

	Systemic and topical therapy of pyoderma
<h2>Systemic and topical therapy of pyoderma</h2>	
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	Systemic and topical therapy of pyoderma
<h2>Introduction</h2>	
<ul style="list-style-type: none"> <li>- cutaneous bacterial infection → pyoderma             <ul style="list-style-type: none"> <li>. common</li> <li>. anatomic, physical and immunological causes</li> </ul> </li> <li>- satisfactory resolution :             <ul style="list-style-type: none"> <li>. symptoms' disappearance</li> <li>. relapsing hazard elimination</li> </ul> </li> </ul> <p>* 95% pyoderma → secondary          - identify and manage primary problem!</p>	

	Systemic and topical therapy of pyoderma
<h2>Introduction</h2>	
<ul style="list-style-type: none"> <li>- surface pyoderma (<i>hot spot</i> and intertrigo)             <ul style="list-style-type: none"> <li>. usually needs only topical treatment</li> </ul> </li> <li>- superficial and deep pyoderma             <ul style="list-style-type: none"> <li>. need systemic and topical treatment</li> </ul> </li> </ul>	

	Systemic and topical therapy of pyoderma
<h2>antibiotic features</h2>	
<ul style="list-style-type: none"> <li>- efficacious for <i>S. intermedius</i> and <i>S. schleiferi</i></li> <li>- high concentration into the skin</li> <li>- better if bactericidal</li> <li>- few side effects</li> <li>- easy to administer (&lt; 2-3 times/day)</li> <li>- should penetrate into the skin at high [ ]</li> <li>- cheap / no rapid developing of antibiotic-resistance</li> </ul>	

	Systemic and topical therapy of pyoderma
<h2>antibiotic spectrum of action</h2>	
<ul style="list-style-type: none"> <li>- preferable a narrow spectrum             <ul style="list-style-type: none"> <li>- intestinal flora disorder ??</li> <li>- predisposition to <i>Malassezia</i>'s infection</li> <li>- e.g.: erythromycin, lincomycin, clindamycin, beta-lactamases resistant penicillin</li> </ul> </li> <li>- don't use beta-lactamases sensible antibiotics             <ul style="list-style-type: none"> <li>- &gt; 70% <i>S. intermedius</i> produce beta-lactamases</li> <li>- e.g.: penicillin, amoxicillin, ampicillin</li> </ul> </li> </ul>	

	Systemic and topical therapy of pyoderma
<h2>antibiotic tissue distribution</h2>	
<ul style="list-style-type: none"> <li>- anatomic reasons             <ul style="list-style-type: none"> <li>- only 4% of the cardiac flow reaches the skin</li> <li>- no blood circulation in the epidermis</li> </ul> </li> <li>- pharmacokinetics             <ul style="list-style-type: none"> <li>- beta-lactamases antibiotics 40-60%</li> <li>- cephalosporins 20-40%</li> <li>- tetracyclines spread slightly in the skin</li> </ul> </li> </ul>	

**antibiotic  
bacteriostatic vs. bactericidal**

- bacteriostatic: e.g. macrolides
  - immunocompetent animals
  - single and short therapy
- bactericidal: e.g. cephalosporins
  - also for immunosuppressed animals
  - deep pyoderma
  - repeated and prolonged therapy

**antibiotic  
bacterial resistance**

- often in superficial pyoderma: empiric choice
- antibiotic sensitivity test indications:
  - deep pyoderma
  - prolonged therapy
  - previous empiric therapy with no results
  - previous antibiotic-therapies, several relapses
  - rod-shaped bacteria on cytology

**antibiotic  
adequated period**

- superficial pyoderma → 3-4 weeks  
until 7-14 days after the clinical resolution  
of the lesions
  - deep pyoderma → 4-8 weeks  
until 14-30 days after the clinical resolution  
of the lesions
- \* Important to perform clinical and cytological  
examination under antibiotic-therapy

