

Remembering What We Forgot We Knew About Tilt & Recline

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Motion Concepts

Objectives

- 1. Participants will be able to describe the mechanics of the recline cycle which results in shearing forces against the body.
- 2. Participants will be able to list at least three factors of the seating system or consumer's body which can alter the reduced shear aspect of a recline system.
- 3. Participants will be able to list at least three clinical applications for tilt in space and the three planes of movement that tilt systems can move through.

What came first?



Tilt or Recline?

- King Phillip II of Spain had a rolling chair with foot rests (1595).
- Manually reclining options have been available on some wheeled mobility devices for more than 100 years.



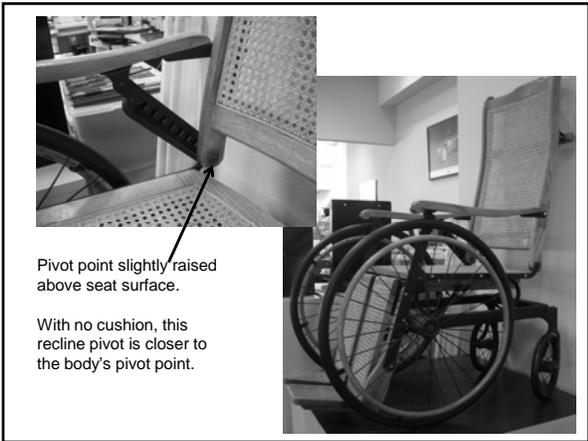
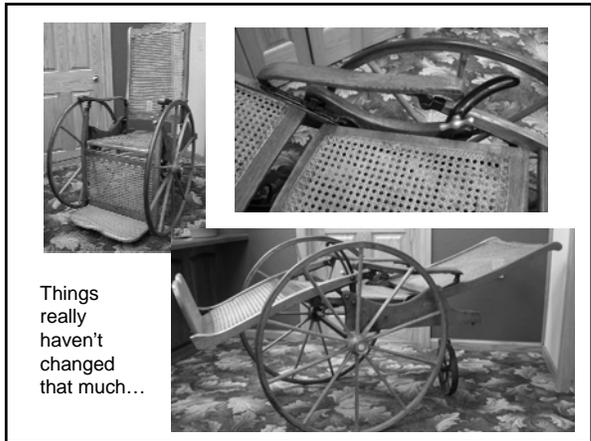
Why Recline?



Why Recline?

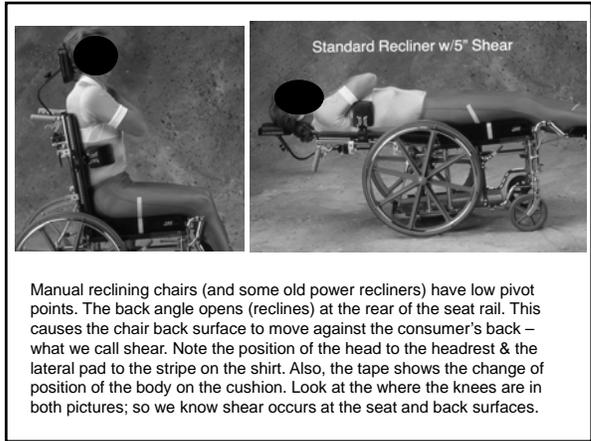
- | Pros | Cons |
|---|---------------------------------|
| •Change of body position (range of motion?) | •Shear |
| •Pressure relief | •Sliding out of chair |
| •Position for better respiration | •Hip and knee range limitations |
| •Transfers | •Spasticity |
| •Personal care | •Contoured seating |

- For decades, manual and power reclining chairs utilized a pivoting point from which the back canes moved to open (recline) and close (sit upright) which was level with the seat rail of the chair.



