

BUILDER

A QUARTERLY PUBLICATION OF HEALTH CARE TRUST FOR GENERAL DENTAL PRACTITIONERS

From the Editor's Desk

This issue of the newsletter comes to you with a whole lot of exciting latest information.

Gingival tissue management is associated in our minds with impression making for cast restorations. If we want to practice state of the art dentistry, if we don't want our patients to come back with discolored anterior restorations, we have to keep the gingival tissues away from the restorative field. There are some fine products in the market to achieve this. These are simple, fast and easy to use.

The fine researchers they are, Swedish scientists are bringing out some revolutionary products. True periodontal regeneration has always been a dream to us, dentists. The Enamel Matrix Derivative (EMDOGAIN) supported tissue-engineering tricks the body to believe that it is forming a new tooth attachment. Emdogain promotes regeneration of all periodontal tissues-cementum, periodontal ligament and alveolar bone.

Carisolv may soon be the ultimate to help us remove carious dentin from open carious lesions, without removal of any sound tooth structure. I can only pray that it hits the Indian market soon.

Vertical fractures of posterior teeth have always been a perplexing problem. They are more so, when they occur soon after we have completed the root canal treatment. It

7th National Conference of Indian Soc. of Oral Implantologists

from 25-28 Nov.99 at Ahmedabad.

Theme- Implantology 2000 and Beyond

For details contact: Dr. Naresh R. Shah,

Organising Secretary

11/A, Silver Arc, B/H Town Hall

Ellis Bridge, Ahmedabad- 380006

E mail nailesh@vsnl.com

will help to realize that the problem must have been present, undiagnosed, even before you started the root canal treatment. What precautions to take, the causes and management of vertical fractures of posterior teeth are all outlined in the Endo series.

We know that periodontitis has been linked to heart disease, but now researchers are finding cause to believe that it is also linked to pre-term pregnancy and low birth weights. We have to direct efforts to make our medical counter parts to be aware of the implications, so that they make it a point to refer would-be mothers to us in the interest of the unborn children.

“Digital photography” and “Cosmetic dentistry” will provide you the latest information on these buzzwords. To bring about immediate relief for dentin hypersensitivity, we have found Gluma desensitizer to be quite effective. The procedure can be pretty fast since no etching/light curing are needed.

Take your own time going through this issue, at least twice, so that you absorb all the information.

Beena Rani Goel, M.D.S.

INSIDE	
1.	Gingival Tissue Management
2.	Emdogain
3.	Endodontic Series- 7
4.	Perio Disease & Pregnancy
5.	Digital Photography
6.	Carisolv & Gluma
7.	Cosmetic Dentistry

Gingival Tissue Management And Adhesive Dentistry

The problems to accurately reproduce the sub gingival surfaces, including the finished margins of the tooth preparations, are

1. difficulty to obtain predictable hemostasis
2. inadequate sulcular fluid control and
3. inability to obtain adequate displacement of overlying gingival tissue

In addition, many of the hemostatic agents in use have significant limitations or possess the potential of causing mild to serious systemic or local adverse reactions.

Electrosurgery has been in use for more than 60 years. It is considered to be an effective method of pre impression tissue management. One of the most obvious limitations in electrosurgery is the unpredictable prognosis of the gingival contours on healing. When esthetics is the main concern and it is imperative to hide the margins of the restoration, this method has severe short coming.

Dan E Fisher in 1981 introduced a new concept for hemostasis known as the **infusion technique**.

This process used the Dento-Infusor device (Ultradent Products Inc), a unique tip attached to a syringe. It facilitated placement of the coagulating hemostatic into the cut capillary openings. This produced coagulum plugs within each capillary orifice below the cut tissue only, thereby preventing their dislodgement during cleaning and impression taking.

These coagulum plugs are best achieved by using a **scrubbing** action during application, which also prevents coagulum residue from competing with impression material for reproduction of the sulcus, preparation esp., the margin and tooth surface just apical to the margin.