**CANINE PYODERMA**

*Definition and Therapy*



**CANINE PYODERMA**

*intertrigo*

- Surface pyoderma
- THERAPY:
  - cleaning with topic disinfectants
    - chlorhexidine digluconate 0,5% - gel
  - topic antibiotic
    - mupirocin creme
  - if associated to other lesions and sites:  
antibiotic PO x 2-3 weeks

**CANINE PYODERMA**

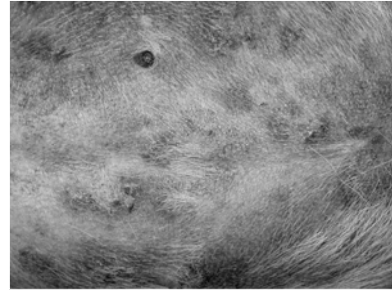
*Definition and Therapy*



**CANINE PYODERMA**  
*pyotraumatic dermatitis*  
*“hot spot”*

- Surface pyoderma
- THERAPY:
  - cleaning with topic disinfectants
    - chlorhexidine digluconate 0,5% or diluted povidone-iodine / topic - systemic steroids
  - systemic antibiotic (if satellites' lesions)
    - until clinical resolution
  - investigate parassitic and allergic causes

**CANINE PYODERMA**  
*Definition and Therapy*



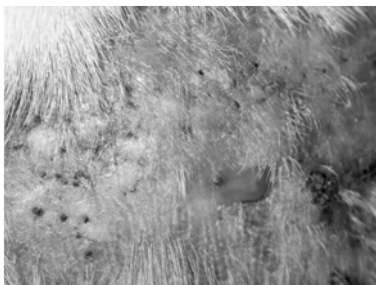
**CANINE PYODERMA**  
*folliculitis*

- Superficial pyoderma
- THERAPY:
  - shampoo-therapy
    - chlorhexidine digluconate 0,8% - 2%
    - benzoil peroxide
    - ethyl lactate
    - triclosan

**CANINE PYODERMA**  
*folliculitis*

- Superficial pyoderma
- THERAPY:
  - shampoo-therapy
    - with foam x 10-15 minutes
    - 1-2 x week x 1-2 months
  - AND SYSTEMIC ANTIBIOTICS\*

**CANINE PYODERMA**  
*Definition and Therapy*



**CANINE PYODERMA**  
*furunculosis / cellulitis*

- Deep pyoderma
- THERAPY:
  - shampoo-therapy
    - chlorhexidine digluconate 2% - 4%
    - benzoil peroxide
    - ethyl lactate
    - triclosan

**CANINE PYODERMA**  
*furunculosis / cellulitis*

- Deep pyoderma
- THERAPY:
  - shampoo-therapy
    - with foam x 10-15 minutes
    - 2 x week x 2-3 months
    - clip the coat
  - AND SYSTEMIC ANTIBIOTICS\*

Systemic and topical therapy of pyoderma

**THERAPY**

- INFO

- cost → €

- . € ☺ cheap
- . € ☹ quite cheap
- . € ☹ expensive

Systemic and topical therapy of pyoderma

**THERAPY**

- INFO

- side effects → S.E.

- . S.E. ☺ few
- . S.E. ☹ some
- . S.E. ☹ many

Systemic and topical therapy of pyoderma

**THERAPY**

- INFO

- compliance → C.

- . C. ☺ good
- . C. ☹ fair
- . C. ☹ poor

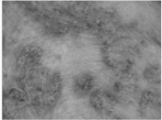
Systemic and topical therapy of pyoderma

**ANTIBIOTICS – systemic therapy**

- first appearance pyoderma

Trimethoprim-sulfa € ☹ S.E. ☹ C. ☹  
15-30 mg/kg/ po q12h - bactericidal

Erythromycin € ☹ S.E. ☹ C. ☹  
10-15 mg/kg/ po 8h - bacteriostatic



Systemic and topical therapy of pyoderma

**ANTIBIOTICS – systemic therapy**

Drug	side effects
<u>trim.-sulfa</u>	vomit and diarrhoea, kerato-congiuntivitis sicca, drug reaction, hepatic necrosis
* antibiotic-resistance	
use gastro protector + blood examinations	

Systemic and topical therapy of pyoderma

### ANTIBIOTICS – systemic therapy

Drug	side effects
<u>erythromycin</u>	vomit and diarrhoea, TID, lincomycin cross-resistance
	* antibiotic-resistance use <i>gastro protector</i>

Systemic and topical therapy of pyoderma

### ANTIBIOTICS – systemic therapy

- first appearance pyoderma – g-e bacterial infection assoc.

