Additional Wheelchair Measurements

Part 2 of the Wheelchair Fitting and Measurements Guide provides information on five supplemental wheelchair properties to take into consideration when fitting an individual for a manual wheelchair. These recommendations will vary based on individual comfort, needs, and activities of daily living.

A. Backrest angle (A) - The angle between the seat and back of the wheelchair.\(^1\)

**Considerations:**
- The preferred angle will vary depending on an individual’s comfort, posture, and needs such as the range of motion available at the hip.\(^1\)
- A more vertical backrest angle will provide lumbar and midtrunk support while also allowing the shoulders to be in a better position to push the wheels.\(^1\)
- A reclined backrest will increase pressure on the sacrum while a more upright backrest will increase pressure on the buttocks.\(^2\)
- A reclined backrest may be needed for individuals that need more postural correction.

B. Camber (B) - This is the angle of the wheels in relation to being straight up and down.

**Considerations:**
- Camber will give the wheelchair more upright stability and improve turning maneuverability.\(^2\)
- Camber will also protect the hands as they propel the wheelchair through narrow doorways.\(^2\)
- Too large of a camber will be difficult to maneuver through tight spaces.\(^2,3\)
C. Center of gravity (C) - This is the position of the axle (center) of the rear wheels in relation to the seat of the wheelchair.

Considerations:
- Center of gravity affects the stability and manual propulsion of the wheelchair.\(^2\)
- If the axle is more posterior, it will increase the stability of the wheelchair; however, it may be more difficult for the user to reach the hand rims of the wheels to propel the chair.\(^2\)
- When the axle is positioned more anteriorly, it will decrease the stability of the wheelchair; however, it will be easier for the user to propel the wheels and to pop a wheelie.\(^2\)
- In general, the wheels should be placed in the most forward position that allows the user to easily propel the chair while not compromising the stability.\(^2\)

D. Footrest length (D) - The distance from the edge of the seat to the top rear of the footplate. The footrests should be 1-2 inches above the ground to allow for adequate clearance.\(^4\)

Considerations:
- If the footrest length is too short, it will not fully support the thighs and will increase pressure on the buttocks.\(^2,4\)
- If the footrest length is too long, the feet will not be fully supported and will thereby increase forward instability\(^2,4\) and footrests may hit the ground or get caught on rocks, sidewalk cracks, etc.

E. Hanger angle (E) - The angle where the footrest bars meet the seat of the wheelchair.

Considerations:
- A smaller hanger angle will require more knee flexion, but it will be significantly easier to turn especially in tight places.\(^1,5\)
- A larger hanger angle will require less knee flexion, but may create a forward instability with the feet being further in front of the wheelchair.\(^1\)
- A larger hanger angle will also require more space to turn the wheelchair.

References: