

Marginal bone level changes at dental implants after 5 years in function: a meta-analysis

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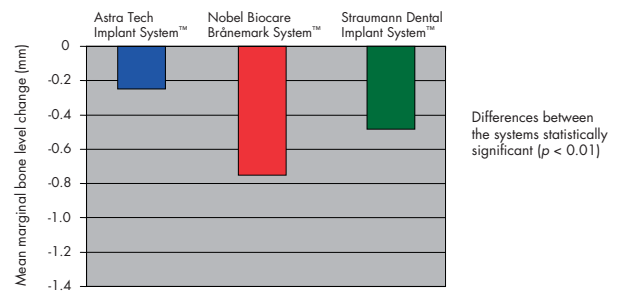
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Purpose: Based on articles on criteria for implant treatment success 1-3, it is accepted that a marginal bone loss of 1 mm during the first year in function and an annual bone loss thereafter not exceeding 0.2 mm, is considered a successful implant treatment. Do implant systems on the market today meet these criteria or do the criteria need to be revised? The study purpose was to compile and compare data on marginal bone level changes, from prosthetic connection to 5 years follow up, reported in prospective studies for implant systems on the market.

Material and Methods: A literature search was conducted to identify prospective studies on peri-implant marginal bone level changes around dental implants. The inclusion criteria for the meta-analysis study was that all implant systems should be available on the market, at least two independent prospective studies should have been published, and radiographic data of marginal bone level from loading and five years should be presented. Studies on advanced surgery, for example; sinus lift, bone augmentation, implants placed immediately in extraction sockets and implants loaded immediately following implant placement were excluded. The following variables were extracted from the articles: study type, number of patients, number of placed implants, implant sites, restoration type, healing time, number of lost implants, implant survival, percentage of patients and implants analyzed, mean marginal bone level change and standard deviation from baseline to 5 years.

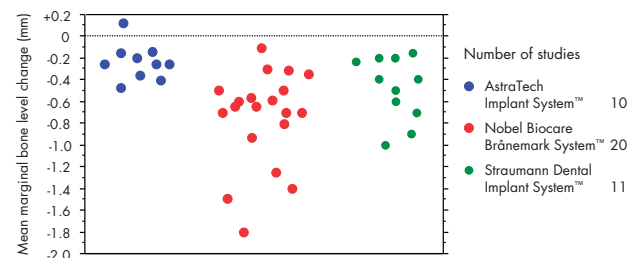
Results: Only three implant systems met the inclusion criteria of having at least two studies; Astra Tech Implant System™ with 10 studies, Brånemark System™ with 20 studies and Straumann™ Dental Implant System with 11 studies. No other implant systems had 2 published 5-year studies with radiographic data. The studies on the Astra Tech Implant System included 324 patients with 1,187 implants being radiographically evaluated, the studies on the Brånemark System included 1,051 patients with 3,719 implants, and the Straumann Dental Implant System comprised 614 patients and 1,364 implants. The meta-analysis revealed a mean marginal bone level change for Astra Tech Implant System of -0.24 mm, for Brånemark System -0.75 mm and for Straumann Dental Implant System -0.48 mm, with a statistically significant difference between all implant systems.

Change in marginal bone level from loading to 5-years of follow-up



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The mean marginal bone level change reported in the various studies showed more consistent results, i.e. less spread, with Astra Tech Implant System than with Brånemark System and Straumann Dental Implant System.



Discussion and Conclusions: The authors conclude that except for these three implant systems, no other implant system could present two or more prospective studies with 5-year data on marginal bone remodeling. The results from the study indicate that Astra Tech Implant System, Brånemark System and Straumann Dental Implant System perform better than the success criteria by Albrektsson et al, and Astra Tech even much better. The authors suggest a revision of existing success criteria to refine the basis for clinical quality judgement of implant treatment.

References

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