**Supplement 3**

Reasons for study’s exclusion (n = 120).

|  |  |
| --- | --- |
| **Reason for exclusion** | **Excluded studies** |
| 1. Does not report on any clinical parameters and/or case definition for peri-implant diseases (n = 28) | 1 Bryant SR, Walton JN, MacEntee MI (2015).A 5-year randomized trial to compare 1 or 2 implants for implant overdentures. J Dent Res. 94(1):36-43. doi: 10.1177/0022034514554224. Epub 2014 Oct 27.PMID: 25348544  2 Fischer K, Stenberg T. (2015)Prospective 10-year cohort study based on a randomized, controlled trial (RCT) on implant-supported full-arch maxillary prostheses. part II: prosthetic outcomes and maintenance. Clin Implant Dent Relat Res.15(4):498-508. doi: 10.1111/j.1708-8208.2011.00383.x.  3 Naert IE, Hooghe M, Quirynen M, van Steenberghe D.(1997)The reliability of implant-retained hinging overdentures for the fully edentulous mandible. An up to 9-year longitudinal study. Clin Oral Investig.1(3):119-24. PMID: 9612151  4 Makkonen TA, Holmberg S, Niemi L, Olsson C, Tammisalo T, Peltola J.(1997) A 5-year prospective clinical study of Astra Tech dental implants supporting fixed bridges or overdentures in the edentulous mandible. Clin Oral Implants Res. 8(6):469-75. PMID: 9555206  5 Røynesdal AK, Amundrud B, Hannaes HR.(2001)A comparative clinical investigation of 2 early loaded ITI dental implants supporting an overdenture in the mandible. Int J Oral Maxillofac Implants. 16(2):246-51.PMID: 11324212  6 Mau J, Behneke A, Behneke N, Fritzemeier CU, Gomez-Roman G, d'Hoedt B, Spiekermann H, Strunz V, Yong M (2003)Randomized multicenter comparison of 2 IMZ and 4 TPS screw implants supporting bar-retained overdentures in 425 edentulous mandibles..Int J Oral Maxillofac Implants.18(6):835-47.  7 Ravald N, Dahlgren S, Teiwik A, Gröndahl K.(2012) Long-term evaluation of Astra Tech and Brånemark implants in patients treated with full-arch bridges. Results after 12-15 years. Clin Oral Implants Res. 2013 Oct;24(10):1144-51. doi: 10.1111/j.1600-0501.2012.02524.x.  8 Naert I, Gizani S, Vuylsteke M, Van Steenberghe D.(1999)A 5-year prospective randomized clinical trial on the influence of splinted and unsplinted oral implants retaining a mandibular overdenture: prosthetic aspects and patient satisfaction. J Oral Rehabil. 26(3):195-202. PMID: 10194726  9 Jemt T, Bergendal B, Arvidson K, Bergendal T, Karlsson LD, Linden B, Rundcrantz T, Wendelhag (2002)Implant-supported welded titanium frameworks in the edentulous maxilla: a 5-year prospective multicenter study. I.Int J Prosthodont. 15(6):544-8.  10 Cannizzaro G, Leone M, Torchio C, Viola P, Esposito M.(2008)Immediate versus early loading of 7-mm-long flapless-placed single implants: a split-mouth randomised controlled clinical trial. Eur J Oral Implantol. 1(4):277-92.  11 Assad AS, Hassan SA, Shawky YM, Badawy MM.(2007) Clinical and radiographic evaluation of implant-retained mandibular overdentures with immediate loading. Implant Dent. 16(2):212-23.  12 Grandi T, Guazzi P, Samarani R, Garuti G, Grandi G.(2012) Immediate loading of two unsplinted implants retaining the existing complete mandibular denture in elderly edentulous patients: 1-year results from a multicentre prospective cohort study. Eur J Oral Implantol. 5(1):61-8.  13 Cannizzaro G, Felice P, Ippolito DR, Velasco-Ortega E, Esposito M.(2018) Immediate loading of fixed cross-arch prostheses supported by flapless-placed 5 mm or 11.5 mm long implants: 5-year results from a randomised controlled trial. Eur J Oral Implantol. 11(3):295-306.  14 Park JH, Shin SW, Lee JY.(2019) Bar versus ball attachments for maxillary four-implant retained overdentures: A randomized controlled trial. Clin Oral Implants Res. 2019 Nov;30(11):1076-1084. doi: 10.1111/clr.13521.  15 Jokstad A, Ellner S, Gussgard A.(2011) Comparison of two early loading protocols in full arch reconstructions in the edentulous maxilla using the Cresco prosthetic system: a three-arm parallel group randomized-controlled trial. Clin Oral Implants Res.22(5):455-63. doi: 10.1111/j.1600-0501.2010.02156.x.  16 Grunder, U. (2001). Immediate functional loading of immediate implants in edentulous arches: two-year results. Int J Periodontics Restorative Dent, 21(6), 545-551.  