Management of Erythematous Oral Lesions
A Peer-Reviewed Publication
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Abstract
Conditions causing oral erythema vary in terms of etiology and complexity. Erythematous lesions may be the result of systemic as well as local disease or trauma. Oral conditions reflecting potential systemic disease may need to be co-managed with the patient’s medical provider. Nonetheless, regardless of the potential cause of oral erythema, local intervention is an important component of the overall management of these oral problems. Dental intervention includes the provision of palliative home care instructions for the erythema, local or systemic pain management, periodontal surgery and the prescription of medication (e.g. topical analgesics, antibiotics, corticosteroids, antifungal drugs, or salivary substitutes). In the case of allergy, removing the offending agent may be recommended. This course focuses on the management of the oral erythematous conditions dental professionals are most likely to see in everyday practice.

Educational Objectives:
At the conclusion of this educational activity participants will be able to:
1. Describe interventions used to manage erythematous oral lesions.
2. Identify the appropriate medication for managing viral lesions causing erythema.
3. Implement treatment strategies for managing a variety of oral infections and conditions.
4. Identify interventions that constitute palliative home care.

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Introduction
Erythema of the oral mucosa is associated with a number of systemic and local diseases. The differential diagnosis includes local conditions such as viral, fungal, and bacterial infection, burns, trauma, neoplasm, allergy, vesiculo-erose or ulcerative diseases and radiation mucositis as well as systemic conditions such as iron deficiency, polycythemia, avitaminosis B, erythroplasia, purpura, angioma, and Kaposi’s sarcoma.1,2

This continuing education course focuses on management of these conditions. In cases where oral erythema is associated with systemic disease, a comprehensive approach to therapy including medical consultation and management should be included in the overall treatment strategy. Treatment of any oral lesion associated with erythema, regardless of local or systemic etiology, should only be approached after a diagnosis has been established.

This course provides a limited description of the diseases capable of causing oral erythema. The course participant is capable of causing oral erythema. The course participant is encouraged to further explore each of the conditions described, including their etiology, epidemiology, signs and symptoms prior to initiating therapeutic options.3-10

As a general rule, the rationale for dental management of oral erythema is to provide relief of symptoms, prevent secondary problems arising from the initial lesion, (e.g., secondary infection, tissue morbidity, dry mouth, dental caries, periodontal disease) and support the patient’s general health if more extensive medical intervention is necessary. Home care should be an integral component of therapy and include the following recommendations: hygiene maintenance, fluid and nutritional support, adequate rest and OTC pain control.11 Medical assessment should be considered when oral erythematous lesions worsen from dental intervention or systemic symptoms develop during the course of treatment.

Local Infection
Viral Infection
Viral conditions such as primary herpetic gingivostomatitis (HSV-1 or 2), recurrent intraoral herpetic simplex, recurrent herpes labialis, primary herpes varicella and herpangina include mucosal erythema coupled with vesicle formation and ulceration.12 There may be regional lymphadenitis, fever and malaise. Viral infections are typically self-limiting, but more serious complications can delay recovery (e.g. herpes simplex encephalitis or viral meningitis). In addition, some infections (e.g. HSV and varicella) may reoccur following reactivation of residual virus, termed latent virus, residing in the sensory ganglion of the trigeminal nerve. In these secondary cases, emerging ulcers and erythema will occur in a well circumscribed area within the dermatome of the affected nerve.13

Reactivation of varicella zoster, which causes chickenpox, is the cause of oral shingles. These lesions develop in approximately 20 percent of infectious cases and sometimes without skin involvement. The older patient with oral shingles is at further risk of developing postherpetic neuralgia or PHN which causes severe persistent pain. When oral shingles is identified the patient should be referred for medical management. Medical treatment is likely to involve antiviral therapy and high dose corticosteroid prophylaxis.14 In the interim, the same topical and analgesic measures described below for the management of primary HSV-1 infection is useful dental intervention.15

Palliative home care
Management of HSV-1 includes assurance, information and caution regarding infectivity. Recommendations include avoiding nail biting to reduce the potential development of a herpetic whitlow and/or touching the oral lesions and then the eye to prevent corneal infection, oral sexual activity that might infect others and supportive care.

Instructions for supportive home care include gargling with cold water or sucking on popsicles. The patient should be advised to avoid hot beverages and spicy, salty or citrus foods as they tend to aggravate pain. The application of a thin paste of baking soda and water helps to shield lesions
and reduces pain. For the patient with severe oral involvement that prevents eating, nutritional supplements can be recommended. Meritene® and Ensure Plus® are protein, vitamin, and mineral food supplements that can be purchased over the counter. They are flavored with acceptable taste and it is recommended that three servings be taken each day with their preparation per package labeling.

**Prescribed medications**

There are a number of topical anesthetics available that can be used alone or compounded with coating agents that effectively reduce pain associated with acute viral disease. When prescribing these formulations the patient should be cautioned regarding potential aspiration as their gag reflex may be reduced by the anesthetic.

