



Demodicosis

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Demodicosis

- Inflammatory parasitic disease characterized by presence of larger than normal numbers of *Demodex* mites
- Most common in purebred dogs: pit bull terrier, bulldog, Boston terrier, boxer, WHWT, Shih tzu, Shar Pei, great Dane, pug, Doberman

Demodicosis

- Clinical disease results from over proliferation of mites
- Defects or compromise in skin's immune function (T cell exhaustion)
- Genetic predisposition
- Predisposing factors: age, short haircoat, poor nutrition, estrus, parturition, stress, endoparasites, debilitating disease

Canine Demodex spp.

- *Demodex canis*
 - Follicular - 150-250µm
- *Demodex cornei* - "short-bodied"
 - Surface stratum corneum - 70-130µm
- *Demodex injai* - "long-bodied"
 - Follicular - up to 350µm

Demodex canis adult



Demodex canis larva



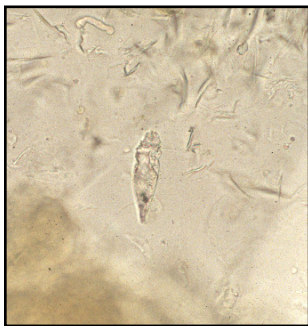
Demodex canis egg



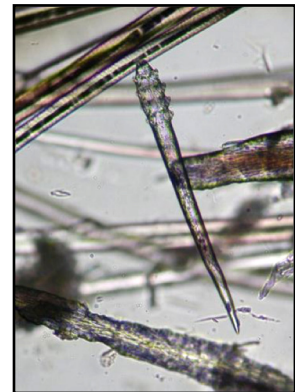
Demodex cornei adult



Demodex cornei larva



Demodex injai
adult



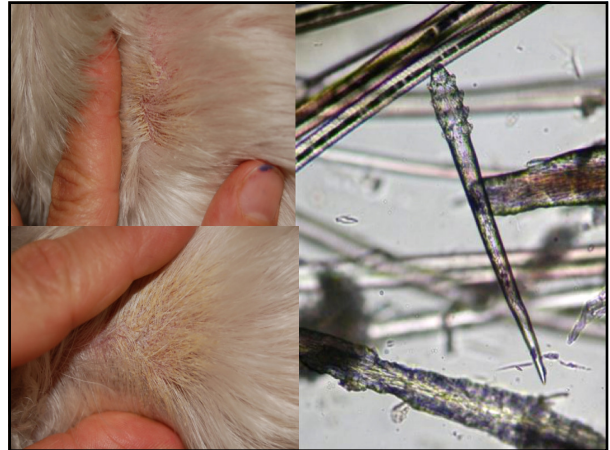
Demodex canis

- Obligate parasite of the skin
- Low numbers in the skin of normal dogs
- Entire life cycle in hair follicles and sebaceous glands
- Transmission through contact between dam and offspring during first few days of life



Demodex injai

- WHWT and wire-haired fox terriers
- Multifocal areas of greasy skin/hair on neck and trunk +/- diffuse hypotrichosis
- Histopathology: sebaceous hyperplasia that persists after parasitological cure
- Very few mites present
- *D. injai* may contribute and not cause lesions

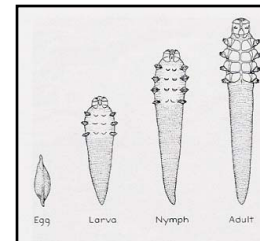


Feline Demodicosis

- Relatively uncommon
- Caused by 2 (possibly 3) different species
 - *D. cati* ("long-bodied")
 - *D. gatoi* ("short-bodied" or "stumpy")
 - A third possible unnamed species with intermediate length

Feline Demodex spp.

