PEDIATRIC AND ADOLESCENT CARE

CHAPTER 16 – SKIN

First Nations and Inuit Health Branch (FNIHB) Clinical Practice Guidelines for Nurses in Primary Care.
The content of this chapter was revised in December 2017.

Table of Contents

ASSESSMENT OF THE INTEGUMENTARY SYSTEM

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEMS

The following characteristics of the skin lesions should be elicited and explored:

- Onset (sudden or gradual)
- Skin site(s) involved, site of onset
- Pruritus or pain
- Chronology, evolution of skin lesions
- Date(s) and site(s) of recurrence(s)
- Current situation (improving or deteriorating)
- Nature of symptom: intermittent or continuous
- Potential causative factors (relationship to season, heat, cold, sun, exercise, recent travel, medication)
- Measures taken to relieve symptoms, previous treatment
- Associated systemic symptoms (for example, fever, anorexia, myalgia)

CARDINAL SYMPTOMS

In addition to the general characteristics outlined above, additional characteristics of specific symptoms should be elicited, as described below.

- Changes in texture or colour
- Unusual dryness or moisture
- Itching, burning, pain, numbness
- Rash
- Bruises, petechiae
- Changes in pigmentation
- Lesions, blisters, crust
- Changes in moles or birthmarks

Hair

- Changes in amount, texture, distribution

Nails

- Changes in texture, structure, colour

MEDICAL HISTORY (Specific to Integumentary System)

- Allergic manifestation (for example, asthma, hay fever, urticarial, eczema)
- Recent or current viral or bacterial illness
- Allergies to drugs, foods, other chemical substances
- Photosensitivity
- Medications (current and past prescription and over-the-counter drugs, including antibiotics, steroid creams)
- Immunosuppression from health condition or medication use (for example, HIV/AIDS or glucocorticoids)
- Seborrheic dermatitis

- Psoriasis
- Diabetes mellitus

FAMILY HISTORY (Specific to Integumentary System)

- Allergies (for example, seasonal, to food)
- Asthma
- Psoriasis
- Seborrheic dermatitis
- Others at home with skin condition(s) (for example, rash)

PERSONAL AND SOCIAL HISTORY (Specific to Integumentary System)

- Obesity
- Inadequate personal hygiene
- Hot or humid environment, poor environmental sanitation
- Exposure to new chemicals (for example, soaps), foods, pets, plants
- Emotional disturbance
- History of sensitive skin
- Others at home, work or school with similar symptoms
- Travel history

PHYSICAL EXAMINATION

- Apparent state of health
- Appearance of comfort or distress
- Colour (for example, flushed, pale)
- Nutritional status (obese or emaciated)
- State of hydration
- Match between appearance and stated age
- Vital signs (temperature may be elevated)

Inspection and Palpation of the Skin

- Colour
- Temperature, texture, turgor
- Dryness or moisture
- Scaling
- Pigmentation
- Vascularity (erythema, abnormal veins)
- Bruises, petechiae
- Edema (dependent, facial)
- Induration
- Blanching
- Individual lesions (colour, type, shape, texture, , pattern of distribution, character of edge [whether raised or flat])
- Hair (amount, texture, distribution)
- Nails (shape, texture, discoloration, grooving, pitting)
- Mucous membranes (moisture, lesions)
- Flexural folds

Other Aspects

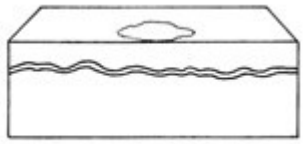
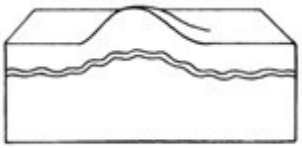
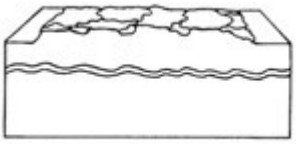
- Examine lymph nodes
- Examine area distal to enlarged lymph nodes

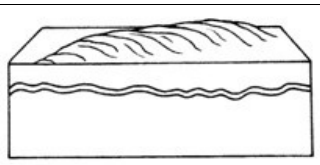
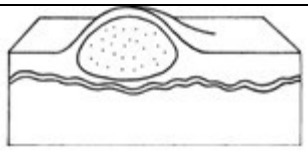
Describing Skin Lesions[1]

Lesions of the skin and mucous membranes are recognized by:

- Type of lesion (see Table 1: Major type of skin lesions)
- Colour
- Margination (ill- or well-defined)
- Shape (round, oval, annular, umbilicated…)
- Palpation:
  - consistency (soft, firm, hard, fluctuant, board like)
  - temperature on palpation (hot, cold)
  - mobility (note tenderness and depth of the lesion)
- Number
- Arrangement on the skin (grouped or disseminated)
- Distribution:
  - extent (for example, isolated, localized, generalized)
  - pattern (for example, symmetric, exposed areas, pressure points or random)

Major Types of Skin Lesions[1]

Type of lesions		Characteristics
Macule		Circumcised area of change in skin color without elevation or depression. (for example, freckle, mole, port-wine stain)
Papule		A solid, elevated lesion < 0.5 cm in diameter (for example, wart, pigmented mole)
Plaque/Patch		A plaque is a well-defined plateau-like elevation that occupies a relatively large surface compared to its height above the skin (for example eczema, psoriasis) A patch is a barely elevated plaque (lesion fitting between a macule and a plaque)
Nodule		Palpable, solid lesion that is larger than a papule (> 0.5 cm). The depth of involvement (epidermis, dermis or subcutaneous tissue) and the size differentiate a nodule from a papule. (for example: acne, small lipoma, fibroma)

Wheal		Transient, irregularly shaped, elevated, rapidly changing lesion caused by local edema (for example, allergic reaction to a drug, a bite, sunlight)
Vesicle/Bulla/Pustule		Fluid-filled, superficial, elevated lesion Vesicle : <0.5 cm, contains clear fluid. Bulla: >0.5 cm, contains clear fluid Pustule: contains purulent exudate (for example: contact dermatitis, herpes simplex, chicken pox lesion)

Other types of skin lesions[1]

Crust	Dry purulent exudate, serum or blood at the surface of the skin
Scales	Flakes of the outer layer of the epidermis
Erosion	Red, sharply defined loss of the epidermis
Ulcer	Loss of epidermis and at least part of the dermis; may go deeper depending on grade of ulcer
Scar	Fibrous tissue that replaces normal skin following a previous ulcer or wound
Atrophy	Thinning or depression of the skin
Cyst	Cavity filled lesion containing fluid, semi-solid or solid material.

[1]Wolff K, A, Johnson RS, Saavedra AP. Fitzpatrick's color atlas and synopsis of clinical dermatology. 7th ed. McGraw-Hill; 2013

COMMON PROBLEMS OF THE SKIN

ACNE VULGARIS

OVERVIEW

Please refer to provincial/territorial guidelines for Acne Vulgaris where available.

Acne vulgaris (acne) is a common, chronic, polymorphic, inflammatory skin condition that most often affects the face.[1] It is prevalent among those aged 12 to 24 years and may persist beyond young adulthood despite treatment.[2]

Acne can be divided into categories based on severity, from mild comedonal acne with or without inflammatory lesions, to aggressive fulminate disease with deep-seated inflammation.[1] Pathogenesis varies by age, and this clinical practice guideline will focus on pre-adolescent and adolescent acne. For an overview of neonatal, infantile, and mid-childhood acne, see *Appendix, Section A*.

Note: Acne vulgaris may be associated with emotional, psychosocial and psychiatric side effects, including depression and suicidal ideation. Suicidal thoughts and actions have also been reported during isotretinoin use. For more information, see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines - Chapter 19 – Adolescent Health – Depression* and *Suicidal Behaviour*.

CAUSES[3]

Four main factors lead to the formation of acne lesions:

- Increased sebum production by sebaceous glands due to increased androgens
- Hyperkeratinization of the follicle leading to a microcomedo that eventually enlarges into a comedo
- Colonization of the follicle by *Propionibacterium acnes* (*P. acnes*)
- An inflammatory reaction

ASSESSMENT

Medication review: Review current medications, including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[4; 5]

- Family history
- Hormonal changes (including medications)
- Environmental factors such as contact with greasy or oily substances
- Friction or pressure on the skin (e.g., cellphones, helmets, backpacks)
- Stress (does not cause acne but may make it worse)

HISTORY OF PRESENT ILLNESS[2; 4; 6]

Review risk factors and collect history of present illness.

– Obtain previous treatment history, including previous response to a specific first-line regimen.

– Determine if client is taking any medications/agents known to cause/aggravate acne.

– Assess for the pain that may be associated with severe acne.

– Ask pre-adolescents about signs of pubertal maturation since acne in this age group may be the first indicator.

Quality of Life Screening[7; 8]

– Acne severity as assessed by clinical observation may not indicate its psychosocial, emotional, or psychiatric impact.

– An acne quality of life questionnaire can assess acne severity from the client's perspective as it assesses symptoms, self-perception, and emotional and social impact.

– The Acne-Q4 and the Cardiff Acne Disability Index (CADI) are short questionnaires that give clients a means to express the impact of their acne on psychosocial domains that are otherwise not apparent. For more information, see *Table 2, Acne Quality of Life Questionnaires* in *Appendix, Section A.*

PHYSICAL FINDINGS

Perform a physical examination using the IPPA approach, with a focus on the skin. The type and location of lesions, scarring, and post-inflammatory pigmentary changes should be noted.

Adolescent Acne (12 to 19 years or after menarche in girls)[2; 4; 7; 9]

– Acne usually appears on the face and neck, but it can also appear on the shoulders, back and arms.

– The clinical presentation of acne varies from primarily comedonal to mixed comedonal and inflammatory acne.

– Acne can be categorized based on severity into the following categories:

  - Comedonal acne consisting of small white papules (closed comedones) or grey-white papules (open comedones, also known as blackheads)
  - Mild-to-moderate papulopustular acne, characterized by inflammatory lesions that are mostly superficial, including papules and pustules (5 mm or less in diameter)
  - Severe acne consisting of deep pustules or nodules (deep and more than 5 mm diameter) that may extend over large areas and can lead to tissue destruction

– Females with suspected hyperandrogenism may also have the following signs:

  - Hirsutism, androgenetic alopecia, central obesity and/or acanthosis nigricans, clitoromegaly, irregular menses, and voice deepening

Pre-adolescent Acne (7 to 12 years or menarche in girls)[6]

– Pre-adolescent acne is characterized by a predominance of comedones on the forehead and central face (the 'T-zone') with relatively few inflammatory lesions.

  - Early presentation may include comedones of the ear.

– Polycystic ovary syndrome or another endocrinologic abnormality may be considered when the acne is unusually severe, accompanied by signs of excess androgens, or is unresponsive to treatment.

DIFFERENTIAL DIAGNOSIS

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

TABLE 1
Differential Diagnosis of Acne Vulgaris[3; 7]

DIFFERENTIAL DIAGNOSIS	DISTINGUISHING FEATURES
Bacterial folliculitis	Abrupt eruption; spreads with scratching or shaving; variable distribution
Hidradenitis suppurativa	Double comedo; starts as a painful boil; sinus tracts
Miliara	Heat rash in response to exertion or heat exposure; non-follicular papules, pustules and vesicles
Perioral dermatitis	Papules and pustules confined to the chin and nasolabial folds
Pseudofolliculitis barbae	Affects curly-haired persons who regularly shave closely
Rosacea	Erythema and telangiectasias; no comedones
Seborrheic dermatitis	Greasy scales and yellow-red coalescing macules or papules
Acne cosmetica and pomade acne (acne variants)	Develop due to application of occlusive cosmetics, skincare products, and hair styling products – present abruptly with extensive monomorphous comedones
Acne associated with specific syndromes (acne variants)	Synovitis, acne, pustulosis, hyperostosis and osteitis (SAPHO) syndrome Sterile pyogenic arthritis, pyoderma gangrenosum, and acne (PAPA) syndrome
Drug-induced acne	Abrupt onset of monomorphous inflammatory papules and pustules on the face, neck, and torso; typically occurs with use of corticosteroids, androgens, lithium, epidermal growth factor receptor (EGFR) inhibitors, and other tyrosine kinase inhibitors

COMPLICATIONS[6; 8; 9]

- Scarring
- Post-inflammatory hyperpigmentation
- Psychological impacts, including:
  - Feelings of low self-esteem
  - Poor body image
  - Embarrassment
  - Frustration
  - Depression (for more information, see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 19 – Adolescent Health – Depression*)
  - Suicidal ideation (for more information, see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 19 – Adolescent Health – Suicidal Behaviour)*

DIAGNOSTIC TESTS

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability. In most cases, no investigation is required.[4; 7]

Laboratory

Testing should be carried out as per provincial/territorial policies and procedures. The tests below are for consideration.

- Pus or wound exudate swab for culture and sensitivity (C+S) if the acne diagnosis is in doubt.[7]
- If hyperandrogenism is suspected from the history or physical examination of a female with acne, further testing is appropriate (e.g., total and free testosterone or free androgen index, dehydroepiandrosterone (DHEAS), androstenedione, 17-hydroxyprogesterone, sensitive thyroid stimulating hormone (sTSH), prolactin).[7]

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT[7]

- Successfully manage active acne.
- Prevent complications (e.g., scarring, pigmentation changes, and psychosocial impact).

NON-PHARMACOLOGICAL INTERVENTIONS

Interventions

Establish trust and a therapeutic rapport by encouraging clients to talk about the impact of acne on their lives and discuss their values and preferences in treatment.

Client Education

- Provide client/family/caregiver(s) with counseling, including addressing their concerns about treatment, dispelling myths, providing instructions for proper use of medications, and timely follow-up to gauge progress.
- Give the client/family/caregiver(s) realistic expectations about timelines for improvement.[2]
    - Improvement in acne is dependent upon prevention and resolution of acne papules, pustules, and nodules.
    - It usually requires at least 2 to 3 months of consistent adherence to a therapeutic regimen to determine whether a treatment is ineffective and whether adjustments are needed.
- Provide the client with the following general skin care recommendations:[10]
    - Apply a gentle synthetic detergent cleanser (e.g., Cetaphil) with the fingers and rinse with warm (not hot) water twice daily.
    - Avoid use of harsh cleansers, scrubs, and astringents.
    - Avoid aggressively scrubbing the skin; massaging gently with the fingertips is sufficient.
    - Use non-comedogenic skin care and cosmetic products.
    - Avoid excessive sun exposure and use a broad-spectrum sunscreen rated at least SPF 30.
    - Do not pick the acne lesions as this may exacerbate scarring.
    - Treatment of acne scars should not be attempted until the acne is completely inactive.
- Counsel client/family/caregiver(s) about appropriate use of medications; dose, frequency, importance of adherence, potential side effects and interactions

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

- Deciding on the appropriate course of treatment requires a comprehensive assessment:[8; 11]
    - Clinical type and severity of acne
    - Skin type (e.g., dry, oily), which influences the choice of topical drug vehicle (e.g., cream, gel)
    - Presence of acne scarring (indicates need to consider more aggressive acne therapy and treatments for scarring)
    - Presence of post-inflammatory hyperpigmentation (indicates need to consider therapies for hyperpigmentation as well as the need to resolve and prevent inflammatory acne lesions)

- Menstrual cycle history and history of signs of hyperandrogenism in females (identifies need to consider laboratory workup and hormonal therapies)
- Current skin care regimen and acne treatment history to identify successful and previous unsuccessful treatments and to identify skin care practices that should be adjusted or discontinued during acne therapy (risk factors for poor treatment adherence: young age, smoking and excessive alcohol use)
- History of acne-promoting cosmetic products and medications (identifies potential for improvement with discontinuation of topical cosmetic products [acne cosmetic] and medications [acne medicamentosa] that may contribute to acne)
- Psychological impact of acne on the client; identifies need for a more aggressive treatment approach and/or psychological services

Adolescent Acne[2]

Comedonal Acne

– Topical therapies are recommended for first-line treatment of comedonal acne and include topical retinoids (e.g., tretinoin, adapalene and tazarotene), benzoyl peroxide, and fixed-dose combinations (e.g., adapalene-benzoyl peroxide and clindamycin-benzoyl peroxide).
  - Clients with dry or sensitive skin may prefer products that are less drying like creams or lotions.
  - Clients with oily skin may prefer a less greasy formula such as a gel.

– If response to first-line treatment is inadequate, use of a fixed-dose clindamycin-tretinoin or a combined oral contraceptive agent (for women) may be considered.

– Convenience and treatment adherence may be enhanced with combination therapy or once-daily application instead of separate therapies or routines requiring multiple applications.

Localized Mild-to-Moderate Papulopustular Acne

– Topical retinoids, benzoyl peroxide, and fixed-dose combinations are strongly recommended.

Extensive Moderate Papulopustular Acne

– Systemic antibiotics (tetracycline or doxycycline) may be used in combination with topical medications as recommended for mild-to-moderate papulopustular acne (antibiotics alone are discouraged due to concerns about resistance). *

– In women, combined oral contraceptives may be added to the topical medications recommended for mild-to-moderate papulopustular acne.*

*Consult with a physician/nurse practitioner.

Severe Acne

Note: More aggressive treatment is warranted to prevent permanent sequelae in clients with moderate and severe acne and in those with more deeply-pigmented skin.[6]

– Oral isotretinoin is recommended to treat severe acne.

- Due to the potential risk of adverse events and teratogenicity, only physicians who are trained and experienced in oral isotretinoin use, monitoring, and appropriate pregnancy-prevention measures should prescribe it.
- Potential psychiatric side effects include depression, psychosis, aggressive or violent behaviour, and changes in mood. Suicidal thoughts and actions have been reported.

– For clients who are not able to use oral isotretinoin, systemic antibiotics in combination with topical benzoyl peroxide, with or without a topical retinoid, may be considered.

– For women, combined oral contraceptives may also be considered.

Pregnancy and Acne Therapy

– Oral isotretinoin and topical tazarotene are contraindicated for pregnant women or women who are contemplating pregnancy.

– Consult with a physician/nurse practitioner for acne therapy during pregnancy.

Pre-adolescent Acne[6]

Note: Antibiotics in the tetracycline class should not be used for the treatment of acne in children under the age of 9 years.

– With the exception of antibiotics in the tetracycline class, acne management of the pre-adolescent is essentially the same as for the adolescent.

– Age group differences may require special considerations in the use of these agents, particularly with regard to:
  - Ease of use and client adherence
  - Cost factors
  - Differences in psychosocial impacts among age groups
  - Likelihood of scarring
  - Use of advanced vehicles to minimize adverse effects on young skin

MONITORING AND FOLLOW-UP

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP[7]

– Upon initiation of treatment, some clinical improvement should be expected within 8 to 12 weeks.

– Treatment effectiveness should be evaluated 2 to 3 months after initiation, at which time therapy may be escalated (if improvement is inadequate), maintained or tapered (if improvement is adequate).

- Monthly follow-up visits are recommended for clients taking oral isotretinoin.
- Monitor client for psychological impacts of acne (e.g., low self-esteem, depression, anxiety).
- For clients on isotretinoin therapy, monitor before, during, and after for signs and symptoms of psychological disturbance (i.e., observe closely for symptoms of depression and/or suicidal ideation).

Referral

Coordinate referral request as required.

- Referral to a specialist should be considered for the following:[7; 8]
  - Systemic features (e.g., hyperandrogenism, SAPHO syndrome (**S**ynovitis, **A**cne [commonly involving the face and upper back], Pustulosis, **H**yperostosis, and Osteitis), or PAPA syndrome [Pyogenic Arthritis, Pyoderma gangrenosum and Acne - a rare genetic disorder characterised by its effects on skin and joints]).
  - Failure to respond to topical treatments and oral antibiotics when taken for at least 6 months.
  - Nodular acne or any type with significant scarring or tendency to scar.
  - Moderately-severe acne in clients with deeply pigmented skin who are likely to develop post-inflammatory hyperpigmentation.
  - Major psychological burden due to the acne disorder.
  - Pregnancy.

APPENDIX

SECTION A: SUPPLEMENTAL CLINICAL MANAGEMENT INFORMATION

Acne Quality of Life Questionnaires

TABLE 2
Acne Quality of Life Questionnaires[7]

SCALE	ITEM	SCORE
Acne-Q4	1. Dissatisfied with appearance 2. Feeling upset 3. Concerns about meeting new people 4. Concern about scarring	Score 0-6: extremely (0), very much (1), quite a bit (2), a good bit (3), somewhat (4), a little bit (5), not at all (6)
CADI	1. As a result of having acne, during the last month have you been aggressive, frustrated or embarrassed? 2. Do you think that having acne during the last month interfered with your daily social life, social events or relationships with members of the opposite sex? 3. During the last month have you avoided public changing facilities or wearing swimming costumes because of your acne? 4. How would you describe your feelings about the appearance of your skin over the last month? 5. Please indicate how bad you think your acne is now.	1. (a) Very much indeed; (b) A lot; (c) A little; (d) Not at all 2. (a) Severely, affecting all activities; (b) Moderately, in most activities; (c) Occasionally or in only some activities; (d) Not at all 3. (a) All of the time; (b) Most of the time; (c) Occasionally; (d) Not at all 4. (a) Very depressed and miserable; (b) Usually concerned; (c) Occasionally concerned; (d) Not bothered 5. (a) The worst it could possibly be; (b) A major problem; (c) A minor problem; (d) Not a problem

From the reference:[7] "Studies evaluating self-rated severity scales in response to single questions regarding the occurrence of pimples over the prior week (4 item response range of no, a little, a lot, and very much) or have acne or pimples been a problem for you? (4 items response range of hasn't been a problem, not too bad, really bad, and terrible) have shown that positive responses to either of the 2 items on the positive spectrum of the response scales were associated with a higher risk of anxiety, mental health problems, suicidal ideation and suicidal attempts."

Pediatric Acne

Neonatal Acne—Birth to 6 Weeks[4; 12; 13].

– Acne as early as birth is called acne neonatorum or "baby acne."

- It affects approximately 20% of all newborns.
- Mainly affecting the cheeks and nose; lesions appear as small, red papules.
- Mean onset is age 3 weeks and it can last from weeks to a few month, usually clearing by 3 months.
- In most cases, it will clear on its own and does not require treatment.
- It can flare and become irritated when skin comes into contact with saliva, milk, some fabrics, or when a baby is too hot.
- Baby acne is not a predictor of who will develop acne in adolescence.
- Daily cleansing with mild soap and water and avoidance of exogenous oils and lotions may be considered.
- Dry the baby's face gently by patting the skin dry.
- Do not pinch or scrub the acne as this may cause more irritation or an infection.

Infantile Acne—Greater than 6 Weeks to 1 Year[6; 12]

- Infantile acne can begin at about age 6 weeks and last for 6 to 12 months, although it may last to age 3 years.
- It is more common in boys.
- It is caused by androgenic stimulation and hyperplasia of sebaceous glands.
- It presents with comedones and inflammatory lesions that can include papules, pustules, or occasionally nodular lesions
- Physical examination should include assessment of growth including height, weight, and growth curve; testicular growth and breast development; presence of hirsutism or pubic hair; clitoromegaly; and increased muscle mass.
- Treatment may be required because infantile acne can persist and occasionally cause scarring.
- Topical therapy may be considered for mild or moderate infantile acne with systemic therapy indicated in more severe cases.
- Consider a workup for a hormonal anomaly; a pediatric endocrinology referral; and/or bone age and serologic evaluation of follicle stimulating hormone, luteinizing hormone, testosterone, and dehydroepiandrosterone sulfate levels.
- For most, no further workup is necessary in the absence of hormonal abnormalities.

Mid-childhood Acne—Between Ages 1 and 7 Years[6]

- Mid-childhood acne presents primarily on the face with a mixture of comedones and inflammatory lesions.
- It is rare because children in this age range do not normally produce significant levels of adrenal or gonadal androgens.
- It may be accompanied by accelerated growth, as per deviation from standardized age-appropriate growth curves.
- Mid-childhood acne warrants an endocrinologic workup for causes of hyperandrogenism.

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline

REFERENCES

1. Nast A, Dréno B, Bettoli V, Degitz K, Erdmann R, Finlay AY, et al. European evidence-based (S3) guidelines for the treatment of acne. J Eur Acad Dermatol Venereol [Internet]. 2012 Feb [cited 2017 June 6]; 26 Suppl 1:1-29. Available from: http://onlinelibrary.wiley.com/doi/10.1111/j.1468-3083.2011.04374.x/epdf

2. Asai Y, Baibergenova A, Dutil M, Humphrey S, Hull P, Lynde C, et al. Management of acne: Canadian clinical practice guideline. CMAJ [Internet]. 2016 Feb [cited 2017 June 6]; 2;188(2):118-26. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4732962/pdf/1880118.pdf.

3. Titus S, Hodge J. Diagnosis and treatment of acne. Am Fam Physician [Internet]. 2012 Oct [cited 2017 June 6]; 15;86(8):734-40. Available from: http://www.aafp.org/afp/2012/1015/p734.pdf

4. Thiboutot D, Zaenglein A. Pathogenesis, clinical manifestations, and diagnosis of acne vulgaris. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2016 [cited 2017 June 6]. Available from: https://www.uptodate.com/contents/pathogenesis-clinical-manifestations-and-diagnosis-of-acne-vulgaris with authorized username and password.

5. Mayo Clinic, Patient Health & Information, Diseases & Conditions. [Internet]. Rochester, MN: Mayo Foundation for Medical Education and Research; c1998 - . Acne; 2017; [cited 2017 June 6]; [about 6 p.]. Available from: http://www.mayoclinic.org/diseases-conditions/acne/basics/risk-factors/con-20020580 [produced by Mayo Clinic Staff].

6. Eichenfield LF, Krakowski AC, Piggott C, Del Rosso J, Baldwin H, Friedlander SF, et al. Evidence-based recommendations for the diagnosis and treatment of pediatric acne. Pediatrics [Internet]. 2013 May [cited 2017 June 6]; 131 Suppl 3:S163-86. Available from: http://pediatrics.aappublications.org/content/pediatrics/131/Supplement_3/S163.full.pdf

7. Asai Y, Baibergenova A, Dutil M, Humphrey S, Hull P, Lynde C, et al. Management of acne: Canadian clinical practice guide. [Internet]. Ottawa, ON: 8872147 Canada Inc.; 2015. Appendix 4 (as supplied by the authors); [cited 2017 June 6]; [about 75 p.]. Available from: http://www.cmaj.ca/content/suppl/2015/11/16/cmaj.140665.DC1/140665-guide-4-at.pdf

8. Archer CB, Cohen SN, Baron SE; British Association of Dermatologists and Royal College of General Practitioners. Guidance on the diagnosis and clinical management of acne. Clin Exp Dermatol [Internet]. 2012 May [cited 2017 June 6]; 37 Suppl 1:1-6. Available from: http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2230.2012.04335.x/epdf

9. Canadian Dermatology Association [Internet]. Ottawa, ON: Public & Patients; 2017. Acne; [cited 2017 July 4]. Available from: https://dermatology.ca/public-patients/skin/acne/

10. Graber E. Patient education: Acne (beyond the basics). In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 June 6]. Available from: https://www.uptodate.com/contents/acne-beyond-the-basics with authorized username and password.

11. Graber E. Treatment of acne vulgaris. In: Post TW, editor. UpToDate [Internet] Waltham, MA: UpToDate; 2017 [cited 2017 June 6]. Available from: https://www.uptodate.com/contents/treatment-of-acne-vulgaris with authorized username and password.

12. Pielop JA. Benign skin and scalp lesions in the newborn and young infant. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 June 6]. Available from: https://www.uptodate.com/contents/benign-skin-and-scalp-lesions-in-the-newborn-and-infant with authorized username and password.

13. Mayo Clinic, Patient Health & Information, Diseases & Conditions. [Internet]. Rochester, MN (US): Mayo Foundation for Medical Education and Research; 1998 - . Baby acne: Lifestyle and home remedies; 2015 [cited 2017 July 4]: [about 2 p.]. Available from: http://www.mayoclinic.org/diseases-conditions/baby-acne/basics/lifestyle-home-remedies/con-20033932

OTHER SOURCES

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON; Health Canada; 2016.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Isotretinoin (Pediatric and Neonatal Lexi-Drugs). Fusidic acid; 2015 [accessed 2017 June 6]. Available from: www.online .lexi.com with authorized username and password.

CELLULITIS

OVERVIEW

Please refer to provincial/territorial guidelines for Cellulitis where available.

Cellulitis is an acute spreading skin infection caused when bacteria breach the skin barrier and invade deeper tissues.[1] The most common site of infection is the lower extremities.[2] The source is often a break in the skin, but breaks may be small and clinically inapparent.[3]

CAUSES

Bacteria

- Streptococcal infections, which may include group A Streptococcus (GAS)[2]
- Staphylococcal infections, which may include methicillin-resistant *Staphylococcus aureus* (MRSA)[2]
- Periorbital cellulitis, which is most commonly caused by bacterial spread from rhinosinusitis with most cases caused by *Staphylococcus aureus*, *Streptococcus pyogenes*, and *Haemophilus influenzae*

Other causative organisms[2]

- Organisms vary greatly according to host factors (e.g., immunosuppression).
- Organisms can be introduced by penetrating skin trauma (e.g., an animal bite may introduce multiple organisms). For more information, see *FNIHB Adult Care Clinical Practice Guidelines – Chapter 9 – Skin Wounds of Traumatic Origin.*
- Examples of pathogens seen in special circumstances:
  - *Pasteurella multocida* in dog and cat bites
  - *Aeromonas hydrophila* and *Vibrio vulnificus* following exposure to water
  - *Pseudomonas aeruginosa* in diabetic patients

ASSESSMENT

Medication review: Review current medications including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake which may impact management.

Allergy history: Screen for medication, latex, environmental, or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[2; 3]

- Trauma that disrupts skin integrity (e.g., bites, penetrating wounds, or ulcers)
- Injection drug use
- Breaks in the skin between the toes (toe web intertrigo)
- Pre-existing skin infections such as tinea pedis (athlete's foot), impetigo, or atopic dermatitis/eczema
- Edema due to impaired lymphatic drainage or venous insufficiency

– Immunosuppression or due to radiation therapy

– Obesity

HISTORY OF PRESENT ILLNESS[1; 2]

Review risk factors and collect history of present illness

– Warm, red, swollen, and tender area of skin with a lesion border that may advance and surrounding skin that may also be painful, swollen, and warm

– Known breach in the skin barrier

– Fever and systemic symptoms that may be present

– Regional lymph nodes that may be palpable and tender (may be reported by a parent or caregiver(s))

PHYSICAL FINDINGS[2; 3]

Perform a physical examination using the IPPA approach.

– Perform a focused skin examination and pain assessment. Include inspection and palpation of skin lesions and examination of secondary sites such as nails and hair, including interdigital toe spaces (looking for fissuring or maceration).

– Look for localized, diffuse inflammatory skin changes, which are almost always unilateral.

– Findings:

- Warm to touch, red, tender, smooth and shiny skin
- Poorly demarcated margins
- Dimpling around hair follicles with an orange peel appearance
- Purulent wound drainage (possibility of vesicles, bullae, or ecchymosis)

Mild Cellulitis Infection[2]

– Infection is localized with no purulence and no signs of systemic symptoms (e.g., fever).

Moderate to Severe Cellulitis Infection[2]

– Cellulitis infection involving hands, feet, face, peri-orbital area, or a joint (sites that are always considered severe)

– Findings:[3]

- Elevated temperature (above 38^{o}C)
- Possibly elevated heart rate and respiration rate
- Regional lymphadenopathy (may/or may not be tender)
- Purulent wound drainage
- Significant increase in pain/discomfort (may be out of proportion to exam findings) and/or evident extension of infection (e.g., expanding margin of erythema) in some cases may indicate an invasive streptococcal infection such as necrotizing fasciitis and require urgent consultation

Periorbital Cellulitis (also called pre-septal cellulitis)[5;6]

– Infection involves the anterior portion of the eyelid, but not the orbit or other ocular structures.

- This type is of cellulitis is more common in children than adults, particularly children under age 5.
- This condition is generally mild and rarely leads to serious complications, unlike orbital cellulitis which involves the orbit and is much more severe.
- Presents with unilateral eyelid swelling, erythema, and sometimes eye pain/tenderness (versus orbital cellulitis which includes pain with eye movements and may include protrusion of the eye, conjunctival swelling, and impaired vision).

DIFFERENTIAL DIAGNOSIS[2; 3]

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

- Foreign body lodged in soft tissue
- Abscess
- Necrotizing fasciitis
- Gas gangrene
- Underlying bone or joint disorders (e.g., osteomyelitis, septic arthritis, gout)
- Vaccine reaction

COMPLICATIONS[2; 3]

- Progression to secondary or more complex infections (e.g., bacteremia, endocarditis, osteomyelitis, metastatic infection, sepsis, and toxic shock syndrome)
- Lymphedema due to lymphatic damage from infection (may become permanent)

Periorbital Cellulitis[6]

- Local abscess formation
- Extension to the central nervous system as meningitis
- Recurrent or persistent infection uncommon

DIAGNOSTIC TESTS

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability.

Laboratory[2; 3; 7]

Testing should be carried out as per provincial/territorial policies and procedures. The tests below are for consideration.

