergenholz G (1974) Micro-organisms from necrotic pulp of traumatized teeth. *Odontol Revy* 25 (4):347-358
- 3) Moller AJ, Fabricius L, Dahlen G, Ohman AE, Heyden G (1981) Influence on periapical tissues of indigenous oral bacteria and necrotic pulp tissue in monkeys. *Scand J Dent Res* 89 (6):475-484
- 4) Fabricius L, Dahlen G, Sundqvist G, Happonen RP, Moller AJ (2006) Influence of residual bacteria on periapical tissue healing after chemomechanical treatment and root filling of experimentally infected monkey teeth. *Eur J Oral Sci* 114 (4):278-285. doi:EOS380 [pii] 10.1111/j.1600-0722.2006.00380.x
- 5) Engstrom B, Lundberg M (1965) The correlation between positive culture and the prognosis of root canal therapy after pulpectomy. *Odontol Revy* 16 (3):193-203
- 6) Sjogren U, Figdor D, Persson S, Sundqvist G (1997) Influence of infection at the time of root filling on the outcome of endodontic treatment of teeth with apical periodontitis. *Int Endod J* 30 (5):297-306
- 7) Katebzadeh N, Sigurdsson A, Trope M (2000) Radiographic evaluation of periapical healing after obturation of infected root canals: an in vivo study. *Int Endod J* 33 (1):60-66
- 8) Smith JJ, Wayman BE (1986) An evaluation of the antimicrobial effectiveness of citric acid as a root canal irrigant. *J Endod* 12 (2):54-58
- 9) Bystrom A, Sundqvist G (1985) The antibacterial action of sodium hypochlorite and EDTA in 60 cases of endodontic therapy. *Int Endod J* 18 (1):35-40
- 10) Orstavik D, Haapasalo M (1990) Disinfection by endodontic irrigants and dressings of experimentally infected dentinal tubules. *Endod Dent Traumatol* 6 (4):142-149
- 11) Stojicic S, Zivkovic S, Qian W, Zhang H, Haapasalo M (2010) Tissue dissolution by sodium hypochlorite: effect of concentration, temperature, agitation, and surfactant. *J Endod* 36 (9):1558-1562. doi:S0099-2399(10)00524-8 [pii] 10.1016/j.joen.2010.06.021

- 12) Berutti E, Marini R, Angeretti A (1997) Penetration ability of different irrigants into dentinal tubules. *J Endod* 23 (12):725-727. doi:S0099-2399(97)80342-1 [pii] 10.1016/S0099-2399(97)80342-1
- 13) Vahdaty A, Pitt Ford TR, Wilson RF (1993) Efficacy of chlorhexidine in disinfecting dentinal tubules in vitro. *Endod Dent Traumatol* 9 (6):243-248
- 14) Fogel HM, Pashley DH (1990) Dentin permeability: effects of endodontic procedures on root slabs. *J Endod* 16 (9):442-445. doi:S0099-2399(06)81888-1 [pii] 10.1016/S0099-2399(06)81888-1
- 15) Drake DR, Wiemann AH, Rivera EM, Walton RE (1994) Bacterial retention in canal walls in vitro: effect of smear layer. *J Endod* 20 (2):78-82
- 16) Sathorn C, Parashos P, Messer HH (2005) Effectiveness of single- versus multiple-visit endodontic treatment of teeth with apical periodontitis: a systematic review and meta-analysis. *Int Endod J* 38 (6):347-355. doi:IEJ955 [pii] 10.1111/j.1365-2591.2005.00955.x
- 17) Penesis VA, Fitzgerald PI, Fayad MI, Wenckus CS, BeGole EA, Johnson BR (2008) Outcome of one-visit and two-visit endodontic treatment of necrotic teeth with apical periodontitis: a randomized controlled trial with one-year evaluation. *J Endod* 34 (3):251-257. doi:S0099-2399(07)01167-3 [pii] 10.1016/j.joen.2007.12.015
- 18) Siqueira JF, Jr., Lopes HP (1999) Mechanisms of antimicrobial activity of calcium hydroxide: a critical review. *Int Endod J* 32 (5):361-369
- 19) Dahlen G, Samuelsson W, Molander A, Reit C (2000) Identification and antimicrobial susceptibility of enterococci isolated from the root canal. *Oral Microbiol Immunol* 15 (5):309-312. doi:omi150507 [pii]
- 20) Azarpazhooh A, Limeback H (2008) The application of ozone in dentistry: a systematic review of literature. *J Dent* 36 (2):104-116. doi:S0300-5712(07)00241-2 [pii] 10.1016/j.jdent.2007.11.008
- 21) Estrela C, Estrela CR, Decurcio DA, Hollanda AC, Silva JA (2007) Antimicrobial efficacy of ozonated water, gaseous ozone, sodium hypochlorite and chlorhexidine in infected human root canals. *Int Endod J* 40 (2):85-93. doi:IEJ1185 [pii] 10.1111/j.1365-2591.2006.01185.x
- 22) Ahmad M, Pitt Ford TR, Crum LA, Walton AJ (1988) Ultrasonic debridement of root canals: acoustic cavitation and its relevance. *J Endod* 14 (10):486-493
- 23) Gutknecht N, van Gogswaardt D, Conrads G, Apel C, Schubert C, Lampert F (2000) Diode laser radiation and its bactericidal effect in root canal wall dentin. *J Clin Laser Med Surg* 18 (2):57-60
- 24) Martins MR, Carvalho MF, Vaz IP, Capelas JA, Martins MA, Gutknecht N (2013) Efficacy of Er,Cr:YSGG laser with endodontical radial firing tips on the outcome of endodontic treatment: blind randomized controlled clinical trial with six-month evaluation. *Lasers Med Sci* 28 (4):1049-1055. doi:10.1007/s10103-012-1172-6