- *Demodex cati*
 - 190-210µm
- *Demodex gatoi*
 - 90µm



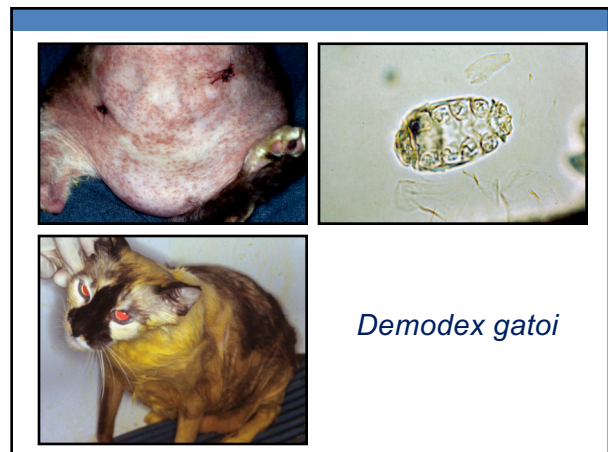
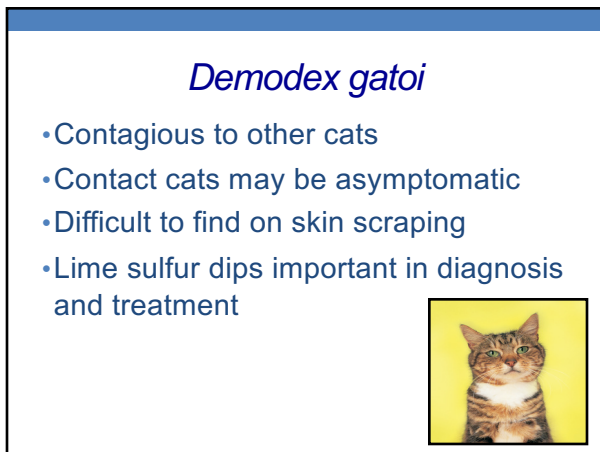
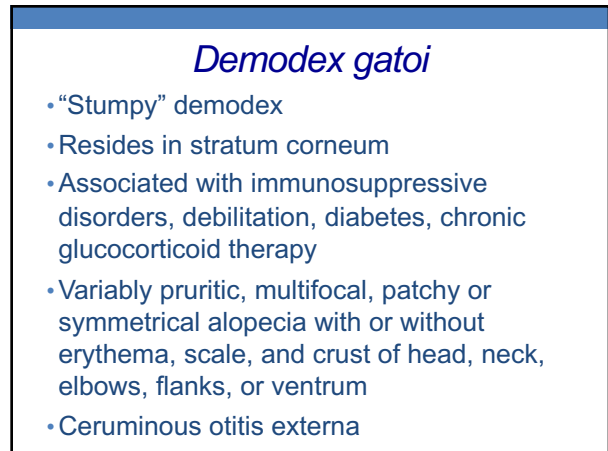
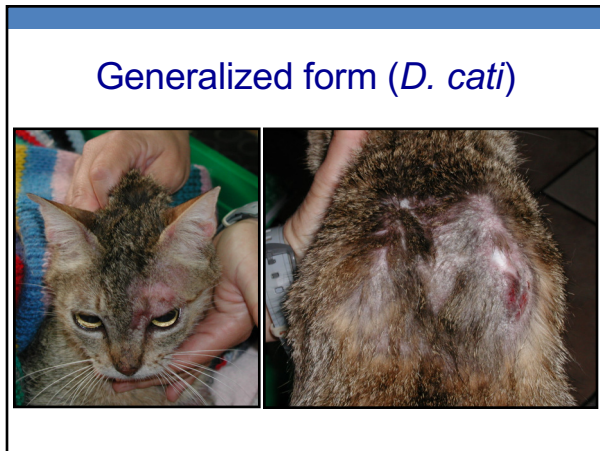
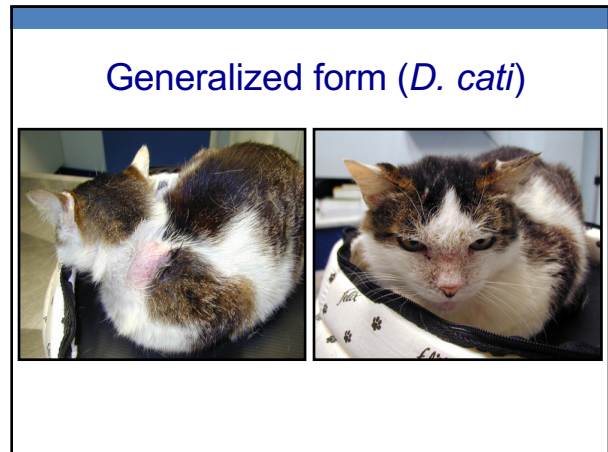
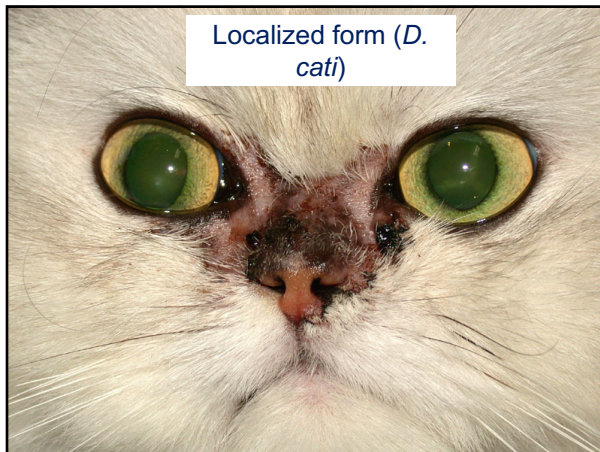
D. cati (hair follicle)



