

Recline and Tilt: Making the Right Match

By Kimberly Pfaff

Many clients who use wheeled mobility devices find change of position helpful. For some the change is needed for function, while others need it for comfort or pressure relief. In some cases it is necessary for the caregiver. Whatever the reason, the rehab team's choice of position change—recline, tilt or a combination of the two—should be based on careful consideration of the client's goals, physical needs and environmental requirements. TeamRehab Report spoke with several seating system specialists to determine some guidelines to use when evaluating these systems.

Relief Through Recline

Recline refers to a change in the seat-to-back angle. Reclining frames are available in either manual systems, which must be operated by a caregiver, or power systems, which the user can operate.

Some power recliners move through the range at a preset rate of speed, while others can be regulated. Some chairs that move at the preset speed can be changed to “adjustable” with the use of an add-on part from another manufacturer. Some power reclining systems have a back that “floats” or “tracks,” allowing the rider to remain interfaced with the back as it moves through its range, with minimal shearing. These are called low shear or zero shear reclining backs.

Power recliners may be ordered with the movement of the back tied into the movement

of the legrests (as the back lowers the legrests elevate), with movement of the legrests powered separately from the back, and with the legrests requiring manual activation.

A reclining back coupled with the proper seating system can assist clients who require a change of position because of: poor postural stability (poor head and trunk control), spasms, muscle shortening, discomfort, fatigue, problems with pressure and circulation, and respiratory problems. Some clients require the back of the wheelchair to be reclined for transfers. Caregivers, using extreme caution, may use the recline feature to lie the wheelchair rider flat during catheterization, as well as during clothing and diaper changes.

A reclining back should be chosen and used with great caution. Wheelchair users who are lowered and raised through the range available often slide or are pushed into a poor

position, with the pelvis moving forward on the seat surface, and the bending occurring in the lower spine rather than at the hip joint. Clients with hypertonicity are especially prone to this problem. On the other hand, clients with hypotonicity may tend to slide forward and collapse down as the back angle is changed, resulting in a rounded trunk and a posterior pelvic tilt.

When To Tilt

A tilt-in-space frame may be an option if the client:

- . has poor upright sitting tolerance and needs frequent change of position in space;
- . has fixed kyphosis;
- . has poor postural control, especially of the head or trunk;
- . is hypertonic;
- . is hypotonic;
- . has difficulty tolerating aggressive positioning for improved postural alignment;
- . has neuromotor impairment and limited hip flexion;
- . sleeps in the chair for extended periods of time secondary to medical problems;
- . needs pressure relief.

Recline and Tilt Systems

Both of these problems require that caregiver continuously monitor the wheelchair user's posture and adjust his or her position as needed. For many clients these problems are significant enough to preclude the use of a reclining back.

Improper use of a reclining back can result in: increased skeletal deformities, respiratory problems, digestive and urological problems, increased discomfort, and increased shearing and pressure, resulting in skin problems. In extreme cases clients who are not repositioned may slide forward on the seat, and even off the front end.

Seating interventions used with a reclining back can be both helpful and destructive. For users who cannot maintain their hip position back in the chair, a posterior sloped seating

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surface may be helpful. In this case the most upright position of the back would be determined by the angle of flexion available for the client (perhaps 95 degrees of seat surface/back surface angle or greater), and lowered down from there. The recline system may require a limiter in those cases to prevent the caregiver from accidentally raising the back beyond the client's available range of hip flexion.

For clients who require seating that involves specific posterior contours with or without lateral hip and trunk support, a great deal of care must be taken. As the standard, or nonfloating, back is raised and lowered through its range, the seated person's interface to the seating system is changed. This means that support surfaces will be in one position in the upright angle and a different position as the back is lowered. In an extreme case, lateral trunk supports may wind up in the lower thoracic region. Therefore, whenever extensive positioning is needed it is imperative that a nonshear back be used, and even then the client's position must be continuously monitored. Custom contoured back inserts are not recommended.

Once the team has determined that a reclining back is appropriate for the client, they must choose a manual or powered system with semi or full recline. Semireclining backs usually move from 90 to 120 degrees, while fully reclining backs can be lowered to 170 or 180 degrees.

Manual backs require caregiver assistance, and are available in incremental and infinite

styles. Manufacturers offer different back heights and different styles of release.

Power reclining backs offer the wheelchair user the ability to change his or her position at will. This usually results in more frequent use of the back, which in turn can increase sitting tolerance and decrease the tendency toward pressure problems. Again it is important to discuss features with the manufacturer.

