

Ankylos[®] Implant System —Clinical documentation

Well documented, reliable and safe

- 24,000 patients followed up to 26 years
- >98% mean implant survival rate after 5 to 18 years of follow-up¹⁻¹⁸
- Stable bone levels after 5 to 12 years of follow-up^{2, 5-8, 14, 16, 17, 19-23}

Clinical result

The Ankylos implant system is scientifically and clinically proven through multiple long-term studies^{1-17, 19-31} and exhibits excellent esthetics, high patient satisfaction^{7, 9, 13, 31-44} and overall high implant survival rate, see table.

	No. of implants	Overall implant survival rate, %	No. of publications	References
Immediate loading	>4300	98,7	45	1, 3, 5, 6, 13-16, 25, 32-34, 39-41, 43, 45-73
Extraction sockets	>1100	99,4	12	28, 31, 49-54, 57, 60, 72, 74
Single tooth	>4000	98,8	34	12, 26, 27, 31, 41, 42, 45, 50, 52-54, 59, 62-65, 67, 72, 74-89
Bridges	>2200	98,6	25	6, 8, 9, 13, 15, 16, 25, 32-34, 37, 43, 47-49, 55-58, 68-71, 90, 91
Overdentures	>1600	97,8	21	1, 4, 7, 11, 14, 17, 36, 38, 39, 66, 73, 92-101

Ankylos implants are safe and predictable in both jaws, for indications such as immediate loading, extraction sockets, single tooth, partial and full bridges and overdentures. Further topics^{83, 91, 102-105} and concepts has also been evaluated with the Ankylos implant system, showing promising results, such as:

- intra-oral welding^{47, 48, 55-58}
- conometric concept with friction-retained restorations^{9, 13, 32, 37, 48, 49, 57, 79, 106, 107} including Acuris^{79, 106}
- studies with mixed prosthetic solutions^{2, 3, 10, 19-21, 28-30, 35, 40, 41, 46, 51, 60, 61, 82, 85, 108-132}

Conclusion

Extensive literature evaluating over 70,000 implants, shows safe and predictable treatment outcomes for the Ankylos implant system, with a mean of >98% implant survival rate after 5 to 18 years of follow-up.

