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견교상에 의한 수지 절단의 재접합술

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— Abstract —

Replantation for Amputation of the Finger by a Dog Bite

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We present the case of a 49- year- old man with a dog bite on his right index finger at the mid-phalanx level. The finger was severely contaminated by the dog bite but, the amputation margin was clean.

We replantated the stump. His finger was recovered very successfully 12 months later. It is recommended that in these types of cases, replantation of the severed finger should proceed even if the amputated finger was contaminated by the dog bite, unless there are other factors that prevent replantation.

Key Words: Dog bite, Finger, Amputation, Replantation

INTRODUCTION

Dogs bites are responsible for 90% of an animal bites[1-3], especially for the children. Adults tend to be bitten on the extremities, particularly the hands. Overall, due to the comparatively superficial nature of the injuries, which are easily cleaned, only 24% of dog bites become infected[1-3]. However, the infection rate increases to 36% when the hand is involved[4]. Therefore bites to the hand exemplify the necessity for a strict protocol of vigorous debridement and irrigation, and all wound should be left open. Primary reconstruction of soft tissue defects can be considered if the tissue bed appears healthy and there is no evidence of necrotic tissue or sepsis after the first 48 to 72 hours[5].

It is commonly thought that a strict protocol

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of treatment couldn't be applied in the dog bite injuries, where replantation is one possible option. We present a case of complete amputation of the finger caused by a dog bite avulsion injury. The successful outcome may encourage others to consider replantation for amputation of a finger by dog bite.

CASE REPORT

A 49years old man visited clinic due to complete amputation of his left index finger at the middle phalanx level by domestic dog bite (Fig. 1). He has been treated diabetes mellitus for the last one year and requested that all reasonable efforts be made to reattach the finger.

We performed a microsurgical dissection under brachial plexus anesthesia. Intraoperative finding was avulsion type damage. Flexor digitorum profundus in stump and the extensor tendon and radial digital nerve in proximal stump were gone.

After performance of mid phalangeal bone shortening with a saw and debridement, the bone was fixated using 2 K-wires. An arterial anastomosis operation was performed with end to end anastomosis of the ulnar digital artery using with 10/0 nylon. The epineurialneurorrha-

