# Targeted Muscle Reinnervation after Transhumeral Amputation during Initial Hospitalization

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## Background
- Targeted Muscle Reinnervation
- Nerve transfers to viable muscles in amputation stumps
- Creates numerous & discrete areas to generate EMG signals
- Myoelectric prosthesis reads multiple signals simultaneously
  - More intuitive prosthetic control
  - Recreation of complex UE movements
- NN transfers prevent neuroma pain

## Case Report
- 35 y/o male involved in MVC rollover
- Presented with near UE amputation
- On presentation:
  - Open midshaft humerus, radius, ulna fractures
  - Nerve avulsions proximal to midshaft of humerus
  - Brachial AA laceration proximally & distally
  - Irreversible ischemic muscle damage
  - Distal avulsion of biceps, triceps, brachialis

## Procedure
- **Initial operation:** transhumeral amputation + xenografting with tagging of structures
- **Secondary operation (POD #5): TMR**
  - **Findings:**
    - Triceps: medial head – no contraction
    - Triceps: long head - contraction but no NN identified
    - Triceps: lateral head – contraction + NN identified
    - Biceps: medial/lateral heads intact
    - Radial N: laceration at midshaft of humerus
    - MC N: branches to biceps intact
    - Median N: level of injury just distal to axilla
  - **Nerve transfers:**
    - Median NN to medial head of biceps using Neurogen tube
    - Radial NN to lateral head of triceps
    - MC Nerve to cutaneous N of distal skin paddle
    - Adipofascial flap placed between medial/lateral heads of biceps
    - Split-thickness skin graft over defect

## Outcomes
- 1 year:
  - No clinical neuroma pain
  - No pain as assessed using the Patient Reported Outcomes Measurement Information System (PROMIS)
  - Successful fitting of patient with myoelectric prosthesis under cortical control

## Techniques
- TMR in acute setting
  - Easier identification of structures
  - Ease of surgical dissection
- Neurogen tube
  - Allowed for transfer of median NN despite proximal level injury and gapping
  - Viable alternative if direct nerve coaptation cannot be achieved