17 Tealdo, T., Bevilacqua, M., Pera, F., Menini, M., Ravera, G., Drago, C., & Pera, P. (2008). Immediate function with fixed implant-supported maxillary dentures: a 12-month pilot study. J Prosthet Dent, 99(5), 351-360. doi:10.1016/s0022-3913(08)60082-7  18 Alves, C. C., Correia, A. R., & Neves, M. (2010). Immediate implants and immediate loading in periodontally compromised patients-a 3-year prospective clinical study. Int J Periodontics Restorative Dent, 30(5), 447-455.  19 Barbier, L., Abeloos, J., De Clercq, C., & Jacobs, R. (2012). Peri-implant bone changes following tooth extraction, immediate placement and loading of implants in the edentulous maxilla. Clin Oral Investig, 16(4), 1061-1070. doi:10.1007/s00784-011-0617-9  20 Horwitz, J., & Machtei, E. E. (2012). Immediate and delayed restoration of dental implants in patients with a history of periodontitis: a prospective evaluation up to 5 years. Int J Oral Maxillofac Implants, 27(5), 1137-1143.  21 Malo, P., Nobre Mde, A., & Lopes, A. (2012). Immediate rehabilitation of completely edentulous arches with a four-implant prosthesis concept in difficult conditions: an open cohort study with a mean follow-up of 2 years. Int J Oral Maxillofac Implants, 27(5), 1177-1190.  22 Tealdo, T., Menini, M., Bevilacqua, M., Pera, F., Pesce, P., Signori, A., & Pera, P. (2014). Immediate versus delayed loading of dental implants in edentulous patients' maxillae: a 6-year prospective study. Int J Prosthodont, 27(3), 207-214. doi:10.11607/ijp.3569  23. Bechara, S., Lukosiunas, A., Dolcini, G. A., & Kubilius, R. (2017). Fixed Full Arches Supported by Tapered Implants with Knife-Edge Thread Design and Nanostructured, Calcium-Incorporated Surface: A Short-Term Prospective Clinical Study. Biomed Res Int, 2017, 4170537. doi:10.1155/2017/4170537  24 Riemann, M., Wachtel, H., Beuer, F., Bolz, W., Schuh, P., Niedermaier, R., & Stelzle, F. (2019). Biologic and Technical Complications of Implant-Supported Immediately Loaded Fixed Full-Arch Prostheses: An Evaluation of Up to 6 Years. Int J Oral Maxillofac Implants, 34(6), 1482-1492. doi:10.11607/jomi.7133  25. Shigehara, S., Ohba, S., Nakashima, K., Takanashi, Y., & Asahina, I. (2015). Immediate Loading of Dental Implants Inserted in Edentulous Maxillas and Mandibles: 5-Year Results of a Clinical Study. J Oral Implantol, 41(6), 701-705. doi:10.1563/aaid-joi-D-14-00018  26. Hug, S., Mantokoudis, D. & Mericske-Stern, R. (2006) Clinical evaluation of 3 overdenture concepts with tooth roots and implants: 2-year results. Int J Prosthodont 19, 236-243.  27. Glibert, M., Vervaeke, S., Jacquet, W., Vermeersch, K., Ostman, P. O. & De Bruyn, H. (2018) A randomized controlled clinical trial to assess crestal bone remodeling of four different implant designs. Clin Implant Dent Relat Res 20, 455-462. doi:10.1111/cid.12604.  28. Niedermaier, R., Stelzle, F., Riemann, M., Bolz, W., Schuh, P., & Wachtel, H. (2017). Implant-Supported Immediately Loaded Fixed Full-Arch Dentures: Evaluation of Implant Survival Rates in a Case Cohort of up to 7 Years. Clin Implant Dent Relat Res, 19(1), 4-19. doi:10.1111/cid.12421 |
| 1. Does not specify the prosthetics design when reporting the outcomes in different investigation groups (n = 4) | 1 Gotfredsen K, Holm B.(2000) Implant-supported mandibular overdentures retained with ball or bar attachments: a randomized prospective 5-year study. Int J Prosthodont..13(2):125-30.  2 Ferrigno N, Laureti M, Fanali S, Grippaudo G.(2002) A long-term follow-up study of non-submerged ITI implants in the treatment of totally edentulous jaws. Part I: Ten-year life table analysis of a prospective multicenter study with 1286 implants. Clin Oral Implants Res. 13(3):260-73.  3 Abd El-Dayem MA, Assad AS, Eldin Sanad ME, Mahmoud Mogahed SA (2009) Comparison of prefabricated and custom-made bars used for implant-retained mandibular complete overdentures..Implant Dent.18(6):501-11. doi: 10.1097/ID.0b013e3181b4f857  4 Malo, P., de Araujo Nobre, M., & Rangert, B. (2007). Implants placed in immediate function in periodontally compromised sites: a five-year retrospective and one-year prospective study. J Prosthet Dent, 97(6 Suppl), S86-95. doi:10.1016/s0022-3913(07)60012-2 |
