

patients demonstrated higher rates of implant loss compared to Hispanic patients. Ciprofloxacin use was linked to significantly lower implant survival compared to amoxicillin.

Conclusions: This large retrospective cohort study of over 41,000 dental implants found that the choice of preoperative antibiotics can affect the long-term treatment outcome. Ciprofloxacin was linked to shorter implant survival times compared to amoxicillin. While more research is needed, this highlights the importance of carefully selecting antibiotics for patients undergoing implant surgery.

PR420 | Exploring Artificial Intelligence in Implant Dentistry and Periodontology: A Systematic Review and Meta-Analysis

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Background & Aim: This study investigates the application of artificial intelligence (AI) in implant dentistry and periodontology, focusing on AI models for predicting peri-implant and periodontal disease diagnosis, progression, clinical outcomes, outcome prediction, and procedural efficiency.

Methods: This systematic review included primary research studies on AI applications in implant dentistry and periodontology. A comprehensive search was conducted using PubMed/MEDLINE, EMBASE, Web of Science, and the Cochrane Database. Risk of bias was assessed using standardised tools. AI models were classified using TRIPOD guidelines and evaluated through the PROBAST tool. Meta-analysis and narrative synthesis were used for analysis.

Results: Out of 9158 initial search results, 31 articles met the inclusion criteria. The review categorised studies into diagnosis, progression, clinical outcomes, outcome prediction, procedural efficiency, and image analysis. Five studies focused on predicting peri-implantitis and periodontitis, Seven on predicting peri-implant bone loss and defects 0.19 on identifying implants and segmenting implant areas, two on predicting the microbial immune landscape of peri-implantitis, and AI demonstrated high accuracy in disease diagnosis and image analysis. The VGG-16, performed best for predicting peri-implant bone loss and defects, while ResNet excelled in identifying implants and segmenting implant areas. In periodontology, AI applications showed potential in automated periodontal charting and radiographic bone level measurements.

Conclusions: AI shows significant potential in diagnosis and treatment planning in implant dentistry and periodontology. VGG-16 and ResNet demonstrated effectiveness in specific tasks. Combining models shows promise for predicting

peri-implantitis and understanding its microbial immune landscape. The review highlighted AI's capabilities in various applications, from predicting bone loss to automating periodontal measurements. Limitations include dataset heterogeneity, variability in human benchmark definitions, and challenges in generalising AI models across clinical settings. Despite these challenges, AI integration in implant dentistry and periodontology holds promise for enhancing diagnostic accuracy and treatment planning, potentially improving patient outcomes.

PR421 | Dental Implant Survival in Patients on Antiplatelet and Anticoagulant Therapy: A Long-Term Retrospective Study

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Background & Aim: This large retrospective study examined the long-term effects of antiplatelet and anticoagulant medications on dental implant success, contributing to the scarce research in this area.

Methods: A retrospective analysis was conducted on patients who underwent dental implant procedures at university dental clinics within the Bigmouth network from 2011 to 2022. Patient demographics, medical history (including antiplatelet/anticoagulant use), and implant outcomes were recorded. The examined antiplatelet medications included: Acetylsalicylic acid (Aspirin); Clopidogrel (Plavix); Prasugrel (Effient); and Ticagrelor (Brillinta). The following anticoagulants were also examined: Apixaban (Eliquis); Dabigatran (Pradaxa); Edoxaban (Lixiana); Rivaroxaban (Xarelto); and Warfarin (Coumadin). Implant failure was defined as implant removal for any reason, and time to failure was measured from the procedure date to the date of failure or last follow-up.

Results: This study analyzed 50,333 dental implants in 20,842 patients, revealing an overall implant failure rate of 1.4% and a patient-level failure rate of 2.7%. Interestingly, Asian, African-American, American Indian or Alaskan Native, and White patients were more likely to use antiplatelet medications compared to Hispanic or Latino patients. Furthermore, males and smokers were significantly more likely to use both antiplatelet and anticoagulant medications than females and non-smokers, respectively. When the implant survival rates between antiplatelet and anticoagulant users were compared to non-users, no significant differences were observed.

Conclusions: Based on the findings of this investigation, it appears that concerns about potential negative effects of antiplatelet and anticoagulant medications on dental implant outcomes may be unwarranted. High survival rates were observed in both medication users and non-users.