Although directly placed restorations constitute about 85% of all restorations done, clinicians have failed to view tissue management as an integral segment of these procedures. In those restorations where gingiva will proximate restoration, **it is highly desirable to use tissue management techniques even if it is only an amalgam restoration.**

The need for gingival tissue management has never been felt more than they are today for adhesive dentistry. Bondable restorations, whether direct or indirect, demand a contamination free filed.

Contact of acid etchants with cut tissues that have been treated for hemostasis can reinitiate bleeding. Acid etchants should have colorants in them to allow visualization of its

placement and to ensure isolation to the desired application site. Sky blue dye is commonly used for coloring the etchant. In presence of low pH, the blue color turns green. Sometimes you must have seen that after application of the etchant, the color changed from blue to green. Even though the preparation's margin was supra gingival and no bleeding occurred, sulcular fluid migrated into the etchant, thus potentially contaminating the tooth surface with sulcular fluid proteins. Although rubber dam application can be effective in such cases, a viable alternative is a displacement cord soaked in an astringent packed into the sulcus. If the tissues are healthy, the astringent can be diluted with water.

Astringent hemostatics, such as Alum, Aluminium chloride, and ferric sulfate effectively seal epithelium against fluid flow. Ultradent has a very easy to use hemostatic- laden barrier-cord (Ultrapak, Ultradent products Inc.). After cord placement, the preparation, cord, and surrounding tissues must be thoroughly washed. Any residual astringent can potentially contaminate the tooth surface to be bonded, thereby reducing the bond strength of the restoration.

All hemostatics can be potential contaminants to the bonding procedures, as also blood, sulcular fluid and saliva. Because all hemostatics are hydrophilic, their presence on the primer layer, bonding resin layer, or between layers of composite immediately contaminates and prevents intimate adaptation of the succeeding hydrophobic or semi hydrophilic resins. The contamination thus results in a non bonded, non sealed restoration with secondary blood infiltration, leading to discoloration.

An **important point** to remember whenever performing a bonding procedure is to **never start it in the presence of blood**. Before starting removal of decay toward the pulp, the clinician should establish position of and refine the gingival margin in the proximal box. With the dento-infusor and syringe loaded with Viscostat or any other astringent, rub the bleeding tissues firmly until profound hemostasis is achieved. Wash the site with a firm air/water spray to clean and check for complete hemostasis. If any bleeding is observed, repeat the process. Caries removal can be performed now.

...contd. on p. 6

EMDOGAIN

The ideal goal of periodontal therapy is the reestablishment and regeneration of the lost periodontal tissues. Many different treatment regimens have been suggested to achieve this dream; however, most are unpredictable and highly debated in the periodontal literature.

Several methods have been used in the past, mainly different types of bone/bone grafting materials, and the GTR-Guided Tissue Regeneration. (we will bring a more detailed article in later issue of YPB on this subject)

Currently used regenerative methods lack predictability, sufficient degree of efficiency and ease of use.

Another way to address periodontal regeneration is to mimic the process that takes place during the development of the nascent root and periodontal tissues.

Recent studies have shown that the cells of Hertwig's epithelial root sheath have a secretory phase during which enamel related matrix proteins are secreted and temporarily deposited onto the root surface. This provides an initial and essential step in the formation of acellular cementum. It is of interest to note that the cells close to the root surface seem to carry the message not only to form acellular cementum but also an associated periodontal ligament and alveolar bone.

The **discovery of the enamel matrix layer** between the peripheral dentin and the developing cementum and its function, provided the fundamental concept for the **Enamel Matrix Derivative (EMDOGAIN)** -supported tissue engineering in regenerative periodontal therapy.

Emdogain is a Swedish product (Biora AB, S-20512, Malmo, Sweden) which, in a biological way recreates the tooth attachment lost due to periodontitis. The important ingredient in Emdogain is **amelogenin**, a protein that the body itself produces during the time that our teeth are developed.