| 1. Includes patients with fixed and removable prostheses, and does not specify the prostheses design in the reported outcomes (n = 1) | 1 Heschl A, Payer M, Platzer S, Wegscheider W, Pertl C, Lorenzoni M.(2011). Immediate rehabilitation of the edentulous mandible with screw type implants: results after up to 10 years of clinical function. Clin Oral Implants Res. 2012 Oct;23(10):1217-23. doi: 10.1111/j.1600-0501.2011.02292.x. |
| 1. No information on prosthetic design provided (n = 4) | 1 Raes M, D'hondt R, Teughels W, Coucke W, Quirynen M.(2018). A 5-year randomized clinical trial comparing minimaly with moderately rough implants in patients with severe periodontitis. J Clin Periodontol. 2018 Jun;45(6):711-720. doi: 10.1111/jcpe.12901.  2 Raghoebar GM, Friberg B, Grunert I, Hobkirk JA, Tepper G, Wendelhag I.(2003).3-year prospective multicenter study on one-stage implant surgery and early loading in the edentulous mandible. Clin Implant Dent Relat Res. 2003;5(1):39-46.  3 Ferrigno N, Laureti M, Fanali S, Grippaudo G.(2002).A long-term follow-up study of non-submerged ITI implants in the treatment of totally edentulous jaws. Part I: Ten-year life table analysis of a prospective multicenter study with 1286 implants. Clin Oral Implants Res.13(3):260-73.  4 Deporter D, Watson P, Pharoah M, Levy D, Todescan R. (1999). Five- to six-year results of a prospective clinical trial using the ENDOPORE dental implant and a mandibular overdenture. Clin Oral Implants Res. 10(2):95-102. |
| 5 Includes only partially edentulous dental arches (n = 1) | 1 Chiapasco M, Ferrini F, Casentini P, Accardi S, Zaniboni M.(2006).Dental implants placed in expanded narrow edentulous ridges with the Extension Crest device. A 1-3-year multicenter follow-up study. Clin Oral Implants Res.17(3):265-72.PMID: 16672021 |
| 6 Reports on peri-implant disease without clear disease definition (n = 1) | 1 Schwarz S, Gabbert O, Hassel AJ, Schmitter M, Séché C, Rammelsberg P.(2010).Early loading of implants with fixed dental prostheses in edentulous mandibles: 4.5-year clinical results from a prospective study. Clin Oral Implants Res. 2010 Mar;21(3):284-9. doi: 10.1111/j.1600-0501.2009.01843.x. |
| 7 Has a follow-up period of less than 1 year (n = 2) | 1 Bernard JP, Belser UC, Martinet JP, Borgis SA.(1995). Osseointegration of Brånemark fixtures using a single-step operating technique. A preliminary prospective one-year study in the edentulous mandible. Clin Oral Implants Res.6(2):122-9.  2 Payne AG, Tawse-Smith A, Thompson WM, Kumara R.(2003).Early functional loading of unsplinted roughened surface implants with mandibular overdentures 2 weeks after surgery. Clin Implant Dent Relat Res.5(3):143-53.PMID: 14575630 |
| 8 Periodontally compromised patients were excluded (n = 1) | 1Gibreel, M., M. Fouad, F. El-Waseef, N. El-Amier and H. Marzook (2017). "Clips vs Resilient Liners Used With Bilateral Posterior Prefabricated Bars for Retaining Four Implant-Supported Mandibular Overdentures." J Oral Implantol 43(4): 273-281. |
| 9 Clinical outcomes of interest presented only graphically (n = 3) | 1 Batenburg RH, Meijer HJ, Raghoebar GM, Van Oort RP, Boering G. (1998).Mandibular overdentures supported by two Brånemark, IMZ or ITI implants. A prospective comparative preliminary study: one-year results. Clin Oral Implants Res. 1998 Dec;9(6):374-83.PMID: 11429939  2 Kutkut A, Rezk M, Zephyr D, Dawson D, Frazer R, Al-Sabbagh M.(2019).Immediate Loading of Unsplinted Implant Retained Mandibular Overdenture: A Randomized Controlled Clinical Study. J Oral Implantol. 2019 Oct;45(5):378-389. doi: 10.1563/aaid-joi-D-18-00202. Epub 2019 Aug 7.PMID: 31389755  3 Krennmair G, Seemann R, Weinländer M, Piehslinger E.(2011).Comparison of ball and telescopic crown attachments in implant-retained mandibular overdentures: a 5-year prospective study. Int J Oral Maxillofac Implants. 26(3):598-606. |
