PERIODONTAL DRESSING

The periodontal dressing is a physical barrier that is placed in the surgical site to protect the healing tissues from the forces produced during mastication for comfort and close adaptation.

HISTORY OF PERIODONTAL PACKS

- **1923** – Dr A W Ward- Wonder pak, consist of Zno Eugenol mixed with Alcohol, pine oil, Asbestos fibers

- **1942** – Box and Ham – use of Zno Eugenol dressing to perform chemical curettage in treatment of NUG – tannic acid was included for haemostasis and astringency-thymol was used as an astringent.

- **1943** – Orban - Zno Eugenol + Paraformaldehyde to perform Gingivectomy by chemosurgery. This dressing caused extensive necrosis of the gingival and bone and was left to promote abscess formation by blockage of exudate.

- **1947** – Bernier and Kaplan – for wound protections.

- **1962** - Blanquie – control post operative bleeding- splint loose teeth – prevent re-establishment of pocket – desensitize cementum

- **1964** – Gold – splint teeth, as it was cement dressing that set hard.

- **1964** - Weinreb and Shapiro - Zno Eugenol impregnated cords into periodontal pockets, but found to be less effective than gingevectomy.

- **1969** - Baer et al stated that primary purpose of a dressing – patient comfort, protect wound from further injury during healing – hold flap in position. They pointed that the dressing should not be used to control post-operative bleeding, nor to splint teeth.

- **USES OF PERIODONTAL DRESSING**

  1. Provide mechanical protection for the surgical wound and therefore facilitate healing.
  2. Enhancement of patient comfort.
  3. Prevents post operative bleeding by maintaining the initial clot in place.
  4. Maintainance of debris free area.
  5. Control of bleeding
  6. Supports mobile teeth during healing.
7. Helps in shaping or molding the newly formed tissue
8. Provide patient comfort by isolating area from external irritations or injuries.

Physical Properties of Dressing

- The dressing should be soft but have enough plasticity and flexibility to facilitate its placement in operated area and to allow proper adaptation.
- The dressing should Set within a reasonable time.
- After setting it should have sufficient rigidity.
- The dressing should have Smooth surface.
- The dressing should have bacteriocidal property.
- The dressing should not interfere with healing.
- The dressing should have Dimensional stability.
- The dressing should not induce reaction.
- The dressing should have acceptable taste.

Zinc oxide eugenol dressing contain 40 -50 % eugenol, increases in amounts as zinc eugenate decomposes. It has been shown to cause tissue necrosis and delayed healing.

Radden 1992 found that free eugenol caused a marked inflammatory reaction, delayed healing and tissue necrosis.

Asbestos was found to have the potential for causing asbestos lung cancer and tannic acid cause liver damage when absorbed systemically.

Baer et al 1960 described the use of a non-eugenol dressings containing zinc oxide, bacitracin and hydrogenated fat. The material did not set to hard consistency as do eugenol dressings, and bacitracin was believed to aid in healing.

Types of Dressings

A. Zinc oxide Eugenol dressing (hard pack)

Popular following gingivectomies. Eugenol has an obtudent effect on exposed dentine and connective tissue. Eugenol has an antiseptic property which can affect bacterial growth.

Brand names: wonder-pak, by ward 1923

Powder

ZnO-

Resin- improve setting

Tannic acid- improve setting

Cellulose fibers- improve setting

Zinc acetate – accelerator, better working time.

asbestos – binder and filler

Liquid

Eugenol,
vegetable oil, added to dissolve Eugenol thymol, a weak antiseptic.

colour additives

the setting involves both chemical and physical properties and is influenced by moisture, proportions of powder and liquid used, mixing time and temperature.

Eugenol can induce an allergic reaction that produces reddening of the area and burning pain in some patients.

**Disadvantages**

- Unpleasantness
- Spicy taste
- Burning sensation
- Lack of smoothness
- Difficulty with adaptation
- Frequency of fracture
- Crazing of acrylic materials

**Non-eugenol dressings (soft pack) developed in 1950s**

1. **Basic ingredients**
   a. base
   b. accelerator

2. **Brand names**
Perioputty

Methyl and Propyl parafens – bactericidal and fungicidal property

Benzocaine – topical anesthetic

Peripac

Eberic and Muhlemann in 1959, ready mix

- Calcium sulphate
- Zinc oxide
- acylate
- Zinc sulfate
- Poly methyl methacrylate
- Di methoxy tetra ethylene glycol
- Ascorbic acid

an organic solvent as a flavoring agent

- Red dye – coloring agent

Setting takes place when it comes in contact with water or the saliva.

