Profile

Definition
- Perioral dermatitis (PD) is inflammation of the maxillary or mandibular cutaneous or mucocutaneous tissues.
- PD has diverse clinical presentations and causes and may be noted as a singular clinical entity or among generalized dermatologic or systemic signs.

Systems
- PD is not limited to lip fold intertrigo (ie, bacterial and Malassezia spp overgrowth; Figure 1); rather, it is a potential manifestation of focal or generalized cutaneous conditions.
  - Conditions include hypersensitivities, immune-mediated dermatopathy, infection, hepatopathy, periodontal disease, and neoplasia.

Signalement & Causes
- See Causes of Perioral Dermatitis, page 59, for causes and presentations.
  - Some causes have known breed and age associations.

Risk Factors
- Redundant lip folds can predispose patients to intertrigo.
  - Any primary cause of PD poses risk for secondary bacterial or Malassezia spp infection.
- Chronic use of topical or systemic glucocorticoids poses risk for demodicosis.
- Sun exposure can pose a risk for pemphigus foliaceus and discoid lupus erythematosus (Figure 2).

Pathophysiology
- Cutaneous or mucocutaneous inflammation can occur from causes that prompt erythema, pruritus, and primary lesions (eg, papules, pustules, vesicles, bullae), followed by secondary lesions (eg, erosions, ulcerations, crusts, alopecia).
  - The resulting skin barrier disruption predisposes patients to secondary bacterial and Malassezia spp overgrowth.

PD = perioral dermatitis
The microenvironment of a deep, redundant lip fold predisposes patients to intertrigo.

Severe periodontal disease with ptalism may predispose to secondary perioral infection, particularly with deep lip folds.

Pruritus and malodor are common.

History

Signalment and clinical signs should be noted and history recorded:

- Degree, location, and seasonality of pruritus
- Duration and progression of lesions
- Previous treatments and response
- Dietary history

Physical Examination

- Cutaneous examination (eg, of the footpads, interdigital spaces, and nasal planum) should be completed.
- Otoscopic and ophthalmic examinations should be performed.
- The oral cavity, mucous membranes, and mucocutaneous junctions should be examined.
- Lymphadenopathy should be assessed and lymph nodes palpated.

Diagnosis

Definitive Diagnosis

- Definitive diagnosis is achieved via history, examination, and appropriate diagnostics (see Perioral Dermatitis in Dogs, a Management Tree, page 62).
- Secondary infections should be resolved, as they can confound clinical and histopathologic features of the primary cause.
- Histopathology is required for diagnosis of immune-mediated disease, superficial necrolytic dermatitis, zinc-responsive dermatitis (Figure 3, previous page), and cutaneous epitheliotrophic lymphoma (Figure 4).

- Patients with nonseasonal perioral pruritus may require an 8-week prescription or home-cooked elimination diet to differentiate atopic dermatitis (Figure 5) from cutaneous adverse food reaction (CAFR).

Cytology

- Acetate tape preparation (only for dry lesions) and impression smear of exudates should be performed to assess for bacteria, Malassezia spp, and presence of acantholytic keratinocytes.

Fine-Needle Aspiration

- Nodules and enlarged lymph nodes should be aspirated.

Deep Skin Scrape

- Deep skin scrape or pluck for Demodex spp (Figure 6) should be performed in all cases.

- If patient compliance impedes the performance of a deep skin scrape, several representative areas (~100 hairs per sample) can be plucked and examined with mineral oil and a coverslip.

Cultures

- Dermatophyte culture is indicated if lesions are consistent (see Causes of Perioral Dermatitis, page 59) and secondary infection and Demodex spp have been ruled out.
- Bacterial culture is indicated if clinical and cytologic response to antimicrobial therapy is lacking.
- Culture nodular or ulcerative lesions if bacteria are found on cytology; culture superficial lesions if intracellular rods are found.

Elimination Diet Trial

- A strict novel or hydrolyzed diet or home-cooked novel diet should be prescribed for a minimum of 8 weeks to differentiate CAFR from nonseasonal atopic dermatitis.

- Diet should be rechallenged to confirm the diagnosis.

Cutaneous epitheliotrophic lymphoma in various canine patients
Histopathology

- Vesiculobullous presentations (Figure 7) and lesions that remain after resolution of secondary infection should undergo biopsy.
- Multiple lesions representing all stages of disease should be sampled.

