Take the “Dis” out of Disability:
What’s New (and not so new) in Adaptive Equipment for the Pediatric Population.
OBJECTIVES

- Explain what the inpatient and outpatient Rehabilitation Team’s role is in providing care for the pediatric population with special needs and discuss when it is appropriate to consult out inpatient team or refer to our outpatient clinic.

- Describe adaptive equipment available to aid in tone management, mobility, ADL’s, vision and communication for the pediatric population with special needs.

- Generate awareness on adaptive sports and resources that are available in our community for the pediatric population with special needs.
We offer a collaborative model of care for children with physical and/or cognitive impairments that interfere with normal functioning. Our team of diverse specialists provides early and intensive interventions to maximize a child's function and development.

We work closely with families to develop individualized care that reflects current research and practice trends while incorporating family values and goals. We are committed to continuity in care and the wise utilization of health care resources.

We have six physiatrists on staff who are the only pediatric board-certified and fellowship-trained rehabilitation specialists in the region. Our team also includes two physician fellows, residents, four nurse practitioners, two social workers, a rehabilitation psychologist, a triage nurse/coordinator, and a research coordinator.

Our mission is to improve and maintain quality of life for the more than 2,000 children and families we serve.
Rehabilitation Clinic

- General Rehab Clinic
- Spinal Differences Clinic
- Torticollis Clinic
- Brachial Plexus Injury Clinic
- Neuromuscular Clinic
- Spasticity Clinic
- Limb Differences Clinic
- Baclofen Pump Program
The Rehabilitation Clinic

- Amputation/limb disorders
- Brachial plexus injuries
- Brain Injury/Near drowning
- Cerebral Palsy
- Gait disorders
- Musculoskeletal system diseases
- Neuromuscular diseases

- Neuro-Oncology
- Physical debilitation
- Spina bifida/Spinal cord injury
- Spasticity
- Torticollis
- Procedures: Electrodiagnostic intraoperative monitoring, baclofen pumps, Botox/phenol/trigger point injections, EMG
Inpatient Rehabilitation Program

- Traumatic Brain Injury
- Hypoxic-Ischemic Brain Injury
- Spinal Cord Injury
- Multiple Trauma
- Stroke
- Brain and Spinal Cord Tumors
- Neurological conditions
- Post-operative disorders
- Debility
- Any condition that leads to a deficit in function
Inpatient Rehab Team Members

- Attending Physician
- Rehab Fellow/Resident
- Neuropsychologist
- Nurse Practitioner
- Nurse Care Manager
- Social Work
- Physical Therapy
- Occupational Therapy
- Speech Pathologist
- Massage Therapist
- Child Life Specialist
- Dietician
- School Teacher
- Music Therapy
Inpatient Rehabilitation Program

To qualify for an inpatient admit:

- The child must have significant functional change requiring at least two of three therapy services (PT, OT, Speech).
  OR

- Require individual and family education to provide a safe, smooth transition to home.
Adaptive Equipment: Tone

- Orthotics
- Serial Casting
- Botox
- Tone medications
- Baclofen pump
Orthotics are used to provide stability for joints where there is increase in tone or decrease in strength.

The goal of orthotics is to provide the best support while maximizing function and to prevent a decline in function (i.e. contractures).
There are multiple orthotic options for upper and lower extremities well as for head and trunk control.

A Rehab Provider, Orthopedic Provider, Orthotist, and OT/PT can determine which type of orthotics are needed.
Adaptive Equipment: Tone Lower Extremity Bracing

- SMO- Supra Malleolar Orthosis
- AFO- Ankle Foot Orthosis
- KAFO- Knee Ankle Foot Orthosis
- HKAFO- Hip Knee Ankle Foot Orthosis
Adaptive Equipment: Tone
Upper Extremity Bracing

For thumb, digits, and wrist

- There are several types of orthotics that are used to promote neutral positioning of upper extremity joints when there is an increase in tone.

- Examples- Comfy resting hand splint, Benik splint, and cock-up wrist splint.
Adaptive Equipment: Tone
Upper Extremity Bracing

For elbow and shoulder

- A Pediwrap or hard splint may be recommended to promote elbow extension due to increased tone.

- Kinesio tape, a sling or shoulder immobilizer may be recommend to prevent or improve shoulder subluxation due to hypotonia and/or hemiparesis.
Adaptive Equipment: Tone Neck and Trunk Support

- A soft collar or Hensinger collar may be recommended to help with low neck tone.
- An abdominal binder or Benik vest may be recommended to help improve low trunk tone or to promote proprioceptive feedback to help with sitting balance.
Adaptive Equipment: Tone

Botox

- Botox can be injected into specific muscles to help with increased tone.
- Sometimes used in conjunction with serial casting if tone is limiting ROM.
- Must be free from illness and not on antibiotics when procedure done.
- Onset is 3-4 days – Peak at 3-4 weeks
- Can be done as often as every 3-6 months
Serial casting can be done by trained PT/OT’s to help with contractures or an increase in tone limiting ROM.