- Let's remember what we forgot we know about recline...
- Shear is the displacement of tissue with friction which can cause tearing of tissue and occlude blood flow.
 - Shear is Bad.
 - Shear can alter the position of the person.
-

- One of the definitions of **shear** in the Encarta English Dictionary for North America is to **“deprive somebody of something valuable”** and the skin damage and postural effects which could result from these systems certainly matched that definition.
-



What is Shear ?

- Blood vessels in affected areas are stretched and angulated causing occlusion.
- The resulting tissue damage is deeper and typified by a large area of undermining around the base of the decubitus ulcer.
- “When sufficient shear is present only half as much pressure is needed to cause occlusion”

Reichel 1958

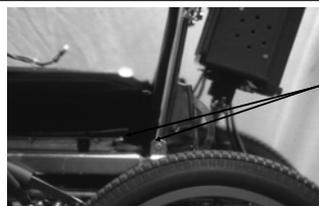


This old power recline shows a low pivot point at the seat rail.

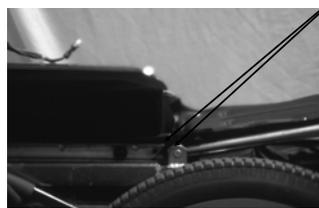
The cushion height raises the body up farther away from the pivot and increasing the amount of shear with recline.



Recline moves the consumer back and allows the tissue of the buttock and posterior pelvis to fall into this gap. Once the back moves up, the soft tissue is trapped, often leading to pressure sores.



Some companies tried to address this by using seats that slide back as the back reclined. You can see how much the seat moved as this system was reclined.



This still didn't address the height difference with the cushion.

Let's remember what we forgot we know about recline...

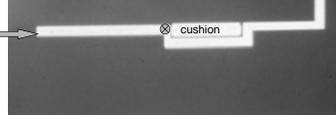
- One way to reduce the amount of shear that occurs with recline is to keep the mechanical pivot point of the reclining back as close to the body's pivot point as possible.

Imagine the difference of laying on these 2 surfaces...

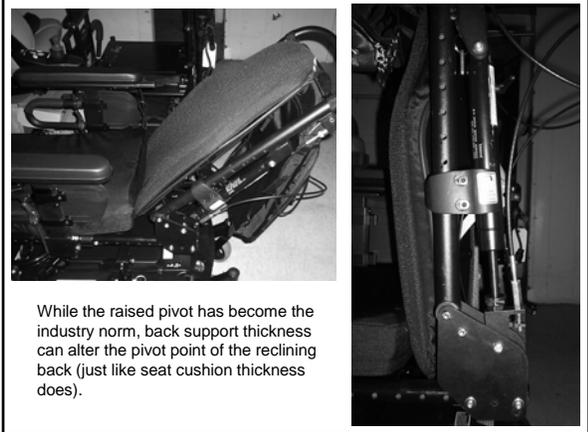
This is a low pivot recline with a cushion



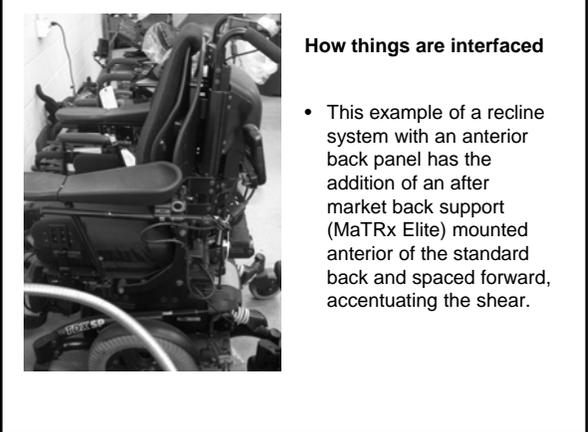
This is a recline with the pivot point raised up 3" (the average thickness of a pressure relief cushion).



Here we see the improved position of the headrest and lateral when the recline pivot point is higher. Today most manufacturers offer recline systems with raised pivot recline as a standard. It doesn't remove all of the shear, but it is MUCH better than the low pivot still found on most manual reclining chairs.