D. gatoi (stratum corneum)

Feline Demodicosis – *D. cati*

- Localized form
 - Often involves the face - muzzle, periocular areas
 - Ceruminous otitis externa
- Generalized form
 - Search for an underlying cause
 - Diabetes, FIV/FelV, neoplasia, toxoplasmosis, immunosuppressive therapies
- Prognosis depends on the underlying disease



Canine Demodicosis - Localized

- Most common clinical form
- Fewer than 5 lesions – excluding the feet
- Often on face and/or forelimbs
- Patchy alopecia +/- erythema, scale, comedones +/- bacterial folliculitis
- Usually juvenile in onset (<18 months)
- May be induced by transient stress (estrus, parasites, vaccinations)
- Spontaneous resolution within 3 months



Canine Demodicosis - Generalized

- Five or more localized lesions
- Involvement of an entire body region
- Involvement of two or more feet
- Ceruminous otitis externa
- Often complicated by deep pyoderma and may be pruritic
- Hereditary predisposition towards generalization of the localized form

Demodicosis - Classification

- Juvenile-onset vs. adult-onset
 - 18 months
- Dogs with juvenile-onset generalized demodicosis should not be bred



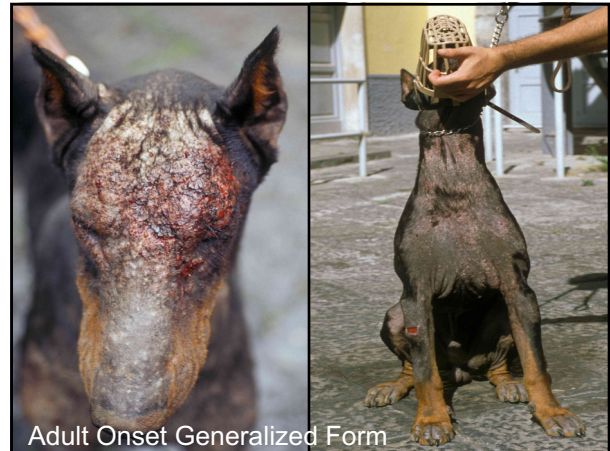
Juvenile Onset Generalized Form



Juvenile Onset Generalized Form

Demodicosis – Adult Onset

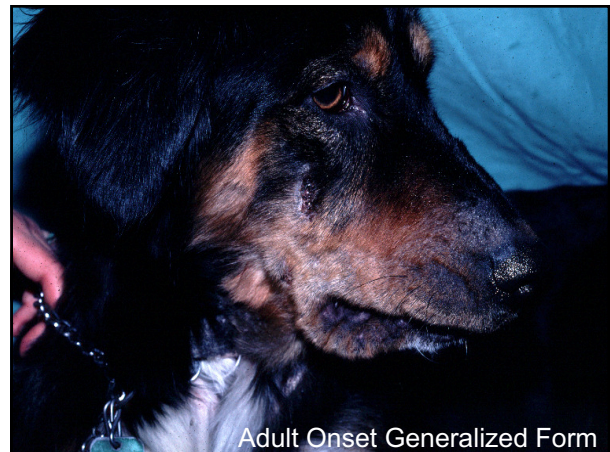
- May not have a hereditary predisposition
- Evaluate dog for potential underlying cause
 - Malnutrition and debilitation
 - Systemic/infectious disease
 - Hypothyroidism, hyperadrenocorticism, diabetes, neoplasia, Ehrlichiosis, Leishmaniosis
 - Immunosuppressive therapy
 - Glucocorticoids, cyclosporine, chemotherapy
- In > 50% of cases, no underlying disease identified



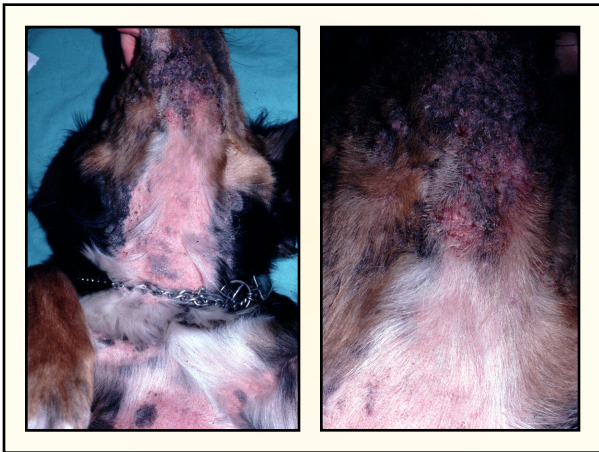
Adult Onset Generalized Form



Adult Onset Generalized Form



Adult Onset Generalized Form



Clinical Signs

- Alopecia and erythema
- Heavy scale and crusts
- Follicular casts
- Comedones
- Lymphadenopathy
- Hyperpigmentation and lichenification
- Secondary infection (often severe)



Generalized Alopecia

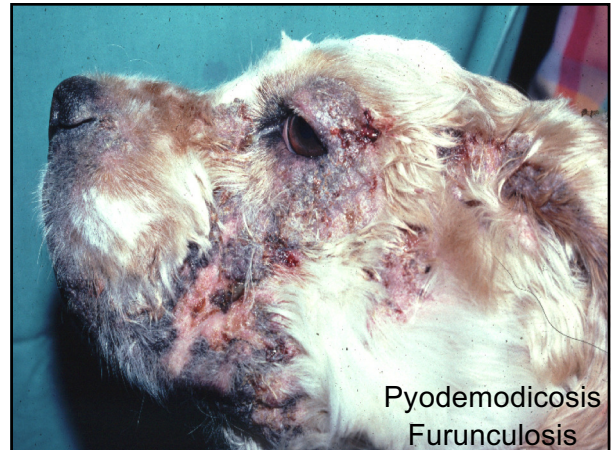
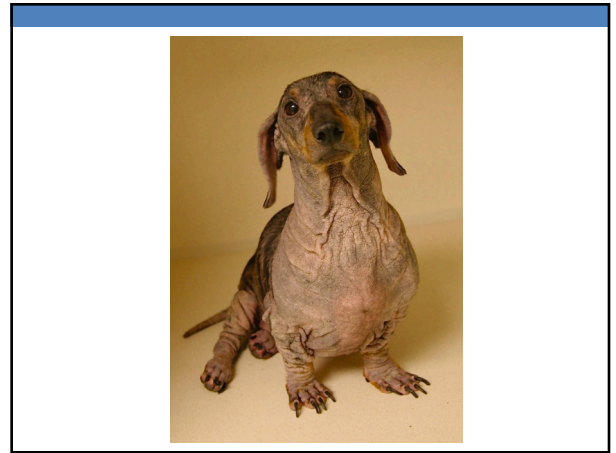


