# Antibiotic guidelines for SKIN AND SOFT TISSUE INFECTIONS

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<th>CLINICAL CONDITION</th>
<th>USEFUL INFORMATION</th>
<th>RECOMMENDATIONS</th>
<th>ALTERNATIVE (suitable in serious penicillin allergy)</th>
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<tr>
<td><strong>Impetigo</strong></td>
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<tr>
<td><strong>Signs and symptoms:</strong></td>
<td>Bullous and non-bullous impetigo can be treated with oral or topical antimicrobials, but oral therapy is recommended for patients with numerous lesions or in outbreaks affecting several people to help decrease transmission of infection. Hygiene measures are important to aid healing and stop the infection spreading to other sites on the body and to other people; advise patient appropriately. Management of the underlying cause (if applicable) is recommended e.g. atopic eczema, scabies, or head lice.</td>
<td>Topical Fusidic acid 6-8 hourly OR Flucloxacillin 1g 6 hourly PO Add penicillin V 500mg 6 hourly PO if streptococcus suspected</td>
<td>Topical Fusidic acid 6-8 hourly OR Clindamycin 450mg 6 hourly PO</td>
<td>7 days</td>
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<td><strong>Investigations:</strong></td>
<td>Signs and symptoms: erythematous papules vesicles and pustules honey-colored crusts on an erythematous base</td>
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<td>Bullous and non-bullous impetigo can be treated with oral or topical antimicrobials, but oral therapy is recommended for patients with numerous lesions or in outbreaks affecting several people to help decrease transmission of infection. Hygiene measures are important to aid healing and stop the infection spreading to other sites on the body and to other people; advise patient appropriately. Management of the underlying cause (if applicable) is recommended e.g. atopic eczema, scabies, or head lice.</td>
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<td><strong>Erysipelas</strong></td>
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<td><strong>Signs and symptoms:</strong></td>
<td>Acute onset of symptoms e.g. cutaneous redness, warmth, tenderness Systemic symptoms e.g. fever</td>
<td>Elevate affected extremity. Identify and manage any underlying risk factors such as eczema, tinea pedis, lymphoedema, leg ulceration, varicella and bites.</td>
<td>Benzyllpenicillin 2.4g 6 hourly IV If no response within 48hrs or acute deterioration add: Clindamycin 900mg 8 hourly IV If MRSA positive add: Vancomycin IV as per dosing guideline Oral step down: Amoxicillin 1g 8 hourly PO If using vancomycin, consider doxycycline 100mg 12 hourly PO or clindamycin 450mg 6 hourly PO</td>
<td>Clindamycin 900mg 8 hourly IV If MRSA positive add: Vancomycin IV as per dosing guideline Oral step down: Clindamycin 450mg 6 hourly PO If using vancomycin, consider doxycycline 100mg 12 hourly PO or clindamycin 450mg 6 hourly PO</td>
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<td><strong>Investigations:</strong></td>
<td>Cultures of blood, pus, or bullae in patients with systemic toxicity</td>
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<tr>
<td>Bites (Dog, cat and human)</td>
<td><strong>Signs and symptoms:</strong> Bite injury which is either infected or at risk of becoming infected.</td>
<td>Co-amoxiclav 625mg 8 hourly PO or 1.2g 8 hourly IV depending on severity&lt;br&gt;<strong>Oral step down:</strong> Co-amoxiclav 625mg 8 hourly PO</td>
<td><strong>Dog and Cat:</strong> Doxycycline 100mg 12 hourly PO&lt;br&gt;<strong>Plus</strong> Metronidazole 400mg 8 hourly PO &lt;br&gt;<strong>Human:</strong> Clarithromycin 500mg 12 hourly PO&lt;br&gt;<strong>Plus</strong> Metronidazole 400mg 8 hourly PO&lt;br&gt;<strong>or</strong>&lt;br&gt;(for dog, cat or human bites) Clindamycin 900mg 8 hourly IV&lt;br&gt;<strong>Plus</strong> Ciprofloxacin 400mg 12 hourly IV depending on severity&lt;br&gt;<strong>Oral step down:</strong> Clindamycin 450mg 6 hourly PO&lt;br&gt;<strong>Plus</strong> Ciprofloxacin 400mg 12 hourly PO</td>
<td>Pre-emptive 3-5 days&lt;br&gt;Treatment: 7 days</td>
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<td><strong>Investigations:</strong> X-ray in clenched fist/ crush injuries to exclude the presence of teeth or dental fragments, rule out bone damage etc.&lt;br&gt;<strong>If infected, send pus or a deep wound swab for culture, before cleaning the wound</strong>&lt;br&gt;<strong>Blood cultures where indicated</strong>&lt;br&gt;<strong>Surgical evaluation where indicated</strong>&lt;br&gt;80% of cat bites and 5% of dog bites become infected. Cleanse wound thoroughly. Assess tetanus and rabies risk; for tetanus prone wound, give human tetanus immunoglobulin with absorbed diphtheria (low dose) vaccine if necessary, according to immunization history. Assess HIV, hepatitis B &amp; C risk in the case of human bites. Cat bite wounds tend to penetrate deeply, with higher risk of associated osteomyelitis, tenosynovitis, and septic arthritis. Pre-emptive antibiotic therapy recommended for:&lt;br&gt;- All human bite wounds &lt;72 hrs old&lt;br&gt;- All cat bites&lt;br&gt;- Animal bites to hand, foot, or face.&lt;br&gt;- Puncture wounds&lt;br&gt;- Wounds requiring surgical debridement&lt;br&gt;- Wounds involving joints, tendons, ligaments, or suspected fractures&lt;br&gt;- Animal bites &lt;48hrs where the risk of infection is high&lt;br&gt;- Immuno-compromised, diabetic, elderly or asplenic patients. Patients require review at 24 and 48hrs with primary care if minor wound or ED if more significant.</td>
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| Cellulitis          | Be wary of over diagnosing cellulitis. Consider possibility of varicose eczema especially when erythema is bilateral. | **Class I:** Flucloxacillin 1g 6 hourly PO  
**Class II:** Flucloxacillin 2g 6 hourly IV +/- Benzylpenicillin 2.4g 6 hourly IV depending on severity.  
**Oral step down:** Flucloxacillin 1g 6 hourly PO  
Where patient suitable for home IV treatment:  
Ceftriaxone 1g 24 hourly IV  
If patient’s BMI is greater than 30 the first dose of Ceftriaxone should be 2g, then 1g 24 hourly thereafter. | **Class I** penicillin allergic or MRSA:  
Doxycycline 100mg 12 hourly PO  
**Class II** penicillin allergic or MRSA:  
Clindamycin 900mg 8 hourly IV  
**Oral step down:**  
Doxycycline 100mg 12 hourly PO  
Clindamycin 450mg 6 hourly PO | **Class I:** 5 days  
**Class II:** 5 days |

