POSITIONING & PUSHING
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POSITIONING GOALS

- **Maximize contact angle**
  Position shoulder to achieve coverage from 2:00 – 7:00

- **Ensure sitting balance**
  Interface the body with the cage so that the arms are able to work effectively from a solid anchor point. Generally, to increase biomechanical efficiency sit as high as possible while ensuring balance and stability.

ADJUSTMENTS

- **Axle Position**
  Move athlete forward or backward relative to the axle.

- **Seat height**
  Raise butt up or down relative to axle and knee height.

- **Knee Height**
  Raise knees up and down relative to axle and butt height
GENERAL RULES OF THUMB

- **Higher function**
  Tend to sit with a higher seat height, lower knee height and minimal to no dump

- **Shorter arms and torso**
  Tend to sit with a shorter axle position and lower seat height
K-E Measurement

To advise handring diameter selection

Measure from knuckle of index finger to elbow to determine handring diameter.
POSITIONING & PUSHING
Initial Contact and Hand Load

- **Hand Position**
  Hand is flexed up to the sky. Cue athlete to drive up into the handring

- **Hand to Handring Interface**
  Hand contacts handring between thumb and first finger.

- **Handring Point of Contact**
  Contact is made on the outer and top of handring. Point of contact on handring 1:00 – 2:00 (ish), per velocity and seating position.

- **Hand Load**
  Hand load establishes solid driving position and determines effectiveness of stroke.
- **Flexion-Extension profile**
  The profile of effective force application presents as elbow flexion and wrist extension.

- **Shoulders-Spine profile**
  With allowances for disability related variability, a firm shoulder-to-shoulder balance intersecting with the spine provides a foundational anchor.
- **Pinky squeeze**

  As the hand moves across the contact angle of the handring, the pinky rotates inward toward the wheel, indicating optimal force application.
- **Dynamic hand movement**
  The hand moves explosively with the thumb rotating away from the handring, the wrist flexing the palm upwards, and the thumb driving downwards toward the floor.

- **Late hours force application**
  The goal is to throw the handring and transfer energy through the fingertips. Cue the athlete to drive through the back of the handring.
- **Hand separation**
  Create optimal distance between the hand and the handring at peak lift & stretch in order to increase distance for acceleration back to contact.

- **Engage a stretch reflex**
  Open the chest while maintaining a hand and elbow path that follows the line of attack created by the arm’s momentum (do not squeeze the elbows together).
HAND TO HANDRING

Make an S (or reverse S)

1. Initial contact made on the top of the handring with the thumb and the outer section of the handring with the first two fingers.

2. Pinky finger rotates in toward the wheel as the hand drives from 1:00 to 3:00. The contact point on the hand moves to base of thumb and cuticles of the fingers.

3. Wrist is in extension and the base of the hand drives into the handring by 4:00.

4. Pinky finger rotates out and thumb drives down toward the floor as the hand moves from 6:00 to 7:00.

5. Wrist is in flexion and palm is facing the sky as the hand releases the handring.

As the hand moves through each of the three propulsive phases - Contact, Drive, Release - it traces a backward "S" as it goes from pronation to supination and back to pronation.
PROXIMAL TO DISTAL MOVEMENT

Follow the kinetic chain

1. [Image of upper body movement]
2. [Image of upper body movement with blocking and transfer of momentum indicated]
3. [Image of lower body movement]
4. [Image of lower body movement with blocking and transfer of momentum indicated]
VIDEO ANALYSIS

- **Blocking & Transfer of Momentum**
  - Aaron Gordian
  - Heinz Frei
  - Ray Martin

- **Case Study**
  - Christian Clemmons, 2016 - 2020
    - 2016: Harness gloves, non-rigid knee upholstery, 14.5" handrings
    - 2020: 3D Finger thumb gloves, solid knee and feet, 15.5" handrings
  - Interventions: Seat foundation, oversize handring training, glove style
  - Performance Curve: 53-55" rolling 400s to 46" rolling 400s