Gjerdet & Haugen measured dimensional changes of freshly prepared samples of Coe-Pak, Peripac, wonder-pak-expansion seen in Peripac, others contracted.

Haugen et al tested the adhesive properties of Coe-Pak, Peripac, wonder-pak- better adhesion in Coe-Pak than wonder-pak and Peripac did not have any adhesive strength at all. Hence mechanical interlocking was necessary to hold the dressings in place.

Watts & Combe compared Coe-Pak, Peripac, and wonder-pak for their effects on composite filling material & GIC, result in softening of composite, but had little effect on glass ionomer cement.

PERIOCARE

Two paste, highly elastic periodontal dressing which sets resiliently hard does not chip or fall apart in the mouth.

- After mixing, PerioCare is ready to be picked up with wet fingers in about 75-90 seconds.
- It has a 7 minute working time and sets in 15 minutes.
- It is patient pleasing, and has a neutral odor and taste.
- contains no eugenol or asbestos

Cyanoacrylate

N-BUTYL Cyanoacrylate (1965)
✓ DROPS/ SPRAYS
✓ SOLIDIFIES IN 5-10 SEC
✓ ADHESION FOR 2-7 DAYS

IDEAL TO BE USED AS PERIODONTAL DRESSING

✓ DECREASES TIME REQUIRED FOR SUTURING
✓ PROVIDES RAPID HAEMOSTASIS DUE TO POLYMORIZATION IN THE PRESENCE OF MOISTURE
✓ ACCELERATE EARLY PERIODONTAL HEALING
✓ AIDS IN PRESICE POSITIONING OF THE FLAP/ FREE GINGIVAL GRAFT

OCHSTEIN, 1969, COMPARED THE EFFECTS OF Cyanoacrylate, an eugenol & non eugenol dressing on surgical wound healing. APICALLY POSITIONED, FULL THICKNESS AND SPLIT THICKNESS FLAPS WERE PERFORMED on 16 patients with one of the 3 dressings applied post surgically. Clinical and histological evaluations were made for 21 days. It was found that Cyanoacrylates produced better healing presumably because they prevent the accumulation of plaque and debris by sealing the wound site.

Forrest, 1974, compared clinically Cyanoacrylate dressing to Suturing without dressing, using Split mouth approach in 30 surgical cases. No significant difference was found between the two with regard to healing responses. Cyanoacrylate dressing produced Rapid hemostasis, Absence of discomfort and better patient acceptance.

Disadvantages – difficulty in application around posterior teeth and rapid polymerization upon contact with small amount of moisture.

• Binnie & Forrest, 1974 clinical & histological healing in 2 beagle dogs using Cyanoacrylate dressings verses suturing following periodontal surgery. after 2 weeks healing was superior in Cyanoacrylate dressing

• Levin et al, 1975 Cyanoacrylate dressing - close to ideal dressing material

It cannot dissipate the pull of the lip or immobilize a flap for the time required for it to attach to the underlying tissue.

Zinc oxide & glycol alcohol (Peridres)

Powder- Zinc oxide & rosin

tannic acid
Kaolin

Liquid- ethlene glycol
Butyl alcohol

Tissue conditioners

✓ methacrylic gels with modifications to increase adhesion & rigidity, addition of antibacterial substances

✓ Close adaptation & constant flow for 3 days
✓ Excellent compatibility with the wound site

✓ Stiffness by zinc oxide powder

✓ Carrier for medication

**IRWIN WATTER SCOPS- ORAL ADHESIVE BANDAGE** - well tolerated and non irritating. Safe to be used in oral cavity which gives protection to the wounds

**BAUER & BLACK ,1954 –TEFLA** facilitate healing in traumatic wounds.

**SCHLUTZ-** viscous filament impregnated with water in oil emulsion, effective in preventing mechanical trauma. oil of bergamot used instead of eugenol causes less inflammation with greatest bactericidal activity

**Light-cure Periodontal Dressings**

**Brand names**

**Barricaid**

**Characteristics**

• a. Non brittle & very elastic

• b. No mixing

• single-component, light-activated periodontal dressing eliminates time-consuming mixing of pastes.

