VOLUME 10 NUMBER 2

Secundum Artem

Current & Practical Compounding Information for the Pharmacist.

# COMPOUNDING FOR DENTISTS AND DENTAL PATIENTS

## GOALS AND OBJECTIVES

Goal: To provide compounding pharmacists supportive information on formulations that may be beneficial to dentists and dental patients.

Objectives: After reading and studying this article, the reader will be able to:

1. Define and discuss the different opportunities of compounding for dental patients.
2. Describe the different disease states that might be appropriate for compounded medications.
3. Discuss the active ingredients used in treating diseases of the oral cavity.
4. Discuss the various formulations used in treating dental patients.

## INTRODUCTION

Many opportunities are available for working with dentists. These range from preparing special oral hygiene products and pre-operative medications to preparing medications used in their dental surgical suites. Dental patients, in addition to therapy for dental and oral diseases, often require medications for proper oral hygiene and prevention. To the dentist and dental patient, the compounding pharmacist can be a valuable resource for the preparation of specific, individualized compounded medications as well as for accurate drug information and regular prescription services.

Today's well-trained dentist is concerned with not only the health of the mouth but also of the head and neck. Dentists are also trained to diagnose most diseases of the mouth and jaw as well as for their treatment, care and management. Dentists deal with numerous oral problems, including dental caries, periodontal disease, oral lesions, oral cancer, temporomandibular joint disorders and inflammatory or ulcerative diseases of the oral tissue. In addition, dentists are also aware that many systemic diseases and some drug side effects include oral symptoms, such as referred pains of the jaw associated with angina, oral fungal infections from long-term antibiotic therapy or gingival hyperplasia in patients receiving anticonvulsants and other drugs.

Generally and routinely, pharmacists are called upon to assist in the management of pain, infections, allergies and other disorders. Some of the most commonly encountered diseases include aphthous stomatitis (canker sore), lichen planus, cicatricial pemphigoid (a chronic autoimmune disease of mucous membrane and/or skin) and drug-induced mucositis.

## DEFINITIONS[1]

Dentistry is the healing science and art concerned with the embryology, anatomy, physiology and pathology of the oral-facial complex, and with the prevention, diagnosis, and treatment of deformities, pathoses, and traumatic injuries thereof. The prefixes "dent-", "denti-", and "dento-" refer to the teeth and dental. A dentist is one legally qualified to practice dentistry. Dentition refers to the natural teeth, as considered collectively, in the dental arch, and may be deciduous, permanent or mixed. Areas of concern include the dentin, gums and oral mucosa.

## STRUCTURE[1]

A tooth consists of the corona (crown), neck and the root. Moving in from the surface, one goes from the enamel, through the dentin and the dental pulp. Surrounding the tooth is the circular ligament, cementum, gingiva and the periodontium.

The dentin is the ivory forming the mass of the tooth; about 20% of which is organic matrix, mostly collagen, with some elastin and a small amount of mucopolysaccharide. The inorganic fraction (about 70%) is primarily hydroxyapatite, with some carbonate, magnesium and fluoride. It is traversed by a large number of fine tubules running from the pulp cavity outward. Within the tubules are processes from the odontoblasts.

The gingiva is the dense fibrous tissue that is covered by mucous membrane. It envelops the alveolar process of the upper and lower jaw and surrounds the necks of the teeth. An inflammation of the gingiva, as a response to bacterial plaque on adjacent teeth, is called gingivitis.

Periodontal refers to around the tooth. Periodontitis is an inflammation of the periodontium. It is a chronic inflammatory disease of the periodontium occurring in response to bacterial plaque on the adjacent teeth and is characterized by gingivitis, destruction of the alveolar bone and periodontal ligament and apical migration of the epithelial attachment resulting in the formation of periodontal pockets and ultimately loosening and exfoliation of the teeth.

## CAUSES OF DENTAL PROBLEMS

Causative agents in many dental problems include lack of or proper oral hygiene and improper diet. Also, drug therapy and various disease states can cause dental problems. Drug induced examples include dry mouth caused by tranquilizers, fluorosis due to excessive fluorine intake, mucosal lesions following cancer chemotherapy, phenytoin hyperplasia, discoloration of teeth due to tetracycline

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and toxic lesions resulting from therapy with bismuth and gold.
Disease induced examples include cardiovascular, respiratory tract, urinary tract, central nervous system, gastrointestinal, skin, neuromuscular diseases, as well as malignancies, serum and infectious hepatitis and pregnancy.

## TYPES OF DISEASES

Local, oral disorders include acute ulcerative necrotizing gingivitis, allergy, angular stomatitis, chemical burns, cysts, dental caries, denture stomatitis, halitosis, hypersalivation/hyposalivation, keratotic diseases including hyperkeratosis and leukoplakia, local infections, periodontitis, recurrent ulcerative stomatitis, salivary calculi, canker sores and tumors or neoplasms (malignant and benign). There are numerous systemic disturbances that have oral manifestations.