PR422 | Survival Rate of Zirconia Versus Titanium Dental Implants: A Systematic Review

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Background & Aim: Zirconia implants have been researched for over fifty years, mainly due to their aesthetic advantages, especially in anterior regions where titanium may not be ideal. Concerns about titanium particles' biological impact have also driven interest in zirconia as a metal-free alternative. The primary aim is to compare survival rates of zirconia and titanium dental implants in trials with over five years of follow-up. The secondary objective is to investigate zirconia's biological properties as an alternative to titanium.

Methods: An electronic search was performed on PubMed/MEDLINE and Scopus, followed by a manual search, in October 2024, to identify clinical and randomized controlled trials about zirconia and titanium implants with at least five years of follow-up. Studies about tissue regeneration and abutments were excluded. Bias was assessed by two researchers using RoB 2 for randomized controlled trials and ROBINS-I for clinical trials.

Results: From 280 studies, eighteen articles were selected for full reading; sixteen met inclusion criteria (two comparing both materials). Only two studies showed low risk of bias. Titanium implants had a longer follow-up period (15.0 years vs. 8.0 years). A total of 2000 titanium and 480 zirconia implants were evaluated. Survival rates ranged from 71.9% to 99.7% for titanium and 55.0% to 100% for zirconia. Success rates were 92.5% to 97.0% for titanium and 51.7% to 96.9% for zirconia. Zirconia had better outcomes in bleeding on probing and probing depth, but did not outperform titanium in long-term aesthetics (PINK score).

Conclusions: Studies over five years reveal no statistically significant differences between zirconia and titanium implants. Many zirconia implants reviewed are no longer on the market, limiting conclusions on zirconia's advantages. Further research is essential to clarify long-term benefits and peri-implant tissue responses to current zirconia implants, with a need for more randomised controlled trials comparing both materials.

PR423 | Comparison of Hydrophilic Properties of Various Dental Implant Surfaces

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Background & Aim: Osseointegration is primarily achieved by a thin layer of titanium dioxide which envelops the implant and contributes to osteoblast accumulation and its stabilization in the bone tissue. The aim of this research was to compare hydrophilic properties of various dental implant surfaces.

Methods: The study compared the hydrophilicity of eight dental implants with different surface treatments.

Hydrophilicity was calculated by measuring the contact angle of saline drops pipetted on the flat implant surface (apical part) with the same volume of each drop. Data was captured by an electric goniometer (PCA, Dataphysics Inc., Germany). Pictures of the drop on the surface of the implant were taken every five seconds, for thirty seconds, and the contact angle was measured by original company software. Results were statistically analyzed.

Results: Titanium implants tested were Nobel TiUltra, Bredent blueSKY, Ankylos, Astra, BTI UniCa, Straumann roxolid SLActive and ceramics Nobel Pearl and Bredent whiteSKY. According to drop contact angle, implants were classified into four groups: ultra-hydrophilic (0°–50°), hydrophilic (50°–90°), hydrophobic (90°–150°) and ultra-hydrophobic (150°–180°). Among the titanium implants, BTI UniCa and Nobel TiUltra demonstrated superior hydrophilicity, with Nobel TiUltra displaying a contact angle of 15° at the 15th s, decreasing to 0° by the 30th s. Straumann Roxolid SLActive and Ankylos showed comparable hydrophilic characteristics at 19.8° and 23.2°, respectively. Compared to them Astra was on the margin of ultra-hydrophilicity with an angle of 53.4°. The implant with highest contact angle was Bredent BlueSKY (88.9°). Ceramic implants shown larger angles compared to titanium implants. Bredent WhiteSKY compared to Nobel Pearl had larger contact angle in all measurement points with 80.5° and 66.4°, respectively.

Conclusions: This study highlights significant differences in hydrophilicity among different titanium and ceramic implants, which may influence osseointegration and clinical outcomes.

PR424 | The Effect of Different Demographic Variables and Dentoalveolar Complex Status on Maxillary Posterior Bone Architecture: A Retrospective Study

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Background & Aim: Implant placement in the posterior maxilla has always been a challenge for clinicians due to the structural characteristics of its. The aim of this study was to investigate the effects of demographic factors and the dentoalveolar complex on the macro and microarchitecture of the alveolar bone in the posterior maxilla.

Methods: This is a retrospective study based on demographic and radiologic data of patients. ASA I-II group patients were included in the study. Patients requiring maxillary sinus or bone augmentation were excluded from the study. Macroarchitecture of the alveolar bone was determined as follows:

1. Buccopalatal dimension of 1 mm apical to the most coronal line alveolar crest/interradicular bone as coronal dimension.
2. Buccopalatal dimension 1 mm coronal of maxillary sinus floor as apical dimension.