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Dental Caries

An ever expanding horizon

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Poster Award
First Prize

Introduction

Dental caries continues to be a common chronic disease among various population groups. Patient care can be improved with prevention, detection, reversal and management at the earliest stage. Accuracy in the above mentioned areas would permit targeted preventive treatment, thereby significantly improving dental health and reducing the need for expensive treatment. The latest improvements and research in these core areas of dental caries have been brought out in this poster which when adopted by the clinicians will definitely help in eliminating the carious process in its bud stage.

Objectives

Current techniques do not have sufficient sensitivity and specificity in prevention, detection, reversal and management of dental caries. We hereby, present with latest research technologies with higher sensitivity and specificity.

Material and Methods

Searched articles from the Pubmed database and Dental Clinics of North America for latest researches, reviews and clinical trials. Main search involved mesh terms associated with caries, caries research, caries vaccine etc. additional search involved Bluetooth device, diagnodent, gene therapy, probiotics etc as well as relevant searching of references of all the retrieved articles for possible inclusion.

Results

Caries prevention
The latest methods in caries prevention are the Bluetooth device which sends signals to the mobile device when the pH<5.5, gene therapy modifying the bacterial genetic pattern, probiotics overgrowing the pathogens, nanorobots fighting the pathogens and the use antibacterial composites.

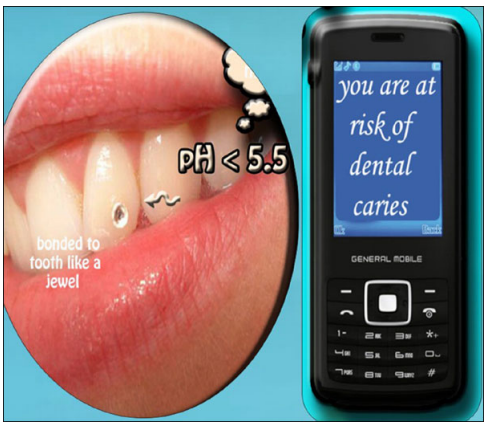

Fig 1: Bluetooth device

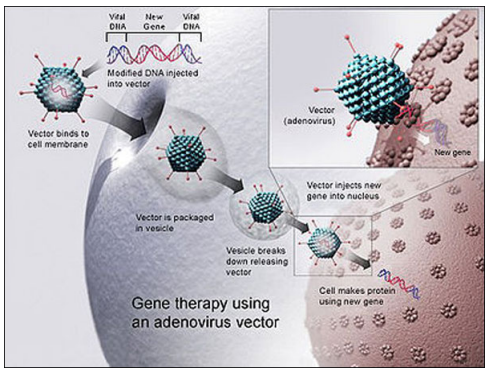

Fig 2: Gene therapy using adenovirus vector

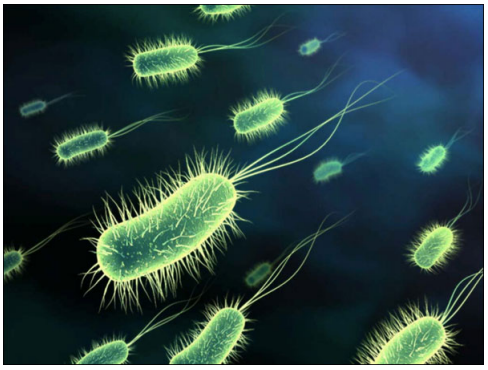

Fig 3: Probiotic bacteria

Fig 4: Dental nanorobots

Fig 5: Plant extracts

Fig 6: Antibacterial composites

Caries diagnosis

The latest in diagnosis are the optical coherence tomography, polarized raman spectroscopy studying the composition, crystallinity and demineralization, impedence spectroscopy measuring the impedence to current, laser fluorescence seen in carious lesions, electronic caries monitor measuring the resistance of enamel and near infrared imaging showing high specificity of detection for caries.