Additional Diagnostics

- Serum biochemistry profile and abdominal ultrasonography are recommended to support diagnosis of superficial necrolytic dermatitis.
- CBC, serum biochemistry profile, fecal flotation, and urinalysis are recommended in cases of adult-onset generalized demodicosis to screen for underlying systemic disease.

Treatment

Lip Fold Intertrigo

- Daily use of topical antiseptic and drying agents should be initiated.
  - 2% acetic acid, 2% boric acid, and antimicrobial-based wipes and solutions are appropriate for maintenance therapy.
- Acid- and alcohol-based topical medications are not recommended for erosive or ulcerative lesions.
- If erosions, ulcers, crusts, nodules, or depigmentation are present, systemic antimicrobial therapy is indicated (see Bacterial Infection & Mucocutaneous Pyoderma).
- Cheiloplasty is curative in patients that have lip fold intertrigo (with no other underlying cause) and are refractory to maintenance therapy.

Bacterial Infection & Mucocutaneous Pyoderma

- Topical therapy is recommended in all cases.
- Systemic antimicrobial therapy is recommended for erosive or ulcerative, crusting, and depigmentation presentations.
- If cocci are found on cytology, appropriate empirical choices include:
  - Clindamycin at 11 mg/kg PO q12–24h
  - Cephalexin at 22–30 mg/kg PO q12h
  - Cefpodoxime at 5–10 mg/kg PO q24h
  - Cefovecin at 8 mg/kg SC q14d up to 2–3 times
  - Amoxicillin–clavulanate at 13.75 mg/kg PO q12h
- Solutions and wipes containing 2% acetic acid, 2% boric acid, or 2%–4% chlorhexidine may be used daily and maintained q3–7d after resolution.
- Avoid acid or alcohol-containing products if erosions are present.
- Shampoos containing 2.5% benzoyl peroxide or 2%–4% chlorhexidine may be used 2–3 times weekly.
- If cocci are found, appropriate empirical choices include:
  - Clindamycin at 11 mg/kg PO q12–24h
  - Cephalexin at 22–30 mg/kg PO q12h
  - Cefpodoxime at 5–10 mg/kg PO q24h
  - Cefovecin at 8 mg/kg SC q14d up to 2–3 times
  - Amoxicillin–clavulanate at 13.75 mg/kg PO q12h
- Solutions and wipes containing 2% acetic acid, 2% boric acid, 2%–4% chlorhexidine, or 1%–2% ketoconazole may be used q24–48h until resolved, then maintained 1–2 times weekly.
- If cocci are found, appropriate empirical choices include:
  - Clindamycin at 11 mg/kg PO q12–24h
  - Cephalexin at 22–30 mg/kg PO q12h
  - Cefpodoxime at 5–10 mg/kg PO q24h
  - Cefovecin at 8 mg/kg SC q14d up to 2–3 times
  - Amoxicillin–clavulanate at 13.75 mg/kg PO q12h

Dermatophytosis

- These infections should be treated systemically and topically (see Malassezia spp Infection).
- Lime sulfur may be used for generalized presentations.

CAFR = cutaneous adverse food reaction
Immune-Mediated Conditions*
- Mild focal presentations may be managed with 0.1% topical tacrolimus (Protopic, protopic.com) and/or doxycycline and niacinamide.
- Typically severe presentations initially require prednisolone at 2 mg/kg q24h.
  - A secondary immunomodulator may be administered as a steroid-sparing agent to achieve remission.
  - Immunomodulating agents include azathioprine, cyclosporine A, mycophenolate, and chlorambucil.
- Diagnosis, condition severity, and potential adverse effects will influence treatment choices.
- Juvenile cellulitis (Figure 8) is treated with prednisolone as sole therapy.
- For mild cutaneous drug eruptions, discontinuation of the drug alone may be sufficient.

Generalized Demodicosis
- Treatment options include:
  - Amitraz (Mitaban, zoetis.com) dips q14d
  - Ivermectin (Ivomec, merial.com) at 0.3–0.6 mg/kg PO q24h
  - Milbemycin oxime at 1–2 mg/kg PO q24h
  - Doramectin (Dectomax, zoetis.com) at 0.6 mg/kg PO or SC q7d
  - Topical 10% imidacloprid and 2.5% moxidectin (Advantage Multi for Dogs, bayerdvm.com) q7–14d (off-label)

Epitheliotropic Lymphoma*
- Therapies include prednisolone as well as oral, injectable, and topical chemotherapeutic agents.
- Consultation with a veterinary oncologist is recommended.