- 25) Ramachandran Nair PN, Pajarola G, Schroeder HE (1996) Types and incidence of human periapical lesions obtained with extracted teeth. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 81 (1):93-102
- 26) Simon JH (1980) Incidence of periapical cysts in relation to the root canal. *J Endod* 6 (11):845-848. doi:S0099-2399(80)80039-2 [pii] 10.1016/S0099-2399(80)80039-2
- 27) Goaz P, White SC (1994) *Oral radiology: principles and interpretation*. Mosby-Year Book, St. Louis
- 28) White SC, Sapp JP, Seto BG, Mankovich NJ (1994) Absence of radiometric differentiation between periapical cysts and granulomas. *Oral Surg Oral Med Oral Pathol* 78 (5):650-654
- 29) Nair PN (1998) New perspectives on radicular cysts: do they heal? *Int Endod J* 31 (3):155-160
- 30) Nobuhara WK, del Rio CE (1993) Incidence of periradicular pathoses in endodontic treatment failures. *J Endod* 19 (6):315-318
- 31) Spatafore CM, Griffin JA, Jr., Keyes GG, Wearden S, Skidmore AE (1990) Periapical biopsy report: an analysis of over a 10-year period. *J Endod* 16 (5):239-241
- 32) Sjogren U, Hagglund B, Sundqvist G, Wing K (1990) Factors affecting the long-term results of endodontic treatment. *J Endod* 16 (10):498-504. doi:S0099-2399(07)80180-4 [pii] 10.1016/S0099-2399(07)80180-4
- 33) Chugal NM, Clive JM, Spangberg LS (2001) A prognostic model for assessment of the outcome of endodontic treatment: Effect of biologic and diagnostic variables. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 91 (3):342-352. doi:S1079-2104(01)17575-X [pii] 10.1067/moe.2001.113106
- 34) Ramskold LO, Fong CD, Stromberg T (1997) Thermal effects and antibacterial properties of energy levels required to sterilize stained root canals with an Nd:YAG laser. *J Endod* 23 (2):96-100. doi:S0099-2399(97)80253-1 [pii] 10.1016/S0099-2399(97)80253-1
- 35) Franzen R, Esteves-Oliveira M, Meister J, Wallerang A, Vanweersch L, Lampert F, Gutknecht N (2009) Decontamination of deep dentin by means of erbium, chromium:yttrium-scandium-gallium-garnet laser irradiation. *Lasers Med Sci* 24 (1):75-80. doi:10.1007/s10103-007-0522-2
- 36) Gutknecht N, Franzen R, Schippers M, Lampert F (2004) Bactericidal effect of a 980-nm diode laser in the root canal wall dentin of bovine teeth. *J Clin Laser Med Surg* 22 (1):9-13. doi:10.1089/104454704773660912
- 37) Stabholz A, Zeltser R, Sela M, Peretz B, Moshonov J, Ziskind D (2003) The use of lasers in dentistry, principles of operation and clinical applications. *Compend Contin Educ Dent* 24 (12):935-948

- 38) Stabholz A (2003) The role of laser technology in modern endodontics. In: Ishikawa I FJ, Aoki A (ed) Lasers in Dentistry, revolution of dental treatment in the new millennium, vol 1248. Elsevier Science, B.V., pp 21-27
- 39) Gordon W, Atabakhsh VA, Meza F, Doms A, Nissan R, Rizou I, Stevens RH (2007) The antimicrobial efficacy of the erbium, chromium:yttrium-scandium-gallium-garnet laser with radial emitting tips on root canal dentin walls infected with *Enterococcus faecalis*. *J Am Dent Assoc* 138 (7):992-1002. doi:138/7/992 [pii]
- 40) Schoop U, Barylyak A, Goharkhay K, Beer F, Wernisch J, Georgopoulos A, Sperr W, Moritz A (2009) The impact of an erbium, chromium:yttrium-scandium-gallium-garnet laser with radial-firing tips on endodontic treatment. *Lasers Med Sci* 24 (1):59-65. doi:10.1007/s10103-007-0520-4
- 41) George R, Walsh LJ (2010) Thermal effects from modified endodontic laser tips used in the apical third of root canals with erbium-doped yttrium aluminium garnet and erbium, chromium-doped yttrium scandium gallium garnet lasers. *Photomed Laser Surg* 28 (2):161-165. doi:10.1089/pho.2008.2423
- 42) Blanken J, De Moor RJ, Meire M, Verdaasdonk R (2009) Laser induced explosive vapor and cavitation resulting in effective irrigation of the root canal. Part 1: a visualization study. *Lasers Surg Med* 41 (7):514-519. doi:10.1002/lsm.20798
- 43) De Moor RJ, Blanken J, Meire M, Verdaasdonk R (2009) Laser induced explosive vapor and cavitation resulting in effective irrigation of the root canal. Part 2: evaluation of the efficacy. *Lasers Surg Med* 41 (7):520-523. doi:10.1002/lsm.20797
- 44) De Moor RJ, Meire M, Goharkhay K, Moritz A, Vanobbergen J (2010) Efficacy of ultrasonic versus laser-activated irrigation to remove artificially placed dentin debris plugs. *J Endod* 36 (9):1580-1583. doi:S0099-2399(10)00510-8 [pii] 10.1016/j.joen.2010.06.007
- 45) Bender IB, Seltzer S (2003) Roentgenographic and direct observation of experimental lesions in bone: II. 1961. *J Endod* 29 (11):707-712; discussion 701