

SEMI-OCCLUSIVE DRESSING FOR FINGERTIP INJURY: A CASE REPORT

Andre Young^{1*}, Teuku Arief Dian^{1,2}

*Correspondent author email: andreyoung@ukwms.ac.id

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ABSTRACT

Introduction: A fingertip injury is an injury to the most distal part of the fingers. Anatomically, the fingertip can be defined as the part located distal to the insertion of the flexor digitorum superficialis and extensor digitorum tendons on the distal phalanx, or the interphalangeal joint if referring to the thumb. **Case Report:** A male patient, approximately 40 years old, with an Allen grade III fingertip injury on the right ring finger due to a work accident, was brought to the Emergency Department. The patient was informed that he would undergo an occlusive dressing procedure with local anesthesia. Evaluation three months after injury showed optimal improvement in both the cosmetic appearance and function of the ring finger. **Conclusion:** Semi-occlusive dressing may be more feasible than operative treatment because of its simple technique while still be able to give satisfactory results for the patient. However, there are several conditions where operative treatment is more preferable than conservative treatment. The patient's preferences, existing comorbidities, and the degree of injury should always be assessed before choosing any treatment option.

Keywords: Fingertip injury, Fingertip amputation, Semi-Occlusive dressing

¹ Department of Surgery and Anesthesiology, Faculty of Medicine, Widya Mandala Catholic University Surabaya

² Department of Orthopedic and Traumatology, Primasatya Husada Citra Hospital Surabaya

INTRODUCTION

The fingertip is the farthest part of the finger, responsible for providing tactile and sensory input to the brain. In anatomical terms, it includes the area beyond the insertion points of the flexor digitorum superficialis and extensor tendons on the distal phalanx, or beyond the interphalangeal joint in the case of the thumb. The fingertip's neurovascular supply is provided by digital arteries and nerves, which branch into three parts near the distal interphalangeal joint. The volar pulp contains specialized sensory nerves such as Pacinian corpuscles, Meissner corpuscles, and Merkel cells, which enable the discrimination of touch and sensation. The dorsal side comprises the nail bed, nail fold, and nail plate. Based on their relationship to the nail, these structures include the eponychium, paronychia, and hyponychium. The eponychium is the soft tissue proximal to the nail, the paronychia is the lateral nail folds, and the hyponychium is a keratinous plug beneath the distal nail edge where the nail bed meets the skin. The nail bed is split into the sterile matrix, where the nail adheres, and the germinal matrix, located proximal to the sterile matrix, which is responsible for 90% of nail growth. The lunula, a white area at

the nail's base, marks the boundary between the sterile and germinal matrices.^{1,2}

Fingertip injuries can be categorized by the injury mechanism or by the injury level according to the Allen classification system. Injury mechanisms include crush injuries, lacerations, amputations, and other injuries. The Allen classification outlines four types of fingertip injuries. Type 1 only involves only the pulp, type 2 involves both the pulp and nail bed, type 3 involves partial loss of the distal phalanx, and type 4 involves injury proximal to the lunula.²

The goal of this study is to be a learning experience for future conservative procedures for Fingertip Injuries cases in Primasatya Husada Citra Hospital.

CASE REPORT

A male patient, approximately 40 years old, with an Allen grade III fingertip injury on the right ring finger due to a work accident, was brought to the Emergency Department. Physical examination shows that the wound was mangled and contaminated with debris, there was partial loss of the distal phalanx with intact flexor and extensor tendon muscle. Perfusions to the nail were visibly preserved and soft tissue injuries are localized around the distal part of the nail. The pulp and the nail

bed also partially were partially damaged with irregular borders. The patient was informed that he would undergo an occlusive dressing procedure with local anesthesia.



Figure 1. Fingertip Injuries of the 4th right finger of a 40 years' old male.