## TREATMENT OF DENTAL DISEASES

Chronic mucositis diseases of the oral mucosa are often treated with corticosteroids, including aphthous stomatitis (canker sore), lichen planus, cicatricial pemphigoid, pemphigus as well as nonmicrobial mucositis. Delivering steroids via oral rinse is advantageous as it provides drug contact with distal, hard-to-reach crevices and surfaces. Commonly, something like 0.1% or 0.2% triamcinolone acetonide is used in 5 mL doses as a mouth rinse four times daily, after meals and at bedtime, for 30 to 60 seconds prior to expectorating.
Common causes of aphthae (nonspecific ulceration) include cinnamon flavoring, sodium lauryl sulfate and pyrophosphates. Moderately or highly alcoholic mouth rinses or other products should not be used for the management of chronic mucositis or any other intraoral disease as it has a significant drying effect in the oral cavity. This makes patients more susceptible to caries, periodontal disease, halitosis and candidiasis. Misoprostol delivered as a powdered mucoadhesive formulation, has been found to markedly decrease pain and appears to aid in the healing process.
Oral pain may be due to a variety of causes, including neuralgias, vesiculerosive diseases, chemotherapy, neoplasms, trauma and infections. The goal in alleviating oral pain syndromes is to modify the underlying disease process. In the case of burning mouth, the pain can be intense and chronic and may occur anywhere in the oral cavity. Therapeutic management is often a trial-and-error process. Systemically, tricyclic antidepressants, chlordiazepoxide, clonazepam and carbamazepine have been used. Limited benefit has been obtained from topical steroid rinses, misoprostol, capsaicin and anesthetics (antihistamines, amitriptyline, dyclonine). Ketamine and dextromethorphan are playing increasingly important roles in the management of refractory neuropathic pain and the use of oral dextromethorphan slow release capsules and ketamine in PLO directly on trigger points have been reported to be effective.
Oral fungal infections can be treated with novel dosage forms such as nystatin lollipops and popsicles. Also, multi-ingredient mouthwashes sporting such names as Reynold's, Kaiser's, and others consisting generally of a corticosteroid, antifungal, antihistamine and others are very widely used.

## DRUGS USED IN DENTAL PREPARATIONS

Drugs commonly employed include analgesics, antibiotics, antihistamines, anti-inflammatory agents, corticosteroids, hemostatic agents, anesthetics, sedatives/hypnotics, stimulants, tranquilizers, vitamins, and involvement with vehicles and protectants. Some patients require artificial saliva, fluoride, desensitizers for dentin, cavity liners (varnishes), pulp cappings, disinfectants for root canals, disinfectants for instruments, denture preparations, prophylaxis pastes, dentrifices, mouthwashes and oral irrigations.

## CONTRIBUTIONS OF COMPOUNDING

A number of disease states can result in oral ulceration. Compounding dental mouth rinses from bulk powders (anti-inflammatory agents, antibiotics, etc.) have numerous advantages over commercial dosage forms. For example, there will be fewer stability and compatibility problems to complicate the administration of the product. Each manufactured product has numerous ingredients that may contribute to compatibility or stability problems. Also, if a preservative is present but the commercial product is diluted down due to mixing with other products, then it may drop below its effective concentration. Active drugs can be incorporated into toothpastes and gels. For gum disease, antibiotics can be incorporated into a poloxamer gel (a reverse thermal gel) and applied to the gum line between the gum and the tooth. The poloxamer will thicken and release the drug over a longer time period than if a rinse or irrigation is used.
In compounding for dentists and dental patients, many options are available depending upon the patients' conditions and needs.

## REFERENCES

1. Spraycar M. Stedman's Medical Dictionary, 25th Edition, Baltimore MD, Williams & Wilkins, 1995, pp. 456-458, 1330-1331, 1823.

## USEFUL FORMULATIONS FOR TREATING DENTAL CONDITIONS

Professional Use Formulas

Analgesic/Anesthetic

Rx Benzocaine 10% Solution for Mucosal Membranes

| | |
|---|---|
| Benzocaine | 10 g |
| Propylene glycol qs | 100 mL |

Accurately weigh the benzocaine. Add sufficient propylene glycol to make 100 mL and stir until dissolved (slight heat may be used to hasten dissolution). Package and label.

Desensitizers for Dentin

Rx Sodium Fluoride 33% Paste

| | |
|---|---|
| Sodium fluoride powder | 10 g |
| Kaolin | 10 g |
| Glycerin | 10 g |

Accurately weigh each ingredient. Mix the sodium fluoride and kaolin powders until uniform. Incorporate the glycerin and mix well. Package and label.

