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BUNDLING METHOD TO TREAT EXTENSIVE THUMB FINGERTIP PULP INCISIONS: A CASE REPORT

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Abstract

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Introduction

The fingertips have special anatomical features and highly complex functions. Therefore, once the injury occurs, it will bring great inconvenience and disability to the patient[1, 2]. Unfortunately, fingertip injuries occurred commonly. There is no clear classification of fingertip injury to guide clinicians in proper management. Usually injuries are defined as defects or no defects. Other definitions are involved structures, such as pulp, nails, and bones, which also define the location of the injury[3]. There are many treatment methods in the literature describing defects and multiple structural composite injuries[3]. However, simple fingertip pulp injury is rarely mentioned. In fact, the finger pulp is the main soft tissue covering the finger, providing an important pinch function and a sensitive touch[2]. Usually, after the fingertip is injured, we will simply bandage with Vaseline gauze or semi-occlusive dressing after thorough debridement. Undoubtedly, it is convenient to handle simple incisions. However, for complex incisions, simple dressing may bring deformity healing, and it will be tricky when changing dressings.

Injuries involving more than one parallel incision or lacerations may require horizontal mattress sutures to cross all incisions to prevent damage to the blood vessel supply of the skin island located between the incisions. However, the fingers are cylindrical, and the wound is valgus and cracked after tearing multiple thumbs with horizontal mattress sutures. We admitted a patient with a severe Incision on the thumb and fingertips, which involved
multiple parallel wounds. We sutured the incisions the bundle method, and finally obtained satisfactory results.

Case Report

A 52-year-old butcher shop worker presented at our emergency room with extensive incisions on the fingertip of his right thumb. He accidentally put his right thumb in the meat slicer while working. There were multiple parallel incisions on his right thumb fingertip pulp (Fig. 1). The incision did not involve the tendons in zone 1 and image showed no fracture. Tetanus injection was performed before surgery, and ceftazidime was used to prevent infection. The incision involved the entire fingertip, but not the nail bed, and the distance between the incisions were only about 1-2 mm and the depth were 3-5 mm. Horizontal mattress sutures are suitable for multiple parallel incisions, but in fact it is
limited to cases where the skin is flat and the soft tissue is thick.

After obtaining the patient's consent, we conducted this study. We performed debridement in the emergency room. After anesthetizing the root of the finger, we used a single suture to pass through all the incisions and then tied the suture outside the skin. (Fig 2). The patient left the hospital immediately after the operation. The patient was given oral anti-inflammatory drugs and analgesics, and the patient was told to follow up in the clinic. The dressing was changed regularly after the injury, and there was more wound fluid in the first week, and the dressing was changed every day. Every 2-3 days after a week. The thread
was removed 14 days after surgery.

The patient's incision basically healed 2 weeks after surgery, and we removed the tied sutures and wrapped affected thumb with sterile gauze. At 12 months follow up, the incisions of the thumb fingertip healed well, and the contour of the fingertips returned to normal (Fig 3). And the thumb's flexion and extension function was normal, and there was no abnormal pain in the fingertips, but a little numbness.
Discussion

Hand injuries are the most frequently encountered injuries, contributing up to 30% of accident and emergency (A&E) attendances[1]. Fingertip incisions are an important part of hand injuries. The highly specialized structure at the fingertips can achieve tasks requiring precision, strength, and durability. Therefore, fingertip injuries, especially pulp injuries, can affect the entire hand[2]. There is a huge difference in the severity of fingertip injuries, ranging from small incisions involving skin to compound injuries including bones, tendons, and nail beds. Consequently, it is important to determine the mechanism and classification of the injury because it can indicate the degree of contamination, the amount of tissue loss, and the best treatment.

In adult, fingertip injuries are often related to professional activities. Employees of meat packaging are submitted to experience Incision injuries of hand[4]. Such injured wounds are often neat and sharp. For deep and complex incisions, such as amputation, hand surgery or even microsurgeon intervention may be required to obtain satisfactory results[3]. If the injury is superficial, or there is no important structural damage in the case of deep injury, simple wound irrigation, debridement, and wound suture in the emergency department are more appropriate, thus avoiding the need for surgery[5]. James et al. [6] conducted a randomized controlled study to assess the difference in clinical outcomes between sutured incisions and conservatively treated incisions. They declared that hand incisions less than 2 cm in length without tendons, fractures and do not involve nail beds can be cleaned and dressed without suturing, and similar cosmetic effects and normal activities can be obtained; Oral or intravenous antibiotics are also not necessary[6, 7]. For incisions longer than 2 cm or complicated, the condition of tetanus, the pathogenic bacteria that may cause infection need to be evaluated before treatment, and the damage to the
surrounding structure needs to be explored to rule out. The most used methods for closing wound include four: Staples, Sutures, Steri-Strips, and Sticky Stuff[8]. Clinicians need to choose the appropriate closure method according to the patient's condition; and there are many reports in this regard. However, there are no studies on the management of extensive thumb fingertip pulp incisions.

The case we presented was a staff of a butcher's shop who accidentally cut his right thumb with a meat slicer while working. His thumb pulp showed multiple parallel incisions. The standard of care for the treatment of such wounds is to vigorously wash the wound, debride and remove foreign bodies; Whether antibiotics should be used prophylactically remains controversial[9]. Considering the patient's working environment, the risk of Staphylococcus aureus infection is greater, we gave him intravenous infusion of antibiotics to prevent possible infections. The tricky thing is that the distance between the incisions of the patients is too close to decide appreciate suture method. Because the skin of the thumb and fingertips is curved, we did not choose a horizontal mattress suture. In addition, we are concerned that the petrolatum gauze covering may cause poor wound healing. Therefore, we decided to use sutures to bind the affected finger and then bandaged them with sterile bandages. Considering that binding may cause iatrogenic finger ischemia[10], we checked the blood supply after loosening the tourniquet. Eventually, the patient obtained a completely recovery of thumb with satisfied appearance. To the best of our knowledge, this is the first reported case of the using bundle to treat a complex thumb Incision.

In summary, fingertip injuries are the most common injuries in emergency departments, with various types of wounds. Clinicians should choose the appropriate antibiotics to prevent infections based on the pathogenic bacteria that may exist in the patient's working environment. Most importantly, routine exploration should be performed to assess soft
tissue damage and contamination. However, there is a risk of over-tightening resulting in finger ischemia which needed carefully care and to pay attention to the blood supply at the fingertips after the operation. In the future, a flexible mesh finger cuff may be developed to treat this type of injury.

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**Figure legends**

Fig.1 The patient's thumb fingertip pulp was severely injured, with 5 parallel lacerations, but the nail bed was intact.

Fig.2 After wearing the tourniquet, all the lacerations were crossed with single sutures, and the sutures were bundled outside.

Fig.3 After a year of follow-up, the patient's fingertips healed well and there were no hypertrophic scars.
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