A Comprehensive Review on Periodontal Pack

Dr Hemalatha D M, Dr Arjun M R, Dr Jilu Jessy Abraham, Anjana J, Archana T

Mahe Institute of Dental Sciences and Hospital, Mahe, India

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INTRODUCTION

Zentler in 1918 was the first to propose the use of iodoform gauze as a periodontal dressing.[1] Dr. A W Ward presented periodontal dressings for the first time in 1923 when he recommended using them after periodontal surgery. AW Ward introduced "WONDER PACK," a zinc oxide and eugenol-based product designed to immobilize tissue and alleviate pain. Using a periodontal dressing following surgery has several key benefits, two of which are stability of the surgical site during the healing process and production of the wound from mechanical damage.[2]

Additional benefits include: protecting the clot from forces applied during speaking or chewing; preventing gingival detachment from the root surface; preventing coronal flat development in apically repositioned flaps; offering additional support in free gingival grafts; good adaptation to underline gingiva and bone tissue; preventing post-operative hemorrhage or infection; and last but not least, production of bone deterioration throughout the healing phase and post-operative splitting of teeth in motion.[3]

Eugenol-based and non-eugenol-based periodontal packs are the two traditional categories into which periodontal dressings fall. There is also another group in use that is known as non-zinc oxide, non- eugenol. The initial product included alcohol, pine oil, asbestos fibers, and a zinc oxide and eugenol basis. Manufacturers have experimented with various additions to zinc oxide eugenol in order to attain desired physical and chemical qualities. Examples of such adjustments include the use of corticosteroids to lower inflammation and tannic acid to control bleeding. The periodontal pack's chemical components should not result in tissue injury. Studies have demonstrated that eugenol dressings inhibit human fibroblasts.[1]

Restoring normal cellular biology is an intricate and dynamic process that occurs during wound healing. There are three stages to this process: the inflammatory, proliferative, and remodeling stages. Throughout these three phases, a complex and coordinated series of events take place.[4] Nevertheless; there are very few situations in which periodontal dressings should be used, despite all of the benefits listed above. This study reviews the literature in order to evaluate the clinical use of periodontal dressings.[3]

Ideal Requisites

The ideal requisites for periodontal dressings:

-Soft, yet also flexible and plastic enough to enable for appropriate modification and to facilitate placement in the operated region.

-Should have desirable mixing and working time.

-Stiff enough to withstand dislocation and fracture from occlusal forces.

-After setting, smooth the surface to avoid irritating the lips and cheeks.

-Bactericidal qualities.

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-Not obstruct the healing process.

-Structural stability to stop saliva from leaking.

Physical And Chemical Properties of Periodontal Pack

Few researches have assessed the mechanical and physical characteristics of periodontal dressings. The mix of the periodontal dressing determines these properties. As of yet, there isn't a precise, repeatable method for assessing these attributes.

Furthermore, not enough research has been done on novel periodontal treatments. The material used for periodontal dressings should be slow-setting to facilitate manipulation and produce a smooth surface that doesn't irritate the skin, flexible enough to tolerate displacement and distortion, cohesive and adhesive without being heavy and dimensionally stable in order to prevent plaque buildup and salivary leakage.

Physical property evaluation is important since it can influence the material's therapeutic behavior, especially how well it adapts to the underlying tissues, which is directly pertaining to changes in dimensions and its ability to adhere to tooth and gingiva.[5]

We examined the physical characteristics of two chemically and one photocured periodontal dressing materials. According to a modified penetrometer test, COEpak and PerioCare behaved similarly, setting 10 to 15 minutes after mixing. Barricaid needed to be exposed to light for at least 30 seconds in order to cure. Water was absorbed by all materials; at 23°C, COEpak and PerioCare exhibited comparable behavior, while at 37°C, PerioCare absorbed significantly more water.

