

Beyond 90/90/90; developing and using seating and mobility systems to support task engagement and use of AT for Students with complex bodies

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A Current Equipment List of Products I USE; including Seating, Switches, Switch Mounting, & Alternative Access

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Basic Products I use for assessment with seating

- 1. EZ Back; Standard** comes in pediatric size, can be used on manual chairs or other seating, this is what I use most often in assessment, now, to assist in trunk support. From: Advanced Mobility Systems, 621 Justus Drive, Kingston, Ontario K7M 4H5 800-661-6716; www.amstilt.com
- 2. Mother Earth Pillows;** Flaxseed pillows/bolster in various shapes, used for simulated seating as demonstrated;. Primarily Small bolster(5" x 15") and small flaxseed pillow (7"x 10") 2024 Key West Drive, Suite E, Arnold, MO, 63010; 800-344-2072; www.motherearthpillows.com
- 3. Elite Head array with mini-laterals from:** Adaptive Switch Labs, Inc., 125 Spur 191, Suite C, P.O. Box 626, Spicewood TX 78669; 1-800-626-8698; www.asl-inc.com
- 4. Chest Strap, Elastic, large or small,** from Bodypoint Designs, Inc. www.bodypoint.com or www.1800wheelchairs.com
- 5. Neck towel roll:** 100% chamois, PakTowl (brand name) I get mine from Campmor; www.campmor.com but they can be obtained from many camping/hiking/outdoor stores.
- 6. Chair Hugger and Cuddle loop** (from Abilitations catalog) www.abilitations.com
- 7. Memory Foam Noodle;** www.walmart.com or www.amazon.com or www.homedepot.com
- 8. Rapid Straps,** from Sammons Preston (Patternson Medical) now, Performance Health, www.performancehealth.com
- 9. G.R.I.P. solutions;** lots of "sticky mats" instead of dycem, really reasonable, not sticky and work great. www.mygripsolutions.com
- 10. Adjustable Height Bench,** can be from Kaye Products or other
- 11. Floor mat** or table mat (from anywhere)
- 12. Rapid Strap Kits** (from Preston Sammons, now www.performancehealth.com)

PRODUCTS to look for and use in pediatrics:

- 1. KidWalk**, finally a hands-free walker, meant to help kids get close, also able to get child in in less than 30 seconds only, in two sizes, but they're quite adjustable (for lots of growth). Developed by pediatric therapist with real kids, for real movement, nothing like it. Can use headrest bracket with a head array and proximity switches too!! Can potentially replace standers. Is manufactured and obtained from Prime Engineering, Inc.
www.primeengineering.com
- 2. X-Panda**, a great high/low chair, uses only one tool (and it's on-board); seating is truly adjustable, not just one piece, can get feet onto floor by taking off footrests completely. Developed by therapists from Europe. Uses one tool, and it's "on board." Also can be configured as a "dynamic" seat, similar to Rock Active's motion. Has various bases, to work from. Distributed by Snugseat, www.snugseat.com
- 3. Nandu**, a smaller high/low chair with low back. . www.snugseat.com
- 4. Activity Chair**, another high/low chair by Rifton. Comes with a rolling base or a standard base.
www.rifton.com
- 5. Leckey's High/Low Chairs; Leckey Mygo and Squiggles**; distributed by Ottobock. .
www.ottobockus.com
- 6. Aquanaut Toilet Chair**, distributed by Ottobock. . www.ottobockus.com
- 7. Theratogs**; www.theratogs.com ****now- DragonFly trunk support, too.
- 8. Cuddle Loop**; www.abilitations.com
- 9. Danmar Products , Hensinger head support but with two part mounting.**
www.danmarproducts.com

Electronic and Other Switches

- 1. Proximity Switches** *I use these the most often, as I find them extremely adjustable to most circumstances.*

Single sensors:

- Can be used with a battery pack in a single or two, three or four, five switch combination for hands, for head, in a tray, or on a headrest
- Can be "Adjustable" (larger switch, can be placed under or behind head array) or "Fixed" (one distance)
- Can also be obtained to attach directly to computer via USB port (for power) with dual mono-plugs and two sensors

Head array:

- Can be purchased within a head rest: 2 or 3 switches, I use the "mini" head array or the "Elite Head array with mini lateral pads"

- 2. Fiber optic switches**

- Can be located anywhere, but cable must be protected, generally best in a tray, or in tubing
- Have adjustability in distance (nearness) to switch
- Multiples can be placed very close together if ROM is compromised