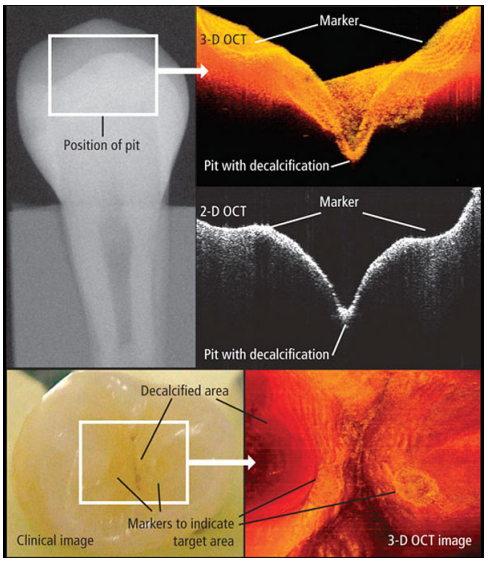

Fig 7: Optical Coherence Tomography

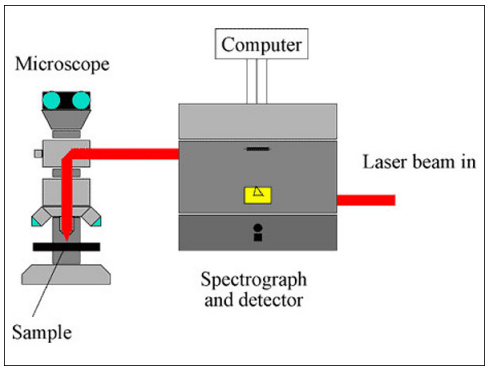

Fig 8: Principle of Polarized Raman Spectroscopy

Fig 9: Impedence spectroscopy

Fig 10: Laser fluorescence

Fig 11: Electronic caries monitor

Fig 12: Near infrared imaging

Caries reversal

Caries reversal using the ozone which destroys the bacteria, plant extracts reversing the demineralization, nanosolutions promoting better bonding, lasers reversing caries, resin infiltration for early pit and fissure caries and tooth mousse pastes which help in early remineralization are the methods on the horizon which are proving themselves very effective.

Fig 13: Laser apparatus

Fig 14: Process of resin infiltration

Fig 15: Tooth mousse

Fig 16: Ozone machine

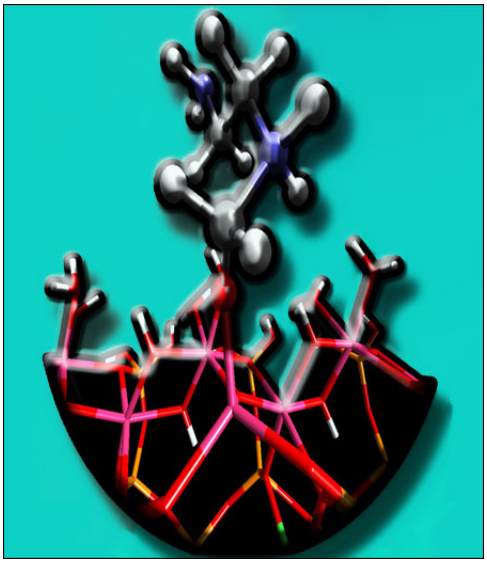

Fig 17: Nanosolution

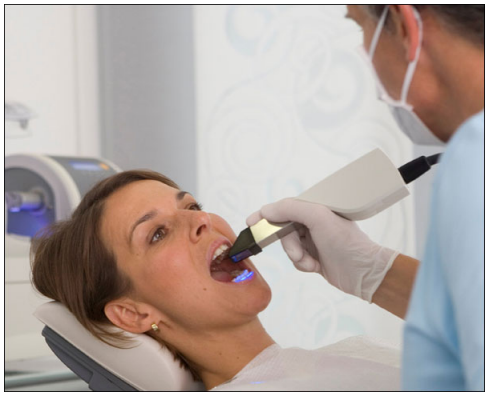

Fig 18: Micro invasive procedure

Caries management

Air abrasive tooth preparation with a flow of abrasive particles at high speed, bioengineering the natural tooth invivo or invitro, ultrasonics for minimal and effective tooth removal, micro invasive proceduresromoting bonding, bonded sapphire replacing the enamel giving the natural enamel the strength of ceramics and waterlase which is a combination of water and laser for better hydrodynamic efficiency are some of the future trends in caries management.

