How to Improve the Resistance of Bioactive Implant Coating?

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Objectives Peri-implant bacterial infections are the main cause of complications in dentistry. Furthermore, current implant devices do not prevent such infections. The coating of antibacterial molecules such as chitosan on the implant surface would bring bioactive properties. In this context, two objectives have to be achieved: (i) establish evidence of the attachment of chitosan onto a titanium substrate and (ii) study how the biopolymer will be maintained on titanium after immersion in saliva.

Methods Polymer binding on the substrate is achieved by covalent link using a coupling agent. Currently, functionalization of the pre-activated titanium based surface (Ta6V) is performed using triethoxy-silylpropylsuccinic anhydride (TESPSA) as a coupling agent, which forms a stable double amide bond with chitosan.

Results FTIR and XPS analyses confirm the presence of chitosan on the titanium surface. This coating shows high scratch resistance and is strongly adhesive to the substrate. These mechanical properties are consistent with an application in implantology. In addition, the resistance of the coating under acid pH solutions (pH 5 and pH 3) is also confirmed still using surface analyses. Moreover, the kinetics of chitosan coating release in acidic aqueous solutions was assessed by colorimetric assays.

Conclusions Surface functionalization using the TESPAS/chitosan coupling method is nontoxic and stable even in drastic environments as found in oral cavity, thus making it a valuable candidate as a bioactive bacteriostatic coating for clinical implantology applications.

Cultural Adaptation and Psychometric Measurements of the Malaysian-OIDP Index

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Objectives Health-related quality of life instruments should be linguistically well-translated, culturally adapted and its psychometric properties re-evaluated when used on populations different from the one they were originally developed for. This study attempts to adapt cross-culturally the Oral Impacts on Daily Performances (OIDP) index and assess its reliability and validity for use in Malaysian adults.

Methods The original OIDP questionnaire was translated from English into the Malay language and adapted culturally through a systematic approach. Then, two cross-sectional studies were carried out to assess the psychometric properties of the Malay-OIDP. The pilot study involved 306 randomly selected attendees (aged 20-50) of the University of Malaya Medical Centre and the main study comprised of conveniently selected 732 employees (aged 30-54) of the University of Malaya, Kuala Lumpur.

Results The Malay-OIDP was shown to have excellent reliability and validity in both studies. The standardised Cronbach's alpha coefficient was 0.94 and 0.81 in the pilot and main study respectively. Cronbach's alpha values for the self- and interviewer-administered Malay-OIDP were almost similar (0.92 and 0.95). A significant negative trend (p<0.001) was observed between the mean OIDP scores and the perception and satisfaction of oral health while a significant positive trend (p<0.001) was observed between the mean OIDP and experiences of dental pain and chewing difficulty, indicating good validity of the Malay-OIDP. The Malay-OIDP was also able to distinguish between those with and without a need for restorative (p=0.07) and prosthetic (p=0.05) treatment. Weighted kappa of 0.84 in the second study confirmed the good test-retest reliability.