- 3. Photo electric switch**

Also has adjustability, I have used this to assist in powered mobility driving with kids with visual impairments, attached to a buzzer/audio feedback to "mark" nearness to wall in hall

From: Adaptive Switch Labs, Inc. 125 Spur 191, Suite C, Spicewood, TX. 78669; 800-626-8698. www.asl-inc.com

- 4. TASH Switches** (send for a catalog, these are not all, just ones I often use. Owned by Ablenet)

TASH SCATIR switch (, Electronic switch) Self calibrating auditory tone infrared) switch, mounted on a gooseneck

From:TASH, Inc.(Technical Aids & Systems for the Handicapped), www.ablenetinc.com

- 5. Ablenet switches**

Candy Corn switch: a proximity switch with internal battery. Has auditory beep, I prefer to NOT have a beep as I think it distracts from the activity, but some adults like it. Does not work with toys.

From: ABLENET, Inc., www.ablenetinc.com

Switch Mounting *(This is not an inclusive list, just some I use now and like)*

1. Slim Armstrong Mount From: ABLENET, Inc., 1081 Tenth Ave. S.E., Minneapolis, MN 55414-1312; 1-800-322-0956; FAX: 612-379-9143; www.ablenetinc.com

2. Switch Mounting Arm, www.asl-inc.com

3. Switch Mounting Systems, even separate switch Hardware, and Switch Mounting Kits from TASH (see under switches), www.ablenetinc.com

4. Stem Switch Mount and Communication mounts by Daedalus Technologies, Inc., 2491 Vauxhall Place, Richmond, BC, Canada, V6V 1Z5; 1-800-561-5570; FAX: 604-244-8443: Mounting systems for switches, communication aids, too and trays. Especially helpful, and ;make custom systems. Make attachments and “mounting blocks” for all Tilt bases. My most favorite systems, reliable, adjustable, and durable. www.daessy.com

5. Magic Arm System, 2 systems: ultimately adjustable with nice knob, “**Stick and suck**” pads for easy switch placement instead of velcro

From: R.J. Cooper, 24843 Del Prado Suite 283, Dana Point, CA 92629, 1-800-RJCooper; www.rjcooper.com

Mouse Emulation and Multiple Switch Interfaces

1. Mouse emulation, 3 switch, both wired and wireless, USB

This 3 switch configuration (one switch moves cursor up & down, one switch moves cursor right and left, one switch controls click, double click and click ‘n drag). The “hard-wired” mouse emulator is both a 3 and 5 switch, can be configured either way. However, if “wireless” is chosen and you obtain both a transmitter and receiver, then the emulator is only 3 OR 5 switch and cannot be reconfigured. As far as I know at this time, the 3 switch wireless configuration can only be obtained from Adaptive Switch Labs, Inc. .

From Adaptive Switch Labs, Inc. www.asl-inc.com or TASH, Inc. www.ablenetinc.com

2. Switch-Adapted Mouse

I use switch adapted mice all the time. Have USB, and can be used at any computer and most white boards, I then use an electronic switch for the Left Click to work with students together. I can teach mouse use, and work with students at managing the internet. Then, I can move into independent mouse emulation. My two favorites are a standard switch adapted mouse, and the BIGGIE switch adapted track ball. From; **Infogrip** www.infogrip.com

3. The Head Mouse

I love the head mouse. However, many of the children I work with can’t get control of it quickly, as they are very unfamiliar or inexperienced with the programs/software they are attempting to control. Consequently, another form of mouse emulation or alternative mouse, I think, is more helpful to begin. Once an application or other software becomes very familiar, then a new method of access can be tried. This is when a Head Mouse can be tried. Many of the manufacturers of these costly products do have “loaner” programs, please avail yourselves of these for your students/patients/clients. However, you need to learn to use it first, not just set it up for them to use. You move it through the programs to be tried, and become more familiar with it yourself. I have been around these Head Mice for a long time, and they have come down in price, and “new” ones appear periodically. Please don’t just look for the cheapest one, make sure you know the company, how long they’ve been around, how many have they sold and serviced, and what happens if one breaks?.. Instead of “saving” money up front, “spend” money wisely, by purchasing reliable, durable products. Here is my favorite:

Origin Instruments’ Head Mouse and Head Mouse Extreme: www.orin.com

I saw several new products at CTG this year, and at ATIA, but I haven’t yet used them. But make sure you pay attention to how the device mounts, how it is calibrated and most importantly, what software are you managing.