Barricaid's water sorption and solubility were not significantly impacted by increased light exposure. Because better adaptation reduces the buildup of plaque beneath the dressing, measuring dimensional changes is also advantageous. Gjerdet assessed the post-setting dimensions changes of three currently marketed periodontal dressings.[6]

Biocompatibility Of Periodontal Pack

Many different substances that can trigger allergic reactions can be employed in dentistry; however, because saliva is present and the oral mucosa is vascularized, the frequency of allergic reactions in the oral cavity is lower than on the skin.

In the literature, periodontal dressing application-related contact stomatitis has been documented on a regular basis. In vitro studies have been developed to assess the cytotoxicity of dressings through the use of cell medium. Local cytotoxicity has also been evaluated by implantation studies.

Numerous animal and human cells have been employed to track the cytotoxicity of dressings.[3] Studies conducted in vitro provide controlled environments to examine how cells react to various substances, offering important insights into cytotoxicity, cell division, as well as morphological modifications. Prior to clinical application, these investigations are essential for determining the efficacy and safety of periodontal dressings.[7]

Procedure Of Pack Placement[8]

On a wax paper pad with a wooden tongue depressor, zinc oxide packets are combined with eugenol or non-eugenol liquids. Until a thick paste forms, the powder and liquid are gradually combined.

To prepare the Coe-Pak, blend paste from tubes holding the accelerator and base in equal lengths until the mixture has a consistent color. A pill of tetracycline powder can be added at this time. After that, the pack is submerged in a cup of room temperature water. The paste is workable after 15 to 20 minutes, after which it

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loses its tackiness and becomes manageable and moldable in 2 to 3 minutes. Before spatulating, add a small amount of zinc oxide to the accelerator (pink paste) to minimize working time.

The pack is then divided into two strips. One strip's end is curved into a hook shape and fitted around the final tooth's distal surface, approaching it from that direction. Gently press the remaining strip into position along the gingival margin and interproximal areas, bringing it forward along the facial surface to the midline. The lingual surface is where the second strip is applied. It is moved forward along the gingival border to the midline after being attached to the pack at the distal surface of the final tooth. By gently pressing on the pack's lingual and facial surfaces, the strips are linked interproximally. The pack should be made continuous from tooth to tooth, covering the edentulous areas, for isolated teeth separated by edentulous spaces.

After doing split flaps, the area needs to be wrapped with tin foil to cover the sutures before the pack is placed. The gingiva should be covered by the pack, but excessive pressure applied to the uninvolved mucosa should be avoided. Overpack irritates the floor of the mouth, the mucobuccal fold, and the tongue. Because the excess tends to break off and take pack from the operated region with it, overextension also jeopardizes the remaining portion of the pack. It is best to discard any pack that obstructs the occlusion before the patient is discharged.

To mold the pack while it is still soft, the operator should instruct the patient to forcefully move their tongue out and to each side as well as to move their cheeks and lips in all directions. The pack needs to be trimmed to remove any excess once it has set.

Pack Removal[8]

After a week, when the patient returns, the periodontal pack is removed using a surgical hoe that is inserted along the edge and gently applied to the side. Scalers are used to remove particles stuck to the tooth surfaces and pieces of pack that are kept interproximal. It is advisable to use fine cotton pliers to carefully remove any particles that might be embedded in the sliced surface. To get rid of surface debris, peroxide is used to rinse the entire area.

FINDINGS AFTER PACK REMOVAL[8]

-A friable meshwork of new epithelium covers the cut surface after a gingivectomy; this meshwork should not be disturbed. Granulation tissue protuberances that resemble beads will persist if the calculus has not been totally eliminated. In order to remove the calculus and root planning, the granulation tissue must be removed with a curette.

-The regions that correspond to the incisions are epithelialized following a flap procedure; however, they should not be disturbed because they may bleed easily when touched. You should avoid probing pockets.