**Lincomycin**      € ⊕ S.E. ⊕ C. ⊕  
20 mg/kg po q12h - bacteriostatic

**Clindamycin**      € ⊕ S.E. ⊕ C. ⊕  
5 mg/kg/ po q12h for superficial infections and 10 mg/kg/12h for deep infections - bacteriostatic

**Tylosin**      € ⊕ S.E. ⊕ C. ⊕  
20 mg/kg/ po q12h bacteriostatic / bactericidal

Systemic and topical therapy of pyoderma

### ANTIBIOTICS – systemic therapy

Drug	side effects
<u>lincomycin</u>	vomit and diarrhoea rare, BID, clindamycin cross-resistance, quite expensive
	* antibiotic-resistance

Systemic and topical therapy of pyoderma


### ANTIBIOTICS – systemic therapy

- recurrent superficial pyoderma and deep pyoderma

- *Cephalosporins 1° gen.*

**Cefalexin**      € ⊕ S.E. ⊕ C. ⊕  
20-30 mg/kg/ po q12h bactericidal

**Cefadroxil**      € ⊕ S.E. ⊕ C. ⊕  
10-20 mg/kg/ po q12h bactericidal



Systemic and topical therapy of pyoderma

### ANTIBIOTICS – systemic therapy

Drug	side effects
<u>Cefalexin</u>	vomit and diarrhoea not frequent, BID, quite expensive, good tissue penetration
	* antibiotic-resistance rare


Systemic and topical therapy of pyoderma

### ANTIBIOTICS – systemic therapy

- recurrent superficial pyoderma and deep pyoderma

- *Cephalosporins 3° gen.*

**Cefovecin**      € ⊕ S.E. ⊕ C. ⊕  
8 mg/kg/ sc q14 days - bactericidal



Systemic and topical therapy of pyoderma

## ANTIBIOTICS – systemic therapy

Drug	side effects
<u>cefovecin</u> possible side effects if use combined to furosemide, ketoconazole, & FANS good compliance, good tissue penetration, expensive, broad bacterial spectrum <i>Staphylococcus intermedius, Streptococcus beta-emoliticus, Escherichia coli Pasteurella multocida</i>	
* antibiotic-resistance: new product	

Systemic and topical therapy of pyoderma

## ANTIBIOTICS – systemic therapy


- recurrent superficial pyoderma and deep pyoderma

- **Potentiated penicillins**

Amoxicillin and clav. acid € ☹ S.E. ☹ C. ☹  
 20-25 mg/kg q12h - bactericidal

- **Rifamycins**

Rifampicin € ☹ S.E. ☹ C. ☹  
 10 mg/kg po q12h - bactericidal



Systemic and topical therapy of pyoderma

## ANTIBIOTICS – systemic therapy

Drug	side effects
<u>amoxi + c.a.</u> vomit and diarrhoea not frequent, BID expensive, broad spectrum	
* antibiotic-resistance rare	

Systemic and topical therapy of pyoderma

## ANTIBIOTICS – systemic therapy

Drug	side effects
<u>rifampicin</u>	vomit and diarrhoea frequent, BID unexpensive, hepato-toxicity and rapid developing of antibiotic-resistance (10-14 dd maximum), orange, saliva, urine, faeces (pill stain)
* good tissue penetration (granulomas, pyogranulomas)	