Cast changes are generally done q week until adequate ROM is achieved- average length of time for casting is 4 weeks.
Adaptive Equipment: Tone
Tone Medications

- Baclofen
- Clonazepam
- Dantrolene
- Tizandine
Adaptive Equipment: Tone
Tone Medications

- Baclofen - 1st line treatment for children 2 yrs or older with increased tone. Note - Must be started at lower dose and increased to desired response (not based on weight). MUST WEAN when discontinuing as the patient can go into withdrawal.

- Clonazepam - Used more often in infants and toddlers < 2 yrs of age to help with increased tone. Can be compounded to make a liquid form at some pharmacies.
Adaptive Equipment: Tone

Tone Medications

- **Dantrolene** - 2\(^{nd}\) line treatment for increased tone/muscle spasms. Note: LFT’s should be checked at baseline, 1, 4, 8 mos then annually. Therapeutic dose: 6-8 mg/kg/day (doses tid-qid).

- **Tizanidine** - 2\(^{nd}\) line treatment for increased tone/muscle spasms. Note: LFT’s should be checked at baseline then q 6 mos thereafter. Can be dosed up to 3x per day. Max 36mg/day (adult).
A baclofen pump can be surgically implanted to give a very small dose of baclofen intrathecal to help with tone.

This procedure is only done if they have failed oral therapy and the family is able to come for frequent clinic visits for refills q 1-3 months.

At risk for baclofen withdraw (if pump malfunction/battery runs out) and baclofen overdose (if dose titrated quickly or too high).
Adaptive Equipment: Tone Baclofen Pump

Things to Consider:

- Post op complications.
- Baclofen overdose/withdraw can be life threatening.
- Family compliance and understanding of withdraw/overdose a must!
Adaptive Equipment: Mobility

- Adaptive Stroller/Wheelchair
- Stander
- Gait Trainer
- Lift
- Go-Baby-Go
- Functional Electrical Stimulation (FES)
- Lokomat
- Alter G
- Zero G
- Exoskeleton - Rewalk
Adaptive Equipment: Mobility

Adaptive Stroller

- Ordered when conventional strollers cannot provide the support needed for the infant/toddler or if the patient requires medical equipment during transport (Ventilator, Enteral Pump, Suction Machine).
- Can be a loaner or custom made.
Adaptive Equipment: Mobility Wheelchair

- Wheelchair- Ordered when a child is non-ambulatory or child requires assistance for community distances. Many types based on support needed.

- Can be a rental, loaner, or custom made.
Adaptive Equipment: Mobility Stander

Used to assist with standing to help strengthen motor skills and to improve bone density and proper hip development.
Adaptive Equipment: Mobility Gait Trainer

Used to assist a child to learn or relearn to walk safely and efficiently. Provides unweighting support and postural alignment.
Adaptive Equipment: Mobility Lifts

To aid caregivers to move a non-ambulatory child from one place to another.
Adaptive Equipment: Mobility Go-Baby-Go!

- Developed by Cole Galloway.
- [https://youtu.be/X0hLkEyyp6w](https://youtu.be/X0hLkEyyp6w)
Adaptive Equipment: Mobility
Functional Electronic Stimulation

- Use small electrical pulses to a peripheral nerves to contract muscles for a task.
- Examples: RT 200, RT 600, Ness L300.
- Benefits: Aerobic/Cardiovascular, Strength and circulation, quality of life.
- Risks: Fracture, Burns
Adaptive Equipment: Mobility

Lokomat

- Provides physiological gait pattern with constant feedback and physical assessment.
- Improves patient outcomes by increasing therapy intensity providing task specific training.
- Electrical drives at knee and hip joint.

Size guidelines
Adaptive Equipment: Mobility
Alter - G

- Antigravity treadmill
- Can improve mobility, strength, ROM, fitness.
- Can support 20-100% of body weight depending on setting.
- Spina Bifida, CP, MD, Brain Injury.
Adaptive Equipment: Mobility Zero-G

- Dynamic Body Weight Support
- Walking, Balance, Sit to Stand, Stairs.
- Toddler to adults (20-400lbs)
- Stroke, SCI, CP, MS, Amputees, Ortho
Adaptive Equipment: Mobility
Exoskeleton- Rewalk

- Can improve walking speed, distance, fluidity, gait and balance.
- Robotic Exoskeleton- Mimics natural gait pattern.
- Wearable brace, computerized control system, motion sensors
- Powered at hip and knee motion.
- Stand, walk, turn, stairs.
Adaptive Equipment: ADL’s

- Bathing Systems
- Toileting Systems
- Feeding Devices
- Dressing Devices
Adaptive Equipment: ADL’s Bathing Systems

- The type of bath chair needed will be determined by the set up of the child’s bathroom in their home and the amount of support needed for bathing.

