Ontario Health
Cancer Care Ontario

Symptom Management Algorithm

Oral Fungal Infections

In Adults with Cancer

About the Oral Fungal Infections Algorithm

- The purpose of this algorithm is to outline the best clinical practice for pharmacological interventions of oral fungal infections. The patient must be properly diagnosed through conventional testing, including but not limited to: exam findings, visual exam, culture and sensitivity from oral swabs, blood cultures, X-rays, and biopsies as indicated
- This algorithm does not negate the need for consultation with the prescriber, dental provider, infectious disease specialist and/or pharmacist

Considerations for All Patients

- Good oral care is important to prevent and decrease oral complications, to maintain normal function of the oral tissues, to maintain comfort, and to reduce the risk of local and systemic infection. See the basic oral care tables (pages 4 and 5)
- Significant risk factors for the development of oral complications include the type of cancer, type of cancer treatments, cumulative doses of chemotherapy or radiation treatment (current or prior), method of delivery, and duration of treatment
- Predisposing medical, dental, and lifestyle factors such as uncontrolled diabetes, pre-existing autoimmune conditions, polypharmacy, tobacco use, alcohol use, oral hygiene, and dental health may increase severity of oral complications
- Oral complications can significantly affect the patient's morbidity, ability to tolerate treatment, and overall quality of life
- Rigorous assessment, diagnosis and early intervention are important in preventing and decreasing oral complications; this includes the assessment of nutritional status and adequacy of oral intake
- A large variety of medications may cause oral complications. Consultation with the prescriber, dental provider, and/or pharmacist is recommended
- Some pharmaceuticals may be unaffordable, and alternatives should be offered where possible
- If odontogenic or periodontal infection is suspected, consultation with a oncology team is strongly recommended

Risk Factors, Signs and Symptoms, and Prevention

Risk Factors

- Neutropenia/immunosuppression
- Dry mouth
- Dehydration
- Antibiotic course
- Corticosteroids (topical, inhaled, systemic)
- Tobacco use
- Poor oral hygiene
- Malnutrition
- Denture use

Prevention

Non-Pharmacological

- Follow meticulous oral care, see the basic oral care tables (pages 4 and 5)

Pharmacological—see dosing table (page 3)

- Fluconazole to reduce oral fungal colonization in patients receiving cancer therapy

Signs and Symptoms

- Pseudomembranous candidiasis: white curd like, removable with pressure, erythematous (red) oral mucosa, burning pain, taste changes, foul taste when not eating
- Hyperplastic candidiasis: hyperkeratotic white patch, cannot be removed with wiping
- Erythematous candidiasis: denuded (bald) and intensely erythematous oral mucosa, burning sensation, pain, and taste changes
- Angular cheilitis: erythema (rash), fissuring and crusting of the commissure (corner of mouth)
- Median rhomboid glossitis, mid-dorsum depapillated tongue with possible 'kissing' contact lesion on the hard palate

Figure 1: Pseudomembranous oral candidiasis 1

Figure 2: Pseudomembranous oral candidiasis 2

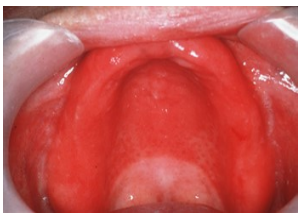

Figure 3: Erythematous oral candidiasis

Figure 4: Hyperplastic candidiasis

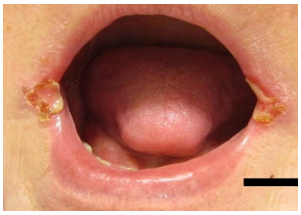

Figure 6: Angular cheilitis

Figure 5: Coated tongue, suspected oral candidiasis overgrowth

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Management

Pharmacological—See dosing table below for details

- Chlorohexidine can be complimentary to systemic or topical therapy, with the exception of patients on active head and neck radiation therapy. See the basic oral care tables (pages 4 and 5)

- Topical agents are preferable to systemic agents for managing mild intraoral fungal infections, due to lower risk of side effects and drug interactions.
- If topical agents are not well tolerated, or the response rate is poor, use systemic agents
- Consider antifungal prophylaxis with antimicrobial therapy if patient is at risk of oral candidiasis

- Mild oropharyngeal candidiasis: clotrimazole or nystatin suspension may be used as first line treatment

- Moderate to severe oropharyngeal candidiasis: systemic fluconazole may be used as first line treatment*
- Patients with acute or chronic renal impairment may need reductions of fluconazole or topical therapy

- For fluconazole refractory disease, itraconazole or posaconazole are recommended

- For ongoing refractory cases, voriconazole and amphotericin-B may be used.

