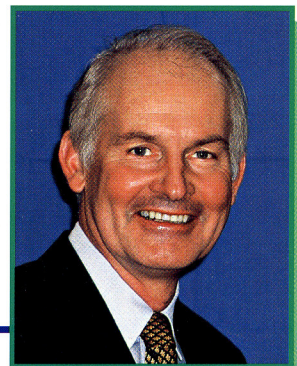


AESTHETIC Update



Compiled by Geoffrey M Knight

Back to basics

Ever since our species first crawled out of the primordial swamps we have shared our oral cavities with various forms of micro-organisms.

Over the millennia man has evolved to resist dental caries in an environment of mutual co-existence to the extent that we have become dependant upon oral bacteria for the demineralization and remineralization process required for enamel maturation. The damaging effects of caries arise when changes to diet and lifestyle disturb this delicate symbiotic balance.

In the past 50 years, teeth have become subjected to the phenomenon of the air rotor to which they have no resistance and no ability to counter the damaging effects of this instrument

Comprehensive dentistry treats dental caries by the gross removal of sound and infected tooth structure to an arbitrary level within a tooth. Restorations, with varying degrees of biological compatibility, are then inserted with a focus upon the longevity of the restoration rather than the viability of the tooth within which they are placed.

Cosmetic procedures regularly require removal of healthy tooth structure to achieve a temporary change in aesthetics and technological overkill is often used to solve clinical problems where simpler and less costly alternatives are more appropriate.

The surgical model for caries management has failed catastrophically to the extent that dentists in western societies spend much of their time repairing the iatrogenic damage caused by their peers.

The pharmacological management of dental caries is a solution to this problem that requires the earliest possible diagnosis of disease activity.

This is followed by remineralization procedures that either facilitate reconstitution of tooth structure or form a caries resistant, mineralized precipitate that provides the base upon which an adhesive restoration can be placed.

CARIES DIAGNOSIS

Fluorescent laser diagnostic instruments provide a high degree of accuracy in diagnosing caries in occlusal fissures and imaging technology is improving early identification of proximal caries.

Biological tests are available that can identify high risk patients as well as specific oral bacteria associated with caries and/or periodontal disease.

ACCESS

Minimal intervention (MI) dentistry requires micro tooth preparation of enamel either with mini burs or air abrasion to gain access to carious dentine.

Air abrasion is an excellent means of treating initial carious lesions in occlusal fissures as demineralized enamel is removed selectively before healthy tooth structure. Lasers are not as selective as air abrasion in removing demineralized enamel but their capacity for micro tooth preparation has applications in this clinical situation.

The air rotor is best suited for the removal of existing restorations and access to proximal lesions in otherwise sound teeth.

REMINERALIZATION THERAPIES

Teeth are semi permeable membranes within which there is a constant

movement of fluid from within the pulp to the outer enamel surface. These fluids contain calcium and phosphate ions that with saliva are capable of remineralizing teeth.

Currently there are four treatment modalities available that either:

- Disinfect carious dentine enabling pH rises to initiate remineralization
- Actively assist with the remineralization process
- Do both

Photo activated dye disinfection using lasers

This system used low energy lasers for the photochemical activation of oxygen releasing dyes that damage cell membranes and DNA in the micro-organisms disinfecting carious dentine and enabling the pH of the lesion to rise so that remineralization can occur.

Potential clinical applications are disinfection of carious lesions, root canals and periodontal pockets. The treatment is painless and does not affect adjacent human cells.

Ozone therapy

KaVo have released the HealOzone instrument that has rapidly achieved a high level of professional acceptance.

The application of ozone to carious lesions has been shown to disinfect the bacteria within the lesion for periods of up to three months enabling the tooth to remineralize free from the acidic environment caused by the associated micro-organisms.

Levels of 99 per cent reversal of lesions in primary teeth have been reported when ozone treatment was combined with a remineralizing toothpaste and a fluoride rinse. Apart from offering a non surgical approach for the management of caries the treatment is painless and if a tooth is sealed with a high fluoride releasing glass ionomer cement such as Fuji VII (GC), it appears to provide a stable environment for tooth remineralization.