- Cultures of blood, microscopic examination of cutaneous aspirates, biopsies or swabs are not routinely recommended[3] except in patients with[7].
  - Malignancy and on chemotherapy
  - Neutropenia

- Severe cell-mediated immunodeficiency
- Immersion injuries
- Animal bites

– Wound swab for culture and sensitivity (C+S) recommended if:[2]
  - Purulent wound discharge is present.
  - There is poor or no response to initial treatment.

– Blood C+S may be helpful in:[2; 3]
  - Immunocompromised patients
  - Suspected atypical pathogen
  - Systemic toxicity
  - Extensive skin or soft tissue involvement
  - Underlying comorbidities (e.g., lymphedema, malignancy, neutropenia, immunodeficiency, splenectomy, diabetes)
  - Special exposures (e.g., animal bites)
  - Persistent cellulitis

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT

– Treat the infection.

– Relieve the symptoms.

– Prevent complications, including auto-inoculation and infection recurrence.

– Prevent infection spread.

NON-PHARMACOLOGICAL INTERVENTIONS

Client Education

– Counsel the parent(s)/caregiver(s)/client [2] about steps to take to care for the infection and prevent recurrence or transmission to others. [2]

  - Handwashing – Practice appropriate handwashing, particularly after touching infected skin (e.g., when applying topical antibiotic). For more information, see *Hand washing* from Health Canada at https://www.canada.ca/en/public-health/services/diseases/hand-hygiene.html
  - Skin care[8] – Do not touch or scratch the lesions. Minimize or prevent edema by elevating legs. Hydrate the skin with emollients and treat any active skin infections, particularly in the toe webs.
  - Wound care[9] – Wash all open skin wounds with mild soap and water daily. Relieve symptoms with treatments such as elevating the infected area. Monitor wounds for signs of skin infection,

particularly redness, pain, or drainage. Cover the wounds with a dry dressing and watch for signs of a spreading margin.

- Counsel the parent(s)/caregiver(s)/client about appropriate use of medications: dose, frequency, importance of adherence, potential side effects and interactions
- Provide the parent(s)/caregiver(s)/client with additional resources. *See Taking Care of Your Legs* from Registered Nurses' Association of Ontario at http://www.rnao.ca/sites/rnao-ca/files/Taking_Care_of_Your_Legs.pdf

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

IV Therapy

If client requires IV antibiotics:

- Initiate an IV line and run IV fluid (0.9% sodium chloride) at a rate sufficient to maintain hydration, or administer medication.

Antibiotic Therapy (non-facial)

Mild Cellulitis

Cephalexin

- Cephalexin 50 to 100 mg/kg PO QID for 5-10 days

OR

Cloxacillin

Cloxacillin 50 mg/kg PO QID[10] for 5-10 days

If known or suspected allergy to penicillin and/or cephalosporins:

Clindamycin

- Clindamycin 25 mg/kg in 24 hours PO divided QID [10]
- Treatment usually requires 5 days but may require up to 10 days' therapy if no clinical improvement o clinical improvement.[7]

Moderate to Severe Cellulitis (non-facial)[10]

Notes: Consult physician/nurse practitioner to choose appropriate antibiotic therapy. Antibiotic therapy may be initiated while client is awaiting medical evacuation. For cellulitis that involves the face (including periorbital cellulitis), consult a physician/nurse practitioner for further advice as the drug suggestions below pertain to non-facial cellulitis only.

CeFAZolin

- CeFAZolin 100 mg/kg in 24 hours IV divided q8h for 5-10 days

With or without

Clindamycin

- Clindamycin 25 to 40 mg/kg in 24 hours PO divided QID for 5-10 days
- May require up to 14 days with severe infection and/or slow response to therapy

Second line treatment:

Clindamycin

- Clindamycin 25 to 40 mg/kg in 24 hours IV divided q8h for 5-10 days

Or

CefTRIAXone

- CefTRIAXone 75 mg/kg in 24 hours IM/IV divided q12 to 24h (maximum 2g in 24 hours) for 5-10 days
- May require up to 14 days' therapy with severe infection and/or slow response to therapy

MRSA Infection:[11]

- Empiric coverage for MRSA may be considered in the following circumstances:
  - Systemic signs of toxicity (e.g., fever, hypotension, sustained tachycardia)
  - MRSA infection in the past, or known MRSA colonization
  - Lack of clinical response to antibiotics not active against MRSA
  - MRSA risk factors such as recent hospitalization including surgery
  - Lesion is near an indwelling medical device such as a prosthetic joint or vascular graft
  - Associated with a penetrating trauma, especially from illicit drug use or with concurrent evidence of MRSA[3; 7]

For more information on MRSA treatment, see *FNIHB Adult Care Clinical Practice Guidelines – Chapter 9 – Skin – Methicillin-Resistant Staphylococcus Aureus.*

Recurrent Cellulitis[3; 7; 11]

- Recurrent cellulitis is common
- Recurrent cellulitis is suspected if the client has 3 to 4 cellulitis episodes per year despite attempts to treat or control predisposing factors (e.g., edema, obesity, eczema, venous insufficiency, or toe web abnormalities)
- Prolonged courses of antibiotics with either penicillin or erythromycin may be prescribed.

Analgesic/Antipyretic

Note: Since neonates and infants (less than 3 months of age) are less able to mount a febrile response, when they do become febrile it is more likely to indicate a major illness. Consult a physician/nurse practitioner particularly for children less than 3 months of age.

Acetaminophen[12; 13]

- Acetaminophen 10 to 15 mg/kg/dose PO q4-6h PRN
- Maximum from all sources: acetaminophen 75 mg/kg in 24 hours or 4,000 mg in 24 hours, whichever is less

Ibuprofen[14]

Infants <6 Months

– Limited data available in infants

For 6 Months to 12 Years of Age

- Ibuprofen 5 to 10 mg/kg/dose PO q6-8h PRN
- Maximum 400 mg/dose*

For Greater than 12 Years of Age

- Ibuprofen 200 to 400 mg PO q4-6h PRN*
- *Maximum from all sources for all ages: Ibuprofen 40 mg/kg in 24 hours or 1200 mg in 24 hours whichever is less. Under physician/nurse practitioner supervision, daily doses ≤2,400 mg may be used.

MONITORING AND FOLLOW-UP

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

– Monitor vital signs, as indicated by the client's condition.

– Monitor for signs of complications and response to treatment.

– If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP

– For mild or moderate cellulitis, re-assess response to therapy within 48 hours of initiating antibiotic treatment.[11]

Referral

– Arrange for medical evacuation if clinically indicated.

– Coordinate referral request as required.

APPENDIX

SUPPLEMENTAL RESOURCES

Provincial / Territorial Guidelines

British Columbia Centre for Disease Control: Interim guidelines for the management of community-associated methicillin-resistant Staphylococcus aureus infections in primary care at http://www.bccdc.ca/search?k=infectioncontrol_gf_managementcommunityassociatedmethicillin_nov06.pdf

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline.

REFERENCES

1. Government of British Columbia, HealthLink BC [Internet]. Vancouver, BC: Government of British Columbia; c2017. Cellulitis; [current as of 2016 Oct 13; cited 2017 May 21]; [about 3 p.]. Available from: https://www.healthlinkbc.ca/health-topics/tr5105 [Produced by HealthWise Staff].

2. Spelman D, Baddour LM. Cellulitis and skin abscess: Clinical manifestations and diagnosis. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc; c2017 [cited 2017 May 21]. Available from https://www.uptodate.com/contents/cellulitis-and-skin-abscess-clinical-manifestations-and-diagnosis

3. DynaMed Plus [Internet]. Ipswich, MA (US): EBSCO Information Services. 1995 - . Record No. 116794, Cellulitis [cited 2017 May 19]. Available from http://www.dynamed.com/login.aspx?direct=true&site=DynaMed&id=116794. Registration and login required.

4. Boston Children's Hospital, Symptoms & Conditions [Internet]. Boston, MA: The Hospital; c2005 - . Orbital cellulitis symptoms & causes; [cited 2017 May 21]. [about 2 print pages]. Available from: http://www.childrenshospital.org/conditions-and-treatments/conditions/o/orbital-cellulitis/symptoms-and-causes

5. Gappy C, Archer SM, Barza M. Pre-septal cellulitis. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; c2017 [cited 2017 May 21]. Available from: https://www.uptodate.com/contents/preseptal-cellulitis with authorized username and password.

6. DynaMed Plus [Internet]. Ipswich (MA): EBSCO Information Services; c1995 - . Preseptal cellulitis [cited May 21, 2017]; [about 18 print pages]. Available from http://www.dynamed.com/topics/dmp~AN~T113841/Preseptal-cellulitis. Registration and login required.

7. Stevens DL, Bisno AL, Chambers HF, Dellinger EP, Goldstein EJ, Gorbach SL, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. Clin Infect Dis. 2014 Jul 15;59(2):e10-52.

8. Bartlett JG. Cellulitis. In: Johns Hopkins ABX Guide. [Internet]. Baltimore (MD): Unbound Medicine Inc; [updated on 2017 Sep 3; cited 2017 May 20]; [about 13 p.]. Available from: https://www.hopkinsguides.com/hopkins/view/Johns_Hopkins_ABX_Guide/540106/all/Cellulitis%20-%20Cellulitis_Erysipelas

9. Mayo Clinic, Patient Care and Health Information, Diseases & Conditions [Internet]. Rochester, MN: Mayo Foundation for Medical Education and Research; 1998 - . Cellulitis; 2015 Feb 11 [cited 2017 May 20]; [about 6 p.]. Available from: http://www.mayoclinic.org/diseases-conditions/cellulitis/basics/prevention/con-20023471 [Produced by Mayo Clinic Staff].

10. MUMs Health. Anti-infective guidelines for community-acquired infections. Toronto: MUMS Guideline Clearinghouse; 2017.

11. Spelman D, Baddour LM. Cellulitis and skin abscess in adults: Treatment. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; c2017 [cited 2017 May 21]. Available from: https://www.uptodate.com/contents/cellulitis-and-skin-abscess-in-adults-treatment?search=cellulitis%20and%20skin%20abscess%20treatment&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1

12. Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Acetaminophen; 2015 [accessed 2017 May 20]. Available from: www.online .lexi.com with authorized username and password.

13. Chen J, Lau E, editors. Hospital for Sick Children. 2015 drug handbook and formulary. Hudson, OH: Lexi-Comp Inc.; 2104 [entry] Acetaminophen; p. 38.

14. Ibuprofen: Pediatric drug information. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UptoDate Inc.; c2017 [cited 2017 March 27]. Available from: http://www.uptodate.com with authorized username and password.

OTHER SOURCES

For client information regarding self care:

Newson L. Cellulitis and erysiplelas. [Internet]. Leeds, England: Patient Platform Ltd.; 2015 [accessed 2017 May 20]. [about 8 p.]. Available from: https://patient.info/health/cellulitis-and-erysipelas-leaflet

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON; Health Canada; 2016.

Public Health Agency of Canada, Laboratory Biosafety and Biosecurity [Internet]. Ottawa, ON: The Agency 2011. Staphylococcus aureus - Pathogen Safety Data Sheets; [modified 2012 Apr 30; accessed 2017 May 20]; [about 9 p.]. Available from: www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/staphylococcus-aureus-eng.php

Public Health Agency of Canada, Laboratory Biosafety and Biosecurity [Internet]. Ottawa, ON: The Agency 2011. Streptococcus pyogenes - Pathogen Safety Data Sheets; [updated July 2010; accessed 2017 May 20]; [about 8 p.]. Available from: http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/strep-pyogenes-eng.php

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Acetaminophen; 2015 [accessed 2017 May 20]. Available from: www.online .lexi.com with authorized username and password.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Cephalexin; 2015 [accessed 2017 May 20]. Available from: www.online.lexi.com with authorized username and password.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Clindamycin; 2015 [accessed 2017 May 20]. Available from: www.online.lexi.com with authorized username and password.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Piperacillin/Tazobactam; 2015 [accessed 2017 May 20]. Available from: www.online .lexi.com with authorized username and password.

DIAPER RASH

Please refer to provincial/territorial guidelines for Diaper Rash, where available.

OVERVIEW

Diaper rash (diaper dermatitis) is a common form of irritant contact dermatitis characterized by inflammation of the skin covered by a diaper, including the buttocks, lower abdomen, genitalia, and upper thighs.[1; 2] It is most common between ages 8 to 12 months.[2; 3]

In contrast, diaper dermatitis caused by the fungus *Candida albicans* is common during the second to fourth months of life in healthy infants.[4] Severity ranges from mild, asymptomatic erythema to severe inflammation characterized by extensive erythema with a glossy appearance, painful erosions, papules, and nodules.[2]

In most cases diaper dermatitis will clear up with changes in diapering but eruptions in the diaper area may represent exacerbations of more diffuse skin diseases such as seborrheic dermatitis or atopic dermatitis, or may be the manifestation of unrelated skin conditions that coincidentally manifest in the diaper area.[2]

CAUSES[1; 2; 5; 6]

- Prolonged contact with urine and feces
- Snug-fitting, air-tight plastic pants that prevent wetness from drying
- Friction
- Change in stool or frequency of stool due to new foods
- Diarrhea
- Detergents or soaps from inadequately-rinsed cloth diapers
- The chemicals in disposable wipes or disposable diapers
- *Candida albicans* infection
- Medication induced[8]

ASSESSMENT

Medication review: Review current medications, including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental, or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[6; 7]

- Infrequent diaper changing
- Sensitive skin

– Formula feeding

– Recent use of broad-spectrum antibiotics

HISTORY OF PRESENT ILLNESS

Review risk factors and collect history of present illness.

– Aspects of the history that can help identify contributing factors and support or exclude non-diaper-associated dermatitis include:[4]

- Associated symptoms (e.g., diarrhea)
- Systemic symptoms
- Information about diapers and diapering (e.g., type of diaper, how often diapers are changed, laundering of cloth diapers)
- Information about how diaper area is cleansed
- Exposure to contagious disease (e.g., scabies, herpes simplex virus)
- History of dermatologic, allergic, or infectious illnesses
- Family history (e.g., psoriasis, atopy)
- Recent antibiotic use
- Previous therapies that have been used to treat diaper rash

PHYSICAL FINDINGS

Perform a physical examination using the IPPA approach.

Contact Diaper Dermatitis[4; 7]

– Mild: scattered red papules or mild erythema over limited skin areas; on buttocks and pubic skin with the creases/skin folds relatively spared

– Moderate: more extensive erythema with maceration or superficial erosions and pain/discomfort

– Severe: extensive erythema with a glossy appearance, painful erosions, papules, and nodules

Candidal Infection[2; 7]

– Beefy red plaques with satellite papules and superficial pustules at margins of inflamed areas

– Often affects the skin folds, unlike non-*Candida* dermatitis, (e.g., the deepest part of the skin in the groin area and buttocks); may also be seen in other creased areas such as the neck and axillae

– Often painful with crying during diaper changes or when infant is urinating or defecating

– Excoriations are prominent

DIFFERENTIAL DIAGNOSIS[2; 7]

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

– Atopic dermatitis

- Seborrheic dermatitis
- Allergic contact dermatitis
- Impetigo
- Scabies
- Psoriasis
- Miliaria (a heat rash that causes small, red papules with pruritus)
- Langerhans cell histiocytosis (a potentially life-threatening hematologic/oncologic disorder)
- Congenital syphilis
- Child abuse/neglect; for consideration in severe, recalcitrant, or atypical diaper dermatitis
  - A severe diaper dermatitis that appears resistant to treatment may be the result of neglect by the parent(s)/caregiver(s). The diaper area is also a possible site for scalds, burns and bruises in abused children.[4] For more information, see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 5 – Child Maltreatment*.

COMPLICATIONS[2]

Secondary infection with microorganisms (e.g., *Candida albicans*, *Staphylococcus aureus, Streptococcus pyogenes*, herpes simplex virus)

DIAGNOSTIC TESTS

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability.

Laboratory

Testing should be carried out as per provincial/territorial policies and procedures.

- Laboratory tests are usually not necessary. They may, however, help confirm the etiology in atypical or recalcitrant cases.[2] Consult with a physician/nurse practitioner for atypical/recalcitrant diaper dermatitis.

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT

- Relieve symptoms.
- Reduce exposure to irritants.
- Treat any secondary infection.
- Prevent recurrence.

NON-PHARMACOLOGICAL INTERVENTIONS

Client Education[1-3; 6; 7]

– Instruct parent(s)/caregiver(s) to:

- Wash their hands before and after each diaper change.
- Change diapers frequently (every time the diaper is wet or soiled) to keep the diaper area clean and dry.
- Wash the diaper area with warm water and mild soap and air dry at each diaper change (if there is no stool, wash with warm water only and allow to air dry.)
- Apply the diaper loosely to allow air to circulate and to air the child's diaper area by removing the diaper for several hours each day.
- Apply a topical protective barrier cream (e.g., 40% zinc oxide cream or silicone-based products) at each diaper change as first-line treatment for mild to moderate diaper dermatitis.
- Avoid wipes that contain alcohol or fragrances.
- Try an alternate brand of disposable diaper or laundry product (if cloth diapers are used) if the current brand seems to cause a diaper rash.
- Avoid using baby powder, talc, or other powders such as cornstarch because they pose a significant respiratory risk if accidentally inhaled.
- Apply creams thickly with every diaper change and cover with petroleum jelly to prevent sticking to the diaper.
- When a barrier cream is applied, wipe off the stool or contaminated portions only, leaving as much barrier cream intact as possible (mineral oil may be helpful).
- Avoid sharing creams and ointments with other children and putting fingers back into the jar after touching affected skin.

– Advise parent(s)/caregiver(s) that there is no evidence that either disposable or cloth diapers are better for preventing diaper rash and instruct them to use the one that works best for them and their baby.

– Counsel parent(s)/caregiver(s) about appropriate use of medications; dose, frequency, importance of adherence, potential side effects and interactions.

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

Mild to Moderate Contact Diaper Dermatitis[2]

Apply a topical protective barrier cream (e.g., 40% zinc oxide cream) or silicone-based product at each diaper change as first-line treatment.

Severe Contact Diaper Dermatitis[2]

If barrier products alone are not enough, a low-potency topical corticosteroid may be required:

– Apply hydrocortisone 0.5% or 1% cream (thin layer to affected areas BID until rash resolves [maximum 7 days]). Treatment in children under the age of 2 should be in consultation with a physician/nurse practitioner.

– Apply a topical barrier cream (e.g., 40% zinc oxide cream) over the hydrocortisone cream.

Candidal Diaper Dermatitis

– Apply clotrimazole 1% cream topically to affected areas BID until rash resolves (recommended 7 days; maximum 14 days).[4]

– If the inflammation is prominent, a low-potency steroid cream (e.g., 0.5% or 1% hydrocortisone cream) may be considered in consultation with a physician/nurse practitioner.[7]

- Instruct parent(s)/caregiver(s) to separate the application of the antifungal and hydrocortisone creams by a few minutes and to apply the antifungal cream first.[7]
- Combination topical corticosteroids/antifungal creams should *not* be used in the diaper area. The combination may cause unwanted corticosteroid side effects such as skin atrophy and adrenal suppression due to enhanced absorption resulting from the occlusive environment.[3, 8]

– Apply topical barrier cream (e.g., 40% zinc oxide cream) over clotrimazole and, if using, hydrocortisone cream(s).[2]

MONITORING AND FOLLOW-UP

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP

– Advise follow-up in 2 to 3 days if the rash:[2; 6]

- Is not improving
- Is severe or unusual
- Involves blisters or pus-filled sores

Note: Advise parent(s)/caregiver(s) to follow up sooner if the rash is accompanied by fever or if there are signs that the dermatitis is worsening.

– In children with diaper rash that does not resolve with standard treatment, non-diaper-associated causes of dermatitis or underlying conditions that predispose the infant to diaper dermatitis must be considered and laboratory testing, or a skin biopsy may be required for accurate diagnosis.[3]

Referral

Not usually necessary unless the condition is recurrent or unresponsive to therapy.

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline.

REFERENCES

1. Mayo Clinic, Patient Health & Information, Diseases & Conditions. [Internet]. Rochester, MN: Mayo Foundation for Medical Education and Research; c1998 - . Diaper rash; 2015 May 8 [cited 2017 Jun 8]; [about 6 p.]. Available from: https://www.mayoclinic.org/diseases-conditions/diaper-rash/symptoms-causes/syc-20371636 [produced by Mayo Clinic Staff].

2. Horii K. Diaper dermatitis. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 May 4]. Available from: https://www.uptodate.com/contents/diaper-dermatitis with authorized username and password.

3. HealthyChildren.org [Internet]. Itasca, IL: American Academy of Pediatrics; c2009. Diaper rash solution; [updated 2015 Nov 21; cited 2017 June 8]; [about 2 p.]. Available from: https://www.healthychildren.org/English/ages-stages/baby/diapers-clothing/Pages/Diaper-Rash.aspx

4. Bortolussi R, Martin S; Canadian Paediatric Society Infectious Diseases and Immunization Committee. Antifungal agents for common outpatient paediatric infections. Paediatr Child Health [Internet]. 2007 [updated 2012 Juy 26; reaffirmed 2016 Feb 1; cited 2017 June 8]; 12(10):875-8. Available from: http://www.cps.ca/documents/position/antifungal-agents-common-infections

5. Government of British Columbia, HealthLink BC [Internet]. Victoria, BC: Government of British Columbia; c2016. Diaper rash. [current as of 2017 March 20; cited 2017 Jun 8]; [about 2 p.]. Available from: https://www.healthlinkbc.ca/health-topics/diras [produced by HealthWise Staff].

6. Caringforkids [Internet]. Ottawa, ON: Canadian PediatricSociety; c2013 [updated 2017 Jul; cited 2017 Jun 8]. Diaper rash; [about 2 print p.]. Available from http://www.caringforkids.cps.ca/handouts/diaper_rash

7. Medsask [Internet]. Saskatoon, SK: University of Saskatchewan; c2017.Diaper dermatitis, irritant and candidal - guidelines for prescribing topical antifungals and hydrocortisone; 2010 May [**updated May 2017;** cited 2017 Jun 8]; [about 12 print pages]. Available from http://medsask.usask.ca/professional/guidelines/diaper-dermatitis-candidal.php

8. Sibbald, Debra. Diaper Dermatitis. In: e-therapeutics [Internet]. Ottawa (ON): Canadian Pharmacists Association; c2016. [updated 2016 Apr; cited 2017 Dec 04]. Available from: https://www.e-therapeutics.ca with authorized username and password.

OTHER SOURCES

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON; Health Canada; 2016.

ECZEMA (ATOPIC DERMATITIS)

OVERVIEW

Please refer to provincial/territorial guidelines for Eczema (Atopic Dermatitis) where available.

Eczema (atopic dermatitis) is a chronic inflammatory dermatosis that affects up to 25% of children. Eczema can begin in infancy (the most common onset is between ages 3 and 6 months), often becoming quiescent later in childhood. Recurrences and exacerbations are common. Pruritus is a hallmark of the condition and is responsible for much of the disease burden borne by clients and their families.[1]

CAUSES

Eczema has a complex pathogenesis involving genetic, immunologic, and environmental factors that lead to a dysfunctional skin barrier and dysregulation of the immune system.[1]

ASSESSMENT

Medication review: Review current medications, including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[1]

– Family history of atopy

  - The odds of developing atopic dermatitis are 2 to 3 times higher in children with 1 atopic parent. This increases to 3 to 5 times higher if both parents are atopic; a maternal history of atopic dermatitis is possibly more predictive.

– Mutations in the filaggrin (FLG) gene (influences proteins involved in the skin barrier function)

– Client-specific triggers, described in *Table 1, Client-specific Triggers* in *Client Education* in *Appendix, Section A*

HISTORY OF PRESENT ILLNESS[1-4]

Review risk factors and collect history of present illness.

– Skin symptoms (for more information, see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 16 – Skin – History of Present Illness and Review of Systems* and *FNIHB Adult Care Clinical Practice Guidelines – Chapter 9 – Skin – Assessment of Integumentary Systems.*

– Itching and scratching (itch-scratch-rash cycle)

– Sleep disruption and irritability due to itching and scratching, especially in infants and young children

– A history of periods of remission and exacerbation

– Various distribution sites if reported

PHYSICAL FINDINGS[4]

Perform a physical examination with a focus on skin assessment using the IPPA approach.

- The clinical presentation is highly variable depending upon the patient's age and disease activity.
- Findings can include: xerosis (abnormally dry skin), evidence of scratching with excoriated erythematous papules, oozing and crusting, and lichenification (thickened/leathery skin).

Distribution of Atopic Dermatitis[1; 2; 4]

- Less than 2 years of age: typically presents with pruritic, red, scaly, and crusted lesions on the extensor surfaces of the extremities and the cheeks, scalp, or trunk; the diaper area is usually spared.
- From 2 to 16 years of age: less exudation; often lichenified plaques in a flexural distribution, especially of the antecubital and popliteal fossae, volar aspect of the wrists, ankles, and neck; sides of the neck may show a reticulate pigmentation, the so-called "atopic dirty neck."
- Adults: more localized and lichenified, often involves hands and feet.
- All age groups: in severe cases, any area of the body, although it is uncommon to see lesions in the axillary, gluteal, or groin areas.

DIFFERENTIAL DIAGNOSIS[1; 2; 4]

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

- Contact dermatitis (irritant or allergic)
- Seborrheic dermatitis
- Ichthyoses
- Psoriasis
- Medication-induced dermatosis
- Scabies
- Immune deficiency diseases
- Nutritional deficiencies
- Cutaneous T-cell lymphoma

COMPLICATIONS[2; 4]

- Secondary bacterial infections, including cellulitis
- Molluscum contagiosum
- Eczema herpeticum (usually due to herpes simplex type 1 or 2)
- Atypical enteroviral infection attributable to coxsackie virus A6 ("eczema coxsackieum")

DIAGNOSTIC TESTS

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability.

Laboratory

Testing should be carried out as per provincial/territorial policies and procedure; the tests below are for consideration:[1]

- Diagnostic tests are not generally required; on occasion, skin biopsy specimens or other tests may be helpful to rule out other or associated skin conditions.
- Culture and sensitivity (C+S) swab or virus culture swab may be indicated to determine causative organism if there are concerns about secondary infection.

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT

- Relieve symptoms.
- Prevent secondary infection.
- Prevent complications.
- Minimize adverse events.

NON-PHARMACOLOGICAL INTERVENTIONS

Client Education[3; 5; 7]

- Advise client/parent(s)/caregiver(s) to keep a diary to record precipitating and aggravating factors, and to minimize exposure to client-specific triggers (for examples of triggers, see *Table 1, Client-specific Triggers* in *Appendix, Section A*).
- Moisturizers are a primary treatment for mild disease and should be part of the regimen for moderate and severe disease (apply liberally and often). Emollients should be applied liberally immediately after bathing or showering to prevent moisture evaporation.
- Use sun protection strategies like avoiding peak sun exposure time and wearing a wide brimmed hat and loose, light protective cotton clothing.
- Choose sunscreens formulated for sensitive skin or those with physical sunblocks (e.g., titanium dioxide or zinc oxide).
- If possible, use a cool-mist humidifier in the house or bedroom, especially during the dry winter months (and clean it as directed to prevent the growth of mould).
- Relieve itching by applying a compress of soft cloth soaked in cool water to area of inflammation.

- Keep nails short and filed smooth, and wear gloves while sleeping to prevent scratching.
- Encourage good hygiene practices to prevent secondary bacterial infection.
- When possible, avoid overheating and sweating.
- Identify ways to reduce stress.
- Counsel client/parent(s)/caregiver(s) about appropriate use of medications; dose, frequency, importance of adherence, potential side effects, and interactions.

Bathing and Moisturizing to Repair the Skin Barrier[2; 3; 7]

- Bathing/showering with warm (not hot) water allows moisture to enter the skin; limit time to 5 to 10 minutes and no longer than 20 minutes.
- Use mild, non-irritating soap.
- Gently wash and pat skin dry, avoid rubbing, and leave the skin slightly damp.
- Use a recommended moisturizer/emollient after bathing while the skin is still slightly damp.

Bleach Baths[3; 5]

Bleach baths are recommended only under direction by a physician/nurse practitioner.

- Bleach baths may be helpful in cases of moderate to severe atopic dermatitis with frequent bacterial infections, particularly for maintenance.
- If bleach baths are ordered by the physician/nurse practitioner, teach the client the following:
  - Add 60 to 120 mL (1/4 cup to 1/2 cup) of regular strength household bleach (4-6% sodium hypochlorite) to a full bathtub of warm water (which is usually about 150 litres); for smaller tubs, use 1 teaspoon (5 mL) of regular bleach for every 5 litres of water.
  - Mix the bleach and water well.
  - Bathe in the solution for 5 to 10 minutes.
  - Rinse the skin well with warm water.
  - Gently pat the skin with a soft towel, leaving some water on the skin.
  - Immediately follow with regular moisturizing routine, using moisturizer and/or prescription products as recommended.
  - Bleach baths may be used 2 or 3 times a week.
  - Always exercise caution when handling bleach and protect clothing, bath mats, towels, etc. as they may become bleached.

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

Topical Corticosteroids[6-9]

– Topical corticosteroids reduce inflammation where itch is moderate to severe.

– Choice of corticosteroid potency should be based upon the patient's age, body area involved, and degree of skin inflammation.

– Ointments are generally preferred over creams due to more uniform coverage and penetration.

– As a guide:

- Medications should be applied to red, rough, and itchy areas of the skin.
- Topical medications should be applied before application the moisturizer/emollient.
- Treatment should continue until the affected skin is smooth, no longer red, and itch free.

Low-potency Topical Corticosteroids

- Hydrocortisone 1% cream; apply a thin layer topically to affected areas 1 or 2 times per day, ideally for 1 to 2 weeks (maximum of 4 weeks).

Medium-potency Topical Corticosteroids

– Consult physician/nurse practitioner in order to consider other topical therapies that are available through the Non-Insured Health Benefit Program.

– Higher potency corticosteroids must be used judiciously, by avoiding thin-skin areas, such as the face or skin folds, and minimizing the duration (ideally 1 to 2 weeks).

Oral Antihistamine[2; 3; 5; 7-9]

Antihistamines should be used with caution in infants as they may experience the paradoxical effects of agitation and may also be more prone to adverse effects; consult a physician/nurse practitioner for antihistamine use in children younger than age 6.

– Topical antihistamines are not recommended due to risk of absorption and contact dermatitis.

– Short-term, intermittent use of sedating antihistamines may be helpful at night although there is insufficient evidence to recommend the general use of antihistamines.

Complicated/Severe Cases[4; 6-9]

– Clients with complicated or severe disease may require:

- More potent topical and/or oral corticosteroids
- Immunosuppressant treatment such as calcineurin inhibitors, e.g., tacrolimus
- Phototherapy/ultraviolet light (in older children and adolescents only; not suitable for infants and young children), but the benefits must be weighed against potential adverse effects
- Topical and/or oral antibiotics due to a secondary infection

MONITORING AND FOLLOW-UP

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP

- Follow up in 1 to 2 weeks to assess response to treatment.
- Advise client/parent(s)/caregiver(s) to return to the clinic sooner if there are signs of infection, such as fever, purulent discharge under scabs, or oozing on skin
- If symptoms resolve, the corticosteroid should be discontinued. It may necessary to step down to a lower potency steroid from a moderate or high potency product to prevent flare-ups. Barrier creams and emollients should be continued [10].

Referral[2]

Coordinate referral request to dermatologist if the eczema is moderate or severe, atypical, not responding to prescribed treatment, or posing issues with recurrent bacterial or viral infections.

APPENDIX

SECTION A: SUPPLEMENTAL CLINICAL MANAGEMENT INFORMATION

TABLE 1
Client-specific Triggers[2; 3; 7; 8]

ENVIRONMENTAL	DIRECT CONTACT	EMOTIONAL OR PHYSIOLOGIC	FOOD RELATED
- Aeroallergens or environmental allergens (e.g., smoke, carpet fibres, dust and dust mites, pollens, animal dander) - Cold and dry weather - Changes in the weather - Overheating	- Chemical irritants (e.g., fabric softeners, harsh detergents or soaps, bubble baths, shower gels) - Toiletries containing alcohol, astringents, fragrances - Sweat or saliva - Rough, abrasive or non-breathable clothing fabrics	- Infections, particularly viral illnesses - Psychosocial stress	- Cow's milk, eggs, citrus foods, soy, wheat, seafood

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline.