Rx Potassium Nitrate 10% Desensitizing Gel

| | |
|---|---|
| Potassium nitrate | 10 g |
| Karigel-N | 90 g |

Accurately weigh each ingredient. Incorporate the potassium nitrate into the gel vehicle. Package and label.

Cavity Liners (Varnishes)

Rx Dental Cavity Varnish

| | |
|---|---|
| Camphor | 70 g |
| Prednisolone | 1 g |
| Parachlorophenol | 26.5 g |
| Metacresol acetate | 2.5 g |

Accurately weigh/measure each ingredient. Mix the camphor with the parachlorophenol. Add the metacresol acetate. Add the prednisolone and mix well. Package and label.

Rx Dental Chemical Curettage Agent

| | |
|---|---|
| Sodium hydroxide | 7.8 g |
| Sodium hypochlorite 5% solution | 100 mL |
| Sodium carbonate | 19 g (approx) |

Accurately weigh/measure each ingredient. Slowly dissolve the sodium hydroxide in the sodium hypochlorite solution using an ice bath to keep the solution cool. Allow the solution to warm to room temperature. Add the sodium carbonate solution until the solution is saturated. It may not take all the sodium carbonate. Package and label.

Rx Dental Pressure-Indicating Paste

| | |
|---|---|
| Zinc oxide ointment | 53 g |
| White petrolatum | 17 g |
| Mineral oil | 25 g |
| White wax | 5 g |
| Flavoring | qs |

Accurately weigh each ingredient. Reduce the white wax to a fine state by grating. Heat the grated wax until it melts, using a double boiler to eliminate scorching. Heat the mineral oil and white petrolatum in a separate double boiler to a temperature near that of the melted wax. Add the mineral oil/petrolatum combination very slowly, in small increments, with continuous stirring to the melted wax. After the two oleaginous liquids are thoroughly mixed - and while constantly stirring the mixture - add the zinc oxide ointment in small increments. When the mixture is completely melted and displays a uniform creamy white appearance, remove the heat and allow the mixture to cool. If a volatile flavoring agent is used, such as lemon oil or peppermint oil, add it during cooling, just before solidification occurs. Pour the "paste" while it is still slightly warm into the desired ointment jars, or allow it to solidify and place with a spatula into appropriate containers. Package and label.

Pulp Cappings or Temporary Cements

Rx Zinc Oxide and Eugenol Cement

| | |
|---|---|
| Zinc oxide | 50 g |
| Eugenol | qs |

Weigh the zinc oxide. Incorporate sufficient eugenol to make a thick, putty-like paste. Package and label. Protect from air and moisture.

Rx Zinc Oxide and Thymol Cement

| | |
|---|---|
| Zinc oxide | 67 g |
| Thymol | 33 g |

Accurately weigh each ingredient. Melt the thymol in a porcelain evaporating dish, using a water bath. Add the zinc oxide and rub the mixture to make a smooth paste. Spread in a thin layer over the dish and allow to cool. Break into small pieces and keep in a well-closed container.

Abrasives

Rx Paste Abrasive for Professional Use #1

| | |
|---|---|
| Pumice, in very fine powder | 40 g |
| Methyl salicylate | 1 mL |
| Starch glycerite | 60 g |

Accurately weigh/measure each ingredient. Mix the methyl salicylate with the

starch glycerite. Incorporate into the pumice and mix until uniform. Package and label.

### Rx Paste Abrasive for Professional Use #2

| | | |
|---|---|---|
| Pumice, in very fine powder | | 61.8 g |
| Sodium borate | | 10.8 g |
| Glycerin | | 28 mL |
| Spearmint oil | | 0.1 mL |

Accurately weigh/measure each ingredient. Mix the glycerin with the sodium borate and the spearmint oil. Incorporate the pumice slowly. Package and label. Note: The final consistency can be altered by the quantity of glycerin used.

## PATIENT FORMULATIONS

Analgesics/Anesthetics

### Rx Benzocaine Troches

| | | |
|---|---|---|
| (Makes 12) | | |
| Benzocaine | | 750 mg |
| Vanillin | | 30 mg |
| Sucrose | | 8 g |
| Tragacanth | | 250 mg |
| Purified Water | | qs |

Accurately weigh the powders. Mix the powders thoroughly. Add sufficient water to make a pliable mass. Shape into a firm cylinder. Using a sharp knife, cut off troches of the desired thickness. Allow to dry. Package and label.

### Rx Benzocaine 5% Ointment

| | | |
|---|---|---|
| Benzocaine | | 5 g |
| Petrolatum | qs | 100 g |

Accurately weigh each ingredient. Reduce the particle size of the benzocaine. Incorporate a small quantity of the petrolatum into the benzocaine and work until very smooth. Incorporate the remainder of the petrolatum geometrically and mix well. Package and label.