#### Signs and symptoms:
- cutaneous redness, warmth, tenderness
- Systemic symptoms e.g. fever

#### Investigations:
- Take blood culture and wound swab or pus for culture.

- **Contact microbiology immediately if:**
  - Rapidly spreading cellulitis (Group A Strep)
  - Panton-Valentine Leukocidin (PVL) positive S. aureus strains suspected; generally affects previously healthy young children and young adults. Risk factors include recurrent abscess/SSTI and close contact/crowding.
  - Necrotising fasciitis, Fournier’s or gas gangrene
- Elevate affected extremity.
- Identify and manage any underlying risk factors (e.g. eczema, tinea pedis, lymphoedema, leg ulceration, varicella and bites) or co-morbidities (such as diabetes mellitus or alcohol misuse) that may cause the cellulitis to spread rapidly, or delay healing.
- **Class 1:** no signs of systemic toxicity, and no significant co-morbidity.
- **Class 2:** systemically well, but with a co-morbidity e.g. PVD, chronic venous insufficiency or morbid obesity which may complicate or delay resolution of their infection OR systemically unwell.
- **Class 3-4:** have severe sepsis syndrome with organ failure or severe life threatening infection e.g. necrotising fasciitis (see separate section).
- If known MRSA positive, check sensitivities if they are available.
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<td><strong>Cellulitis Class III</strong></td>
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<td><strong>Signs and symptoms:</strong> Five clinical features suggest the presence of a deep and severe infection of skin and its deeper tissue:</td>
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<td>o severe, constant pain</td>
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<td>o bullous lesions</td>
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<td>o gas in the soft tissues</td>
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<tr>
<td>o systemic toxicity</td>
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<td>o rapid spread centrally along fascial planes.</td>
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<td><strong>Investigations:</strong></td>
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<tr>
<td>• Take blood culture and send wound swab, debrided tissue/ pus for culture to microbiology.</td>
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<td>• CT/MRI when indicated.</td>
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<td>• In IV drug users consider anthrax and potential for abscesses.</td>
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<td>Contact microbiology for treatment options.</td>
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- **Daptomycin:** If creatinine kinase elevated before treatment contact microbiology for advice.
- Monitor creatinine kinase before treatment and then weekly (more frequently if receiving another drug known to cause myopathy-preferably avoid concomitant use).
- If >83kg confirm dose with pharmacy or microbiology between 9am and 5pm day 1 or 2 of treatment.
- **If known MRSA positive, check sensitivities if they are available**

- **No MRSA:** Flucloxacillin 2g 6 hourly IV
  Plus Benzylpenicillin 2.4g 6 hourly IV depending on severity.
  **If known MRSA:** Daptomycin 6mg/kg 24 hourly IV
  **Oral step down:** Flucloxacillin 1g 6 hourly PO
  **Oral step down for known MRSA:** Doxycycline 100mg 12 hourly PO

- **Teicoplanin 10mg/kg 12 hourly x 3 doses, then 10mg/kg 24 hourly**
  Plus Clindamycin 1.2g 6 hourly IV
  **If known MRSA add:** Daptomycin 6mg/kg 24 hourly IV
  Contact microbiology if necrotising fasciitis or toxic shock syndrome.

- **Doxycycline 100mg 12 hourly PO**

| **Cellulitis Class IV/ Severe Soft Tissue Infection such as:** | **Signs and symptoms:** As for Class III | **Investigations:** As for Class III | | |
| | Necrotizing fasciitis | Fournier’s gangrene | Gas gangrene | Evidence of toxic shock |

- These are acute, rapidly developing infections of deep fascia which are life threatening.
- Urgent surgical and microbiology input is required.
- Treatment includes early surgical debridement and high dose antibiotic therapy directed at the pathogens.
- If necrotising fasciitis or Fournier’s gangrene suspected, isolate patient with appropriate contact/droplet precautions and discuss with IPCT.
- **Daptomycin:** As above

- Piperacillin/tazobactam 4.5g 6 hourly IV
  **Plus** Clindamycin 1.2g 6 hourly IV
  **If known MRSA add:** Daptomycin 6mg/kg 24 hourly IV
  Contact microbiology if necrotising fasciitis or toxic shock syndrome.

- **Teicoplanin 10mg/kg 12 hourly x 3 doses, then 10mg/kg 24 hourly**
  Plus Clindamycin 1.2g 6 hourly IV
  **Plus** Ciprofloxacin 600mg 12 hourly IV
  **Plus** Metronidazole 500mg 8 hourly IV
  Review antibiotics based on cultures

