

O'Driscoll's Stages of Instability

The Horii Circle & The Predictable Mechanics of Elbow Failure

Core Biomechanical Principle: The elbow functions as a structural ring rather than a simple hinge. Tissue failure during a FOOSH injury (axial load + valgus + supination) is not random. The soft tissue envelope peels in a highly predictable sequence known as the **Horii Circle**, initiating laterally and propagating medially.

The Progression of Failure

STAGE 1: THE LATERAL BLOWOUT

- The **Lateral Ulnar Collateral Ligament (LUCL)** is the first primary structure to fail.
- During this initial blowout, the Medial Collateral Ligament (MCL) remains completely intact.
- The ulna and radius supinate and pivot away from the trochlea.
- This specific anatomical failure results in **Posterolateral Rotatory Instability (PLRI)**.
- Forms the clinical and biomechanical basis for eliciting a positive **lateral pivot-shift test**.

STAGE 2: THE PERCHED ELBOW

- Tissue disruption continues to propagate anteriorly and posteriorly along the joint capsule.
- Results in an incomplete dislocation where the coronoid process rests (perches) directly on the trochlea.
- The lateral side is completely blown out, but the medial structures still provide some tethering effect.
- The joint is highly unstable and will easily progress to complete dislocation if the forces continue.

STAGE 3: THE MEDIAL BLOWOUT

- Failure completes the ring, reaching and disrupting the medial structures.
- **Stage 3A:** The posterior band of the MCL fails, leaving the anterior band intact. The elbow can hinge open on the medial side.
- **Stage 3B:** Complete MCL failure (the anterior band is disrupted). The elbow joint is now fully dislocated.
- **Stage 3C:** The entire distal humerus is completely stripped of its soft tissues. The joint remains grossly unstable, even when reduced and placed in a cast at 90 degrees of flexion.