Topical anesthetic agents (and prescribing information) include the following:

1. **Diphenhydramine syrup (OTC) or Benadryl® elixir** 12.5 mg/5mLs; Dispense 4 oz bottle; Sig: Rinse with one teaspoonful for two minutes before each meal and spit out.

2. **Diphenhydramine syrup (OTC) 4 oz.** with **Kaopectate® syrup (OTC) 4 oz.** to make a 50% mixture of each by volume (Maalox® – OTC, or sucralfate® suspension can be used instead of the Kaopectate®); Dispense 8 oz.; Sig: Rinse with one teaspoonful every two hours and spit out.

3. **Dyclonine HCL (Dyclone®) 5% or 1%** (One oz. of Dyclone® can be added to the topical mixtures listed above for improved anesthetic efficacy); Dispense one ounce bottle; Sig: Rinse with one teaspoonful before each meal and spit out.

4. **Lidocaine/Prilocaine (EMLA®) 5% cream.** Dispense 30 gm tube; Sig: Apply cream to lesions before each meal.

5. **Benzocaine 20% gel (Ultracare®, Topex®)** Dispense 30 ml bottle; Sig: Apply on a cotton swab to specific lesions for 60 seconds before each meal.

6. **Lidocaine 2% gel.** Dispense 30 ml tube; Sig: Apply the gel to the lesions before each meal.

The syrups, elixirs and suspensions listed above are generally more effective for multiple lesions where coverage needs to extend over a broad area of mucosa. The creams and gels work best as treatment of single or a limited number of lesions confined to a discrete area of mucosa.

Adverse effects from topical anesthetics are rare when these medications are used judiciously. However complications can occur if there is rapid absorption, hypersensitivity or an idiosyncrasy to the prescribed medication. Side effects include central nervous system excitation or depression, cardiovascular manifestations, and allergic reactions (localized or anaphylaxis).

Antiviral medications are not recommended for management of primary herpetic stomatitis because in the immune competent individual the condition is self limiting and the use of antiviral medication potentially increases the risk of resistance. The current FDA recommendation and best practices is that systemic acyclovir or valacyclovir should be used only for the treatment of HSV-1 stomatitis in the immunocompromised patient.

In terms of secondary lesions, treatment guidelines are suggested by the scientific literature. One recent study suggests that frequently occurring secondary (i.e. recurrent) lesions including intra-oral lesions may be suppressed successfully with administration of 500 mg of valacyclovir delivered once a day over four months. Systematic review of 17 randomized controlled studies further suggests that acyclovir is equally efficacious as valacyclovir in treating herpes simplex viral infections.

Recurrent lip lesions precipitated by sun exposure may be prevented by high SPF sunscreen application.

When oral pain of viral origin is moderate to severe, systemic pain medication is also indicated. Acetaminophen 325mg with codeine is helpful in reducing pain. Medication combinations containing aspirin should be avoided in children.

**Fungal Infection**

Candida albicans is the predominant organism that causes fungal oral infection. However, in the immunocompromised individual other candida species may also be involved. Candida albicans is opportunistic and will proliferate when normal oral homeostasis is altered via the use of antibiotics, corticosteroids, cytotoxic drugs and immunosuppression or as a consequence of conditions such as diabetes and xerostomia.

There are several types of fungal conditions including candidiasis (thrush), erythematous candidiasis, median rhomboid glossitis, denture stomatitis and atrophic candidiasis among other fungal diseases.

Erythematous candidiasis is characterized by generalized tissue redness and pain. When localized to the tongue the condition is called median rhomboid glossitis or central papillary atrophy. Denture stomatitis or chronic atrophic candidiasis is a more generalized condition.

In patients with removable prostheses, dental treatment should include not only prescription of medication but also instruction on the disinfection of appliances. Denture soaking solutions coupled with application of an antifungal powder or cream to the contacting surface of the appliance helps to prevent reinfection. As an example, an appliance can be soaked overnight in a one percent chlorhexidine/hypochlorite solution. In the morning this is followed by the application of miconazole denture lacquer prior to its insertion.

In the patient with dry mouth and candidiasis, chewing gum or candy with xylitol is recommended to stimulate daytime salivary flow. Products that improve night (sleep) dryness such as Xylimelts® help to stimulate flow and alter the perception of dryness.
Antifungal medications found to be useful in treating oral candidiasis include nystatin (Mycostatin®), the imidazoles such as clotrimazole and ketoconazole, and triazole agents such as fluconazole.25,26 The following describes dosage considerations for a number of useful antifungal medications. Topical preparations should be taken for 10-14 days.