By applying Emdogain to the root surface, body believes it is forming a new tooth attachment. The process of forming a natural tooth attachment and jaw bone starts again, just the way it did when your tooth was originally developed.

Indications

Emdogain has been shown to be effective in sites with periodontal pockets more than 6mm deep that are associated with angular bone loss greater than 3mm, as

measured on the radiographs.

2. Emdogain is also effective in the teeth with furcation involvement exceeding 2mm but not through and through defects.

Clinical procedure

In areas selected for surgery with Emdogain, full thickness buccal/lingual muco periosteal flaps are raised.

After removal of granulation tissue and gentle root planing, a short cleaning with an acid solution or gel is recommended, followed by generous rinsing with saline.

The freshly mixed Emdogain gel is immediately applied onto the clean root surfaces, starting at the most apical part of the defect.

Blood and saliva should not be present. After application the protein adheres to the root surface and forms an insoluble matrix. The reflected flap is sutured back.

The wound healing after an Emdogain operation is rapid. The recreation of the tooth attachment starts immediately and continues over a much longer time, sometimes more than a year.

Emdogain **promotes regeneration** of all periodontal tissues:

- Cementum with anchoring fibers
- Functional periodontal ligament
- Alveolar bone with inserting periodontal fibers
- The improved results are seen in
- Probing periodontal pocket reduction
- Clinical attachment gain
- Radiographic bone gain

Biological safety

The biological safety of Emdogain has been documented in complete toxicology programs. In vitro mutagenicity and reproductive toxicology tests have been carried out. The potential for allergic reaction in humans was also examined. No toxic or allergic reactions were found.

Ref.: Hiejl L, Heyden G et al: J. Clin. Periodontol 24:705-714,1997

Vertical Fractures of Posterior Teeth

This is one of the most frustrating diagnostic problems. It can be very difficult for the patient or the dentist to reproduce the pain and to locate it. It's often characterized by a sharp but brief pain during mastication.

When the vertical fracture is a tiny crack extending into the dentin but not yet intersecting the pulp space, the pain will be sharp but only momentary. Abstinence from mastication in the affected area gives total relief. This type of fracture eventually progresses apically, intersecting the pulp space and infecting it.

When the fracture line just intersects the pulp space, it may cause a pulp inflammation that can result in spontaneous pain referred to the areas of 5th cranial nerve. Since the pulp tissue has no proprioceptive capabilities i.e. sense of location, it will be impossible to locate the source of pain, unless tooth responds to thermal stimuli or **stick-bite test**.

Once this type of fracture progresses to the pulp space and causes pulp necrosis, the inflammation extends to the periodontal ligament and periapical bone. Proprioceptive fibers are present in both the periodontal ligament and the bone and resultant tenderness to percussion reveals the pain source.

Techniques for detecting the vertical fractures-

1. Through dental history

If a patient continuously complains of pain while mastication even after frequent occlusal adjustments or pain with horizontal tapping of the crown, a vertical fracture should be suspected.

The patient may have a hypersensitive response to thermal change in an otherwise perfectly sound tooth, may recall sudden pain after biting into an unexpected seed or bone, or may present with advanced symptoms of bruxism.

If a patient reports that a restoration continues to fall out after several attempts at replacement or several re-cementations, examine the tooth carefully for fracture.

2. Persistent periodontal defect

When an isolated sulcus defect continues to expand, regardless of treatment and there is continuous periodontal breakdown around only one tooth while the other teeth appear periodontally sound, a possible vertical tooth fracture is implied.

3. Fiberoptic examination

Pointing a fiberoptic light horizontally at the level of gingival sulcus in a dimly lit room may reveal a dark, continuous line in an otherwise well illuminated pulpal floor.

4. Wedging and staining

Have the patient bite on a cotton wood stick to reveal the split tooth.