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References

- Romanos GE, May S, May D. Treatment concept of the edentulous mandible with prefabricated telescopic abutments and immediate functional loading. *Int. J. Oral Maxillofac. Implants* 2011;26(3):593-7. [Abstract](#)
- Romanos GE, Aydin E, Gaertner K, Nentwig GH. Long-term results after subcrestal or crestal placement of delayed loaded implants. *Clin. Implant Dent. Relat. Res.* 2015;17(1):133-41. [Abstract](#)
- Romanos GE, May S, May D. Immediate loading of tooth-implant-supported telescopic mandibular prostheses. *Int. J. Oral Maxillofac. Implants* 2012;27(6):1534-40. [Abstract](#)
- Frisch E, Ziebolz D, Ratka-Kruger P, Rinke S. Double crown-retained maxillary overdentures: 5-year follow-up. *Clin. Implant Dent. Relat. Res.* 2015;17(1):22-31. [Abstract](#)
- Romanos GE, Gaertner K, Aydin E, Nentwig GH. Long-term results after immediate loading of platform-switched implants in smokers versus nonsmokers with full-arch restorations. *Int. J. Oral Maxillofac. Implants* 2013;28(3):841-5. [Abstract](#)
- Romanos GE, Aydin E, Locher K, Nentwig GH. Immediate vs. delayed loading in the posterior mandible: A split-mouth study with up to 15 years of follow-up. *Clin. Oral Implants Res.* 2016;27(2):e74-9. [Abstract](#)
- Eerdekens L, Schols M, Coelst L, Quirynen M, Naert I. A 5-year prospective study on cone-anchored implants in the edentulous maxilla. *Clin. Implant Dent. Relat. Res.* 2015;17 Suppl 2:e621-32. [Abstract](#)
- Romanos GE, Gurbanov S, Hess P, Nentwig GH, Schwarz F, Sader R. Crestal bone loss and implant failure of prefabricated versus customized abutments: A 10-year retrospective radiological study. *Clin. Oral Investig.* 2022;26(3):2879-86. [Abstract](#)
- Degidi M, Nardi D, Gianluca S, Piattelli A. The conometric concept: A 5-year follow-up of fixed partial monolithic zirconia restorations supported by cone-in-cone abutments. *Int. J. Periodontics Restorative Dent.* 2018;38(3):363-71. [Abstract](#)
- Krebs M, Schmenger K, Neumann K, Weigl P, Moser W, Nentwig GH. Long-term evaluation of Ankylos dental implants, part I: 20-year life table analysis of a longitudinal study of more than 12,500 implants. *Clin. Implant Dent. Relat. Res.* 2015;17 Suppl 1:e275-86. [Abstract](#)
- Frisch E, Ratka-Kruger P, Wenz HJ. Unsplinted implants and teeth supporting maxillary removable partial dentures retained by telescopic crowns: A retrospective study with >6 years of follow-up. *Clin. Oral Implants Res.* 2015;26(9):1091-7. [Abstract](#)
- Shim HW, Yang BE. Long-term cumulative survival and mechanical complications of single-tooth Ankylos Implants: Focus on the abutment neck fractures. *J Adv Prosthodont* 2015;7(6):423-30. [Abstract](#)
- Bressan E, Sbricoli L, Guazzo R, Bambace M, Lops D, Tomasi C. Five-year prospective study on conometric retention for complete fixed prostheses. *Int J Oral Implantol (Berl)* 2019;12(1):105-13. [Abstract](#)
- Kourtis S, Madianos P, Patras M, Andrikopoulou E. Rehabilitation of the edentulous mandible with implant-supported overdentures on telescopic abutments and immediate loading. A controlled prospective clinical study. *J Esthet Restor Dent* 2018;30(4):369-77. [Abstract](#)
- Romanos GE, Gaertner K, Nentwig GH. Long-term evaluation of immediately loaded implants in the edentulous mandible using fixed bridges and platform shifting. *Clin. Implant Dent. Relat. Res.* 2014;16(4):601-8. [Abstract](#)
- Romanos GE, Gupta B, Gaertner K, Nentwig GH. Distal cantilever in full-arch prostheses and immediate loading: A retrospective clinical study. *Int. J. Oral Maxillofac. Implants* 2014;29(2):427-31. [Abstract](#)
