

Atasoy Flap Reconstruction in the Management of Multiple Finger Tip Injuries: A Case Report

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Abstract

Fingertips are very useful in social expression, exploration, and hand protection. Injuries affecting this part of the hand require a protective functional restoration which in multiple digital involvements requires the use of larger flap options mainly from the abdominal wall and chest wall. The use of the Atasoy flap is mainly for solitary cases. This report aims to show the successful use of the Atasoy flap to reconstruct multiple fingertip injuries.

We present a right-handed adolescent male who sustained multiple fingertip injuries to the middle, ring, and little fingers, and extensor zone 1 injury of the thumb of the left hand from a milling machine accident. He had fingertip reconstruction with Atasoy flap on a single theatre session with a satisfactory outcome. Atasoy flaps which afforded the obvious advantage of replacing like with like and avoided additional wounds endeared this option to both the surgeon and the patient.

Keywords: Adolescent; Atasoy Flaps; Multiple Fingertip Injuries.

Introduction

Fingertip injuries are trauma to the fingertips which are part of the finger distal to the insertion of the flexor digitorum superficialis and extensor digitorum tendons. They are the commonest injuries of the hand due to their position and their use in exploring the environment.¹ They account for about two-thirds of all hand injuries in children.² They occur mainly in ages 4-30years with 75% of the patients being males.³ Fingertip injuries vary from simple crushing type appearing as sub-ungual hematoma to severe mutilation with amputation of the distal phalanges.² Simple lacerations are the most common type while the least common is the avulsion injuries.⁴ About 50% of fingertip injuries are associated with phalangeal fractures.⁵

Fingertip injuries are classified clinically into four main groups by Allen. Type 1 involves the pulp only; type 2 involves the pulp and the nail bed; type 3 includes partial loss of the distal phalanx distal to the lunula, and type 4 includes distal phalangeal fractures proximal to the lunula.¹ This classification has relevance to management. While type 1 could heal by secondary intention, types 3 and 4 usually require flap reconstruction.¹

There are many options for flap cover of fingertip wounds which range from local to distant flaps and are determined by many factors. The race, sex,

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hand dominance, age, mechanism of injury, and anatomy of the defect among others determine the options of flap cover that are utilized.⁶ In multiple fingertip injuries, several options have been used which include the use of reverse cross-finger flap,⁷ and use of abdominal flaps.⁸ The use of Atasoy volar V-Y advancement flap is mostly for solitary fingertip defects⁹. We successfully managed a case of multiple fingertip injuries secondary to cassava milling machine trauma in an adolescent male minor whose parents could not give consent for abdominal flaps using Atasoy volar V-Y advancement flaps.

Case Presentation

We present a 15-year-old adolescent boy who sustained multiple fingertip injuries while working on a milling machine. He is a right-handed student of a secondary school assisting his father to grind corn with a commercial milling machine when his left hand inadvertently slipped into the business end of the machine resulting in injuries to the thumb, middle, ring, and little fingers sparing only the index finger (Figure 1). There was no injury to the right hand. He presented with pains and anxiety with bleeding digits to the accident and emergency of Alex Ekwueme federal university teaching hospital, Abakaliki in southeast Nigeria within 30mins of injury. He had no significant medical and drug history.

Examination showed a clinically stable patient in psychological distress but not pale or febrile. The hand findings showed extensor zone 1c injury to the thumb, Allen type 4 fingertip injuries to the middle and ring fingers, and Allen type 3 fingertip injury to the little finger (Figure 1).

Basic investigations were done and were all within the normal range. Hematocrit was 30% while electrolytes, blood urea, and creatinine were normal. An X-ray of the hand showed an undisplaced fracture of the distal phalanx of the thumb and amputation of the distal phalanges of the middle, ring, and little finger.

The patient was counseled for abdominal flap for resurfacing of the digits but refused consent in accord with his family. They wanted a direct closure instead before the use of the Atasoy flap was considered and discussed with the patient and

family. Consent was obtained and the procedure was performed under general anesthesia with digital glove tourniquets applied to one finger at a time. Atasoy flaps were designed using the nearest interphalangeal crease as the landmark for the apex of the V flap. Adequate coverage was achieved. The flap was sutured with vicryl 4/0. The thumb fracture was stabilized with K-wire and the wound closed in two layers.

Post-operatively the hand was maintained in elevation with Dunlop traction. Parenteral presumptive antibiotics, ceftriazone, and metronidazole, were given as the wound was contaminated. Adequate analgesia was maintained and other useful ancillary drugs like vitamins and hematinics were all continued. Flaps were inspected on the 4th postoperative day together with the sutured laceration on the thumb. All the flaps had 100% patient survival up to discharge on postoperative day 9. The patient did not keep the outpatient appointment but was traced to the contact address. He had a satisfactory hand function. Nail growth was satisfactory in the little finger, acceptable in the middle finger, but significantly deformed in the ring finger (Figure 2). The patient however was contented with the outcome and unwilling to undergo a further surgical procedure for aesthetic refinement.



Figure 1: Fingertip injuries to middle, ring and little fingers



Figure 2: 14-months post reconstruction: volar view



Figure 3: 14 months post-reconstruction:dorsal view

Discussion

Fingertip reconstruction is done with the aim of providing a painless functional digit with a protective sensation.¹⁰ A supple and stable cover is needed to achieve this and maintain an aesthetically

acceptable length. There is however paucity of local soft-tissue options to achieve this.¹⁰ It is even more challenging when there are multiple fingertip injuries.

In the management of our patient who is a minor the parents were unwilling to give consent for an abdominal flap but accepted the use of volar V-Y advancement flaps for the reconstruction. This attitude to the distant pedicled flaps is not uncommon in our centre due mainly to fear of having a secondary wound. It was necessary to consider a method of cover that would be acceptable to the patient and at the same time achieve a good result. We therefore resorted to using the Atasoy V-Y volar advancement flap. This is not a common method of reconstruction of multiple fingertip injuries in the centre. Our literature search also did not yield any results on using the volar V-Y advancement flap to cover multiple fingertip injuries.

The Atasoy flap was first described in 1935 by Tranquilli-Laeli and later popularized by Atasoy and colleagues.¹¹ It has the obvious advantage of covering like with like, with an excellent match of colour, texture, sensation, and padding. It is mostly employed in the coverage of exposed bones in transverse and oblique amputations of the fingertips.¹¹ It is relatively technically easy to raise flaps with good survival when the principles are adhered to. It does not lead to loss of length but does not result in significant length gain associated with better padded abdominal and chest flaps.

The use of abdominal flap from cursory observation is scary to the patients who prefer to ignorantly go against medical advice than entertain further wounds on the trunk. They consequently allow the wounds to heal badly by secondary intention. This necessitated resorting to this alternative early enough which proved worth the while. The patient had satisfactory hand function having no obvious disability after flap healing. The outcome supports resorting to this option in selected cases when consent for abdominal flap options is denied.

Conclusion

The use of the V-Y advancement volar flap option in the management of multiple fingertip injuries was

successful in a 15-year-old boy whose parents declined consent for abdominal flaps. This alternative is endearing in settings where patients would prefer to heal by secondary intention instead of regional flaps despite the consequences of healing by secondary intention.

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