Systemic and topical therapy of pyoderma

## ANTIBIOTICS – systemic therapy

- rod-shaped bacterial or mix cutaneous infections

- **Quinolones**

Enrofloxacin € ☹ S.E. ☹ C. ☹  
 5-10 mg/kg/ po q24h  
 bactericidal

Marbofloxacin  
 2 mg/kg/ po q24h

Ciprofloxacin  
 10 mg/kg/ po q24h

Systemic and topical therapy of pyoderma

## ANTIBIOTICS – systemic therapy

Drug	side effects
<u>enrofloxacin</u>	not in dogs < 1 yo (developmental cartilage abnormalities), expensive, but SID & broad spectrum
* good tissue penetration	

### ANTIBIOTICS – systemic therapy

- rod-shaped bacterial or mix cutaneous infections

• *Aminoglycosides*

Amikacin

10 mg/kg/ im, sc q12h

bactericidal

€ ☹ S.E. ☹ C. ☹

Gentamycin

2mg/kg/ im, sc q8h

bactericidal

### ANTIBIOTICS – systemic therapy

Drug	side effects
<u>amikacin</u>	nephro-toxicity, BID-TID, expensive, narrow spectrum (Gram neg.)
	* check renal function

### PYODERMA – topical therapy

- Useful and often associated with systemic therapy

- Appropriate product

- Contact time (10-15 min.)

- owner's compliance

- explain

- motivate

### PYODERMA – topical therapy

- goals:

- Debris and bacteria removal

- Antibiotic strengthening

- Useful in relapsing prevention

### PYODERMA – topical therapy

- product:

-Indication: antibacterial, antifungal, hydrating  
cheratolytic action...

- ability to penetrate the stratum corneum

-residual timing efficacy

- vehicle

- pH

- perfume, color, consistence

### PYODERMA – topical therapy

- product's choice:

- immersions (chlrexhedine, povidone iodine)


- shampoos

- lotions, sprays

- ointments, gels

<small>Systemic and topical therapy of pyoderma</small>	
<b>PYODERMA – topical therapy</b>	
<ul style="list-style-type: none"> <li>- owner's compliance:</li> <li>- animal's temperament</li> <li>- animal's size</li> <li>- length's coat</li> <li>- bathroom space's availability</li> <li>- season</li> <li>- wash frequency</li> <li>- washing and product's cost</li> <li>- perfume, foaminess</li> </ul>	

<small>Systemic and topical therapy of pyoderma</small>	
<b>PYODERMA – topical therapy</b>	
<ul style="list-style-type: none"> <li>- Immersions and hydrotherapy</li> <li>- Shampoos</li> <li>- Topical medicated ointments</li> </ul>	

<small>Systemic and topical therapy of pyoderma</small>	
<b>PYODERMA – topical therapy</b>	
<ul style="list-style-type: none"> <li>- Immersions and hydrotherapy (exp. deep pyoderma)</li> <li>- Disinfectants to add into the water             <ul style="list-style-type: none"> <li>. chlorhexidine (2-4%)</li> <li>. povidone iodine</li> </ul> </li> </ul> <p>x 10-15 min. 1-2 v/die x 3-7 dd</p> 	

<small>Systemic and topical therapy of pyoderma</small>	
<b>PYODERMA – topical therapy</b>	
<ul style="list-style-type: none"> <li>- Shampoo-therapy (all kinds of pyoderma)</li> <li>- Healing actions             <ul style="list-style-type: none"> <li>. Foam massage on the coat</li> <li>. Detergent vehicles</li> </ul> </li> </ul> <p>usefull to remove tissue debris</p> <ul style="list-style-type: none"> <li>. Promote a better contact between active molecules and the skin</li> </ul>	

<small>Systemic and topical therapy of pyoderma</small>	
<b>PYODERMA – topical therapy</b>	
<ul style="list-style-type: none"> <li>- Shampoo-therapy</li> <li>- ETHYL LACTATE</li> </ul> <p>properties</p> <ul style="list-style-type: none"> <li>. antibacterial effect (ethanol)</li> <li>. acidifying action (lactic acid )</li> <li>. degreasing, comedonolytic</li> </ul> <p>disadvantages</p> <ul style="list-style-type: none"> <li>. could excessively dry the skin</li> <li>. could cause dermatitis and contact irritation</li> </ul>	