Types Of Periodontal Dressings[3]

1. Those containing zinc oxide and eugenol
2. Those containing zinc oxide without eugenol
3. Those containing neither zinc oxide nor eugenol Periodontal Dressings Containing Zinc Oxide and Eugenol Ward's Wondrpak

Both liquid and powder versions of this medication were offered. Eugenol, peanut oil or rose oil, and resin are all present in the liquid. Tannic acid, powdered resin, and zinc oxide are all present in the powder. After mixing the powder and liquid on a paper pad, the resulting paste is either utilized right away or frozen for a week after being wrapped in aluminum foil. Periodontal Dressings Containing Zinc Oxide without Eugenol

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Coe-Pak

Coe-Pak is based on the interaction of fatty acids with a metallic oxide (De Trey/Denstply, Konstanz, Germany). It comes in a pair of tubes, the contents of which are combined right before usage. Zinc oxide, oil, gum, and lorothidol are all present in one tube. The liquid coconut fatty acids in the other tube have been thickened with chlorothymol and colophony resin.

PeriPac

Calcium sulfate, zinc sulfate, zinc oxide, polymethylmethacrylate, dimethoxy tetra-ethylene glycol, ascorbic acid, taste, and iron oxide pigment make up PeriPac (GC America Inc., Chicago, USA), which is sold as a single paste. Using a dry, sterile spatula, remove a little amount of this substance from the jar and place it on a paper napkin.

If desired, powdered medications might be added. Peripac starts to harden as soon as it comes into contact with water and finishes in roughly 20 minutes. It should take no more than 2-3 minutes to apply the dressing. For 8 to 10 days, a well put dressing doesn't change.

Treating necrotic gingivitis is one benefit of this substance. In these situations, the material on the paper napkin should be rolled with an antibiotic powder. The medication remains in contact with the ulcerated area thanks to the dressing. Other uses for this paste include temporary rebasing of immediate dentures in periodontal surgery, fixation of dressing medications to the cervical area, and protection of non- specific lesions or sutured margins.

Vocopac

Vocopac (Voco, Cuxhaven, Germany) is provided in two chemically curing pastes (catalyst and base). This substance is not fragile and stays elastic in the patient's mouth. Purified colophonium, magnesium oxide, zinc oxide, zinc acetate, fatty acids, natural resin, natural oils, and colorant E127 are all present in Vocopac. Patients who are allergic to these components should not use it, and contact with the bone should also be avoided. Synthetic textiles may also become somewhat discolored.

SeptoPack

This product (Septodont, saint-maur-des-fosses cedex, France) is supplied in 60-g jars. This product's ingredients include zinc oxide (20–50%), zinc sulfate (2.5%–10%), methyl polymethacrylate, amyl acetate, and dibutyl phthalate (10–25%). This product is a plastic paste that sets on its own and has fibers in it. Only 2 or 3 minutes after application is the working time in the mouth. About half an hour is needed for setting.

Dibutyl phthalate, which is extremely harmful to aquatic life, is present in this product. This substance has the potential to compromise fertility and damage an unborn child's eyes. As a result, respirator equipment, gloves, and protective clothes are required.

Periocarea

Two tubes of paste and gel are included with this product (Voco, Cuxhaven, Germany). On the mixing pad, equal parts paste and gel must be combined until the color is consistent. This product has a 45–60 second setting time and 4-5 minutes working period.

Periodontal Dressings Containing neither Zinc Oxide nor Eugenol Reso-pac

One hydrophilic paste is provided by this product (Hager & Werken Gm bH & Co. KG, Postfach, Germany), which can be used right away without mixing. This dressing's hydrophilic qualities allow it to stay in place for up to 30 hours, even on bleeding wounds. After roughly 3 minutes, Reso-pac swells up to a gel-like consistency.

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Mucotect

This product, which comes in a single tube, comprises carboxymethyl cellulose, polyvinyl acetate, ethyl alcohol, vaseline, and polyethylene oxide resin (Hager & Werken Gm bH & Co. KG, Germany). Mucotect is a hydrophilic paste that can stay on the surface for up to half an hour. It sticks very effectively to moist, even bleeding regions because of its makeup.