Tooth slooth can be applied to the occlusal surfaces of various cusps and the biting tests can be gently repeated.

Sometimes the vertical fracture line can be identified with food coloring placed on the dried occlusal surface moments before the wedge test. The dye will stain the fracture line. Clean the occlusal surface immediately after the wedge test, with a cotton pellet lightly moistened with 70% isopropyl alcohol. Food coloring from the tooth surface is washed off by the alcohol but it remains within the fracture line and becomes apparent.

5. Radiographic findings

Usually the fracture line is parallel to the film and is seldom revealed in a radiograph. However, suspect a vertical fracture in the absence of an apparent cause for pulpal involvement.

An advanced fracture may show what appears to be periodontal pocket. It is an area of bone loss caused by the necrosis of periodontal ligament in the fracture line.

Causes of posterior fractures

An unexpected encounter with a hard object during confident crushing mastication is the most common cause of the vertical fracture. Most of the patients with cracked teeth are healthy.

When there is a cracked tooth opposing a denture or a bridge pontic or there is a crack in a tooth with a large restoration, an iatrogenic cause should be suspected, such as the overzealous effort to seat a poorly fitting casting or the injudicious use of a mechanical condenser.

There is a higher incidence of vertical fracture in mandibular molars, with a slight preference for the first molars over the second. In the maxillary molars there is greater occurrence in the first molars. Little difference exists in the sex distribution. Contrary to common notion,

...contd. on p. 5

....contd. from p. 4

bruxism has not been found to be a contributory factor. Drugs affecting proprioception and other sensory receptors modulating force and reflex may also act as possible contributors to the etiology of cracked or fractured teeth. Dental caries, restorations and root canal treatment also make teeth more prone to vertical fracture. Pan and supari chewers in India/Asia may also be more predisposed.

Treatment:

A high degree of failure is caused from unrealistic case selection. Efforts have been made to retain fractured segments with full coverage in a binding type of restoration. There is no statistical data available regarding the success in treatment of fracture cases. Unrealistic optimism may lead to the practitioner's embarrassment and unnecessary expenditure for the patient. It is important to realize that many posterior teeth lost because of fracture after root canal treatment must have had the problem unrecognized before the treatment. A full crown is not a guarantee that a fracture will not progress.

During access cavity preparation of posterior teeth, a careful look at the dentin floor for evidence of a subtle fracture before removal of the roof of the pulp chamber will minimize the chances of failure.

No treatment is indicated when the fracture does not intersect

the pulp space and does not terminate beneath the epithelial attachment, and no esthetic problem exists. Endodontic therapy and full coverage restoration are indicated when the fracture intersects the pulp space and no movement is evident in the fracture line with a wedging test. At the time of pulpectomy, reduce the occlusal surface radically to limit occlusal forces that would tend to fracture the tooth further before the full crown is placed.

Neodymium: yttrium-aluminium-garnet laser beam to seal vertical root fracture lines with tricalcium phosphate paste has been tried as an alternative treatment for cracked teeth with noted clinical results

A vertically fractured tooth can not heal. It can only worsen. So watchful waiting period is not advocated. If you see a fracture that has separated and you can not remove a mobile piece without leaving a severe pocket, extract the tooth.

Ref.

1. Cohen and Burns: Pathways of pulp ed 6 Mosby
2. Edward Besner et al: Practical Endo. A clinical Atlas, Mosby
3. Franklin S Weine: Endodontic Therapy ed. 5, Mosby
4. Levy GC, Koubi GF: Compendium 14(11) 1993

Periodontal disease and PRETERM birth

During normal pregnancy, maternal hormones and locally acting cytokines play a key role in regulating the onset of labor, cervical ripening, uterine contraction, and delivery. Maternal infections during pregnancy have been demonstrated to perturb this normal cytokine and hormone-regulated gestation, sometimes resulting in preterm labor, preterm premature rupture of membranes, and preterm low birth weight (PLBW), i.e., < 2,500 g and < 37 weeks of gestation.