The Tilt Option

Tilt refers to the angle of the seat surface. In a tilt-in-space system all of the seating angles (seat-to-back, seat-to-calf, calf-to-foot) are preset to the client's needs. When position change is needed, the caregiver (in a manual system) or the client (in a power-driven system) can change the tilt of the entire system as one piece, usually with a trigger, lever or switch.

A tilt-in-space option transforms a wheelchair into a dynamic therapy tool, allowing the client multiple position options. The ability to tilt a seating system from forward five to seven degrees to backward 60 degrees affords clients with seating problems assistance with: postural control, tone management, pressure relief, comfort and increased sitting tolerance, feeding difficulties, controlled movements, tolerance of aggressive positioning for management of deforming forces, and maintaining positions where they can function despite skeletal deformity.

For example, a client with only 50 degrees of available hip flexion might be relegated to a reclined position. With a tilt frame the seat surface can be sloped forward 10 degrees and the back reclined only 30 degrees. Left in this position for long periods, the client might slide forward on the seat. However, using this position for activity periods and then tilting the person back to level the seat for rest periods, will afford the person periods of more vertical orientation than might otherwise be tolerated.

Clients with poor postural and head control are often relegated to posterior tilt, or strapped heavily to maintain their position. A tilt-in-space frame affords them short periods of upright positioning interspersed with periods in posterior tilt. Since upright periods are brief they can often practice activating muscle groups without excessive strapping. When they can no longer tolerate being upright, they can be tilted back for a rest period and then reoriented in an upright position for continued work.

Choosing a tilt frame requires careful cli-

ent assessment. Some clients respond poorly to being locked into one position. Caregivers and teachers who see the system as "dynamic" might mistakenly assume that positioning outside of the chair is no longer necessary. Some clients may be so comfortable in rear tilt that caregivers leave them that way for long periods of time, rarely reorienting them into a more "active" upright position.

Leaving a client in a tilted position may have negative implications for respiration, swallowing, visual orientation and arousal level. Many clients with traumatic brain injury fall asleep when left in a tilted position. Some clients experience negative tonal influence, increased reflex activity, decreased sense of security, and problems with their parasympathetic and autonomic nervous systems.

Most seating interventions work well with tilt-in-space frames, since the "ideal" position arrived at during the client's seating assessment is more easily maintained. Custom molded systems, which require consistent accurate interface with the client's body contours, work well in this type of frame. The tilt position makes repositioning of the client into an aggressive seating system much easier, as the person's body weight is actually helping with the positioning.

Tilt systems are available in manual and power activation. Manual activation, which requires caregiver intervention, is usually

Reasons To Recline

In general, a recliner is appropriate if a client:

- has limited range and cannot sit in a chair with a 90-degree seat-to-back angle and requires frequent angle changes;
- has fixed kyphosis;
- is hypotonic;
- requires reclined positioning for the short-term and will later be more upright;
- must rest in a horizontal position without being transferred out of the wheelchair;
- requires position change for fatigue or discomfort;
- must slowly be brought upright over minutes, hours or days;
- sleeps in the chair for extended periods of time secondary to medical problems;
- needs pressure relief.

accomplished with a squeeze trigger or a step-on release. Here, too, there are both incremental and infinite mechanisms, and the range of tilt varies among manufacturers. Power tilt affords the wheelchair **user more autonomy**.

For some clients the combination of tilt and recline makes the system even more dynamic. It provides the user with even more degrees of adjustability and change of position, but continues to have some of the problems noted above in the discussion of reclining backs. For pressure relief many clients find the best results with a slight recline plus tilt to a specific angle. For clients who spend time in forward tilt, the seat-to-back angle may need to be more open for that particular position, and more closed during more level or posterior tilt. For these clients tilt and recline might need to be combined.

A combined system is also helpful for clients using tilt who need intermittent catheterization.

Environmental Access

Reclining and tilting frames offer many benefits, but also present some problems because of their size and weight. Almost all of them can be wider or longer, taller or heavier than their standard frame counterparts. There are wide differences between manufacturers that must be carefully explored before frame choices are made.

Some professionals feel that recliners are generally longer than tilt frames and require more turning room. While this is often the case, some recliner manufacturers offer frames with changeable base length, where the wheel actually moves forward and backward depending on the position of the back.

Most tilt frames may be shorter than recliners, but some have extended bases that may be as long as or longer than reclining frames. Front-wheel-drive power tilting systems may have a base that measures the same length as a power tilt on a standard configuration frame, but the forward drive will allow the chair to turn in a smaller radius, making it suitable for tight spaces.

Power tilt chairs require additional room under the seat for the actuator, making the seat height higher. The rehab team must note the seat height for transfers, table access and van clearance. But even when the higher seat is standard, the manufacturer may offer customizations to bring the seat surface back down to a better level for the rider. ■

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