1. Nystatin oral suspension 500,000 units/tsp (brand names Mycostatin®, Nilstat®, Nystex®); Dispense 240 mls; Sig: 1 tsp tid; rinse for two minutes and swallow.
2. Ketoconazole cream 2% (brand name Nizoral®); Dispense 15 gm tube; Sig: apply to the affected area once daily at bedtime.
3. Clotrimazole vaginal cream 1% (OTC brand names Gyne-Lotrimin®, Mycelex-G®); Dispense one tube; Sig: apply to the denture or partial and the involved oral mucosa four times a day.
4. Clotrimazole troches 10 mg (brand name Mycelex®); Dispense 70 troches; Sig: dissolve one troche in the mouth 5 times a day. Do not chew.
5. Nystatin Pastilles – 200,000u (brand name Mycostatin® pastilles); Dispense 70 pastilles; Sig: dissolve one pastille in the mouth 5 times a day. Do not chew.
6. Miconazole nitrate vaginal cream 2% (OTC – brand name Monistat®); Dispense one tube; Sig: apply to the denture and to the involved oral mucosa four times a day.

Nystatin ointments and powders can be used to treat appliances per the following instructions:
1. Nystatin ointment; dispense 15 gm tube; Sig: apply a thin coat to the denture and affected area after each meal.
2. Nystatin topical powder; dispense 15 gm tube; Sig: apply to dentures/prostheses after each meal and after cleaning the appliance.

Antifungal medication has been associated with allergy and GI problems. Nystatin suspension also contains sugar so if the patient has teeth, good oral hygiene is important to prevent decay; particularly if treatment is extended over a prolonged period of time. A suspension of nystatin can also be used as a disinfectant for a patient’s acrylic prostheses (see above). It should be appreciated that ketoconazole absorption is reduced when antacid medication is taken concurrently. The oral use of vaginal creams (miconazole nitrate vaginal cream or clotrimazole vaginal cream) to treat oral candidiasis remains controversial. However sugar content (in contrast to clotrimazole troches) is minimal in these formulations which may be advantageous in cases involving the need for long-term application. In addition, antifungal troches may not be well tolerated in the patient with dry mouth. Pregnant or breast feeding patients should consult with their physician prior to use of any of these antifungal medications. All of the troches described above provide good contact of drug with the mucosa over time.27,28

Systemic antifungal agents are usually prescribed when topical agents are not effective or are not practical. They are well tolerated but should be used with caution in the patient with impaired liver function. Best practices include pre-treatment liver function testing and monthly reassessment if ketoconazole or itraconazole is to be prescribed over a prolonged period of time.29,30 Chronic fungal infection is typically associated with suppressed immune function and debilitating disease so these patients will usually be under the care of a medical specialist. If systemic antifungals are being considered, consultation with the patient’s physician is imperative. These systemic drugs include: ketoconazole (Nizoral®), fluconazole (Diflucan®), itraconazole (Sporanox®), and amphotericin B (Fungizone®).31,32

Bacterial Infection
Bacterial infection involving the oral mucosa includes streptococcal tonsillitis and pharyngitis; Group A ß-hemolytic streptococci (Scarlet fever), diphtheria, primary syphilis, tuberculosis, and Cancrum Oris (NOMA). Patients with these conditions will likely be under the care of a medical infectious disease specialist; but if they are not, the best ‘treatment’ a dentist can deliver is recognition of the disease and prompt referral to a physician for appropriate follow-up care.

Periodontal disease is the most common erythematous oral disease that is caused by bacteria. A complete review of periodontal disease is beyond the scope of this course. In brief, the classic dental management of periodontal disease includes removal of local factors (e.g., plaque and calculus), diet and behavior modification and surgical intervention. Antibiotic usage has been studied as an adjunct to nonsurgical debridement. The research to date suggests that systemic amoxicillin and metronidazole are effective in reducing the signs and symptoms of periodontal disease.35 Long-term use of antibiotic is discouraged because of potential adverse effects and because of the increased possibility of resistance. The National Institute of Dental and Craniofacial Research and the CDC offer some useful periodontal treatment guidelines on their Web sites.33,34

Other localized infections that can be managed in the dental office include pyogenic granuloma and peripheral giant cell granuloma. These erythematous growths are non-neoplastic. Dental treatment is surgical. If surgery is to be pursued, successful outcome will depend on excising the gingival tissue down to the periosteum. Both of these tumor types often recur and re-excision may be necessary. This is especially true for pyogenic granuloma if removed during pregnancy.

One oral bacterial infection that is best co-managed with the patient’s medical provider is necrotizing stomatitis associated with HIV-infection. Lesions associated with this condition typically respond to topical and systemic glucocorticosteroid therapy coupled with systemic antibiotics.
HIV patients can also develop severe recurring aphthous ulcers. Pain associated with these lesions is best managed with topical steroids or the topical anesthetic medications detailed in the list under viral infections. In some cases recalcitrant deep ulcerative lesions can be effectively medically managed and suppressed with systemic thalidomide.36-38

**Contact Allergy**

This section covers the dental treatment of mucosal erythema caused by contact stomatitis (stomatitis venenata), geographic tongue (areae migrans) and orofacial granulomatosis which also causes tongue or lip swelling. In addition to erythema and swelling, contact allergy may be associated with lichenoid change of the mucosa and ulceration. Mucosal contact allergies usually take a long time to develop and are thought to represent a delayed hypersensitivity reaction. Symptoms of allergy typically include a sensation of mucosal burning, or dysesthesia and pain. There may also be increased salivation.

