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# Immediate emergency free anterolateral thigh flap after car-tyre friction injury: A case report with eight years follow-up

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ABSTRACT

The car-tyre friction injury has differences from other injuries. The components of injury which are burn, crushing, shearing, and degloving occur. Many treatment options can be performed for coverage of wound which are Vacuum Assisted Closure system (V.A.C), skin grafting, free flaps, local flaps and cross leg flap.



Free flaps offer many advantages for limb coverage, including a one-step procedure, decreased incidence of infection, promotion of bone consolidation, shorter hospitalization, and cost reduction. Immediate treatment is considered a reasonable option in terms of low bacterial colonization, shortened hospitalization period and cost effectiveness. We report car-tyre friction injury affecting the foot of 2 years old child treated with immediate emergency free anterolateral thigh flap (ALT) with eight years follow-up.

## 1. Introduction

Car-tyre friction injuries of the foot are common in countries where children are left unattended to play in the street [1]. The injuried extremity in car-tyre friction injury is presented with combination of friction burn, crushing, shearing, and degloving. Car-tyre friction injury differs from the other type of foot injuries, this type of injury is detailed and classified by Al-Qattan [2]. These injuries have been classified into five grades according to the severity of the injury and magnitude of tissue damage. Higher grade of injuries need flap reconstruction and initial reconstruction directly associated with good outcome [2,3]. Naturally, the reconstructed foot grows with the child and the literature is very limited about long term follow-up in car-tyre friction injuries. We report on grade IV car-tyre friction injury affecting the foot of 2 years old child treated with immediate emergency free anterolateral thigh flap (ALT) with eight years follow-up. Outcome of the patient evaluated on the basis of function, gait, shoe-wear and the problems regarding growing of foot and also flap in long term.

## 2. Case report

In June 2006, a 2-years-old male patient was presented grade IV car-tyre friction injury (dorsal skin avulsion defect with tendon + arterial injury and bone exposure) of his left ankle and dorsal foot. He had no additional injury and co-mobirdity at the time of injury. After completion of emergency assessment and support, he was taken directly to surgical room. Initial evaluation of the injured foot was performed under general anestesia. The injury had severe crush and burn component and the wound was very contaminated with $7 \times 5$ cm defect just anterior of ankle joint. The defect was started from distal anteromedial metaphysis of tibia and finalised at anteromedial of the mid-foot. The area of skin defect was about 30 $cm^2$. Distal tibial periost, talonaviculer joint and anterior of talus was exposed. Anterior tibial artery was injuried at the proximal edge of the wound. Tibialis anterior and extensor hallucis longus tendons had defective injury where extensor digitorum longus tendons were intact. (Fig. 1). There was no fracture at any bone.

A single-stage reconstruction was planned: thorough surgical debridement, tendon repair and transfer, soft tissue coverage using immediate emergency free ALT flap. After wide debridement and saline washing, resulting defect was about 40 $cm^2$. Short segment from the distal stump of extensor hallucis longus tendon was taken to repair anterior tibial tendon as a tendon graft, distal stump was transferred using end-to-side fashion to extensor digitorum longus tendons. Defect on the tibialis anterior tendon was reconstructed anatomically with interpositional tendon graft which was obtained from extensor hallucis longus, using "0" no polypropylene (Atramat® Internacional Farmacéutica, Inc.) (Fig. 2). Anterior tibial artery and accompanying veins were prepared as recipient vessels. $9 \times 6$ cm ALT flap was elevated based on two perforators including fascia full breadth with the flap dimesion as a tendon gliding surface from ipsilateral thigh (Fig. 3). The anastomoses were performed

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**Fig. 1.** First image after injury. 7 × 5 cm defect just anterior of ankle joint .