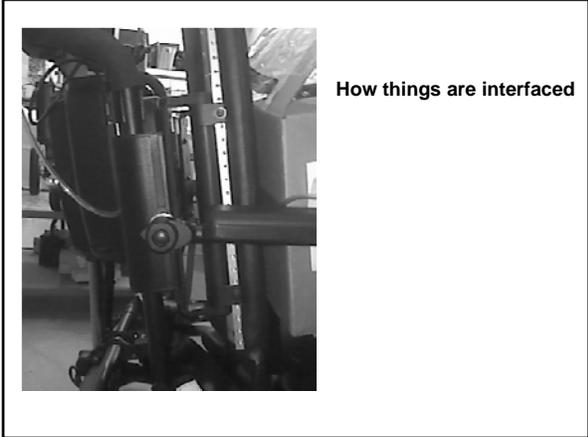


While the raised pivot has become the industry norm, back support thickness can alter the pivot point of the reclining back (just like seat cushion thickness does).

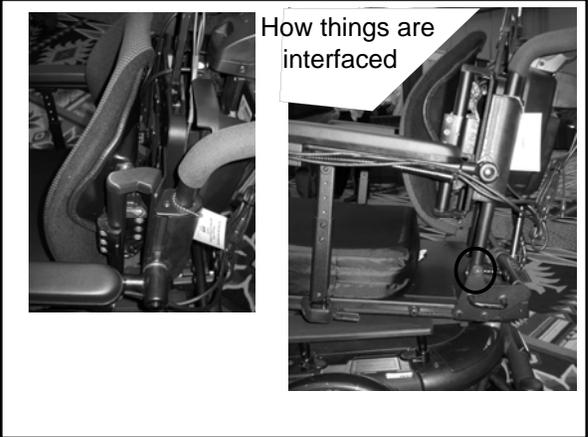


How things are interfaced

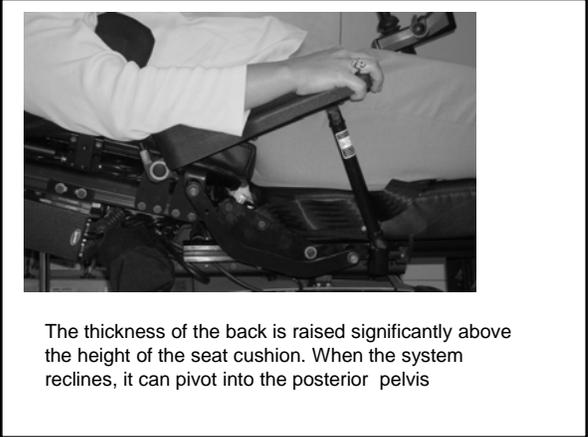
- This example of a recline system with an anterior back panel has the addition of an after market back support (MaTRx Elite) mounted anterior of the standard back and spaced forward, accentuating the shear.