- **Severe cellulitis:** 7 days
- Necrotizing fasciitis,Fournier’s gangrene,Gas gangrene, Evidence of toxic shock: seek advice from micro
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| **Preseptal cellulitis** | **Signs and symptoms:** eyelid swelling with or without erythema, ocular pain | *Preseptal cellulitis:*  
  - No proptosis  
  - No impairment of ocular motility  
  - Normal optic nerve function  
  - If concerns of progression to orbital cellulitis, or not improving, treat as orbital cellulitis and contact microbiology. | **Oral step down:**  
  - Flucloxacillin 1g 6 hourly PO | 7 days  
  - Treatment should be continued until the erythema and swelling have resolved or nearly resolved |
| **Orbital cellulitis** | **Signs and symptoms:** as above + ophthalmoplegia, proptosis, conjunctival swelling, fever | *Ophthalmologist, ENT and microbiology referral required.*  
  *Most patients with uncomplicated orbital cellulitis can be treated with antibiotics alone.*  
  *Complications include subperiosteal abscess, orbital abscess, visual loss, and intracranial extension.*  
  *The main indications for surgery are a poor response to antibiotic treatment, worsening visual acuity or pupillary changes, evidence of an abscess (especially a large abscess (>10 mm in diameter) or one that fails to respond promptly to antibiotic treatment).*  
  *In some cases, drainage of affected sinuses is also required to control the infection.*  
  *The results of cultures and susceptibility testing from samples obtained during surgery can be used to tailor therapy.* | **Oral step down:**  
  - Clindamycin 450mg 6 hourly PO  
  - Doxycycline 100mg 12 hourly PO | 7 days  
  - Treatment should be continued until the erythema and swelling have resolved or nearly resolved |
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| **Infected Leg Ulcers**  | • Take care when diagnosing infection on top of chronic venous insufficiency. Manage associated oedema, pain and dermatitis as well as infection. Clinically non-infected ulcers should not be cultured.  
  • Leg ulcers occasionally become infected, but are invariably colonised by two or more different bacterial species. The predominant pathogens are *S.aureus* and beta-haemolytic streptococci.  
  • Organisms which commonly **COLONISE** (but rarely infect) ulcers include: *coliforms* (especially Proteus species), *Pseudomonas aeruginosa* and enterococci.  
  • For Diabetic Foot Infections see relevant guidelines | **Non-severe:** Flucloxacillin 1g 6 hourly PO  
**Severe:** Flucloxacillin 2g 6 hourly IV  
+/- Benzylpenicillin 2.4g 6 hourly IV depending on severity  
**Oral step down:** Flucloxacillin 1g 6 hourly PO  
**MRSA:**  
Teicoplanin 10mg/kg 12 hourly x 3 doses, then 10mg/kg 24 hourly  
**Oral step down:** Doxycycline 100mg 12 hourly PO | **Non-severe:** Doxycycline 100mg 12 hourly PO  
**Severe:** Clindamycin 900mg 8 hourly IV  
**Oral step down:** Doxycycline 100mg 12 hourly PO | 5-7 days  
May be extended if slow response; contact microbiology |
| **Infected insect/ tick bites or stings** | • Most local reactions to insect/tick bites or stings can be managed symptomatically; only treat with antibiotics if infected.  
  • If a tick is still attached, remove it.  
  • Tick bites: Consider micro/ID consultation and advise review by a doctor for consideration of antibiotics if they develop any symptoms of Lyme disease.  
  • For people who do not have an erythema migrans rash but have symptoms suggestive of Lyme disease and a recent history of a tick bite or possible exposure to ticks, test for antibodies to *Borrelia burgdorferi*. | Doxycycline 100mg 12 hourly PO | **Infected insect bite:** 7 days  
**Erythema migrans rash/Lyme disease:** 21 days |
| **Signs and symptoms:** | • local reactions  
  • papular urticarial  
  • systemic allergic reaction  
  • Erythema migrans rash | | | |

- **Duration:** 7 days

| **Signs and symptoms:** | | | |

- **Duration:** 21 days

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**Infected insect/ tick bites or stings**

- **Signs and symptoms:**
  - local reactions
  - papular urticarial
  - systemic allergic reaction
  - Erythema migrans rash