| 10 No eligible outcomes for this review (n = 1) | 1 Zitzmann NU, Marinello CP. (2000). Treatment outcomes of fixed or removable implant-supported prostheses in the edentulous maxilla. Part II: clinical findings.J Prosthet Dent. 83(4):434-42. |
| 11 Follow-up period of some patients < 1 year (n = 1) | 1 Testori, T., M. Del Fabbro, M. Capelli, F. Zuffetti, L. Francetti and R. L. Weinstein (2008). Immediate occlusal loading and tilted implants for the rehabilitation of the atrophic edentulous maxilla: 1-year interim results of a multicenter prospective study.Clin Oral Implants Res 19(3): 227-232 |
| 12 Does not provide any information on the periodontal status and/or reasons for tootk loss (n = 73) | Agliardi, E., S. Panigatti, M. Clerico, C. Villa and P. Malo (2010). Immediate rehabilitation of the edentulous jaws with full fixed prostheses supported by four implants: interim results of a single cohort prospective study. Clin Oral Implants Res 21(5): 459-465.  Agliardi, E. L., A. Pozzi, C. F. Stappert, R. Benzi, D. Romeo and E. Gherlone (2014). Imme-diate fixed rehabilitation of the edentulous maxilla: a prospective clinical and radiological study after 3 years of loading. Clin Implant Dent Relat Res 16(2): 292-302.  Akoglu, B., M. Ucankale, Y. Ozkan and Y. Kulak-Ozkan (2011). Five-year treatment out-comes with three brands of implants supporting mandibular overdentures. Int J Oral Maxillo-fac Implants 26(1): 188-194.  Al-Nawas, B., U. Bragger, H. J. Meijer, I. Naert, R. Persson, A. Perucchi, M. Quirynen, G. M. Raghoebar, T. E. Reichert, E. Romeo, H. J. Santing, M. Schimmel, S. Storelli, C. ten Brug-genkate, B. Vandekerckhove, W. Wagner, D. Wismeijer and F. Muller (2012). A double-blind randomized controlled trial (RCT) of Titanium-13Zirconium versus Titanium Grade IV small-diameter bone level implants in edentulous mandibles--results from a 1-year observation peri-od. Clin Implant Dent Relat Res 14(6): 896-904.  Arvidson, K., O. Esselin, E. Felle-Persson, G. Jonsson, J. I. Smedberg and U. Soderstrom (2008). Early loading of mandibular full-arch bridges screw retained after 1 week to four to five Monotype((R)) implants: 3-year results from a prospective multicentre study. Clin Oral Implants Res 19(7): 693-703.  Assad, A. S., M. A. Abd El-Dayem and M. M. Badawy (2004). Comparison between mainly mucosa-supported and combined mucosa-implant-supported mandibular overdentures. Im-plant Dent 13(4): 386-394.  Behneke, A., N. Behneke and B. d'Hoedt (2002). A 5-year longitudinal study of the clinical effectiveness of ITI solid-screw implants in the treatment of mandibular edentulism. Int J Oral Maxillofac Implants 17(6): 799-810.  Bergkvist, G., K. Nilner, S. Sahlholm, U. Karlsson and C. Lindh (2009). Immediate loading of implants in the edentulous maxilla: use of an interim fixed prosthesis followed by a perma-nent fixed prosthesis: a 32-month prospective radiological and clinical study. Clin Implant Dent Relat Res 11(1): 1-10.  Bernard, L., M. Vercruyssen, J. Vanderveken, W. Coucke, M. Quirynen and I. Naert (2019). Randomized controlled trial comparing immediate loading with conventional loading using cone-anchored implant-supported screw-retained removable prostheses: A 2-year follow-up clinical trial. J Prosthet Dent 121(2): 258-264.  Boerrigter, E. M., R. P. van Oort, G. M. Raghoebar, B. Stegenga, P. J. Schoen and G. Boering (1997). A controlled clinical trial of implant-retained mandibular overdentures: clinical as-pects. J Oral Rehabil 24(3): 182-190.  Boven, G. C., H. J. A. Meijer, A. Vissink and G. M. Raghoebar (2020). Maxillary implant overdentures retained by use of bars or locator attachments: 1-year findings from a random-ized controlled trial. J Prosthodont Res 64(1): 26-33.  Buttel, A. E., D. A. Gratwohl, P. Sendi and C. P. Marinello (2012). Immediate loading of two unsplinted mandibular implants in edentulous patients with an implant-retained overdenture: an observational study over two years. Schweiz Monatsschr Zahnmed 122(5): 392-397.  