Casein phosphopeptide and amorphous calcium phosphate

Casein phosphopeptide and amorphous calcium phosphate when used twice daily have been shown to reduce enamel mineral loss by over 50 per cent. Professor Reynolds suggests that there is an anti cariogenic mechanism for CCP-ACP that provides calcium and phosphate ions in a buffered environment that increases local pH and facilitates enamel remineralization.

Diammine silver fluoride

Diammine silver fluoride AgF has been shown to significantly prevent and arrest caries in a number of studies. It was promoted extensively in Japan during the 70s but the associated black staining of teeth and aesthetic restorative materials has limited its use, especially in the permanent dentition.

The application of a concentrated solution of potassium iodide immediately after the application of AgF reacts to form a white precipitate of silver iodide that prevents tooth and restoration staining and is itself a sparingly soluble powerful antibacterial.

Initial *in vitro* studies have confirmed that AgF/KI prevents staining and has similar anti cariogenic properties to AgF used alone. AgF had the dual benefits of disinfecting caries and facilitating the remineralization process.

RESTORATION TECHNIQUE

After the minimal removal of cariously broken down tooth structure the remaining enamel and remineralizing dentine should be restored with an adhesive material that is bactericidal and capable of forming a biological seal and encouraging further remineralization.

Composite resins will not bond to caries affected dentine and require surgical preparation of the cavity to sound tooth structure. These materials are not suitable for restoring cariously damaged teeth other than an overlay.

Glass ionomer cement bonds to cariously affected dentine; assists with a biological seal at the interface and creates an environment that encourages remineralization. Current research is looking at ways of making glass ionomer cements more effective in this role, in conjunction with materials such as ozone, silver fluoride and photo activated dye (PAD) that will interact with infected tooth structure at the restorative interface.

The following figures show the restoration of a small occlusal cavity where caries invasion had moved just beyond the dentino enamel margin and did not warrant remineralization procedures:



Fig 1. Shows a stained fissure on the occlusal surface of tooth 37.

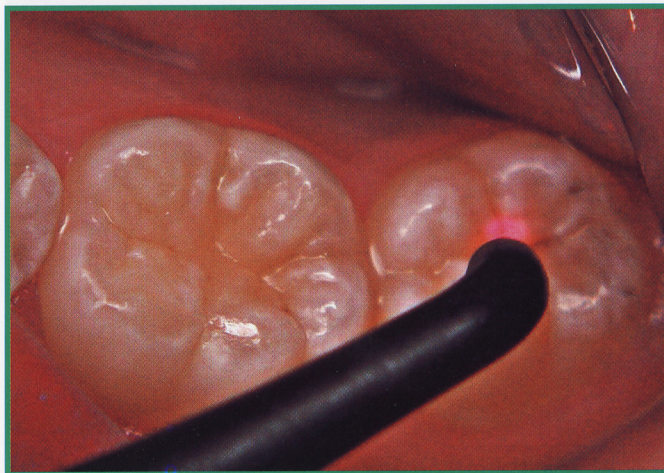


Fig 2. Demonstrates the Diagnodent (KaVo) being used to confirm the presence of caries.



Fig 3. Shows how air abrasion Rondoflex Plus, (KaVo) can be utilized to preferentially remove demineralized enamel and dentine. Caries removal was confirmed using the Diagnodent.

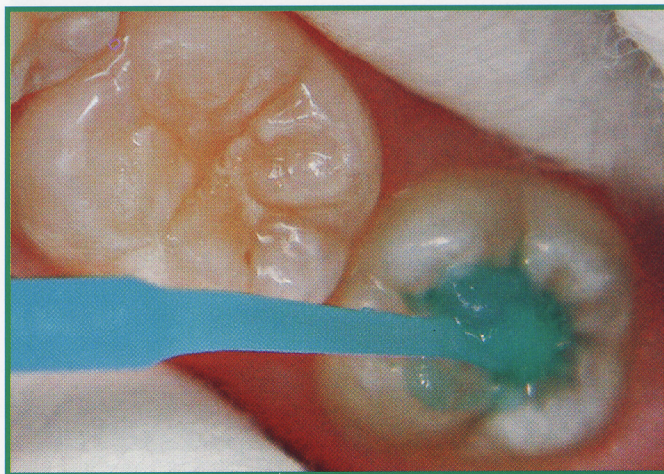


Fig 4. As the perimeter of the cavity consisted entirely of enamel, the preparation was etched for five seconds with phosphoric acid, washed off and dried with oil free air.