- Rinke S, Ziebolz D, Ratka-Kruger P, Frisch E. Clinical outcome of double crown-retained mandibular removable dentures supported by a combination of residual teeth and strategic implants. *J. Prosthodont.* 2015;24(5):358-65. [Abstract](#)
- Romanos GE, Schesni A, Nentwig G-H, Winter A, Sader R, Brandt S. Impact of Implant Diameter on Success and Survival of Dental Implants: An Observational Cohort Study. *Prosthesis* 2023;5(3):888-97. [Abstract](#)
- Joda T, Michelaki I, Heydecke G. Peri-implant bone loss of dental implants with platform-switching design after 5 years of loading: A cross-sectional study. *Quintessence Int.* 2015;46(1):59-66. [Abstract](#)
- Hasegawa M, Hotta Y, Hoshino T, Ito K, Komatsu S, Saito T. Long-term radiographic evaluation of risk factors related to implant treatment: Suggestion for alternative statistical analysis of marginal bone loss. *Clin. Oral Implants Res.* 2016;27(10):1283-89. [Abstract](#)
- Elemek E, Urgancioglu A, Dincer J, Cilingir A. Does implant-abutment interface affect marginal bone levels around implants? *Eur J Dent* 2019;13(1):47-52. [Abstract](#)
- Murakami H, Igarashi K, Fuse M, Kitagawa T, Igarashi M, Uchibori S, Komine C, Gotouda H, Okada H, Kawai Y. Risk factors for abutment and implant fracture after loading. *J. Oral Sci.* 2020;63(1):92-97. [Abstract](#)
- Obreja K, Ramanauskaite A, Begic A, Galarraga-Vinueza ME, Parvini P, Sader R, Schwarz F. The prevalence of peri-implant diseases around subcrestally placed implants: A cross-sectional study. *Clin. Oral Implants Res.* 2021;32(6):702-10. [Abstract](#)
- Rinke S, Ohl S, Ziebolz D, Lange K, Eickholz P. Prevalence of periimplant disease in partially edentulous patients: A practice-based cross-sectional study. *Clin. Oral Implants Res.* 2011;22(8):826-33. [Abstract](#)
- Romanos GE, May S, May D. Implant-supporting telescopic maxillary prostheses and immediate loading. *Clin. Implant Dent. Relat. Res.* 2014;16(3):412-8. [Abstract](#)
- Rinke S, Roediger M, Eickholz P, Lange K, Ziebolz D. Technical and biological complications of single-molar implant restorations. *Clin. Oral Implants Res.* 2015;26(9):1024-30. [Abstract](#)
- Ziebolz D, Schmalz G, Gollasch D, Eickholz P, Rinke S. Microbiological and aMMP-8 findings depending on peri-implant disease in patients undergoing supportive implant therapy. *Diagn. Microbiol. Infect. Dis.* 2017;88(1):47-52. [Abstract](#)
- Ramanauskaite A, Schwarz F, Begic A, Parvini P, Galarraga-Vinueza ME, Obreja K. The influence of simultaneous lateral grafting on clinical outcomes following one-stage implant placement: A cross-sectional analysis. *Int J Implant Dent* 2020;6(1):37. [Abstract](#)
- Kesar N, Weigl P, Nentwig GH, Krebs M. Prevalence and risk of peri-implant diseases based on the type of prosthetic restoration: A retrospective study after 17 to 23 years. *J. Prosthodont.* 2022;E-pub Jan 8, doi: 10.1016/j.prosdent.2021.11.0301-8. [Abstract](#)
- Yu H, Qiu L. Analysis of fractured dental implant body from five different implant systems: A long-term retrospective study. *Int. J. Oral Maxillofac. Surg.* 2022;51(10):1355-61. [Abstract](#)
- Parvini P, Trimpou G, Begic A, Cafferata EA, Petsos H, Muller KM, Schwarz F, Eickholz P, Obreja K. Esthetic and clinical outcomes after immediate placement and restoration: Comparison of two implant systems in the anterior maxilla-A cross-sectional study. *Clin. Implant Dent. Relat. Res.* 2023;25(2):252-60. [Abstract](#)
- Bressan E, Lops D. Conometric retention for complete fixed prosthesis supported by four implants: 2-years prospective study. *Clin. Oral Implants Res.* 2014;25(5):546-52. [Abstract](#)
- Eccellente T, Piombino M, Piattelli A, D'alimonte E, Perrotti V, Iezzi G. Immediate loading of dental implants in the edentulous maxilla. *Quintessence Int.* 2011;42(4):281-9. [Abstract](#)