Superficial Necrolytic Dermatitis
- Treatment includes topical antimicrobial therapy and IV and/or oral amino acid supplementation (Aminosyn, hospira.com) to manage dermatologic lesions.
- Hepatopathy is treated symptomatically, and surgery or octreotide may be considered for pancreatic glucagonoma.
- Prognosis for survival is poor to grave.

Zinc-Responsive Dermatosis
- Lifelong supplementation with zinc gluconate at 5 mg/kg PO q24h, zinc sulfate at 10–15 mg/kg PO q24h, or zinc methionine at 1.7 mg/kg PO q24h is required; additional topical or oral glucocorticoid therapy may be needed.

Hypersensitivity
- CAFR is controlled via restrictive diet.
- Treatment options for atopic dermatitis include but are not limited to:
  - Immunotherapy

Follow-up
- Requirements depend on cause.
- For infections, recheck clinical and cytologic response in 2–3 weeks to ensure topical and/or oral therapy is effective.

In General

Relative Cost
- Cost can vary.
- Lip fold intertrigo (diagnosis and treatment): $–$5
- Cheiloplasty for lip fold intertrigo: $5–$$5
- Zinc-responsive dermatosis (diagnosis and management): $5–$$5
- Generalized demodicosis management: $5–$$5
- Immune-mediated disease (diagnosis and management): $$5–$$5
- Superficial necrolytic dermatitis (diagnosis and management): $$5–$$5

Cost Key
- $ = up to $100
- $5 = $101–$250
- $$5 = $251–$500
- $$$ = $501–$1000
- $$$5 = more than $1000

See Aids & Resources, back page, for references & suggested reading.

* A complete discussion of therapy is beyond the scope of this text.

CAFR = cutaneous adverse food reaction

Juvenile cellulitis in a dog

Vitiligo
- No treatment is required or reliably effective.

Focal Demodicosis
- Treatment is not recommended; lesions are expected to resolve within 4–8 weeks.

8

Vitiligo

The content of the image includes a mix of text and images, featuring a page from a document discussing various medical conditions, treatments, and costs. The text discusses conditions such as generalized demodicosis, epitheliotropic lymphoma, superficial necrolytic dermatitis, zinc-responsive dermatosis, and hypersensitivity. It also mentions follow-up requirements, relative costs for different conditions, and a cost key. The page contains references and a note indicating that a complete discussion of therapy is beyond the scope of the text. The information is presented in a structured format, with headings, subheadings, and bullet points for clarity. The page is visually organized with images and a footer indicating the page number and edition. The text is written in a medical and professional tone, suitable for a veterinary or medical audience. The image also includes a visual element of a dog with juvenile cellulitis, illustrating the condition being discussed. The text highlights the importance of interdisciplinary consultation, such as with a veterinary oncologist, and emphasizes the role of immunomodulating therapies in managing immune-mediated conditions. The page contains a cost breakdown for different conditions, providing a practical guide for healthcare providers.
### Causes of Perioral Dermatitis