REFERENCES

1. Eichenfield LF, Tom WL, Chamlin SL, Feldman SR, Hanifin JM, Simpson EL, et al. Guidelines of care for the management of atopic dermatitis: Section 1. Diagnosis and assessment of atopic dermatitis. J Am Acad Dermatol [Internet]. 2014 Feb [cited 2017 June 11];70(2):338-51. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4410183/pdf/nihms598033.pdf

2. Tollefson MM, Bruckner AL; Section On Dermatology. Atopic dermatitis: skin-directed management. Pediatrics [Internet]. 2014 Dec [cited 2017 June 11];134(6):e1735-44. Available from: http://pediatrics.aappublications.org/content/pediatrics/134/6/e1735.full.pdf

3. Eczema Help [Internet]. Keswick, ON: Exzema Society of Canada; c2009 - 2017. Managing eczema guide; 2017 [cited 2017 June 11]. [about 15 p.]. Available from: https://eczemahelp.ca/wp-content/uploads/2017/04/ESC-Managing-Eczema-Guide-2017.pdf

4. Weston WL, Howe W. Pathogenesis, clinical manifestations, and diagnosis of atopic dermatitis (eczema). In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 June 11]. Available from: https://www.uptodate.com/contents/atopic-dermatitis-eczema-pathogenesis-clinical-manifestations-and-diagnosis

5. Eichenfield LF, Tom WL, Berger TG, Krol A, Paller AS, Schwarzenberger K, et al. Guidelines of care for the management of atopic dermatitis: Section 2. Management and treatment of atopic dermatitis with topical therapies. J Am Acad Dermatol [Internet]. 2014 Jul [cited 2017 June 11];71(1):116-32. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4326095/pdf/nihms598590.pdf

6. Weston WL, Howe W. Treatment of atopic dermatitis (eczema). In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 June 11]. Available from: https://www.uptodate.com/contents/treatment-of-atopic-dermatitis-eczema with authorized username and password.

7. Lio PA, Lee M, LeBovidge J, Timmons KG, Schneider L. Clinical management of atopic dermatitis: practical highlights and updates from the atopic dermatitis practice parameter 2012. J Allergy Clin Immunol Pract. 2014;2(4):361-9.

8. Wolter S, Price HN. Atopic dermatitis. Pediatr Clin North Am. 2014 Apr;61(2):241-60.

9. Watson W, Kapur S. Atopic dermatitis. Allergy Asthma Clin Immunol. 2011 Nov 10;7 Suppl 1:S4.

10. Medsask [Internet]. Saskatoon, SK: University of Saskatchewan; c2017. Atopic dermatitis - guidelines for prescribing topical corticosteroids; [cited 2017 June 11]; [about 15 p]. Available from: https://medsask.usask.ca/professional/guidelines/atopic-dermatitis.php

OTHER SOURCES

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON: Health Canada; 2016.

HEMANGIOMA

OVERVIEW

Please refer to provincial/territorial guidelines for Hemangioma, where available.

Infantile hemangiomas are common vascular tumours of infants and children.[1] Most are benign and self-limiting although some cause complications such as ulceration or life-altering disfigurement.[2] Generally, they are absent at birth and develop by 1 to 4 weeks of age.[1]

Clinical course varies, but there is typically a sequence of proliferation, latency, and involution, with the latent phase starting around 1 year and a return to a more neutral skin color over the next 5 to 7 years.[1] A subclassification system divides infantile hemangiomas based on depth of tissue involvement. These include superficial, compound (mixed-type), and deep and reticular hemangiomas. Further subdivision is determined by pattern of distribution as either focal, multifocal, segmental, or indeterminate.[1] Determining the subclassification category is important as it influences treatment.[1]

CAUSES

Most cases occur sporadically (i.e., no cause is known).[3]

ASSESSMENT

Medication review: Review current medications, including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[1; 2]

- Gender (female)
- Race (white, non-Hispanic)
- Prematurity
- Multiple gestations
- Advanced maternal age
- Placental anomalies (e.g., placenta previa, pre-eclampsia)

HISTORY OF PRESENT ILLNESS[1; 2]

Review risk factors and collect history of present illness.

- There are multiple lesions in up to 20% of affected infants, especially multiple births.
- Hemangiomas often occur in the head and neck but may affect the trunk and extremities.
- Rapid proliferation of blood vessels occurs in the first year of life with lesion size reaching about 80% by age 3 to 6 months.

- Dimension or colour may change over time with the spontaneous involution phase generally late in the first year and continuing over a variable number of years.
- Complicated hemangiomas (approximately 10%) may present with airway obstruction, hemorrhage, ulceration, heart failure, functional impairment (e.g., affecting vision), or cosmetic disfigurements.

PHYSICAL FINDINGS

Perform a physical examination using the IPPA approach.

Cutaneous Hemangiomas[1]

Superficial Hemangiomas

- Referred to as capillary/strawberry hemangioma or capillary/strawberry nevus
- Bright red, slightly elevated, noncompressible

Deep Hemangiomas

- Referred to as cavernous hemangioma
- Soft, warm, slightly bluish colour

Mixed Hemangiomas

- Both superficial and deep components

Extracutaneous Hemangiomas

Airway hemangiomas may result in airway obstruction that presents as initial hoarseness, stridor, loud breathing, cough and/or cyanosis and progress to respiratory failure.[3]

For information regarding the different types of extracutaneous hemangiomas and their respective signs see *Table 1*.

TABLE 1
Types of extracutaneous hemangiomas[3]

EXTRACUTANEOUS HEMANGIOMA	SIGNS
Auditory canal hemangioma	Obstruction of the external auditory canal that results in decreased auditory conduction that may delay speech development
Eyelid or periorbital hemangioma	May compromise normal visual development and some (subcutaneous periocular hemangiomas) may cause exophthalmos or globe displacement
Hemangiomas in the liver, brain, or gastrointestinal tract	May (rarely) cause life-threatening complications

EXTRACUTANEOUS HEMANGIOMA	SIGNS
Facial hemangioma*	May be associated with central nervous system malformations or ophthalmic vessel anomalies[2]
Tongue, oral cavity, or aerodigestive tract	May (rarely) interfere with eating, swallowing, or speech

*PHACE syndrome is the presence of a large segmental hemangioma, usually on the face or head, in association with 1 or more congenital malformations (e.g., posterior fossa and cerebral vascular anomalies as well as cardiac and ocular abnormalities). PHACE, also known as PHACES, is an acronym for **P**osterior fossa malformations–**h**emangiomas–**a**rterial anomalies– **c**ardiac defects– **e**ye abnormalities–**s**ternal cleft and supraumbilical raphe syndrome. It is a cutaneous condition characterized by multiple congenital abnormalities.

DIFFERENTIAL DIAGNOSIS[4]

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

- Vascular malformations: port-wine stains, telangiectatic nevi
- Vascular tumours
- Nonvascular lesions (e.g., neurofibroma, infantile fibrosarcoma, dermatofibrosarcoma protuberans, rhabdomyosarcoma, nasal glioma, dermoid cysts, and infantile myofibroma)

COMPLICATIONS[1; 3; 5; 6]

Complications will vary depending on the type of hemangioma and may include:

- Ulceration and associated local infections
- Hemorrhage
- Airway obstruction
- Visual impairment
- Heart failure
- Severe thrombocytopenia or bleeding
- Permanent disfigurement (skin exhibits telangiectasia, hypopigmentation, scars)

DIAGNOSTIC TESTS

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability.

– The diagnosis of hemangioma is based on clinical presentation.[4]

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT [2]

– Prevent or treat life-threatening complications.

– Prevent or minimize disfigurement.

– Prevent impairment or functional complications.

– Adequately treat ulceration to minimize scarring, bleeding, infection, and pain.

– Manage psychological distress for client/family/caregiver(s).

NON-PHARMACOLOGICAL INTERVENTIONS

Interventions

– Most infantile hemangiomas do not require medical or surgical intervention; most are benign and managed via "watchful waiting."[3; 6]

Client Education

– Reassure parent(s)/caregiver(s) and provide some expectations of the clinical course, for example, the duration of involution and possible residual changes (i.e., about 50% are gone by age 5 years, 70% by age 7, and 90% by age 9, although course is variable).[7]

– Counsel parent(s)/caregiver(s) to return for further assessment if there is no improvement in signs and symptoms of presenting condition.

– For extracutaneous hemangioma, discuss with parent(s)/caregiver(s) the potential complications of hemangioma and advise to seek medical attention if condition deteriorates.

– Counsel parent(s)/caregiver(s) about appropriate use of medications; dose, frequency, importance of adherence, potential side effects, and interactions.

PHARMACOLOGICAL INTERVENTIONS[2; 5; 6; 8]

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

– Infants with complicated hemangiomas are more likely to require systemic treatment, including medical or surgical therapy (including laser treatment) or a combination.

– The approach should be individualized and based on location, size, and severity of complications.

– Medications such as propranolol, systemic corticosteroids, and other treatment options may be considered by a pediatric dermatologist or vascular anomalies specialist.

MONITORING AND FOLLOW-UP

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

- Measure the hemangioma at each visit to determine regression.
- Monitor vital signs as indicated by client's condition.
- Monitor disease progression and development of complications.
- If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP

- Follow-up visits will depend on client's clinical condition.

Referral

- Arrange for medical evacuation if clinically indicated.
- For complicated hemangiomas, coordinate referral request to a pediatric dermatologist or vascular anomalies team.[6]

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline

REFERENCES

1. Keller RG, Patel KG. Evidence-based medicine in the treatment of infantile hemangiomas. Facial Plast Surg Clin North Am. 2015 Aug;23(3):373-92.

2. Metry DW. Infantile hemangiomas: management. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 9]. Available from: https://www.uptodate.com/contents/infantile-hemangiomas-management with authorized username and password.

3. Metry DW. Infantile hemangiomas: epidemiology, pathogenesis, clinical features and complications. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 9]. Available from: https://www.uptodate.com/contents/infantile-hemangiomas-epidemiology-pathogenesis-clinical-features-and-complications with authorized username and password.

4. Metry DW. Infantile hemangiomas: Evaluation and diagnosis. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 9]. Available from: https://www.uptodate.com/contents/infantile-hemangiomas-evaluation-and-diagnosis with authorized username and password.

5. Drolet BA, Frommelt PC, Chamlin SL, Haggstrom A, Bauman NM, Chiu YE, et al. Initiation and use of propranolol for infantile hemangioma: report of a consensus conference. Pediatrics [Internet]. 2013 Jan [cited 2017 Jun 9];131(1):128-40. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3529954/pdf/peds.2012-1691.pdf

6. Shayan YR, Prendiville JS, Goldman RD. Use of propranolol in treating hemangiomas. Can Fam Physician [Internet]. 2011 Mar [cited 2017 Jun 9];57(3):302-3. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3056677/pdf/0570302.pdf

7. Patient education (the basics). Hemangiomas. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; [nd]; [cited 2017 Jun 9]. Available from: https://www.uptodate.com/contents/table-of-contents/patient-information/the-basics with authorized username and password.

8. Hochman M. Infantile hemangiomas: current management. Facial Plast Surg Clin North Am. 2014 Nov;22(4):509-21.

OTHER SOURCES

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON; Health Canada; 2016.

IMPETIGO

OVERVIEW

Please refer to provincial/territorial guidelines for Impetigo where available.

Impetigo is a highly contagious, superficial bacterial infection of the skin that can affect clients of all ages, but most often affects children 2 to 5 years of age. There are 2 types of impeptigo: nonbullous (crusted) and bullous (blisters), with nonbullous being more common (70% of cases) and more contagious.[1] Impetigo may also be classified as primary (direct bacterial invasion of normal skin) or secondary (infection of disrupted skin caused by minor trauma, insect bites, or underlying conditions such as eczema).[2; 3]

CAUSES[2]

- *Staphylococcus aureus (S. aureus)*: Causes both nonbullous and bullous types
- Group A *Streptococci* (GAS): May be a cause of the nonbullous type

TRANSMISSION[2-5]

- Usually through direct contact with an infected individual—lesions or nasal discharge
- Often spreads to surrounding skin areas by autoinoculation
- Can be spread by touching items (e.g., bed sheets, towels, or clothing) that have been in contact with an infected person's skin

INCUBATION PERIOD

- 1 to 3 days for streptococcal infections
- 4 to 10 days for staphylococcal infections[4]

COMMUNICABILITY

Impetigo is communicable until 24 hrs after antibiotic initiation.[5-7]

ASSESSMENT

Medication review: Review current medications, including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[2; 3; 6; 8]

- Warm, humid conditions (e.g., summer months, travel to warm climates)
- Overcrowding and poverty
- Poor hygiene
- Skin trauma

- Underlying skin conditions (e.g., scabies, eczema, insect bites)
- Underlying medical comorbidities (e.g., diabetes mellitus, HIV, chemotherapy)
- Close contact (e.g., daycare, schools)
- Malnutrition
- Carrier of *S. aureus* and/or GAS

HISTORY OF PRESENT ILLNESS[2-4]

Review risk factors and collect history of present illness.

- Lesions may be pruritic or painful.
- Systemic symptoms are uncommon but can include fever, diarrhea, and weakness (moreso for the bullous type).

PHYSICAL FINDINGS[2; 3; 6]

The diagnosis of impetigo can be made based on evolution of lesions and physical examination. Perform a focused examination of the skin using the IPPA approach.

- Assess skin lesions and secondary sites, such as nails and hair, as well as regional lymph nodes.

Nonbullous Impetigo

- Papules, vesicles, and pustules that quickly rupture to form honey-golden adherent crusts usually on the face (around the nose and mouth) or extremities
- Regional lymphadenitis may occur

Bullous Impetigo

- Flaccid, fluid-like bullae that rupture and leave a thin brown crust with a collarette of scales around the periphery
- Typically on the trunk, axilla, and extremities, and in intertriginous (diaper) areas

DIFFERENTIAL DIAGNOSIS[2; 3]

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

A number of blistering and rash disorders including:

- Bullous form:
  - Autoimmune blistering diseases (e.g., pemphigus)
  - Bullous drug eruption
  - Burns
  - Contact dermatitis
  - Insect bites
- Nonbullous form:

- Atopic dermatitis
- Contact dermatitis
- Cutaneous Candidiasis
- Pediculosis (lice)
- Scabies
- Viral infections such as herpes and varicella (chickenpox)

COMPLICATIONS[2; 3; 6; 8]

– Cellulitis
– Lymphangitis
– Septicemia
– Osteomyelitis
– Spetic arthritis
– Guttate psoriasis
– Staphylococcal scalded skin syndrome
– Rheumatic fever
– Acute poststreptococcal glomerulonephritis (due to GAS-related impetigo): most often occurs within 1 to 2 weeks and common findings include edema, hypertension, fever, and hematuria

DIAGNOSTIC TESTS[2; 3]

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability. Testing should be carried out as per provincial/territorial policies and procedure and guided by client's clinical presentation.

– Diagnosis is nearly always clinical.
– Obtain swab for culture and sensitivity testing of pus or bullous fluid if first-line therapy fails .

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT [3; 6]

– Resolve infection.
– Prevent spread/recurrence of infection.
– Relieve symptoms.

– Improve cosmetic appearance.

– Prevent complications.

NON-PHARMACOLOGICAL INTERVENTIONS[2-9]

Client Education

– Counsel client/family/caregiver(s) about condition.

– Children can return to school 24 hours after beginning an effective antimicrobial therapy and draining lesions should be kept covered.

– Counsel client/family/caregiver(s) about prevention (i.e., spreading of the infection to others and worsening of current infection by autoinoculation):

- Discourage touching/scratching the lesions (trim fingernails).
- Avoid newborns.
- Avoid sharing personal items (e.g. towels, face cloths, bed sheets).
- Wash washable toys and sponge off non-washable soft toys thoroughly with a cloth that has been dampened by detergent and warm water / wrung out. Allow toys to dry completely.
- Apply warm saline compresses to soften and soak away crusts 4 times a day for 15 minutes, or as needed, and/or wash crusted lesions gently with soap and water and pat dry before applying topical antibiotic therapy.
- Lesions that are draining should be kept covered with a loose dressing (light gauze).
- Topical disinfectants (e.g., hydrogen peroxide) are not recommended due to lack of evidence.

– Counsel client/family/caregiver(s) about the importance of appropriate handwashing to reduce transmission, particularly after touching infected skin (e.g., when applying topical antibiotic).

– Counsel client/family/caregiver(s) about appropriate use of medications; dose, frequency, importance of adherence, potential side effects, and interactions.

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

Topical Antibiotic Therapy[2; 3; 6; 11]

- Recommended as first-line for clients who have only a localized and/or limited number of lesions (versus oral therapy, has fewer side effects and lower risk for contributing to bacterial resistance)

– Over-the-counter (OTC) antibiotic ointments is not recommended; they are not as effective and may cause contact dermatitis.

Mupirocin[11]

Adults and children greater than or equal to 2 months of age:

- Mupirocin 2% ointment or cream; apply sparingly to affected areas TID for 5 days [10]

Fusidic Acid[12]

- Should be reserved for impetigo that has not responded to a standard 5 day course of topical mupirocin
- Sodium fusidate 2% (ointment)/Fusidic acid (cream) 2%; apply sparingly to affected areas BID-TID for 5 days.

Oral Antibiotic Therapy[2; 3; 6; 10]

– Recommended for:

- Clients with numerous lesions, fever, or evidence of systemic disease
- Immunocompromised clients or those with valvular heart disease
- Clients in whom infection has not improved with topical therapy within 24-48 hours
- Community outbreaks, including those complicated by poststreptococcal glomerulonephritis

– In patients with both scabies and impetigo, it is important to treat the scabies in order to optimize the response of impetigo to antibiotic therapy and thereby reduce the prevalence of impetigo in areas of scabies prevalence.

– Duration of therapy should be for 7 days but this can be extended if the clinical response is inadequate and antibacterial susceptibility has been confirmed.

– Resistance rates vary regionally, so be familiar with local resistance patterns.

– Unless cultures reveal only GAS, the oral antibiotic prescribed for impetigo and ecthyma should be effective for the treatment of both *S. aureus* and GAS.

Preferred Treatment[11]

Cephalexin

Adults

- Cephalexin 250 or 500 mg PO QID

Children greater than 1 year of age

- Cephalexin 50 to 100 mg/kg in 24 hours PO divided QID;
- Maximum 4,000 mg in 24 hours

Cloxacillin

Adults

- Cloxacillin 250 to 500 mg PO QID

Children

- Erythromycin estolate 30 to 40 mg/kg in 24 hours divided QID

OR

- Azithromycin 10 mg/kg OD first day, then 5 mg/kg OD x 4 days

Alternate Treatment: If Known or Suspected Allergy to Penicillin and/or Cephalosporin

Clindamycin

Adults

- Clindamycin 150 to 300 mg PO QID

Children

- Clindamycin 10 to 20 mg/kg in 24 hours PO divided TID or QID;
- Maximum 1,800 mg in 24 hours

MRSA

If MRSA is suspected and/or confirmed, treatment with 1 of the following is recommended: clindamycin, doxycycline (in children greater than 8 years of age), or trimethoprim-sulfamethoxazole. For more information, see FNIHB Adult Care Clinical Practice Guidelines – *Chapter 9 – Skin – Methicillin-Resistant Staphylococcus Aureus*.

Pregnant or Breast-feeding Women

Mupirocin, cloxacillin, cephalexin, and erythromycin(with the exception of the estolate salt) may be used. **Do not use** doxycycline or trimethoprim-sulphamethoxazole.

MONITORING AND FOLLOW-UP

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP[3; 6]

– Follow up in 2 to 3 days to assess response to treatment.

– Improvement should occur within a single course of appropriate antibiotic treatment and with appropriate environmental measures.

– Follow-up may be necessary if there is no improvement after completing treatment or at any time if there is worsening of the client's condition (e.g., fever; the possibility of resistant pathogens or an incorrect diagnosis may then be considered).

Referral

Coordinate referral request as required.

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline.

REFERENCES

1. Cole C1, Gazewood J. Diagnosis and treatment of impetigo. Am Fam Physician [Internet]. 2007 Mar 15 [cited 2017 Aug 15];75(6):859-64. Available from: http://www.aafp.org/afp/2007/0315/p859.pdf

2. Hartman-Adams H, Banvard C, Juckett G. Impetigo: diagnosis and treatment. Am Fam Physician [Internet]. 2014 Aug [cited 2017 Jun 13];15;90(4):229-35. Available from: http://www.aafp.org/afp/2014/0815/p229.pdf

3. Baddour LM. Impetigo. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 13]. Available from: https://www.uptodate.com/contents/impetigo with authorized username and password.

4., State Government of Victoria, Australia, Department of Health & Human Services [Internet]. Victoria, Australia: State of Victoria; c2017. Impetigo - school sores; [cited 2017 Jun 13]; [about 4 p.]. Available from: https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/impetigo-school-sores

5. CaringforKids [Internet]. Ottawa, ON: Canadian Pediatric Society; c2017. Impetigo; 2013 [cited 2017 Jun 13]; [about 2 p.]. Available from: http://www.caringforkids.cps.ca/handouts/impetigo

6. College of Registered Nurses of British Columbia - Remote Nursing Certified Practice [Internet]. Vancouver, BC: c2017. Pediatric impetigo; 2014 [cited on 2017 Jun 15]; 6 p. Available from: https://www.crnbc.ca/Standards/CertifiedPractice/Documents/RemotePractice/776PediatricImpetigoDST.pdf#search=impetigo with authorized username and password

7. HealthyChildren.org [Internet]. Itasca, IL; American Academy of Pediatrics; c2009. Impetigo; [updated 2015 Nov 11; cited 2017 Jun 13]; [about 2 p.]. Available from: https://www.healthychildren.org/English/health-issues/conditions/skin/Pages/Impetigo.aspx

8. National Health Service, Choices, Health A – Z – Conditions and Treatments [Internet]. London, England; c2017. Impetigo – treatment; [cited 2017 Jun 13]; [about 6 p.]. Available from: http://www.nhs.uk/conditions/impetigo/Pages/Introduction.aspx

9. Koning S, van der Sande R, Verhagen AP, van Suijlekom-Smit LW, Morris AD, Butler CC, et al. Interventions for impetigo. 2015 Jan 18 [cited 2017 Jun13]. In: Cochrane Database System Reviews [Internet]. Hoboken, NJ: John Wiley & Sons, Ltd. c1999 - . Available from: http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD003261.pub3/epdf/standard

10. Stevens DL, Bisno AL, Chambers HF, Dellinger EP, Goldstein EJ, Gorbach SL, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. 18. Clin Infect Dis. 2014 Jul 15;59(2):e10-52.

11. MUMS Health. Anti-infective guidelines for community-acquired infections (2013th ed.). Toronto: MUMS Guideline Clearinghouse; 2013.

12. Miller, Penny F. Bacterial Skin Infections: Impetigo, Furuncles and Carbuncles. In: Therapeutics [Internet]. Ottawa (ON): Canadian Pharmacists Association; c2016 [updated October 2016; cited 2017 Dec 04]. Available from: https://www.e-therapeutics.ca

OTHER SOURCES

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON; Health Canada; 2016.

The Hospital for Sick Children. 2015 drug handbook and formulary. Hudson, OH: Lexi-comp Inc.; 2015.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Cephalexin; 2015 [accessed 2017 May 20]. Available from: www.online .lexi.com with authorized username and password.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Clindamycin; 2015 [accessed 2017 May 20]. Available from: www.online .lexi.com with authorized username and password.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Cloxacillin; 2015 [accessed 2017 May 20]. Available from: www.online .lexi.com with authorized username and password.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Erythromycin; 2015 [accessed 2017 May 20]. Available from: www.online .lexi.com with authorized username and password.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Mupirocin; 2015 [accessed 2017 May 20]. Available from: www.online .lexi.com with authorized username and password.

The Hospital for Sick Children. 2015 drug handbook and formulary. Hudson, OH: Lexi-comp Inc.; 2015.

MUMS Health. Anti-infective guidelines for community-acquired infections (2013th ed.). Toronto: MUM Guideline Clearinghouse; 2013.

MOLLUSCUM CONTAGIOSUM

OVERVIEW

Please refer to provincial/territorial guidelines for Molluscum Contagiosum where available.

Molluscum contagiosum is a benign, localized, viral infection of the skin consisting of flesh-coloured papules, some with central umbilication. Humans are the only known hosts.[1-3] A common disease of childhood (particularly ages 1 to 10),[4] the disease also occurs in healthy adolescents and adults, often as a sexually transmitted disease or in relation to participation in contact sports.[1] The papules usually resolve within 2 months, and the infection generally clears completely within 6 to12 months without scarring, although may persist for up to 4 years.[1; 2; 4] Immunocompromised people (e.g., those with HIV) can develop severe, persistent cases of molluscum contagiosum.[1]

CAUSES

Molluscum contagiosum virus (a pox virus)[1]

TRANSMISSION[1]

- Direct skin-to-skin contact
- Autoinoculation by scratching (e.g., anogenital lesions in children), shaving, or touching a lesion
- Fomites (e.g., clothing and towels, bathing sponges, pool equipment, toys)
- Person-to-person by sexual contact; classed as sexually transmitted infection (STI) if skin infection occurs in the genital region in sexually active individuals

INCUBATION PERIOD

Typically 2 to 6 weeks but may be as long as 6 months[1]

ASSESSMENT

Medication review: Review current medications, including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[1; 2; 4]

- Individuals with the following tend to have more widespread and prolonged eruptions:
  - Atopic dermatitis (eczema) due to frequent breaks in the skin (although this is controversial)[1]
  - Immunocompromising condition or on immunosuppressant drug(s)
  - HIV
- Previous molluscum contagiosum infection
- Close contact with infected individual

– People who live in warm, humid climates where living conditions are crowded

– Sexual contact with infected individual

HISTORY OF PRESENT ILLNESS[1]

Review risk factors and collect history of present illness.

– May have pruritus

PHYSICAL FINDINGS[1-4]

Perform a physical examination using the IPPA approach.

– 1 to 20 firm, dome-shaped papules, 2 to 5 mm in diameter

– Papules are usually white, pink, flesh-coloured, pearly, and shiny with a central indentation and possibly a stalk

– Evidence of scratching; lesions sometimes become visibly inflamed

– May appear anywhere on the body:

  - Most common areas include the trunk, axillae, antecubital and popliteal fossa, inguinal folds
  - Rarely seen on the palms or soles

– Papules, typically involving the groin, genitals, proximal thighs and lower abdomen in sexually transmitted molluscum contagiosum

– Lesions may be large (giant molluscum) or widespread in HIV-infected and immunocompromised individuals

– If the eyelid is involved, possible conjunctivitis

– Eczematous patches surrounding the papules, occurring in 10% of patients (molluscum dermatitis)

DIFFERENTIAL DIAGNOSIS[1; 4]

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

– Fungal infections (e.g., cryptococcosis, histoplasmosis, and coccidioidomycosis)

– Verruca vulgaris (common warts)

– Basal cell carcinoma

– Keratoacanthoma (common low-grade skin tumour)

– Genital lesions, such as condyloma acuminata (genital warts) and vaginal syringomas (non-cancerous and harmless tumors of sweat ducts)

COMPLICATIONS[1; 4-6]

– Bacterial infection secondary to scratching, particularly in those who are immunocompromised

– Conjunctivitis from papules on the eyelid

– Scarring from scratching

DIAGNOSTIC TESTS

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability. Molluscum contagiosum may be diagnosed by the characteristic appearance of the papules. Diagnostic tests are not usually required.[1]

Laboratory

Testing should be carried out as per provincial/territorial policies and procedures. The tests below are for consideration.

- If the papules are in the genital area, testing for other STIs may be considered.
- Patients with extensive lesions should be tested for HIV infection and the possibility of other immune system disorders should also be considered.
- For more information on testing for STIs, see *Canadian Guidelines on Sexually Transmitted Infections, Section 4 – Syndromic Management and Treatment of Specific Syndromes* at www.phac-aspc.gc.ca/std-mts/sti-its/cgsti-ldcits/section-4-1-eng.php.

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT [1]

– Prevent spread to other body sites.

– Prevent transmission to others.

– Resolve pruritus, when present.

– Prevent scarring from lesions that become inflamed, traumatized, or secondarily infected.

– Reduce patient or parental psychological stress over the appearance of lesions.

NON-PHARMACOLOGICAL INTERVENTIONS

As molluscum contagiosum is usually self-limited in healthy individuals, treatment is not generally recommended, although the disease remains contagious.[1; 4; 7]

Client Education

– For strategies to prevent spread of infection, see *Prevention* in *Appendix, Section A.*

– Counsel client/family/caregiver(s) about appropriate use of medications; dose, frequency, importance of adherence, potential side effects, and interactions.

PHARMACOLOGICAL INTERVENTIONS[1; 4; 6; 7]

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

- If asymptomatic, emollients may be used.[1]
- If symptomatic, consultation with a physician/nurse practitioner is required prior to decision to treat molluscum contagiosum.
- Depending on the therapy, treatment can cause adverse effects, such as pain, irritation, dyspigmentation, or scarring (particularly in darker-skinned people);[1; 6] however, treatment is recommended for:[1]
  - Sexually transmitted molluscum contagiosum to prevent the spread of infection to others
  - Immunocompromised conditions (treated early as the condition can become severe)

Cryotherapy

- Physical destruction of the papules may include cryotherapy with liquid nitrogen or curettage (i.e., the piercing of the core and scraping of caseous material).[1; 4]
  - Cryotherapy with liquid nitrogen: cotton-tipped swab dipped in liquid nitrogen and applied to the individual papule for 6-10 seconds. It is a painful procedure, particularly for young children and in cases where there are multiple papules.[1]
  - If cryotherapy is ordered, consider using a topical anesthetic.[4]

Topical Anesthetic[8]

- Apply Lidocaine prilocaine (EMLA® cream) 1 gram per 10 cm^2 topically to the cryotherapy site approximately 1 hour prior to procedure.
- Wipe off prior to the procedure.

Keratolytic Topical Agent[1]

Podophyllotoxin 0.5% (Condyline®) may be ordered by the physician/nurse practitioner. Podophyllotoxin is contraindicated in pregnancy and lactation and safety has not been established for young children. It is not for use in clients who have diabetes mellitus or poor circulation. Nor is it for use concurrently with steroids. Local erythema, burning, pruritus, inflammation, and erosions can occur.

Topical Anti-inflammatory[1]

For pruritis, a low or medium potency topical corticosteroid may be considered.[1]

Low-potency Topical Corticosteroid[1]

Apply a thin layer of Hydrocortisone 1% cream topically to affected areas once daily or BID for 1 to 2 weeks.

Or

Medium-potency Topical Corticosteroid

Apply a thin layer of Betamethasone valerate 0.1% cream topically to the affected area once daily or BID for 1 to 2 weeks.

MONITORING AND FOLLOW-UP

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

If administering an agent with risk of anaphylaxis, monitor the client closely for at least 30 minutes.

FOLLOW-UP

- Follow up in 1 to 2 weeks as clinically indicated.
- Monitor for resolution of papules and for signs of infection.

Referral

Coordinate referral request to dermatologist as required.

APPENDIX

SECTION A: SUPPLEMENTAL CLINICAL MANAGEMENT INFORMATION

Prevention[1; 4; 6]

- The best way to prevent the spread of molluscum infection is by following good hand washing and good hygiene habits.
- There should be no shaving or electrolysis on areas with papules.
- People should avoid touching, scratching and picking at the papules as these actions can spread the virus to other parts of the body and spread the infection to others.
- When possible, the bumps should be covered with clothing or a bandage to avoid scratching and spreading the virus.
- The affected skin should be kept clean and dry. Any time there is no risk of others coming into contact with the skin (such as at night sleeping) the lesions can be left uncovered.
- Clothing articles, towels, washcloths, clothing, or other personal items should not be shared.
- People with molluscum should not take part in contact sports like wrestling, basketball, and football unless all lesions can be covered by clothing or bandages.
- Activities that use shared gear like helmets, baseball gloves and balls should also be avoided unless all lesions can be covered.
- Swimming should also be avoided unless all lesions can be covered by watertight bandages.
- Personal items such as towels, goggles, and swim suits should not be shared and other items and equipment such as kick boards and water toys should be used only when all lesions are covered by clothing or watertight bandages.
- Male and female condoms may not be fully protective as the virus can be on areas of the skin not covered by the condom; however, condoms should still be used to protect against other sexually transmitted infections and HIV.

– When all the papules are gone, the virus is gone. New papules mean reinfection.

– Children may attend school or daycare with care taken to reduce the risk of transmission to others.

SECTION B: SUPPLEMENTAL RESOURCES

Other Resources

BC Centre for Disease Control
Health Info, Diseases & Conditions: Molluscum contagiosum at www.bccdc.ca/health-info/diseases-conditions/molluscum-contagiosum

BC Centre for Disease Control
HealthlinkBC: Molluscum contagiosum at www.healthlinkbc.ca/healthlinkbc-files/molluscum-contagiosum

US Centres for Disease Control and Prevention: Molluscum contagiosum at www.cdc.gov/poxvirus/molluscum-contagiosum/

BIBLIOGRAPHY

The following References and Other Sources have informed the updating of this Clinical Practice.

REFERENCES

1. Isaacs SN. Molluscum contagiosum. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc., 2017 [cited 2017 Jun 18]. Available from: https://www.uptodate.com/contents/molluscum-contagiosum#!

2. Kimberlin SS, Brady DW, Jackson MT. Molluscum contagiosum. In: Long MA, editor. Red book online, 30th edition [Internet]. Elk Grove Village, IL: American Academy of Pediatrics; 2015. [cited 2017 Jun 18]. Available from: https://redbook.solutions.aap.org/chapter.aspx?sectionid=88187190&bookid=1484 with authorize username and password.