Researches done by Offenbacher et al at North Carolina Univeristy show that periodontitis may be linked to pre-term pregnancies and low birth weight. More than 60% of mortality among infants without congenital or anatomical defects is attributable to PLBW. If periodontitis is confirmed as a risk factor for PLBW, it could provide new opportunities to reduce infant mortality.

In a study on 124 women by Offenbacher, O'Reilly and Katz, it was shown that women with periodontitis has an almost **eight fold** greater chance of having PLBW infants than mothers without periodontal disease. Pre-term labor appears to be mediated by the mother's secreted anti-inflammatory agents such as prostaglandin in response to an infection.

Offenbacher et al found a two fold increase of prostaglandin E2 in the gum area (crevicular fluid) around the teeth of women with PLBW infants as compared to women with normal birth weight infants. This suggests a relationship between prostaglandin concentration in the gum area and inside the amniotic sac. These data suggest that biochemical measures of maternal periodontal status and oral microbial burden are associated with current PLBW.

Ref:

- Offenbacher, et al.:Journal Of Dental Education,62(10),852-8,1998
Offenbacher, et al.:Ann Periodontol,3(1),233-50,1998

Digital Photography

In our past issue we brought you an article about digital X rays. This issue we introduce Digital Photography. Though the cost remains high, it is expected to come down in near future and the quality to go up. This is only an introduction, but as these cameras become more common, we will bring you more detailed articles on this subject.

The possibility of having a camera that can take advantage of computer technology and produce an infinite number of high quality images with little or no additional cost is very exciting.

What is different in Digital Photography as compared to normal every day picture taking? In Digital Photography, instead of storing the image on the film, the camera stores all of its images on to a computer chip.

The computer chip captures the subject and creates a picture in its memory in a way that computers can understand. In the computer's point of view, an image looks like a smattering of X's O's and numbers and dots in a sequential order. This is decoded by the computer when it spells out the image.

Because these images are stored in such pure computerized form, they are very conducive to other computer programs, they can be easily manipulated or computer imaged with virtually none of the skewing or fuzziness that accompany manipulation of video images. Most cameras provide a floppy or mini floppy to store images. These can be then read into your normal computer floppy drive. Some cameras can directly link to the computer to transfer images. Most cameras now come with a LCD display for easy viewing of picture while clicking.

Advantages-

- immediate printing of images on normal office color inkjet printer.
- the pictures can be put into letters.
- manipulation of the image.
- digital cameras are revolutionary partners in case presentations.

But the problem is that there is lack of affordable Digital Photography equipment for dental clinicians. The reason is that demand for digital clinical equipment is not large enough at this point to merit a major photographic corporation to spend the time and invest the marketing dollars to produce a camera specific for dentists.

Recently Lester A Dine Inc. and Kodak began to develop a digital macro camera around Kodak's existing 756X504 resolution chip. The entire system is designed with the perceptive that the photography should be simple and straight forward.

Source- Internet

...contd. from p. 2

After hemostasis and on etching of the preparation or shortly there after, sometimes a little blood may ooze up onto the preparation. In such a case, the clinician should first stop the bleeding using astringent, with infusor or cord, then thoroughly and firmly wash all the hemostatic away. The tooth preparation should then be re-etched.

We have used the Ultradent system in cases of Class II restorations and crown preparations when bleeding was hampering the restorative procedure or impression making. No other product can come even close to the performance of this one.

Ref. DCNA Oct. 1998 p 595-606

CARISOLV

Carisolv is a **chemical mechanical method** to soften carious dentin to facilitate the removal with hand instruments.