- **Useful Information:**
  - Most local reactions to insect/tick bites or stings can be managed symptomatically; only treat with antibiotics if infected.
  - If a tick is still attached, remove it.
  - Tick bites: Consider micro/ID consultation and advise review by a doctor for consideration of antibiotics if they develop any symptoms of Lyme disease.
  - For people who do not have an erythema migrans rash but have symptoms suggestive of Lyme disease and a recent history of a tick bite or possible exposure to ticks, test for antibodies to *Borrelia burgdorferi*.
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| **Superficial abscesses, boils and carbuncles** | • Treat with Incision and drainage as soon as possible.  
  • The decision to administer antibiotics as an adjunct to incision and drainage should be made based on if:  
  o Severe or rapidly progressive infections  
  o The presence of extensive associated cellulitis  
  o Signs and symptoms of systemic illness  
  o Associated septic phlebitis  
  o Diabetes or other immune suppression  
  o Advanced age  
  o Location of the abscess in an area where complete drainage is difficult (e.g. face, genitalia)  
  o Lack of response to incision and drainage alone  
  • A recurrent abscess at a site of previous infection should prompt a search for local causes such as a pilonidal cyst, hidradenitis suppurativa, or foreign material. | Flucloxacillin 1g 6 hourly PO | Clindamycin 450mg 6 hourly PO | Continue antibiotics until drained. |
| **Surgical wound infections** | In deep seated infections, source control is critical. Oral antibiotics without source control is rarely successful.  
• Wound infections associated with cellulitis alone (i.e., no fluctuance) can be treated with a course of antibiotics without open drainage.  
• Suture removal plus incision and drainage should be performed for surgical site infections  
• Adjunctive systemic antimicrobial therapy is not routinely indicated, but in conjunction with incision and drainage may be beneficial for surgical site infections associated with a significant systemic response, such as erythema and induration extending >5 cm from the wound edge, temperature 38.5°C, heart rate >110 beats/minute, or white blood cell (WBC) count >12 | **Superficial infections:**  
Treat as per cellulitis guidelines  
**Deeper infections:**  
Piperacillin/tazobactam 4.5g 8 hourly IV  
*Plus*  
Gentamicin IV as per prescription chart  
**Oral step down:**  
Co-amoxiclav 625mg 8 hourly PO | **Superficial infections:**  
Treat as per cellulitis guidelines  
**Deeper infections:**  
Co-trimoxazole 1.44g 12 hourly IV  
*Plus*  
Metronidazole 500mg 8 hourly IV  
**Oral step down:**  
Trimethoprim 200mg 12 hourly PO  
*Plus*  
Metronidazole 400mg 8 hourly PO | 5 days post source control |
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<tr>
<td><strong>Burn wound infections</strong>&lt;br&gt;Investigations:  &lt;br&gt;- Blood cultures when indicated  &lt;br&gt;- Swabs</td>
<td>• Treatment not recommended for colonisation, only if burn wound cellulitis or sepsis.  &lt;br&gt;- Discuss with microbiology when swab results available.</td>
<td>Piperacillin/Tazobactam 4.5g 8 hourly IV  &lt;br&gt;<strong>If MRSA add:</strong> Teicoplanin IV as prescription chart  &lt;br&gt;<strong>Oral step down:</strong> Co-amoxiclav 625mg 8 hourly PO</td>
<td><strong>Non-severe penicillin allergy:</strong>  &lt;br&gt;IV Teicoplanin as prescription chart  &lt;br&gt;<strong>Plus</strong> Ceftazidime 2g 8 hourly IV  &lt;br&gt;<strong>Plus</strong> Metronidazole 500mg 8 hourly IV  &lt;br&gt;<strong>Oral step down as in severe</strong>  &lt;br&gt;<strong>Severe penicillin allergy:</strong>  &lt;br&gt;IV Teicoplanin as prescription chart  &lt;br&gt;<strong>Plus</strong> Ciprofloxacin 600mg 12 hourly IV  &lt;br&gt;<strong>Plus</strong> Metronidazole 500mg 8 hourly IV  &lt;br&gt;<strong>Oral step down:</strong> Clindamycin 450mg 6 hourly PO  &lt;br&gt;<strong>Plus</strong> Ciprofloxacin 400mg 12 hourly PO</td>
<td>7-14 days</td>
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| **Puncture wound**<br>Or<br>**Contaminated wound**<br>Investigations:  <br>- Surgical specimens for culture | • A careful history is required to manage the patient and to identify risk factors for complications of the puncture injury.  <br>- Cleanse thoroughly and evaluate wound for the presence of foreign bodies.  <br>- Surgical debridement or abscess drainage is an important component of treatment of infected puncture wounds.  <br>- For tetanus prone wound, give human tetanus immunoglobulin with absorbed diphtheria (low dose) and tetanus vaccine, according to immunization history. | Non-severe:  <br>Co-amoxiclav 625mg 8 hourly PO  <br>**Severe:**  <br>Co-amoxiclav 1.2g 8 hourly IV  <br>**Oral step down:**  <br>Co-amoxiclav 625mg 8 hourly PO  <br>**If plantar puncture wound, ear cartilage wound, farmyard injury or not settling within 48hrs:**  <br>Piperacillin/Tazobactam 4.5g 8 hourly IV  <br>**Oral step down:**  <br>Clindamycin 450mg 6 hourly PO  <br>**Plus** | **Non-severe:**  <br>Co-trimoxazole 960mg PO 12 hourly  <br>**Plus** Metronidazole 400mg PO 8 hourly  <br>**Severe:**  <br>Co-trimoxazole 1.44g IV 12 hourly  <br>**Plus** Metronidazole 500mg IV 8 hourly.  <br>**Oral step down:**  <br>Trimethoprim 200mg 12 hourly PO  <br>**Plus** Metronidazole 400mg 8 hourly PO | Prophylaxis: 3-5 days  <br>Treatment of contaminated wound: 7-14 days |
- Following puncture injury antibiotic prophylaxis can be administered in high risk patients e.g. Forefoot injury, Wearing shoes at the time of the injury, Diabetes mellitus.