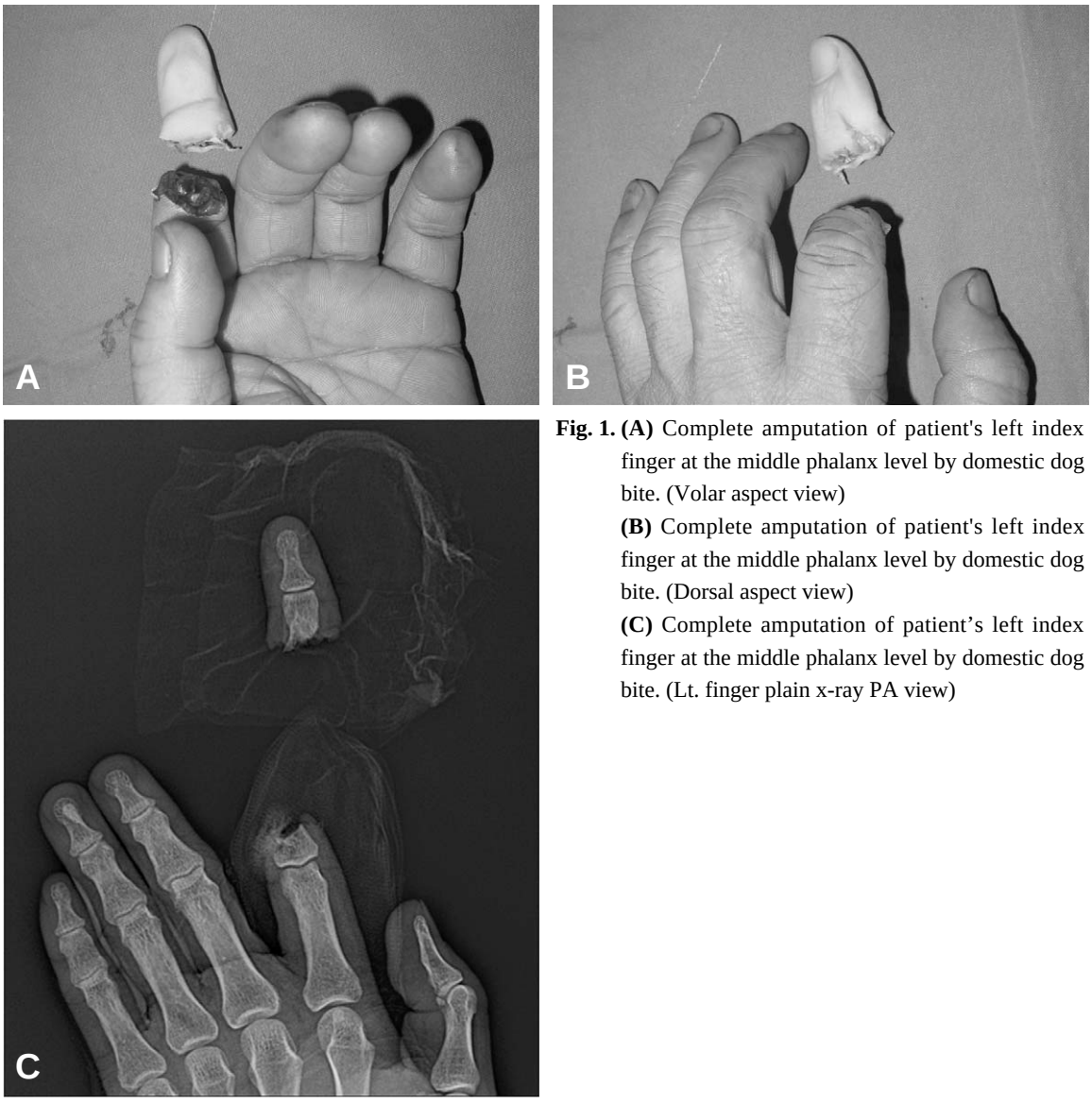

Fig. 1. (A) Complete amputation of patient's left index finger at the middle phalanx level by domestic dog bite. (Volar aspect view)
(B) Complete amputation of patient's left index finger at the middle phalanx level by domestic dog bite. (Dorsal aspect view)
(C) Complete amputation of patient's left index finger at the middle phalanx level by domestic dog bite. (Lt. finger plain x-ray PA view)