Barricaid

For direct administration, Barricaid (Pupdent, Watertown, USA) comes in a syringe. Another indirect method can also be used with the syringe. For this dressing to set, a visible light-curing apparatus is necessary. This product offers exceptional aesthetics due to its translucent nature. Polyether dimethacrylate, silanized silica, accelerator, VLC photo-initiator, and colorant make up the majority of Barricaid.

Controversies

Studies Favouring Periodontal Dressing

1. Waerhaug et al, 1957, Dressing does not interfere in healing; chemical constituents get leached out and gets diluted thus causing minimal irritation to tissues.
2. Jorkjend and Skoglund, 1990, Postoperative pain is reduced with use of periodontal dressing.
3. Antoniazzi et al, 2004, Preferable in cases of connective tissue/bone exposure following surgical crown lengthening.
4. Sigusch et al, 2005, Wound dressing has a positive effect on clinical long-term results using a two-step non-surgical procedure.
5. Genovesi et al, 2012, Use of a periodontal dressing improves the periodontal parameters after scaling and root planning procedure and it is attributed to clot stabilization and prevention of bacterial colonization during wound healing.
6. Soheilifar et al, 2015, Pain score was significantly lower in periodontal flap surgical sites with periodontal dressing

Studies Controversial to Periodontal Dressing

1. Stahl et al, 1969, Use of a pack did not influence the healing parameters.
2. Greensmith and Wade, 1974, Postoperative dressing was associated with greater incidence of pain and swelling although it resulted in less bleeding, sensitivity and eating difficulty.
3. Haugen et al, 1978, Coe-Pak and Wondrpak cause more hemolysis than another product and the cytotoxicity of Coe-Pak increases with time.
4. Newman and Addy, 1978, Significantly more plaque accumulated and the sulcus bleeding index were significantly higher on the dressing treated side.
5. Jones and Cassingham, 1979, Surgical dressing serves no useful purpose when periodontal flap surgery is performed.
6. Allen and Caffesse, 1983, No significant differences were found between dressed and sites without dressing regarding changes in clinical attachment levels, pocket depth, or gingival inflammation.

7. Tavelli et al, 2018, A double layered protection of the palatal wound with a gelatin sponge combined with cyanoacrylate appeared to be the best option in reducing pain and post- operative discomfort.	7. Checchi and Trombelli, 1993, Postoperative pain following an apically positioned, full thickness flap procedure does not seem to call for the use of a periodontal dressing when a 0.2% Chlorhexidine mouthwash is prescribed.
8. Saxena et al, 2020, Light cured periodontal dressing showed better patient acceptability and compliance	8. Jentsch et al, 2016, No additional benefit of periodontal dressing following scaling and root planning; periodontal dressing has detrimental effect on the gingival inflammation status by covering the tissue and retaining food which creates a wet chamber phenomenon.

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CONCLUSION

This review paper included a brief discussion of the availability, biocompatibility, and physical characteristics of periodontal dressings. Following surgery, the use of periodontal dressings appears to be advantageous. However, it would be preferable to restrict their use to certain situations; for instances, undisplaced flaps, in which the flap returns to its original position and there is little gingival bleeding and root hypersensitivity, do not require their use.

Overall, applying a periodontal dressing would be advantageous when the benefits outweigh the drawbacks. The choice of dressing is influenced by a number of factors, including:

The purpose of the periodontal dressing for the surgeon.

Time needed for the periodontal dressing to stay in place on the surgical site: prolonged use of Coe-Pak may intensify its cytotoxic effects. Compared to other products, Ward's Wondrpak is more cytotoxic, and once barricade has fully polymerized, it is cytocompatible. Cellulose-based periodontal dressings appear to cause fewer inflammatory reactions and are likely more patient- acceptable.

Dimensional changes: The adhesive qualities of all dressings are weak. Plaque builds up beneath them as a result, slowing the healing process. Generally speaking, it appears that periodontal dressings made of cellulose can take the place of conventional dressings.

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