

# Amputation of the digit

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## **Introduction**

Digit amputation is commonly used to treat deep sepsis of the digit and septic arthritis of the distal interphalangeal (DIP) joint. Other reasons for digital amputation include luxation of the proximal or distal interphalangeal joints, pedal osteitis, degloving of the claw capsule with severe injury to the underlying soft tissues or fracture of the distal phalanx. It is a rapid, inexpensive and technically easy procedure. All the infected tissues are resected, which facilitates healing and cattle usually return rapidly to previous levels of production. However, longevity might be reduced. Heavy (more than 680 kg) and older animals are reported to do poorly due to unsatisfactory healing. Other factors, which may influence outcome depends on which digit was removed and the type of housing. Animals kept on concrete may be culled before those kept on pasture.

Several studies found that production longevity of cattle after digit amputation ranges between 10 and 27 months. Another study found no significant difference in survival time between digit amputation (27.2 months) and joint resection (21.2 months) in bulls. However, survival time in dairy cattle affected with DIP joint sepsis and treated by amputation was longer (13.5 months) but not significantly so compared to the average 10.9 months for the group that had joint resection. Another study found the cull rate during the first 60 days in lactating dairy following amputation to be 44% compared to 0% following arthrodesis of the DIP joint. In the same study milk production was higher for cattle that underwent arthrodesis compared to the amputation group. They concluded that arthrodesis should be favoured.

## **Surgical approach.**

The following has been described: Distal part of the first phalanx; Disarticulate proximal interphalangeal joint; Proximal part of second phalanx.

Digit amputation through the distal aspect of the proximal phalanx is the most common technique used. The site of amputation should be based on the location and extent of the infection. Amputation usually provides wide resection and effective drainage of the affected digit and the flexor tendon sheath. However, in cases of extensive pre-existing tenosynovitis there is continued swelling and lameness. The tendon sheath remains open and there is a purulent discharge present.

One big advantage of this approach is that the wound is further away from the ground compared to a low amputation thus preventing ulceration and trauma particularly on concrete flooring. However, instability with early break down and premature culling may result if the amputation through P1 is made too high because of complete or partial resection of the proximal cruciate ligament.

Amputation through the proximal part of P2 will provide more digital stability because of preservation of the interdigital cruciate ligament. However, the stump might be too low leading to repeated trauma. Amputation close to the proximal interphalangeal joint can lead to necrosis of the remaining part of P2 due to ischemia; septic arthritis of the proximal interphalangeal joint; inadequate drainage of the tendon sheath.

Disarticulation or amputation through the joint is an easy technique to do in field situation. If the cartilage of the phalanx is left intact after disarticulation, cover by granulation tissue might be delayed and a cyst-like lesion might form.

### **Surgical procedure.**

The distal limb is prepared surgically and intravenous regional anesthesia is administered. For the proximal amputation technique, the interdigital skin is incised from the level of the PIP joint dorsally continued through the interdigital space close to the affected side and continued caudally to the very distal aspect of the proximal

phalanx axially. The distal cruciate is severed followed by inserting a gigli wire to just above the proximal interphalangeal joint. This can be determined by pushing a finger up the incision on the axial side. The amputation is done at a angle of 45 degrees to the proximal digit abaxially. An assistant can hold the digit to provide more stability when the cut is performed. The cut should go through the distal portion of the proximal phalanx. All remaining necrotic tissues and interdigital fat are removed and digital vessels ligatured with absorbable suture. The wound including the tendon sheath are lavaged. Using sufficient padding a pressure bandage is applied on the distal portion of the proximal phalanx. The animal should be observed for several hours to make sure that excessive bleeding through the bandage does not occur. The bandage is changed after 48-72 hours then every 5-7 days as needed. Ideally, bandages are continued until the surface of the bone is covered with granulation tissue. A broad spectrum, systemic antibiotic is administered for 5-10 days after the surgery. It should be remembered that antibiotics will never replace good surgical principals and adequate postoperative hygiene. Bulls can return to breeding 3-4 months after the surgery.

A skin flap could be preserved to cover the stump by continuing the interdigital incision distal and abaxial at the palmar and dorsal aspect of the digit and along the proximal aspect of the coronary band.<sup>13</sup> Although this technique provides a superior cosmetic result and decreases subsequent care of the stump, it may prevent adequate drainage and extension of the infection. This technique is recommended for a nonseptic process of the digit (pedal fracture, digit luxation) or distal sepsis without extensive soft tissue infection (pedal osteitis). If skin flap is elected in the presence of infection, the distal portion of the incision should be left opened for drainage.

## References

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- 2 Desrochers A. Septic arthritis of the distal interphalangeal joint. Proceedings of the AABP lameness seminar 2007.

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