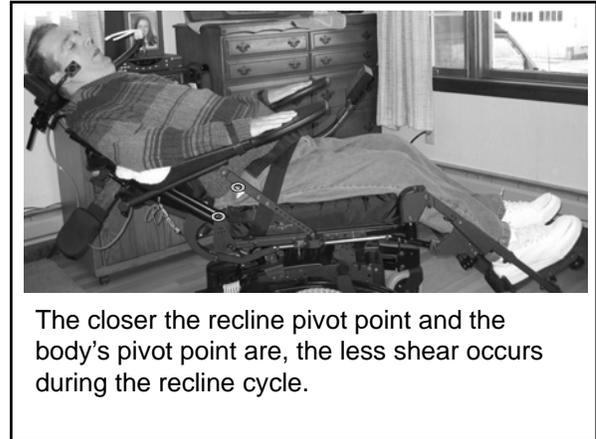
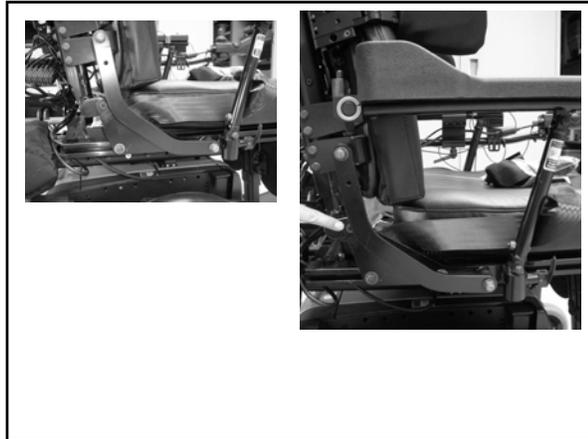
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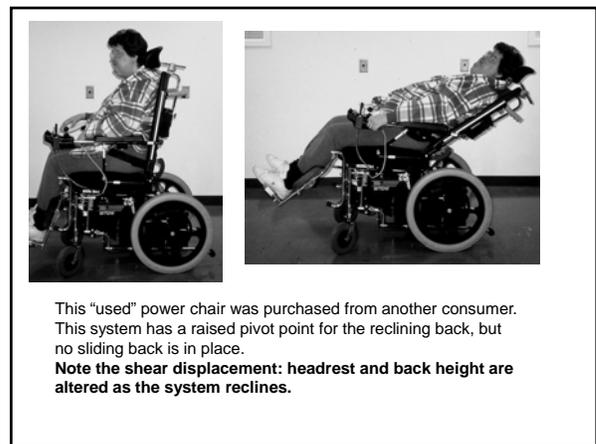
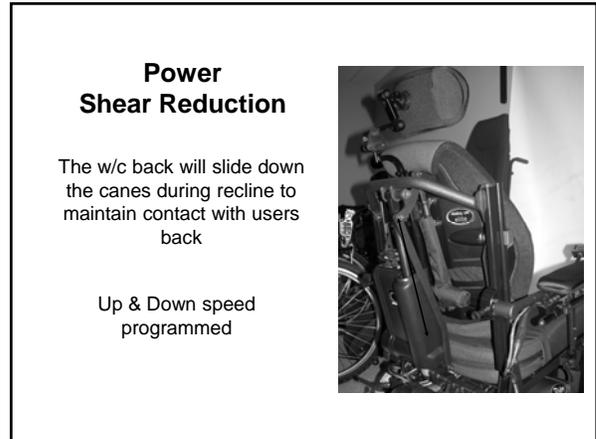