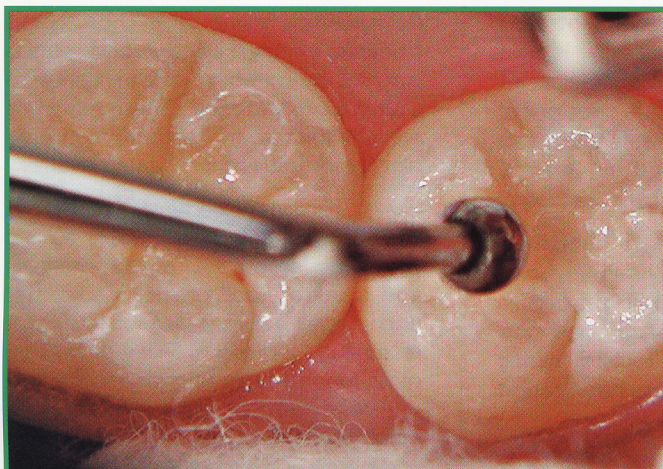


Fig 5. A wear resistant glass ionomer cement (Fuji IX Fast, GC Corp; Ketac Molar Quick, 3M ESPE; Riva fast, SDI) was placed into the cavity and puddled into place with a ball burnished, working excess material over the cavo margins to assure a good peripheral seal.



Fig 6. After initial setting and occlusal adjustment, a small amount of resin bond was brushed over the restoration and photo cured.



Fig 7. The completed restoration. There has been minimal tooth removal and extension of the glass ionomer into the adjacent fissures affords further occlusal surface protection against caries.

CONCLUSIONS

Minimal intervention dentistry was first conceived for developing countries with high caries rates that lacked the infrastructure to provide western style dentistry. The minimally invasive philosophy of this type of dental care and the materials that were developed for its use has produced new guidelines for managing dental diseases. In other words, people living in developing communities without access to the aggressive tooth preparation techniques available in the west may in fact be receiving superior care in the initial management of the disease than their western counterparts.

ROYAL AUSTRALASIAN COLLEGE OF DENTAL SURGEONS

FINAL EXAMINATION RESULTS

SPECIAL FIELD OF PROSTHODONTICS

The Royal Australasian College of Dental Surgeons have advised that two candidates were admitted to Fellowship by the Council of the College following successful completion of their Final Examination in the Special Field of Prosthodontics which was held in Melbourne from 30 August to 1 September 2004.

The successful candidates are Mahesh Veera Gantasala (NSW); and Wendy Chia-Wei Wang (UK).

AFFILIATE IN GENERAL DENTAL PRACTICE

The Royal Australasian College of Dental Surgeons have advised that two candidates were admitted by the Council of the College after successfully completing Part II of the Examination for the Affiliate in General Practice (AGDP) held in Melbourne on 23 July 2004.

The two candidates are John Alfred Chrystie (Vic); and Christopher Henry Crook (NSW).

The AGDP comprises Part I Examinations in basic sciences and general dentistry which was held in May 2004. The examination panel, chaired by Professor Robert Love (NZ), included Gerard Condon (Vic), Keith Watkins (Vic) and Peter Carr (Qld).

Part II, which consists of clinical case presentations, was held in Melbourne during July 2004 and conducted by Braham Pearlman, Registrar General Stream. The examiners were Diana Evans (Vic) and Paul Wright (Vic).

The AGDP is a clinical qualification which is open to all dentists with at least four years experience.

The Royal Australasian College congratulates all the successful candidates.