• Curing with a visible light-curing unit to form a non-brittle, but firm, protective elastic covering.

• Incremental additions of the material, which bond adherently, can be made in the mouth without any special prior surface preparation.

• The dressing is tinted pink, is tasteless, and has a translucent character which allows for superior esthetics

• Designed for both Direct and Indirect Placement. If the syringe is used in direct intra-oral placement, the syringe must be discarded to avoid any potential patient cross-infection.

• For Direct Dispensing - Using a sterile, dry 2 x 2 gauze, dry the buccal or lingual tooth surfaces adjacent to the surgical site.

• Remove the tip from the disposable syringe. Dispense the material at the juncture of the cervical one-third of the teeth

For Indirect Placement

➢ Place a thin layer of lubricant on a clean mixing pad.. If the application will be delayed more than 1 or 2 minutes, cover the dispensed dressing to prevent premature curing by light. With gloved finger, lightly lubricated, roll the ribbon of dressing off the pad.

➢ The material may be muscle molded, contoured with a plastic instrument, carver, or finger pressure. Remove any uncured material that may have extended onto occlusal contact areas.

➢ Expose Barricaid to a visible light-curing unit for at least 10 seconds per tooth per side (buccal or lingual). Uncured material can be detected with an explorer or a blunt instrument. Repeat exposure, as needed, until the entire dressing is cured. (A segment of
approximately four teeth requires 40 seconds per side, buccal or lingual).

- Check occlusion and coverage of material. The material may be curved and contoured with finishing burs in a low-speed handpiece.

- Additional material may be added to cure dressing at any time during the placement appointment and incrementally cured for an additional 40 seconds.

- Check the dressing coverage and the occlusion prior to dismissing the patient.

Thorstensen Ae et al demonstrated the effect of adding two bisguanide antimicrobial agents (chlorhexidine and polyhexamethylene bisguanide) on physical properties of the light-cured periodontal dressing material. The addition of both chlorhexidine and PHMB solutions reduced the elastic modulus. Tear stress was also reduced by the addition of water and the chlorhexidine and PHMB solutions.

Gilbert AD et al J Periodontol. 1994 demonstrated the effect of a light-cured periodontal dressing material on HeLa cells and fibroblasts in vitro. Fully-cured material has no effect on either cell type. Uncured material produces a surrounding zone of growth inhibition and cell death on direct contact. Inhibition is caused by the release into the medium of substances toxic to cells. It is suggested that partly-cured material containing residual free monomer in contact with a healing gingival site could impede rapid repair. Increasing the exposure to the curing light will prevent (or minimize) the presence of partly-cured material; the fully-cured material being compatible with the cells.

SMEEKENS JP et al. examined histologically the tissue responses of surgical areas covered during 7 days with either Barricaid, the eugenol-containing dressing Ward’s Wondrpak or the bionert control gel Carboxyl Methyl Cellulose.

Results after 7 days indicate acute inflammatory reactions in the test areas without significant differences between the 2 periodontal dressing materials.

From a biological point of view, these findings suggested no contra-indication for application of this photocuring dressing material after periodontal surgery.

**Application of Hard and Soft Periodontal Dressing**

**A. Hard Pack**

1. Mix maximum amount of powder into the liquid to achieve a putty mix
2. consistency is firm and thick

**B. Soft Pack**

- Extrude equal lengths & quickly mix together with tongue blade until blended
  - use vaseline on gloves to form pack
  - If there are open embrasures with missing papillae or recession, use small sections of the dressing to mold into wedge shapes to press interproximally.
Apply 1 U-Strip starting from distal and placing on the facial & lingual

Press interproximally and with a plastic instrument adapt around the gingival surface and interproximal areas to gain retention and create festooning

For protection & promotion of healing, the dressing should not exceed 1-2 mm beyond the surgical site

Any edentulous areas can be filled in to make dressing continuous

Muscle trim cheeks, lips and tongue to prevent movement or dislodgement dressing should not interfere with muscle, cheek and frenum attachments; overextension causes irritation

Check occlusion

1. dressing should extend only to the height of contour of the teeth
2. it should not be in occlusal contact during closure

Repacking

After the pack is removed, it is usually not necessary to repeat it. However in some condition it is advisable to repack for additional 1 week. The conditions are-

i) A low pain threshold value patients who are particularly uncomfortable when the pack is removed.

ii) Unusual extensive periodontal involvement

iii) Slow healing.

