

Problem Wound

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The patient was initially treated for a lick granuloma diagnosed by biopsy and did not respond to conservative management by application of various topical and oral antibiotics. The lesion progressed to involve the fourth and fifth digits. These digits were eventually amputated by osteotomy through the proximal metacarpal diaphysis, and the wound was closed. Wound dehiscence occurred after surgery.

The limb was nonpainful on physical examination. The dog was able to put the limb on the floor, but could not bear weight on the limb when walking. An open wound extended along the lateral aspect of the limb from the carpus to the proximal phalanx of the third digit (**Figure 1**). The lateral aspect of the third metacarpal joint was exposed. Radiographs of the limb showed subluxation of the metacarpophalangeal joint of the third digit (**Figure 2**). Except for mature neutrophilia ($23.4 \times 10^3/\mu\text{l}$), mildly elevated globulins (3.3 g/dl [reference range, 1.8 to 3.10]), elevated ALT 268 U/L [reference range, 3 to 50]), and ALP (485 U/L [reference range, 388–1007]), the CBC and biochemical profile were within normal limits.

A 12-year-old, male, neutered mixed-breed dog was presented for evaluation of a chronic, nonhealing wound on the lateral aspect of the left forelimb at the level of the carpus.



Appearance of the wound at presentation



Craniocaudal radiograph of distal portion of the left forelimb

ASK YOURSELF...

If the owner would not consent to complete amputation, which of the following treatments would have the greatest likelihood of success?

- Carpal arthrodesis, metacarpophalangeal joint stabilization, and reconstruction of the skin defect by microvascular transfer of a composite flap (skin and muscle).
- Carpal arthrodesis, metacarpophalangeal arthrodesis, and reconstruction of the skin defect with a skin graft.
- Carpal arthrodesis, metacarpophalangeal arthrodesis, and reconstruction of the skin defect with a pouch flap.
- Amputation at the level of the carpometacarpal joint with carpal pad transposition.

INSIGHTS FROM CLINICAL CASES . DISCUSSION

Correct Answer: D

Amputation at the level of the carpometacarpal joint with carpal pad transposition (Figure 3)

The two most viable options for injuries such as this are total limb amputation and amputation at the level of the carpometacarpal joint with carpal pad transposition. Carpal pad transposition is a salvage procedure that preserves some limb function. Factors that should be considered in case selection include activity level of the animal, the patient's ability to use the other limbs, and to some extent the patient's size. Small dogs and cats can be expected to do well, especially if they are not allowed to become overweight. The procedure can be used in larger dogs, but hypertrophy adequate for the pad to bear weight may take longer to occur. Although limb function is altered, the animal can compensate fairly well for the shortening of the limb by walking with the shoulder and elbow extended.

Keys to Success

Because of the lateral skin loss, we elected to perform the amputation at the level of the intercarpal joints to facilitate wound closure. The prominence of the accessory carpal bone was removed with rongeurs to facilitate rotation of the carpal pad over the distal end of the limb. A

key to the success of this procedure is to maintain as much soft tissue as possible on the distal aspect of the limb to provide additional cushioning. Position the carpal pad on the mid-to-caudal aspect of the stump because that is where the most weight is borne. Apply a non-weight-bearing splint for 2 to 3 weeks after surgery to allow healing to occur. This can be accomplished using a well-padded caudal splint or bivalved cast. When the splint (cast) is removed, restrict weight-bearing to softer surfaces, such as carpet and grass, until hypertrophy of the pad and thickening of surrounding skin occur. Advise the owner to examine the area frequently for evidence of increasing skin bruising or ulceration. If bruising or ulceration is noted, reapply the splint. Some patients may benefit from application of a soft, padded bandage for 1 to 2 weeks after splint removal to provide additional protection as weight-bearing is allowed to occur.

Two of the biggest problems with digital pad transposition procedures are establishing proper position of the pad during surgery and keeping the pad in position as healing occurs. We were initially concerned that we had left too much skin cranially, which might have allowed the pad to slip out of position. Fortunately, this did not happen and the wound healed uneventfully.

Functional Salvage

Although considered to be a salvage procedure, pad transposition can help maintain limb function. The postoperative appearance of another patient (Figure 4) shows a successful outcome in a limb and pad that differed from those of our patient. This patient had a metatarsal pad transposition. The toes were amputated at the level of the metatarsophalangeal joints, and the metatarsal pad was positioned over the end of the stump to provide a durable weight-bearing surface. Digital pad transposition procedures should be considered as alternatives to complete amputation, especially when preservation of the limb is considered necessary to aid ambulation. ■

See Aids & Resources, back page, for references, contacts, and appendices.



Immediate postoperative appearance. The pad is positioned well on the mid-to-caudal aspect of the limb. More of the skin cranially (arrow) could have been removed to reduce risk for excessive contact with the ground and possible abrasion.



Postoperative appearance in a different patient after metatarsal pad transposition of the hindlimb. This dog is able to bear full weight on the transposed pad.

THE CORRECT ANSWER EXPLAINED ...

Primary reconstruction using the other techniques is a less viable option for the following reasons:

- Clients who want to avoid complete amputation if possible may also want to avoid multiple procedures and potentially protracted hospitalization.
- The cost of primary reconstruction would be considerably higher.
- Since a primary weight-bearing digit (digit 4) was missing and there was concern about long-term function of the third digit because of the abnormalities seen on the radiograph, the prognosis for use of the limb was questionable.

TAKE-HOME MESSAGES

- Pad transposition procedures can be an effective alternative to amputation.
- Preserving as much soft tissue in the wound bed as possible provides additional support for the transposed pads.
- Preventing early weight-bearing is essential to allow the transposed tissue to heal and adapt to its new environment.
- Reassessing the patient after weight-bearing should be done to ensure that the transposed pad is in the most appropriate location.