Dr. Dan Ericson, of Sweden developed this concept. Carisolv has as its ingredients Sodium hypochlorite and amino acids, with high pH. The viscous solution is applied to the carious lesion and kept in situ for 30 seconds. With the special instrument provided with the kit, the softened caries is then removed by scraping. The process is repeated if caries still remains. Carisolv is useful only for open caries lesions.

Advantages

- Since the solution has some anaesthetic effect it is a painless procedure.
- Carisolv softens only the carious portion, so there is no loss of healthy tooth structure.
- As compared to routine cavity preparation, it is less invasive.
- It is good for root caries.

The product is awaiting patent and is not available right now in India. We received a sample from the inventor and have tried it. I feel that this product is revolutionary in the management of open caries lesions and root caries.

This product removes the backened carious dentin and reaches to the natural color dentin, after reaching this layer the bonding and restoration can be done in routine way.

Cosmetic Dentistry

General population is becoming more informed about cosmetic dental procedures and people are asking their dentists to render these services. Cosmetic dentistry is fun. It gives satisfaction to the dentists because he is making someone look better and contributing to their lives in a positive way.

Cosmetic dentistry can have beneficial health as well as psychological benefits. When one looks good, he feels good, and smile is an important part of one's personality. **Cosmetic dentistry is that which enhances, improves or changes the appearance of teeth.** There are different types of cosmetic dentistry which can transform disfigured or stained teeth into a brand new smile.

Here is a list of procedures which come under cosmetic dentistry:

- replace discolored fillings in front teeth
- whiten teeth to a lighter/whiter color
- straighten crooked teeth with orthodontic treatment
- recontouring of your teeth-closing up spaces between teeth

- porcelain or resin veneers to change the shape and alignment of teeth
- placing tooth colored fillings in back teeth instead of silver filling
- porcelain or resin inlays and onlays for back teeth
- cosmetic periodontal surgery to even out gum tissue that is crooked
- restoration of worn and short teeth to their proper shape
- filling in tooth brush abrasion notches
- replacing missing teeth with bridges or implants
- replacing defective and unsightly old crowns
- cover stained dentin
- remove stained fracture lines from enamel
- restore chipped teeth (bonding)
- make teeth longer
- make teeth shorter

Before undertaking any cosmetic work, dentist should ensure that the patient has good oral health. Also, patients need to know that cosmetic dentistry is not a substitute for good oral hygiene and periodontal care.

Desensitizing dentin with GLUMA

The major cause of post operative and cervical sensitivity has been identified to be the fluid shifting within exposed dentinal tubules. Heraeus Kulzer has come up with Gluma desensitizer which acts in seconds to stop the pain of localized sensitivity, often associated with restorative procedures.

Gluma desensitizer contains 5% glutaraldehyde, 35% HEMA and water. It stops dentinal fluid shifts by polymerization with proteins within the tubules, providing a physiological seal to protect against microleakage sensitivity.

Indications for use

- For cervical sensitivity (when composite is not to be placed)
- Under resin bonded veneers, inlays, onlays and crowns.
- Gluma desensitizer is placed after smear layer has been removed by acid etching. Though Gluma does not require smear layer removal, most dentin bonding agents require it to achieve a bond.
- Under glass ionomers
- Under composite restorations
- Under amalgam restorations (apply Gluma prior to placing lining)

- After root planing/ periodontal treatment

Clinical procedure

Using Gluma desensitizer is a simple one step chair side procedure. No etching or light curing is required. Thorough drying of the tooth is not required, it can be moist prior to application. A gentle but firm rubbing motion for 30 seconds with a small sterile cotton pellet creates a 200-micron deep occlusive barrier in dentinal tubules.

This barrier prevents dentinal fluid shifts from heat, cold and osmotic changes, the primary causes of sensitivity. Also its anti-microbial action inhibits bacterial growth. It is universally compatible with all restorative materials.

Under restorative materials the effect should last as long as the material remains in place. For cervical sensitivity (without restoration) 6 months or longer can be anticipated, depending upon the patient specific erosion factors.