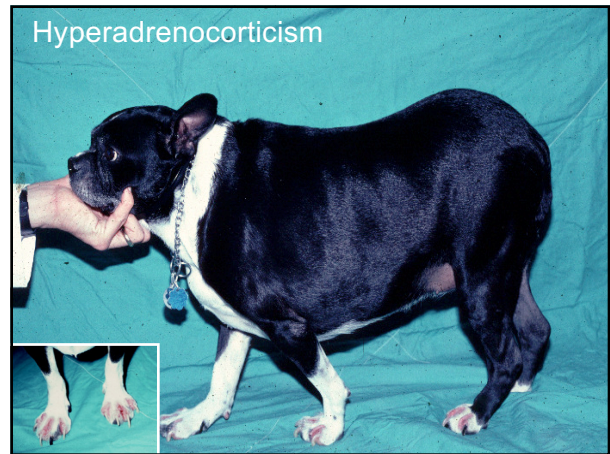
Heavy Scale and Crust



Heavy Scale and Crust







Demodicosis - Diagnosis

- Multiple deep and superficial skin scrapings
- Trichogram
- Biopsy
 - Chronic granulomatous lesions
 - Often required for Shar Pei and pododemodicosis cases
- Fecal floatation (*D. gatoi*)





Localized Disease - Treatment

- Juvenile, localized form in non-predisposed breed may resolve spontaneously (>90%) → consider no treatment
- Benzoyl peroxide gel
- Rotenone (Goodwinol®)
 - Natural organic compound of low toxicity, rapid action
 - Interferes with electron transport → blockage of nerve conduction
- Amitraz should not be used to “spot” treat

Generalized Disease - Treatment

- 30 to 50% of juvenile-onset cases will spontaneously resolve
- Antibiotics to treat bacterial pyoderma
 - Based on culture and sensitivity if deep pyoderma
 - Minimum 28 days; then re-evaluate and continue if indicated (often 6-8+ weeks)
- Vitamin E 200-400 IU PO twice daily
- Avoid the use of corticosteroids and oclacitinib if the animal is pruritic

Generalized Disease - Treatment

- Sedation and clipping of long-haired breeds to facilitate medicated bathing
- Aggressive systemic and topical antimicrobial treatment +/- analgesics
- Manage sepsis and dehydration in patients with concurrent deep pyoderma
- Monitor patients with severe generalized demodicosis for development of peripheral edema

Treatment - Isoxazolinolines

- Current first choice treatment in US at label doses
 - Afoxolaner (Nexgard™, Merial)
 - Fluralaner (Bravecto®, Merck)
 - Lotilaner (Credelio™, Elanco)
 - Sarolaner (Simparica™, Zoetis)



Treatment - Amitraz

- Alpha-2 adrenergic
- Side effects: transient sedation, mydriasis, hyperglycemia, vomiting, diarrhea, bradycardia, hypothermia, hypotension, ataxia, convulsions
- Topical side effects: edema, erythema, pruritus
- Antidote is alpha-2 antagonist (yohimbine)



