Adaptive Equipment and Assistive Technology in Pediatrics
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Who Are You?

Therapy discipline - PT OT ST Other
Experience in AT - None Occasional Frequent
Custom WC experience – None <5 > 10
2 personal goals for this webinar
Background and Introductions

Objectives

Find answers to your questions regarding use of adaptive equipment and assistive technology (AT) with children

- Definition
- Hi-tech, low-tech options
- Risk for deformity relative to growth, postural control, tone, function
- Develop goals
- Learn to assess
- Cost vs. benefit
- User-friendly, feasibility
- Effective LMNs
- Wheelchair evaluations
- Case Studies
WHAT?

Adaptive equipment – Any device that supports the musculoskeletal system

Assistive Technology – Any device that improves functional control

Any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability.²

Other WHAT Questions?

• What are the caregiver/client/teacher goals?
• What are your therapy goals?
• What level of assistance is needed?
• What are your options and other considerations?
  – Discuss with other therapists
  – Review online sites - Google it!
  – Consider funding source
  – Start with a trial/demo equipment

Case Study: Riley 2½ y.o. Athetoid CP at daycare
Caregiver/Client/Teacher Goal: Floor sitting for independent play, meals, group activities
Therapy Goal: Long sitting to stretch hamstrings, adductors, improve sitting balance, indep. function
Option: Leckey Squiggles Early Sitting System
http://www.leckey.com/products/
Considerations: $1477, Max weight 37 lbs
Caregiver/Client/Teacher Goal: Supported sitting for floor play
Therapy Goal: Stretch hamstrings/adductors, develop sitting balance/postural control
Options: Molded seats, corner chairs, floor sitters, homemade

Options:
- Molded seats, corner chairs, floor sitters, homemade?
- Infant/Toddler Corner Floor Sitter
  - Made from high density foam blocks
  - $20

Child Rite Seat $320
Tumbleforms Corner Chair $620
Leckey Corner Sitter $875
Abilitations Straddle Sitter Discontinued

Janae Designs Wedgster: Cost $765
http://janaedesigns.com/ourproducts/thewedgster.html

What are caregiver/client/teacher goals?
School participation

What are therapy goals?
Stretching tight hamstrings/adductors, functional skills in sitting

What level of assistance is needed? CP GMFCS Level IV, V

What are your options and other considerations?
Discuss with other therapists and teachers
Review online sites - Google it!
Consider funding source
Start with a trial/demo equipment

Client/Teacher Goal: Upright safe alignment for circle time or other classroom activities
Therapy Goal: Hip abduction and neutral pelvis/erect spine in sitting, stretching tight adductors, accommodating hip deformities, improving sitting balance
Options: Saddle Seats; commercial/homemade

Leckey Saddle Seat $2549
Ottobock Krabat Jockey Plus $6800
Home Made Peanut Ball Saddle Seat $65
TOT Collar
Tubular Orthosis for Torticollis

https://www.totcollar.com/tot-collar-science/

Therapy Goal:
Optimal cervical alignment for correction of torticollis.
Solution:
TOT Collar
Considerations:
Poor tolerance in South FL due to heat.
Parent Solution:
Homemade cloth cover

Ambulation Assistive Devices

Therapy/Client Goal: Independent walking, unable to maintain grasp
Solution: Kaye Anterior support walker with forearm trough

Therapy/Client Goal: Participate in PE
Solution: Rifton Gait Trainer® with trunk support & hip stabilizer

Therapy/Client Goal: Walking unaided post-op w/ halo
Solution: Rifton Gait Trainer® without trunk support

Importance of Trials
Nurmi Walker® vs. TAOS1 Walker®
Choosing a Standing Device

A. What could be the caregiver/client goals for using each of these standers?

B. What could be the therapy goals?

Video

WHY?
“Stabilizing the head in a neonate can produce dramatic changes in behavior. Uncontrolled movements of the head produce a Moro response. External support to the child’s head and trunk result in more mature behavior, including attending to people and objects, and even reaching.”

You can be the best therapist in the world...

But what happens when you take your hands off the child?

Why do therapists need to know about Adaptive Equipment?