### Rx Benzocaine Compound Ointment

| | | |
|---|---|---|
| Benzocaine | | 5 g |
| Chlorobutanol | | 5 g |
| Methyl salicylate | | 15 drops |
| Petrolatum | qs | 100 g |

Accurately weigh/measure each ingredient. Mix the benzocaine, chlorobutanol and methyl salicylate. Incorporate the mixture into the petrolatum and mix well. Package and label.

### Rx Benzocaine-Guaiacol Solution

| | | |
|---|---|---|
| Benzocaine | | 20 g |
| Guaiacol | | 20 g |
| Peruvian balsam | | 60 g |

Accurately weigh each ingredient. Mix the benzocaine with the guaiacol to form a smooth paste. Incorporate the Peruvian balsam and mix well. Package and label.

### Rx Chlorobutanol in Clove Oil

| | | |
|---|---|---|
| Chlorobutanol | | 25 g |
| Clove oil | qs | 100 mL |

Accurately weigh the chlorobutanol.
Incorporate the clove oil to volume and mix well.
Package and label.

Oral Ulceration Formulas

### Rx Misoprostol 0.0027% Mucoadhesive Powder

| | | |
|---|---|---|
| Misoprostol | | 400 µg |
| Polyethylene oxide (Polyox 301) | | 200 mg |
| Hydroxypropyl methylcellulose | qs | 15 g |

Obtain two misoprostol 200 µg tablets. Accurately weigh each of the other ingredients. Pulverize the misoprostol tablets to a very fine powder. Add the polyethylene oxide (Polyox 301) followed by the hydroxypropyl methylcellulose (Methocel E4M) and mix well. Note: It is important to have all the materials of approximately the same particle size. Package and label.

### Rx Misoprostol 0.0024% and Lidocaine 1% in Glycerin

| | | |
|---|---|---|
| Misoprostol | | 2.4 mg |
| Lidocaine HCl | | 1 g |
| Glycerin | qs | 100 mL |

Accurately weigh/measure each ingredient and count the required number of misoprostol tablets. In a mortar, thoroughly pulverize the misoprostol tablets. Add the lidocaine hydrochloride powder and comminute the powders together. Wet the powders with glycerin to form a smooth paste. Geometrically, add additional glycerin until the product measures 100 mL.
Package and label.

### Rx Misoprostol 0.0024% Mouth Rinse for Oral Ulcerations

| | | |
|---|---|---|
| Misoprostol 200 µg tablets | | 12 tablets |
| Methylparaben | | 200 mg |
| Glycerin | | 10 mL |
| Cherry Flavor, Anhydrous | | 10 µL |
| Syrup | | 40 mL |
| Sodium carboxymethylcellulose 0.25% | qs | 100 mL |

Calculate the required quantity of each ingredient for the total amount to be prepared. Accurately weigh/measure each ingredient and obtain the misoprostol tablets. Pulverize the misoprostol tablets. Add the glycerin to form a paste and add the methylparaben and the glycerin and the cherry flavor. Add the syrup and sufficient sodium carboxymethylcellulose 0.25% solution to volume and mix well. Package and label.

### Rx Misoprostol 0.001% and Lidocaine 0.5% Oral Rinse

| | | |
|---|---|---|
| Misoprostol | | 1 mg |
| Lidocaine hydrochloride | | 500 mg |
| Methylparaben | | 200 mg |
| Glycerin | | 10 mL |
| Cherry Flavor, Anhydrous | | 10 µL |
| Syrup | | 40 mL |
| Sodium carboxymethylcellulose 0.25% Soln. | qs | 100 mL |

Calculate the required quantity of each ingredient for the total amount to be prepared. Accurately weigh/measure each ingredient and obtain and pulverize 5- 200 µg misoprostol tablets. Dissolve the methylparaben in the glycerin and add the lidocaine hydrochloride, pulverized misoprostol tablets and the cherry flavor. Add the syrup and sufficient sodium carboxymethylcellulose 0.25% solution to volume and mix well. Package and label.

Anti-Infectives

### Rx Tetracycline 2.4% Periodontal Gel

| | | |
|---|---|---|
| Tetracycline hydrochloride | | 2.4 g |
| Pluronic F127 | | 30 g |
| Sterile water for injection | | 90 g |

Accurately weigh each ingredient. Add the Pluronic F127 to 70 g (mL) of the sterile water for injection (which has been previously cooled in the refrigerator), and mix well. Store in a refrigerator. Disperse the tetracycline hydrochloride in 20 g (mL) of the sterile water for injection. Add this mixture to that from Step #2 and mix well. Package and label.

### Rx Metronidazole 10% Periodontal Gel

| | | |
|---|---|---|
| Metronidazole | | 10 g |
| Pluronic F127 | | 30 g |
| Sterile water for injection | | 85 g |

Accurately weigh each ingredient. Add the Pluronic F127 to 70 g (mL) of the sterile water for injection (which has been previously cooled in the refrigerator), and mix well. Store in a refrigerator. Disperse the metronidazole in 15 g (mL) of the sterile water for injection forming a paste. Add this paste to the Pluronic gel and mix well. Package and label.