<small>Systemic and topical therapy of pyoderma</small>	
<b>PYODERMA – topical therapy</b>	
<ul style="list-style-type: none"> <li>- Shampoo-therapy</li> <li>- BENZOYL PEROXIDE - max 2,5-3%</li> </ul> <p>properties</p> <ul style="list-style-type: none"> <li>. anti-bacterial activity</li> <li>. keratolytic properties</li> <li>. degreasing, comedonolytic, follicular flushing (demodicosis)</li> </ul> <p>disadvantages</p> <ul style="list-style-type: none"> <li>. could excessively dry the skin</li> <li>. could cause dermatitis and contact irritation</li> <li>. temporary staining of the hair coat</li> </ul>	



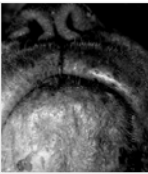
Systemic and topical therapy of pyoderma	
<b>PYODERMA – topical therapy</b>	
<p>- Shampoo-therapy          - <b>CHLORHEXIDINE DIGLUCONATE 0,5 - 4%</b></p> <p><i>properties</i></p> <ul style="list-style-type: none"> <li>. well tolerated antibacterial agent</li> <li>. anti-bacterial and anti-fungal broad spectrum activity</li> <li>. it is non-irritating and rarely sensitizing</li> <li>. not inactivated by organic substances (e.g. pus)</li> <li>. good residual activity</li> </ul> <p><i>disadvantages</i></p> <ul style="list-style-type: none"> <li>. it has not the follicular flushing action (benzoyl peroxyde)</li> <li>. High concentrations could stain the coat of light-coated dogs</li> </ul>	

Systemic and topical therapy of pyoderma	
<b>PYODERMA – topical therapy</b>	
<p>- Shampoo-therapy (pyoderma – seborrhea)          - <b>SULFUR 2% and SALICYLIC ACID 2%</b></p> <p><i>properties</i></p> <ul style="list-style-type: none"> <li>. antibacterial, antipruritic and keratoplastic action</li> <li>. keratolytic action (sulfur with salicylic acid)</li> </ul> <p><i>disadvantages</i></p> <ul style="list-style-type: none"> <li>. in case of known hypersensitivity to acetylsalicylic acid or to sulfamidics</li> </ul>	

Systemic and topical therapy of pyoderma	
<b>PYODERMA – topical therapy</b>	
<p>- Shampoo-therapy          - <b>DICHLOROFEN</b></p> <p><i>properties</i></p> <ul style="list-style-type: none"> <li>. antibacterial and keratoplastic action</li> <li>. it is non-irritating</li> </ul> <p><i>disadvantages</i></p> <ul style="list-style-type: none"> <li>. could excessively dry the skin</li> <li>. it has not the follicular flushing action</li> </ul>	

Systemic and topical therapy of pyoderma	
<b>PYODERMA – topical therapy</b>	
<p>- Shampoo-therapy          - <b>OCTOPIROX - piroctolamine</b></p> <p><i>properties</i></p> <ul style="list-style-type: none"> <li>. antibacterial action</li> <li>. keratin high affinity</li> </ul> <p><i>disadvantages</i></p> <ul style="list-style-type: none"> <li>. could excessively dry the skin</li> <li>. it has not the follicular flushing action</li> </ul>	

Systemic and topical therapy of pyoderma	
<b>PYODERMA – topical therapy</b>	
<p>- Shampoo-therapy          - <i>Correct shampoo application</i></p> <ul style="list-style-type: none"> <li>. 2-3 v./week → decrease with amelioration...</li> <li>. excessive use → cutaneous dryness</li> </ul> <p><i>daily use CUTANEOUS MOISTURIZING</i></p> <ul style="list-style-type: none"> <li>. glycerine</li> <li>. propylene glycole</li> <li>. urea</li> <li>. lactic acid</li> </ul>	