Cepa, S., B. Koller, B. C. Spies, S. Stampf and R. J. Kohal (2017). Implant-retained prosthe-ses: ball vs. conus attachments - A randomized controlled clinical trial. Clin Oral Implants Res 28(2): 177-185.  Cooper, L. F., J. D. Moriarty, A. D. Guckes, L. B. Klee, R. G. Smith, C. Almgren and D. A. Felton (2008). Five-year prospective evaluation of mandibular overdentures retained by two microthreaded, TiOblast nonsplinted implants and retentive ball anchors. Int J Oral Maxillofac Implants 23(4): 696-704.  Cune, M. S., J. W. Verhoeven and G. J. Meijer (2004). A prospective evaluation of Frialoc implants with ball-abutments in the edentulous mandible: 1-year results. Clin Oral Implants Res 15(2): 167-173.  de Araujo Nobre, M., A. Mano Azul, E. Rocha and P. Malo (2015). Risk factors of peri-implant pathology. Eur J Oral Sci 123(3): 131-139.  Degidi, M., D. Nardi and A. Piattelli (2010). Immediate definitive rehabilitation of the eden-tulous patient using an intraorally welded titanium framework: a 3-year prospective study. Quintessence Int 41(8): 651-659.  Degidi, M., D. Nardi and A. Piattelli (2010). Prospective study with a 2-year follow-up on immediate implant loading in the edentulous mandible with a definitive restoration using in-tra-oral welding. Clin Oral Implants Res 21(4): 379-385.  Eliasson, A., F. Blomqvist, A. Wennerberg and A. Johansson (2009). A retrospective analysis of early and delayed loading of full-arch mandibular prostheses using three different implant systems: clinical results with up to 5 years of loading. Clin Implant Dent Relat Res 11(2): 134-148.  Elsyad, M. A., Y. F. Al-Mahdy and M. M. Fouad (2012). Marginal bone loss adjacent to con-ventional and immediate loaded two implants supporting a ball-retained mandibular overden-ture: a 3-year randomized clinical trial. Clin Oral Implants Res 23(4): 496-503.  ElSyad, M. A., H. E. Alameldeen and E. A. Elsaih (2019). Four-implant-supported fixed prosthesis and milled bar overdentures for rehabilitation of the edentulous mandible: A 1-year randomized controlled clinical and radiographic study. Int J Oral Maxillofac Implants 34(6): 1493-1503.  ElSyad, M. A., B. A. Denewar and E. A. Elsaih (2018). Clinical and Radiographic Evaluation of Bar, Telescopic, and Locator Attachments for Implant-Stabilized Overdentures in Patients with Mandibular Atrophied Ridges: A Randomized Controlled Clinical Trial. Int J Oral Max-illofac Implants 33(5): 1103-1111.  Elsyad, M. A., E. A. Elsaih and A. S. Khairallah (2014). Marginal bone resorption around immediate and delayed loaded implants supporting a locator-retained mandibular overden-ture. A 1-year randomised controlled trial. J Oral Rehabil 41(8): 608-618.  Elsyad,, E. L., Shaheen, N.H., and Ashmawy, T.A. (2017). Long-term clinical and prosthetic outcomes of soft liner and clip attachments for bar/implant overdentures: a randomised con-trolled clinical trial. J Oral Rehabil 44(6): 472-480.  Elsyad, M. A., F. F. Mahanna, M. A. Elshahat and A. H. Elshoukouki (2016). Locators versus magnetic attachment effect on peri-implant tissue health of immediate loaded two implants retaining a mandibular overdenture: a 1-year randomised trial. J Oral Rehabil 43(4): 297-305.  Elsyad, M. A. and A. H. Shoukouki (2010). Resilient liner vs. clip attachment effect on peri-implant tissues of bar-implant-retained mandibular overdenture: a 1-year clinical and radio-graphical study. Clin Oral Implants Res 21(5): 473-480.  Fartash, B. and K. Arvidson (1997). Long-term evaluation of single crystal sapphire implants as abutments in fixed prosthodontics. Clin Oral Implants Res 8(1): 58-67.  Fischer, K. and T. Stenberg (2004). Early loading of ITI implants supporting a maxillary full-arch prosthesis: 1-year data of a prospective, randomized study. Int J Oral Maxillofac Im-plants 19(3): 374-381.  Fischer, K. and T. Stenberg (2012). Prospective 10-year cohort study based on a randomized controlled trial (RCT) on implant-supported full-arch maxillary prostheses. Part 1: sandblasted and acid-etched implants and mucosal tissue. Clin Implant Dent Relat Res 14(6): 808-815.  