You will need to also look at **On-Screen Keyboard programs** when using a head mouse. Make sure you look carefully through these, too. Again, you can find them through searches on the internet, your local AT resources may have some, but, again, look at **Infogrip**, as they carry several choices, including the popular REACH on-screen keyboards. Then, you need to choose looking at **word prediction and screen reading programs** too.

Communication Device Mounting

1. Each Augmentative Communication device Manufacturer has mounts for their systems, Prentke-Romich, Dynavox, Salttillo, Words+, Zygo, etc. . These are made to fit their devices exactly, and I usually order from them. HOWEVER, you must know where and on what brand chair, and the tubing diameter of that chair's part so that you make sure they will fit the chair. Each chair and each part of each chair is NOT the same diameter tubing.

2. If there is unique tubing, or the company does not make a size to fit your child's chair, call Daedelus below because they can make a fitting for ANY Chair!

Daedelus Technologies, Inc., 2491 Vauxhall Place, Richmond, BC, Canada, V6V 1Z5; 1-800-561-5570; FAX: 604-244-8443; Mounting systems for communication aids, too, switches, and trays; www.daessy.com

3. **Mount'n Mover**: I also really love this new company's products. I think this will really change our whole choice categories for mounting. Please see and try: Mount'n Mover. www.mountnmover.com

Seating System Components

1. **Adaptive Engineering Lab**, P. O. Box 12930, Mill Creek, WA 98082-0930; 800-327-6080; FAX: 800-368-0785; Makes all types of seating accessories, as the two companies above, nice quick release brackets, & adjustable summer/winter hook-ups; love their Posa-fit trunk laterals. www.aelseating.com

2. **Freedom Designs, Inc.**, 2241 Madera Rd., Simi Valley, CA 93065, 1-800-331-8551; www.freedomdesigns.com

3. **Adaptive Equipment Systems**, AES East; 7128 Ambassador Road, Baltimore, MD 21244; 1-800-237-2370; FAX: 800-617-2370; Make all types of seating accessories, and custom make products, also very helpful over the phone. Finally a company who makes a Pediatric size pelvic positioning belt with accompanying small belt closure. Have Lil Kiddo's seating, with small hardware. www.sunrisemedical.com .

4. **JAY Medical**, .from: Sunrise Medical/Quickie, 7477 East Dry Creek Parkway, Longmont, CO 80803; 800-333-4000; Manufacturer of JAY products including the JAY GS system, pressure relief cushions, drop down seats, seat and back cushions, etc.; always adding new cushions and/or mounts, check site often. www.sunrisemedical.com

5. **Miller's Adaptive Technologies**, ,2023 Romig Road., Akron, OH 44320; 1-800-837-4544; FAX: 216-376-4948. Make multiple hardware parts and seating components. including various types of clamps. Also have extensive catalog, be sure to obtain it. They have been in business a long time, and are happy to make customizations for a specific situation. Most hardware is especially durable. www.millersadaptive.com

6. **Bodypoint Designs, Inc.**, 80 South Washington #303, Seattle, WA 98104; 1-800-547-5716; prefer their pelvic positioning belts, are padded, and stable, come in various types. also make other seating products like chest harnesses, trays, etc. Also like their new padded ankle supports. Are carrying NEW BED mattress system, very worth looking at, and soon to be carrying a rigid pelvic assist positioner. www.bodypoint.com

7. **Roho Inc.**, From: Crown Therapeutics Inc., 100 Florida Ave., Belleville, IL 62221-3429; 800-851-3449 dry flotation or air cushions and seating products, best for pressure relief, very effective. www.therohogroup.com

8. **RIDE Designs**, Decaf Back and Forward Cushion: 4211-G South Natches Court, Sheridan, CO, 80110; 1-866-781-1633email: info@ridedesigns.com; www.ridedesigns.com;

Custom Molded Seating Products

1. **Otto-Bock's OBSS** (CAD-CAM custom seating;) seating developed on a simulator and then "copied" via light pen into computer for a CAD-CAM development. . OTTO BOCK Two Carlson Parkway Suite 100, Minneapolis, MN 55447-4467; 1-800-328-4058, Contact local vendor. www.ottobockus.com

2. **Precision Fit and Signature 2000**; Uses the simulator, but then a "photo" is taken and from that, the custom contour product is developed. They have added "tempurpedic" foam to top their systems. 11861 East Main Road, North East, PA 16428; 814-725-87311; FAX: 814-725-2934; www.prmrehab.com

3. **Contour-U seating**; a negative mold is taken of the patient and then shipped to company for the seat and back to be formed, covered and returned to be mounted within the chair. Cushion feels like a dense type foam.