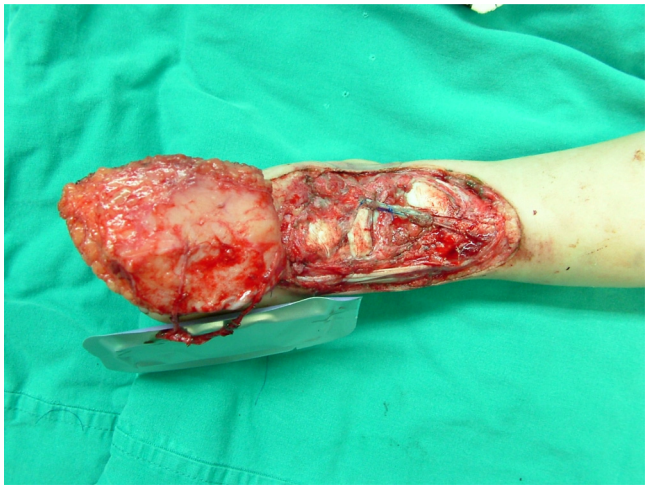

**Fig. 2.** The picture of the reconstructed tibialis anterior tendon with interpositional tendon graft which was obtained from extensor hallucis longus.

**Fig. 4.** The picture of flap after anastomoses.

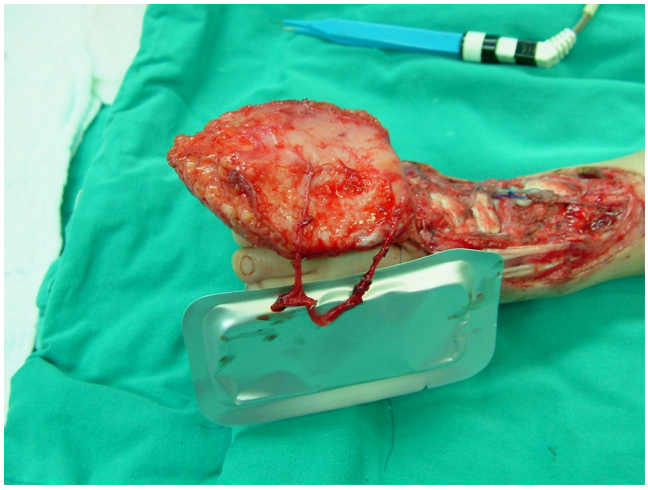

**Fig. 3.** The picture of elevated 9 × 6 cm ALT flap based on two perforators including fascia.

at proximal wound using end to end fashion with 10/0 polyamide monofilament nonabsorbable sutur(Dafilon® Aesculap,Inc.) (Fig. 4). The donor side was closed primarily.

A short leg cast was used for immobilization. The total surgery time was 6 h, flap ischemia time was 45 min. Post-operative period was uneventful, hospitalization period was only 7 days, antiaggeragant and/or anticoagulant treatment was not necessary in the early post-op period. After four weeks of immobilization, patient was set free including weight bearing, no rehabilitation program was planned due to his age.

Only after 6 weeks after the reconstruction, his gait and running were almost normal, and he was using same and normal shoe like opposite side. No medical compression garment was used all along follow-up period but as he was growing, the ALT flap gained weight and became bulky preventing using same size shoe like opposite side. Liposuction was performed at two session for debulking procedure 8 years after the first reconstruction. (Fig. 5). After 8 years post-operatively, he has no functional defecit, his gait and running patern were totally normal, he wears same size shoe compared to the other side. There is no ankle dorsiflexion deficit and extension lack of big toe was disappeared after three years post-operatively, now there is no extension lack of big toe (Fig. 6).

## 3. Discussion

The car-tyre friction injury has differences from other injuries. In this injury; while the car is passing over on child's foot, the driver tries to stop the car and as a result of this event, the components of injury which are burn, crushing, shearing, and degloving occur. This injury has been classified by Al-Qattan [2]. Grade I superficial 2nd degree friction burn without skin loss, Grade II deep 2nd degree friction burn with a small area of skin loss, Grade III 3rd degree friction burn with or without a small area of skin loss, Grade IV skin avulsion with tendon and/or bone exposure, Grade V severe soft tissue injury with significant bone loss.