- Eccellente T, Piombino M, Piattelli A, Perrotti V, Iezzi G. A new treatment concept for immediate loading of implants inserted in the edentulous mandible. *Quintessence Int.* 2010;41(6):489-95. [Abstract](#)
- Morris HF, Ochi S, Rodriguez A, Lambert PM. AICRG, Part IV: Patient satisfaction reported for Ankylos implant prostheses. *J. Oral Implantol.* 2004;30(3):152-61. [Abstract](#)
- Weigl P, Trimpou G, Lorenz J, Nentwig GH, Lauer HC. Prefabricated taper crowns for the retention of implant superstructures: Three-year results of a prospective clinical trial. *J. Prosthet. Dent.* 2019;121(4):618-22. [Abstract](#)
- Degidi M, Nardi D, Sighinolfi G, Degidi D, Piattelli A. The conometric concept: A two-year follow-up of fixed partial CEREC restorations supported by cone-in-cone abutments. *J. Prosthodont.* 2019;28(2):e780-e87. [Abstract](#)
- Cepa S, Koller B, Wolkewitz M, Kohal R. Implant-retained prostheses: ball vs. conus attachments – A randomized controlled clinical trial. *Z Zahnärztl Impl* 2011;27(4):320-33. [Abstract](#)
- Shaarawy MA, Abouelross EM. The effect of varying implant position in immediately loaded implant-supported mandibular overdentures. *J. Oral Implantol.* 2013;39(3):345-54. [Abstract](#)
- Esposito M, Bressan E, Grusovin MG, D'avenia F, Neumann K, Sbricoli L, Luongo G. Do repeated changes of abutments have any influence on the stability of peri-implant tissues? One-year post-loading results from a multicentre randomised controlled trial. *Eur J Oral Implantol* 2017;10(1):57-72. [Abstract](#)
- Bressan E, Grusovin MG, D'avenia F, Neumann K, Sbricoli L, Luongo G, Esposito M. The influence of repeated abutment changes on peri-implant tissue stability: 3-year post-loading results from a multicentre randomised controlled trial. *Eur J Oral Implantol* 2017;10(4):373-90. [Abstract](#)
- Weigl P, Saarepera K, Hinrikus K, Wu Y, Trimpou G, Lorenz J. Screw-retained monolithic zirconia vs. cemented porcelain-fused-to-metal implant crowns: A prospective randomized clinical trial in split-mouth design. *Clin. Oral Investig.* 2019;23(3):1067-75. [Abstract](#)
- Bernard L, Verbruggen M, Vanderveken J, Coucke W, Quirynen M, Naert I. 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.* 2019;121(2):258-64. [Abstract](#)
- Li K, Liu F, Liu P, Wei C, Li X. Clinical effect and aesthetic evaluation of minimally invasive implant therapy. *Emerg. Med. Int.* 2023;2023:9917311. [Abstract](#)
- Abboud M, Koeck B, Stark H, Wahl G, Pailon R. Immediate loading of single-tooth implants in the posterior region. *Int. J. Oral Maxillofac. Implants* 2005;20(1):61-8. [Abstract](#)
- Abboud M, Wahl G, Calvo-Guirado JL, Orentlicher G. Application and success of two stereolithographic surgical guide systems for implant placement with immediate loading. *Int. J. Oral Maxillofac. Implants* 2012;27(3):634-43. [Abstract](#)
- Albiero AM, Benato R, Benato A, Degidi M. Use of intraoral welding to increase the predictability of immediately loaded computer-guided implants. *Int. J. Periodontics Restorative Dent.* 2017;37(4):591-98. [Abstract](#)
- Albiero AM, Benato R, Benato A, Degidi M. Guided-welded approach planning using digital scanning technology for combined screw- and conometric-retained implant-supported maxillary prosthesis. *Int. J. Comput. Dent.* 2020;23(4):325-33. [Abstract](#)
- Baruffaldi A, Baruffaldi A, Baruffaldi M, Maiorana C, Poli PP. A suggested protocol to increase the accuracy of prosthetic phases in case of full-arch model-free fully guided computer-aided implant placement and immediate loading. *Oral Maxillofac. Surg.* 2020;24(3):343-51. [Abstract](#)
- Cauduro FS, Silva DN, Oliveira RBD, Bridi MDP, Cauduro DE, Pretto SM. Single tooth morse taper implant placement and restoration immediately after extraction. *RGO - Revista Gaúcha de Odontologia* 2019;67. [Abstract](#)

51. Crespi R, Cappare P, Gherlone E. Radiographic evaluation of marginal bone levels around platform-switched and non-platform-switched implants used in an immediate loading protocol. *Int. J. Oral Maxillofac. Implants* 2009;24(5):920-6. [Abstract](#)
52. Degidi M, Daprile G, Nardi D, Piattelli A. Immediate provisionalization of implants placed in fresh extraction sockets using a definitive abutment: The chamber concept. *Int. J. Periodontics Restorative Dent.* 2013;33(5):559-65. [Abstract](#)
53. Degidi M, Daprile G, Nardi D, Piattelli A. Buccal bone plate in immediately placed and restored implant with Bio-Oss® collagen graft: a 1-year follow-up study. *Clin. Oral Implants Res.* 2013;24(11):201-5. [Abstract](#)
54. Degidi M, Nardi D, Daprile G, Piattelli A. Nonremoval of immediate abutments in cases involving subcrestally placed postextractive tapered single implants: A randomized controlled clinical study. *Clin. Implant Dent. Relat. Res.* 2014;16(6):794-805. [Abstract](#)
55. Degidi M, Nardi D, Piattelli A. Prospective study with a 2-year follow-up on immediate implant loading in the edentulous mandible with a definitive restoration using intra-oral welding. *Clin. Oral Implants Res.* 2010;21(4):379-85. [Abstract](#)
56. Degidi M, Nardi D, Piattelli A. One abutment at one time: Non-removal of an immediate abutment and its effect on bone healing around subcrestal tapered implants. *Clin. Oral Implants Res.* 2011;22(11):1303-7. [Abstract](#)
57. Degidi M, Nardi D, Piattelli A. The conometric concept: Coupling connection for immediately loaded titanium-reinforced provisional fixed partial dentures—A case series. *Int. J. Periodontics Restorative Dent.* 2016;36(3):347-54. [Abstract](#)
58. Degidi M, Nardi D, Sighinolfi G, Piattelli A. Immediate rehabilitation of the edentulous mandible using Ankylos SynCone telescopic copings and intraoral welding: A pilot study. *Int. J. Periodontics Restorative Dent.* 2012;32(6):e189-94. [Abstract](#)
59. Donovan R, Fetner A, Koutouzis T, Lundgren T. Crestal bone changes around implants with reduced abutment diameter placed non-submerged and at subcrestal positions: A 1-year radiographic evaluation. *J. Periodontol.* 2010;81(3):428-34. [Abstract](#)
60. Hakobyan G, Esayan L, Hakobyan D, Khachatryan G, Tunyan G. The comparative assessment of the effectiveness of immediate and delayed dental implantation. *Int J Oral Craniofac Sci* 2021;6(2):30-37.
61. Jesch P, Jesch W, Bruckmoser E, Krebs M, Kladek T, Seemann R. An up to 17-year follow-up retrospective analysis of a minimally invasive, flapless approach: 18 945 implants in 7783 patients. *Clin. Implant Dent. Relat. Res.* 2018;20(3):393-402. [Abstract](#)
62. Koutouzis T, Adeinat B, Ali A. The influence of abutment macro-design on clinical and radiographic peri-implant tissue changes for guided, placed, and restored implants: A 1-year randomized controlled trial. *Clin. Oral Implants Res.* 2019;30(9):882-91. [Abstract](#)
63. Koutouzis T, Ali A, Alrubaie M. Clinical and radiographic peri-implant tissue changes for implants restored with convex or concave abutment shapes: A 3-year randomized controlled trial. *Clin. Oral Implants Res.* 2023;34(7):675-83. [Abstract](#)
64. Koutouzis T, Neiva R, Nair M, Nonhoff J, Lundgren T. Cone beam computed tomographic evaluation of implants with platform-switched Morse taper connection with the implant-abutment interface at different levels in relation to the alveolar crest. *Int. J. Oral Maxillofac. Implants* 2014;29(5):1157-63. [Abstract](#)
65. Koutouzis T, Neiva R, Nonhoff J, Lundgren T. Placement of implants with platform-switched Morse taper connections with the implant-abutment interface at different levels in relation to the alveolar crest: A short-term (1-year) randomized prospective controlled clinical trial. *Int. J. Oral Maxillofac. Implants* 2013;28(6):1553-63. [Abstract](#)
66. May D, R. GE. Immediate implant-supported mandibular overdentures retained by conical crowns: A new treatment concept. *Quintessence Int.* 2002;33(1):5-12.
67. Obreja K, Begić A, Trimpou G, Galarraga-Vinueza ME, Balaban Ü, Schwarz F, Parvini P. Clinical and Esthetic Evaluation Following Immediate Implant Placement and Restoration with Platform-Switched Morse Taper Implants in the Esthetic Zone: A Cross-Sectional Study. *Int. J. Periodontics Restorative Dent.* 2022;42(5):665-73. [Abstract](#)
68. Romanos GE, Malmstrom H, Feng C, Ercoli C, Caton J. Immediately loaded platform-switched implants in the anterior mandible with fixed prostheses: A randomized, split-mouth, masked prospective trial. *Clin. Implant Dent. Relat. Res.* 2014;16(6):884-92. [Abstract](#)
69. Romanos GE, Nentwig GH. Immediate versus delayed functional loading of implants in the posterior mandible: A 2-year prospective clinical study of 12 consecutive cases. *Int. J. Periodontics Restorative Dent.* 2006;26(5):459-69. [Abstract](#)
70. Romanos GE, Nentwig GH. Immediate loading using cross-arch fixed restorations in heavy smokers: Nine consecutive case reports for edentulous arches. *Int. J. Oral Maxillofac. Implants* 2008;23(3):513-9. [Abstract](#)
71. Romanos GE, Nentwig GH. Immediate functional loading in the maxilla using implants with platform switching: Five-year results. *Int. J. Oral Maxillofac. Implants* 2009;24(6):1106-12. [Abstract](#)
72. Sethi A, Kaus T. Immediate replacement of single teeth with immediately loaded implants: Retrospective analysis of a clinical case series. *Implant Dent.* 2017;26(1):30-36. [Abstract](#)
73. Wittwer G, Adeyemo WL, Wagner A, Enislidis G. Computer-guided flapless placement and immediate loading of four conical screw-type implants in the edentulous mandible. *Clin. Oral Implants Res.* 2007;18(4):534-9. [Abstract](#)
