ANTIBACTERIAL ACTIVITY OF PARTICULATE NOVAMIN AGAINST SUPRA-AND SUBGINGIVAL BACTERIA

I. Allan*, H. Newmanb, M. Wilsona

aDepartment of Microbiology, Eastman Dental Institute, University College London, 256 Gray’s Inn Road, London WC1X 8LD UK. ; bClinical Research Center, International Centre for Excellence in Dentistry, London, UK

iallan@eastman.ucl.ac.uk

Particulate BioGlass® (NovaMin®) is a bioactive material used in the repair of periodontal defects. This material undergoes a series of surface reactions in an aqueous environment which lead to osseointegration. The aim of this study was to determine whether these reactions exerted an antibacterial effect on a range of oral bacteria. Streptococcus sanguis, Streptococcus mutans and Actinomyces viscosus were suspended in nutrient broth (NB), artificial saliva (AS) or Dulbecco's modified eagle medium plus 10% foetal calf serum (DMEM + 10%FCS), with or without particulate NovaMin®. All bacteria showed reduced viability following exposure to NovaMin® in all the media after 1 h. This antibacterial effect increased after 3 h. Porphyromonas gingivalis, Fusobacterium nucleatum, Prevotella intermedia and Actinobacillus actinomycetemcomitans were suspended in either BM broth or 40% horse serum (HS) in RPMI. A considerable reduction in viability was observed with all bacteria tested, in both media, compared to inert glass controls. In further experiments it was found that the viability of S. sanguis was significantly reduced following exposure to NB pre-incubated with NovaMin®. Additionally, it was found that neutralisation of this highly alkaline solution eliminated the antibacterial effect. Moreover, a solution of NB and NaOH (of equivalent pH) exerted an antibacterial effect of similar magnitude to that of the solution pre-incubated with NovaMin®. Thus, particulate NovaMin® exerts an antibacterial effect on certain oral bacteria, possibly by virtue of the alkaline nature of its surface reactions. This may reduce bacterial colonisation of its surface in vivo.