RETENTION OF PACKS

• MECHANICALLY INTERLOCKING in interdental spaces
• Splints
• Stents
• Placement of dental floss
• Wire ligation

Anti bacterial properties of packs

• Bacitracin
• Oxytetracycline
• Neomycin
• Nitrofurazone

Waehaug & Loe – EUGENOL PACKS prevent or retard bacterial growth.

Persson & Thilander- tested antibacterial property of 5 periodontal dressings against staphylococcus aurous & candida albicans. coe-pac had the greatest antibacterial property & tissue irritation, peripac had the least. the zinc oxide
dressings showed a diminishing effect over time which was felt to be due to its setting into non-reactive eugenate. Coepac and peri-pac produced more inflammation in the tissues than the zinc oxide eugenol products.

Fraleigh evaluated the effect of Oxytetracycline containing packs, on gingival wounds of 50 patients revealed more rapid healing, comfortable, less odour & unpleasantness. 12 patients developed allergic reactions.

Baer, 1958 effect of Bacitracin, on 200 patients experienced less odour & unpleasant taste and dressing was cleaner than dressings without Bacitracin. 3000 units/gm of Bacitracin, was recommended, but hydrogenated fat was used instead of eugenol in the dressing with the following formula:

- zinc oxide 42%
- hydrogenated fat 58%

Ramanov, 1964 – antibiotics in periodontal dressings encouraged the growth of candida albicans and yeast.

O Neill, 1975 - antibacterial effect of 5 periodontal dressing, on 430 patients as well as in vitro against 9 strains of bacteria.

- peripac - greatest antibacterial effect
- Coe – pac – none

Breloff & caffesse, 1983 - Achromycin applied underneath the dressing in a single blind study involving 12 patients - no beneficial effect on healing.

Saad & swenson - corticosteroid in dressing and its effect in 22 cases. The difference in result between corticosteroid treated and experimental dressing were statistically insignificant.

CHLORHEXIDINE AS AN ADDITIVE TO DRESSING

Absoe Jorgerson et al, 1974 found that a dressing containing CHX promoted healing.

Plyss et al, 1975 evaluated the efficacy of CHX when used with a dressing.

20 PERIODONTALLY HEALTHY SUBJECTS AND instructed to rinse with 0.2% CHLX for 5 days. No significant reduction in plaque formation was observed compared to control. In another experiment, dressings rolled in 15-20 mg of CHLX dichloride, significant reduction in plaque formation because CHLX did not have access to the teeth due to the dressing whereas powder was in direct contact with the teeth and thus able to inhibit plaque.

Addy and douglas, 1975, found that methacrylate gel is a good medium for carrying CHX to the wound area and releasing it slowly (conc of 2%) in vitro and in vivo.

Split mouth approach following gingivectomy, patients experienced less pain with dressing (coe-pac).

Newman and Addy, 1978, flap surgery. Patients preferred for CHLX rinse than dressing, less plaque accumulation and less sulcular bleeding with CHLX rinse.

Disadvantages of using CHLORHEXIDINE

Toxicity to Cells:-
Delayed healing of sutured skin incisions was reported after a brief exposure to the drug.

- Human gingival fibroblasts in tissue culture exposed to CHX at concentration as low as 0.04% result in altered cell function or death.

- Toxic to PMNS

**Systemic implications:**

- When placed on the hamster cheek pouch, CHLX glyconate brought about an increase of flow of velocity in the sub epithelial venules.

- When labelled and applied to intact cheek pouch, it was found to accumulate in the liver and kidneys.

- Therefore drug can penetrate intact mucosa and become deposited elsewhere in the body.

**Allergy to a periodontal dressing**

Fraleigh – noted allergic reactions due to terramycin in a dressing

Pulsion – reported an anaphylactic reaction after application of eugenol containing dressing

Lysell — reported a case of contact allergy to rosin, urticaria on the abdomen, swelling on dorsum of the hand, involvement of interphalangeal joints

Haugen & Hensten Petterson demonstrated that coe–pac, peri–pac & wonder-pak were all capable of producing sensitization in guinea pigs. wonder-pak-exhibited the strongest effect, Peri-pac- exhibited weakest effect.

**Care after periodontal pack**

- A periodontal pack placed over your gums to protect them from irritation. The pack prevents pain, aids healing, and enables you to carry on most of your usual activities in comfort.