Many foods, chemicals, medications and metals have been associated with oral allergy. For a list of some of these offending allergens the reader is referred to the articles by Wray and colleagues.39, 40

If an acute mucosal allergy is suspected, the patient should be referred for testing. Sensitivity testing via the RAST (radioallergosorbent) test is typically performed by a medical allergy specialist. If intraoral patch testing is being considered, it should be performed by a dentist familiar with such testing (e.g. Oral Medicine) as there is a risk of false positive results. Solutions with standard percentages of various metals can be obtained in a commercial patch test kit. These metal samples are then combined with orabase and placed against the lip or palatal mucosa via a modified splint. The material is allowed to remain for 24 hours, after which the tissue can be assessed for reactivity.41

Some of the conditions that should be differentiated from mucosal allergy prior to treatment include: candidiasis, leukoplakia, oral lichen planus, autoimmune blistering disease, drug reactivity (e.g. lichenoid drug reaction), viral infection and other oral ulcerative diseases.

Allergic contact stomatitis is best treated by removing the offending sensitizing agent. This can mean replacing a dental material that is the source of the allergy; for example, restorative materials containing nickel, titanium implants or mercury found in amalgam.42-44 If a food is the cause of the allergy the offending agent should be eliminated from the diet.45 If a drug has been identified as the cause of oral erythema the patient should be cautioned regarding continued use; however, he/she should also be advised to seek medical consultation prior to discontinuation of a prescribed drug to avoid potential systemic complications upon withdrawal.

Topical anesthetics such as Dyclonine HCL and corticosteroid such as flucinonide gel or dexamethasone elixir can be used separately or combined with an antihistamine (e.g. OTC Benadryl® 25 mg/ tsp; swish and spit) to help reduce pain and chronic inflammation.

Geographic tongue is considered in this section with contact allergy, even though the etiopathogenesis is unknown. This is because there is limited evidence that the condition might represent a hypersensitivity reaction to an unknown environmental factor in some individuals. Although the condition is typically non-painful and self-limiting, in the patient that has moderate to severe pain, management can be problematic. These patients should be advised to avoid hot or spicy food and to reduce exposure to cigarette smoke and certain toothpastes, including those with whitening chemicals or which are excessively flavored.

At present the treatment of symptomatic geographic tongue is based on empirical evidence rather than randomized controlled trials. Topical anesthetics, antihistamine rinses and corticosteroids such as flucinonide gel applied four times daily can help to reduce symptoms. A recent case study suggests that tacrolimus ointment may also be an effective therapy.46 The results of this particular case study are potentially significant because in a recent systematic review of studies assessing the efficacy of tacrolimus ointment in the treatment of atopic dermatitis it was found that the drug was as effective as corticosteroid in reducing symptoms.47 Antihistamine rinses have also been suggested as treatment.48 Another recent study suggests that refractory painful cases may be responsive to cyclosporine (cyclosporine microemulsion pre-concentrate, 3 mg/kg/day for initial intervention with a reduction to 1.5 mg/kg/day for maintenance).49 Of potential significance, a patient with psoriasis and geographic tongue may see the condition resolve with treatment of the psoriasis skin lesions.

The etiology of orofacial granulomatosis has not been determined and is likely to be complex.50 As the condition may spontaneously remit, treatment is only necessary if there is pain. If food or medication is determined to be causative, it should be eliminated from the diet or use. In chronic cases involving severe cosmetic deformity or impaired oral function, surgical intervention may be necessary. Corticosteroids, including topical application as well as systemic delivery, can be helpful. Intraleisonal cortisone injection is indicated for moderate swelling. The literature also suggests that oral tetracycline, anaerobic antibiotics (e.g. dapsone or metronidazole), and topical tacrolimus may help to reduce swelling. Other drugs that modulate the immune system such as methotrexate and thalidomide have also been reported to be helpful in reducing swelling in severe cases.51

**Aphthous Stomatitis**

Aphthous stomatitis is characterized by the presence of multiple ulcers of the oral mucosa with adjacent tissue erythema. The treatment of aphthous stomatitis remains
largely empirical and includes topical or systemic corticosteroids and/or immunosuppressant drugs.\textsuperscript{52} Aphthous lesions are self limiting and heal without scarring. Isolated ulcers, if small, do not typically need prescribed intervention and can be managed by OTC preparations.

Recurrent severe ulceration requires a more comprehensive work up of the patient to rule out systemic disease. Some of the conditions that should be considered in the differential diagnosis include anemia, diabetes mellitus, PFAPA (periodic fever, aphthous stomatitis, pharyngitis, and adenitis syndrome), Behcet’s disease, inflammatory bowel disease and immunosuppressive disease. Systemic disease necessitates comprehensive medical and dental management.