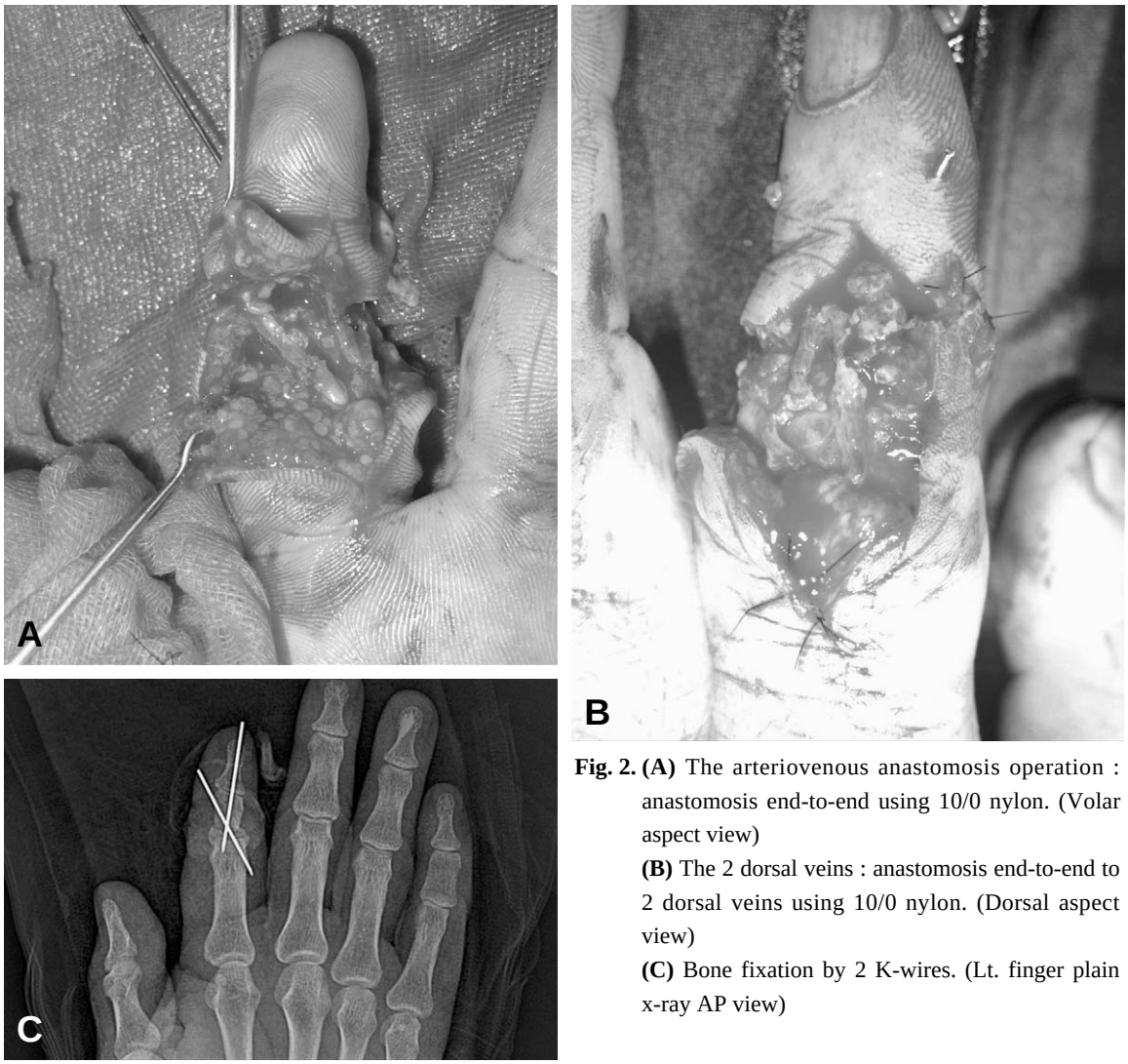

Fig. 2. (A) The arteriovenous anastomosis operation : anastomosis end-to-end using 10/0 nylon. (Volar aspect view)
(B) The 2 dorsal veins : anastomosis end-to-end to 2 dorsal veins using 10/0 nylon. (Dorsal aspect view)
(C) Bone fixation by 2 K-wires. (Lt. finger plain x-ray AP view)

phy of the ulnar digital nerve, proximally to radial digital nerve in the stump was done using 8/0 nylon. The 2 dorsal veins were anastomosed end-to-end to 2 dorsal veins using 10/0 nylon (Fig. 2).

After an operation, to prevent blood clotting, we did injections for 7 days with prostaglandin E1(10 ㎍/day) and Heparin (5000 units/day). To prevent infection, we injected 2nd generation cephalosporin for 3 weeks and aminoglycoside for 1 week. After then, the patient took 2nd generation of cephalosporin, per oral for 3 weeks. The fingers recovered successfully from the operation. After the operation, it took one year to recover normal movement and right index finger final total range of motion was 160 degree, key pinch was 4 pound and 2 point discrimination was 7 mm. The patient was very satisfied (Fig. 3).

DISCUSSION

Domestic dog bites are common. This kind of injury has several unique characteristics that distinguish it from other traumatic injuries. Because it is caused by blunt teeth and powerful masseter muscles, this kind of injury causes the tearing of soft tissue and leaves a large open wound[6]. This is contrast to facial bites, which can be closed primarily or reconstructed primarily. Because bleeding of facial bites is profuse and wounds are easily cleaned with antibiotic