3. Public Health Agency of Canada, Infections Diseases. Canadian guidelines on sexually transmitted infections: Syndromic management of sexually transmitted infections [Internet]. Ottawa, ON; The Agency; [2017] - . Section 4 - Management and treatment of specific syndromes: Ecoparasitic infestations (pubic lice, scabies); [modified 2013 Feb 1; cited 2017 Jun 20]; [about 15 p.]. Available from: http://www.phac-aspc.gc.ca/std-mts/sti-its/cgsti-ldcits/section-5-3-eng.php.

4. Centres for Disease Control and Prevention [Internet]. Atlanta, GA: The Centres; [2017] -. Molluscum contagiosum; [reviewed 2015 May 11; updated 2015 May 11; cited 2017 Jun 20]; [about 10 screens.]. Available from: http://www.cdc.gov/poxvirus/molluscum-contagiosum/

5. Mayo Clinic, Patient Care & Health Information, Diseases & Conditions [Internet]. Rochester, MN: Mayo Foundation for Medical Education and Research; [1998] - . Molluscum contagiousum; 2015 Mar 21 [cited 2017 Jun 20]; [about 5 p.]. Available from: http://www.mayoclinic.org/diseases-conditions/molluscum-contagiosum/basics/definition/con-20026391 [Produced by Mayo Clinic Staff].

6. Toronto Public Health [Internet]. Toronto, ON; City of Toronto; 1998 - . Molluscum; [updated 2014 Jan; cited 2017 Jun 20]; [about 2 p.]. Available from: https://www.toronto.ca/community-people/health-wellness-care/diseases-medications-vaccines/molluscum-contagiosum-fact-sheet/.

7. American Academy of Dermatology [Internet]. Schaumburg, IL; [2017] - . Molluscum contagiosum; [cited 2017 Jun 20]; [about 7 p.] Available from: https://www.aad.org/public/diseases/contagious-skin-diseases/molluscum-contagiosum

8. Astra [Internet]. Westborough, MA: Astra USA, Inc.; n.d. EMLA® cream; 2000 [cited 2017 Jun 20]; [about 15 p.]. Available from: https://www.accessdata.fda.gov/drugsatfda_docs/label/2000/19941S11LBL.PDF

OTHER SOURCES

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

MONGOLIAN SPOTS

OVERVIEW

Please refer to provincial/territorial guidelines for Mongolian Spots where available.

Mongolian spots, also known as congenital dermal melanocytosis, are benign, flat, congenital birthmarks most commonly seen on the back or buttocks at birth or in the first few weeks of life.[1; 2] They appear as blue-grey, blue-black, greenish-blue or brown macules (or nevi) with indefinite borders.[1; 2] Most fade (at least somewhat) by 2 years of age, and by 5[3] or 10[2] years of age, they have usually disappeared, although about 3% remain into adulthood, particularly those in extrasacral locations.[2]

CAUSES

Mongolian spots result from the delayed disappearance of dermal melanocytes.[2]

ASSESSMENT

Medication review: Review current medications, including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS

Mongolian spots are commonly seen in infants of Indigenous, African, Asian, Hispanic, Middle Eastern, Mediterranean, and bi-racial descent.[1-3]

HISTORY OF PRESENT ILLNESS

Review risk factors and collect history of present illness.

- Birthmark present at birth
- Birthmark reported by parent after birth

PHYSICAL FINDINGS[1-5]

Perform a physical examination using the IPPA approach.

- Spots are non-tender and blue-grey, blue-black, greenish-blue, or brown with indefinite borders.
- The most common location is the buttocks or back, followed by the shoulders. They rarely occur on the scalp, head, face, or flexor surfaces of the extremities.
- The diameter of the lesion may vary from a few cm to more than 20 cm.
- It is important to document the appearance and size on presentation to avoid confusion with bruises in the event child abuse is suspected.

DIFFERENTIAL DIAGNOSIS[1; 2; 4; 6; 7]

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

- Blue nevi appear mainly on the scalp, face, dorsa of hands and feet, and have a raised irregular surface with discrete borders; they are rare in children.
- Nevus of Ota is blue-grey and may be mottled in appearance rather than uniform. The ophthalmic (V1), and/or maxillary (V2) branches of the trigeminal nerve are involved.
- Nevus of Ito involves the shoulder area. Its appearance is similar to Nevus of Ota.
- Café-au-Lait macules are tan to dark brown and usually uniform. They may be present at birth or appear during early childhood, often first becoming noticeable following sun exposure. They measure from a few millimeters to 15 cm in size and may be an early manifestation of neurofibromatosis.
- Traumatic bruising is sometimes suspected on presentation of mongolian spots and other non-traumatic skin findings and may be inaccurately interpreted as evidence of child abuse. However, bruises change colour and shape over a period of days.
    - If there are concerns about maltreatment, see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 5 – Child Maltreatment* and child protection provincial/territorial policies.

COMPLICATIONS

None

DIAGNOSTIC TESTS

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings and test availability. No tests are recommended.[4]

MANAGEMENT

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

NON-PHARMACOLOGICAL INTERVENTIONS

Client Education

Reassure parent(s)/caregiver(s) that mongolian spot(s) fade over time with most disappearing by the time the child is 5 years of age, some as late as 6 to 10 years of age.[2; 3]

PHARMACOLOGICAL INTERVENTIONS

No pharmacologic interventions are required.

MONITORING AND FOLLOW-UP

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

No monitoring is required.

FOLLOW-UP

Monitor the infant and the size and appearance of the mongolian spot(s) with usual neonatal/infant follow-up appointments.

Referral

- No referral is required for mongolian spots.
- Coordinate referral request as required to a dermatologist for infant with Nevi of Ota or Blue Nevi or other unusual lesions.
  - Infants with Nevus of Ota should be followed yearly for ophthalmologic examinations and parent(s)/caregiver(s) should be educated regarding the clinical signs of ocular and cutaneous melanoma.[6]

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline

REFERENCES

1. McLaughlin MR, O'Connor NR, Ham P. Newborn skin: Part II. Birthmarks. Am Fam Physician [Internet]. 2008 Jan [cited 2017 Jun 21];1;77(1):56-60. Available from: http://www.aafp.org/afp/2008/0101/p56.pdf

2. Pielop JA. Benign skin and scalp lesions in the newborn and young infant. In:Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 21]. Available from: https://www.uptodate.com/contents/benign-skin-and-scalp-lesions-in-the-newborn-and-infant with authorized username and password.

3. CaringforKids [Internet]. Ottawa, ON: Canadian Paediatric Society; c2017. Your baby's skin; [cited 2017 Jun 21]; [about 4 p.]. Available from: http://www.caringforkids.cps.ca/handouts/your-babys-skin

4. Great Ormond Street Hospital for Children [Internet]. London, England: Great Ormond Street Hospital for Children NHS Foundation Trust; c2017. Mongolian blue spots; [cited 2017 June 21]. Available from: http://www.gosh.nhs.uk/medical-information/mongolian-blue-spots with authorized username and password.

5. Gupta D, Thapta M. Mongolian spots. Indian J Dermatol Venereol Leprol [Internet]. 2013 Jul-Aug [cited 2017 Aug 15];79(4):469-78. Available from: http://www.ijdvl.com/article.asp?issn=0378-6323;year=2013;volume=79;issue=4;spage=469;epage=478;aulast=Gupta.

6. Ward MG, Ornstein A, Niec A, Murray CL; Canadian Paediatric Society, Child and Youth Maltreatment Section. The medical assessment of bruising in suspected child maltreatment cases: A clinical perspective. Paediatr Child Health [Internet]. 2013 Oct [cited 2017 Jun 21];18(8):433-42. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3887084/pdf/pch18433.pdf

7. Schaffer JV, Bolognia JL. Benign pigmented skin lesions other than melanocytic nevi (moles). In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 June 21]. Available from: https://www.uptodate.com/contents/benign-pigmented-skin-lesions-other-than-melanocytic-nevi-moles authorized username and password.

PEDICULOSIS (LICE INFESTATION)

OVERVIEW

Please refer to provincial/territorial guidelines for Pediculosis (Lice Infestation) where available.

Pediculosis capitis (head lice), pediculosis corporis (body lice), and pediculosis pubis (pubic lice) are disorders caused by an infestation of 1 of 3 distinct varieties of lice that specifically infest humans.[1-4] Lice are blood-sucking parasites that are the size of a sesame seed (pubic are smaller).[5] An allergic reaction to lice saliva and bites leads to intense itching, erythema, skin irritation, and inflammation.[4-7] Symptoms may take 2 to 6 weeks to develop after the first exposure, but subsequent infestations result in pruritus within several days of exposure.[5; 6]

CAUSES, TRANSMISSION, INCUBATION PERIOD, RISK FACTORS

TABLE 1
Causes, Transmission, Incubation Period, Risk Factors for Pediculosis

TYPE AND CAUSE	TRANSMISSION	INCUBATION PERIOD AND LIFE CYLE	RISK FACTORS
Head lice (*Pediculus humanus capitis*)[4-8]	Direct head-to-head contact (lice do not jump, fly, or use pets as vectors) Contact with contaminated items (controversial)*	Egg to adult: 14 days Life span is about 30 days Die in 1 to 2 days off host (though eggs can survive off host for up to 3 days)	Young school children; more common in females Household members or caregiver(s) of young children (Not a sign of poor hygiene or a disease vector)
Body lice (*Pediculus humanus corporis*)[2; 5]	Direct contact Contact with contaminated items* Can transmit diseases (e.g., trench fever, epidemic of typhus, relapsing fever)	Incubate in clothing (seams) Egg to adult: 14 days Life span is about 30 days Can survive 3 days without a blood meal	Communal bed, crowding, poor hygiene, lack of access to bathing or clean clothes (e.g., homeless, transient individuals)

TYPE AND CAUSE	TRANSMISSION	INCUBATION PERIOD AND LIFE CYLE	RISK FACTORS
Pubic lice (*Phthirus pubis*, crab louse)[3; 5; 9]	Intimate sexual, non-sexual contact Pubic lice in eyelashes or eyebrows of a child may be an indication of sexual exposure Contact with contaminated items*	Egg to adult: 14 to 21 days Life span is 21 to 30 days Die in 1 day off host	Teenagers and young adults are most commonly affected Sexual contact Presence of other sexually transmitted infections (STIs)

*Contaminated items include clothing, beds, bed linen, towels, and personal items (e.g., combs, hair brushes). Additional risk factors for contacting any type of pediculosis may be a history of previous infestation or a close contact with a recent infestation of lice.

ASSESSMENT

Medication review: Review current medications, including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

HISTORY OF PRESENT ILLNESS

Review risk factors and collect history of present illness.

TABLE 2
Reported Symptoms of Pediculosis

PEDICULOSIS	SYMPTOMS
Head Lice[4; 5]	- May be asymptomatic - Pruritus is the most common symptom; may have difficulty sleeping, irritability - The first infestation may take 4 to 6 weeks for itching to start
Body Lice[2]	- Intense pruritus, scratching; may have difficulty sleeping
Pubic Lice[3; 9]	- Intense pruritus, erythema, skin irritation and inflammation in the pubic area and sometimes the axillae - Extensive infestation can be associated with mild fever and malaise

PHYSICAL FINDINGS

Perform a focused examination of the head, body and genital region skin using the IPPA approach.

TABLE 3
Physical Findings on Examination

PEDICULOSIS	DESCRIPTION	PHYSICAL FINDINGS
Head Lice[4; 6-8]	Nits: oval, yellow to white; 0.8 x 0.3 mm diameter, attached firmly to hair shaft near the scalp Adults: tan to grey-white; 2 to 4 mm long (size of a sesame seed)	- Found on scalp, around ears, nape of neck; sometimes in eyelashes and eyebrows - Erythema, skin irritation, inflammation, excoriation
Body Lice[2]	Nits: oval, yellow to white; 0.8 x 0.3 mm diameter Can be found in seams of clothing or in bedding Adults: tan to grayish-white 2 to 4 mm long (size of a sesame seed)	- Found in clothing or on body - Erythema, skin irritation, inflammation, excoriation - Small blue spots where the louse has bitten - May have thickened, discoloured patches around the waist, groin, or upper thighs
Pubic Lice[3; 9]	Nits: oval, yellow to white, 0.8 x 0.3 mm diameter, attach to hair shaft Adults: tan to greyish-white; 1.5 to 2 mm long and flattened. The 2 front legs are large; look like crab pincers	- Found in hair of pubic area, sometimes found on coarse hair elsewhere (e.g., eyebrows, eyelashes, beard, mustache, chest, axilla) - Erythema, skin irritation, excoriation - Small blue-slate spots where lice have bitten on lower abdomen, proximal thighs, or buttocks (heavy or prolonged infestation) - May have inguinal lymphadenopathy

Note: If pubic nits or lice are found on a child, including the eyebrows or eyelashes, consider sexual abuse and consult with physician/nurse practitioner.[3]

DIFFERENTIAL DIAGNOSIS

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

TABLE 4
Differential Diagnosis of Pediculosis

PEDICULOSIS	DIFFERENTIAL DIAGNOSIS
Head Lice[4-6; 8]	- Skin conditions such as seborrheic dermatitis and atopic dermatitis - Dandruff, hair spray debris, or dirt particles - Hair casts, white and black piedra (fungal infections of the hair shaft)
Body Lice[2]	- Scabies (may have simultaneous infestations with body lice and scabies) - Atopic or contact dermatitis - Pruritus secondary to a systemic disease - Neurodermatitis
Pubic Lice[3]	- Scabies - Trichomycosis axillaris (corynebacteria are found on hair shafts) - White piedra (fungal infection of the hair shaft)

COMPLICATIONS[3; 4]

– Secondary bacterial infections with local lymphatic involvement

– Conjunctivitis when eyelashes/eyebrows affected

DIAGNOSTIC TESTS

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability.

– The definitive diagnosis of head lice infestation requires the detection of a living louse; detection of nits alone does not indicate active head lice infestation.[7]

– The diagnosis of body lice is based on seeing lice or nits in clothing, especially in the seams, and may be seen crawling or feeding on skin.[2]

– Diagnosis of pubic lice is based on seeing nits or lice in the genital region (lice may look like scabs).[3; 9]

- Wetting the hair with water using a fine-tooth comb may improve ability to diagnose head lice infestation.[4]
- A magnifying lens and/or microscope can be useful.[2; 3]

Laboratory

Testing should be carried out as per provincial/territorial policies and procedures. If client presents with pubic lice, other sexually transmitted infections (STIs) should be considered.[3]

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT [2-4]

- Eradicate the infestation.
- Prevent spread.
- Prevent recurrence.

NON-PHARMACOLOGICAL INTERVENTIONS

Client Education

Counsel and advise parent(s)/caregiver(s)/client about the following:

- Fumigation is not necessary.[1]
- Itching may persist for up to 2 weeks, even after effective treatment.[5]
- For ways to eradicate and prevent reinfestation/spreading of lice, see *Application of Permethrin 1% Cream Rinse* and *Eradication of Lice and Prevention* in *Appendix, Section A.*
- Appropriate use of medications; dose, frequency, importance of adherence, potential side effects, and interactions.

Head Lice[4; 6-8]

- Head lice infestations are common, may be asymptomatic for weeks, and are not a sign of lack of cleanliness.
- Children with head lice should be treated and may attend school or child care after treatment. Follow provincial/territorial policies and procedures.
- Household members should be examined and treated if infested (live lice or nits within 1 cm of the scalp detected). Bedmates should be treated prophylactically.
- Environmental cleaning is not warranted. At most, washing items that have been in close or prolonged contact with the head (e.g., hats, pillowcases, brushes) may be warranted.
- Brushes and combs should be soaked in a disinfectant solution (e.g., rubbing alcohol for 10-20 minutes) or in hot water (at least 50°C for 5–10 minutes) [10]

– Wet-combing of the hair is worth trying (safe and low cost) although it takes time to complete and the combing steps must be followed carefully and completely.
  - Use a generous amount of hair conditioner and a special lice comb.
  - Perform every 3 to 4 days for 2 weeks to catch newly hatched lice.
  - Brush or comb the hair to remove tangles.
  - Insert the comb near the crown until it gently touches the scalp, then draw firmly down and look for lice after each stroke.
  - Comb the entire head systematically at least twice.

- Head lice screening programs have not been proven to be effective although parent education programs may be useful.

– Provide educational handouts to parent(s)/caregiver(s)/family and if age appropriate to client (e.g., *Head lice* at http://www.caringforkids.cps.ca/handouts/head_lice).

Body Lice and Pubic Lice[2; 3; 9]

– Emphasize the importance of improving hygiene with regular changes of clean clothing and bedding.

– Bedding and clothing should be machine washed in hot water and dried in a hot dryer, dry cleaned, or sealed in a plastic bag for at least a week; ironing is helpful with a focus on the seams.

– Vacuum the mattress.

– Non-sexual household contacts do not need to be treated if they have no signs of infestation.

– If pubic lice, advise client to avoid sexual contact with their sex partner(s) until both the client and their partners have been successfully treated and re-evaluated to rule out persistent infestation.

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

Permethrin 1% Cream Rinse[1-9] – Head Lice, Body Lice, Pubic Lice

– Treatment should be initiated for an active infestation of head lice and for pubic lice; it may be considered for body lice (for more information, see *Application of Permethrin 1% Cream Rinse* in *Appendix, Section A).*

– For infants 2 months of age or older, children, adolescents, and adults: Permethrin 1% lotion or shampoo is the treatment of choice.

– All household members and other close contacts should be checked:
  - Individuals with evidence of an active infestation should be treated at the same time as the client.
  - Prophylactic treatment may be appropriate for individuals sharing the same bed with client.

– Permethrin is not to be used to treat pediculosis of the eyelashes; the recommended treatment is to apply an occlusive ophthalmic ointment to the eyelid margins BID for 10 days.[9]

– A second application (two applications 7 to 10 days apart) is recommended when a case of active infestation is detected. [7]

Pyrethrin, piperonyl butoxide Shampoo + Conditioner – Head Lice Only

– Apply thoroughly to dry hair and scalp that does not have residue from a conditioner, gel, cream or other grooming product

– An acceptable treatment for confirmed cases of head lice in children ≥2 months of age

- It should be noted that an itchy or burning sensation on the scalp after treatment with insecticidal shampoo is common and does not does not indicate reinfestation and need for retreatment. If two permethrin / pyrethrin applications 7 days apart do not eradicate live lice, consider administering a full treatment course using a medication from another class.([12])

Isopropyl myristate 50% / ST-cyclomethicone 50% solution (Resultz rinse) – Head Lice Only

- For use in permethrin / pyrethin resistant head lice
- Thoroughly apply to dry hair and scalp
- 30–60 mL for short hair, 60–90 mL for shoulder-length hair, 90–120 mL for long hair
- Keep product on hair and scalp for 10 min
- Rinse off with warm water
- Repeat in 7 days
- Not recommended for use on infants or children <4 years of age

Topical Anti-inflammatory

A topical corticosteroid may relieve the itching and inflammation that may persist after successful treatment.[2; 9]

Low-potency Topical Corticosteroid

Hydrocortisone 1% cream; apply a thin layer topically to affected areas BID for 1 to 2 weeks.

Oral Antihistamine/Antipruritic[8; 9]

Pruritis may be controlled with antihistamines such as hydrOXYzine or diphenhydrAMINE

Note: Diphenhydramine may cause sedation or paradoxical excitement in children

DiphenhydrAMINE

2 Years to Less than 6 Years of Age

- DiphenhydraAMINE (Benadryl®) 6.25 mg PO at bedtime PRN

6 Years to Less than 12 Years of Age

- DiphenhydrAMINE (Benadryl®) 12.5 to 25 mg PO at bedtime PRN

12 Years of Age or Greater

- DiphenhydrAMINE (Benadryl®) 25 to 50 mg PO at bedtime PRN

HydrOXYzine

Greater than 18 years of Age

- HydrOXYzine 25 mg PO at bedtime PRN

MONITORING AND FOLLOW-UP

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP

For head lice, check for 2 to 3 weeks to be sure all lice and nits are gone.[1]

Referral

Coordinate referral request as required.

Reporting[8; 9]

– Pediculosis is not reportable to local public health authorities; partner notification is also not required.

– Follow provincial/territorial policies and procedures.

– If pubic nits or lice are found on a child, including the eyebrows or eyelashes, consider sexual abuse and consult with physician/nurse practitioner, and follow provincial/territorial policies and procedures for reporting.

APPENDIX

SECTION A: SUPPLEMENTAL CLINICAL MANAGEMENT INFORMATION

Application of Permethrin 1% Cream Rinse

Head Lice[1; 4; 6]

- Shaving the head is not required or recommended.
- Before applying treatment, remove clothing that can become wet or stained during treatment .
- Wash hair with conditioner-free shampoo, rinse with water, and towel dry.
- Apply a sufficient amount of Permethrin 1% Cream Rinse to saturate the damp hair and scalp (especially behind the ears and nape of neck), leave on hair for 10 minutes, rinse off with warm water, remove remaining nits with nit comb, and put on clean clothing.
- Rinsing of the treatment should be performed over a sink rather than in a shower or bath to limit skin exposure.
- Rinsing with warm water is preferred over hot water to minimize vasodilation and systemic absorption.
- Ch**e**ck the head, scalp, behind the ears and nape of neck in about 8 to 12 hours, and comb remaining live or dead lice out of the hair using a fine–toothed nit comb.
    - If a few live lice are still found 8 to12 hours after treatment but they are moving more slowly than before, do not retreat – the medicine may take longer to kill all the lice.
    - If after 12 hours of treatment, no dead lice are found, and lice seem as active as before, the medicine may not be working, and a different medication may be needed.
- Check the hair and use a fine-toothed comb or nit-removal comb to remove nits and lice every 2 to 3 days for 2 to 3 weeks to be sure all lice and nits are gone.
- To allow the treatment to continue to work, do not rewash the hair for 1 to 2 days after the treatment.

Body Lice[1; 2]

- If hygiene is maintained and items are laundered appropriately at least once per week, treatment may not be needed.
- Sometimes the individual with body lice needs treatment with Permethrin 1% Cream Rinse. If it is necessary, apply it to the affected areas as for head lice.

Pubic Lice[1; 3; 9]

- Wash the infested area and towel dry.
- Thoroughly saturate the pubic hair and other infested areas (typically also the perianal areas, thighs, trunk, and axillae) with the Permethrin 1% Cream Rinse. Leave on for 10 minutes and wash off.
- Remove remaining nits with fingernails, tweezers, or a nit comb.
- Put on clean underwear after treatment.

Eradication of Lice and Prevention of Reinfection

Advise parent(s)/caregiver(s)/client of the following ways to eradicate and prevent spread of the lice:

General Guidance[1]

- Machine wash clothing, bed linens, and other items that an infested person wore or used during the 2 days before treatment using hot water (66 degrees Celsius) and a high heat drying cycle (or seal in a plastic bag for at least a week).
- Vacuum the floor and furniture, if a vacuum is available.
- Do not share clothing, beds, bedding, and towels used by a person with lice.
- Do not use fumigant sprays or fogs as they are not effective and can be toxic if inhaled or absorbed through skin.

SECTION B: SUPPLEMENTAL RESOURCES

[British Columbia] HealthLink BC. Lice. Available from: https://www.healthlinkbc.ca/health-topics/hw51114

[Alberta Health Services] Head lice and how to treat them. Available from: http://www.albertahealthservices.ca/assets/info/school/if-sch-sh-head-lice-and-how-to-treat-them.pdf

[MyHealthAlberta.ca] Lice. Available from: https://myhealth.alberta.ca/Health/pages/conditions.aspx?hwid=hw51114

[Saskatchewan] Help control head lice. Available from: http://publications.gov.sk.ca/documents/13/74074-CD118HeadLice2017-04-03.pdf

[Manitoba] Communicable Disease Management Protocol: Pediculosis Capitis. Available from: https://www.gov.mb.ca/health/publichealth/cdc/protocol/pediculosis.pdf

[Quebec] Lice. Available from: http://sante.gouv.qc.ca/en/problemes-de-sante/poux/

[Nova Scotia] Guidelines for Treatment of Pediculosis Capitis (Head Lice). Available from: https://novascotia.ca/dhw/publications/Public-Health-Education/Head_Lice_Guidelines_for_Treatment.pdf

[PEI] So you have an itch? Survival Guide for Parents: Preventing and Treating Head Lice. Available from: http://www.gov.pe.ca/photos/original/hpei_headlice.pdf?_ga=2.247066884.1039557215.1497807294-860644273.1497807294

[Newfoundland and Labrador] What you need to know about head lice. Available from: http://www.health.gov.nl.ca/health/publichealth/cdc/infectioncontrol/head_lice%20.pdf

[Yukon] Head lice. Available from: https://www.ykhealthguide.org/downloads/headlice.pdf

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline

REFERENCES

1. Centers for Disease Control and Prevention [Internet]. Atlanta, GA: The Centres: c2017. Lice; [reviewed 2013 Sep 24; updated 2014 Sep 24; cited 2017 Jun 16]; [about 2 p.]. Available from: https://www.cdc.gov/parasites/lice/

2. Goldstein AO, Goldstein BG. Pediculosis corporis. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 16]. Available from: https://www.uptodate.com/contents/pediculosis-corporis with authorized username and password.

3. Goldstein AO, Goldstein BG. Pediculosis pubis and pediculosis ciliaris. In: Post TW, editor. UpToDate [Internet]. Waltham, MA; UpToDate Inc.; 2017 [cited 2017 Jun 16]. Available from: https://www.uptodate.com/contents/pediculosis-pubis-and-pediculosis-ciliaris with authorized username and password.

4. Goldstein AO, Goldstein BG (2015). Pediculus capitis.In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 16]. Available from: https://www.uptodate.com/contents/pediculosis-capitis with authorized username and pasword.

5. Gunning K, Pippitt K, Kiraly B, Sayler M. Pediculosis and scabies: treatment update. Am Fam Physician [Internet]. 2012 Sep 15 [cited 2017 Jun 16];86(6):535-41. Available from: http://www.aafp.org/afp/2012/0915/p535.pdf

6. Devore CD, Schutze GE. Head Lice. Pediatrics [Internet]. 2015 May [cited 2017 Jun 16];135 (5) e1337-e1354. Available from: http://pediatrics.aappublications.org/content/pediatrics/135/5/e1355.full.pdf.

7. Carl Cummings, Jane C Finlay, Noni E MacDonald; Canadian Paediatric Society, Community Paediatrics Committee Paediatr Child Health 2018 23;(1) e18–e24 Available from http://www.cps.ca/documents/position/head-lice

8. Manitoba Public Health Branch, Communicable disease management protocol [Internet]. Winnipeg, MB: The Branch; c2017. Pediculosis capitis (head lice); 2014 July [cited 2017 Jun 16]; [about 7 p.]. Available from: from https://www.gov.mb.ca/health/publichealth/cdc/protocol/pediculosis.pdf

9. Public Health Agency of Canada, Infectious Diseases. Canadian guidelines on sexually transmitted infections [Internet]. Ottawa, ON: The Agency; 2017. Section 5 - Management and treatment of specific syndromes: Ectoparasitic infestations (pubic lice, scabies); [modified 2013 Feb 1; cited 2017 Jun 16]; [about 7 p.]. Available from: http://www.phac-aspc.gc.ca/std-mts/sti-its/cgsti-ldcits/section-5-3-eng.php. (Accessed on June 16, 2017.)

10. Knowles, Sandra and Neil Shear. Scabies and Lice. In: Therapeutics [Internet]. Ottawa (ON): Canadian Pharmacists Association; c2016 [updated June 2017; cited 2017 Dec 04]. Available from: http://www.myrxtx.ca with authorized username and password.

12. Canadian Paediatric Society Head lice infestations: A clinical update. Carl Cummings, Jane C. Finlay, Noni E. MacDonald. Canadian Paediatric Society, Community Paediatrics Committee, Ottawa, Ontario 2018

Other Sources

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. Ottawa, ON: Health Canada: 2016.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Diphenhydramine (Benadryl®); 2015. Available from : www.online .lexi.com with authorized username and password.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Hydrocortisone; (Topical) 2015. Available from: www.online.lexi.com with authorized username and password.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Hydroxyzine; 2015. Available from: www.online.lexi.com with authorized username and password.

POISON IVY DERMATITIS

OVERVIEW

Please refer to provincial/territorial guidelines for Poison Ivy Dermatitis where available.

Poison ivy dermatitis is a common type of allergic contact dermatitis resulting from contact with an allergenic oil, urushiol, found in the poison ivy plant.[1] The inflammatory response occurs within 12 to 48 hours.[1-3] Left untreated, the dermatitis usually resolves in 1 to 3 weeks.[1; 4]

If difficulty breathing or swallowing occurs, see FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 20 – General Emergencies and Major Trauma and arrange for medical evacuation.

Poison Ivy Plants[3]

- Plants grow as straggling or climbing woody vines on sandy, stony, or rocky shores, and sprout in thickets, in clearings, and along the borders of woods and roadsides.
- Poison ivy is found in every province except Newfoundland.
- Plants have three pointed leaflets that are reddish in the spring, green in the summer, and various shades of yellow, orange, or red in the fall.
  - The middle leaflet has a much longer stalk than the two side ones.
  - Leaflet edges can be smooth or toothed (rarely lobed) and vary greatly in size, from 8 to 55 mm in length.
  - Clusters of cream to yellow-green flowers appear in June and July.
  - Berries appear by September and are clustered, round, waxy, and green to yellow.
- Direct contact with a dead plant can still cause dermatitis.

CAUSES[3-5]

- Exposure to urushiol (allergenic oil) present in all parts of the poison ivy plant (i.e., roots, stems, leaves, and flowers)
  - Dermatitis results from contact with the poison ivy plant itself or with a surface that has picked up the urushiol (e.g., pet fur, tools, clothing, sports equipment).
  - Burning poison ivy plants releases particles of urushiol into the air which can be inhaled, leading to a rash on the lining of the lungs and causing extreme pain and possibly fatal breathing problems.
  - Eating poison ivy may cause damage to the digestive tract, airway, kidneys, or other organs.
- Poison ivy dermatitis (including blister fluid) is not contagious and cannot be passed either from person to person or from autoinoculation.

ASSESSMENT

Medication review: Review current medications including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[1; 3]

– Sensitivity to urushiol
  - Other plants with urushiol: poison oak, poison sumac, mango, ginkgo, and cashew (nutshells)
– Amount of urushiol in contact with an individual's skin

HISTORY OF PRESENT ILLNESS

Review risk factors and collect history of present illness.

The following may be reported by the client:[1]

– Rash with intense pruritus
– Symptoms appearing 12 to 48 hours after exposure to poison ivy

PHYSICAL FINDINGS[1; 3; 4; 6]

Perform a physical examination using the IPPA approach.

Note: Difficulty breathing or swallowing is a medical emergency and requires medical evacuation.[6]

– Erythema is a common presenting sign.
– Clients may develop papules or plaques, vessicles, and/or bullae that may ooze.
– Lesions are characteristically arranged in linear or streak-like configurations where the plant has made contact with the skin.
– Lesions may occur in different locations at different times after exposure depending on the amount of urushiol present and the thickness of the affected areas.
– Swelling is a sign of a serious reaction, particularly swelling of the eyes and face.

DIFFERENTIAL DIAGNOSIS[1]

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

– Contact dermatitis from other plant and non-plant causes (e.g., nickel)
– Arthropod reactions:
  – Pruritic burrows of scabies, which may be mistaken for poison ivy dermatitis but do not generally appear as vesicles
  – Bedbug bites, which can be linear and pruritic and may occasionally present as vesicles or bullae

COMPLICATIONS[1]

Secondary bacterial skin infection

DIAGNOSTIC TESTS

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability.

The diagnosis of poison ivy dermatitis is based on history of exposure and characteristic physical findings (e.g., well-demarcated contact dermatitis, particularly with linear streaks).

MANAGEMENT

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT

- Relieve symptoms.
- Prevent secondary bacterial infection.
- Prevent further transmission (e.g., from clothing, pets).

NON-PHARMACOLOGICAL INTERVENTIONS

Client Education

- Advise parent(s)/caregiver(s)/client about the importance of washing the affected areas with cold water (avoid hot water as it can open the pores and allow resin to be absorbed) and mild soap as soon as possible after exposure (ideally within less than 10 minutes), including under the fingernails.
- Alcohol (1/2 cup to 1/2 cup of water) or vinegar (2 tablespoons in 1 cup of water) are alternatives if soap is not available.[1; 3]
- Advise parent(s)/caregiver(s)/client to wash everything that may have been contaminated with the urushiol (e.g., clothing, tools) with hot, soapy water prior to reuse.[1; 3]
  - Wash clothing separately from anything else to avoid further contamination.[3]
  - Wear gloves when handling items that may be contaminated.[3]
  - Items may require repeat washing to remove all of the urushiol.[3]
  - Hang items outside to dry for several days.[3]
- Advise parent(s)/caregiver(s)/client to avoid scratching the affected skin, as this may cause an infection and/or scarring.[4; 7]
- Advise parent(s)/caregiver(s)/client to leave blisters alone even if they open. The overlying skin may protect the raw wound underneath and prevent infection.[7]
- Advise parent(s)/caregiver(s)/client that they may try to alleviate symptoms with:[1; 4; 7]

- Cool cloths on affected areas
- Short, cool showers or lukewarm baths with colloidal oatmeal preparation or baking soda

– Provide resources for additional information from The Hospital for Sick Children (SickKids) available at: www.aboutkidshealth.ca/En/HealthAZ/ConditionsandDiseases/Dermatology/Pages/poison-ivy.aspx.