The wound was cleaned using sterile water and antiseptic solution then carefully debrided from necrotic soft tissue to preserve as many viable soft tissues as possible. A prophylactic Human Tetanus Immunoglobulin / HTIG and broad-spectrum antibiotic was administered. After that, the wound was gently dried to allow good attachment of the dressing. A Tegaderm dressing is applied and positioned up to the proximal part of the affected finger then a sterile gauze is slightly fastened at the end of the dressing on the intact skin. Lastly, a stiff tube was being used as a cage to protect the finger from being compressed.

An oral empirical antibiotic regimen of Cefixime 500 mg twice a day and Metronidazole 500 mg three times a day was prescribed for one week. The patient attended weekly follow-up appointments at the outpatient clinic for dressing changes and wound assessments. The first dressing change was done on the 3rd day, followed by changes every seventh day until day 30, when the wound ceased to produce discharge. Throughout the follow-up, no cleaning was performed, leaving the typically foul-smelling liquid film and any clots on the wound. There were no notable signs of pus or infection. Two weeks later, a new nail plate began to develop, and granulation tissue formed over the fingertip. After four weeks, the granulation tissue had grown, and the fingertip started to regain its original form. By eight weeks, epithelialization was nearly complete, although a small amount of granulation tissue still remained at the tip.



Figure 2. Three months after treatment, satisfactory recovery without cosmetic or functional complications.

Three months post-injury, the nail complex, including the nail bed, paronychium, eponychium, nail fold, and hyponychium, had remodeled without deformities or signs of infection. The skin at the fingertip and the pulp had regenerated completely with scarless epithelialization, resulting in satisfactory function and cosmetic appearance. Sensation in the fingertip was satisfactory, with a similar two-point discrimination compared to corresponding healthy finger. There was no complication such as tenderness, cold intolerance, or neuroma, the range of motion at the distal interphalangeal joint and the fingertip's ability to oppose the palm were satisfactory.

DISCUSSION

Treatment for Fingertip Injuries can be divided into operative and non-operative treatment. Operative treatment includes primary closure, full thickness skin grafting from hypothenar, and flap reconstruction while non-operative treatment is achieved from healing by secondary intention.³ A non-operative treatment is employed to promote secondary healing and managed by using simple dressings. Patients with non-operative treatment may recover quickly and avoid any surgical-related complications. Common indications of healing by secondary intention are wounds without exposed bare bone or tendon, and wound size of less than 1 cm². However, exposed bone or tendon can be excised to facilitate healing. The wound vascularity is also more important than the size of the wound.⁴ The favorite method of healing by secondary intention including the application of dressing to promote granulation on the wound site.

Each method has its advantages and disadvantages. In the case of operative treatment, clinical studies report a risk of necrotizing soft tissue flap which leads to secondary operation for revision.^{5,6} Moreover, surgical procedure using flap method often leads to a reduced soft tissue cushion with a narrowed & flattened fingertip.⁷ Regarding the recovery time, conservative treatment may provide faster healing time.^{5,8} Although, it is also

depending on the severity of the injury. Conservative treatment patients also show lower VAS / visual analogue scale, better subjective aesthetic, less cold sensitivity, less disturbance during daily activities compared to surgical treatment,⁵ and good functional results regarding the soft-tissue thickness.⁹ Other studies assessing patient satisfaction and incidence of complications during 2 years follow-up also show that conservative treatment is a feasible procedure and can provide good results.¹⁰ Randomized control trials compared non-operative treatment with operative treatment shows that semi-occlusive dressing enabled satisfactory healing and sensitivity recovery without increasing the risk of infection although it is not recommended for zone III amputation because of the risk of hook-nail deformity.¹¹ Other disadvantages of conservative treatment are the frequency of consultation at the outpatient setting for at least once a week for a period of 3-4 weeks after injury and the odor and liquid accumulation under the dressing which may be intolerable by some patients.^{5,12}

CONCLUSION

Semi-occlusive dressing may be more feasible than operative treatment because of its simple technique while still being able to give satisfactory results for the patient. However, there are several

conditions where operative treatment is more preferable than conservative treatment. The patient's preferences, existing comorbidities, and the degree of injury should always be assessed before choosing any treatment option.

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