1. Limited function
2. Deforming forces of tone and gravity impact body more
3. Muscle tightness/Joint Contractures
4. Pain, Fatigue, Injury
5. Negate therapeutic intervention

1. Increased/improved function
2. Limit deforming forces of tone and gravity
3. Decrease rate of muscle shortening/joint limitation
4. Greater comfort, endurance, safety
5. Carry over therapeutic intervention
Case Study: 3 Year old boy with Spinal Muscular Atrophy Type 1, unable to sit independently, easily fatigues, bright, social

**Therapy/Client/Caregiver Goal:** Continue attending daycare, ADL’s

**Solution:** Rifton Activity Chair, Rifton Hygiene & Toileting System (HTS)

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**Why?**

**The Rifton Hi-lo Activity chair:**
- Allows peer level interactions – low for table top, higher for outside play
- Easier for caregiver transfers at highest height
- Easily adjusted in height, tilt and recline based on activity, fatigue level and progression of SMA, as well as easily adjusted for growth

**The Rifton Hygiene and Toileting System (HTS):**
- Easily rolled over and off the toilets that were also being used by other students
- Great degree of adjustability including tilt and recline, as well as growth
- Comfort and safety

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**Purpose of Adaptive Equipment:**
To support and provide optimal alignment for function, and reduce potential for deformity

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**Adaptive Equipment = Independence**

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Adaptive Equipment = “Fun”ction

WHO?

Adaptive equipment and AT are essential for growing children who are unable to maintain appropriate alignment.

Infants – with or without disabilities
Toddlers – smaller sized chairs and tables, sippy cups, chunky handle spoons, strollers
School aged children – more customized solutions due to larger sizes, growth, deformity

Who Needs Adaptive Equipment?

Any individual who needs support to maintain alignment for function
WHEN?

- Does the child no longer function well in typical baby equipment?
- Is the child too heavy for the caregivers to hold and carry?
- Does the child express a desire for more independence than their motor skills allow?
- Is the child at risk for deformity?
- Does the child need extra support for safety?
- Will the child begin attending school and/or ride on a bus?

WHEN?

- Growing bodies are impacted by abnormal forces more rapidly than adult bodies
- Postural control is important 24/7
- Prolonged posture in abnormal alignment -> pain, deformity, poor function, poor sleep
- We use adaptive equipment all day long – standers, wheelchairs, wedges but... What happens at night?
“While we work to give people the best possible support in wheelchair seating systems during the day that is often where the effort ends. What happens when they are not in those seating systems? Is that “relaxed” position in the recliner detrimental? Could it be that sleeping all night in asymmetric postures is working against what we are trying to accomplish during the day?” Posture24-7.org

Consider Spending Night after Night like this ...

24/7 Postural Support
Consider night time positioning

24/7 support -> Improved MS alignment
Hi Tech, Lo Tech Options

- Jenx Dreama Bed
  Approx $6000
- Foam Hip Abduction Wedge
  with Sandbags $30

Orthotics, Prosthetics

Custom
- Requires RX from MD
- Orthotist/Prosthetist
- Involves casting and fitting
- Input from PT/OT/client/caregiver
- Insurance/Expensive!

- S.W.A.S.H.
- Benik
- Cascade
- Surestep
Case Study: 13 y.o. w/ Duchenne's Muscular Dystrophy, household ambulator, ankle DF w/ knee ext PROM -25 degrees. Self selected shoes with deep heel on insole. Why? Can we make it even better?

Comparison of Gait Without and With Heel Wedges

When? Toe Walkers – when R1 DF ROM is less than 95 degrees
Why? Load heels and increase surface area during stance, activate dorsiflexors, balance
How? Trial: foam wedges inside shoes or taped to soles Permanently: shoemaker or orthotist

Consider need for "tuning" orthoses and shoes for optimal balance, control, and alignment.

Where?

School:
- Moving throughout the school
- Sitting/Standing for classwork, meals
Home:
- Meals
- Homework
- Leisure
Considerations: Safety, Comfort, Efficiency
Case Study:
16 y.o, male, dx CP, GMFCS Level III

Lifestyle
University high school
10th grade
“Gamer”

Therapy
PT 60 min 1x/wk
Personal trainer 60 min 1x/wk

Diagnosis:
Bilateral Spastic CP

Surgical History
SDR – age 5
8 hamstring/adductor tenotomies – age 12

Musculoskeletal
Crouched gait
Kyphosis, lateral tilt to right

Therapy Goals? Client Goals? Solutions?