– Counsel parent(s)/caregiver/client about appropriate use of medications: dose, frequency, importance of adherence, potential side effects, and interactions.

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

– Topical antihistamines, anesthetics and antibiotics should be avoided as they are not effective treatments for poison ivy and may cause irritation or allergic reactions[10].

– Topical treatment with calamine lotion may provide symptomatic relief.[1]

- Apply Calamine lotion topically to affected area(s) PRN.

– Antihistamines are generally not effective in treating the pruritus associated with poison ivy dermatitis as it is not caused by histamine release.[1]

- However, sedation from some oral antihistamines (e.g., diphenhydrAMINE [Benadryl®]) may be helpful for clients who have difficulty sleeping due to pruritus.[1]

Note: Diphenhydramine may cause sedation or paradoxical excitement in children.

Corticosteroids

– For mild cases of poison ivy dermatitis, a low-potency topical corticosteroid (e.g., hydrocortisone) may help:[7]

- Apply a thin layer of Hydrocortisone 1% cream topically to affected area(s) BID to TID for no more than 10 to 14 days.[11]

– For moderate to severe cases of poison ivy dermatitis, consult physician/nurse practitioner for more potent topical or systemic corticosteroids.

MONITORING AND FOLLOW-UP

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP

– Poison ivy dermatitis is usually self-limiting; reassess as clinically indicated.

– Advise parent(s)/caregiver(s)/client to return to the clinic if there are signs of infection developing (e.g., fever, and/or purulent discharge, pain, swelling, and warmth around the rash).[8]

REFERRAL

– Arrange for medical evacuation if clinically indicated.

– Coordinate referral request as required.

APPENDIX

SECTION A: SUPPLEMENTAL CLINICAL MANAGEMENT INFORMATION

Prevention[9]

– The best way to prevent poison ivy dermatitis is to avoid contact with poison ivy plants: "leaves of three, let them be."

– If planning to be in areas where poison ivy may be found, wear protective clothing:

- Long sleeves and pants
- Boots
- Heavy-duty vinyl gloves

– Certain types of barrier creams may prevent poison ivy dermatitis by blocking urushiol absorption.

– After coming in contact with poison ivy:

- Remove contaminated clothing.
- Wash skin and areas under fingernails with soap and water as soon as possible.
- Wash everything (e.g., clothing, shoes) that may have come into contact with urushiol.

– Do not burn or eat poison ivy.

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline.

REFERENCES

1. Prok L, McGovern T. Poison ivy (Toxicodendron) dermatitis. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 28]. Available from: https://www.uptodate.com/contents/poison-ivy-toxicodendron-dermatitis with authorized username and password.

2. Weston WL. Contact dermatitis in children. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 28]. Available from: https://www.uptodate.com/contents/contact-dermatitis-in-children with authorized username and password.

3. Government of Canada, Home and Garden Safety [Internet]. Ottawa, ON: Government of Canada; c2017. Poison Ivy; [cited 2017 Jun 28]; [about 5 p.]. Available from: https://www.canada.ca/en/health-canada/services/home-garden-safety/poison-ivy.html

4. Silver S. Poison ivy. In: AboutKidsHealth [Internet]. Toronto, ON: The Hospital for Sick Children; 2014 [cited 2017 Jun 28]. [about 3 p.] Available from: http://www.aboutkidshealth.ca/En/HealthAZ/ConditionsandDiseases/Dermatology/Pages/poison-ivy.aspx

5. American Academy of Dermatology, Public & Patients, Diseases & Treatments [Internet]. Rosemont, IL; 2017. Poison ivy, oak, and sumac: Causes; [cited 2017 Jun 28]; [about 2 p.] Available from: https://www.aad.org/public/diseases/itchy-skin/poison-ivy-oak-and-sumac#causes

6. American Academy of Dermatology, Public & Patients, Diseases & Treatments [Internet]. Rosemont, IL; 2017. Poison ivy, oak, and sumac: Overview; [cited 2017 Jun 28]; [about 2 p.]. Available from: https://www.aad.org/public/diseases/itchy-skin

7. American Academy of Dermatology, Public & Patients, Diseases & Treatments [Internet]. Rosemont, IL; 2017. Poison ivy, oak, and sumac: Tips; [cited 2017 Jun 28]; [about 7 p.] Available from: https://www.aad.org/public/diseases/itchy-skin/poison-ivy-oak-and-sumac

8. American Academy of Dermatology, Public & Patients, Diseases & Treatments [Internet]. Rosemont, IL; 2017. Poison ivy, oak, and sumac: Treatment; [cited 2017 Jun 28]; [about 2 p.]. Available from: https://www.aad.org/public/diseases/itchy-skin/poison-ivy-oak-and-sumac#treatment

9. Prok L, McGovern T. Patient information: Poison ivy (Beyond the basics). In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 28]. Available from: https://www.uptodate.com/contents/poison-ivy-beyond-the-basics with authorized username and password.

10. Pharmacists Letter [Internet] [no place of publication]: Therapeutics Research Centre LLC; c2017. Clinical Resource, Poison Ivy, Oak and Sumac; [cited 2017 Jun 28]. Available from: http://pharmacistsletter.therapeuticresearch.com/cat4921-OTCs-Poison-Ivy/Browse.aspx?s=PL with authorized username and password.

11. Sibbald D., Atopic, Contact, and Stasis Dermatitis. In: Therapeutics [Internet]. Ottawa (ON): Canadian Pharmacists Association; c2016 [updated February 2017; cited 2017 November 2]. Available from: http://www.myrxtx.ca with authorized username and password.

OTHER SOURCES

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON; Health Canada; 2016.

Lexicomp Online [Internet]. Hudson, OH: Lexi-Comp, Inc. Hydrocortisone; 2016 [accessed 2017 Jun 28]. Available from: www.online .lexi.com with authorized username and password.

POLYMORPHIC LIGHT ERUPTION

OVERVIEW

Please refer to provincial/territorial guidelines for Polymorphic Light Eruption where available.

Polymorphic light eruption is a type of photosensitivity disorder (sometimes called "sun poisoning" or "sun allergy"). It is a chronic skin rash caused by an abnormal reaction to visible light.[1] Lesions occur primarily on sun-exposed skin (e.g., face, upper chest and 'V' of the neck, dorsal hands, and extensor forearms),[2] but may also occur in unexposed areas.[1] It is less common in children than adults; however, pediatric onset can persist into adulthood.[2; 3]

CAUSES[1; 3]

– Exposure to ultraviolet radiation (both UVA and UVB)

– Family history in 15% to 46% of clients

– May be a cell-mediated immune response to unknown allergens

ASSESSMENT

Medication review: Review current medications including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[1; 4]

- Family history of hereditary polymorphic light eruption
- More common in females:
  - Fair-skinned individuals are the most commonly affected but there is also increased frequency in Indigenous people of North and South America as well as in Finns.
- Occurs more frequently in temperate regions

HISTORY OF PRESENT ILLNESS

Review risk factors and collect history of present illness.

– Obtain condition-specific additional history including:[5]

- Age of onset
- Length of time between exposure and appearance of eruption
- Description of eruption, including symptoms, duration and location
- Seasonal variation
- Family history

- Time spent outdoors

– The following may be reported by the client:[1; 6; 7]
  - Onset or exacerbations usually occuring in the spring and summer and resolution going into fall and winter
  - Recurrance each year after the first incident
  - Significant pruritus
  - Ocular and/or lip lesions
  - Other more rare symptoms such as fever, chills, headache, or nausea

PHYSICAL FINDINGS

Perform a physical examination of both sun-exposed and unexposed area.[5]

– The most common presentation is clusters of 2-5 mm pink or red papules; however, there may be redness, scaling, edema, itching or burning, and blistering (not often seen) following an acute exposure.[2; 7; 8]

– Less commonly, lesions resemble insect bites or erythema multiforme.[1]

– Eczematous changes can occur as a secondary response to rubbing and scratching.[1]

– Skin lesions develop symmetrically on sun-exposed areas (e.g., bridge of nose, forehead, chin, ears, upper chest, the "V" of the neck, back of the arms, and occasionally shoulders and lower legs), but may develop in unexposed areas as well (e.g., back and buttocks).[1; 3; 9]

DIFFERENTIAL DIAGNOSIS[1;6; 10]

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

– Other photosensitivity disorders including: juvenile spring eruption (affects the ears, generally of boys) and actinic prurigo (characterised by pruritic papulonodules, crusts, excoriations, lichenification, cheilitis, and the lesions can extend into winter)

– Lupus rash

– Insect bites

COMPLICATIONS[7]

– Secondary skin infections

– Emotional distress, anxiety and depression

DIAGNOSTIC TESTS

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability.

– Diagnosis is often based on clinical findings. Tests such as skin biopsy or bloodwork may be useful to rule out other diseases.[5-7]

MANAGEMENT

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT [2]

– Avoid and protect against sunlight .

– Relieve symptoms.

– Prevent recurrence of symptoms.

– Prevent complications.

NON-PHARMACOLOGICAL INTERVENTIONS

Client Education[5]

Note: Sunscreen alone is not sufficient sun protection and should be combined with other methods of sun protection.

– Counsel parent(s)/caregiver(s)/client about the condition and the importance of daily sun avoidance and protection:

- Avoid midday sun (between 10 a.m. and 4 p.m.).
- Wear protective clothing (e.g., long sleeved shirts, long pants, broad brim hats).
- Use broad-spectrum sunscreen daily (protects against both UVA and UVB) with a minimum sun protection factor (SPF) of 30. Apply on all parts of the body not covered by clothes and reapply every 2 to 3 hours and after sweating or swimming.
- Use window films that block UV radiation for cars and homes.
- More information on sun safety is available from the Canadian Dermatology Association at https://dermatology.ca/public-patients/sun-protection/sun-safety-every-day/

– Counsel parent(s)/caregiver(s)/client about appropriate use of medications; dose, frequency, importance of adherence, potential side effects, and interactions.

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

In patients with severe eruptions, oral steroids may be initiated after consultation with a physician or nurse practitioner.[1; 3] (Prednisone 0.5 mg/kg/day for 4 to 7 days.)

MONITORING AND FOLLOW-UP

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP

Follow up as clinically indicated.

Referral

Coordinate referral request as required.

BIBLIOGRAPHY

The following references and other sources have informed the updating of this clinical practice guideline.

REFERENCES

1. Elmets CA. Polymorphous light eruption. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc,; 2017 [cited 2017 Jun 29]. Available from: https://www.uptodate.com/contents/polymorphous-light-eruption#H2 with authorized username and password.

2. Grossberg AL. Update on pediatric photosensitivity disorders. Curr Opin Pediatr. 2013 Aug;25(4):474-9.

3. Chantorn R, Lim HW, Shwayder TA. Photosensitivity disorders in children: part I. J Am Acad Dermatol. 2012 Dec;67(6):1093.e1-18.

4. . Draelos ZK, Hansen RC. Polymorphic light eruption in pediatric patients with American Indian ancestry. Pediatr Dermatol. 1986 Nov;3(5):384-9.

5. Elmets CA. Overview of cutaneous photosensitivity: Photobiology, patient evaluation, and photoprotection. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 29]. Available from: https://www.uptodate.com/contents/overview-of-cutaneous-photosensitivity-photobiology-patient-evaluation-and-photoprotection with authorized username and password.

6. Mayo Clinic, Patient Health & Information, Diseases & Conditions. [Internet]. Rochester, MN: Mayo Foundation for Medical Education and Research; c1998 - . Polymorphous light eruption; [cited Jun 29]; [about 5 p.]. Available from: http://www.mayoclinic.org/diseases-conditions/polymorphous-light-eruption/symptoms-causes/dxc-20308959# [produced by Mayo Clinic Staff].

7. DermNet New Zealand [Internet]. Hamilton, NZ: Dermnet New Zealand Trust; c2016 - . Polymorphic light eruption; [cited 2017 Jun 29]; [about 3 p.]. Available from: http://www.dermnetnz.org/topics/polymorphic-light-eruption/

8. MedlinePlus, Medical Encyclopedia. [Internet]. Bethesda, MD: c2017. Polymorphic light eruption; 2015 [updated 2017 Apr 4; cited 2017 Jul 18]; [about 3 p.]. Available from: https://medlineplus.gov/ency/article/001477.htm

9. Stratigos AJ, Antoniou C, Katsambas AD. Polymorphous light eruption. J Eur Acad Dermatol Venereol. 2002 May;16(3):193-206.

10. Elmets CA. Photosensitivity disorders (photodermatoses): Clinical manifestations, diagnosis, and treatment. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc,; 2017 [cited 2017 Jun 29]. Available from: https://www.uptodate.com/contents/photosensitivity-disorders-photodermatoses-clinical-manifestations-diagnosis-and-treatment with authorized username and password.

OTHER SOURCES

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON; Health Canada; 2016.

RINGWORM (TINEA)

OVERVIEW

Please refer to provincial/territorial guidelines for Ringworm (Tinea) where available.

Dermatophyte infections (commonly known as ringworm) can affect all keratinized areas of the body (i.e., skin, hair, and nails).[1] The major clinical subtypes are tinea corporis (body), tinea pedis (athlete's foot), tinea cruris (jock itch), tinea capitis (scalp), and tinea unguium (nails).[2]

CAUSES[1; 2]

Dermatophytes (types of fungus or mold)

TRANSMISSION[1; 3; 4]

- Direct or indirect contact with skin or scalp lesions of infected people or animals, or fomites contaminated with desquamated epithelium (e.g., floors, shower stalls, clothing, hairbrushes)
- Via broken skin in immunocompromised individuals

INCUBATION PERIOD[1]

The incubation period is from several days to a few weeks, depending on the species and the host.

COMMUNICABILITY[1]

Ringworm presents low to moderate communicability, depending on species (transmission occurs mostly between humans and animals, with limited human-to-human transmission).

ASSESSMENT

Medication review: Review current medications including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[1-4]

- Exposure to the causative fungi from infected humans, animals, soil, or fomites, including sharing clothing, bedding, or towels with someone who has a fungal infection
- Diabetes mellitus or an immunocompromising condition,
- Conditions that increase moisture (e.g., occlusive clothing or shoes and warm humid conditions)
- Additional risks, varying with clinical subtype (more information in *Table 1, Risk Factors for Contracting Ringworm)*

TABLE 1
Risk Factors for Contracting Ringworm

CONDITION/LOCATION	RISK FACTORS AND CONTACT	GROUPS MOST AFFECTED
Tinea capitis (scalp)[5]	- Adults and children may be asymptomatic carriers - Contagious via direct contact with infected persons, animals, and contaminated clothing	Children
Tinea corporis (face, arms, legs, trunk)[2]	- May occur by direct skin contact with an infected individual or animal, contact with fomites, or from secondary spread from other sites of dermatophyte infection (e.g., scalp, feet) - Outbreaks can occur in athletes (e.g., wrestlers)	Any age group
Tinea cruris (groin)[2]	Risk factors: copious sweating, obesity, diabetes, immunodeficiency, and concomitant tinea pedis	Adolescents and young adults More common in males
Tinea pedis (feet)[2]	- Acquisition usually by direct contact with the causative organism (e.g., walking barefoot in locker rooms or swimming pool facilities) - Concomitant tinea unguium or tinea cruris	Adolescents (post-puberty) and young adults More common in males

HISTORY OF PRESENT ILLNESS

Review risk factors and collect history of present illness.

– Symptoms depend on which part of the body is infected, but they generally include:[2]
  - Itchy rash
  - Hair loss (with tinea capitis)
  - Pain, particularly with affected nails

PHYSICAL FINDINGS[3; 5]

Perform a physical examination using the IPPA approach.

– The classic lesion is an erythematous, raised, scaly ring with central clearing.

– Multiple lesions may be present.

- The severity of the infection can range from mild, scaly lesions to erythematous, exudative lesions characteristic of superimposed bacterial infections.
- Tinea capitis may involve cervical lymph nodes.
- Concomitant dermatophyte infection is common (e.g., tinea pedis, tinea cruris, tinea pedis).
- Some fungal infections can be accompanied by an hypersensitivity reaction to the fungi (i.e., auto-eczematization reaction with secondary dermatitis eruptions).

TABLE 2
Physical Findings of Ringworm

CONDITION /LOCATION	PHYSICAL FINDINGS
Tinea capitis (scalp)[5]	- Black-dot tinea capitis (from broken hairs): patchy, pruritic, scaling areas, and hair loss - Scaly patches with alopecia (from pets): single or multiple scaly patches with hair loss - Kerion: a boggy edematous painful plaque that is an intense immune response to the infection with pustules, thick crusting, and/or drainage - Flavus: a unique clinical presentation of tinea capitis with erythema with multiple cup-shaped yellow crusts (scutula)—may have an unpleasant odour and may result in scarring
Tinea corporis (face, arms, legs, trunk)[2]	- Pruritic, circular or oval, erythematous, scaling patches/plaques - Central clearing may be observed with an active advancing raised border - The result is a ring-shaped plaque - Multiple plaques may coalesce
Tinea cruris (groin)[2]	- Affects the medial and upper parts of the thigh and pubis; pruritus is common - Infection may have spread to the perineum, perianal areas, gluteal cleft or onto the buttocks - The scrotum is often not affected - Lesions are usually bilateral, scaly with red-brown centres and a clearly defined, raised border - May have vesicles
Tinea pedis (feet)[2]	Interdigital tinea pedis: pruritic, erythematous erosions or scales between the toes, especially in the third and fourth digital interspaces
	Hyperkeratotic tinea pedis: diffuse hyperkeratotic eruption involving soles and medial and lateral surfaces (resembles a moccasin distribution)
	Vesiculobullous (inflammatory) tinea pedis: pruritic, sometimes painful, vesicular or

CONDITION /LOCATION	PHYSICAL FINDINGS
	bullous eruption with underlying erythema; the medial surface of the foot often affected
Tinea unguium (nails)[6]	Accumulation of keratinous debris between the nail plate and nail bed with possibility of whitish, yellowish, or brownish discoloration bands in the nail resulting

DIFFERENTIAL DIAGNOSIS

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

TABLE 3
Differential Diagnosis of Ringworm

CONDITION	DIFFERENTIAL DIAGNOSIS
Tinea capitis (scalp)[5]	Psoriasis, alopecia areata, pediculosis (lice), seborrheic dermatitis, hair pulling Kerion: bacterial folliculitis
Tinea corporis (face, arms, legs, trunk)[2]	Sub-acute cutaneous lupus erythematous, granuloma annulare, erythema annulare centrifugum, psoriasis, nummular eczema, and pityriasis rosea
Tinea pedis (feet)[2]	Interdigital tinea pedis: erythrasma, interdigital candida infection
	Hyperkeratotic tinea pedis: atopic dermatitis, chronic contact dermatitis, chronic palmoplantar (dyshidrotic) eczema, palmoplantar psoriasis, pitted keratolysis, juvenile plantar dermatosis, keratolysis exfoliativa (peeling skin syndrome), keratodermas
	Vesiculobullous (inflammatory) tinea pedis: acute palmoplantar (dyshidrotic) eczema, acute contact dermatitis, palmoplantar pustulosis, scabies
Tinea cruris (groin)[2]	Inverse psoriasis, seborrheic dermatitis, erythrasma, candidial intertrigo
Tinea unguium (nails)[6]	Nail psoriasis, traumatic nail injury, onychogryphosis (a hypertrophy that may produce nails resembling claws or a ram's horn)

COMPLICATIONS[2; 5; 6]

- Secondary bacterial infection (particularly with tinea pedis)
- Reinfection from site to site (e.g., infected toenails may be source for recurrent tinea pedis)
- Majocchi's granulomas (ringworm invades the dermis or subcutaneous tissue)
- Pain exacerbated by nail cutting, footwear, and bed clothing due to tinea unguium
- Scarring and permanent hair loss

DIAGNOSTIC TESTS

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

The diagnosis of ringworm is based on clinical presentation. Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability.

Laboratory

Testing should be carried out as per provincial/territorial policies and procedures. The tests below are for consideration.

- Potassium hydroxide (KOH) stain testing, which provides almost immediate results[2; 3]
- Fungal swab, which may be considered if the diagnosis is uncertain, although they take several weeks[3; 5]

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT

- Relieve symptoms.
- Treat infection.
- Prevent spread/recurrence of infection.
- Prevent secondary complications.

NON-PHARMACOLOGICAL INTERVENTIONS

Client Education[4]

- Skin should be kept clean and dry.
- Keep common or shared areas clean, especially in schools, child care centers, gyms and locker rooms.
- Avoid restrictive clothing that may irritate the area, and avoid excessive sweating.
- Maintain proper hygiene (e.g., change socks frequently, wash sheets and night clothes daily).
- Avoid infected animals.

- Do not share personal items (for more information on prevention, see *Appendix, Section A*).
- Provide client/family/caregiver(s) information on ringworm:
  - Caring for Kids: *Ringworm* at www.caringforkids.cps.ca/handouts/ringworm
- Counsel client/family/caregiver(s) on appropriate use of medications; dose, frequency, importance of adherence, potential side effects, and interactions.

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary, NIHB Drug Benefit List or provincial/territorial formulary before initiating treatment.

- The treatment of ringworm depends on its location on the body and the severity of the infection.
- Some forms can be treated with over-the-counter (OTC) medications, but other forms require treatment with prescription antifungal medication.[3]

Tinea Corporis, Tinea Cruris, and Tinea Pedis

- **Topical antifungal agents**[2; 7] are the preferred treatment for tinea corporis, tinea cruris, and tinea pedis.
- A wide variety of topical agents is available in cream, gel, lotion, and shampoo formulations.
- Duration of therapy depends on type of ringworm infection.
- Continue topical treatment for 1 to 2 weeks after resolution of lesions to prevent recurrences.

Note: Topical agents mixed with corticosteroids should be avoided.

Clotrimazole[7; 8]

Children and Adults

- Clotrimazole 1% cream topically BID for 2 weeks (tinea cruris) or 4 weeks (tinea corporis, tinea pedis)

Terbinafine

Note: Terbinafine may be slightly more effective than the azoles for tinea pedis[12]

- Terbinafine can be ordered by physician/nurse practitioner through NIHB.

Tinea Capitus and Tinea Unguium

- For tinea capitis and tinea unguium, an oral antifungal agent such as terbinafine is preferred.
- Oral antifungal agents are primarily reserved for clients with extensive or refractory cutaneous infections and infections extending into the follicles or the dermis or involving nails.
- The duration of therapy will depend on the type, location, and severity of the infection.

Terbinafine

Note: terbinafine tablets are contraindicated in patients with pre-existing or active liver disease

- Terbinafine can be ordered by physician/nurse practitioner through NIHB.

Selenium Sulfide Shampoo (Adjunct Therapy for Tinea Capitis)[5; 9]

– Using shampoo with antifungal properties reduces the risk of spreading infection to others; use is recommended for household contacts for 2 to 4 weeks.

Children and adults

- Selenium sulfide 2.5% shampoo massaged into the wet scalp for at least 2 to 3 minutes, a minimum of 2 times per week

Note: Safety in infants has not been established so avoid use in children less than 2 years of age.

MONITORING AND FOLLOW-UP

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP

Follow up with client in 2 weeks to ensure resolution of tinea infection.

Referral

Coordinate referral request as requested by physician/nurse practitioner.

APPENDIX

SECTION A: SUPPLEMENTAL CLINICAL MANAGEMENT INFORMATION

Prevention

– Counsel client/family/caregiver(s) on the following tips to prevent recurrence and spread of ringworm:[12]

- Keep skin clean and dry.
- Wear shoes that allow air to circulate freely around feet.
- Do not walk barefoot in areas such as locker rooms or public showers.
- Clip fingernails and toenails short and keep them clean.
- Change socks and underwear at least once a day.
- Do not share clothing, towels, sheets, pillow cases, or other personal items.
- Athletes involved in close contact sports should shower immediately after practice sessions or matches and keep all sports gear clean. Do not share sports gear with others.

Preventing Acquisition of Ringworm from a Pet

– Ringworm can easily transfer from animals to humans, counsel client/family/caregiver(s) on the following tips to protect themselves and their pet(s):[12]

- Wash hands with soap and running water after playing with or petting pet(s).
- Wear gloves and long sleeves when handling animals with ringworm and always wash hands after handling the animal.
- If available, vacuum the areas of the home that the infected pet commonly visits to help remove infected fur or flakes.
- Disinfect areas the pet has spent time in, including surfaces and bedding (the spores of the fungus can be killed with diluted chlorine bleach or strong detergents).
- Do not handle animals with ringworm if immunocompromised (e.g., HIV/AIDS, undergoing cancer treatment or taking medications that suppress the immune system).

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline

REFERENCES

1. Public Health Agency of Canada, Laboratory Biosafety & Biosecurity. [Internet]. Ottawa, ON: The Agency; c2017. Epidermophyton floccosum, microsporum SPP., Trichophyton SPP; [cited 2017 Jun 30]; [about 7 p.]. Available from: http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/epidermophyton-eng.php

2. Goldstein AO, Goldstein BG. Dermatophyte (tinea) infections. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 30]. Available from: https://www.uptodate.com/contents/dermatophyte-tinea-infections with athorized username and password.

3. Centers for Disease Control and Prevention [Internet]. Atlanta, GA: The Centres; c2017. Ringworm information for healthcare professionals; [reviewed 2015 Dec 6; cited 2017 Jun 30]; [about 3 p.]. Available from: https://www.cdc.gov/fungal/diseases/ringworm/health-professionals.html.

4. Mayo Clinic, Patient Care & Health Information [Internet]. Rochester, MN: Mayo Foundation for Medical Education and Research; c1998 - . Ringworm (body); [cited 2017 Jun 30]; [about 3 p.]. Available from: http://www.mayoclinic.org/diseases-conditions/ringworm-body/symptoms-causes/dxc-20232319 [produced by Mayo Clinic Staff].

5. Treat JR. Tinea capitis. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc,; 2017 [cited 2017 Jun 30]. Available from: https://www.uptodate.com/contents/tinea-capitis with authorized username and password.

6. Goldstein AO, Bhatia N. Onch]omycosis: Epidemiology, clinical features, and diagnosis. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 30]. Available from: https://www.uptodate.com/contents/onychomycosis-epidemiology-clinical-features-and-diagnosis with authorized username and password.

7. Robert Bortolussi, Susanna Martin; Canadian Paediatric Society, Infectious Diseases and Immunization Committee. Antifungal agents for common outpatient paediatric infections. Paediatr Child Health [Internet]. 2007 [cited 2017 Jun 30];12(10):875-878. Available from: http://www.cps.ca/documents/position/antifungal-agents-common-infections

8. Lexicomp. Clotrimazole (topical): Drug information. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 30]. Available from: www.uptodate.com with authorized username and password.

9. Lexicomp. Selenium sulfide. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 30]. Available from: www.uptodate.com with authorized username and password.

10. Chen X, Jiang X, Yang M, González U, Lin X, Hua X, et al. Systemic antifungal therapy for tinea capitis in children. Cochrane Database Syst Rev [Internet]. 2016 May 12 [cited 2017 Jun 30];(5):CD004685. Available from: http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004685.pub3/abstract

11. Lexicomp. Fluconazole. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 30]. Available from: www.uptodate.com with authorized username and password.

12. Crawford F, Hollis S. Topical treatments for fungal infections of the skin and nails of the foot. Cochrane Database Syst Rev [Internet]. 2007 Jul 18 [cited 2017 Jun 30];(3):CD001434. Available from: http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001434.pub2/full

OTHER SOURCES

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Health Canada; 2016.

SCABIES

OVERVIEW

Please refer to provincial/territorial guidelines for Scabies where available.

Scabies is a contagious skin infestation of adult female *Sarcoptes scabiei* mites. It is characterized by an intensely pruritic and erythematous papular eruption due to a hypersensitive reaction to the proteins of the mite, its eggs, or its scybala (feces).[1; 2] It occurs 3 to 6 weeks after the first exposure although reinfections become symptomatic within several days.[1; 2] Scabies can lead to stigmatization, depression, insomnia, and significant direct and indirect financial costs.[1] See *Overview of Sarcoptes Scabiei Life Cycle* in *Appendix, Section A.*

Crusted (Norwegian) scabies is a rare form that often occurs in people who are immunocompromised. It is caused by the host's response to control the mite and results in hyperinfestation with millions of mites, severe inflammation, and a hyperkeratotic reaction (thickening of the stratum corneum).[1] Due to the burden of mites, crusted scabies is more contagious than the classic form scabies and can cause significant outbreaks.[1]

CAUSE

Microscopic adult female *Sarcoptes scabiei* mites[1; 2]

TRANSMISSION[1-4]

- Person-to-person, direct skin-to-skin contact
- Clothing, bed linens (transmission by fomite is limited as the mite can only live away from human skin for a brief time, typically 24 to 36 hours)

INCUBATION PERIOD[2]

- In individuals with no previous exposure, the incubation period is usually 3 to 6 weeks.
- Previously infested individuals are sensitized and develop symptoms 1 to 4 days after repeated exposure to the mite although these reinfestations are usually milder than the original episode.

ASSESSMENT

Medication review: Review current medications, including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[1]

- Poverty, overcrowding, malnutrition, and reduced access to health care
- Age (young children, elderly), being immunocompromised, or developmentally delayed
- Lack of clean running water (may contribute to secondary bacterial infections)

– Community-wide and institutional outbreaks (e.g., child care settings, long-term care facilities and prisons)

HISTORY OF PRESENT ILLNESS[1; 2]

Review risk factors and collect history of present illness.

– Generalized pruritus that is typically worse at night

– Rash, skin excoriations

PHYSICAL FINDINGS[1-4]

Perform a physical examination and focus on skin assessment using the IPPA approach.

– The essential lesion is a small, erythematous, nondescript papule, often excoriated and tipped with hemorrhagic crusts.

– Burrows, which are usually located between the fingers; in the flexure of the wrist, elbows, or armpits; or on the genitals or breasts; however, they can sometimes be difficult to find or may be obscured by excoriation or secondary infection (look in non-excoriated areas as well).

– In infants and elderly individuals, burrows may also be on the face, scalp, and neck, and can manifest as vesicles, pustules or nodules.

  - Burrows appear as thin, raised grayish, reddish, brownish, or skin-coloured serpentine lines that are 2 to 15 mm long.

– Secondary infections may result from scratching.

DIFFERENTIAL DIAGNOSIS[1; 2]

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

– Eczema (atopic dermatitis)

– Psoriasis

– Tinea corporis

– Impetigo

– Unusual conditions, such as Langerhans cell histiocytosis, systemic lupus, bullous pemphigoid, and papular urticaria

Note: Crusted scabies is commonly misdiagnosed as psoriasis or eczema, especially when a topical steroid has already been used.

COMPLICATIONS[1; 2; 5]

– Impetigo

– Pyoderma with *Staphylococcus aureus* and group A *Streptococcus* (GAS)

– Potential complications of bacterial infections secondary to scabies include:

  - Lymphangitis

  - Lymphadenitis

- Skin infections such as impetigo, ecthyma, and furuncles
- Extensive eczematization due to constant scratching and the application of irritating or sensitizing proprietary medications
- Sepsis
- Poststreptococcal glomerulonephritis
- Rheumatic fever

DIAGNOSTIC TESTS

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

– The clinical diagnosis is usually based on a history of pruritic rash that is typically worse at night and present in characteristic locations, especially with similar symptoms in other household members.[1; 2]

– Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability.

– Skin scrapings (for examination under a microscope) can be collected:[2]

- Find a non-excoriated papule with a fine white to gray line across the top.
- Place 2 to 3 drops of ink over the papule, leave the ink on for 5 to 10 seconds, then wipe the area clean with alcohol.
- Place a drop of mineral oil on the lesion and scrape the area with a number 15 blade or pinch it between the thumb and index finger and superficially shave the top layer of skin.
- Place the specimen on a glass slide, apply the coverslip, and examine it under the microscope at 10x magnification to identify the female adult mite (0.4 mm long), the male (0.2 mm long), the eggs, or feces

Laboratory

Testing should be carried out as per provincial/territorial policies and procedures.

MANAGEMENT

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT

– Treat scabies infestation.

– Treat all household members and close contacts, even those without symptoms.[1]

– Relieve symptoms.

– Prevent transmission.

– Prevent complications.

– Prevent reinfection.

NON-PHARMACOLOGICAL INTERVENTIONS

Client Education[1; 2]

Provide instructions and advise parent(s)/caregiver(s)/client of the following:

– See *Application of 5% Permethrin Cream or Lotion and Additional Education* and *Prevention* in *Appendix, Section A.*

– It is important that all symptomatic and asymptomatic household members and close contacts are treated at the same time as the client. Treatment may need to be repeated in 1 to 2 weeks (generally 1 week).

– Scabies mites cannot survive more than 4 days away from skin. Decontaminate items used within several days before treatment (clothing, linens, stuffed animals, etc.) by either placing in a plastic bag for a week, machine washing with hot water and then ironing, or drying in a hot dryer.

– Itching may persist or increase over several weeks despite killing the mites. Itching alone is not evidence of persistent infection but the appearance of new lesions may be considered a sign of persistent infection.

– Advise parent(s)/caregiver(s)/client to return to clinic if symptoms persist after re-treatment, there are signs of infection, or symptoms become worse.

– A client with scabies may return to child care, school, or work the day after completing the initial treatment. However, a client with crusted scabies is highly contagious—follow provincial/territorial policies and procedures regarding treatment and workplace restrictions.

– Counsel parent(s)caregiver(s)/client about appropriate use of medications; dose, frequency, importance of adherence, potential side effects, and interactions

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

Scabicides

– 5% permethrin cream or lotion is the preferred treatment, particularly for infants (safe for age 3 months and older), young children, and pregnant or nursing women.[1; 2]

– Topical medications and cosmetic use should be discontinued prior to and during treatment with a scabicide.

5% Permethrin (Cream)[1; 2; 5-7]

– For infants, young children and the elderly, use 5% permethrin cream or lotion. Apply topically in a thin layer over the scalp and face (hairline, temple, forehead), neck, whole body and under trimmed, short fingernails. Avoid the eyes and mouth.

– For older children and adolescents and adults, use 5% permethrin cream or lotion. Apply topically in a thin layer over the whole body below the head, and under fingernails trr.

– Remove the applied cream or lotion by bathing or showering 8 to 14 hours after application.

– Retreatment in 7 days may be recommended to improve efficacy.

Sulphur[1; 2; 7]

– A compounded mixture of sulphur 5-10% in petroleum jelly is an alternative treatment for infants, young children, and pregnant women.

– Applied topically in a thin layer over the whole body, face, entire head, neck, and under trimmed, short fingernails every night at bedtime for 5 to 7 nights and wash off each morning.

– Effective but not commonly used due to messy application and odour.

Oral Ivermectin[1; 2]

– Oral ivermectin as a single dose may be considered to control an institutional or community outbreak or to treat crusted scabies. It is not approved for pregnant or nursing women, or for children weighing less than 15 kg.

– Oral ivermectin is only available through Health Canada's Special Access Programme at https://www.canada.ca/en/health-canada/services/drugs-health-products/special-access/drugs.html.

Antihistamine / Antipruritic

An oral antihistamine or a topical corticosteroid may be considered for the management of pruritis[1; 2] It is advisable to avoid or limit the use of corticosteroids during an active, untreated infestation as this may mask symptoms of continued infestation, which may result in transmission to others.

Note: Diphenhydramine may cause sedation or paradoxical excitement in children.[9]

Diphenhydramine

2 Years to Less than 6 Years of Age
- DiphenhydrAMINE (Benadryl®) 6.25 mg PO q4-6h PRN
- Maximum 37.5 mg in 24 hours

6 Years to Less than 12 Years of Age
- DiphenhydrAMINE (Benadryl®) 12.5 to 25 mg PO q4-6h PRN;
- Maximum 150 mg in 24 hours

12 Years of Age or Greater
- DiphenhydrAMINE (Benadryl®) 25 to 50 mg PO q4-6h PRN
- Maximum 300 mg in 24 hours

Note: If diphenhydramine is too sedating for daytime, cetirizine may be considered.

Cetirizine [12]

Less than 12 Months of Age
- Consult physician/nurse practitioner

12 Months to Less than 2 Years of Age
- Cetirizine 2.5 mg PO once daily PRN; *may increase to a maximum dose of 2.5 mg BID
  *Consult physician/nurse practitioner

2 Years to 5 Years of Age
- Cetirizine 2.5 mg PO once daily PRN; may increase to a maximum dose of 2.5 mg BID or 5 mg once daily

6 Years of Age or Greater
- Cetirizine 5 to 10 mg PO once daily PRN

- Maximum 10 mg in 24 hours

Antimicrobial

Topical or systemic antimicrobial therapy is indicated for secondary bacterial infections.[1; 2]

MONITORING AND FOLLOW-UP

Consult physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

– Monitor vitals signs as indicated by client's condition.

– Monitor for signs of infection.

– If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP

– Follow up if clinically necessary.[7]

Referral

Referral not required unless there is a complication or a secondary bacterial infection requiring treatment in a hospital.

Reporting[7]

Scabies is not reportable to local public health authorities. Partner notification is also not required.

APPENDIX

SECTION A: SUPPLEMENTAL CLINICAL MANAGEMENT INFORMATION

Application of 5% Permethrin Cream and Additional Education

Advise parent(s)/caregiver(s)/client of the following:[1; 2; 4; 7; 8; 10]

- 5% permethrin cream should be applied after a shower/bath, preferably in evening/before bed.
- 5% permethrin cream should be applied and massaged into the skin from the neck to the toes:
  - For infants older than 1 month, young children, and the elderly, it should also be applied to the face (hairline, neck, scalp, temple and forehead).
  - Ensure application in the skin folds, creases, and skin between the fingers and toes, and on the soles of the feet.
  - Do not apply the cream or lotion to the nose, lips, eyelids, nor around the eyes or mouth.
- Apply 5% permethrin cream or lotion under trimmed, short nails with a toothbrush, then throw away the toothbrush.
- If applying the cream or lotion to another person, it is recommended to wear medical disposable gloves or to wash hands after application. If the hands of the infected person are washed after applying the cream or lotion, it should be reapplied (mites like to burrow in the hands).
- Do not touch the skin of anyone else while wearing the 5% permethrin cream or lotion.
- Wear light clothing while the topical 5% permethrin cream or lotion is on the skin.
- The cream should be removed by washing (shower or bath) after 8 to 14 hours.
- Keep fingernails short.
- On the day the treatment is applied, launder all bed linen (sheets, pillowcases, blankets) and clothing worn next to the skin using a hot cycle wash and a hot drying cycle, or dry clean.
- Store things that cannot be washed in an airtight plastic bag for 1 week to kill the mites (the mite cannot survive beyond 4 days without contact with human skin).
- Vacuum the home (including mattresses, carpeting, area rugs, and upholstered furniture) if possible, the day treatment is initiated. Discard the vacuum bag or empty the canister and wash the removable canister with hot, soapy water. If the canister cannot be removed wipe it with a damp paper towel.
- Pets are not treated because the human itch mite cannot survive on animals.
- Do not use insecticides. Use of insecticide sprays and fumigants is not recommended.

Prevention

- Encourage parent(s)/caregiver(s)/client and family to learn more about signs and symptoms of scabies by reviewing the links to resources provided.
- Raise awareness of the link between scabies and substandard living conditions, and press for improvements to basic living standards. For more information, see the Canadian Paediatric Society position statement *Housing need in Canada: Healthy lives start at home* at: https://www.cps.ca/en/documents/position/housing-need [11]

Overview of Sarcoptes Scabiei *Life Cycle*[1-3]

- The female adult mite burrows into the skin's epidermis and deposits eggs over several days.
- Larvae hatch in approximately 2 to 4 days and take 10 to 14 days to mature.

- The average adult mite infestation is 10 to 15 adult female mites.
- Animals can contract a different subspecies of scabies that is unlikely to cause extensive infestations on a human unless the animal does not receive treatment.

SECTION B: SUPPLEMENTAL RESOURCES

See also *Scabies* in *Section 5, Management and Treatment of Specific Infections* at www.phac-aspc.gc.ca/std-mts/sti-its/cgsti-ldcits/section-5-3-eng.php.

Provincial/Territorial Guidelines

BC Centre for Disease Control, Health Info, Diseases & Conditions [Internet]. Vancouver, BC: Provincial Health Services Authority; c2017. Scabies; [about 4 p.]. Available from: http://www.bccdc.ca/health-info/diseases-conditions/scabies

North West Territories Health and Social Services, Brochure & Fact Sheets [Internet]. Yellowknife, NT: Northwest Territories Health and Social Services; c2017. Scabies: Frequently asked questions; Available from: http://www.hss.gov.nt.ca/en/services/skin-infections/scabies

Other Resources

The following are links to resources that may be provided to the parent(s)/caregiver(s)/client and family member and/or close contacts:

CaringforKids [Internet]. Ottawa, ON; Canadian Pediatric Society; 2017. Scabies [updated 2015 Oct]; [about 2 p.]. Available from: www.caringforkids.cps.ca/handouts/illnesses-index

BC Centre for Disease Control, HealthlinkBC [Internet]. Vancouver, BC: Provincial Health Services Authority; c2017. Scabies; 2013 Feb; [about 2 p.]. Available from: https://www.healthlinkbc.ca/hlbc/files/documents/healthfiles/hfile09.pdf

Healthwise Staff. Scabies [Internet]. MyHealth.Alberta.ca; c2017 [current as of 2017 May 16]; [about 2 p.]. Available from: https://myhealth.alberta.ca/Health/Pages/conditions.aspx?hwid=hw171811

Tsawout First Nation [Internet]. Saanichton B.C; Tsawout First Nation; c2017. Scabies [2012 Apr 4]; [about 2 p.]. Available from: www.tsawout.com/past-news-items/929-scabies-and-lice

Centers for Disease Control and Prevention, Parasites [Internet]. Atlanta, GA: The Centres: c2017. Scabies, FAQs; [updated and reviewed 2010 Nov 2]; [about 6 p.]. Available from: www.cdc.gov/parasites/scabies/gen_info/faqs.html#how_soon

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline.

REFERENCES

1. Banerji A; Canadian Paediatric Society. First Nations, Inuit and Métis Health Committee. Position statement: Scabies. Paediatr Child Health [Internet] 2015 [cited 2017 Jun 23];20(7):395-98. Available from: https://www.cps.ca/en/documents/position/scabies

2. Goldstein BG, Goldstein AO. Scabies: Epidemiology, clinical features and diagnosis In: Post TW, editor. UpToDate. [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 23]. Available from: https://www.uptodate.com/contents/scabies-epidemiology-clinical-features-and-diagnosis with authorized username and password.

3. Centers for Disease Control and Prevention, DPDx - laboratory identification of parasitic diseases of public health concern [Internet]. Atlanta, GA: Centers for Disease Control and Prevention; c2017. Scabies; [cited 2017 Jun 23]; [about 3 p.]. Available from: https://www.cdc.gov/dpdx/scabies/index.html

4. CaringforKids [Internet]. Ottawa, ON: Canadian Pediatric Society; c2017. Scabies [updated 2015 Oct; cited 2017 Jun 23]; [about 2 p.]. Available from: http://www.caringforkids.cps.ca/handouts/scabies

5. McLean FE. The elimination of scabies: a task for our generation. Int J Dermatol. 2013 Oct;52(10):1215-23.

6. American Academy of Dermatology, Public and Patients [Internet]. Schaumburg, IL: The Academy; c2017. Scabies: Treatment; [cited 2017 Jun 23]; [about 2 p.] Available from: https://www.aad.org/public/diseases/contagious-skin-diseases/scabies#treatment

7. Public Health Agency of Canada, Infections diseases. Canadian guidelines on sexually transmitted infections [Internet]. Ottawa, ON: The Agency; c2017. Section 5 - Management and treatment of specific syndromes; [modified 2013 Feb 1; cited 2017 Jun 23]; [about 7 p.]. Available from: http://www.phac-aspc.gc.ca/std-mts/sti-its/cgsti-ldcits/section-5-3-eng.php

8. Centers for Disease Control and Prevention [Internet]. Atlanta, GA: The Centres; c2017. Scabies: Treatment; [reviewed 2016 Sep 12; updated 2016 Sep 16; cited 2017 Jun 23]; [about 2 p.]. Available from: http://www.cdc.gov/parasites/scabies/treatment.html

9. MedlinePlus [Internet]. Bethesda, MD: American Society of Health-System Pharmacists, Inc.; c2017. Diphenhydramine [updated 2017 Jul 15; cited 2017 Jun 23]; [about 9 p.]. Available from: https://medlineplus.gov/druginfo/meds/a682539.html

10. American Academy of Dermatology, Public and Patients [Internet]. Schaumburg, IL: The Academy; c2017. Scabies: Tips for managing; [cited 2017 Jun 23]; [about 4 pages]. Available from: https://www.aad.org/public/diseases/contagious-skin-diseases/scabies#tips

11. Waterston S, Grueger B, Samson L; Canadian Paediatric Society. Position statement: Housing need in Canada: Healthy lives start at home. Paediatr Child Health [Internet]. 2015 [cited 2017 Jun 23];20(7):403-07. Available from: https://www.cps.ca/en/documents/position/housing-need

12. Compendium of pharmaceuticals and specialties [Internet]. Ottawa (ON): Canadian Pharmacists Association; c2016. Cetirizine [product monograph]; [updated 2016 Feb 11; cited 2017 Dec 4]. Available from: http://www.e-cps.ca or https://www.e-therapeutics.ca/search .

OTHER SOURCES

Compendium of therapeutic choices. 2017 edition. Ottawa, ON: Canadian Pharmacists Association; 2017.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON; Health Canada; 2016.

URTICARIA (HIVES)

OVERVIEW

Please refer to provincial/territorial guidelines for Urticaria (Hives), where available.

Urticaria or hives is a common disorder characterized by wheals of various sizes surrounded by flares (erythema).[1; 2] A typical urticarial lesion is an intensely itchy red plaque. Urticaria is sometimes accompanied by angioedema, which is swelling deeper in the skin.[2]

Urticaria is clinically classified by its chronicity as either acute or chronic.[1; 2] The lesions of acute and chronic urticaria are identical in appearance, so when the problem first develops, it is not possible to differentiate the between the two.[2]

Note: Although typically self-limited, acute urticaria and angioedema can be symptoms of anaphylaxis or a medical emergency.[1]

Note: If shortness of breath, wheezing, or swelling of the tongue or mouth occurs, see FNIHB Adult Care Clinical Practice Guidelines – Chapter 14 – Anaphylaxis and FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 20 – General Emergencies and Major Trauma.

Acute Urticaria[1; 2]

Acute urticaria is defined as hives lasting less than 6 weeks.

Chronic Urticaria[1; 3]

– Chronic urticaria is defined as hives occurring intermittently with signs and symptoms recurring most days of the week, for 6 weeks or longer.

– Chronic urticaria may be spontaneous or inducible.

– Chronic spontaneous urticaria is endogenous; the appearance of lesions is not triggered by consistent or identifiable factors.

– Chronic inducible urticaria is a response to a physical trigger. Examples include:

- Dermographism
- Delayed pressure urticaria
- Solar urticaria
- Vibratory angioedema
- Cholinergic urticaria
- Cold contact urticaria

Heat contact urticaria

- Aquagenic urticaria

– Associated angioedema occurs in at least 50% of patients and usually affects the lips, cheeks, periorbital areas of the face, extremities, and genitals.[4]

– For more information on inducible urticaria, see *Table 1 Inducible Urticaria* in *Appendix, Section A.*

CAUSES

Urticaria is due to the release of chemical mediators (e.g., histamine) from tissue mast cells.[1]

Acute Urticaria[2]

Acute urticaria can be induced by the following factors (although cause is not always identified):

– Infections: viral, bacterial, and parasitic (particularly in children)

– Medication pseudoallergy including non-immune mediated reaction (e.g., nonsteroidal-anti-inflammatory agents [NSAIDs], narcotics)

Type 1 Allergy [Immunoglobulin (IgE)-mediated]

– Food allergy:

  - In children the most common are milk, eggs, peanut, soy, tree nuts, and wheat
  - In adults the most common are fish, shellfish, tree nuts, and peanuts

– Medication allergy: often an antibiotic (e.g., beta-lactams such as penicillin and cephalosporins)

– Contact allergy: physical contact with plant product, resins, latex

– Other causes: blood products, insect bites or stings

Chronic Urticaria[3; 5]

– Idiopathic in 80% to 90% of cases

– Can be associated with autoimmune disorders such as thyroid disease, systemic lupus erythematosus (SLE), rheumatoid arthritis, and type I diabetes mellitus

ASSESSMENT

Medication review: Review current medications, including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental, or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS

– The only risk factors identified were being female and being a young adult.[6]

HISTORY OF PRESENT ILLNESS

Review risk factors and collect history of present illness.

– The client may describe the lesions as intensely pruritic plaques that disrupt work, school, or sleep; the symptoms often seem most severe at night.[2]

Past Medical History[1; 2]

A comprehensive history is important to try to determine a possible etiology, including:

- Extent, frequency, duration, severity, and pattern of the urticaria
- Other signs and symptoms of a generalized allergic reaction or anaphylaxis
- Possible triggers include drugs (especially NSAIDs), foods, insect stings, or infections
- History of urticaria, allergies or intolerances, or other possible cause
- Symptoms or signs to suggest an underlying systemic disorder (e.g., unexplained fever, weight loss, arthralgias, arthritis, or bone pain)
- Travel history and sexual history

PHYSICAL FINDINGS[1; 2; 5]

Perform a physical examination using the IPPA approach.

- Urticaria lesions are circumscribed, raised, erythematous plaques, often with central pallor.
- Serial photographs are useful.
- Individual urticarial lesions usually resolve completely within 24 hours.
- In most cases the lesions:
  - Are round, oval, or serpiginous (wavy margin) in shape
  - May involve any area of the body; however, areas in which the skin is compressed (e.g., under waistbands) or rubs together (e.g., axillae) may be affected more dramatically
  - Are 1 to 2 cm in diameter (although they can vary in size)
  - Are intensely pruritic

DIFFERENTIAL DIAGNOSIS[2; 6]

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

- Insect bites
- Scabies
- Dermatitis (atopic and contact)
- Erythema multiforme
- Drug eruptions
- Plant-induced reactions
- Viral exanthem
- Pityriasis rosea

COMPLICATIONS[5]

- Infection from scratching
- Systemic allergic response with bronchospasm, syncope, vomiting, diarrhea

– Anaphylaxis

DIAGNOSTIC TESTS

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability. Diagnostic tests are not recommended for acute urticaria, unless history or physical examination suggests underlying disease or a specific cause that needs to be confirmed or ruled out.[2; 3]

Laboratory

Testing should be carried out as per provincial/territorial policies and procedures. The tests below are for consideration for chronic urticaria:[3]

– CBC with differential

– C-reactive protein (CRP) or erythrocyte sedimentation rate (ESR)

– Thyroid stimulating hormone (TSH)

– Hepatitis B and C titers (may be associated with cryoglobulinemia, which is associated with some forms of cold-induced urticaria and urticarial vasculitis)

– Skin biopsy is not routinely needed

For testing in chronic inducible urticaria, see *Table 1 Inducible Urticaria* in *Appendix, Section A.*

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT [1; 5]

– Accomplish complete symptom control and disease remission.

– Identify and eliminate triggers (e.g., medication, physical stimulus).

– Prevent complications.

NON-PHARMACOLOGICAL INTERVENTIONS [4; 7; 8]

Interventions

– Remove or work to avoid potential triggers.

– Apply cool compresses to reduce itching.

Client Education

Avoid nonsteroidal anti-inflammatory drugs (NSAIDs) such as aspirin and ibuprofen as they can trigger urticaria and/or angioedema.

– Discuss with client/family/caregiver(s) the identification of causative agent that may induce urticaria (e.g., recent changes in foods, medications, supplements), although identifying a cause is unlikely.

- Advise client/family/caregiver(s) to keep a diary of potential triggers.
- Advise client/family/caregiver(s) to avoid/minimize aggravating factors that may worsen symptoms, (e.g., overheating, tight clothing).
- Recommend avoidance of scratching and harsh soaps.
- Recommend cooling of the affected area with a shower, fan, cool cloth, or soothing lotion.
- Counsel client/family/caregiver(s) about appropriate use of medications; dose, frequency, importance of adherence, potential side effects, and interactions.

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary, NIHB Drug Benefit List or provincial/territorial formulary before initiating treatment.

Topical Antipruritic[9]

Topical cooling antipruritic lotions such as calamine lotion can be used to relieve and sooth itching.

Calamine Lotion

Adults and children:

- Calamine lotion; apply topically to affected area(s) PRN.

Oral Antihistamines[1; 4; 5; 9]

- H_1-antihistamines may be started if symptoms persist for 2 weeks.
- H_1-antihistamines should be taken on a regular daily basis rather than as needed.
- Second-generation H_1-antihistamines (e.g., cetirizine) are preferred over first-generation H_1-antihistamines (e.g., diphenhydramine, hydroxyzine) as they are minimally sedating and free of anticholinergic effects.
- Patients at low risk of complications may prefer to use a sedating H1 antihistamine at bedtime and a nonsedating H1 antihistamine during the day.

Cetirizine [13]

Less than 12 Months of Age

- Consult physician/nurse practitioner

12 Months to Less than 2 Years of Age

- Cetirizine 2.5 mg PO once daily PRN;* may increase to a maximum dose of 2.5 mg BID
  *Consult physician/nurse practitioner

2 Years to 5 Years of Age

- Cetirizine 2.5 mg PO once daily PRN; may increase to a maximum dose of 2.5 mg BID or 5 mg once daily

6 Years of Age or Greater

- Cetirizine 5 to 10 mg PO once daily PRN
- Maximum 10 mg in 24 hours

Note: Treatment with diphenhydrAMINE can be considered if symptoms remain poorly controlled

DiphenhydrAMINE[12]

Children 2 to Less Than 6 Years of Age

– DiphenhydrAMINE 6.25 mg q 4-6 hours, PRN.
– Maximum from all sources: diphenhydrAMINE 25 mg in 24 hours

Children 6 to Less Than 12 Years of Age

– DiphenhydrAMINE 12.5 – 25 mg q 4-6 hours, PRN
– Maximum from all sources: diphenhydramine 100 mg in 24 hours

Children Greater than 12 Years of Age

– DiphenhydrAMINE 25-50 mg q 4-6 h, PRN.
– Maximum from all sources: diphenhydrAMINE 200 mg in 24 hours

Glucocorticoids[1; 2; 5; 9]

– A brief course of systemic glucocorticoids may be added to antihistamine therapy to control persistent and severe symptoms.

– Repeated courses of glucocorticoids should be avoided for most patients as the risk of adverse effects outweighs the benefit.

– For clients requiring glucocorticoid therapy, consult with physician/nurse practitioner.

MONITORING AND FOLLOW-UP

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP

– Follow up with client in 2 to 7 days.

– Instruct client/family/caregiver(s) to return to clinic for reassessment if lesions progress despite therapy.

– Instruct client/family/caregiver(s) to return to clinic immediately if shortness of breath, wheezing, or swelling of the tongue or mouth occurs; in this situation, see *FNIHB Adult Care Clinical Practice Guidelines – Chapter 14 – Anaphylaxis* and *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 20 – General Emergencies and Major Trauma.*

Referral

– Coordinate referral request to a physician/nurse practitioner for evaluation if lesions are recurrent in order to rule out allergies or an underlying organic pathology.

– Coordinate referral request to an allergist or dermatologist for:[1; 2; 4; 5]

- Difficult-to-control symptoms
- Urticaria associated with anaphylaxis
- Suspected allergic etiology causing new-onset urticaria
- Suspected underlying disorder

APPENDIX

Section A: Supplemental Clinical Management Information

Chronic Inducible Urticaria[10; 11]

TABLE 1

Inducible Urticaria (Representative Types)

DISORDER	INCITING TRIGGER(S)	DIAGNOSTIC TEST
Dermographism	Firm stroking, scratching pressure	Moderate stroking of the skin with a blunt, smooth object (e.g., closed ballpoint pen tip or wooden tongue depressor
Cold contact urticaria	Exposure of skin to cold air, cold liquids or cold objects	Ice cube in thin plastic bag for 5 minutes and response assessed 10 minutes after removal
Heat contact urticaria	Warm object in direct contact with affected skin	Application of test tube containing 44°C water or metal cylinder heated to 50-55°C on skin for 5 minutes
Cholinergic urticaria	Elevation of body temperature (exercise, hot water, strong emotion)	Exercising using a machine (treadmill or stationary bike) to the point of sweating plus 15 minutes If test is positive, passive heating of 1 or both arms in 40°C warm water bath to cause increase in body temperature of at least 0.7°C
Delayed pressure urticaria	Application of pressure 30 minutes to 12 hours before onset of symptoms (e.g., carrying heavy bags, sitting for prolonged period)	Sling with weights placed over arm or shoulder for 15 minutes (7 kg weight on 3 cm wide shoulder strap) Client reports symptoms over next 24 hours
Solar urticaria	Direct exposure of skin to sunlight	Exposure of a small area of skin to natural sunlight, which induces erythema or urticaria (reaction generally fades quickly after the test is halted)
Vibratory angioedema	Lawn mowing, riding a motorcycle, horseback riding, mountain biking, exposure to vibrating machinery (jackhammer operator, machinist, carpenter, metal grinder)	Vortex mixer held against skin for 10 minutes and site observed for 5-6 hours
Aquagenic urticaria	Skin contact with water of any temperature Salinity of water important in some cases	Application of 35°C water in compress to upper body for 30 minutes

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline

REFERENCES

1. Sussman G, Hébert J, Gulliver W, Lynde C, Waserman S, Kanani A, et al. Insights and advances in chronic urticaria: a Canadian perspective. Allergy Asthma Clin Immunol [Internet]. 2015 Feb 11 [cited 2017 Jul 4];11(1): [about 7 p.]. Available from: http://pubmedcentralcanada.ca/pmcc/articles/PMC4336710/pdf/13223_2015_Article_72.pdf

2. Bingham CO. New-onset urticaria. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 12]. Available from: https://www.uptodate.com/contents/new-onset-urticaria#! with authorized username and password.

3. Saini, S. Chronic urticaria: Clinical manifestations, diagnosis, pathogenesis and natural history. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc; 2015 [cited 2017 Jun 12]. Available from: https://www.uptodate.com/contents/chronic-urticaria-clinical-manifestations-diagnosis-pathogenesis-and-natural-history with authorized username and password.

4. Khan DA. Chronic urticaria: Standard management and patient education. In: Post TW, editor. UpToDate [Internet] Waltham, MA: UpToDate Inc; 2017 [cited 2017 Jun 12]. Available from: https://www.uptodate.com/contents/chronic-urticaria-standard-management-and-patient-education with username and password.

5. DynaMed Plus[Internet] Ipswich (MA): EBSCO Information Services; 1995 - . Record No. 115257, Chronic urticaria; [updated 2017 Apr 10, cited June 12, 2017]. Available from http://www.dynamed.com/login.aspx?direct=true&site=DynaMed&id=115276. Registration and login required.

6. Wong HK. Chronic urticaria. In: Medscape [Internet]. New York, NY: WebMD LLC: c1994 - . [cited 2017 Jul 5]. Available from: emedicine.medscape.com/article/1050052

7. Mayo Clinic. Patient Care & Health Information, Diseases & Conditions [Internet]. Rochester, MN: Mayo Foundation for Education and Research; c1998 - . Chronic hives; [cited 2017 Jun 13]; [about 3 print pages]. Available from: http://www.mayoclinic.org/diseases-conditions/chronic-hives/basics/complications/con-20031634 [produced by Mayo Clinic Staff].

8. Bingham CO. Patient education: Hives (urticaria) (Beyond the basics). In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017. [cited 2017 June 13]. Aailable from: https://www.uptodate.com/contents/hives-urticaria-beyond-the-basics

9. Mayo Clinic, Patient Care & Health Information, Diseases & Conditions [Internet]. Rochester, MN: Mayo Foundation for Medical Education and Research; c1998 - 2018. Acne; [cited 2017 June 6]; [about 6 p.]. Available from: http://www.mayoclinic.org/diseases-conditions/acne/basics/risk-factors/con-20020580 [produced by Mayo Clinic Staff].

9. Grattan CE, Humphreys F; British Association of Dermatologists Therapy Guidelines and Audit Subcommittee. Guidelines for evaluation and management of urticaria in adults and children. Br J Dermatol [Internet]. 2007 Dec [cited 2017 Jul 4];157(6):1116-23. Available from: http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2133.2007.08283.x/epdf. (Accessed on July 4, 2017.)

10. Dice JP, Gonzalez-Reyes E. Physical urticarias. 2016. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 12]. Available from: https://www.uptodate.com/contents/physical-urticarias with authorized username and password.

11. Maurer M. Cold urticaria. Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun13]. Available from: https://www.uptodate.com/contents/cold-urticaria with authorized username and password.

12. Compendium of pharmaceuticals and specialites [Internet]. Ottawa (ON): Canadian Pharmacists Association; c2016. Diphendydramine [product monograph]; [updated 2016 Feb 1; cited 2017 Dec 04]. Available from: http://www.e-cps.ca or https://www.e-therapeutics.ca/search

13. Compendium of pharmaceuticals and specialties [Internet]. Ottawa (ON): Canadian Pharmacists Association; c2016. Cetirizine [product monograph]; [updated 2016 Feb 11; cited 2017 Dec 4]. Available from: http://www.e-cps.ca or https://www.e-therapeutics.ca/search

OTHER SOURCES

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON; Health Canada; 2016.

DERMATOLOGICAL EMERGENCIES

BURNS IN CHILDREN

OVERVIEW

Please refer to provincial/territorial guidelines for Burns where available.

If a client presents with a partial-thickness (second-degree) or full-thickness (third-degree) burn, consult immediately with physician/nurse practitioner and arrange urgent medical evacuation.

Burns result from thermal, electrical, chemical, or radiation injury. Burns cause necrosis of skin cells and other surrounding tissues and can have major local and systemic consequences.[1; 2] Prompt care can minimize morbidity and mortality. Proper classification guides management. Classification of a burn as minor, moderate, or major requires accurate determination of the depth and extent of the wounds, and consideration of location, patient characteristics, and comorbid conditions.[1] Burns are a common injury in children as exploring is part of normal behaviour; however, they can also be a sign of neglect or abuse that requires further investigation.[3]

CAUSES

Burns are usually caused by contact with a source of heat and can be sub-categorized by mechanism of injury: thermal, electrical, chemical and radiation.

Thermal

- Hot liquids and steam (through spills, flow, or immersion injuries resulting in scalds)[3]
- Fire (e.g., open flames)[1]

Electrical[4]

– Electrical burns are caused by current that passes through tissue

– Surface findings may underestimate the extent of tissue damage and require special consideration. Always assume that an electrical burn is major.

– A lightening strike can cause burn injuries.

– Electrical burn injuries are classified as:

- Low-voltage—less than 1000 V (e.g., injury while repairing home appliances).
- High-voltage—greater than 1000 V (e.g., injury at an electrical power plant).

Chemical[5]

– Chemical burns are caused by a toxic agent that contacts the skin.

– Industrial and domestic sources that cause burns include:
  - Acids (e.g., car battery acid)
  - Alkalis (e.g., lime products, plaster, select household cleaners such as drain cleaner or bleach)
  - Other chemicals (e.g., phosphorous, petroleum products, or other organic compounds)

Radiation

Radiation burns are caused by ultraviolet radiation exposure (e.g., sun), industrial electromagnetic and particle radiation (e.g., cancer treatments, and repeated x-ray imaging).[1]

ASSESSMENT

Medication review: Review current medications, including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS[6]

– Age and gender (children, women, and older adults)
– Low socioeconomic status
– Living in overcrowded conditions or congested housing
– Absence of smoke detectors
– Photosensitizing medication therapy
– Cold climates or winter months (increased use of wood stoves and other heating devices)

HISTORY OF PRESENT ILLNESS

Review risk factors and collect history of present illness.

Note: Defer collecting the history until airway, breathing, circulation (ABC) and burn severity have been assessed and the client is stabilized, including assessing for a possible inhalation injury[7]

Burn History[7; 8]

– Obtain a description of the exact cause (e.g., thermal or chemical burn) and time of injury.
– Identify the location of the event (e.g., open or enclosed space).
– Determine whether a flash or explosion occurred and what agents may have burned (e.g., chemicals or plastics).
– Interview other victims, caregivers, police, or community members to help provide information.
– Investigate whether there was associated trauma (e.g., from falling debris).
– Inconsistencies in the history may indicate an inflicted injury.

Non-accidental Burn Injury[3]

- A non-accidental burn injury is one that results from abuse, neglect, or violence.
- Burn injuries that are non-accidental or intentionally inflicted are more extensive and severe.
- Consult with a physician/nurse practitioner regarding appropriate situational management strategies and consideration for medical evacuation to hospital. For more information, see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 5 – Child Maltreatment – Child Maltreatment Prevention Strategies*.

Tetanus Immunization Status[7; 8]

- Review tetanus immunization status as burns are a risk for developing tetanus.

PHYSICAL FINDINGS

Perform a physical examination using the IPPA approach.

- Assess ABC and disability as a priority, and stabilize the client. Once the initial assessment has been performed and the ABC are stabilized, complete a full physical exam.
- An accurate weight is essential for determining fluid requirements and should be obtained whenever possible.[8]
- For non-accidental or inflicted burns, injury patterns indicating other forms of abuse can often be observed during the physical examination (e.g., bite marks, old fractures, bruises in various stages of healing).[9] For other signs of non-accidental burns, see *Appendix, Section A*.