Systemic and topical therapy of pyoderma	
<b>PYODERMA – topical therapy</b>	
<p>- <i>topical antibiotic ointments</i>          - <i>localized infections</i></p> <ul style="list-style-type: none"> <li>. pododermatitis</li> <li>. chin acne</li> </ul> <p>ctrl 10-15 min. that dog doesn't lick itself</p>	
	

**PYODERMA – topical therapy**

- topical antibiotic ointments
- MUPIROCIN
  - . bactericidal action – Gram positive
  - . pH acid
  - . no systemic absorption
  - . good tissue penetration (granulomas)

**PYODERMA – topical therapy**

- topical antibiotic ointments
- NEOMYCIN
  - . bactericidal action
  - . sensitizing effect
    - irritation action / allergy x protract using
  - . inactivated by organic substances

**PYODERMA – topical therapy**

- topical antibiotic ointments
- POLIMYXIN B e BACITRACIN
  - . bactericidal action
  - . poor tissue penetration
  - . inactivated by organic substances

**PYODERMA – topical therapy**

- topical antibiotic ointments
- FUSIDIC ACID
  - . bactericidal action – Gram positive
  - . good tissue penetration
  - . not inactivated by organic substances
  - . in combination with g/c + antibiotic
    - . limited use in vet. derm.

**PYODERMA**  
*Relapses or not recovery*

- Correct diagnosis?
- Identification of the underlying causes?
- Management mistakes:
  - Antibiotic-therapy too short
  - Antibiotic not able
  - Use of corticosteroids (topic or systemic)

**PYODERMA**  
*Relapses or not recovery*

- Relapsing few days from the antibiotic suspension
  - Antibiotic-therapy too short
  - Repeat the antibiotic-therapy with an adequate period of time

<p><b>PYODERMA</b> <i>Relapses or not recovery</i></p> <ul style="list-style-type: none"> <li>• Relapsing few weeks or months from the antibiotic suspension <ul style="list-style-type: none"> <li>• recurrent pyoderma</li> <li>• identification and cure of underlying cause</li> <li>• if done: idiopathic</li> </ul> </li> </ul>
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Systemic and topical therapy of pyoderma
<p><b>PYODERMA – topical therapy</b></p>
<ul style="list-style-type: none"> <li>- MAINTENANCE ANTIBIOTIC-THERAPY</li> <li>- recurring pyoderma (months-years) <ul style="list-style-type: none"> <li>. cefalexin</li> <li>. clavulanated amoxicillin</li> </ul> </li> <li>- Pulse - therapy <ul style="list-style-type: none"> <li>- full dosage in alternate weeks</li> <li>- full dosage in the first 3 days of the week</li> <li>- full dosage in the first week of the month</li> </ul> </li> <li>- Daily treatment under-dosages <ul style="list-style-type: none"> <li>- full dosage (very expensive) – ½ o ¼ dosage</li> </ul> </li> </ul>

Systemic and topical therapy of pyoderma
<p><b>PYODERMA – topical therapy</b></p>
<ul style="list-style-type: none"> <li>- MAINTENANCE ANTIBIOTIC-THERAPY</li> <li>- recurring pyoderma (&gt; 7 days)</li> <li>- Pulse - therapy</li> <li>- recurring pyoderma (&gt; 7 days)</li> <li>- Daily treatment under-dosages</li> </ul>

Systemic and topical therapy of pyoderma
<p><b>PYODERMA – topical therapy</b></p>
<ul style="list-style-type: none"> <li>- MAINTENANCE ANTIBIOTIC-THERAPY</li> <li>- Daily treatment under-dosages</li> <li>- in vitro studies <ul style="list-style-type: none"> <li>- bacterial structural alteration</li> <li>- better phagocytosis</li> <li>- better serum bactericidal action</li> <li>- reduction bacterial adhesion to the corneocytes</li> <li>- bacterial enzyme processes alteration</li> </ul> </li> </ul>

<p>Systemic and topical therapy of pyoderma</p>
<p><b>the end</b></p> 