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<tr>
<th>Medication</th>
<th>Dose and Administration</th>
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<tr>
<td>Ciprofloxacin</td>
<td>400mg 12 hourly PO</td>
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**If plantar puncture wound, ear cartilage wound, farmyard injury or not settling within 48hrs:**
- Teicoplanin IV as per prescription chart
- Ciprofloxacin 600mg 12 hourly IV
- Metronidazole 500mg 8 hourly IV

**Oral step down:**
- Clindamycin 450mg 6 hourly PO
- Ciprofloxacin 400mg 12 hourly PO
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<td><strong>Marine Infection</strong></td>
<td>• Many more potential pathogens compared to non-marine injury including <em>Aeromonas, Edwardsiella tarda, Erysipelothrix rhusiopathiae, Vibrio vulnificus, Mycobacterium marinum</em>&lt;br&gt;• Empiric antibiotic coverage does not include coverage for <em>M. marinum</em> infection, since the presentation is subacute and without associated systemic toxicity.&lt;br&gt;• A specimen (e.g. lesion aspirate, biopsy) should be obtained and the microbiology laboratory notified that <em>M. marinum</em> is suspected so that appropriate culture conditions will be included. If acid-fast staining is positive or if the exposure history and physical examination findings suggest <em>M. marinum</em> infection (e.g. laceration from an aquarium), then we suggest that specific treatment for <em>M. marinum</em> infection should be initiated.&lt;br&gt;• For tetanus prone wound, give human tetanus immunoglobulin with absorbed diphtheria (low dose) and tetanus vaccine, according to immunization history.</td>
<td>Cephalexin 500 mg 6 hourly PO OR Cefazolin 1g 8 hourly IV <strong>Plus</strong> ●Levofloxacin 750 mg once daily PO/IV <strong>Plus</strong> ●Metronidazole 500 mg 6 hourly PO/IV if exposure to sewage-contaminated water or if soil-contaminated wound) OR ●Doxycycline 100 mg 12 hourly PO for coverage of Vibrio species if seawater exposure&lt;br&gt;&lt;br&gt;<strong>Oral step down:</strong> Discuss with microbiology</td>
<td>Clindamycin 300mg 6 hourly PO OR Clindamycin 600mg 8 hourly IV <strong>Plus</strong> ●Levofloxacin 750 mg once daily PO/IV <strong>Plus</strong> ●Doxycycline 100 mg 12 hourly PO for coverage of Vibrio species if seawater exposure&lt;br&gt;&lt;br&gt;<strong>Oral step down:</strong> Discuss with microbiology</td>
<td>10-14 days For <em>Mycobacterium marinum</em> d/w ID/Respiratory</td>
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<td><strong>Associated underlying/open fracture</strong></td>
<td>See Surgical Prophylaxis guidelines</td>
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<td>CLINICAL GUIDELINES ID TAG</td>
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<td><strong>Title:</strong></td>
<td><em>Antibiotic Guidelines for Skin and Soft tissue Infection</em></td>
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References:
7. NICE 2018. Lyme disease