OBJECTIVES

1. Identify 3 key muscle groups connected to the pelvis and their effect on the outcome of head position in the seating system.
2. Analyze the effects of orientation in space and critical angles in a seating system that affect head alignment.
3. Define several seating strategies and equipment options to influence a client’s postural function and head control in a wheeled mobility device.

WHO ARE YOU?

- Physical or Occupational Therapist
- Rehab Technology Supplier/ATP
- Rehab Technician
- Manufacturer Employee (REP, Educator, etc)

WHAT IS YOUR BIGGEST HEAD POSITIONING CHALLENGE?

1. Wheelchair users who posture with a Forward Head and hyperextension of their neck?
2. Persons with Excessive extension tone?
3. Those who laterally flex around their posterior head support?

WHY ISN’T IT THIS EASY?!
DECREASED HEAD CONTROL

- Hypotonia
- Flexor Tone
- Extensor Tone
- Dystonia
- Scoliosis
- Overstretched neck extensors
- Muscle weakness
- Compensation due to poor trunk alignment

EFFECTS OF POOR HEAD CONTROL

- Limited visual field
- Poor attention to task
- Difficulty swallowing
- Impaired respiration
- Difficulty eating
- Poor socialization
- Inability to be mobile

TYPES OF HEAD SUPPORT

- Posterior
- Posterior and lateral
- Posterior/Lateral with anterior shoulder support
- Neck rests
- Anterior support with forehead straps and pads
- Anterior collars
- Dynamic

MATERIALS USED IN HEADRESTS

- Foam
- Elastomer Gel
- Lycra, dartex, darlex covers
- Sheepskin cover
- Glidewear

ORIENTATION IN SPACE, ANGLES AND MEASUREMENTS

- The orientation of someone’s head in a wheelchair is directly influenced by the set up of the wheelchair frame.
- Optimal position for the client should be determined during the hands on mat assessment.
- Optimal seat to back angle includes finding a balanced upright position of the head

EFFECT OF SEAT TO BACK ANGLE

Open seat to back angle  Closed seat to back angle
Positioning the Head

MAT ASSESSMENT SUPINE

- Hip flexion range helps determine seat to back angle
  - Is it the same right and left?
- Popliteal angle helps determine lower leg position.
  - Is it equal right and left?

These angles affect the actual seat depth and position of the head

MAT ASSESSMENT SITTING

- Short sitting with thighs, feet and trunk supported
- Facilitate optimal alignment
- Assess pelvic, spine and head alignment
- Affect of gravity on postural alignment
- Postural tendencies
- External support & forces required to achieve upright posture with functional head control

A CLINICAL APPLICATION GUIDE TO STANDARDIZED WHEELCHAIR SEATING MEASURES OF THE BODY AND SEATING SUPPORT SURFACES

WHAT DETERMINES SEAT DIMENSIONS?

- Body contours
- Where is the most prominent point on the posterior contour?
  - Kyphosis, rib hump, or prominent scapula?
- Postural tendency for posterior pelvic tilt, anterior pelvic tilt, obliquity or rotation?
- Flexibility?
- Balance point position, is shoulder girdle behind their pelvis?

DETERMINING EQUIPMENT RECOMMENDATIONS

The following will impact choices of the seating components and wheelchair frame:

- Angles
- Measurements
- Orientation in Space

A CLINICAL APPLICATION GUIDE TO STANDARDIZED WHEELCHAIR SEATING MEASURES OF THE BODY AND SEATING SUPPORT SURFACES

Revised Edition August 2013

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Primary Project Consultant/Co-Author Barbara Crane, PT, PhD, ATP/SMS

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3 MAJOR MUSCLE GROUPS

- Erector Spinae Muscles
- Hip Flexors
- Hamstrings

ERECTOR SPINAES MUSCLES

ALLEN - ALL 3 MAJOR MUSCLE

30 y.o.
Diagnosis: CP
Med History:
- Dorsal Rhizotomy 1992
- Bilateral hip osteotomies 1995
- Spinal fusion 2001
Power chair user for previous job, limited space at home
Unable to weight shift in 12 y.o.
Q2, Silhouette seat with SSI, custom RIDE back