If dental trauma is the cause of ulceration, this should be corrected. Other causes such as stress and food allergy, if deemed contributory, should be treated via stress reduction or dietary restriction.\textsuperscript{53}

A number of topical OTC strategies for suppressing developed lesions have been studied and found to be effective in reducing lesion duration and pain. However these preparations do not appear to alter the frequency of recurrences or maintain remission. Application of a dissolving gum-based patch containing glycyrrhiza (licorice) complex herbal extract has been found to reduce lesion duration and pain.\textsuperscript{54} A paste containing Myrtus communis (Myrtle) has also demonstrated an effect on lesion size and pain severity.\textsuperscript{55} In a randomized, double-blind, placebo-controlled trial, a mouthwash containing Rosa damascena extract also demonstrated efficacy in the treatment of recurrent aphthous stomatitis.\textsuperscript{56}

Few drugs have been found to reduce the frequency and severity of reoccurring aphthous ulcers, however, two studies assessing this potential show promise. In one study, Irsogladine prescribed at 2-4 mg/day was found to be effective in reducing ulcer count and preventing recurrence.\textsuperscript{57} In a second study, rebamipide was delivered at 300mg/day to 35 patients with Behcet’s disease in a randomized double-blind, placebo-controlled study. It was well tolerated, reduced the aphthous lesion count and improved pain. There were no specific adverse drug reactions.\textsuperscript{58}

Recurrent aphthous stomatitis has been associated with reduced dietary intake of vitamin B12 and folate.\textsuperscript{59} However vitamin B12 as a cause of aphthous stomatitis remains controversial and no effect has been observed for multivitamin intervention.\textsuperscript{60} Nonetheless, vitamin B 12 supplementation has been found to reduce reoccurrence of aphthous lesions, even in the absence of clinical deficiency.\textsuperscript{61, 62} Immunomodulating medications such as the tetracyclines and amlexanox sirolimus, when applied topically, have anti-inflammatory activity that appears to reduce the severity of aphthous ulceration.\textsuperscript{63} Application of a tetracycline solution via cotton swab to a lesion may also reduce secondary infection which can complicate healing and increase pain.

The following list of topical steroids can be used to treat oral ulceration.

1. Triamcinolone (brand – Kenalog in Orabase\textsuperscript{®}); Dosage 0.1\% (provided in one tube).
2. Fluocinonide (brand – Lidex\textsuperscript{®} gel or Lidex\textsuperscript{®} ointment); Dosage 0.05\% (provided in one tube).
3. Clobetasol propionate (brand – Temovate\textsuperscript{®} gel or Temovate\textsuperscript{®} ointment; Dosage 0.05\% (provided in one tube).

All three of these corticosteroid medications should be applied after each meal and at bedtime. Clobetasol propionate should be applied for three or four days with a break of three to four days before reaplication. This approach will reduce potential steroid side effects.

For generalized erythema associated with multiple ulcers an oral rinse may be the best way to achieve effective lesion coverage. Dexamethasone (Decadron\textsuperscript{®} elixir) incorporates 0.5mg per 5 mls of solution and comes in 100 ml volumes. The patient should rinse with one tsp (5 mls) for 3-4 minutes four times a day and spit. For severe cases it may be useful to prescribe 320 mls with 15mls swished with swallowed four times a day for three days followed by 5mls taken in the same manner for three days, then 5 mls used for three days with swish but with swallowing every other day and finally with 5 mls used four times a day as a rinse with expectoration of the medication. With steroid use the patient should be monitored carefully for emergence of candidiasis. With low doses of steroid potential side effects should be minimal. However they can be problematic and include CNS stimulation, sleep disturbance, and gastrointestinal abnormality including ulcer formation and bleeding. Additionally, in the diabetic patient, blood glucose levels should be carefully monitored with long term use.

Recurrent severe debilitating aphthous stomatitis may need to be managed with prednisone delivered systemically at higher doses. A Medrol Dosepak\textsuperscript{®} (methylprednisolone) titrates corticosteroid over a 7 to 10 day period. This option should only be considered by experienced clinicians in cooperation with the patient’s physician. Azathioprine (Imuran\textsuperscript{®}) is a prednisone sparing agent that can be prescribed concomitantly with steroid but if this course of therapy is to be implemented, a baseline CBC and liver enzyme panel should be acquired prior to the start of treatment.\textsuperscript{64} Additional preventative management for candidiasis needs to be utilized.

**Oral Cancer**

Dental involvement in the patient with oral cancer usually involves oral examination and if neoplasm is suspected, biopsy of the tissue. Surgical management of carcinoma is determined by the clinical stage of the disease. Small lesions identified by biopsy such as squamous cell carci-
noma that are without nodal involvement can be surgically excised (best practices is by an oral surgeon or ENT physician) using a wide margin technique. The treatment of large lesions or lesions with nodal involvement is complicated. Hence the patient with extensive involvement needs to be referred so that they can receive comprehensive management by oncology, ENT, and oral (maxillofacial) surgery. Treatment may include radiation and/or chemotherapy and oral reconstruction.

