

Osseointegration and implants: trends and directions



Professor Asbjorn Jokstad, head of prosthodontics at the University of Toronto Dental Faculty, talks to Dental Learning Hub about a recent article he wrote on the future of oral implants and osseointegration.

Dental Learning Hub: Briefly explain the approach you took in the article on oral implants.

Asbjorn Jokstad: Given the topic, I thought the reader would first be interested to know what the hottest implant research topics are currently. I continued with my more personal biases, i.e., that we currently have far too many implant brands on the market and it is becoming a problem for the profession. Thus, the two next sessions in the paper described how many implant brands are available on the market (currently 385!) and whether the regulatory agencies really are doing their jobs?

Since my opinion is that it seems like it's enough today to have a drawing board and a minimal amount of some form of experimental laboratory data to have something approved for sale the three following sections were focused on how reliable are experiment data for predicting clinical outcomes, does the surface topography really make a difference and what are the relevant morphological differences between implants? I discussed thereafter briefly whether perhaps creating an implant register is a good idea. To sum up I discussed whether the principles recommended by Brånemark in the mid-70's have since seriously been challenged.

This last question can perhaps be seen as a paradox since many, if not all, so-called 'new' paradigms for early postextraction and/or early loading were suggested long time before this time. Although a few old references were included to highlight some historical facts I selected the recently published high-quality systematic reviews, i.e., 2007, as a source for my line of arguments. I could add that since the manuscript submission there hasn't been any new literature that has been contrarian to my views.

Dental Learning Hub: How do you define the clinical application of osseointegration?

Asbjorn Jokstad: The osseointegration (OI) concept we can observe. That is, bone will in most patients adapt so closely to an implanted foreign material, e.g., titanium, that even if loads are applied the implant it will not become loose. By practical application of the OI concept I mean that implants can serve as a foundation for the use of intra and extraoral supraconstructions over many years without disintegrating. It should be added that we still don't really fully understand the complex multifactorial mechanisms involved in the osseointegration process.

Dental Learning Hub: Where do you see the future use of oral implants heading?

Asbjorn Jokstad: When I was requested to write about the future of dental implants I remembered that in primary school days we often read these funny essays about the future written by some unknown author in the past centuries. I introduced therefore this article with a sort of disclaimer saying that in this tissue engineering era, everything that we know today can change radically within a short period. It is plausible that substituting teeth with metal screws rapidly can become obsolete if somebody can begin to grow hard tissues. However, with this caveat, I think the three hottest research fields within the dental implant research field are

- (i) understanding and improving the implant-bone interface by applying new knowledge from nano-technology research, by chemically modifying the titanium surface and/or by incorporating osseo-inductive substances in the surface
- (ii) on ceramic implants, which has been revived with the introduction of Zirconia
- (iii) as a consequence of the enormous advances made in developing innovative recombinant-DNA techniques, the manufacturing of complex extracellular matrix proteins, e.g. bone morphogenetic proteins, (BMP) that may prove to have different important therapeutic usefulness.

Dental Learning Hub: How do you see these trends translating to the dental practice in the future? Will these developments imply changes in continuing education and undergraduate curricula?

Asbjorn Jokstad: Answering this question is complex and requires an explanation of how I regard the dental education situation in many, if not most, countries. A long time ago the clinical curricula in dental programs reflected the everyday procedures in the general practice. As the number and complexities of clinical interventions as well as range of biomaterials, appliances and procedures increased, schools were faced with either increasing the study length or limit the teaching to 'basic concepts'. In some countries, we have 7 years dental school curriculums, in others 4, 5 or 6 with or without some additional vocational training.



schools become wider and wider every day. Thus, when going back to answering the question - yes, in my opinion dental implant teaching should be part of undergraduate curriculums. The problematic is that if curriculum is not extended what should it replace?

The reason I think undergraduates should be taught some dental implant related procedures is that it is important for the newly graduate to know what is achievable, but it is even more important to know where the boundaries of their own competencies lies. It is in my opinion difficult to make rules and detailed lists of what dentists can do and can't do after certain time periods of clinical training and courses. That's why all dental authorities and associations in the world follow the same general ethical principle, i.e. that every practicing dentist must always be cognizant of their own abilities and competency limits and recognize when it is of the best interest of their patient to either be referred to a specialist or to be taken care of in

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Dental Learning Hub: Are you planning to pursue further reviews or research into this particular topic?

Asbjorn Jokstad: My Magnum Opus from 2003 was titled "Quality of dental implants" and was written with the help of some remarkably capable researchers (Urs Bragger, John Brunski, Alan Carr, Ignace Naert and Ann Wennerberg, Int Dent J 53(6 Suppl 2): 409-43). In this extensive report we attempted to describe every clinical study that purported to substantiate a claim of superiority of a particular implant design or feature. Of course, the scientific foundations for these claims were either weak or non-existent. I hope one day to plough through the about 800 clinical trials that have since been published to appraise whether there is any new evidence of superiority of a particular implant or implant feature.

Send your comments and questions to editorial@dental-learninghub.com



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Full article

Oral Implants - the future

Volume 53, Oral implant rehabilitation: a state-of-the art overview of case management. An Australian Dental Journal Special Supplement, June 2008