ALLEN

Thoracic Trunk Extension  Scapulas retracted

HIP FLEXORS

Hip flexors include the psoas and iliacus muscles

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Positioning the Head

ALLEN

Seat depth < femur length  Balanced Forward

ROMT:
Hip flex bilat 90
Hip abd R 40  L -40
Hip add R 10  L 40
Poplite angle R 90 L 105

HAMSTRINGS

LIMITED ROM EFFECTS POSTURAL STABILITY

ALLEN AT AGE 5 VS AGE 30

HAMSTRING TIGHTNESS

ALLEN IN PREVIOUS SEATING SYSTEM

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HUNTER

20 y.o.
Diagnosis: CP, MR, scoliosis
Med History:
- Femoral resections R 9-12-11 & L 7-24-12
- R shoulder dislocated
- G-tube
  Iris TIS, OBSS, modified post surgeries

ORIENTATION IN SPACE

Upright
Posterior Tilt

ORIENTATION IN SPACE - TILT

SEAT MUST BE DEEPER THAN THIGH LENGTH

WIDTH DETERMINED BY CORRECTED POSTURE

HAMSTRING TIGHTNESS

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Positioning the Head

WINDSWEPT RIGHT
ISSUES WITH LEG REST HANGER

CUSTOM MOLD OBSS

MOLDED BACKS - OLD VS. NEW

ORIENTATION IN SPACE
GUNNEL LATERAL TILT

WITHOUT HEAD POD

WITH HEAD POD

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HEAT POD

HEAD POD SET UP FOR HUNTER

HEAD POD

USA Distributor is
Cathy Mulholland
Pacific Rehab, Inc
Carefree, Arizona
888-222-9040
www.pacificrehab.com
www.headpod.com

JACOB

18 y.o. at time of eval
Dx: CP
Equipment:
Iris TIS, custom Action Xact seat with L pelvic obliquity build up, FIP back.
Seat to back angle open at 100 degrees
Pelvis Slides forward in his seat

PREVIOUS SEATING

Increased seat to back angle to 110, tilted 35 degrees;
Anterior chest support straps fall off of shoulders

Severe kyphosis
Unable to hold his head up
Difficulty breathing and swallowing

Recline, posterior sacral support, anterior chest support, plus traction
under his axillas to achieve head alignment
SUPINE AND SIDELYING
Rib cage elongated anterior/posterior

CUSTOM MOLDING

NEW SEATING RIDE BACK, OTTO BOCK TRU SHAPE SEAT

FINAL FITTING
Positioning the Head

WITH HEADREST IN PLACE

Now requires only 25 degree of tilt to hold head upright
Able to rest his head into posterior pad
Can raise both arms to reach items

WHITMYER HEADS UP
POSTERIOR LATERAL HEAD SUPPORT,
ANTERIOR ARMS

Sunrise Medical
2842 Business Park Ave
Fresno, CA
800-333-4000
www.sunrisemedical.com

MICHAEL – PLANAR BACK, FIXED TILT,
CLOSED SEAT TO BACK ANGLE EQUALS
THORACIC FLEXION, FORWARD HEAD

-BALANCE POINT -
ORIENTATION IN SPACE - HORIZONTAL
CONTOURS - SHOULDER GIRDLE BEHIND HIPS

BACK RELIEF FOR SHOULDER GIRDLE
POSTERIOR WEDGE SEAT
CONTOURED BACK, POSTERIOR HEAD SUPPORT

COSTNER
• Age 14 y.o.
• Dx: CP, myoclonic seizures, scoliosis, DJD L hip, MR
• Iris, Vicair Adjuster, FIP back, Whitmyer Plush 14” headrest
• Recent hip flexor, hamstring, adductor releases