Head and neck cancer radiotherapy and chemotherapy can directly impact the oral mucosa and saliva and result in oral mucositis (OM) which is characterized by ulceration, tissue slough, erythema, and pain. Mucositis can also follow chemotherapeutic intervention for other non-oral cancers. The oral conditions that may develop secondary to treatment of oral as well as other forms of cancer include cheilitis, gingivitis, herpetiform gingivostomatitis, oral mucositis (OM), oral candidiasis, periodontitis, and ulceration. Recent evidence suggests that the incidence of OM will vary depending on the type of chemotherapeutic agent used and the type of cancer treated.

Dental intervention for patients receiving chemotherapeutic agents and radiotherapy includes pre-treatment preventative hygiene measures and restorative care. After lesion development, dental treatment focuses on symptomatic support including pain relief, reducing periodontal disease and caries and treating opportunistic infection. In the hospital setting dental intervention may be more comprehensive and include additional management strategies for mucositis.

For the dentist asked by a treating physician to provide a recommendation about the management of mucositis the following information may be useful. In the treatment of oral mucositis, recent evidence suggests that benzydamine hydrochloride (0.15%) used as an oral rinse, swished for 30 seconds four times a day, may be more effective than chlorhexidine and povidone iodine in preventing the development of severe mucositis.

Results from systematic review of the research literature published prior to 2007 (Cochrane report) suggest that several medications may be more effective in reducing OM than benzydamine HCL, chlorhexidine and the ‘magic’ mouth rinse (lidocaine solution, diphenhydramine hydrochloride and aluminum hydroxide suspension). These include allopurinol, granulocyte macrophage-colony stimulating factor, immunoglobulin, and human placental extract. In fact, based on at least one study, allopurinol appears to eradicate mucositis. The authors of this Cochrane review conclude that the evidence for the use of benzydamine HCL does support its use as adjuvant treatment. Nonetheless, they further conclude that the evidence for the above effective medications (e.g. allopurinol, etc.) is also weak and ‘unreliable’.

A Cochrane review published prior to the 2007 concludes antibiotic pastes or pastilles can also provide a moderate benefit. Hydrolytic enzymes appear to reduce moderate and severe mucositis and ice chips can prevent mucositis. Other interventions with potential effect (based on only one study at the time) include calcium phosphate, honey, oral care protocols, povidone, and zinc sulphate.

In general, a multifocal multi-pharmacy approach is necessary in managing oral mucositis, oral pain, dry mouth and opportunistic infection that can be associated with chemotherapy and radiation treatment.

Topical measures effective in reducing oral pain include 2% viscous lidocaine HCL (Xylocaine®), dyclonine (Dyclone®) and diphenhydramine elixir (Benadryl®, Benalin®). Mouth rinses that may reduce oral discomfort include alkaline saline (salt/bicarbonate), Biotene®, and sucrafate (Carafate®) suspension. Chlorhexidine gluconate mouthwash (Peridex®, Periogard®) at 0.12% may help in reducing gingivitis. In patients with dry mouth a salivary substitute or stimulant should be included to provide the needed protein binding to make it effective. Artificial salivas include Sage Moist Plus®, Moi-Stir® and Xero Lube®. Oral moisturizers include OralBalance® gel and Sage Mouth Moisturizer®. Fluorides should be applied for caries control. These include neutral NaF gel (Thera-Flur-N®) 1.0% which can be applied one drop per tooth or via a custom tray, stannous fluoride gel (0.4%) which should be applied in the same manner. Biotene® toothpaste (OTC), placed on a soft brush that can be made softer by placing it under hot water, can help with plaque control. Antifungal medications previously described will help reduce potential candidiasis.

**Vesiculoerosive or Ulcerative Disease**

**Benign Mucous Membrane Pemphigoid (BMMM)**

Benign mucous membrane pemphigoid (BMMM) is an autoimmune disease that cleaves the epithelium. This then produces fluid filled bullae which rupture and leave the mucosal surface raw and erythematous. The condition can affect the eye, so immediate ophthalmology referral is important once the disease is confirmed by biopsy.

Relatively small BMMM oral lesions can be managed with topical steroids. Severe erosions may require systemic steroids and/or azathioprine coupled with analgesics and antifungal medication. Since these lesions have significant potential for morbidity, referral should be made to oral medicine specialists, ophthalmologists, dermatologists and/or rheumatologists.

**Lichen Planus**

Although the etiology of erosive oral lichen planus (OLP) remains unknown, accumulated evidence points to an autoimmune problem with a genetic predisposition. The condition appears to involve T-cell mediated inflammation of the tongue, palate, buccal mucosa, and gingiva which leads to tissue erythema, hyperkeratosis, and the erosions that char-
acterize the severe form of the disease. There can also be dermal involvement.