Fischer, K., T. Stenberg, M. Hedin and L. Sennerby (2008). Five-year results from a random-ized, controlled trial on early and delayed loading of implants supporting full-arch prosthesis in the edentulous maxilla. Clin Oral Implants Res 19(5): 433-441.  Francetti, L., E. Agliardi, T. Testori, D. Romeo, S. Taschieri and M. Del Fabbro (2008). Im-mediate rehabilitation of the mandible with fixed full prosthesis supported by axial and tilted implants: interim results of a single cohort prospective study. Clin Implant Dent Relat Res 10(4): 255-263.  Gadallah, A. A., H. G. Youssef and Y. M. Shawky (2012). A comparative study between early occlusal loading at 1 and 6 weeks in implant-retained mandibular overdentures. Implant Dent 21(3): 242-247.  Gallucci, G. O., C. B. Doughtie, J. W. Hwang, J. P. Fiorellini and H. P. Weber (2009). Five-year results of fixed implant-supported rehabilitations with distal cantilevers for the edentu-lous mandible. Clin Oral Implants Res 20(6): 601-607.  Giannakopoulos, N. N., K. Ariaans, L. Eberhard, A. L. Klotz, K. Oh and S. Kappel (2017). Immediate and delayed loading of two-piece reduced-diameter implants with locator-analog attachments in edentulous mandibles: One-year results from a randomized clinical trial exam-ining clinical outcome and patient expectation. Clin Implant Dent Relat Res 19(4): 643-653.  Hegazy, S., N. Elmekawy and R. M. Emera (2016). Peri-implant Outcomes with Laser vs Nanosurface Treatment of Early Loaded Implant-Retaining Mandibular Overdentures. Int J Oral Maxillofac Implants 31(2): 424-430.  Heydenrijk, K., G. M. Raghoebar, H. J. Meijer, W. A. Van Der Reijden, A. J. Van Win-kelhoff and B. Stegenga (2002). Two-part implants inserted in a one-stage or a two-stage pro-cedure. A prospective comparative study. J Clin Periodontol 29(10): 901-909.  Karabuda, C., T. Tosun, E. Ermis and T. Ozdemir (2002). Comparison of 2 retentive systems for implant-supported overdentures: soft tissue management and evaluation of patient satis-faction. J Periodontol 73(9): 1067-1070.  Karoussis, IK., Salvi, GE., Heitz‐Mayfield, LJ., Bragger, U., Hammerle, CH., Lang, NP (2003). Long‐term implant prognosis in patients with and without a history of chronic perio-dontitis: a 10‐year prospective cohort study of the ITI Dental Implant System. Clin Oral Im-plants Res 14:329–339.  Kern, M., W. Att, E. Fritzer, S. Kappel, R. G. Luthardt, T. Mundt, D. R. Reissmann, M. Ra-del, M. Stiesch, S. Wolfart and N. Passia (2018). Survival and Complications of Single Dental Implants in the Edentulous Mandible Following Immediate or Delayed Loading: A Random-ized Controlled Clinical Trial. J Dent Res 97(2): 163-170.  Krennmair, G., M. Krainhöfner and E. Piehslinger (2007). Implant-supported mandibular overdentures retained with a milled bar: a retrospective study. Int J Oral Maxillofac Implants 22(6): 987-994.  Krennmair, G., R. Seemann, A. Fazekas, R. Ewers and E. Piehslinger (2012). Patient prefer-ence and satisfaction with implant-supported mandibular overdentures retained with ball or locator attachments: a crossover clinical trial. Int J Oral Maxillofac Implants 27(6): 1560-1568.  Krennmair, G., R. Seemann, M. Weinlander and E. Piehslinger (2011). Comparison of ball and telescopic crown attachments in implant-retained mandibular overdentures: a 5-year pro-spective study. Int J Oral Maxillofac Implants 26(3): 598-606.  Krennmair, G., D. Suto, R. Seemann and E. Piehslinger (2012). Removable four implant-supported mandibular overdentures rigidly retained with telescopic crowns or milled bars: a 3-year prospective study. Clin Oral Implants Res 23(4): 481-488.  Krennmair, G., M. Weinlander, M. Krainhofner and E. Piehslinger (2006). Implant-supported mandibular overdentures retained with ball or telescopic crown attachments: a 3-year prospec-tive study. Int J Prosthodont 19(2): 164-170.  Maniewicz, S., R. Buser, E. Duvernay, L. Vazquez, A. Loup, T. V. Perneger, M. Schimmel and F. Muller (2017). Short Dental Implants Retaining Two-Implant Mandibular Overden-tures in Very Old, Dependent Patients: Radiologic and Clinical Observation Up to 5 Years. Int J Oral Maxillofac Implants 32(2): 415-422.  