### Rx Metronidazole 0.05% and Neomycin Sulfate 1% Irrigation Solution

| | | |
|---|---|---|
| Metronidazole | | 500 mg |
| Neomycin sulfate | | 1 g |
| Methylparaben | | 25 mg |
| Sterile water for irrigation | qs | 100 mL |

Accurately weigh/measure each ingredient. Dissolve the metronidazole, neomycin sulfate and methylparaben in about 90 mL of the sterile water for irrigation. Adjust the pH, if necessary, to between pH 4.5 and 7 with either sulfuric acid or sodium hydroxide. Add sufficient sterile water for irrigation to volume and mix well. Sterilize by filtration and place in sterile container.
Package and label.

### Rx Amphotericin B 100 mg Troches (makes 24)

| | |
|---|---|
| Amphotericin B | 2.4 g |
| Aspartame | 500 mg |
| Silica gel | 240 mg |
| Acacia powder | 400 mg |
| Flavoring oil | 3-4 drops |
| Polyethylene glycol 1450 | 21.5 g (depending upon the mold used) |

Note: It is necessary to calibrate the troche mold using the polyethylene glycol 1450 base prior to determining the exact quantity of polyethylene glycol 1450 required for this prescription. Calculate the required quantity of each ingredient for the total amount to be prepared. Accurately weigh/measure each ingredient. Melt the polyethylene glycol 1450 using low heat or a water bath. Comminute and mix the amphotericin B, aspartame, silica gel and acacia powders together in a mortar. Sift into the melted base and mix thoroughly. Cool slightly and add the flavoring oil and mix well. Pour into molds and cool. Package and label.

Rx Tetracaine Hydrochloride 0.025% and/or Nystatin 250,000 unit Popsicles (4 Popsicles)

| | | |
|---|---|---|
| Tetracaine hydrochloride | | 120 mg |
| and/or Nystatin | | 1,000,000 units (227 mg) |
| Aspartame | | 480 mg |
| Corn syrup | | 48 mL |
| Purified water | qs | 480 mL |
| Flavor or KoolAid powder | qs | |

Calculate the required quantity of each ingredient for the total amount to be prepared. Accurately weigh/measure each ingredient. Note: Check the potency of the nystatin to determine the exact quantity to be weighed. Dissolve the tetracaine hydrochloride and aspartame in about half the purified water. Add the corn syrup, nystatin powder and flavor/KoolAid powder and mix well. Add sufficient purified water to volume and mix well. Pour into mold/tray/plastic sleeves and freeze. Package and label. Note: Volume and quantities can be adjusted to mold/tray/plastic sleeve size.

PreOp Medications

Rx Pediatric Pre-Operative Cocktail Injection

| | | |
|---|---|---|
| Single Dose | | |
| Meperidine HCl | | 50 mg |
| Chlorpromazine HCl | | 10 mg |
| Promethazine HCl | | 15 mg |
| Sterile water for injection | qs | |

Note:This preparation should be prepared in an aseptic working environment, using aseptic technique, by a validated aseptic compounding pharmacist.

Method 1: Using commercially available injections.

The quantity of meperidine hydrochloride would be 1 mL, chlorpromazine hydrochloride 0.4 mL and promethazine hydrochloride 0.6 mL. Accurately withdraw each quantity in a syringe and place in a sterile, evacuated vial.

Mix well, package and label. The final solution can be withdrawn into a sterile syringe, capped, labeled and dispensed.

Method 2: Using bulk drug substances.

Accurately weigh the 50 mg of meperidine hydrochloride and place in a clean vial. Accurately weigh 20 mg of chlorpromazine hydrochloride, dissolve in 1 mL of sterile water for injection, withdraw 0.5 mL and add to the meperidine hydrochloride powder and mix well.

Accurately weigh 20 mg of promethazine hydrochloride, dissolve in 1 mL of sterile water for injection, withdraw 0.75 mL and add the meperidine hydrochloride: chlorpromazine hydrochloride mixture, and mix well. Note: If desired, sufficient sterile water for injection can be added to make a total volume of 2 mL. Withdraw the solution into a syringe and filter through a sterile filter into a sterile evacuated vial. Package and label.

Rx Promethazine Hydrochloride 50 mg/mL in PLO Gel

| | | |
|---|---|---|
| Promethazine HCl | | 5 g |
| Purified water | | 4 mL |
| Lecithin:Isopropyl palmitate solution | | 22 mL |
| Pluronic F127 30% gel | qs | 100 mL |

Calculate the required quantity of each ingredient for the total amount to be prepared. Accurately weigh/measure each ingredient. Dissolve the promethazine hydrochloride in the purified water. Add this solution to about 70 mL of the Pluronic F127 30% gel and mix well.