Treatment - Amitraz

- Don't use or adjust dose (↓ by 50%) in toy/small breeds, geriatric, or debilitated animals
- Safety for pregnant animals or dogs less than four months of age not established
- Avoid handling pets immediately after treatment as contact may cause skin irritation in sensitive individuals

Treatment - Amitraz

- Clip medium and long-haired dogs
- Shampoo (benzoyl peroxide or chlorhexidine based) prior to treatment followed by towel drying
- Dilute and use immediately
 - Inactivated by light and air
- Place E collar and allow to dry

Treatment - Amitraz

- Label recommendations: 0.0250% concentration applied every 14 days
- Intensive treatment:
 - 0.05% twice weekly or every day (applied to 1/2 of body)
 - 0.125% on half of the body every other day → 80% cure in animals refractory to previous treatment regimens
- Increased frequency and/or increased dosage (0.05-0.1%) → better results with 75-80% cure rates
- Oto and pododemodiosis: 1 ml of amitraz in 30 ml of mineral oil or propylene glycol
- Minimum of 3 treatments; treat 30 days beyond a second negative scraping

Treatment - Ivermectin

- Daily off-label high dose oral administration of injectable formulation
- 300 to 600 µg/kg PO q 24 hours (dose often gradually increased in 5-7 days increments)
- Heartworm antigen negative
- Avoid in animals under 2-4 months of age

Treatment - Ivermectin

- Very toxic in select breeds
 - P glycoprotein deficient: allows ivermectin to cross blood brain barrier
 - Lethargy, salivation, vomiting, mydriasis, blindness, severe neurotoxicosis (ataxia, seizure, coma, death)
 - Dose dependent and reversible
 - ABCBΔ1 gene (MDR1) testing to identify risk
 - Test dosing can be done using 100 µg/kg to identify sensitive dogs



Collie

Bobtail

Shetland sheepdog

Ivermectin hypersensitivity



Australian sheepdog



Long haired Whippet

Also Silken
Windhound,
McNab,
GSD others

Breeds Affected by the MDR1 Mutation

- Collie 70%
- Long-haired Whippet 65%
- Australian Shepherd 50%
- Australian Shepherd, Mini 50%
- Silken Windhound 30%
- McNab 30%
- English Shepherd 15%
- Shetland Sheepdog 15%
- German Shepherd 10%
- Herding Breed Cross 10%
- Mixed Breed 5%
- Old English Sheepdog 5%
- Border Collie <5%

Advocate® or Advantage Multi®

- 10% imidacloprid and 2.5% moxidectin topical solution
- Off-label use
- May be applied every other week; weekly application more effective
- Questionable efficacy for severe or more generalized cases

Other Macrocyclic Lactones

- Doramectin
 - 0.6 mg/kg subcutaneous or PO once weekly
- Moxidectin
 - 0.2-0.4 mg/kg PO q 24 hours
- Efficacy similar to oral ivermectin
- Same concern for hypersensitivity

Feline Demodicosis - Treatment

- Case reports with efficacy of oral and topical fluralaner
- Lime sulfur dips every 5-7 days
 - Most effective for *D. gatoi*
- Ivermectin at 500 µg/kg PO SID
- Advocate® every 1-2 weeks for 6 treatments
- Treat for minimum of six weeks or one month beyond negative skin scraping
- Treat all in contact animals (*D. gatoi*)



Demodicosis - Monitoring

- Repeat multiple deep skin scrapings every 30 days
- Treat for one month beyond a second negative skin scraping
- Sterilize female dogs
 - Estrus may trigger recurrence
- Hereditary disease

Demodicosis – Key Points

- Perform a deep skin scraping in all patients with alopecia
- Educate owners on the expense, duration and frequency of monitoring involved
- Perform monthly re-examinations
- Manage secondary infection
- Treat beyond a clinical cure
- May be considered cured if remain disease-free 1 year after the last treatment
- Isoxazolines are very promising in treatment