LEG SUPPORT ISSUES
TILT NOT WORKING

FOAM IN PLACE

ELVES AT WORK
Positioning the Head

Trunk – alignment sitting

Danmar Products
221 Jackson Industrial Drive
Ann Arbor, MI 48103
800-783-1998
www.danmarproducts.com

ASHLEY
DOB: 1-21-93, 20 y.o.
Dx: CP, scoliosis,
• Medical History:
  - 1997 bilateral hip surgery
  - 2001 baclofen pump
  - 2009 G-tube
  - History of pressure ulcers - R side pelvic crest, rib cage
  - Respiratory issues with bronchial pneumonia
  - Requires suctioning

Danmar Hensinger
Anterior Head Support

Ashley Dob: 1-21-93, 20 y.o.
Dx: CP, scoliosis,
• Medical History:
  - 1997 bilateral hip surgery
  - 2001 baclofen pump
  - 2009 G-tube
  - History of pressure ulcers - R side pelvic crest, rib cage
  - Respiratory issues with bronchial pneumonia
  - Requires suctioning

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ATNR

RIGHT SIDE RIBS RESTING ON PELVIS

POSTERIOR OCCIPITAL SUPPORT

WITH CORRECTION
Positioning the Head

CUSTOM MOLDED OBSS

FITTING 2012  FOLLOW UP 2013

STEALTH I2I HEADREST POSTERIOR, LATERAL HEAD SUPPORT ANTERIOR ARMS

REMOVAL OF FACIAL PAD
Positioning the Head

REMOVAL OF HEADREST

STEALTH I2I
Stealth Products
104 John Kelly Drive
Burnet, TX 78611
800-965-9229
www.stealthproducts.com

STEALTH I2I WITH 2 FACIAL PADS

Whitmyer SOFT with anterior forehead strap & MagiTek

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WHITMYER SOFT HEADREST

- Sub occipital pads
  - Adjust these first under the occipital shelf
  - Helps support lateral cervical spine
- Occipital pad
  - Adjust next to support posterior occiput
- Lateral Facial pads
  - Final adjustment

WHITMYER SOFT

Sunrise Medical
2842 Business Park Ave
Fresno, CA
800-333-4000
www.sunrisemedical.com

MARTHA

62 y.o.
Dx: Multiple Sclerosis, CVA 2009 affecting L dominant side
Med Hx:
- Power chair user x 10 years
- Osteoarthritis
- Fell out of w/c 2003 cervical fracture, fusion
- Neck pain 5-6/10

CUSTOM MOLD FOR OBSS BACK
Positioning the Head

**WHITMYER ADJUSTAPlush**

Sunrise Medical
2842 Business Park Ave
Fresno, CA
800-333-4000
www.sunrisemedical.com

**ANTERIOR HEAD SUPPORT OPTIONS**

Headmaster Collar
Symmetric Designs
125 Knott Place
Salt Spring Island, BC, Canada
250-537-2177
www.symmetric-designs.com

**SYMMETRIC DESIGNS SAVANT**

**BRADLEY USING METALCRAFT HAWK**

**SWITCHES FOR DRIVING**

Posterior occipital pad and swing away switches
METALCRAFT HEAD-SUPPORT ADJUSTABLE WING COLLAR (HAWC)

Metalcraft Industries, Inc
399 N. Burr Oak Ave.
Oregon, WI
608-835-3232

www.metalcraft-industries.com

ARIELLE

- Zippie TIS
- Contoured seat cushion
- AES curved back, lateral thoracic & pelvic pads
- Whitmyer Adjustplush Narrow
- HeadsUp™

ARIELLE HEADSUP™ HAT

HEADSUP™

Practical Things, LLC.
3267 East 3300 South
Suite 105
Salt Lake City, UT. 84109
877-233-1773
www.practicalthings.com

REFERENCES


• http://www.musclesused.com

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