The Role of External Fixation When Treating Terrible Triad Injuries
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INTRODUCTION
- Terrible triad injuries of the elbow consist of a posterior elbow dislocation with concomitant fractures of the coronoid process of the ulna and radial head.
- ORIF treatment principles:
  1. Repair lateral ligamentous complex and posterolateral capsule
  2. Restore radial head anatomy (prosthesis vs. internal fixation)
  3. Reduction and fixation of the coronoid process
  4. Repair medial ligamentous complex.
- In the setting of continuing instability after ORIF, an external fixator (Ex-Fix) is typically utilized to ensure adequate reduction of the elbow joint.
- Alternatively, a static external fixator can be applied to act as a splint in all cases. This external fixator can be unlocked to allow supervised early range of motion and subsequently relocked following the therapy session.
- Purpose: To evaluate the usefulness or lack thereof of placing a static external fixator to be used as a removable brace when treating patients with terrible triad injuries.

METHODS
- Retrospective Study: Patients treated for a terrible triad injury at a Level 1 trauma center, from 2000-2015.
- Patient demographic and outcome data were recorded including complication rates and post-operative range of motion (ROM).
- Statistical Analysis: Two-tailed Fischer’s exact and t-tests, assuming unequal variances, were performed.
  - Data was analyzed, matching for age, body mass index (BMI), and presence of concurrent injuries.

RESULTS
- 93 terrible triad injuries treated with:
  - Open Reduction Internal Fixation (ORIF): 80 injuries
  - ORIF + Static External Fixator (Ex-Fix): 13 injuries
- Average age:
  - ORIF: 45.7 years
  - ORIF + Static Ex-Fix: 51 years
- Concurrent injuries:
  - ORIF: 33.8% (27/80)
  - ORIF + Static Ex-Fix: 61.5% (8/13)
- Reoperation:
  - ORIF: 20% (16/80)
  - ORIF + Static Ex-Fix: 7.69% (1/13)
  - Indications for reoperation: capsulectomy, heterotopic ossification removal, hardware removal, and recurrent elbow subluxation.
- Postoperative ROM:
  - ORIF + Static Ex-Fix
    - Early in rehabilitation: Greater forearm supination/pronation and elbow flexion.
    - Later in rehabilitation: Greater average arc of motion.
  - Obese patients (BMI > 30) had significantly better forearm supination and pronation when treated with ORIF + Static Ex-Fix.

CONCLUSIONS
- The addition of a static external fixator when performing ORIF of terrible triad injuries serves to function as a rigid brace, which can be unlocked for supervised physical therapy leading to better postoperative range of motion and lower reoperation rates, especially in obese patients.