74. Zeren KJ. Use of bone morphogenetic protein-2 in molar extraction sockets for immediate implant placement: A prospective case series. *Int. J. Periodontics Restorative Dent.* 2018;38(1):87-93. [Abstract](#)
75. Al-Hashedi AA, Tayheb-Ali TB, Yunus N. Outcomes of placing short implants in the posterior mandible: A preliminary randomized controlled trial. *Aust. Dent. J.* 2016;61(2):208-18. [Abstract](#)
76. Chen H, Gu T, Lai H, Gu X. Evaluation of hard tissue 3-dimensional stability around single implants placed with guided bone regeneration in the anterior maxilla: A 3-year retrospective study. *J. Prosthet. Dent.* 2022;128(5):919-27. [Abstract](#)
77. De Freitas AR, Del Rey YC, De Souza Santos E, Faria Ribeiro R, De Albuquerque Junior RF, Do Nascimento C. Microbial communities of titanium versus zirconia abutments on implant-supported restorations: Biodiversity composition and its impact on clinical parameters over a 3-year longitudinal prospective study. *Clin. Implant Dent. Relat. Res.* 2021;23(2):197-207. [Abstract](#)
78. De Oliveira Silva TS, De Freitas AR, De Albuquerque RF, Pedrazzi V, Ribeiro RF, Do Nascimento C. A 3-year longitudinal prospective study assessing microbial profile and clinical outcomes of single-unit cement-retained implant restorations: Zirconia versus titanium abutments. *Clin. Implant Dent. Relat. Res.* 2020;22(3):301-10. [Abstract](#)
79. Degidi M, Nardi D, Sighinolfi G, Degidi D, Piattelli A. The conometric concept: Definitive rehabilitation of a single posterior implant using a friction retention abutment. A 1-year follow-up report. *Int. J. Prosthodont.* 2023;36(1):104-12. [Abstract](#)
80. Doring K, Eisenmann E, Stiller M. Functional and esthetic considerations for single-tooth Ankylos implant-crowns: 8 years of clinical performance. *J. Oral Implantol.* 2004;30(3):198-209. [Abstract](#)
81. Froum SJ, Cho SC, Suzuki T, Yu P, Corby P, Khouly I. Epicrestal and subcrestal placement of platform-switched implants: 18 month-result of a randomized, controlled, split-mouth, prospective clinical trial. *Clin. Oral Implants Res.* 2018;29(4):353-66. [Abstract](#)
82. Koutouzis T, Fetner M, Fetner A, Lundgren T. Retrospective evaluation of crestal bone changes around implants with reduced abutment diameter placed non-submerged and at subcrestal positions: The effect of bone grafting at implant placement. *J. Periodontol.* 2011;82(2):234-42. [Abstract](#)
83. Koutouzis T, Podaru A, Neiva R. Facial peri-implant soft tissue topography of posterior single implant-supported restorations and relationship to adjacent teeth: A retrospective analysis. *Int. J. Oral Maxillofac. Implants* 2015;30(3):681-7. [Abstract](#)
84. Luo ZB, Zhang QB, Zhang ZQ, Chen D, Yan WX, Li KF, Chen Y. Performance of coralline hydroxyapatite in sinus floor augmentation: A retrospective study. *Clin. Oral Investig.* 2013;17(9):2003-10. [Abstract](#)
85. Nentwig GH. Ankylos implant system: Concept and clinical application. *J. Oral Implantol.* 2004;30(3):171-7. [Abstract](#)
86. Rana V, Dhakne VM, Jadhawar S, Kadam I, Mishra K, Patil P. Bone level measurements around platform switched and platform matched implants: A comparative study. *Niger J Surg* 2019;25(1):9-13. [Abstract](#)
87. Rinke S, Lattke A, Eickholz P, Kramer K, Ziebolz D. Practice-based clinical evaluation of zirconia abutments for anterior single-tooth restorations. *Quintessence Int.* 2015;46(1):19-29. [Abstract](#)
88. Romanos GE, Nentwig GH. Single molar replacement with a progressive thread design implant system: A retrospective clinical report. *Int. J. Oral Maxillofac. Implants* 2000;15(6):831-6. [Abstract](#)
89. Weigl P, Trimpou G, Grizas E, Hess P, Nentwig GH, Lauer HC, Lorenz J. All-ceramic versus titanium-based implant supported restorations: Preliminary 12-months results from a randomized controlled trial. *J Adv Prosthodont* 2019;11(1):48-54. [Abstract](#)
90. Ding Y, Zhou H, Zhang W, Chen J, Zheng Y, Wang L, Yang F. Evaluation of a platform-switched Morse taper connection for all-on-four or six treatment in edentulous or terminal dentition treatment: A retrospective study with 1-8 years of follow-up. *Clin. Implant Dent. Relat. Res.* 2023;E-pub May 29, doi:10.1111/cid.13228. [Abstract](#)
91. Romanos GE, Biltucci MT, Kokaras A, Paster BJ. Bacterial composition at the implant-abutment connection under loading in vivo. *Clin. Implant Dent. Relat. Res.* 2016;18(1):138-45. [Abstract](#)
92. Ahmad R, Abu-Hassan MI, Chen J, Li Q, Swain MV. The relationship of mandibular morphology with residual ridge resorption associated with implant-retained overdentures. *Int. J. Prosthodont.* 2016;29(6):573-80. [Abstract](#)
93. Ahmad R, Abu-Hassan MI, Li Q, Swain MV. Three dimensional quantification of mandibular bone remodeling using standard tessellation language registration based superimposition. *Clin. Oral Implants Res.* 2013;24(11):1273-9. [Abstract](#)
94. Ahmad R, Chen J, Abu-Hassan MI, Li Q, Swain MV. Investigation of mucosa-induced residual ridge resorption under implant-retained overdentures and complete dentures in the mandible. *Int. J. Oral Maxillofac. Implants* 2015;30(3):657-66. [Abstract](#)
95. Cepa S, Koller B, Spies BC, Stampf S, Kohal RJ. Implant-retained prostheses: ball vs. conus attachments – A randomized controlled clinical trial. *Clin. Oral Implants Res.* 2017;28(2):177-85. [Abstract](#)
96. Frisch E, Ziebolz D, Ratka-Kruger P, Rinke S. A new technique for retaining double crowns on implants via custom-positioned vertical screws. *Int. J. Prosthodont.* 2014;27(6):577-8. [Abstract](#)
97. Khalid T, Yunus N, Ibrahim N, Elkezza A, Masood M. Patient-reported outcome and its association with attachment type and bone volume in mandibular implant overdenture. *Clin. Oral Implants Res.* 2017;28(5):535-42. [Abstract](#)