Incorporate the lecithin:isopropyl palmitate solution using shear mixing. Add additional pluronic F127 30% gel to volume and continue shear mixing. Package and label. Note: Lecithin:isopropyl palmitate solution (100 g) can be prepared by mixing 0.2 g sorbic acid, 49.9 g of soy lecithin and 49.9 g of isopropyl palmitate. Dissolution can be accomplished by placing in a sealed container in a refrigerator, with periodic agitation.

Note: Pluronic F127 gel (30%; 100 mL) can be prepared by mixing 0.2 g sorbic acid, 30 g of Pluronic F127 and sufficient purified water to make 100 mL. The pH should be adjusted to about 4.5 for maximum effectiveness of the sorbic acid as a preservative. Dissolution can be easily accomplished by placing in a sealed container in a refrigerator, with periodic agitation that does not incorporate air into the gel.

Dry Mouth

Rx Pilocarpine Hydrochloride 2 mg Troches (makes 24)

| | | |
|---|---|---|
| Pilocarpine hydrochloride | | 48 mg |
| Silica gel, micronized | | 240 mg |
| Aspartame | | 480 mg |
| Acacia powder | | 400 mg |
| Flavor | qs | |
| Polyethylene glycol 1450 | | 23.8 g |

Calculate the required quantity of each ingredient for the total amount to be prepared. Accurately weigh/measure each ingredient. Triturate the pilocarpine hydrochloride, silica gel, aspartame and acacia powders together until fine and uniform. Melt the base at about 50°C. Incorporate the powders with stirring until uniformly mixed. Remove from heat, add the flavor and mix well. Pour into molds and allow to cool. Package and label.

Rx Saliva Substitute for Dry Mouth/Throat 100 mL

| | | |
|---|---|---|
| Methylparaben | | 200 mg |
| Glycerin | | 10 mL |
| Cherry Flavor, Anhydrous | | 10 µL |
| Syrup | | 40 mL |
| Sodium carboxymethylcellulose 0.25% | qs | 100 mL |

Calculate the required quantity of each ingredient for the total amount to be prepared. Accurately weigh/measure each ingredient. Dissolve the methyl-

Stomatitis Preparations

| (100 mL) | Kaiser's | Kraemer's | Powell's | Reynold's | Stanford's | T-N-D-D |
|---|---|---|---|---|---|---|
| RxTetracycline 25 mg/mL Susp. | 50 mL | | 8 mL | 50 mL | 48 mL | |
| Nystatin Oral Susp. | 12 mL | 30 mL | 4.8 mL | 12 mL | 12 mL | |
| Hydrocortisone Powder | 46 mg | | 20 mg | 46 mg | 46 mg | |
| Purified Water | qs 100 mL | | | | qs 100 mL | |
| Dyclonine 1% Solution | | 22.5 mL | | | | |
| Lemon Oil | | 0.25 mL | | | | |
| Glycerin | | qs 100 mL | | | | |
| Diphenhydramine 2.5 mg/mL Elixir | | | qs 100 mL | | | |
| Chlorpheniramine 0.4 mg/ mL Syrup | | | | qs 100 mL | | |
| Chlorpheniramine 4 mg Tablets | | | | | #5 | |
| Tetracycline | | | | | | 1.25 g |
| Nystatin | | | | | | 1,666,667 unit |
| Diphenhydramine HCl | | | | | | 125 mg |
| Dexamethasone | | | | | | 333 µg |
| Xanthan Gum | | | | | | 200 mg |
| Aspartame | | | | | | 200 mg |
| Saccharin Sodium | | | | | | 100 mg |
| Flavor | | | | | | |
| Simple Syrup | | | | | | qs 100 mL |

Calculate the required quantity of each ingredient for the total amount to be prepared. Accurately weigh/measure each ingredient.

Kaiser's: Mix the hydrocortisone powder with a small amount of the tetracycline syrup until smooth. Slowly add the remaining tetracycline syrup, mix in the nystatin suspension and add sufficient purified water to volume and mix well.

Kraemer's: Add the lemon oil to about 100 mL of glycerin followed by the dyclonine solution and nystatin oral suspension. Add sufficient glycerin to volume and mix well.

Powell's: Mix the hydrocortisone powder with a small amount of the tetracycline suspension. Add the remainder of the tetracycline suspension followed by the nystatin oral suspension and the diphenhydramine elixir and mix well.

Reynold's: Mix the tetracycline and nystatin suspension. Slowly add the hydrocortisone (previously dissolved in 15 mL ethanol) with constant stirring. Add sufficient chlorpheniramine syrup to volume and mix well.

Stanford's: Thoroughly pulverize the chlorpheniramine tablets and blend in the hydrocortisone powder. Add the tetracycline syrup in portions with thorough mixing followed by the nystatin oral suspension. Add sufficient purified water to volume and mix well.

