



Positioning The Pelvis

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Course Objectives:

The participants will be able to:

1. describe pelvic tilt and seating interventions to address this concern.
2. describe pelvic rotation and seating interventions to address this concern.
3. describe pelvic obliquity and seating interventions to address this concern.

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What we will be Covering Today

Achieving and maintaining a neutral pelvis

- Posterior pelvic tilt
- Anterior pelvic tilt
- Pelvic rotation
- Pelvic obliquity



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Why is this Important?

The position of the trunk, and subsequently the head, is very dependent on the position of the pelvis

- A neutral pelvis optimizes biomechanical function through stability
- A neutral pelvis distributes pressure
- A posterior pelvic tilt is stable, but not as functional

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Positioning Strategies

- Not a cookbook approach
- Can't really look at challenges in isolation
- Always keep in mind the possible causes and your goals
- Goals can be used as justifications for funding


Positioning Chart

- www.atilange.com under Resources
- See handouts

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A word about Assessment...

- We are not going into Seating Assessment today
- We are jumping into common seating challenges and interventions
- But... don't forget that Mat Evaluation!



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Anatomy Review

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Anatomy Review

Key multi-joint muscles that impact pelvic position

Hamstrings

Hip Flexors

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Hamstrings

The hamstrings attach at the bottom of the pelvis, pass over the back of the hip joint and knee joint and attach at the back of the lower leg, behind the knee

Extends the hip and flexes the knee

When shortened:

- Extending the knee may pull the pelvis into a posterior pelvic tilt
- Assuming a neutral pelvic tilt may pull the knees into flexion

Zionphysicaltherapy.com

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Hamstrings

Solution:

- Supine mat exam – determine how far the knee can extend while maintaining neutral pelvis

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Hip Flexors

Hip flexors which cross the front of the hip and the knee joint

Quadriceps femoris – 4 muscle group

Flexes the hip, extends the knee

If shortened, extending the hip will lead to anterior pelvic tilt

Solution:

- Possibly extend the knees
- Determine optimal seat to back angle on supine mat exam

ResearchGate.net

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Hip Flexors

Quadriceps femoris – 4 muscle group

Solution:

- Possibly extend the knees
- Determine optimal seat to back angle on supine mat exam

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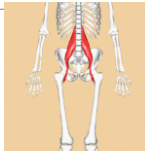
Hip Flexors

Hip Flexors – psoas (zo-is) major

- This muscle attaches to the femur at one end and all the lumbar and lowest thoracic vertebrae at the other
- Flexes and externally rotates the hip and stabilizes the lumbar spine with the abdominals
- If range is limited, the psoas will pull the pelvis into an anterior tilt and the spine into lordosis. External rotation may also be present.

Solution:

- Allow slight external rotation
- Stabilize pelvis
- Determine optimal seat to back angle on mat exam



Physio-pedia.com

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Terminology Time

Reducible

- The pelvic asymmetry can be reduced to neutral
- Correction to tolerance – pressure and comfort

Non-reducible

- The pelvic asymmetry cannot be reduced to neutral
- Accommodation



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Reducible vs. Non-Reducible

Reducible

- Goal is to achieve neutral without excessive pressure, discomfort, or loss of function

Non-reducible

- Accommodate
- Critical to determine true available range and not actually be moving something else
 - i.e. correcting windswept tendency and creating pelvic rotation
- Critical to distribute pressure as much as possible
 - Reduce risk of injury
 - Reduce pain
 - Minimize risk of continued loss of range
- Postural Care

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Positioning Challenges: the Pelvis

Posterior pelvic tilt

Anterior pelvic tilt

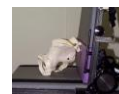
Pelvic rotation

Pelvic obliquity

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Posterior Pelvic Tilt

THE BANE OF SEATING TEAMS!



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Posterior Pelvic Tilt

Top of pelvis is tipped posteriorly

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Posterior Pelvic Tilt

Let's try it!

Sit up straight


Sit on your hands, find those ITs

Assume a posterior tilt

Where did those ITs go?

What is your spine doing?

Where is the pressure risk?