98. Khalid T, Yunus N, Ibrahim N, Saleh NBM, Goode D, Masood M. Assessment of masticatory function of mandibular implant-supported overdenture wearers: A 3-year prospective study. *J. Prosthet. Dent.* 2020;124(6):674-81. [Abstract](#)
99. Laurila M, Mäntynen P, Mauno J, Suojanen J. Prosthetic Oral Rehabilitation with CAD/CAM Suprastructures in Patients with Severe Tissue Deficits: A Case Series. *Dentistry Journal* 2023;11(12):289. [Abstract](#)
100. Riad R, Meselhy A, Alaswad M. Thermoplastic versus conventional heat cured denture bases for implant-retained mandibular overdenture. *Egypt. Dent. J.* 2020;66(4):2179-85. [Abstract](#)
101. Yunus N, Saub R, Tayeb Ali TB, Salleh NM, Baig MR. Patient-based and clinical outcomes of implant telescopic attachment-retained mandibular overdentures: A 1-year longitudinal prospective study. *Int. J. Oral Maxillofac. Implants* 2014;29(5):1149-56. [Abstract](#)
102. Kocar M, Seme K, Hren NI. Characterization of the normal bacterial flora in peri-implant sulci of partially and completely edentulous patients. *Int. J. Oral Maxillofac. Implants* 2010;25(4):690-8. [Abstract](#)
103. Lin G, Ye S, Liu F, He F. A retrospective study of 30,959 implants: Risk factors associated with early and late implant loss. *J. Clin. Periodontol.* 2018;45(6):733-43. [Abstract](#)
104. Nogueira-Filho G, Pesun I, Isaak-Ploegman C, Wijegunasinghe M, Wierzbicki T, McCulloch CA. Longitudinal comparison of cytokines in peri-implant fluid and gingival crevicular fluid in healthy mouths. *J. Periodontol.* 2014;85(11):1582-8. [Abstract](#)
105. Uraz A, Isler SC, Cula S, Tunc S, Yalim M, Cetiner D. Platform-switched implants vs platform-matched implants placed in different implant-abutment interface positions: A prospective randomized clinical and microbiological study. *Clin. Implant Dent. Relat. Res.* 2020;22(1):59-68. [Abstract](#)
106. Degidi M, Nardi D, Sighinolfi G, Degidi D, Piattelli A. Fixed partial restorations made of a new zirconia-reinforced lithium silicate material: A 2-year short-term report. *Int. J. Prosthodont.* 2021;34(1):37-46. [Abstract](#)
107. Degidi M, Nardi D, Sighinolfi G, Piattelli A. The conometric concept: Definitive fixed lithium disilicate restorations supported by conical abutments. *J. Prosthodont.* 2018;27(7):605-10. [Abstract](#)
108. Al-Fakeh H, Sharhan HM, Ziyad TA, Abdulghani EA, Al-Moraissi E, Al-Sosowa AA, Liu B, Zhang K. Three-dimensional radiographic assessment of bone changes around posterior dental implants at native bone site in Gansu Province, Northwest of China: A retrospective cohort study. *J Stomatol Oral Maxillofac Surg* 2022;123(4):e186-e91. [Abstract](#)
109. Alhammadi SH, Burnside G, Milosevic A. Clinical outcomes of single implant supported crowns versus 3-unit implant-supported fixed dental prostheses in Dubai Health Authority: A retrospective study. *BMC Oral Health* 2021;21(1):171. [Abstract](#)
110. Block MS, Kalem A. Use of sintered xenograft over allograft for ridge augmentation: Technique note. *J. Oral Maxillofac. Surg.* 2014;72(3):496-502. [Abstract](#)
111. Chou CT, Morris HF, Ochi S, Walker L, Desrosiers D. AICRG, Part II: Crestal bone loss associated with the Ankylos implant: loading to 36 months. *J. Oral Implantol.* 2004;30(3):134-43. [Abstract](#)
112. Degidi M, Daprile G, Piattelli A. Marginal bone loss around implants with platform-switched Morse-cone connection: A radiographic cross-sectional study. *Clin. Oral Implants Res.* 2017;28(9):1108-12. [Abstract](#)
113. Frisch E, Ratka-Kruger P, Ziebolz D. Increasing the width of keratinized mucosa in maxillary implant areas using a split palatal bridge flap: Surgical technique and 1-year follow-up. *J. Oral Implantol.* 2015;41(5):e195-201. [Abstract](#)
114. Grisar K, Sinha D, Schoenaers J, Dormaar T, Politis C. Retrospective analysis of dental implants placed between 2012 and 2014: Indications, risk factors, and early survival. *Int. J. Oral Maxillofac. Implants* 2017;32(3):649-54. [Abstract](#)