Follow-Up and Ongoing Monitoring

- Seek dental care in addition to prescribing medication. For ongoing infections not responding to prescribed treatment, request the assistance of an infectious disease specialist or consider a swab for culture and sensitivity, if feasible

Antimicrobial Stewardship and Opioid Use

Antimicrobial Stewardship

- Antimicrobial stewardship is the appropriate use of antimicrobials to optimize clinical outcomes, combat resistant infections, avoid adverse drug events, and minimize costs. It means that patients get the right antibiotic, only when needed and for only as long as needed

- Visit Choosing Wisely Canada and The Canadian Association for Hospital Dentists for best practices of antimicrobial stewardship

Pharmacological Dosing Table for Management of Oral Fungal Infections

Rx	Dispense	Dose and Route
Fluconazole 100mg	15 tablets	• Take 2 tablets (200mg) initially with a meal, then 1 tablet a day with a meal until finished • LU Code: 203
Fluconazole 400mg		• 400mg by mouth, daily for hematopoietic stem cell transplantation (HSCT) fungal prophylaxis • For autologous HSCT patients: fluconazole stops with engraftment • For allogenic HSCT patients: continue fluconazole for several months
Nystatin suspension 100,000 units/mL	250mL	• Swish 5 to 10mL in mouth for 30 seconds and swallow four times a day for 14 days • For patients with dentures: soak dentures in denture bath with solution and rinse
Ketaconazole 2% cream	30g	• Apply to corner of mouth 7 to 14 times a day

*Extended use of antimicrobials may cause secondary oral candidiasis, an adjuvant antifungal therapy should be considered

Basic Oral Care Tables

Flossing

Basic	• Patients who have not flossed routinely before cancer treatment should not begin flossing at this time • Patients with mouth cancers, trismus, dysphagia, and/or dysgeusia may not be able to floss; use of interproximal brushes can replace flossing • Floss at least once daily • Waxed floss may be easier to use and minimize trauma to the gums
Intensified	• Continue with basic plan until discomfort becomes too great
End of Life	• Discontinue flossing if patient chooses

Discontinue flossing if:
- Gums bleed for longer than two minutes

Restart flossing if:
- Platelet count is >20x10^9 cells/L, or as instructed by cancer care team

Brushing

Basic	• Use a small, ultra-soft-headed, rounded-end, bristle toothbrush (an ultrasonic toothbrush, may be acceptable) • Rinse toothbrush in hot water to soften the brush before using • Use a prescription strength fluoride toothpaste. Spit out the foam but do not rinse mouth • Use a fluoridated toothpaste and re-mineralizing toothpaste containing calcium and phosphate • Brush tongue gently from back to front, using a sweeping motion • Rinse brush after use in hot water and allow to air dry • Change toothbrush when bristles are not standing up straight • Brush within 30 minutes after eating and before bed. Ensure the gingival portion of the tooth and periodontal sulcus (where the tooth and gums meet) are included • Consider topical anesthetics (e.g. viscous lidocaine 2% or viscous xylocaine 2%, 2-5 mL) before brushing and eating to minimize pain • With continuous pain, a regularly prescribed oral analgesic allows for more thorough tooth brushing
Intensified	• Encourage patient to continue brushing through treatment phase even when it causes discomfort • If bleeding occurs, encourage gentler brushing • Use a non-flavoured, non-alcoholic chlorhexidine gluconate (CHX) 0.12% rinse to aid in plaque control, 2 times a day after meals • If unable to continue brushing with a toothbrush, use a moist gauze or foam swab • Discontinue use of toothpaste if it is too astringent and dip toothbrush in bland rinse • If there has been an oral infection, use a new toothbrush after infection has resolved • If unable to tolerate brushing, seek assistance from nursing or dental staff
End of Life	• Continue with basic and intensified mouth care plan, if possible • Instead of moist gauze may use a foam brush soaked in CHX

Discontinue brushing if:
- Gums bleed for longer than two minutes

Restart brushing if:
- Platelet count is >20x10^9 cells/L, or as instructed by cancer care team