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Posterior Pelvic Tilt

Possible Causes:

- Low abdominal/trunk tone
- Tight hamstrings
- Seat depth too long
- Limited range of motion, particularly limited hip flexion
- Sliding forward on seat
- Extensor thrust
- Sling seat and back

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Posterior Pelvic Tilt

Cause:

- Low abdominal/trunk tone

Interventions:


- Provide support to posterior superior surface of pelvis to block rearward rotational movement
- Biangular back/shape or PSIS pad
- Anteriorly sloped seat or drop footrests to allow hip extension
 - Pulls pelvis into anterior tilt

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PSIS Pad

Posterior, superior, iliac support

Great for evaluations



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Biangular Back

The lower portion ends at the PSIS


- Posterior superior iliac spine

The upper portion extends slightly beyond the angle of the lower portion

- Fixed – typically 7 degrees
- Adjustable angle available

Other backs incorporate this shape

- Tarta



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Stealth Products Epic Back

2 piece highly adjustable back

Designed to maintain pelvis in neutral during movement

Moves at pelvis spine junction

New product

Postural Variation system



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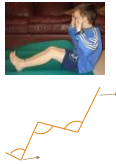
Posterior Pelvic Tilt

Cause:

- Tight hamstrings


Interventions:

- Open seat to back angle
- Decrease thigh to calf angle



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Seat to Back Angle



90 degrees Open 100 degrees Closed 85 degrees

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
Posterior Pelvic Tilt

Cause:

- Seat depth is too long.
- Really??? Really...

Intervention:

- Provide appropriate seat depth for hip and knee flexion



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Posterior Pelvic Tilt

Cause:

- Limited Range of Motion, particularly limited hip flexion

Interventions:

- Accommodate non-reducible limitation in hip flexion by opening seat to back angle
- Accommodate asymmetries with contoured or molded positioning system



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Posterior Pelvic Tilt

Cause:

- Sliding forward on seat.

Interventions:

- Provide anti-thrust or aggressively contoured seat
- Stabilize pelvis using appropriately angled pelvic belt
- Change upholstery type

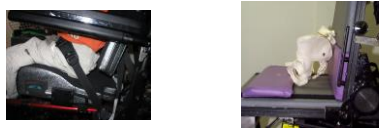


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Anti-thrust cushion

Curb doesn't need to be high

Too high can unweight ITs and close seat to back angle



Freedom Designs antithrust cushion

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Combining Positioning and Pressure Relief

Many off the shelf cushions combine materials to provide both pressure relief and positioning

Most incorporate an anti-thrust design



Stealth Products custom seat cushion



FORMAT ANTI-THRUST

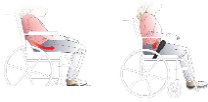
Anti-Thrust Layer

The Anti-Thrust cushion is made of closed foam cells that resist being crushed and prevent pressure buildup in one location. The closed-cell foam cells resist being crushed, instead of being able to compress and recover like most foams. The closed-cell foam cells resist being crushed, instead of being able to compress and recover like most foams. The closed-cell foam cells resist being crushed, instead of being able to compress and recover like most foams.


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Posterior Pelvic Tilt Hip Belt Position

60 degree angle maintains neutral pelvic tilt



Courtesy of Bodypoint



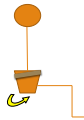
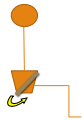
Stealth Positioning padded dual pull pelvic belt

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Hip Belt Position

30 DEGREES PULLS THE PELVIS INTO A POSTERIOR TILT

45 DEGREES ALLOWS THE PELVIS TO SLIDE UNDER THE BELT

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Posterior Pelvic Tilt Hip Belt Position

60 degree angle maintains neutral pelvic tilt




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Posterior Pelvic Tilt

A Leg Harness can be used to prevent pelvis from sliding into posterior pelvic tilt

- Contra-indicated for dislocated hip



Therafin



Bodypoint

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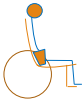
Posterior Pelvic Tilt

Cause:

- Sling seat and back
- Allows / Promotes posterior pelvic tilt and trunk kyphosis
- Hammocking
- Also promotes hip adduction and internal rotation

Interventions:

- Replace with more substantial support

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Posterior Pelvic Tilt

Goals:

- Neutral alignment of the pelvis
- Support anatomical curvatures of the spine
- Promote weight bearing on ischial tuberosities to reduce pressure risks
- Best alignment for biomechanical function
- Increase proximal stability for function

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Posterior Pelvic Tilt

Cause:

- Extensor Thrust, aka Whole Body Extensor Spasms

Interventions:

- Pelvic stabilization using appropriately angled pelvic positioning belt
- Anti-thrust seat or aggressively contoured seat



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Posterior Pelvic Tilt

Cause:

- Extensor Thrust

Other Interventions:

- Anterior knee blocks
- Change position in space if thrust is caused by tonic labyrinthine reflex
- Increase hip and knee flexion, hip abduction and ankle dorsiflexion
- Dynamic back

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Anterior Knee Blocks

Placed anterior to lower legs

Make sure this is below the patella tendon

Contraindicated with dislocated hips



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Dynamic Backs

Movement occurs only at the back in response to client forces, such as hip extension

Diffuses force and maintains pelvic alignment

Can often be combined with other dynamic options to provide movement in other areas



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Dynamic Backs

Movement occurs only at the back

Can often be combined with other dynamic options to provide movement in other areas

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Dynamic Backs

- Ki Mobility
- Seating Dynamics
- Stealth Products
- Sunrise Medical

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Seating Dynamics Dynamic Back

Seating Dynamics

- Dynamic rocker back
- Resistance is adjustable through a set of elastomers



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Stealth Products Dynamic Back

Tarta back

Off the shelf, can customize

Goal: to assist movement to improve function

Not designed for clients with extensor thrust or significant postural support needs



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Sunrise Medical Dynamic Back

Mono Back or Dual Cane

Available on many Quickie manual wheelchairs

Locks out

4 levels of resistance




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Posterior Pelvic Tilt

Goals of controlling **extensor thrust**:

- previous goals of controlling posterior pelvic tilt
- conserve energy
- reduce friction
- maintain alignment with other positioning components

Goals



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Posterior Pelvic Tilt Summary

Correcting a posterior pelvic tilt is critical for:

- Pressure distribution
- Trunk and neck alignment
- Stability
- Function


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Anterior Pelvic Tilt

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Anterior Pelvic Tilt

Let's try it!
 Sit up straight
 Sit on your hands, find those ITs
 Assume an anterior tilt
 Where did those ITs go?
 What is your spine doing?
 Where is the pressure risk?




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Anterior Pelvic Tilt

Possible causes:

- low trunk tone
- muscle weakness
- lordosis






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Anterior Tilt Interventions

Place pelvic positioning belt across ASIS

- Anterior superior iliac spine






30 degrees

Courtesy of Bodypoint

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45 degree placement to limit anterior pelvic tilt



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Anterior Tilt Interventions

Belly binder

- Also called abdominal panel or corset

Spans the lower rib cage and upper pelvis

Must fit closely to lateral trunk

Custom made




Aspen Seating / Ride Designs

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Anterior Pelvic Tilt

Goals:

- Reduce lordosis
- Neutral alignment of the pelvis
- Promote weight bearing on ischial tuberosities
- Best alignment for biomechanical function
- Increase proximal stability for function

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Anterior Tilt Summary

Correcting an anterior pelvic tilt is critical for:

- Pressure distribution
- Trunk and neck alignment
- Stability
- Function

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Pelvic Rotation

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Pelvic Rotation

Let's try it!

Sit up straight

Sit on your hands, find those ITs

Put one knee forward of the other

Where did those ITs go?

What is your spine doing?

Where is the pressure risk?



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Pelvic Rotation

Cause:

◦ Range of motion limitations in hip:

- Abduction
- Adduction
- Hip flexion
- Windswept posture →

Intervention:

- Align pelvis in neutral and accommodate any residual asymmetrical lower extremity posture



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Pelvic Rotation

Cause:

- Non-reducible limitations in spine, pelvis and/or femoral mobility (i.e. rotational scoliosis)

Intervention:

- Pelvis may need to assume asymmetrical posture in order to keep head and shoulders in neutral position and client facing forward →



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Pelvic Rotation

Causes:

- Unequal thigh length
- Hip dislocation

Interventions:

- Check measurement to confirm leg length discrepancy vs. pelvic rotation
- Asymmetrical seat depth, if non-reducible

Stealth Products
Custom Cushion



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Pelvic Rotation

Cause:

- Discomfort

Intervention:

- Identify source and remediate, or refer to physician

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Pelvic Rotation

Causes:

- Tone and/or reflex activity
- ATNR



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Pelvic Rotation

Interventions:

- Lower extremity abduction, hip and knee flexion, ankle dorsiflexion
 - To "break up" tone
- Pull pelvic belt back on **forward** side of pelvis



If right side of pelvis is forward, ensure the pelvic belt pulls back on the right side



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Pelvic Rotation

Goals:

- Neutral alignment of pelvis
- Support anatomical curvatures of the spine
- Promote weight bearing on ischial tuberosities
- Best alignment for biomechanical function
- Increase proximal stability for function
- Prevent trunk rotation
- Increase pressure distribution over posterior trunk

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Pelvic Rotation Summary

Pelvic rotation can lead to spinal rotation as well as pressure injury and an inability for the client to face forward in their seating system
This must be remediated or accommodated

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Pelvic Obliquity

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Pelvic Obliquity

Let's try it!