- The pack will harden in a few hours, after which it can withstand most of the forces of chewing without breaking off; it may take a little while to become accustomed to it.

- The pack should remain in place as long as possible. For the first 3 hours after the operation avoid hot foods in order to permit the pack to harden.

- Do not brush over the pack. Brush and floss normally the areas of the mouth not covered by the pack. Use chlorhexidine mouth rinses after brushing.

- After the pack is removed the gums most likely will bleed more than they did before the operation. This is perfectly normal in the early stage of healing.

**Effects of wound healing**

**Comparison of Eugenol and non-eugenol Dressings:**

- Studies have shown that eugenol dressings are more irritating than non-eugenol dressings.

- Recently, Early irritating effects of dressings may contribute to
postoperative pain and swelling whether or not it contains eugenol.

- Peripac was shown to be more irritating than wonder-pak due to dimensional changes, which caused tissue irritation.

- Materials such as Tefla or other fabrics may be interposed between dressings tissues to prevent such harmful effects.

**Disadvantage of eugenol dressings:**

- They set hard often with sharp edges and leave a bad taste in the mouth which make them less popular

**Jorkjend L., et al** examined the incidence and severity of postoperative pain after gingivectomy, Coe-pak and 2 eugenol-containing periodontal dressings, Wondrpak and Nobetec

- patients were subjected to gingivectomy using 1 type of local anaesthesia (lidocaine + adrenalin) only and covering the surgical areas with either of the 3 different dressings in a randomized study

- Mean pain score after Coe-pak was higher than after Nobetec

- Mean pain score after Coe-pak was higher than after Wondrpak

No statistically significant difference was found between Wondrpak and Nobetec regarding mean pain score

**Effects on Cell Cultures**

Kreth et al 1966, tested 4 periodontal dressings on Hela cell cultures, and found eugenol dressings slightly inhibitory to cell growth.

Hildebrand and De Renzis 1974 tested 2 eugenol and 2 non-eugenol dressings on fibroblasts, greatest cell toxicity was with wonder-pak

Hanger & Hensten Petterson 1978 compared cytotoxic effects of coe-pak, peri-pac & wonder-pak, all exhibited high degree of cytotoxicity.

Present status and value of surgical dressing

**Whether or not to use a dressing?**

- **Loe and Silness 1961,** concluded that dressing has little influence on the healing provided that the surgical area is kept clean.

- **Stahl et al 1969 showed** that the presence of inflammation at the wound site had more to do with the rate of healing than whether or not a dressing is placed.

- **Wampole et al 1978,** found 24% incidence of transient bacteremia in patients during post operative dressing change.

- **Greensmith and Wade 1974,** effects of coe-pak & without dressing on GCF flow, gingival index & pocket depth, following reverse bevel flap procedures. They reported no significant differences between any of these parameters and found that the use of the dressing caused more pain & swelling but less sensitivity & eating difficulty, also healing was rapid, but patients expressed a preference for no dressing.

- **Heaney and Appleton 1976,** tested the effect of periodontal dressings when placed in periodontally
healthy mouths, using either coe-pak or wondr –pak. They found that while the dressing caused little damage to the periodontium, they were associated with more inflammation than undressed areas.

- **Jones and Cassingham 1979,** tested the post operative differences between using no dressings and using coe-pak in 7 patients, who had periodontal surgery. Patients reported more pain and discomfort when dressing was used and expressed a preference for no dressing. Other disadvantages are, possibility of displacing a flap, entrapping sutures beneath the dressing & forcing dressing material under the flap during the placement.

- **Newman & Addy 1982,** compared a dressing plus a saline mouth rinse to 0.2% CHLX rinse following internal bevel flap procedures in 9 patients. They suggested that the use of a dressing post operatively is undesirable as it promotes bacterial contamination of the surgical site, increases post operative surgical inflammation. CHLX reduced postoperative plaque accumulation and surgical inflammation.

- **Allen & Caffesse 1983,** examined clinical effects of perio-putty on periodontal healing, following modified widman flap procedures, concluded that no significant differences exist.

**no pack philosophy**

- Modified home care procedure during immediate postoperative time period. The patient is asked to employ a very soft brush and to work the brush bristles down to the tooth to the gingival margin but not onto the soft tissue.

- Cautious flossing so as not to disturb the sutures is also encouraged, to remove bacterial plaque and ensure reduced inflammatory reaction during initial healing.

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