CLIENT GOALS FOR STANDER

Improve standing and walking alignment
Independent transfer in/out of stander
Independent adjustment
Able to use one hour per day
Work surface for laptop/gaming controller

Therapist Goals: Weight bearing, alignment, ROM, strength
Easy Stand Glider®
Clinic and Home Trial

ADDITIONAL BENEFITS OF EASY STAND GLIDER

• Independent, safe use of Glider mechanism
  - Legs Only
  - Arms Only
  - Reciprocally

• Dynamic stretch on knee and hip flexors
• Single piece of equipment
• Small enough for house, dorm room, apartment
• Large enough for use as adult

From Goals to Solutions
How-to’s for getting the equipment

• Discuss client/caregiver goals
• Consider therapy goals
• Trials with various equipment
• Assess response, if positive -
  • Write LMN, obtain RX
• Submit to vendor for submission to insurance
• Wait for approval/denial
• After equipment comes in, attend fitting with vendor and caregivers

How?

• Recognize the practical considerations associated with use of adaptive equipment and AT
• Evaluate
• Seek funding
• Document need, trials if possible, and fitting

How?

3 Year old boy with Spinal Muscular Atrophy Type 1

• Problem: Not covered by insurance
• Solution: Seek outside funding (Hope4Mobility.org, United Way of PBC Special Needs Equipment Fund, Bella’s Angels, Wheels for Kids)
**Letter of Medical Necessity Components**

1. Introduction: Client age, diagnosis, your position as therapist, and your experience with client.
2. Currently owned adaptive equipment, if any, reason why equipment is no longer appropriate (i.e. outgrown, excessive wear and tear, change in functional status).
3. Explanation why client requires the specific adaptive equipment with medical justification, including functional deficits that impact independence in all environments. Usually includes the words *medically necessary*.
4. Discussion of client trial with equipment and outcome, especially for standing frames and gait trainers.
5. Inclusion of goals specific to adaptive equipment.
6. Itemized list of the adaptive equipment and each component with medical justification for each item.

**Additional Considerations for LMN**

- Emphasis on structure and anatomy, with considerations for anticipated growth changes.
- Family lifestyle and needs of the user and caregivers is critical. Caregivers should be involved in the selection process.
- Pediatric adaptive equipment is always evolving and new products are constantly being developed → stay current through cooperation with a knowledgeable vendor, attending conferences such as Medtrade or the International Seating Symposium, and CE courses.

CR is an 8 year old girl with cerebral palsy, spastic quadriplegia. She is a tall girl for her age and requires assistance for all positioning, self-care and mobility needs. Cristina has been receiving outpatient physical therapy with me for the past 10 months. She currently has a small Rifton bathchair and toilet which she has had for many years and has now outgrown.

It is, therefore, medically necessary for Cristina to receive the following, which will be used for both bathing and toileting:

**Rifton Hygiene and Toileting System Chair** including:

- **Medium Open Seat and Back with padding** is required to provide comfort, support, and optimal growth potential for use of this system. The open seat option is required to allow for ease in hygiene. Cristina is currently 44” tall and this seat will fit heights from 40-56”.
- **Mobile Option with tilt in space function** is required to allow ease of transfers and safety, the ability to move Cristina from toilet to bathtub to bedroom without lifting, and to allow her to be tilted back to maintain head alignment and to assist with hair washing.
- **Medium armrests** are required to provide upper extremity support as well as to allow a tray to be attached.
- **Headrest** is required to provide support to head and neck and encourage midline position of head, with adjustability for growth and optimal alignment.
- **Large lateral trunk supports with strap** is required to maintain trunk upright and in midline, while preventing her from falling due to lack of independent trunk control.