Bland rinse:
- 1 teaspoon salt, 1 teaspoon baking soda, 4 cups of water

Lidocaine alternative:
- Dyclonine 0.5 or 1% rinse (5 mL every 6 to 8 hours, swish and swallow) as needed for pain

Patients with head and neck cancers:
- Brushing may not be appropriate in the area of tumour involvement
- Consult with a dentist
- Patients should be assessed for the use of daily fluoride tray

Patients with dentures:
- Remove dentures, plates and prostheses before brushing
- Brush and rinse dentures after meals and at bedtime
- Remove from mouth nightly (at least 8 hours per 24 hours) and soak in bland rinse
- Leave dentures out as much as possible during radiation therapy
- Patients who have had head and neck surgery should not wear dentures post-surgery unless assessed by a dental specialist or head and neck surgeon, to prevent

Rinsing

Basic	• Rinse the oral cavity with a bland rinse vigorously, at least twice a day to maintain mouth moisture, remove the remaining debris and toothpaste, and reduce the accumulation of plaque and infection • Use a bland rinse to increase oral clearance for oral hygiene maintenance and improved patient comfort. • Following emesis, rinse with bland rinse immediately to neutralize the mouth • If allergic to lidocaine, dyclonine 0.5 or 1% rinse (5 mL every 6 to 8 hours, swish and swallow) may be used as needed for pain
Intensified	• Rinse in place of brushing if patient is unable to brush • Seek dental care where possible for removing plaque • In addition to rinsing twice a day, encourage rinsing every 1 to 2 hours while awake and every 4 hours through the night if awake, to minimize complications of decreased saliva • If unable to clean using moist gauze, or foam swab, consider rinsing via syringe if platelet count >20x10^9 cells/L
End of Life	• Continue with basic and intensified mouth care plan • Consider sialagogues in instances of dry mouth for pharmacotherapy relief (pilocarpine, and anethole trithione)

Patients with dentures:
- After removing dentures, rinse mouth thoroughly with rinse solution
- Brush and rinse dentures after meals and at bedtime
- Rinse with rinsing solution before placing in mouth
- Remove from mouth nightly (at least 8 hours per 24 hours) and soak in rinsing solution

Bland rinse:
- 1 teaspoon salt, 1 teaspoon baking soda, 4 cups of water

Avoid:
- Club soda due to the presence of carbonic acids
- Commercial mouthwashes with hydroalcoholic base or astringent properties

Moisturizing the Oral Cavity

Basic	• Moisturize the mouth with water, artificial saliva products, or other water soluble lubricants • Apply lubricant after each cleaning, at bedtime, and as needed. Water-based lubricant needs to be applied more frequently • Frequent rinsing as needed with basic mouth rinse • Patients may suck on xylitol lozenges (up to 6 grams a day), xylitol containing popsicles, or xylitol containing gum
Intensified	• Continue with basic mouth care plan with increased frequency and intensity • Increase frequency of bland mouth rinse to every hour
End of Life	• Continue with basic mouth care plan with increased frequency and intensity, as needed • Use a steam vaporizer at night • May use a cool mist humidifier at night, but use should be weighed against the risk for fungal infection

Avoid:
- Glycerin or lemon-glycerin swabs as they dry the mouth
- Acidic or minty mouth products, if they burn

Lip Care

Basic	• To keep lips moist and avoid chapping and cracking, use water soluble lubricants, lanolin (wax-based), or oil based lubricants (mineral oil, cocoa butter) • Water soluble lubricants should be used inside and outside the mouth, and may also be used with oxygen (e.g. products compounded with Glaxal base or Derma base) • Apply lubricant after each cleaning, at bedtime, and as needed. Water-based lubricants need to be applied more frequently
Intensified	• Continue with basic mouth care plan with increased frequency and intensity
End of Life	• Continue with basic mouth care plan with increased frequency and intensity, as needed • May use a cool mist humidifier at night, but use should be weighed against the risk for fungal infection

Avoid:
- Touching any lip lesions
- Oil based lubricants on the inside of the mouth
- Petroleum based products

Miscellaneous

Basic	• Dental evaluation and treatment as indicated prior to cancer therapy is desirable to reduce risk for local and systemic infections from odontogenic sources for hematologic, solid or head and neck cancers
Intensified	• Continue with basic mouth care plan with increased frequency and intensity
End of Life	• Continue with basic mouth care plan with increased frequency and intensity, as needed