T-N-D-D: Blend the tetracycline, nystatin, diphenhydramine hydrochloride dexamethasone, xanthan gum, aspartame, saccharin powders and mix well. Add 90 mL of simple syrup, in portions, with thorough mixing after each addition. Add the desired flavor and mix well. Add sufficient simple syrup to volume and mix well. Package and label.

paraben in the glycerin and add the cherry flavor. Add the syrup and sufficient sodium carboxymethylcellulose 0.25% solution to volume and mix well. Package and label.

Miscellaneous Preparations

### Rx Fluoride Lozenges

| | |
|---|---|
| Sodium fluoride | 52.8 mg |
| Sorbitol candy | 30 g |

Accurately weigh the sodium fluoride and obtain the required quantity of sorbitol candy.
Melt the sorbitol candies at a temperature not exceeding 70° C. Add the sodium fluoride and mix well. While still fluid, cool and pour into lozenge (troche) molds. Allow to cool until solid.
Package and label.

### Rx Gag Prevention Lollipops/troches

| | | |
|---|---|---|
| Sodium chloride | | 46.56 g |
| Potassium chloride | | 3 g |
| Calcium lactate | | 6.12 g |
| Magnesium citrate | | 2.04 g |
| Sodium bicarbonate | | 22.44 g |
| Sodium phosphate monobasic | | 3.84 g |
| Silica gel | | 3.60 g |
| Polyethylene glycol 1450 | qs | |

Calibrate the lollipop or troche mold that is to be used. Spray the mold with a vegetable-based oil and wipe off the excess. Accurately weigh each ingredient. Triturate all the powders together to obtain a small, uniform particle size. Melt the polyethylene glycol 1450 to about 55° C in a suitable beaker. Slowly, with stirring, add the powders and mix until homogenous.
Cool to approximately 45° C and pour into molds. Let cool, package and label.

### Rx Chlorhexidine 0.2% Oral Rinse

| | | |
|---|---|---|
| Chlorhexidine gluconate | | 200 mg |
| Aspartame | | 35 mg |
| Flavor | qs | |
| Purified water | qs | 100 mL |

Calculate the required quantity of each ingredient for the total amount to be prepared. Accurately weigh/measure each ingredient. Dissolve the chlorhexidine and aspartame in about 95 mL of purified water. Add the flavor (patient's preference) and mix well. Add sufficient purified water to volume and mix well. Package and label.

## CONSUMER PREPARATIONS

Consumer Oral Hygiene Preservative-Free Preparations
Dentifrices are generally used with a toothbrush for cleaning teeth surfaces that can be easily reached. Dentifrices are available as gels, pastes, powders and slurries. Generally, they contain abrasives (phosphate salts, calcium and magnesium carbonates, hydrated aluminum oxides, silicates or dehydrated silica gels), binders (gums, seaweed colloids, synthetic cellulose or mineral colloids), flavoring agents, sweetening agents (saccharin sodium), foaming agents (sodium lauryl sulfate) and humectants (sorbitol, glycerol or propylene glycol).
Mouthwashes are used to mechanically flush loose debris from the mouth, to provide a pleasant taste and to mask bad breath for approximately 15 to 30 minutes. These can also be used as vehicles to deliver various drugs.

### Rx Toothpaste vehicle

| | |
|---|---|
| Calcium pyrophosphate | 45 g |
| Sorbitol 70% solution | 20 mL |
| Sodium lauryl sulfate | 1.2 g |
| Sodium carboxymethylcellulose | 600 mg |
| Sodium saccharin | 100 mg |
| Peppermint oil | 0.75 mL |
| Purified water | 32.35 mL |

Accurately weigh/measure each ingredient. Add the sodium lauryl sulfate, sodium saccharin and peppermint oil to the purified water. Add the sodium carboxymethylcellulose to the sorbitol solution. Mix the two preparations until uniform. Geometrically, incorporate the calcium pyrophosphate to form a paste. Package and label.

### Rx Paste Dentifrice, Preservative Free

| | |
|---|---|
| Methylcellulose | 1 g |
| Glycerin | 1 g |
| Propylene glycol | 18 g |
| Purified water | 13.5 g |
| Saccharin sodium | 50 mg |
| Peppermint oil | 300 mg |
| Mineral oil | 1 g |
| Sodium lauryl sulfate | 2.5 g |
| Dicalcium phosphate,in very fine powder | 54 g |

Accurately weigh/measure each ingredient. Mix the methylcellulose with the glycerin, propylene glycol, saccharin sodium, peppermint oil and mineral oil. Slowly incorporate the purified water and mix until smooth. Slowly incorporate the sodium lauryl sulfate and dicalcium phosphate and mix until uniform. Package and label.