Causes of perioral dermatitis include but are not limited to the diseases listed. Except for intertrigo, these diseases may manifest without perioral involvement.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Clinical signs</th>
<th>Locations, other signs</th>
<th>Age</th>
<th>Breed predisposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutaneous epitheliotropic lymphoma</td>
<td>Alopecia, Crusts, Depigmentation, Erosions, ulcers, Erythema, Plaques, Scales</td>
<td>Any cutaneous, Footpads, Lymphadenopathy, Mucous membrane</td>
<td>Adult</td>
<td>Any</td>
</tr>
<tr>
<td><strong>Demodex spp infection</strong></td>
<td>Erythema, Alopecia, Comedones, Crusts, Nodules (advanced), Papules, Pustules, Scales</td>
<td>Any, often facial, Any cutaneous, Ear canal</td>
<td>&lt;1 year</td>
<td>Shar-pei, Staffordshire bull terrier</td>
</tr>
<tr>
<td>Focal (&lt;5 locations)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generalized (&gt;5 locations/pedal/regional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dermatophytosis</strong></td>
<td>Crusts, Erythema, Papules, Pustules, Scales</td>
<td>Any cutaneous</td>
<td>Any</td>
<td>Parson Russell terrier, Yorkshire terrier</td>
</tr>
<tr>
<td><strong>Hypersensitivity</strong></td>
<td>Erythema*, Pruritus*, Scales</td>
<td>Axillae, Ear canals, Facial, periocular, Groin, Interdigital, Perianal, Ventral neck</td>
<td>Any</td>
<td>Any</td>
</tr>
<tr>
<td>Atopic dermatitis and/or cutaneous adverse food reaction (CAFR)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Immune-mediated cutaneous drug eruption</strong></td>
<td>Any</td>
<td>Any</td>
<td>Any</td>
<td></td>
</tr>
<tr>
<td><strong>Immune-mediated discoid lupus erythematosus</strong></td>
<td>Crusts, Depigmentation, Erosion, Erythema, Scales</td>
<td>Facial, pinnal, Footpads (rare), Nasal planum*, Periocular</td>
<td>Adult</td>
<td></td>
</tr>
<tr>
<td><strong>Immune-mediated juvenile cellulitis</strong></td>
<td>Alopecia, Crusts, Nodules, Plaques, Pustules</td>
<td>Lameness, Muzzle, Pain, Periocular, Pinnae, Purulent otitis, Pyrexia, Submandibular lymphadenopathy*</td>
<td>1–3 months</td>
<td>Dachshund, Golden retriever, Gordon setter</td>
</tr>
</tbody>
</table>

*Feature occurs in nearly all cases
<table>
<thead>
<tr>
<th>Disease</th>
<th>Clinical signs</th>
<th>Locations, other signs</th>
<th>Age</th>
<th>Breed predisposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immune-mediated pemphigus foliaceus or erythematous</td>
<td>Crusts Erythema Pustules</td>
<td>Facial, pinnal Footpads Generalized Nasal planum</td>
<td>Adult</td>
<td>Akita Chow chow Cocker spaniel English bulldog Labrador retriever</td>
</tr>
<tr>
<td>Immune-mediated uveodermatologic syndrome</td>
<td>Crusts Depigmentation Erythema</td>
<td>Footpad Nasal planum Periocular Uveitis*</td>
<td>Adult</td>
<td>Akita Malamute Samoyed</td>
</tr>
<tr>
<td>Lip fold intertrigo</td>
<td>Crusts Deep, redundant lip fold* Depigmentation Erosions, ulcers Moist erythema Purulent exude</td>
<td>Adult</td>
<td>Basset hound Saint Bernard Spaniels</td>
<td></td>
</tr>
<tr>
<td>Mucocutaneous pyoderma</td>
<td>Cheilitis Crusts Depigmentation Erosions, ulcers Erythema Fissures</td>
<td>Anus Nares Periocular Vulva/prepuce</td>
<td>Any</td>
<td>German shepherd dog</td>
</tr>
<tr>
<td>Superficial necrolytic dermatitis</td>
<td>Crusts Erosions, ulceration Erythema Hyperkeratosis Scales</td>
<td>Footpad* Hepatopathy or glucagonoma* Hocks Perianal Pinna Lateral elbow</td>
<td>Adult</td>
<td>Any</td>
</tr>
<tr>
<td>Visculobullous dermatosis</td>
<td>Ulcers Vesicles</td>
<td>Mucocutaneous Oral cavity</td>
<td>Any</td>
<td>Any</td>
</tr>
<tr>
<td>Bullous pemphigoid Epidermolysis bullosa acquisita Mucous membrane pemphigoid Pemphigus foliaceus</td>
<td>Crusts Pain Bullae</td>
<td>Footpad Facial, pinnal Generalized</td>
<td>Adult</td>
<td>Doberman pinscher Rottweiler</td>
</tr>
<tr>
<td>Vitiligo</td>
<td>Depigmentation Leukotrichia</td>
<td>Any cutaneous Mucous membrane</td>
<td>Adult</td>
<td>Alaskan husky Malamute</td>
</tr>
<tr>
<td>Zinc-responsive dermatosis</td>
<td>Crusts Erythema Hyperkeratosis Scales</td>
<td>Facial Footpads Nasal planum Periocular</td>
<td>Any</td>
<td></td>
</tr>
</tbody>
</table>

Note: Other lesions may occur with secondary bacterial or *Malassezia* spp overgrowth.

*Feature occurs in nearly all cases