Airway, Breathing, Circulation, and Disability (ABCDs)[3; 10]

- Suspect an inhalation injury if the child was exposed to heat, smoke, or chemicals, and perform an ongoing assessment of the airway watching for system toxicity. Check whether nasal hairs are singed or sputum is carbonaceous.
- Inhalation injuries can rapidly lead to a comprimised airway. Symptoms are:
  - Persistent cough, hoarseness, and wheezing
  - Soot-containing airway secretions
  - Increased work of breathing
- Assess circulation and the need for fluids (replacement or resuscitation).
- Assess disability (e.g., level of consciousness and pain).
- Assess symptoms that could be indicative of carbon monoxide poisoning (e.g., dizziness, nausea, or vomiting) .

Skin Burn Assessment[1; 11-13]

- Determining burn severity is an essential component of initial assessment to determine the interventions needed. Factors to consider include:
  - Burn locations – critical locations requiring special attention and urgent medical evacuation are the face, eyes, hands, genitals, feet, and burns encircling limbs, torso, or joints.

- Burn depth – is classified as either a first-, second- or third-degree burn. See *Table 1, Burn Depth* to determine the burn classification.
- Burn size – expressed as a percentage of the total body surface area (TBSA) affected.[8] One tool to estimate the extent of a burn in children is the *Lund-Browder Chart* (see *Table 2*).

Note: All types of burn severity may occur within the same burn wound; the depth may change with time, especially if infection occurs

TABLE 1
Classification of burns by depth of injury[1; 13]

DEPTH	CAUSE	APPEARANCE	SENSATION	HEALING TIME	SCARRING
First-degree (Superficial)	Sunburn, flash, minor scald	Dry, erythema, brisk capillary refill, blanches with pressure	Painful	3 to 6 days	None
Second-degree (Superficial -Partial thickness)	Scald, contact with hot liquids	Erythema, broken blisters, weeping/wet, blanch painfully when touched, brisk capillary return	Painful to air, temperature	7 to 20 days	Unusual; potential pigmentary changes
Second-degree (Deep - Partial thickness)	Scald, minor flame contact, oil grease	Moist, white slough, red mottled, do not blanch with pressure, wet or waxy blisters, sluggish capillary return, may see loss of hair follicles	Perceives pressure only	Greater than 21 days	Major (hypertrophic, risk of contracture)
Third-degree (Full thickness)	Flame, major scald, oil, grease, electricity or lightning	Dry, charred and leathery, black, dry and inelastic, absent capillary return, loss of hair follicles	Deep pressure only	Rarely heal without grafting	Major risk of contracture
Fourth-degree (Extends into Fascia and/or	As above	White or charred, no feeling in the area as the nerve endings are destroyed	Deep pressure only	Never, unless surgically treated (may be excision or amputation)	Function is lost or severely limited; death may result

DEPTH	CAUSE	APPEARANCE	SENSATION	HEALING TIME	SCARRING
Muscle)					

TABLE 2
Modified Lund-Browder Chart[8]

ANATOMY	BIRTH TO 1 YEAR	1 TO 4 YEARS	5 TO 9 YEARS	10 TO 14 YEARS	15 YEARS	TOTAL PERCENTAGE
Head	19	17	13	11	9	
Neck	2					
Anterior or Posterior Trunk	13					
Buttock	2.5					
Genitalia	1					
Upper Arm	4					
Forearm	3					
Hand	2.5					
Thigh	5.5	6.5	8	8.5	9	
Calf	5	5	5.5	6	6.5	
Foot	3.5					

Note: Use the chart in Table 2 to calculate the TBSA.

Classification of Burns

Burns in children may have a different appearance in comparison to those of adults. The true depth is not immediately obvious, and burns are rarely homogenous throughout.

– To identify the depth of the burn (first-, second-, third-, fourth-degree), see *Table 1, Burn Depth.*

– Calculate the TBSA using *Table 2- Lund-Browder Chart.*

– To calculate IV fluid requirements, see *IV Therapy* in *Pharmacological Interventions*.

– In consultation with the physician/nurse practitioner, this information will be used to determine the client's transfer needs. For more information, see *Table 3, Transfer Considerations.*

First-degree (Superficial) Burns[1; 15]

– Superficial, involving the epidermal skin layer (e.g., sunburn)

– Blanch with pressure

– Result in a painful, erythematous (red) area, rarely requiring hospital care

– Usually heal in 3 to 6 days

Second-degree (Partial Thickness) Burns[1]

– Significant burns involving the epidermal skin layer and parts of the dermis

– Characterized by blistering

– No blanching with pressure

– Superficial partial-thickness

  - Only epidermis and papillary dermis (top skin layers) involved
  - Adequate viable tissue remaining to allow healing by re-epithelialization within 7 to 21 days

– Deep partial-thickness

  - Damage extends from the epidermis to deeper layers of dermis (e.g., hair follicles and glandular tissue may now be absent)
  - Differentiation from a full thickness burn is often difficult
  - Wound may convert to a third degree (full-thickness) burn with secondary infection, mechanical trauma, or thrombosis

Third-degree (Full Thickness) Burns[1]

– Damage extending to all skin layers; dermis destroyed

– Anaesthetic or hypoaesthetic (i.e., sensation only to deep pressure)

– No blanching with pressure

– Hair follicles lost

– Skin grafting required for healing

Fourth Degree Burns[1; 13; 14]

Damage extends beyond dermal tissue and into muscle, bone, tendons, or ligaments, resulting in charring and catastrophic damage to the subcutaneous tissue.

Signs of Burn Tissue Infection

Wound site purulent drainage, erythema, tenderness, or increased pain[16]

TABLE 3
Classification of Burn Severity and Transfer Considerations in Children[12]

REMAIN AT BASE SITE (MINOR BURNS)	TRANSFER TO MINOR BURN CENTER (MODERATE BURNS)	TRANSFER TO MAJOR BURN CENTER (MAJOR BURNS)	SPECIAL CONSIDERATIONS
Burns less than 5% TBSA in children younger than 10 years Full-thickness burns less than 2% TBSA	Burns equal to or greater than 5% TBSA and equal to or less than 10% TBSA in children younger than 10 years Full-thickness burns between 2% and 5% TBSA	Burns greater than 20% TBSA Burns greater than 10% TBSA for ages less than 10 years Full-thickness burns greater than 5% TBSA Burns to hands, face, feet, joints, genitalia, perineum Electrical burns and chemical burns or inhalation injury Burns with comorbidity Burns with patients who require special social, emotional, or rehabilitation care	Some clients may require transfer with lower clinical thresholds Examples: - Need for anticoagulation - Immunosuppression - Diabetes - Other significant medical problems that could lengthen recovery or affect mortality

DIFFERENTIAL DIAGNOSIS[16; 17]

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

- Medication-related mucocutaneous reactions
- Hypermetabolic response to thermal burn
- Phytocontact dermatitis (contact with noxious plants)
- Other causes of sepsis

COMPLICATIONS

Local[1; 2; 18-20]

- Increased depth and extension of burn, and/or delayed healing
- Secondary wound infection (e.g., cellulitis), often within 24 to 48 hours

- Scarring
- Severe pruritis and neuropathic pain
- Contractures
- Compartment syndrome
- Psychological trauma

Systemic[21-23]

- Hypothermia, hypovolemia, hypotension
- Cardiac arrhythmias from electrical burns
- Sepsis
- Multiorgan failure
- Death

DIAGNOSTIC TESTS

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical exam findings, and test availability.

Laboratory Tests

Testing should be carried out as per provincial/territorial policies and procedures. The tests below are for consideration:[23;)]

- Blood glucose
- Complete blood count, clotting screen, electrolytes and renal function tests

Additional investigations

- Electrocardiogram (ECG), if electrical burn[4]

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT

- Promote healing and restoration of tissue.
- Control pain.
- Prevent complications.
- Identify and minimize risk exposure.

NON-PHARMACOLOGICAL INTERVENTIONS

Interventions[1; 2]

First aid priorities are to stop the burning process and cool the burn wound.

- Remove anything tight (e.g., jewellery and non-adherent clothing).
- Cleanse the wound (see *Burn Care* in *Appendix, Section A*), then irrigate or immerse the wound in cool running water, making sure that patient's core temperature does not drop below 35 degrees Celsius.
- Avoid direct application of ice as it may increase cell damage and pain.
- If cooling is clinically indicated, cool with water and cover with a sterile, non-adherent dressing (e.g., cling wrap or gauze).
    - Do not apply cling wrap to face or to skin with chemical burns.
- Keep the client warm with a blanket to prevent hypothermia.

Note: Burns on critical body sites or clients with inhalation injury or minor burns with other injuries are likely to require resuscitation, oxygen therapy, and medical evacuation.[25]

Note: If the perineum, face, or hands are involved, or if the burn crosses a major joint or is circumferential, the burn should be considered major and the child transferred to a burn center.[2]

Thermal Burns (Tar)

- Do not attempt to scrape tar off the skin surface as this can cause further skin damage.[7]

Electrical Burns[3; 4]

- The most common etiologies of electrical burn injury in children differ from those of adults and usually occur at home (e.g., less than age 2, etiology is usually biting an electrical cord; after this age the etiology is outdoor risk-taking activities such as being outdoors in lightning, or climbing trees and utility structures).
- Treat electrical skin burns as thermal burns, recognizing that surface findings do not correlate with the severity of the injury.
- Traditional formulae for fluid replacement are not applicable for electrical burns since surface burns may grossly underestimate the extent of injury.

Chemical Burns[5]

- Call a poison control centre for specific instructions. Most chemical burns will require irrigation with water. However, avoid using water to irrigate burns caused chemical toxins such as dry lime, elemental metals, and phenol.
- For most chemical burns from household products:
    - Protect rescuers and health care workers from exposure to the chemical
    - Brush powdered agents from the skin

- Immediately wash the burn with copious amounts of water

– Chemical injuries of the eye require continuous irrigation. Always ensure that the unaffected eye is uppermost during irrigating to avoid contamination.

Radiation Burns[15]

– Sunburns usually resolve in a few days and involve symptomatic management of inflammation and pain.

– Wash blistered areas gently with mild soap and water. For ruptured blisters, follow washing with application of a wet sterile dressing to open areas (e.g., saline or petrolatum-impregnated gauzes).

– Apply cool compresses or soaks and calamine lotion for comfort.

Inhalation Injury[10]

For all inhalation injuries, administer oxygen at FiO_2 of 100% to cover carbon monoxide poisoning.

Minor Burns[8; 25]

– This includes burn sites that are limited in distribution and superficial or superficial partial-thickness (for more information, see *Table 1*).

– Burns on non-critical body sites generally require wound care.

– Continue cool water irrigation, then cover with sterile non-adherent dressing (e.g., cling wrap).

– Keep the child warm to prevent hypothermia (e.g., cover with a blanket).

Moderate and Major Burns [8]

These include burn sites that are more extensive and may include deep partial thickness and/or full-thickness burns (see *Table 3* for *American Burn Association classification*).

– If cooling is clinically indicated, cool with water and cover with a sterile non-adherent dressing, (e.g., cling wrap or gauze, but do not apply cling wrap to face or to skin with chemical burns).

– Keep the child warm to prevent hypothermia (e.g., cover with a blanket).

Client Education

– Advise parent(s)/caregiver(s)/client about the signs of wound infection.

– Educate parent(s)/caregiver(s)/client to keep dressings clean and dry until the area has healed.

– Counsel parent(s)/caregiver(s)/client about appropriate use of medications; dose, frequency, importance of adherence, potential side effects, and interactions.

– Provide parent(s)/caregiver(s)/client with information on safety and prevention:

- See *Burns: Household Safety and Prevention* at http://www.aboutkidshealth.ca/En/HealthAZ/SafetyandtheEnvironment/IndoorSafety/Pages/BurnsHouseholdSafetyandPrevention.aspx

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary, or provincial/territorial formulary before initiating treatment.

Superficial Burns (first-degree)

Analgesic/Antipyretic

Note: Analgesia should be considered prior to each dressing change.[22]

Note: Since babies less than 3 months of age are less able to mount a febrile response, when they do become febrile, it is more likely to indicate a major illness. Consult a physician/nurse practitioner for children less than 3 months of age.

Acetaminophen[27]

- Acetaminophen 10 to 15 mg/kg/dose PO q4-6h PRN
- Maximum from all sources: acetaminophen 75 mg/kg in 24 hours or 4,000 mg in 24 hours, whichever is less

Ibuprofen[28]

Infants <6 Months

- Limited data available in infants

For 6 Months to 12 Years of Age

- Ibuprofen 5 to 10 mg/kg/dose PO q6-8h PRN
- Maximum 400 mg/dose*

For Greater than 12 Years of Age

- Ibuprofen 200 to 400 mg PO q4-6h PRN*
- *Maximum from all sources for all ages: Ibuprofen 40 mg/kg in 24 hours or 1200 mg in 24 hours whichever is less. Under physician/nurse practitioner supervision, daily doses ≤2,400 mg may be used.

Calamine Lotion[15; 29]

Calamine lotion can be used for mild radiation burns (sunburns) to help with skin irritation. Consult a physician/nurse practitioner for use in children less than 6 months of age.

Topical Antibiotic Therapy

Superficial burns do not require topical antibiotics.[2; 19]

Partial-thickness and Full-thickness Burns (Second and Third Degree)

Analgesic/Anxiolytic

For partial-thickness burns, a benzodiazepine and high doses of morphine may be required.[7]

Note: patient should be monitored for respiratory depression if the combination is to be administered.

Topical Antibiotic Therapy

- If a client with second- or third-degree burns (partial-thickness or full-thickness) is being medically evacuated immediately, wrap the client in a clean dry sheet (topical antibiotics will be applied at the burn center.[2; 7] If transfer is delayed, a dressing should be applied in consultation with the burn center physician/nurse practitioner.
- Topical antibiotic therapy can be applied to nonsuperficial burns to prevent infection.[2] Various topical treatments may be used to promote healing, including medical honey.[30]
- Apply a thin layer of Silver sulfadiazine 1% topically to the affected area once daily or BID.[22]

  Note: Silver sulfadiazine should be avoided for infants younger than two months of age. The product should also be avoided for patients with severe sulfa allergies. Avoid contact of product with the eyes.
- Other antibiotics include: bacitracin zinc/polymyxin B sulfate or mupirocin 2% ointments.[14; 19]
- Topical antibiotics can also be impregnated in a burn dressing

IV Therapy[8]

- Initiate an IV line and run IV fluid (Ringer's Lactate) for fluid resuscitation according to the 24-hour volume needs determined using the Parkland Formula (uses weight and TBSA).
- Parkland Formula (not applicable for superficial or first-degree burns):
  - The amount of fluid required for the first 24 hours is calculated by 4 mL/kg of body weight for each percentage of TBSA affected by partial- and full-thickness burns.
  - Half of the fluid is given in the first 8 hours and the remainder over the following 16 hours (starting point is the time of injury).
  - Fluid should be infused at a consistent rate to avoid edema and vascular collapse.
  - Volume status must be carefully monitored and fluid therapy adjusted accordingly.
- A maintenance IV is also required and should include a 5% glucose solution for children less than 20 kg to prevent hypoglycemia.[8] Maintenance fluid is needed on an hourly basis:[31]
  - Weight less than 10 kg: 4 mL/kg per hour
  - Weight greater than 10 kg to 20 kg: 40 mL/hour for first 10 kg of body weight plus 2 mL/kg per hour for any increment of weight greater than 10 kg
  - Weight greater than 20 kg: 60 mL/hour for first 20 kg of body weight plus 1 mL/kg per hour for any increment of weight over 20 kg, to a maximum of 100 mL/hour (up to a maximum of 2400 mL daily)

Antibiotic Therapy[16]

Wound cellulitis or sepsis may indicate the need for systemic broad-spectrum antibiotic therapy. See the *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 16 – Skin – Cellulitis.*

Tetanus Prophylaxis

- A Tetanus booster is recommended if the burn is deeper than superficial and/or the last tetanus shot was more than five years ago.[2]

– For additional information regarding Immunization, see *Canadian Immunization Guide* at: www.phac-aspc.gc.ca/publicat/cig-gci/index-eng.php.

MONITORING AND FOLLOW-UP

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

– *Table 4* illustrates physiologic goals in monitoring children with burns.

– Monitor vital signs as indicated by the client's condition.

– Monitor for symptoms of inhalation injury.

– Monitor intake and output.

– Monitor for signs of infection and/or healing during subsequent follow-up visits.

– Frequent monitoring is indicated while awaiting medical evacuation, including:

  • A baseline ECG and cardiac monitoring for clients with electrical burns, while awaiting medical evacuation.[4]

– If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

TABLE 4
Fluid Resuscitation Goals for Children with Burns[8]

MENTAL STATUS	Alert and comfortable
SKIN	Warm and well perfused
URINE OUTPUT	
- Weight < 30 kg	1 to 2 ml/kg per hour
- Weight ≥ 30 kg	0.5 to 1 ml/kg per hour
HEART RATE: Normal mean for age	
- Newborn to 3 months	140 beats per minute
- 3 months to 2 years	140 beats per minute
- 2 years to 10 years	80 beats per minute
- > 10 years	75 beats per minute
Systolic blood pressure (SBP): Normal range for age > 1 year	

- Median SBP = 90 mm Hg + (2 x age in years)
- Lower limit of SBP = 70 mm Hg + (2 x age in years)

FOLLOW-UP

– For minor burns:

- Follow up 24 to 48 hours of a burn injury to change the dressing and assess the wound.
- Follow up every 3 to 5 days until the wound has healed.

– For moderate and/or major burns:

- Client will require medical evacuation.

For additional information on follow-up burn care, see *FNIHB Adult Care Clinical Practice Guidelines – Chapter 9 – Skin – Burns*.

Psychological Consequences of Burn Injury

– Consider support services for the client and family affected by the psychological impact of burn injuries. For more information on depression see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 19 – Adolescent Health – Depression*.

– Children who suffer burn injuries are at risk for delayed social and academic development due to long hospitalizations and body image, self-esteem and social identity issues as a result of contractures and scarring.[32]

– Burn camps and support resources are available. The purpose of the camps is for children to meet other children who have suffered burns to share feelings and experiences. For information about camps, support resources, and how to access funding, see *Table 6, Burn Camps and Support Resources,* in *Appendix, Section B.*

Referral

– Transfer considerations should be based on clinical judgement and made in consultation with a physician/nurse practitioner. Arrange for medical evacuation if clinically indicated (i.e., requires more care than can be provided locally). For more information, see *Table 5, Transfer Considerations*.

– Coordinate referral request as required.

TABLE 5

Transfer Considerations[8; 12; 22]

TRANSFER TO A BURN CENTER
Full-thickness burn with 5% or more of TBSA affected
Partial- and/or full-thickness burn with 10% or more of TBSA affected for age 10 years or less
Partial- and/or full-thickness burn with 20% or more of TBSA affected
Burns to the face, hand, foot, genitalia, perineum or joint
Electrical, chemical or inhalation injury burns

Burns with comorbidity

Burns with clients who require special social, emotional, or rehabilitation care

Reporting

If a non-accidental burn injury is suspected, report to the relevant child protection agency according to provincial/territorial policies. For more information on maltreatment, see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 5 – Child Maltreatment – Reporting Maltreatment*.

APPENDIX

SECTION A: SUPPLEMENTAL CLINICAL MANAGEMENT INFORMATION

Burn Care

Wound Cleaning Methods[2]

– Do not cleanse a wound with a cleaning agent.

– Use mild soap and water.

– Remove exudative fluid and debris gently to avoid disrupting new tissue growth.

Wound Debridement[2; 19]

– Consult with a physician/nurse practitioner if unsure about debridement of necrotic tissue.

– Remove sloughed or necrotic skin, including large ruptured blisters.

– Management of blisters:

- Debride ruptured blisters but leave small blisters intact.
- The best treatment for an intact burn blister is still under debate. Some experts advocate preserving blisters and others advocate rupturing them.
- Keep debrided wounds clean, protected, and moist with topical dressings

Topical Therapy and Dressings[2; 33]

Moist environments promote re-epithelialization, prevent dehydration, and may improve healing.

– First-degree (superficial) burns

- Therapies: Calamine lotion, medical honey, aloe vera, antibiotic ointment
- Dressings: not generally required but a low-adherent dressing may be used

– Second-degree (superficial partial-thickness or deep-partial thickness) burns

- Therapies: dependent upon type and severity of burn; consider topical antibiotics if client is not being transferred.[2]
- Dressings: apply a low-adherent dressing (e.g., JELONET™) or a silver-coated dressing (e.g., ACTICOAT™).
- The frequency of dressing change will depend on burn injury characteristics and product(s) used; change the dressing if the burn wound becomes painful or is saturated with exudate or has a foul smell.

– Third-degree (full-thickness) burns

- Keep the burn injury covered with a sterile non-adherent dressing (e.g., gauze, cling) while awaiting medical evacuation.

– Epithelialization occurs when new epithelium grows and gradually covers a wound bed.

- When epithelialization occurs, a non-scented moisturizing cream should be applied to the wound until natural lubricating mechanisms return.

- Avoid cosmetic preparations with lanolin, thick waxes, and/or ointments as these can cause irritation.

First 24 hours after Injury[2]

– All burns will progress during the first 24 hours after injury. Reassess depth and extent of injury after this period.

– Cleanse and debride as needed.

– Edema management:

- Edema increases over the first 24 hours following a burn injury.
- Where possible, elevate the affected area.
- Remove jewellery or constricting clothing.

– Reapply dressings and antimicrobial treatments as needed .

– Adjust medications for pain as needed .

– If skin is not intact, change to moist wound healing product and monitor for signs of infection.

7 Days after Injury

– If healing is progressing (i.e., epithelization is occurring), continue with dressing changes.

– If there are no concerns about the progress of healing or parent(s)/caregiver(s)/client ability to perform dressing changes, arrange follow-up every 3 days.

– If there are concerns around inadequate pain control or parent(s)/caregiver(s)/client's ability to provide adequate care, then daily assessments of the wound until epithelialization is complete are recommended.

10 to 14 Days After Injury

– If healing seems likely within 7 days, continue with dressing changes and follow up every 3 days.

– If healing does not seem likely, immediately consult with a physician/nurse practitioner as the client may require medical evacuation and transfer to a hospital and/or burn unit.

Post Epithelialization

– Follow-up visits are recommended every 4 to 6 weeks to assess for hypertrophic scar tissue formation and monitor the client's overall status.

Toxic Shock Syndrome[22]

– Toxic shock syndrome is a rare but potentially fatal complication of small burns in children (usually age less than 2 years) (TBSA greater than 10%).

– The client presents 2 to 4 days post-injury with fever, rash, irritability, poor feeding, decreased capillary refill and/or tachypnea, but the burn wound often appears clean

– The client often deteriorates rapidly and once shock develops the mortality rate may be 50%.

– For more information on toxic shock, see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 18 – Toxic Shock Syndrome – Physical Findings.*

Indicators of Non-Accidental Burn Injuries[9; 34]

- Delay in seeking help[9]
- Historical accounts of injury differ over time or are inconsistent
- Past abuse or family violence
- Inappropriate behaviour/interaction between child and parent(s)/caregiver(s)
- Immersion burns (e.g., glove and sock pattern scalds)
- Symmetrical burns of uniform depth
- Brands or contact burns (e.g., cigarette burns or iron)
- Examples of pictures showing common burn patterns associated with abuse in *Physical child abuse: Recognition* at uptodate.com [34]

Prevention

About Kids Health, Burns: Household Safety and Prevention, available at www.aboutkidshealth.ca/En/HealthAZ/SafetyandtheEnvironment/IndoorSafety/Pages/BurnsHouseholdSafetyandPrevention.aspx.

SECTION B: SUPPLEMENTAL RESOURCES

About Kids Health (The Hospital for Sick Children, Toronto). Burns in children. Available from: www.aboutkidshealth.ca/En/HealthAZ/ConditionsandDiseases/Injuries/Pages/burns.aspx

Indigenous and Northern Affairs Canada. Fire Education and Prevention. https://www.aadnc-aandc.gc.ca/eng/1317842518699/1317842725065

Table 6

Burn Camps and Support Resources

Burn Camps	**Contact Information**
Camp Bucko (Ontario)	http://www.campbucko.ca/
Camp Phoenix North (Manitoba)	http://experiencemomenta.com/
SUPPORT RESOURCES	CONTACT INFORMATION
Canadian Burn Survivors Community	www.canadianburnsurvivors.ca
Mamingwey Burn Survivor Society (Manitoba)	www.mamingwey.ca
Nova Scotia Burn Treatment Society	www.nsffbts.ca
Calgary Firefighters Burn Treatment Society	www.cfbts.org
B.C. Professional Fire Fighters' Burn Fund	www.burnfund.org
International Association of Fire Fighters	https://client.prod.iaff.org/

Burn Camps	Contact Information
Edmonton Fire Fighters Burn Treatment Society	www.efbts.ca

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline.

REFERENCES

1. Rice PL, Orgill DP. Classification of burns. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 6]. Available from: https://www.uptodate.com/contents/classification-of-burn-injury with authorized username and password.

2. Wiktor A, Richards D. Treatment of minor thermal burns. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 6]. Available from https://www.uptodate.com/contents/treatment-of-minor-thermal-burns with authorized username and password.

3. Toon MH, Maybauer DM, Arceneaux LL, Fraser JF, Meyer W, Runge A, Maybauer M O. Children with burn injuries--assessment of trauma, neglect, violence and abuse. J Inj Violence Res. [Internet]. 2011 Jul [cited 2017 Jul];3(2):98-110. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3134932/pdf/jivr-03-98.pdf

4. Pinto DS, Clardy PF. Environmental and weapon-related electrical injuries. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 6]. Available from: https://www.uptodate.com/contents/environmental-and-weapon-related-electrical-injuries with authorized username and password

5. Kaushik S, Burd S. Topical chemical burns. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 6]. Available from: https://www.uptodate.com/contents/topical-chemical-burns with authorized username and password.

6. Peck MD. Epidemiology of burn injuries globally. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 6]. Available from: https://www.uptodate.com/contents/epidemiology-of-burn-injuries-globally with authorized username and password.

7. Rice PL, Orgill DP. Emergency care of moderate and severe thermal burns in adults. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 6]. Available from: https://www.uptodate.com/contents/emergency-care-of-moderate-and-severe-thermal-burns-in-adults with authorized username and password

8. Joffe MD. Emergency care of moderate and severe thermal burns in children. In: Post TW, editor. [Internet]. Waltham, MA: UpToDate Inc.; [cited 2017 Aug 15]. Available from: https://www.uptodate.com/contents/emergency-care-of-moderate-and-severe-thermal-burns-in-children with authorized username and password.

9. Boos S. Physical child abuse in children: Diagnostic evaluation and management. In: Post TW, editor. [Internet]. Waltham, MA: UpToDate Inc,; 2017 [cited 2017 Jul 8] Available from: https://www.uptodate.com/contents/physical-child-abuse-diagnostic-evaluation-and-management with authorized username and password.

10. Michak RP. Inhalation injury from heat, smoke, or chemical irritants. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc; 2017 [cited 2017 Jul 8]; [about 2 p.]. Available from: https://www.uptodate.com/contents/inhalation-injury-from-heat-smoke-or-chemical-irritants with authorized username and password.

11. American Burn Association [Internet]. Chicago, IL: c2017. Burn Center referral criteria; 2006 [cited 2017 Jul 6]; [about 1 p.]. Available from: http://ameriburn.org/wp-content/uploads/2017/05/burncenterreferralcriteria.pdf

12. Ontario Injury Prevention Resource Centre [Internet]. Toronto, ON: The Centre; c2017. Burns centre consultation guidelines; 2014 [cited 2017 Jul 6]. Available from: http://www.oninjuryresources.ca/downloads/news/CCSO_BurnsCentreGuidelines_11x14-EN.PDF

13. HealthResearchFunding.org [Internet]. Washington, DC: National Health Council. c2015 - . Burn injuries; 2013 Oct 28 [cited 2017 Jul 8]; [about 5 p.]. Available from: https://healthresearchfunding.org/difference-between-3rd-and-4th-degree-burns

14. Dai T, Huang YY, Sharma SK, Hashmi JT, Kurup DB, Hamblin MR. Topical antimicrobials for burn wound infections. Recent Pat Antiinfect Drug Discov [Internet]. 2010 Jun [cited 2017 Jul 7];5(2):124-51. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2935806/pdf/nihms232370.pdf

15. Young AR, Tawari A. Sunburn. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 7]. Available from: https://www.uptodate.com/contents/sunburn with authorized username and password.

16. Gauglitz GG, Shahrokhi S. Burn wound infection and sepsis. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 7]. Available from https://www.uptodate.com/contents/burn-wound-infection-and-sepsis with authorized username and password.

17. DynaMed Plus [Internet]. Ipswich, MA: EBSCO Information Services. 1995 - . Record No. 901428, Minor burns [updated 2017 Mar 20; cited 2017 Jul 7]. Available from http://www.dynamed.com/login.aspx?direct=true&site=DynaMed&id=901428. Registration and login required.

18. Mayo Clinic, Patient and Health Information, Diseases and Conditions [Internet]. Rochester, MN: Mayo Foundation for Medical Education and Research; c1998 - . Burns: Complications; 2015 Aug 1[cited 2017 Ju 8]; [about 4 p.]. Available from: http://www.mayoclinic.org/diseases-conditions/burns/basics/complications/con-20035028 [produced by Mayo Clinic Staff].

19. Tenenhaus M, Rennekampff H-O.Topical agents and dressings for local burn wound care. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 7]. Available from: https://www.uptodate.com/contents/topical-agents-and-dressings-for-local-burn-wound-care with authorized username and password.

20. Gauglitz GG, Williams FN. Comlications and long-term outcomes of a severe burn. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 7]. Available from: https://www.uptodate.com/contents/complications-and-long-term-outcomes-of-a-severe-burn with authorized username and password.

21. Findlay JM, Shaw A. Emergency management of burns. Br J Hosp Med (Lond). 2010 Nov;71(11):M162-6.

22. Wounds Group: Wounds International [Internet]. London (UK). Wounds Group; c2014c - . Best Practice Guidelines: Effective skin and wound management of non-complex burns; 2014 May 9 [cited 2017 Jul 8]; [about 4 p.]. Available from: http://www.woundsinternational.com/best-practices/view/best-practice-guidelines-effective-skin-and-wound-management-in-non-complex-burns. Registration and login required.

23. DynaMed Plus [Internet]. Ipswich (MA): EBSCO Information Services; 1995 - . Record No. 113804, Major burns [updated 2017 Mar 15; cited 2017 **Jul 7**]; [about 47 p.]. Available from http://www.dynamed.com/login.aspx?direct=true&site=DynaMed&id=113804. Registration and login required.

24. Mecott GA, Al-Mousawi AM, Gauglitz GG, Herndon DN, Jeschke MG. The role of hyperglycemia in burned patients: evidence-based studies. Shock [Internet]. 2010 Jan [cited 2017 Jul 7];33(1):5-13. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3878072/pdf/nihms525737.pdf

25. Shrivastava P, Goel A. Pre-hospital care in burn injury. Indian J Plast Surg [Internet]. 2010 Sep [cited 2017 Jul 7];43(Suppl):S15-22. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3038405/

26. Mlcak R. Inhalation injury from heat, smoke, or chemical irritants. 2017. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: Waltham MA: UpToDate Inc.; 2017 [cited 2017 Jul 7]. Available from: https://www.uptodate.com/contents/inhalation-injury-from-heat-smoke-or-chemical-irritants with authorized username and password.

27. Lexicomp Online. Acetominophen (paracetamol): Pediatric drug information). In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 8]. Available from www.uptodate.com with authorized username and password.

28. Lexicomp Online. Ibuprofen: Pediatric drug information. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 8]. Available from www.uptodate.com with authorized username and password.

29. Lexicomp Online. Calamine lotion: Pediatric drug information. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 8]. Available from www.uptodate.com with authorized username and password.

30. Jull AB, Cullum N, Dumville JC, Westby MJ, Deshpande S, Walker N. Honey as a topical treatment for wounds. 2015 Mar 6 [cited 2017 Jul 8]. In: Cochrane Database of Systematic Reviews [Internet]. Hoboken, NJ: John Wiley & Sons, Ltd. C1999 - . Available from: : http://www.cochrane.org/CD005083/WOUNDS_honey-as-a-topical-treatment-for-acute-and-chronic-wounds

31. British Columbia Childrens Hospital, ePOPs, [Internet]. Vancouver, BC: Provincial Health Services Authority; c2017. Fluid replacement; 2013 [cited 2017 Aug 15]; [about 3 p.] Available from: http://policyandorders.cw.bc.ca/resource-gallery/Documents/BC%20Children's%20Hospital/CC.12.24%20Fluid%20Replacement.pdf

32. De Sousa A. Psychological aspects of paediatric burns (a clinical review). Ann Burns Fire Disasters [Internet]. 2010 Sep 30 [cited 2017 Jul 8];23(3):155-9. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3188258/pdf/Ann-Burns-and-Fire-Disasters-23-155.pdf

33. Senarath-Yapa K, Enoch S. Management of burns in the community. Wounds UK [Internet]. 2009 [cited 2017 Jul 8];5(2):38-48. Available from: http://www.wounds-uk.com/pdf/content_9277.pdf

34. Boos S. Physical child abuse: recognition. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 8]. Available from: https://www.uptodate.com/contents/physical-child-abuse-recognition with authorized username and password.