115. Jin X, Guan Y, Ren J, Zhao Y, Wang X, He F. A retrospective study of 12,538 internal conical connection implants focused on the long-term integrity of implant-abutment complexes. *Clin. Oral Implants Res.* 2022;33(4):377-90. [Abstract](#)
116. Klaus RE, Romanos G, Egerer C, Nentwig GH. Treating free-end cases with Ankylos System restorations. *Z Zahnärztl Impl* 1997;4.
117. Krebs M, Kesar N, Begic A, Von Krockow N, Nentwig GH, Weigl P. Incidence and prevalence of peri-implantitis and peri-implant mucositis 17 to 23 (18.9) years postimplant placement. *Clin. Implant Dent. Relat. Res.* 2019;21(6):1116-23. [Abstract](#)
118. Maier FM. Initial crestal bone loss after implant placement with flapped or flapless surgery—a prospective cohort study. *Int. J. Oral Maxillofac. Implants* 2016;31(4):876-83. [Abstract](#)
119. Morris HF, Ochi S, Crum P, Orenstein IH, Winkler S. AICRG, Part I: A 6-year multicentered, multidisciplinary clinical study of a new and innovative implant design. *J. Oral Implantol.* 2004;30(3):125-33. [Abstract](#)
120. Morris HF, Ochi S, Orenstein IH, Petrazzuolo V. AICRG, Part V: Factors influencing implant stability at placement and their influence on survival of Ankylos implants. *J. Oral Implantol.* 2004;30(3):162-70. [Abstract](#)
121. Morris HF, Ochi S, Plezia R, Gilbert H, Dent CD, Pikulski J, Lambert PM. AICRG, Part III: The influence of antibiotic use on the survival of a new implant design. *J. Oral Implantol.* 2004;30(3):144-51. [Abstract](#)
122. Morris HF, Winkler S, Ochi S. The ankylos endosseous dental implant: Assessment of stability up to 18 months with the Periotest. *J. Oral Implantol.* 2000;26(4):291-9. [Abstract](#)
123. Morris HF, Winkler S, Ochi S, Kanaan A. A new implant designed to maximize contact with trabecular bone: Survival to 18 months. *J. Oral Implantol.* 2001;27(4):164-73. [Abstract](#)
124. Mäntynen P, Laurila M, Strausz T, Mauno J, Leikola J, Suojanen J. Use of Individually Designed CAD/CAM Suprastructures for Dental Reconstruction in Patients with Cleft Lip and Palate. *Dent J (Basel)* 2023;11(9). [Abstract](#)
125. Romanos G, Grizas E, Laukart E, Nentwig GH. Effects of early moderate loading on implant stability: A retrospective investigation of 634 implants with platform switching and morse-tapered connections. *Clin. Implant Dent. Relat. Res.* 2016;18(2):301-9. [Abstract](#)
126. Shin YK, Han CH, Heo SJ, Kim S, Chun HJ. Radiographic evaluation of marginal bone level around implants with different neck designs after 1 year. *Int. J. Oral Maxillofac. Implants* 2006;21(5):789-94. [Abstract](#)
127. Solakoglu O, Filippi A. Regenerative therapy of peri-implantitis: Clinical and radiologic documentation of 16 consecutive patients with a mean follow-up of 3 years. *J. Oral Implantol.* 2019;45(2):145-53. [Abstract](#)
128. Sun P, Yu D, Luo X, Xu A, Feng Y, He FM. The effect of initial biologic width on marginal bone loss: A retrospective study. *Int. J. Oral Maxillofac. Implants* 2022;37(1):190-98. [Abstract](#)
129. Woo IH, Kim JW, Kang SY, Kim YH, Yang BE. Narrow-diameter implants with conical connection for restoring the posterior edentulous region. *Maxillofac Plast Reconstr Surg* 2016;38(1):31. [Abstract](#)
130. Yang F, Ruan Y, Liu Y, Chen J, Chen Y, Zhang W, Ding Y, Wang L. Abutment mechanical complications of a Morse taper connection implant system: A 1- to 9-year retrospective study. *Clin. Implant Dent. Relat. Res.* 2022;24(5):683-95. [Abstract](#)
131. Young-Kyu S, Chong-Hyun H, Seong-Joo H, Kim S, Heoung-Jae C. Radiographic evaluation of marginal bone level around implants with different neck designs after 1 year. *Int. J. Oral Maxillofac. Implants* 2006;21(5):789-94. [Abstract](#)
132. Atieh MA, Almutairi Z, Amir-Rad F, Koleilat M, Tawse-Smith A, Ma S, Lin L, Alsabeeha NHM. A retrospective analysis of biological complications of dental implants. *Int J Dent* 2022;2022:1545748. [Abstract](#)

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