References

1. Sambunjak D, Nickerson JW, Poklepovic T, Johnson TM, Imai P, Tugwell P, Worthington HV (2011) Flossing for the management of periodontal diseases and dental caries in adults. Cochrane Database Syst Rev 12, CD008829. doi:10. 1002/14651858.CD008829.pub2
2. de Souza RF, de Freitas Oliveira Paranhos H, Lovato da Silva CH, Abu-Naba'a L, Fedorowicz Z, Gurgan CA (2009) Interventions for cleaning dentures in adults. Cochrane Database Syst Rev 4, CD007395. doi:10.1002/14651858.CD007395.pub2
3. Glenny AM, Gibson F, Auld E, Coulson S, Clarkson JE, Craig JV, Eden OB, Khalid T, Worthington HV, Pizer B (2010) The develop- ment of evidence-based guidelines on mouth care for children, teen- agers and young adults treated for cancer. Eur J Cancer 46(8):1399– 1412. doi:10.1016/j.ejca.2010.01.023
4. Elad S, Cheng KKF, Lalla RV, et al. MASCC/ISOO clinical practice guidelines for the management of mucositis secondary to cancer therapy. Cancer. 2020 Oct;126(19):4423-4431. DOI: 10.1002/cncr.33100.
5. Funk CS, Warmling CM, Baldisserotto J. A randomized clinical trial to evaluate the impact of a dental care program in the quality of life of head and neck cancer patients. Clin Oral Investig. 2014 May;18(4):1213-1219. doi: 10.1007/s00784-013-1068-2. Epub 2013 Aug 30. PMID: 23989505
6. Lalla, R.V., Latortue, M.C., Hong, C.H. et al. A systematic review of oral fungal infections in patients receiving cancer therapy. Support Care Cancer 18, 985–992 (2010). https://doi.org/10.1007/s00520-010-0892-z
7. Elad, S., Ranna, V., Ariyawardana, A. et al. A systematic review of oral herpetic viral infections in cancer patients: commonly used outcome measures and interventions. Support Care Cancer (2017) 25:687–700. DOI 10.1007/s00520-016-3477-7
8. Funk CS, Warmling CM, Baldisserotto J. A randomized clinical trial to evaluate the impact of a dental care program in the quality of life of head and neck cancer patients. Clin Oral Investig. 2014 May;18(4):1213-1219. doi: 10.1007/s00784-013-1068-2. Epub 2013 Aug 30. PMID: 23989505
9. Roldan, C., Chai, T., Erian, J., & Welker, J. (2018). Oral pain associated with cancer therapy, a pain medicine perspective. Pain Management, 8 (6), 487-493. https://doi.org/10.2217/pmt-2018-0036
10. Joel B Epstein, Christine Miaskowski, Oral Pain in the Cancer Patient, JNCI Monographs, Volume 2019, Issue 53, August 2019, lgz003, https://doi.org/10.1093/jncimonographs/lgz003
11. Gibson, R.J., Keefe, D.M.K., Lalla, R.V. et al. Systematic review of agents for the management of gastrointestinal mucositis in cancer patients. Support Care Cancer 21, 313–326 (2013). https://doi.org/10.1007/s00520-012-1644-z
12. Kyllo, R. L., & Anadkat, M. J. (2014). Dermatologic adverse events to chemotherapeutic agents, Part 1: Cytotoxic agents, epidermal growth factor inhibitors, multikinase inhibitors, and proteasome inhibitors. Seminars in Cutaneous Medicine and Surgery, 33(1), 28-39. https://doi.org/10.12788/j.sder.0060
13. Macdonald JB, Macdonald B, Golitz LE, LoRusso P, Sekulic A. Cutaneous adverse effects of targeted therapies: Part II: Inhibitors of intracellular molecular signaling pathways. Journal of the American Academy of Dermatology. 2015 Feb;72(2):221-36; quiz 237-8. DOI: 10.1016/j.jaad.2014.07.033.
14. Radvansky LJ, Pace MB, Siddiqui A. Prevention and management of radiation-induced dermatitis, mucositis, and xerostomia. Am J Health Syst Pharm. 2013 Jun 15;70(12):1025-32. doi: 10.2146/ajhp120467. PMID: 23719879.
15. Robert C, Sibaud V, Mateus C, Cherpelis BS. Advances in the management of cutaneous toxicities of targeted therapies. Seminars in Oncology. 2012 Apr;39(2):227-240. DOI: 10.1053/j.seminoncol.2012.01.009.

Disclaimer

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