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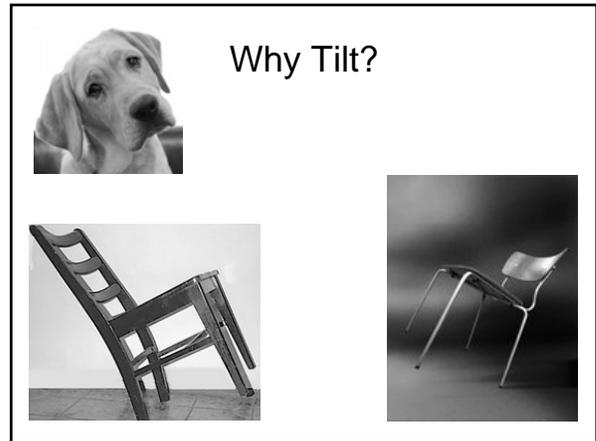
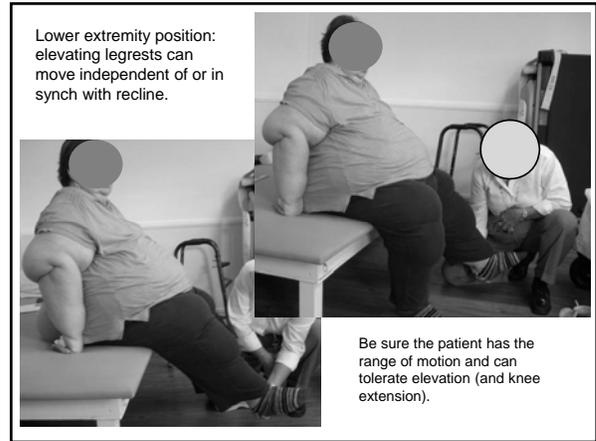
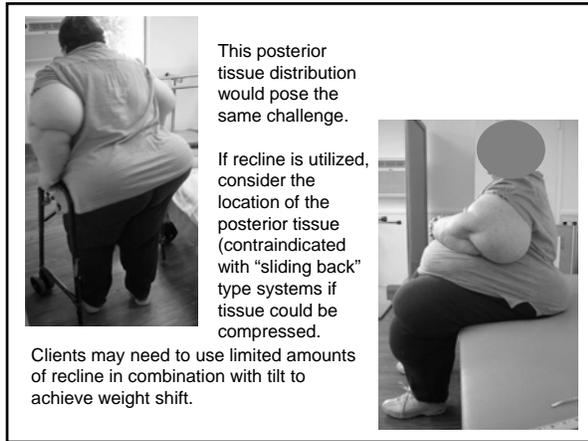
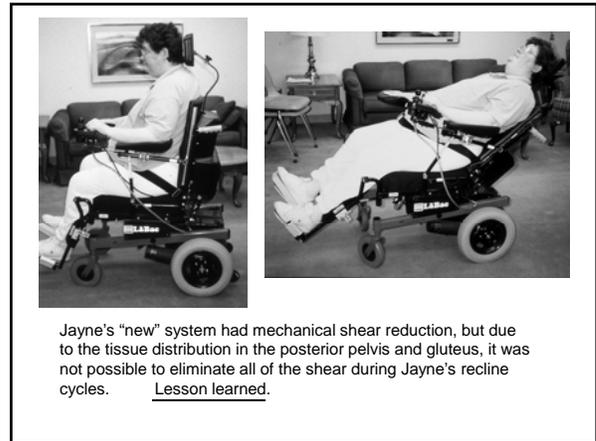
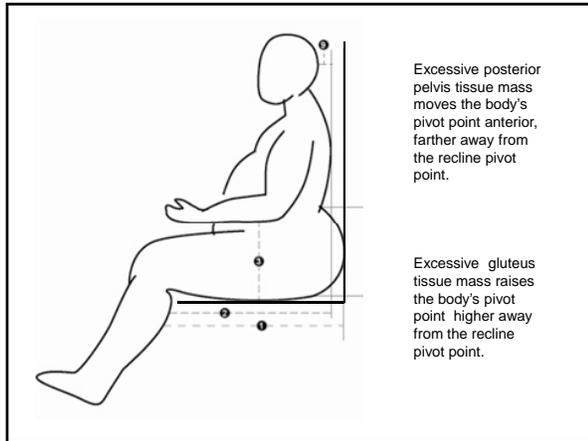