### Rx Toothgel vehicle

| | |
|---|---|
| Glycerin | 22 g |
| Carbopol 934 | 500 mg |
| Purified water | 25.2 mL |
| Tetrasodium pyrophosphate | 250 mg |
| Sodium saccharin | 200 mg |
| Sodium benzoate | 500 mg |
| Sodium hydroxide 50% solution | 0.4 mL |
| Dicalcium phosphate dihydrate | 48.76 g |
| Sodium lauryl sulfate | 1.2 g |
| Flavor | 1 mL |

Accurately weigh/measure each ingredient. Add the tetrasodium pyrophosphate, sodium saccharin, sodium benzoate, sodium lauryl sulfate and flavor to the purified water. Mix the Carbopol 934 with the glycerin. Mix the two mixtures until uniform. Add the sodium hydroxide solution and mix well. Incorporate the dicalcium phosphate dihydrate into the gel vehicle geometrically. Package and label.

### Rx Mouthwash/Gargle

| | |
|---|---|
| Cetylpyridinium chloride | 100 mg |
| Polysorbate 20 | 1 mL |
| Spearmint oil | 0.25 mL |
| Ethanol 95% | 10 mL |
| Sodium saccharin | 100 mg |
| Sodium benzoate | 200 mg |
| Sorbitol 70% solution | 10 mL |
| Purified water qs | 100 mL |

Accurately weigh/measure each ingredient. Add the spearmint oil to the polysorbate 20 and mix well. Add the ethanol and mix well. Separately, add the sodium saccharin and sodium benzoate to about 70 mL of purified water, followed by the sorbitol solution. Mix the two solutions together and mix well. Add a few drops of food color if desired. Add sufficient purified water to volume and mix well. Package and label.

Denture Preparations

### Rx Denture Adherent Powder

| | |
|---|---|
| Tragacanth, fine powder | 75 g |
| Karaya gum, fine powder | 25 g |
| Sassafras oil | 1.5 mL |

Accurately weigh each ingredient. Mix the powders until uniform. Incorporate the sassafras oil and thoroughly mix.

### Rx Denture Cleanser

| | |
|---|---|
| Trisodium phosphate | 120 g |
| Cinnamon oil | 0.3 mL |

Accurately weigh the trisodium phosphate. Incorporate the cinnamon oil and mix well. Package and label.

**Extemporaneous Formulations and Stability Studies Available For:**

- Acetazolamide
- Allopurinol
- Alprazolam
- Azathioprine
- Baclofen
- Bethanechol
- Captopril
- Chloroquine Phosphate
- Cisapride
- Clonazepam
- Diltiazem HCl
- Dipyridamole
- Enalapril Maleate
- Flecainide Acetate
- Flucytosine
- Hydralazine HCl
- Ketoconazole
- Labetalol
- Metolazone
- Metoprolol Tartrate
- Metronidazole
- Procainamide
- Pyrazinamide
- Quinidine Sulfate
- Rifampin
- Spironolactone
- Spironolactone/HCTZ
- Tetracycline HCl
- Verapamil HCl


*When swallowing a tablet is a problem...*

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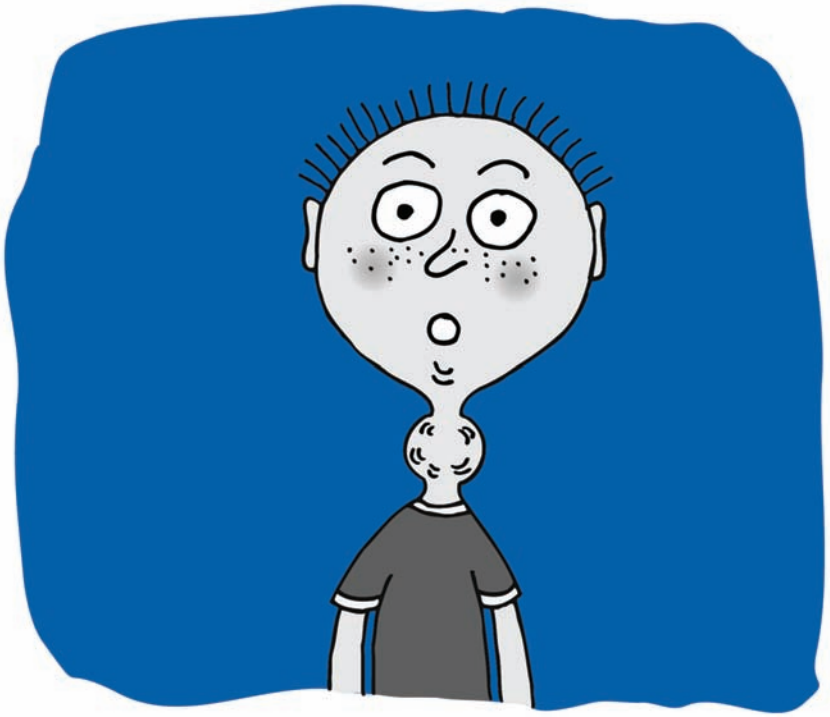

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