Asymptomatic reticular lichen planus that does not involve erosion, erythema or esthetic concern does not need intervention.

The rationale for treatment of erosive OLP includes suppression of oral lesions, pain control and prevention of secondary fungal infection. Research data regarding efficacy suggests that there may not be a considerable difference between current treatment strategies. In a Cochrane review, 28 randomized controlled clinical trials that assessed symptomatic treatments for OLP were reviewed. There was no specific therapeutic approach that stood out above the others as a ‘go to’ approach to intervention.

Topical and systemic steroid application is considered a first-line treatment for erosive OLP. However, as was noted by the authors of the Cochrane review, no randomized controlled trials have compared this medication strategy with placebo.

A number of other medications have been suggested as treatment of erosive LP. Pimecrolimus is one of these drugs. The evidence for use of pimecrolimus, an immunomodulating agent used in the treatment of atopic dermatitis (eczema), consists of three clinical trials that suggest that its use is no better than placebo in reducing pain associated with OLP. Two trials assessing aloe vera suggest that it may reduce pain compared to placebo. In addition, two other small trials suggest that cyclosporine may reduce pain and the clinical signs of OLP. Five trials comparing steroids with calcineurin inhibitors (e.g., pimecrolimus, tacrolimus) suggest no difference between the two in reducing pain. And in 6 trials specifically assessing steroid therapy, there was limited evidence that one steroid worked better than another. Thus, it would appear that there is insufficient evidence to support the effectiveness of any specific treatment as being superior to another in the management of erosive OLP. Given this, a prudent approach to management would be to start with a minimal application of the lowest dose topical steroid before prescribing stronger acting drugs.

One of the more challenging problems in treating OLP is that the condition can be refractory to topical steroids and systemic therapy may be necessary to fully control the disease. As noted by Lozada-Nur and Miranda (1997), no one single standard protocol has been proven effective in treating chronic OLP and consequently, the most effective therapy is topical high-potency corticosteroids coupled with systemic steroid (prednisone).

The use of a specific topical steroid preparation is based on lesion size. For isolated lesions, fluocinonide (Lidex®) gel or ointment can be applied after each meal and at bedtime. If clobetasol (Temovate®) is used, it should be prescribed as previously described to prevent potential adrenal suppression. If OLP lesions are extensive, dexamethasone (Decadron®) elixir may be more effective in providing complete lesion coverage. One teaspoonful (5 mls) should be used to rinse for 3-4 minutes after each meal with the drug spit out. The patient should be monitored for yeast infection and treated accordingly if infection emerges during steroid use.

Topical cyclosporine has shown some promise in limited trials. Topical and systemic retinoids (e.g., tretinoin and etretinate) do not appear to be particularly useful. Alternate-day treatment protocols, low doses, and adjunctive therapy have been suggested by at least one expert if the condition is to be treated long-term.

In a small study, local ultraviolet B phototherapy was found to be effective in treating OLP, suggesting a nonpharmacological approach to the management of the disease. A larger randomized controlled trial is needed, however, before this approach can be recommended for intervention.

Pain medications can include acetaminophen preparations, including codeine (in severe cases) or other narcotics taken short-term.

Bibliography

13. See http://www.medical-library.net/herpes_simplex_


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Questions

1. In cases where oral erythema is associated with systemic disease the dentist should:
   a. Manage the condition without establishing a diagnosis
   b. Prescribe steroids
   c. Seek medical consultation prior to pursuing local management
   d. Perform a biopsy

2. Home care should be an integral component of therapy. Which of the following is not included in the ‘best practices’ recommendations?
   a. Fluid and nutritional support
   b. Adequate rest
   c. OTC pain medication
   d. Vitamin therapy

3. Which one of the following viral infections is associated with localized reoccurrence secondary to reactivation of latent virus within nerve?
   a. Herpes simplex virus (HSV-1 or 2)
   b. Morbillivirus
   c. Human herpes virus 6 (HHV-6)
   d. Cytomegalovirus (CMV)

4. Reactivation of varicella-zoster virus (VZV) causes:
   a. Oral shingles
   b. Postherpetic neuralgia
   c. Both of the above
   d. None of the above

5. In patients with HSV-1 lesions, palliative home care should include all of the following except:
   a. Gargling with cold water
   b. Drinking hot beverages
   c. Avoidance of nail biting
   d. Use of a nutritional supplement

6. Which one of the following is not considered a topical medication that can be used for desensitizing erythematous mucosa?
   a. Dyclonine HCL
   b. Lidocaine/prilocaine cream
   c. Diphencypridine syrup
   d. Vitamin C cream

7. Topical anesthetic syrups are typically prescribed as rinses to be used before each meal and:
   a. Swallowed
   b. Spit out
   c. Both a and b
   d. Neither a or b

8. Which one of the following is not likely to be a side effect of topical anesthetic?
   a. Depression
   b. Cardiovascular problems
   c. CNS excitation
   d. Stomach ulceration