- Examples: Resin Chair, Transfer Tub Bench, Rifton, Columbia Medical Elite Reclining Bath Shower System

- Grab bars can be installed to help aid in bathing and toileting.
Adaptive Equipment: ADL’s Toileting Systems

- The type of toileting system needed will be determined by the set up of the child’s bathroom in their home and the amount of support needed for toileting.
- Examples include: commode, transfer tub bench with commode cut-out, Rifton HTS
Adaptive Equipment: ADL’s Feeding Devices

- Weighted Utensils
- Easie Eater
- Cuffed Utensil Holder
- Mobile Arm Supports
Adaptive Equipment: ADL’s Dressing Devices

- Reacher
- Dressing Stick
- Elastic Laces
- Shoe horns
- Sock donner
Adaptive Equipment: Communication

- Picture Cards
- Eye Gaze
- Assistive Communication App’s
- Inline speaking valves (for trach and/or vent dependent children)
Adaptive Equipment: Communication - Picture Cards

- www.do2learn.com
- Provides an easy way for nonverbal children to express their wants and needs as well as how they are feeling.
Adaptive Equipment:
Communication-Eye Gaze

- A computer application that allows a person to communicate with their eyes using a camera and infrared lights.

- Must be able to track/shift gaze in most visual fields (horizontal, vertical).

- The application is able to calibrate to the patient.

- There are adapters available to allow the infrared lights to turn on the TV, lights, etc.
Adaptive Equipment: Communication - Eye Gaze

https://youtu.be/GR908jA_pXY
Adaptive Equipment: Communication - Electronic App’s

- There are multiple mobile apps available for electronic devices to help a child acquire new life skills, engage in self-directed play, and to facilitate communication.
Adaptive Equipment: Communication - Electronic App’s

- Parents should identify their child's needs and capabilities when trying to determine what app’s are appropriate for their child.

- www.a4cwsn.com

- www.care.com/special-needs
Adaptive Equipment: Communication

In-line speaking valves

- One way valve
- Placed on the hub of the tracheostomy tube or in-line with a ventilator circuit.
- Redirects air flow through the vocal folds, mouth, and nose enabling voice and improved communication.
Activities: Adaptive Sports

Disability does not mean inability!

- Mid America Adaptive Sports
- Midwest Adaptive Sports
- Special Olympics
- YMCA Challenger Program
Mid America Adaptive Sports

- Provide recreational and competitive sports and athletic opportunities for children and young adults who have physical impairments in the Kansas City area.

- MAASports is about fun, friendship, fitness, and adapting to physical limitations, through training and the use of specialized sports equipment. Training focuses on the personal development, health benefits, and leadership growth which come about through active participation in sports.

- Currently offer organized programs in recreational and competitive wheelchair basketball, adaptive track, and field athletics. Athletes compete in local and regional track and field competitions during the spring/summer season.
Activities: Adaptive Sports

Midwest Adaptive Sports

- Provide therapeutic recreational and competitive ski program for individuals with physical and/or cognitive impairment.

- Objective is to have fun, build independence, self-esteem, confidence, physical development and socialization.

- They strive to enhance active participation in all aspects of community by promoting the concept of ability through integration, public awareness and education.
The mission of Special Olympics is to provide year-round sports training and athletic competition in a variety of Olympic-type sports for children and adults with cognitive impairments.

Provide continuing opportunities to develop physical fitness, demonstrate courage, experience joy, and share personal skills, gifts of spirit, and friendship with their families, their fellow Special Olympics athletes, and the world.

Special Olympics strives to awaken the world to the precious abilities and dignity of every human being.
Activities: Adaptive Sports
YMCA KC- Challenger Program

- Helping children and young adults with special needs grow physically and socially. They offer many indoor/outdoor sports and recreation.

- The Fred and Shirley Pryor YMCA Challenger Sports Complex is designed for young athletes with physical, developmental and intellectual disabilities, and includes the only all-accessible fields in the Kansas City area.

Activities: Adaptive Sports

- For additional information on adaptive sports and recreation go to: www.thewholeperson.org
THANK YOU!