



# OrthoInnovations



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## Saving the arm of a 6-year-old girl



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Extremity fractures with damaged major blood vessels represent an acute threat to life and limb. Applying a tourniquet above the level of injury can provide emergent bleeding control. The patient must then be transferred as early as possible to a major trauma center with microvascular capabilities and adequate resources for acute limb salvage procedures.

This requires a qualified interdisciplinary team of vascular and microvascular surgeons, pediatric surgeons, and orthopaedic traumatologists, who must be available 24/7. It is a troubling fact that microsurgical services are scarce throughout the United States. For example, Denver Health offers the only 24/7/365 microvascular replantation service for the greater Rocky Mountain Region for adult and pediatric patients. In children, the smaller caliber vessel size adds an additional technical challenge to limb salvage surgery. Successful outcomes rely on the seamless interaction between preoperative pediatric emergency doctors, a surgical specialist team and postoperative pediatric intensive care.

### Case Presentation

An emergency physician in Southern Colorado contacted us to take over the emergent care of a 6-year-old girl who had fallen off her horse and whose elbow had been stepped upon by her horse. There was a deep laceration and gushing bleeding from an artery at the elbow level. Fortunately for the patient, her horse trainer immediately placed a tourniquet above the elbow. This measure stopped the bleeding and likely saved her life. Upon presentation to the emergency room at the outside hospital, it became quickly apparent that this was a serious injury. There was an open supracondylar fracture to the elbow and a transected brachial artery with pulsatile bleeding (*Figure 1*). The patient was in need of emergent vascular repair and bony fixation to save the arm. With a tourniquet in place it was obvious that “the clock was ticking” to restore blood flow to the arm as soon as possible.

After numerous unsuccessful attempts of reaching out to multiple hospitals in Colorado for specialized microvascular care, the local ED physician contacted Denver Health Medical Center. Upon arrival in the pediatric emergency department, the patient was expedited to the operating room for vascular repair and salvage of her severely injured arm.



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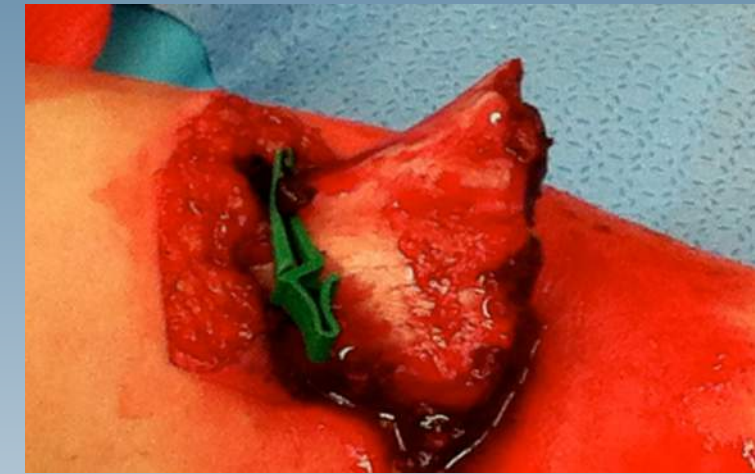
In the operating room an interdisciplinary surgical team, including a pediatric surgeon, an orthopedic microvascular surgeon, and an orthopedic traumatologist, worked together to manage this challenging injury (Figure 2). The open elbow fracture was surgically cleaned, followed by fracture reduction and fixation with wires (Figure 3). Hereafter, the brachial artery was reconstructed with an interpositional vein graft

under the microscope, and a torn bicep tendon was repaired. The patient was subsequently monitored in the pediatric intensive care unit, and discharged home after an uneventful course in the hospital. The fracture healed uneventfully within 4 weeks, and the pins were removed in outpatient clinic (Figure 4). We were excited to see her recover full function of her arm, allowing her to resume all activities in her active young life without restrictions.

Figure 1



Figure 2



Open supracondylar elbow fracture with protruding humeral shaft (Figure 1) and clamped brachial artery (Figure 2)



Dr. Stahel,  
Thank you for  
putting Ally's arm back  
together.  
The care we  
received at Denver Health was  
Amazing. We will be forever grateful.  
Thanks.  
The Post

Figure 3a

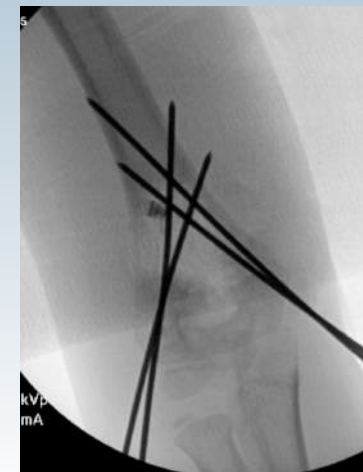
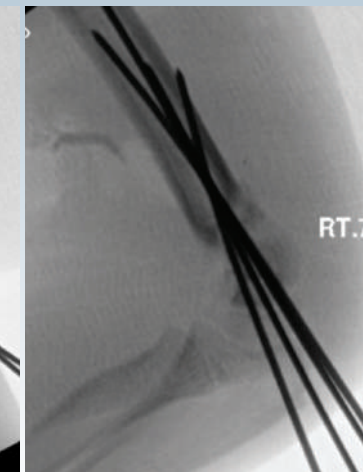


Figure 3b



Final X-ray after completed fixation; AP view (3a); Lateral (3b)

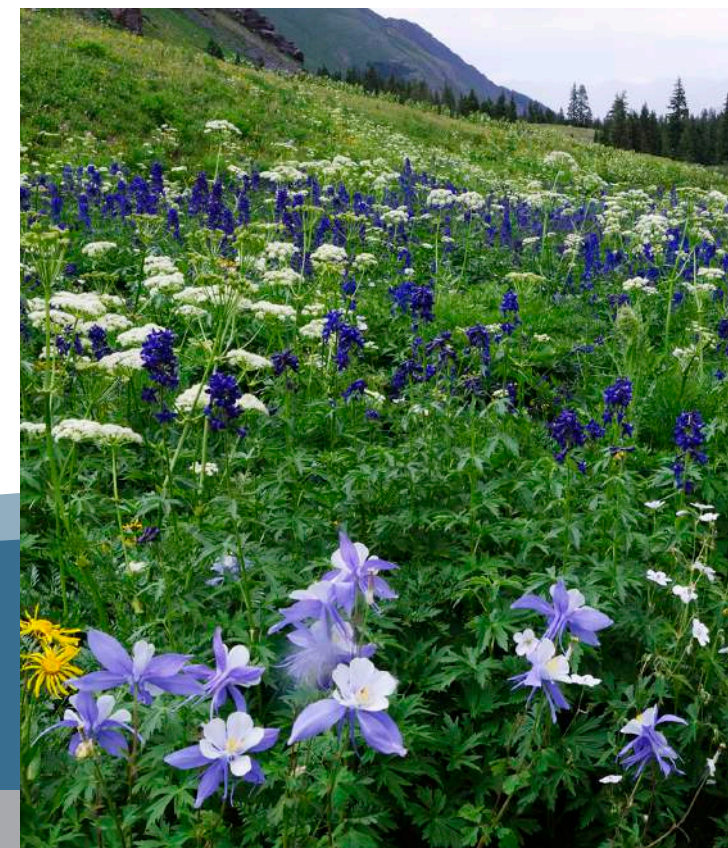
Figure 4a



Figure 4b



Healed elbow fracture; AP view (4a); Lateral (4b)



Save the Date!

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