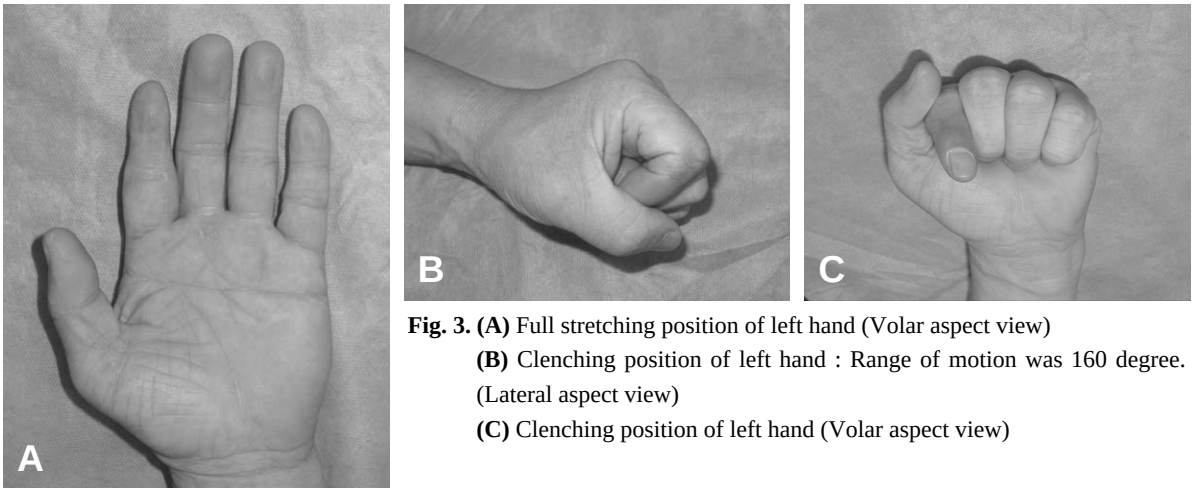

Fig. 3. (A) Full stretching position of left hand (Volar aspect view)
(B) Clenching position of left hand : Range of motion was 160 degree. (Lateral aspect view)
(C) Clenching position of left hand (Volar aspect view)

prophylaxis, facial bites have a very low risk of infection[7-10]. Only 15 to 20 % of dog bite wounds become infected. Crushing injuries and puncture wounds in dog bite wounds are more likely to become infected than scratches or tears[11]. Therefore bites to the hand exemplify the necessity for a strict protocol of vigorous debridement and irrigation. It is recommended that all wounds should be left open and treated with antibiotic prophylaxis[5]. If the amputated finger doesn't get an immediate operation within a right time, it can become necrotic and the procedure for dog bite is too late for success.

As in this case, if the patient strongly wants reconstruction, we have to perform the reconstruction operation and provide for infection treatment. In this case we need to follow the protocol of reconstruction operation, irrigation, and debridement. Also, we need an acceptable amount of bone shortening. While the use of prophylactic antibiotics is controversial, this case demonstrates that we have to use prophylactic antibiotics[5,12].

Most infected dog bite wounds yield polymicrobialorganisms[13,14]. Pasteurellamultocida and staphylococcus aureus are the most common aerobic organisms. Other possible aerobic pathogens include streptococcus species, corynebacterium species, Eikenellacorrodens and Capnocytophagacanimorsus. Anaerobic organisms including Bacteroides fragilis, Fusobacterium species and Veillonella parvula have also been found in infected dog bites. Hence prophylaxis should cover Staphylococci, Streptococci, anaerobes, Pasteurellae and Eikenella spp. We used 2nd generation cephalosporin 2.0 g/day, erythromycin 300 mg/day for the antibiotics in this case, based on other experience. Treatment with prophylactic antibiotics for three to seven days is appropriate for dog bite wounds, unless the risk of infection is low or the wound is superficial[13,14].

If the cellulitis is already present, 10-14 days may be necessary for the therapeutic course. It may be extended to three weeks for tenosynovitis, four weeks for septic arthritis and six weeks for osteomyelitis[9]. We could protect from infection with 2nd generation cephalosporin intravenous therapy for 3 weeks, aminoglycoside intravenous therapy for one week, and 2nd generation oral antibiotics medication for 3 weeks.

In conclusion, we recommend that replantation protocol should include wound debridement and protection from infection using a variety of antibiotics. And if patients don't have contraindication, they can have successful results in replantation from a bog bite.

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