9. Which of these statements is true in relation to the treatment of primary HSV-1 oral viral infection?
   a. Use of an antiviral medication may increase resistance
   b. Systemic acyclovir should only be used as a treatment of HSV-1 stomatitis when the patient has a compromised immune system
   c. Both a and b
   d. Neither a or b

10. Which of these statements is true in relation to the treatment of secondary HSV-1 lesions?
    a. Frequently recurring secondary lesions can be suppressed with 500 mg of valacyclovir
    b. Acyclovir is not as effective as valacyclovir in treating recurrent lesions.
    c. Both a and b
    d. Neither a or b

11. In the patient with a competent immune system which of the following fungal organism is most responsible for oral erythema?
    a. Cladosporium
    b. Saccharomyces
    c. Candida albicans
    d. Aureobasidium

12. In the patient with removable prostheses and erythematous candidiasis, overall management should include:
    a. Instruction to soak the appliance overnight in a mouthrinse
    b. Instruction not to use their prostheses during intervention
    c. Instruction to soak the appliance in a one percent chlorhexidine/hypochlorite solution
    d. Instruction to apply an antibiotic denture lacquer prior to insertion

13. Topical antifungal medication should be used for how many days?
    a. 10-14 days
    b. 3-5 days
    c. 14-21 days
    d. 6-9 days

14. The advantage of using an antifungal troche over a rinse is that:
    a. The troche can be swallowed quickly.
    b. A troche such as Mycelex® has no sugar in its formulation.
    c. A troche provides longer contact with the mucosal surface.
    d. A troche can be taken with antacid medication.

15. Systemic antifungal agents are usually prescribed when:
    a. Patients have concomitant liver disease or impaired liver function.
    b. When topical agents are not effective or are not practical.
    c. Both a and b
    d. Neither a or b

16. Which of the following is not a systemic antifungal medication?
    a. Diflucan
    b. Sporanox
    c. Fungizone
    d. Monistat

17. The most common erythematous oral disease caused by bacteria is:
    a. Streptococcal tonsillitis and pharyngitis
    b. Periodontal disease
    c. Diphtheria
    d. Tuberculosis

18. The standard dental treatment of pyogenic granuloma and peripheral giant cell granuloma is:
    a. Prescription of systemic antibiotics
    b. Surgery
    c. Both a and b
    d. Neither a or b

19. Which of the following is not considered a reasonable treatment of a symptomatic allergic stomatitis that is associated with oral mucosal erythema?
    a. Prescription of systemic antibiotic
    b. Removal of dental fillings or crowns
    c. An elimination diet
    d. Prescription of Dyclonine HCL and corticosteroid troches

20. Which of the following has been recommended for the treatment of symptomatic geographic tongue?
    a. Tacrolimus ointment
    b. Cyclosporine microemulsion
    c. Both a and b
    d. Neither a or b

Notes
Management of Erythematous Oral Lesions

COURSE CREDITS/COST

INSTRUCTIONS

ANSWER SHEET

Requirements for successful completion of the course and to obtain dental continuing education credits: 1) Read the entire course. 2) Complete all information above. 3) Complete answer sheets in either pen or pencil. 4) Mark only one answer for each question. 5) A score of 70% on this test will earn you 2 CE credits. 6) Complete the Course Evaluation below. 7) Make check payable to PennWell Corp. For Questions Call 216.398.7822

Educational Objectives

1. Describe interventions used to manage erythematous oral lesions.
2. Identify the appropriate medication for managing oral lesions causing erythema.
3. Implement treatment strategies for managing a variety of oral infections and conditions.
4. Identify interventions that constitute palliative home care.

Course Evaluation

1. Were the individual course objectives met? Objective #1: Yes No Objective #3: Yes No
   Objective #2: Yes No Objective #4: Yes No
   Please evaluate this course by responding to the following statements, using a scale of Excellent = 5 to Poor = 0.
   2. To what extent were the course objectives accomplished overall? S 4 3 2 1 0
   3. Please rate your personal mastery of the course objectives. S 4 3 2 1 0
   4. How would you rate the objectives and educational methods? S 4 3 2 1 0
   5. How do you rate the author's grasp of the topic? S 4 3 2 1 0
   6. Please rate the instructor's effectiveness. S 4 3 2 1 0
   7. Was the overall administration of the course effective? S 4 3 2 1 0
   8. Please rate the usefulness and clinical applicability of this course. S 4 3 2 1 0
   9. Please rate the usefulness of the supplemental webography. S 4 3 2 1 0
   10. Do you feel that the references were adequate? Yes No
   11. Would you participate in a similar program on a different topic? Yes No
   12. If any of the continuing education questions were unclear or ambiguous, please list them.
   13. Was there any subject matter you found confusing? Please describe.
   14. How long did it take you to complete this course?
   15. What additional continuing dental education topics would you like to see?

PLEASE PHOTOCOPY ANSWER SHEET FOR ADDITIONAL PARTICIPANTS.

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