Sit up straight

Sit on your hands, find those ITs

Cross one leg over the other

Where did those ITs go?

What is your spine doing?

Where is the pressure risk?



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Pelvic Obliquity

One side of the pelvis is higher

Causes:

- Scoliosis
- ATNR
- Surgeries
- Discomfort
- Cushion tipped on sling seat



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Pelvic Obliquity

Interventions:

- Reducible
 - Change angle of pull of pelvic belt
 - Wedge under low side
 - Pressure mapping can help determine if pressure is well distributed

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Pelvic Obliquity

Best pelvic positioning placement is over the lap, just in front of the ASIS, to pull the leg down on the high side, which in turn pulls the pelvis down

- Contra-indicated for dislocated hip

Therafin pelvic belt at 90 degrees



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Pelvic Obliquity

If rotation or posterior tilt are also present, a 4-point belt may be indicated to control both directions of movement



Stealth Positioning 4-point pelvic belt

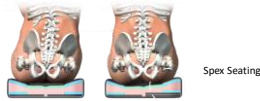


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Pelvic Obliquity

Interventions:

- Reducible
- Wedge
- Under low side to remediate and distribute pressure



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Pelvic Obliquity

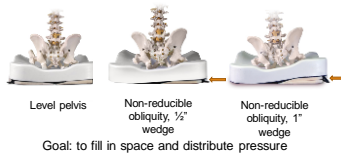
Interventions:

- Non-reducible
- Wedge
- Under high side to accommodate...

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Wedging a non-reducible pelvic obliquity

Invacare Matrix
InTouch



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Lateral tilt to level non-reducible pelvic obliquity



Goal:

The first wedge fills in space to distribute pressure.

The second wedge, or lateral tilt, levels the pelvis for equal pressure distribution on the ITs – Make sure the head is level

Invacare Matrix
InTouch

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Pelvic Obliquity

Goals:

- Best alignment for biomechanical function
- Level head
- Level pelvis, if possible while leveling head
- Equalize pressure under pelvis
- Prevent subsequent trunk lateral flexion
- Reduce fixing to increase function

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Pelvic Obliquity Summary

Pelvic obliquity impacts spinal and neck alignment, as well as pressure distribution

Obliquity must be remediated or accommodated

Goals include pressure distribution between the ITs and also promote a balanced head

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Pelvic Asymmetries in Combination

Pelvic Asymmetries can be seen in combination with one another

- i.e., posterior tilt and obliquity
- More common when postures are non-reducible

What to do?

- Choose solutions that address both issues
 - i.e., 4-point pelvic positioning belt to address more than one issue
 - Increase contact for better postural control



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Other Related Concerns

Aren't some of these strategies considered Restraints?

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Other Related Concerns

A team member wants to use a different solution to save money. What should I do?



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Other Related Concerns

FUNDING



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Requirements To Receive Credit

A QR Code will be provided in order to "sign in" for the class. Please scan it with your phone camera. It will direct you to a website to enter your information for attendance.

Within 24-48 hours of the conclusion of the class, a link will be sent to your email.

- A **course evaluation** will need to be completed.
- Upon completion of the post-course evaluation, the CEU Certificate is immediately available to you. This will be located under your Achievements near the top of the screen.

A PDF Copy of the PowerPoint will be emailed to you in the next 24-48 hours for your reference.



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Final House Keeping

Within 1 – 2 days you will receive an email

- This email will contain a link to the quiz. The link is safe and will say [Pridelearninginstitute.iltimos.com](https://pridemobility.com/learning/institute/iltimos.com). Click on the link and it will bring you to the evaluation for the course.
- This email will also have the PDF of the course and directions to complete the process below.

Click the start button to fill out the course evaluation.

Near the top left of the page, you will see the achievements tab. Click on achievements tab and find the title of the course taken. Next to the course title will be a link to download certificate. Download the certificate and print or save it on your computer.

If you have problems or difficulties, please email education@pridemobility.com



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