Thank you for your consideration and assistance. Please feel free to call me if you have any questions.
Letter of Medical Necessity

- https://www.lmnbuilder.com/lmn/lmn-home
- http://www.fdhc.state.fl.us/Medicaid/dme/custom_evaluation_form_07-22-08.pdf

Wheelchair Evaluation

- Existing equipment – what works/what doesn’t
- What is funding source? What do they require?
- Supine mat evaluation is essential
  - true potential for optimal alignment with gravity eliminated
- Seat assessment on bench
  – how much support is needed to retain optimal alignment - i.e. pelvis/spine neutral
- Use seating simulator for complex needs
- Product trials if possible
Wheelchair Seating Simulators
Planar or Custom Molded

Components
Custom Seating System and Frame

Client Measurements
(Write measurements inside of box)
Considerations for positioning

Tilt-in-Space vs. Recline

Consider pros/cons for each system and client need/medical necessity
What’s wrong with this picture?

Case Study: 7 y.o. boy with Dystonic Cerebral Palsy, GMFCS Level IV
Independently mobile with manual wheelchair age 4

What do you like?
• Small frame
• Easily maneuvered
• Fairly lightweight
• Cute

Let’s take a closer look...

What might be a problem?
Let’s take a closer look...

Problems:
- Narrow seat/BOS
- Seat depth too short
- Rounded thoracic spine
- Lacks adequate trunk support for stability
- Increased dystonic posturing when self-propelling
- Increased trunk rotation left
- Wind-swept posturing to right

These postures become very evident out of the chair

Seating Considerations:
How can habitual postures affect a growing body?
(i.e. Wheelchairs must be more than just cute and easy to self-propel...)

Age 4
Age 5
Age 6

Age 7 – Orthopedic Surgery
Femoral Derotation Osteotomy with Acetabular Reconstruction
Completed Recommendation
Wheelchair Evaluation/Letter of Medical Necessity

- Therapist/Supplier/Family – assess together
- Copy of all details during assessment go to both supplier and therapist
- Supplier writes up proposal and sends to therapist
- Therapist writes up LMN/WC Eval - All parts specified (down to type of foam for cushion) with justification for each written into evaluation
- For children, chair should have enough adjustability built-in to allow for 3-4 inches of growth in length and width without new seating
- If delivery takes longer than 4 months from assessment, supplier must re-measure for growth prior to delivery.

Insurance
Certificate of Medical Necessity

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Video

Visit the website for more information.
Delivery – Always with Family and Therapist Present

• Have original write-up on hand; review all requested items and dimensions
• Therapist and supplier position client in chair, make adjustments
• Family, therapist, supplier agree equipment is what was requested
• Family is instructed in positioning, safety and process to break-down chair if needed

Custom Wheelchairs Should:
Provide Independence, Comfort, Correct Anatomical Alignment, Accommodate Growth, and Be Functional

Challenges

• Durability versus comfort and function
• Ease of adjustability of seating system and frame for growth modifications
• Consider client’s needs in 5 years - *Almost never recommend 12” wide or narrower seat* unless needed for self propulsion
• Availability and knowledge of supplier – do they know the options available, will they be willing and able to make repairs and modifications
• Small things can make a big difference!
Power Mobility – Considerations
When do we start\textsuperscript{14}?

Lenix’s First Drive Video

Trial period/Training

32 year old with spastic quadriplegia cerebral palsy
What would you do differently?

Sip-N-Puff Control
37 year old man with Duchenne’s MD

The possibilities are great!
Power wc with proximity switch head array, power seat elevator and power tilt.

Permobil power tilt and elevate alternative controls using head array with proximity switches.
References

1. 1http://www.resna.org
3. 3http://www.childdevelopment.ca/Libraries/Hip_Health/sunnyhill_clinical_tool_Hip_Health_Full_FINAL.pdf
5. 5https://www.cdc.gov/nchs/data/sr_11/sr11_246.pdf
6. 6https://posture24-7.org/

Product References

*Please reference the following websites for more information.*


e. http://www.ottobockus.com/Mobility/Indoor-Seating/Hi-Low-Seating/Jockey-Plus/c/6307


h. http://www.rifton.com

i. http://www.ottobockus.com/Mobility/Mobility-for-kids/Solution-overview/Kids-walkers-featuring-Nurmi-Neo/


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