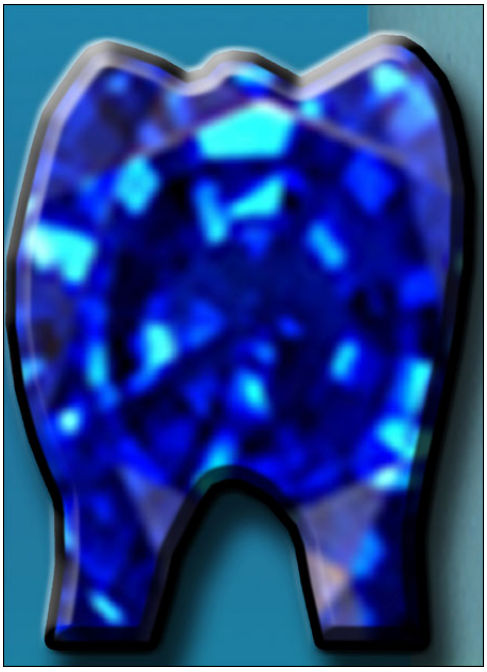

Fig 19: Bonded sapphire replacing enamel

Fig 20: Waterlase apparatus

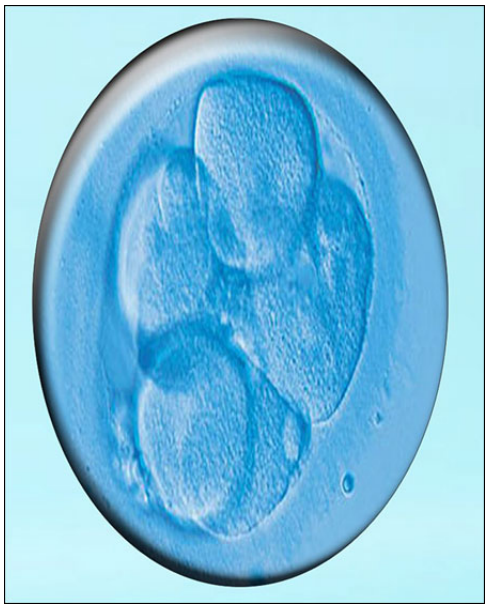

Fig 21: Air abrasion apparatus

Fig 22: Bioengineering

Fig 23: Ultrasonic handpiece

Conclusions

Exploring these various future technologies by continued research and bringing them into dental practice shows great promise to erase dental caries.

Literature

- Kolahi J, Fazilati M.Bluetooth technology for prevention of dental caries.Med Hypotheses (2009), doi:10.1016/j.mehy.2009.04.055.
- Pitts NB. Implementation. Improving Caries Detection, Assessment, Diagnosis and Monitoring.Monogr Oral Sci. 2009;21:199-208.
- Longbottom C, Ekstrand K, Zero D, Kambara M.Novel Preventive Treatment Options.Monogr Oral Sci. 2009;21:156-163.
- Afolabi OC, Ogunsola FT, Coker AO. Susceptibility of cariogenic Streptococcus mutans to extracts of Garcinia kola, Hibiscus sabdariffa, and Solanumamericanum.West Afr J Med. 2008 Oct;27(4):230-3.
- Llena C, Forner L, Baca P.Anticariogenicity of casein phosphopeptide-amorphous calcium phosphate: a review of the literature.
- Hamilton JC, Gregory WA, Valentine JB.DIAGNOdent measurements and correlation with the depth and volume of minimally invasive cavity preparations.Oper Dent. 2006 May-Jun;31(3):291-6.
- Chalmers JM.Minimal intervention dentistry: a new focus for dental hygiene.Dent Today. 2008 Apr;27(4):132-136.
- Mount GJ.A new paradigm for operative dentistry.Aust Dent J. 2007 Dec;52(4):264-70.

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