Other Sources

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON; Health Canada; 2016.

SKIN WOUNDS IN CHILDREN

OVERVIEW

Please refer to provincial/territorial guidelines for Skin Wounds, where available.

A wound is an acute tissue injury causing disruption of the normal structure and function of the skin.[1] Wounds may be acute (normal wound physiology) or chronic (physiologically impaired).[1] Pediatric wounds can be categorized into three etiology-based types: injury-related wounds, bites, and burns.[2] This clinical practice guideline will focus on the management of acute injury-related wounds and bite wounds. For more information on burn wounds, see the *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 16 – Skin – Burns.*

CAUSES[3]

TABLE 1

Causes of Open versus Closed Skin Wounds[3; 4]

OPEN SKIN WOUNDS	CLOSED SKIN WOUNDS
Abrasions: from skin brushing a rough surface or a smooth surface at high speed	Contusions: caused by direct, blunt trauma
Lacerations: generally caused by trauma or contact with an object such as a hard blow, collision, or accident	Hematomas: caused by trauma that damages the small blood vessels and capillaries resulting in blood collecting and pooling in a limited space
Incisions: often from a surgical procedure or skin cut with a sharp object like a knife or scissors	Crush injuries: usually caused by an external high-pressure force that squeezes part of the body between 2 surfaces
Punctures: result from objects with thin pointed tips such as needles, nails or other tapered objects, or teeth in cases of human or animal bites	
Penetrating, including gunshot wounds: caused by an object or force that breaks through the skin to the underlying organs or tissue	

Miscellaneous Types of Wounds

- Thermal wounds from extreme hot or cold temperatures (e.g., burns, sunburns, and frostbite)
- Chemical wounds from contact with or inhalation of chemical materials that cause skin or lung damage
- Bites and stings (e.g., from humans, dogs, bats, rodents, snakes, scorpions, spiders, and ticks)

- Electrical wounds, which usually present with superficial burn-like or sting-like wounds secondary to the passage of high-voltage electrical currents through the body and may include internal damage

Tension forces from blunt injuries and compressive forces from crush injuries deliver more energy to a larger amount of tissue and cause greater disruption and higher infection rates than shear forces resulting from sharp trauma; most pediatric trauma occurs as a result of blunt trauma.[4-6]

ASSESSMENT

Medication review: Review current medications including over-the-counter, complementary and alternative medicines, as well as any chemical or substance intake that may impact management.

Allergy history: Screen for medication, latex, environmental or other allergies and determine approximately when and what type of reaction occurred.

RISK FACTORS

– Factors that influence childhood injuries include age, gender, behaviour and environment:[4]

- Age and gender are the most important factors affecting the patterns of injury.
- Males younger than 18 years of age have higher injury and mortality rates, in part because of their more aggressive behaviour and involvement in contact sports.
- In the infant and toddler age group, falls are a common cause of severe injury.
- Bicycle-related accidents, with or without the interaction of motor vehicles, are the main cause of injury in older children and adolescents.

– Children have a higher incidence of dog-bite wounds than adults, especially bites to the face, neck and head.[6]

Risk Factors for Wound Breakdown and Infection[6; 7]

– Duration of the open wound

– Associated open fracture

– Degree of contamination

– Deeper wounds

– Puncture injuries

– Crush wounds

– Wounds on the hand

– Comorbid and immunocompromising conditions (e.g., diabetes mellitus, asplenia)

Note: Risk factors for wound breakdown must be taken into consideration for decisions about wound healing by primary, secondary, or delayed primary intention; see *Wound Repair General Principles* in *Non-Pharmacological Interventions*[7] section.

HISTORY OF PRESENT ILLNESS[2; 5]

Review risk factors and collect history of present illness.

Note: It is important to consider the possibility of inflicted trauma; a history inconsistent with the severity of the injury or the child's developmental stage, or that changes over time, should arouse suspicion.[5] For more information, see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 5 – Child Maltreatment*. If self-inflicted trauma is suspected, see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 19 – Adolescent Health – Suicidal Behaviour.*

- Mechanism of injury including risk of a foreign body (e.g., wood or metal splinter, jewellery, glass, fishhook, fragment from gunshot, needles)
- Environment in which the injury occurred to identify potential contamination (e.g., wounds sustained in barnyards or stables should be considered contaminated)
- Time elapsed since the injury
- Care provided prior to evaluation
- Loss of function in nearby tendons, ligaments, and nerves (sensation)
- Child's developmental stage
- Developmental delays or coexisting medical conditions (may affect the clinician's ability to repair the wound or alter wound healing)
- Immunization status
- Associated injuries

PHYSICAL FINDINGS[2; 5; 8; 9]

Perform a physical examination using the IPPA approach.

- Assess wound location, size, and shape.
- Assess for neurovascular compromise, muscle and/or tendon injury, underlying fractures, tissue damage or loss, and, with extremity injuries, distal perfusion and sensorimotor function.
    - Assessment of nerve and tendon functions may be difficult in a pre-verbal child. Observation of spontaneous activity provides an indirect measure of function.
- Check two-point discrimination for hand and finger lacerations which should be less than 5 mm at the fingertips.
- Tachycardia and hypotension may be present if there is significant blood loss from the wound.
- Inspect wound for retained foreign bodies.
- Assess for presence of infection:
    - Redness around the wound
    - Exudate
    - Malodour

- Localized pain
- Localized heat
- Elevated temperature
- Lymphangitis
- General malaise

– For bite marks, measure the intercanine distance. A human bite mark with an intercanine distance greater than 3 cm was likely inflicted by an adult.

DIFFERENTIAL DIAGNOSIS[10]

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

– Suspicion of abuse should be raised if:

- Accounts of the mechanism of injury keep changing, differ, or are implausible or inconsistent with the injury.
- The mechanism of injury is inconsistent with the child's age/developmental stage, normal activities, and existing medical conditions.
- Delay in seeking medical attention.
- Lack of concern from parent(s)/caregiver(s).
- Demeanour/behaviour of child causes concern.

All human bite marks in a young child should raise suspicion of abuse.[9]

COMPLICATIONS

Note: The morbidity of traumatic wounds in children varies according to the type of wound.[7]

– Infection

– Poor healing

– Nerve laceration

– Injury to major vascular structures such as arteries

– Injury to tendons

– Compartment syndrome (loss of sensation may be the first sign)

– Crush injury may decrease two-point discrimination

– Rabies infection

Note: The decision to initiate post-exposure prophylaxis for rabies should be guided by knowledge of regional rabies carriage in the biting species and the ability to monitor the implicated animal.[5] For more information, see *FNIHB Adult Care Clinical Practice Guidelines – Chapter 11 – Communicable Diseases – Rabies Exposure.*

Bite Wounds[2]

- Depending on location, bite wounds can be accompanied by the development of severe infections with bacteremia and marked sequelae.
- Risk of infection increases significantly with larger wounds, particularly those longer than 3 cm.
- Cat bites are complicated by infections in 30% to 80% of cases.
- Human bites are also polymicrobial and pose the potential for the transmission of systemic, life-threatening infections such as hepatitis B.

DIAGNOSTIC TESTS

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

Diagnostic test selection is based on client history, risk factors, physical examination findings, and test availability.

Laboratory

Testing should be carried out as per provincial/territorial policies and procedures. The tests below are for consideration.

- Diagnostic tests are rarely needed for a child with a simple laceration or wound.[2]
- Laboratory studies may be indicated if concerns arise such as prolonged bleeding or difficulty in achieving hemostasis that may indicate an underlying disorder.[2]
- A wound swab culture and sensitivity (C+S) is indicated for an infected wound.[8]
- If human bodily fluid exchange is a possibility for human bite wounds, testing for blood-borne pathogens (e.g., HIV, hepatitis B) may be considered.[11]

Imaging

- Radiographs may be necessary if there are concerns about retained glass or metal. Ultrasound may be required to evaluate for a radiolucent foreign body or to assist in the removal of a foreign body during the procedure.[2]
- Radiographs may be required for clenched-fist injuries and penetrating scalp wounds to rule out fractures or presence of foreign bodies or teeth fragments in a wound.[9]

MANAGEMENT

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

GOALS OF TREATMENT [2]

- Assist in hemostasis.
- Avoid wound infection.
- Achieve rapid healing with optimal function.

– Achieve optimal cosmetic results with minimal scarring.

NON-PHARMACOLOGICAL INTERVENTIONS

Interventions

Wound Repair General Principles

– If restraint is required for a child between the ages of 1 and 6 years, see https://www.canada.ca/en/health-canada/services/first-nations-inuit-health/health-care-services/nursing/clinical-practice-guidelines-nurses-primary-care/pediatric-adolescent-care/chapter-2-pediatric-procedures.html#a1.

– Primary closure of a wound involves definitive repair at the time of presentation:[2]

  - Wounds that are clean with no signs of infection may be closed up to 12 hours of the injury and one cited study suggests suturing can be delayed for up to 18 hours.[12]
  - Wounds to areas with an extensive vascular supply (e.g., head, face), after thorough cleaning, can be closed up to 24 hours from the time of injury if there is no evidence of infection.[12]

– Lacerations in some areas of the face may require surgical consultation (e.g., lip, tongue). Wound closure by secondary intention involves allowing the laceration to heal naturally without any attempt at primary wound closure. This is a reasonable option for late-presenting lacerations, and should be used when wound infection is a concern.[2]

– Delayed primary closure may be considered for highly-contaminated wounds when there has been a significant delay in access to wound care, and for open traumatic wounds with large soft-tissue defects due to limited native tissue availability for coverage.[2; 7]

  - Wounds that are not amenable to closure are treated with daily moistened saline gauze packing of the wound cavity to keep the tissue moist and to assist with debridement.[7]
  - Primary closure may be attempted when there is no obvious evidence of infection on re-assessment.[2]
  - This method is also useful for wounds that may require the expertise of a specialist, such as a plastic surgeon, who is not immediately available, or if the child needs sedation but has recently eaten.[2]

TABLE 2
Risk Factors for Wound Infection or Poor Wound Healing[2]

CLIENT FACTORS	WOUND FACTORS
Immunocompromised	Increased age of wound at time of presentation
Peripheral arterial disease	Animal bites, particularly in decreased vascular areas (extremities, trunk)
Diabetes mellitus	Deep puncture wounds that are difficult to irrigate effectively
Malnutrition	Excessive wound tension with suture placement
Corticosteroid use	
Obesity	

Hemostasis

Direct pressure and elevation is the first choice for controlling bleeding.[5]

Wound Preparation[5; 13]

Note: For eyebrow injuries, never shave the eyebrows as they are needed for alignment of the wound and may grow back unpredictably[5]

- Skin disinfection can be performed with a dilute (1:10) povidone-iodine (Betadine®)/saline solution. Avoid introducing iodine into the wound as it may impede healing.
- Hair need not be removed unless it interferes with wound closure or knot formation; lubricate and comb the hair away from wound margins using a sterile water-based lubricant (Muko).
- Use copious wound irrigation with 0.9% sodium chloride or tap water to wash away foreign matter; this dilutes the bacterial concentration to decrease post-repair infection:
  - Warmed solution is more comfortable for the client.
  - Hydrogen peroxide and detergents should not be used in the wound because they impede healing.
  - Irrigate copiously with a 30 or 60 mL syringe and 18-gauge needle or angiocatheter.
  - The volume needed for irrigation is not well studied. Use 50 to 100 mL of 0.9% sodium chloride per cm of laceration modified by depth and degree of contamination.
- Most simple pediatric lacerations do not require excision or revision of injured tissue. The dermis should be debrided sparingly, if at all, as excessive skin tension makes approximation difficult and excessive scarring more likely.
- Indications for debridement include extremely irregular or oblique wound edges, or obviously non-viable tissue remnants.

Wound Closure[2; 5]

The goal is approximation of skin under minimal tension while achieving wound edge eversion.

Wound Closure with Steri-Strips™

– Steri-Strips™ provide a fast, simple, relatively pain-free, and inexpensive method of wound closure:
  - Should be considered for simple linear lacerations over low-tensile areas
  - Do not provide significant hemostasis or adhere to hair-bearing areas like scalp
  - Initial strength much less than with suture closure; not for wounds in regions of increased mobility or tension

Wound Closure with Adhesives[2]

– Tissue adhesives are relatively painless and ideal for pediatric clients who sustain wounds that are uncomplicated and less than 5 cm in length:
  - If a laceration is above the fascia and measures less than 5 cm in length and 0.5 cm or less in width, and if edges can be approximated easily with no or minimal tension, tissue adhesives may be considered. see *FNIHB Pediatric and Adolescent Care Clinical Practice Guidelines – Chapter 2 – Pediatric Procedures – Wound Closure).*

Wound Closure with Staples[2]

- For many minor wounds staples are an acceptable alternative for linear lacerations through the dermis that have straight, sharp edges and are located on the scalp, trunk, arms, and legs. Staples should be avoided on the face and neck and on the feet and hands. Please refer to Regional guidelines and protocols where available.

Wound Closure with Sutures

– Suturing is considered the gold standard of wound closure.
  - Sutures offer the most meticulous skin closure, providing good strength, particularly on high-tension areas. For more information, see *Table 5, Types of Suture Material for Particular Sites and Table 6, Timing of Removal of Sutures in Appendix, Section A.*
  - Simple interrupted sutures are used for surface suture closure.

Client Education[2]

– Advise parent(s)/caregiver(s)/client to monitor closely for signs of infection and instruct them to return for reassessment if there are any signs of infection (e.g., redness, swelling, discharge, pain, fever).

– Advise parent(s)/caregiver(s)/client to avoid cleaning the wound with povidone-iodine, alcohol, or hydrogen peroxide because these products can disrupt wound healing.

– Wounds repaired with tissue adhesives should be kept dry, and antibiotic ointment should not be applied to avoid wound dehiscence.

– A moist healing environment improves the rate of re-epithelization, reduces pain, and improves cosmetic outcomes (i.e., postoperative bathing of the wound within 12 hours).

– Counsel parent(s)/caregiver(s)/client about appropriate use of medications; dose, frequency, importance of adherence, potential side effects, and interactions.

PHARMACOLOGICAL INTERVENTIONS

In addition to consulting a physician/nurse practitioner, review the drug monograph, the FNIHB Nursing Station Formulary or provincial/territorial formulary before initiating treatment.

Analgesic/Antipyretic

Note: Since neonates and infants (less than 3 months of age) are less able to mount a febrile response, when they do become febrile, it is more likely to indicate a major illness. Consult physician/nurse practitioner particularly for children less than 3 months of age.

Acetaminophen

- Acetaminophen 10 to 15 mg/kg/dose PO q4-6h PRN
- Maximum from all sources: acetaminophen 75 mg/kg in 24 hours or 4,000 mg in 24 hours, whichever is less.

Ibuprofen[20]

Infants <6 Months
- Limited data available in infants

For 6 Months to 12 Years of Age
- Ibuprofen 5 to 10 mg/kg/dose PO q6-8h PRN
- Maximum 400 mg/dose*

For Greater than 12 Years of Age
- Ibuprofen 200 to 400 mg PO q4-6h PRN*
- *Maximum from all sources for all ages: Ibuprofen 40 mg/kg in 24 hours or 1200 mg in 24 hours whichever is less. Under physician/nurse practitioner supervision, daily doses ≤2,400 mg may be used.

Local Anaesthetic for Suturing[14; 15]

Note: Although rare, an allergic reaction to lidocaine is possible; ensure access to an anaphylaxis kit.

- Always check sensation before administering anesthesia.
- Lidocaine 1% WITHOUT epinephrine is the most frequently used local anesthetic for local infiltration.
- Administer lidocaine 1% WITHOUT epinephrine 0.4 mL/kg by subcutaneous injection (maximum 0.5 mL/kg/dose not to exceed the recommended adult maximum dose of 30 mL of lidocaine 1% without epinephrine). Do not repeat within 2 hours.[15] The lowest effective doses should be used in children to avoid systemic toxic effects. For an added margin of safety, 80% of the maximum allowable dose should be used in children under 8 years of age.
- Use a 25-, 27- or 30-gauge needle and a small-volume syringe (1 mL or 3 mL).
- The onset of anesthesia typically occurs within 2 to 5 minutes and it lasts 30 minutes to 2 hours.
- If extensive suturing is required, it may be necessary to anesthetize and suture a small area at a time to prevent the anesthetic from wearing off before suturing is complete.

– Intact, uninfected skin and clean lacerations may undergo direct infiltration but heavily-contaminated lacerations or skin abscesses should undergo a field block. For more information, see *Table 3, Technique for Direct Infiltration and Field Block*.

TABLE 3
Technique for Direct Infiltration and Field Block[14]

DIRECT INFILTRATION	FIELD BLOCK
Uninfected skin and clean lacerations	Heavily-contaminated lacerations
Ensure that the areas distal to the wound show no neurovascular compromise. Explain the procedure to the parent(s)/caregiver(s)/client. Provide restraint, as needed. Cleanse the site of infiltration with povidone-iodine or other similar antiseptic preparation and allow to air dry or dry with sterile gauze. Hide the needle from view prior to and during injection, especially in younger children. For open wounds, put a few drops of anesthetic into the wound and then rapidly place the needle into the subcutaneous layer by inserting it through the wound margin rather than intact skin. For intact skin, place the needle through the skin into the subcutaneous layer. Slowly inject small volumes of anesthetic. During anesthetic infiltration, either slowly advance the needle or initially insert it to the hub and infiltrate as the needle is withdrawn. Always pull back on plunger to ensure the needle is not in a blood vessel. Toxic effects of lidocaine may be observed if anesthetic is injected into a blood vessel inadvertently. Anesthetize adjacent areas by inserting the needle through the previously injected skin or wound until the entire region requiring anesthesia is infiltrated (this is ordinarily accomplished in a linear laceration, for example, by entering the proximal portion of the wound and administering lidocaine as one proceeds forward or by moving the needle forward to the distal end of the wound and withdrawing back to the original point while injecting lidocaine). Know where the last portion of anesthesia was delivered and insert the needle in that area if additional injections are required	Prepare the client and wound in the same way as for direct infiltration. Insert the needle into the subcutaneous layer through intact, clean skin along the margin of the contaminated wound or through uninfected skin immediately adjacent to the abscess. Slowly inject small volumes of anesthetic, taking care to monitor the total dose administered. During anesthetic infiltration, either slowly advance the needle or initially insert it to the hub, and infiltrate as the needle is withdrawn. Aspiration is not necessary prior to each infiltration, unless the area undergoing local anesthesia is close to major blood vessels. Reinsert the needle through the area just anesthetized, redirecting it along the margins of the wound or circumferentially around the abscess and infiltrate additional anesthetic. Continue infiltration through previously injected skin until the entire region requiring anesthesia is infiltrated. After a few minutes, lightly test the skin or wound margins for adequate

DIRECT INFILTRATION	FIELD BLOCK
to avoid additional pain from repeated insertion of the needle. After a few minutes, lightly test the skin or wound margins for adequate anesthesia using the injection needle or another sharp object.	anesthesia using the injection needle or another sharp object.

Antibiotic Prophylaxis for Non-Bite Wounds

- Prophylactic antibiotics are not indicated in healthy clients with clean non-bite wounds.[12]
- In consultation with the physician/nurse practitioner, prophylactic antibiotics may be considered for individuals with client and/or wounds factors that place them at high risk for wound infection.

Topical Antibiotics

- A topical antibiotic ointment may be considered for preventing infection in minor skin injuries:
  - Bacitracin/polymyxin B ointment: apply a small amount topically to affected area(s) once daily to TID for up to 7 days. Cover with sterile bandage if needed.[16]
- Alternatively an antibiotic-impregnated dressing may be considered for infected wounds.

Antibiotic Prophylaxis/Therapy for Bite Wounds

Human Bites

- All human bite wounds require antibiotic prophylaxis, particularly when in high-risk areas such as the hand (e.g., the clenched fist).[2; 6]

Cat Bites

- Prophylactic antibiotics are routinely required for all cat bites because of the high rate of infection associated with cat bite wounds.[6]

Dog Bites

- In consultation with the physician/nurse practitioner, 3 to 5 days of prophylactic antibiotics for dog bites is recommended for clients with the following conditions:[17]
  - Immunocompromised
  - Asplenic
  - Advanced liver disease
  - Pre-existing or resultant edema of the affected area
  - Moderate to severe injuries
  - Injuries to hand, foot, face, or genitalia
  - Injuries that may have penetrated the periosteum or joint capsule

Bites of Other Animals[18]

- Bites of most small animals should generally be treated in the same fashion as cat bites (e.g., squirrels, or rodents such as rats, rabbits, and guinea pigs).
- The potential for deep structure injury and life-threatening wounds increases with the size of the animal involved.

For more information, see *Table 4, Pharmacotherapy for Cat, Dog, Wild Animal, and Human Bites*

TABLE 4
Pharmacotherapy for Cat, Dog, Wild Animal, and Human Bites

ANTIBIOTIC	DOSING
Preferred Treatment	
Amoxicillin/clavulanate [21]	**Greater than/equal to 3 months and less than/equal to 40 kg:** Calculate 40 mg amoxicillin/kg in 24 hours PO divided TID **Greater than 40 kg:** 875 mg (amoxicillin component) PO BID or 500 mg (amoxicillin component)PO TID
Alternate Treatment if Known or Suspected Allergy to Penicillin and/or Cephalosporin	
Doxycycline[18] (Not recommended for less than age 8 due to dental staining)	**Greater than 8 years of age and less than/equal to 45 kg:** Calculate 2 to 4 mg/kg in 24 hours divided BID (maximum 200 mg in 24 hours) **Greater than 8 years of age and greater than 45 kg:** 100 mg PO BID
OR	
Trimethoprim/ sulfamethoxazole[18] with/without metronidazole **Note:** Clindamycin may be used as an alternate treatment to metronidazole; consult with physician/nurse practitioner	**Trimethoprim/ sulfamethoxazole** **Children:** 4 to 6 mg/kg (trimethoprim component) per dose twice daily (maximum 160 mg trimethoprim per dose) **Metronidazole** **Children:** 10 mg/kg per dose TID (maximum 500 mg per dose)

Note: The duration of therapy varies according to the severity of the injury/infection. Consider 3 to 5 days of prophylactic antibiotic therapy; longer duration of therapy (e.g., 5 to 10 days) is indicated for an established infection.[17] Consult with the physician/nurse practioner for most severe infections and moderate infections in high-

ANTIBIOTIC	DOSING
risk clients, which require initial intravenous (IV) antibiotics.[12]	

Post-Exposure Vaccine Prophylaxis

- Individuals who are previously unimmunized or incompletely immunized (unknown or fewer than 3 doses of tetanus-toxoid containing vaccine) and sustain a wound that is other than minor and clean should receive both the tetanus toxoid-containing vaccine and tetanus immune globulin.[18, 19]

– Post-exposure prophylaxis for rabies may be indicated.[18, 19] For more information, see *FNIHB Adult Care Clinical Practice Guidelines – Chapter 11 – Communicable Diseases – Rabies Exposure* and the most recent Canadian Immunization Guide, available at https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-18-rabies-vaccine.html.

– If a child known to be a Hepatitis B (HBV) carrier bites and breaks the skin of a non-immune child, Hepatitis B immunoglobulin 0.06 mL/kg IM and HBV vaccine should be administered to the bitten child. If the biter is non-immune and bites a HBV carrier, HBV vaccine should be given to the biter. Where the status of the biter or victim is unknown, low risk does not warrant HBV testing.[11] For more information and for HBV vaccine dosing guidance, see the most recent *Canadian Immunization Guide*, available at*:* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-7-hepatitis-b-vaccine.html.

MONITORING AND FOLLOW-UP

Consult a physician/nurse practitioner when practice is outside legislated scope and without authorized delegation.

MONITORING

– Monitor vital signs as indicated by client's condition.

– Monitor intake and output.

– If administering an agent with risk of anaphylaxis, monitor the client closely for 30 minutes.

FOLLOW-UP

All wounds should be assessed daily until it is clear that infection is not developing and then follow-up is as clinically indicated.

Referral

– Medical evacuation may be required for:[12]

- Treatment failure
- Severe/systemic infection including necrotizing fasciitis and severe cellulitis
- Treatment non-compliance
- Poorly-controlled diabetes mellitus or peripheral vascular disease or immunocompromised client
- Worsening of wound

- Wounds affecting joints, bones, tendons, or nerves
- Wounds on large areas of the body
- Wounds to face

Reporting

Concerns about maltreatment must be documented accurately and reported immediately according to provincial/territorial child protection policies.[10]

General Guidelines for Removing Sutures

– Wound appears clean and healed.

– Wound appears dry with no evident drainage.

– For larger wounds it is advisable to initially remove alternate sutures to ensure that wound edges stay approximated and, if dehiscence occurs, do not remove remaining sutures.

APPENDIX

SECTION A: SUPPLEMENTAL CLINICAL MANAGEMENT INFORMATION

TABLE 5
Types of Suture Material for Particular Sites[22]

	TYPE OF SUTURE	SIZE OF SUTURE	BODY AREA
Non-absorbable	Nylon-Dermalon, Ethilon	#3-0, 4-0 #5-0, 6-0 #3-0, 4-0, 5-0 #3-0, 4-0, 5-0 #3-0, 4-0, 5-0	Scalp Forehead Back Torso Limbs
	Nylon coated with polypropylene glycol (Prolene)	#5-0, 6-0	Face
Absorbable	Polygalactin (Vicryl, Dexon) Monofilament (Monocryl)	#4-0, 5-0	Subcutaneous tissue Muscle Lacerations underneath casts or splints Tongue or oral mucosa lacerations Nail bed

TABLE 6
Timing and Removal of Sutures[13; 22]

Consider increased time before removal of sutures in clients with diabetes mellitus or clients receiving steroids as healing may be delayed.

WOUND LOCATION	REMOVAL TIME
Face	3–5 days (may use Steri-Strips™ following suture removal)
Scalp	7-14 days
Neck	3-4 days
Trunk and upper extremities	7-10 days
Lower extremities	8-14 days
Joints	8-10 days (14 days for extensor joints[12])

SECTION B: SUPPLEMENTAL RESOURCES

Alberta

Alberta Health
Public Health Notifiable Disease Management Guidelines: Tetanus. Available from :
https://open.alberta.ca/publications/tetanus

British Columbia

British Columbia Provincial Nursing Skin and Wound Care Committee
Guideline: Treating Minor Uncomplicated Lacerations in Adults. Available from :
https://www.clwk.ca/buddydrive/file/guideline-treating-minor-lacerations/

Manitoba

Manitoba Health, Seniors and Active Living
Communicable Disease Management Protocol: Tetanus Reporting and Case Investigation. Available from:http://www.gov.mb.ca/health/publichealth/diseases/tetanus.html

Newfoundland and Labrador

Health and Community Services
Protection From Tetanus, Diphtheria (Td) and Pertussis (Tdap) Adult Program. Available from:
http://www.health.gov.nl.ca/health/publichealth/cdc/Protection_from_Td_and_Tdap_adult_program_2014.pdf

Nova Scotia

Department of Health and Wellness
Communicable Disease Manual General Information: Tetanus. Available from :
http://www.novascotia.ca/dhw/populationhealth/surveillanceguidelines/tetanus.pdf

Ontario

Ontario Ministry of Health and Long-Term Care Diseases and Conditions, Immunization: Tetanus and Diphtheria (Td) Vaccine. Available from:
http://www.health.gov.on.ca/en/pro/programs/immunization/docs/hcp_fact_sheets_tetanus.pdf and
http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/tetanus_chapter.pdf

Yukon

Health and Social Services
Communicable Disease Control: Tetanus. Available from: http://www.hss.gov.yk.ca/fr/pdf/im_manual_section3.pdf

Canada

Public Health Agency of Canada
Canadian Immunization Guide. Available from: https://www.canada.ca/en/public-health/services/canadian-immunization-guide.html

BIBLIOGRAPHY

The following references and other sources have informed the updating of this Clinical Practice Guideline.

REFERENCES

1. Armstrong DG, Meyer AJ. Basic principles of wound management. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 30]. Available from: https://www.uptodate.com/contents/basic-principles-of-wound-management with authorized username and password.

2. Black KD, Cico SJ, Caglar D. Wound management. Pediatr Rev. 2015 May;36(5):207-15.

3. Wound Care Centers [Internet]. Jacksonville, FL: Healogics Inc.: c1994 - . Different types of wounds; [cited 2017 Jun 30]; [about 6 p.].Available from: http://www.woundcarecenters.org/article/wound-basics/different-types-of-wounds

4. Daley, B. J. Considerations in pediatric trauma. In: Medscape [Internet]. New York, NY (US): WebMD LLC; 2015 [cited 2017 May 24]. [about 2 p.]. Available from: http://emedicine.medscape.com/article/435031-overview#a2

5. Kanegaye JT. A rational approach to the outpatient management of lacerations in pediatric patients. Curr Probl Pediatr. 1998 Aug;28(7):205-34.

6. Broom J, Woods ML. Management of bite injuries. Australian Prescriber [Internet]. 2006 [cited 2017 Jun 30];29(6):6-8. Available from: https://www.nps.org.au/australian-prescriber/articles/management-of-bite-injuries

7. Bernabe KQ, Desmarais TJ, Keller MS. Management of traumatic wounds and a novel approach to delivering wound care in children. Adv Wound Care (New Rochelle) [Internet]. 2014 Apr 1 [cited 2017 Jun 30];3(4):335-343. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3985539/pdf/wound.2013.0465.pdf

8. The Royal Children's Hospital, Melbourne Clinical Guidelines (Nursing) [Internet]. Melbourne, Australia: Royal Children's Hospital; c2017. Wound care; 2012 Apr [currently under review; cited 2017 Jun 30]; [about 8 p.]. Available from http://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Wound_care/

9. Patil PD, Panchabhai TS, Galwankar SC. Managing human bites. J Emerg Trauma Shock [Internet]. 2009 Sep [cited 2017 Jun 30];2(3):186-90. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2776367/

10. Wounds UK. Best practice statement: Principles of wound management in paediatric patients [Internet]. Norwich, England: Schofield Publishing Ltd.; 2014 [cited 2017 Jun 30]. [16 p.]. Available from: http://www.wounds-uk.com/pdf/content_11461.pdf.

11. MUMS Anti-infective Review Panel. Anti-infective guidelines for community-acquired infections.Toronto, ON: MUMS Guideline Clearinghouse; 2013.

12. Worster B, Zawora MQ, Hsieh C. Common questions about wound care. Am Fam Physician [Internet]. 2015 [cited 2017 Jun 30];91(2):86–92. Available from: http://www.aafp.org/afp/2015/0115/p86.pdf

13. Notley DA, Martin DR, Hill M. Evaluation and management of traumatic wounds. Trauma reports. [Internet] Chicago, IL; Relias; 2015 [cited 2017 June 2]. Available from: https://www.ahcmedia.com/articles/134664-evaluation-and-management-of-traumatic-wounds

14. Hsu DC. Subcutaneous infiltration of local anesthetics. In: Post TW, editor. UpToDate [Internet. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 3]. Available from: https://www.uptodate.com/contents/subcutaneous-infiltration-of-local-anesthetics with authorized username and password.

15. Lexicomp Online. Lidocaine (systemic). In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 3]. Available from: www.uptodate.com with username and password.

16. Lexicomp Online. Bacitracin (topical): Pediatric drug information. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jul 3]. Available from: www.uptodate.com with username and password.

17. Stevens DL, Bisno AL, Chambers HF, Dellinger EP, Goldstein EJ, Gorbach SL, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. Clin Infect Dis [Internet]. 2014 Jul 15 [cited 2017 Jul 4];59(2):e10-52. Available from: https://academic.oup.com/cid/article/59/2/e10/2895845

18. Harper M. Clinical manifestations and initial management of animal and human bites. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 Jun 4]. Available from: https://www.uptodate.com/contents/clinical-manifestations-and-initial-management-of-animal-and-human-bites with authorized username and password.

19. Public Health Agency of Canada [Internet]. Ottawa, ON: The Agency; 2013. Canadian immunization guide; [cited 2017 Jul 4]; [about 2 p. with hyperlinks to 5 subsections]. Available from https://www.canada.ca/en/public-health/services/canadian-immunization-guide.html

20. Ibuprofen: Pediatric drug information. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UptoDate Inc.; 2017 [cited 2017 Dec 7]. Available from: http://www.uptodate.com with authorized username and password.

21. Lexicomp Online. Amoxicillin and clavulanate: Pediatric drug information In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UptoDate Inc.; 2017 [cited 2017 Dec 7]. Available from: http://www.uptodate.com with authorized username and password.

22. DeLemos D. Closure of minor skin wounds with sutures. In: Post TW, editor. UpToDate [Internet]. Waltham, MA: UpToDate Inc.; 2017 [cited 2017 June 2]. Available from: https://www.uptodate.com/contents/closure-of-minor-skin-wounds-with-sutures with authorized username and password.

OTHER SOURCES

Compendium of therapeutic choices. 7th edition. Ottawa, ON: Canadian Pharmacists Association; 2014.

First Nations and Inuit Health Branch (FNIHB) Nursing Station Formulary and Drug Classification System. April 2016 edition. Ottawa, ON; Health Canada; 2016.