The thickness of the back is raised significantly above the height of the seat cushion. When the system reclines, it can pivot into the posterior pelvis



The closer the recline pivot point and the body's pivot point are, the less shear occurs during the recline cycle.





Why Tilt?

- Pressure relief (no shear)
- Posture
- Balance
- Respiration
- Swallowing
- Digestion
- Edema (swelling)
- Spasticity
- Communication
- Stability
- Comfort
- Pain
- Endurance
- Agitation
- Transfers
- Orthostatic hypertension

What is Tilt?

- “Tilt” or “Tilt in Space” is a means of altering a persons seated position without changing their hip flexion.



What is Tilt?

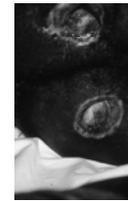
The hip angle does not change as Melanie tilts back, but the distribution of weight shifts from her buttock to her back, improving blood flow & return to the capillaries .



Why Tilt?



Without the ability to change position and relieve pressure, many consumers are at risk to develop pressure sores which can lead to dangerous infection and even cause death. Often they require costly surgery that is very often unsuccessful. Power seating can provide a method for consumers to change the pressure distribution and will better protect the skin.



Tilt systems (manual and power) were initially pivot style, moving from a stationary mounting point. Note the length of this rear wheel drive base from 1995.

Center of Gravity Shift



Additional CG Shift = Additional Stability on Smaller Bases

- Do Consumers Use Tilt Systems “Properly”? (and what is “properly”, anyway?)
- How many degrees of tilt is necessary for weight shift?
- How frequently must this weight shift be performed?
- How are consumers educated about this process?
- Which leaves us with more questions than answers.

So Why Don't Consumers Tilt All The Way?

FEAR



- Many are afraid the system will tip over.

Other things that Tilt and/or Recline



Lateral tilt systems are also available, manual and power and offer not only an alternative plane of weight shift but relief from the collapsing effects of gravity for some orthopedic conditions.

Other things that Tilt and/or Recline

Alternative forms of tilt have evolved to offer additional medical and functional benefits as well as positioning solutions for consumers with severe orthopedic variations.

Other things that Tilt and/or Recline

Anterior tilt is considered a position of function. It can promote a neutral or slightly anterior pelvic rotation and a neutral spinal alignment. Functionally, this can be an ideal position for feeding and many other upper extremity activities for consumers of all ages, but it is not practical or functional as a static seated position.



Precline

- Closed back angle
- Lordosis
- Muscular Dystrophy
- Transfer assist
- Tasking, functional position
- Use in conjunction with bi-angular or molded back
- Headrest placement and positioning
- N/C Option on any system that accepts recline (8 degrees), 30 degrees



Precline power back in combination with a power wedge seat

Alexzander



- Dx. Arthrogyposys
- Molded with versa form bags to create a single contoured mold, reinforced to support weight against gravity.



Horizontal tilt can also be used to meet specific orthopedic and functional needs.



Combination Tilt and Recline

Optimal Pressure Reduction

"Pressure alone was reduced significantly with 120 degrees of recline however caused significant shear which would result in a person sliding out of the chair. Twenty degrees of tilt was significant in reducing shear and perhaps more tilt would reduce shear forces greater. A combination of tilt and recline could further reduce pressure and shear"
 (Schmeler, Boninger, Cooper and Vitek)

Combination Tilt and Recline

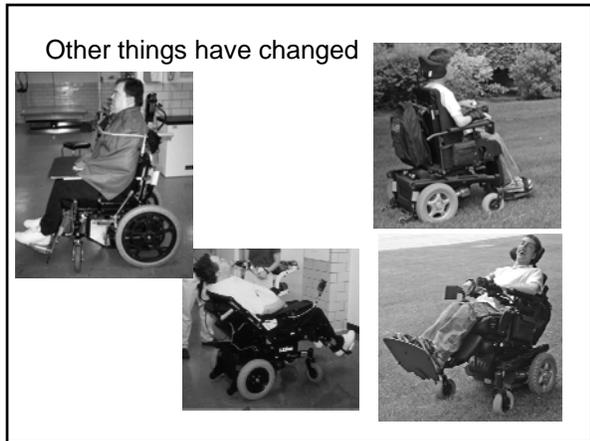
Maximum Pressure Relief!

Optimal Pressure Reduction

Tilting First, then Reclining can reduce the detrimental effects of Shear while still offering Max surface area / pressure re-distribution.

Many users require Tilt to address one set of needs, and Recline to address a different set.

Some users with sensation require recline for hip pain / hip discomfort management



<http://www.surveymonkey.com/s/PowerPositioningSurvey>

Lois Brown and Stephanie Tanguay are conducting a survey for clinicians (not RTSs) - this is specific for therapists who evaluate & prescribe power mobility with power positioning.

It was posted a couple months ago on RESNA, so if you responded to that, please do not respond again.

We would also appreciate if you pass this along to other clinicians you know who are prescribing power mobility & positioning.

We will be gathering data and hope to submit the results at ISS in March 2011.