Meijer, H. J., R. H. Batenburg, G. M. Raghoebar and A. Vissink (2004). Mandibular overden-tures supported by two Branemark, IMZ or ITI implants: a 5-year prospective study. J Clin Periodontol 31(7): 522-526.  Meijer, H. J., M. E. Geertman, G. M. Raghoebar and J. M. Kwakman (2001). Implant-retained mandibular overdentures: 6-year results of a multicenter clinical trial on 3 different implant systems. J Oral Maxillofac Surg 59(11): 1260-1268; discussion 1269-1270.  Meijer, H. J., G. M. Raghoebar, M. A. Van 't Hof, A. Visser, M. E. Geertman and R. P. Van Oort (2000). A controlled clinical trial of implant-retained mandibular overdentures; five-years' results of clinical aspects and aftercare of IMZ implants and Branemark implants. Clin Oral Implants Res 11(5): 441-447.  Moberg, L. E., P. A. Kondell, G. B. Sagulin, A. Bolin, A. Heimdahl and G. W. Gynther (2001). Branemark System and ITI Dental Implant System for treatment of mandibular eden-tulism. A comparative randomized study: 3-year follow-up. Clin Oral Implants Res 12(5): 450-461.  Muller, F., B. Al-Nawas, S. Storelli, M. Quirynen, S. Hicklin, J. Castro-Laza, R. Bassetti and M. Schimmel (2015). Small-diameter titanium grade IV and titanium-zirconium implants in edentulous mandibles: five-year results from a double-blind, randomized controlled trial. BMC Oral Health 15(1): 123.  Naert, I., G. Alsaadi, D. van Steenberghe and M. Quirynen (2004). A 10-year randomized clinical trial on the influence of splinted and unsplinted oral implants retaining mandibular overdentures: peri-implant outcome. Int J Oral Maxillofac Implants 19(5): 695-702.  Naert, I., S. Gizani, M. Vuylsteke and D. van Steenberghe (1998). A 5-year randomized clini-cal trial on the influence of splinted and unsplinted oral implants in the mandibular overden-ture therapy. Part I: Peri-implant outcome. Clin Oral Implants Res 9(3): 170-177.  Papaspyridakos, P., C. J. Chen, S. K. Chuang and H. P. Weber (2014). Implant loading proto-cols for edentulous patients with fixed prostheses: a systematic review and meta-analysis. Int J Oral Maxillofac Implants 29 Suppl: 256-270.  Pozzi, A., M. Tallarico and P. K. Moy (2016). Four-implant overdenture fully supported by a CAD-CAM titanium bar: A single-cohort prospective 1-year preliminary study. J Prosthet Dent 116(4): 516-523.  Quirynen, M., B. Al-Nawas, H. J. Meijer, A. Razavi, T. E. Reichert, M. Schimmel, S. Storelli and E. Romeo (2015). Small-diameter titanium Grade IV and titanium-zirconium implants in edentulous mandibles: three-year results from a double-blind, randomized controlled trial. Clin Oral Implants Res 26(7): 831-840.  Romeo, E., M. Chiapasco, A. Lazza, P. Casentini, M. Ghisolfi, M. Iorio and G. Vogel (2002). Implant-retained mandibular overdentures with ITI implants. Clin Oral Implants Res 13(5): 495-501.  Salman, A., S. Thacker, S. Rubin, A. Dhingra, E. Ioannidou and G. P. Schincaglia (2019). Immediate versus delayed loading of mandibular implant-retained overdentures: A 60-month follow-up of a randomized clinical trial. J Clin Periodontol 46(8): 863-871.  Schrott, A. R., M. Jimenez, J. W. Hwang, J. Fiorellini and H. P. Weber (2009). Five-year evaluation of the influence of keratinized mucosa on peri-implant soft-tissue health and stabil-ity around implants supporting full-arch mandibular fixed prostheses. Clin Oral Implants Res 20(10): 1170-1177.  Slot, W., G. M. Raghoebar, M. S. Cune, A. Vissink and H. J. Meijer (2016). Maxillary over-dentures supported by four or six implants in the anterior region: 5-year results from a ran-domized controlled trial. J Clin Periodontol 43(12): 1180-1187.  Slot, W., G. M. Raghoebar, M. S. Cune, A. Vissink and H. J. A. Meijer (2019). Four or six implants in the maxillary posterior region to support an overdenture: 5-year results from a ran-domized controlled trial. Clin Oral Implants Res 30(2): 169-177.  Slot, W., G. M. Raghoebar, A. Vissink and H. J. Meijer (2013). Maxillary overdentures sup-ported by four or six implants in the anterior region; 1-year results from a randomized con-trolled trial. J Clin Periodontol 40(3): 303-310.  Slot, W., G. M. Raghoebar, A. Vissink and H. J. Meijer (2014). A comparison between 4 and 6 implants in the maxillary posterior region to support an overdenture; 1-year results from a randomized controlled trial. Clin Oral Implants Res 25(5): 560-566.  Stoker, G., R. van Waas and D. Wismeijer (2012). Long-term outcomes of three types of im-plant-supported mandibular overdentures in smokers. Clin Oral Implants Res 23(8): 925-929.  Stricker, A., R. Gutwald, R. Schmelzeisen and N. G. Gellrich (2004). Immediate loading of 2 interforaminal dental implants supporting an overdenture: clinical and radiographic results after 24 months. Int J Oral Maxillofac Implants 19(6): 868-872.  Tawse-Smith, A., A. G. Payne, R. Kumara and W. M. Thomson (2002). Early loading of unsplinted implants supporting mandibular overdentures using a one-stage operative proce-dure with two different implant systems: a 2-year report. Clin Implant Dent Relat Res 4(1): 33-42.  Tawse-Smith, A., C. Perio, A. G. Payne, R. Kumara and W. M. Thomson (2001). One-stage operative procedure using two different implant systems: a prospective study on implant overdentures in the edentulous mandible. Clin Implant Dent Relat Res 3(4): 185-193.8.Todisco, M., J. Buti, L. Sbricoli and M. Esposito (2019). On the role of keratinised mucosa at dental implants: a 5-year prospective single-cohort study. Int J Oral Implantol (New Malden) 12(1): 13-22.  Todisco, M., L. Sbricoli, D. R. Ippolito and M. Esposito (2018). Do we need abutments at immediately loaded implants supporting cross-arch fixed prostheses? Results from a 5-year randomised controlled trial. Eur J Oral Implantol 11(4): 397-407.  Todisco, M., J. Buti, L. Sbricoli and M. Esposito (2019). On the role of keratinised mucosa at  dental implants: a 5-year prospective single-cohort study. Int J Oral Implantol (New Malden)  12(1): 13-22.  Toljanic, J. A., K. Ekstrand, R. A. Baer and A. Thor (2016). Immediate Loading of Implants in the Edentulous Maxilla with a Fixed Provisional Restoration without Bone Augmentation: A Report on 5-Year Outcomes Data Obtained from a Prospective Clinical Trial. Int J Oral Maxillofac Implants 31(5): 1164-1170.  Turkyilmaz, I., T. F. Tozum, D. M. Fuhrmann and C. Tumer (2012). Seven-year follow-up results of TiUnite implants supporting mandibular overdentures: early versus delayed loading. Clin Implant Dent Relat Res 14 Suppl 1: e83-90.  Visser, A., G. M. Raghoebar, H. J. Meijer, R. H. Batenburg and A. Vissink (2005). Mandibu-lar overdentures supported by two or four endosseous implants. A 5-year prospective study. Clin Oral Implants Res 16(1): 19-25.  von Hippel, P. T. (2015). The heterogeneity statistic I(2) can be biased in small meta-analyses. BMC Med Res Methodol 15: 35.  Weinlander, M., E. Piehslinger and G. Krennmair (2010). Removable implant-prosthodontic rehabilitation of the edentulous mandible: five-year results of different prosthetic anchorage concepts. Int J Oral Maxillofac Implants 25(3): 589-597.  Wismeijer, D., M. A. van Waas, J. Mulder, J. I. Vermeeren and W. Kalk (1999). Clinical and radiological results of patients treated with three treatment modalities for overdentures on implants of the ITI Dental Implant System. A randomized controlled clinical trial. Clin Oral Implants Res 10(4): 297-306.  Zancope, K., P. C. Simamoto Junior, L. R. Davi, C. J. Prado and F. D. Neves (2014). Imme-diate loading implants with mandibular overdenture: a 48-month prospective follow-up study. Braz Oral Res 28.  Zhang, X. X., J. Y. Shi, Y. X. Gu and H. C. Lai (2016). Long-Term Outcomes of Early Load-ing of Straumann Implant-Supported Fixed Segmented Bridgeworks in Edentulous Maxillae: A 10-Year Prospective Study. Clin Implant Dent Relat Res 18(6): 1227-1237.  Zou, D., Y. Wu, W. Huang, F. Wang, S. Wang, Z. Zhang and Z. Zhang (2013). A 3-year pro-spective clinical study of telescopic crown, bar, and locator attachments for removable four implant-supported maxillary overdentures. Int J Prosthodont 26(6): 566-573. |