Both systems are from **Pin-Dot now owned by Invacare Corporation.** www.invacare.com

4. **Silhouette System**; custom seating developed on a simulator, not as aggressive as two systems above, but does allow more contour and support. Also available through Invacare. www.invacare.com

5. **Foam in place** Various manufacturers make molds which are created literally while the person is sitting. They are either “partially” foam in place or totally “foam in place” where a cover is added. This is done in “real time” but it is a one-shot deal, can’t be altered, is done once only.
6. **Matrix Seating:** not molded as above, a totally different method, contoured with many, unique, build-able, changeable, pieces, more popular in Europe, now available here and in Canada. Have worked with a few kids who had it, haven’t recommended it myself, but am interested in it and its use, as it is “thin” rather than so “thick” as all systems above. From: Matrix USA www.matrixseatingusa.com
7. **Free Form Seating**, not molded just like matrix system above, and from the same original inventor as above, but sell backs separately, I am very excited about this product. www.symmetric-designs.com

Interesting Further Reading:

This is not a bibliography, as I have shared with you, instead my own understandings and musings as a treating therapist who has had so many wonderful children as a part of my clinical life. However, I do attempt to base my observations, thoughts, and attitudes not only on experience but also on current and past readings, and studies of others. These books I have found particularly helpful to me, I offer them to you for further study yourself, if you so choose. This is by no way a comprehensive list, but rather a good beginning.

1. Prescriptive Seating for Wheeled Mobility, Vol. 1, Theory, Application and

Terminology, By Diane E. Ward, M.Ed., OTR, Published by: Healthweath International, 517 NW 103 Avenue, Ft. Lauderdale, FL 33324-1625; www.hlthwlth.com ; 954-472-0517

*****I love this book, every therapist involved in seating should have it to refer to, and read frequently. Will help in the “big” picture, and explain all terminology accurately. I use this text in my graduate course. Don’t think it’s “old” just because AOTA no longer carries it.*

2. Ergonomic Seating, A True Challenge; Wheelchair Seating and Mobility Principles, By

Bengt Engstrom, P.T., Published by: Posturalis Books, Sweden, copyright, 2002

Email: pbooks@telia.com *****I also love this book, not for “kids” but for its humanity expressed by a therapist who really did and does observe the client. Wonderful section in last chapters on training and use of manual wheelchairs. Hard to find now, as it is out of print in English.

3. Clinical Assessment and Training Strategies for the Child’s Mastery of Independent

Powered Mobility By Karen M. Kangas OTR/L, updated 2008, booklet can be purchased directly from author (by check or money order to Karen M. Kangas OTR/L, for \$22.00 includes S&H)

4. Sensory Integration, Theory and Practice by Anne G. Fisher ScD, OTR, Elizabeth A. Murray, ScD, OTR and Anita C. Bundy, ScD, OTR copyright 1991; published by F. A. Davis Company, Philadelphia OR (I think this has replaced it)

Sensory Integration, Theory and Practice, 2nd edition, By Bundy, Anita; Lane, Shelly; Murray, Elizabeth, ISBN ; 0545-5 from F.A. David Company, 1-800-323-3555;

www.fadavis.com

5. Early Diagnosis and Intervention Therapy in Cerebral Palsy edited by Alfred Scherzer, 2001, ISBN: 0-8247-6006-9, Marcel Dekker, Inc., New York, Basel; www.dekker.com

6. Sensory Integration and the Child by A. Jean Ayres from Harcourt Publishing (previously Therapy Skill Builders); www.psychcorp.com (Dr. Ayres wrote this book for parents, but I think it is so readable, it helps all of us in our busy lives to remember the issues and concepts we need. Then, we can go back and re-read her textbooks.)

7. **Understanding the Nature of Sensory Integration with Diverse Populations** by Susanne Smith Roley, Erna Blanche, and Roemann Sc. Schaaf from Harcourt Publishing (previously Therapy Skill Builders); www.psychcorp.com
8. **Occupational Therapy for Children**, 4th edition, edited by Jane Case-Smith, Chapter 20, "Mobility", (By Christine Wright-Ott), 2001, published by Mosby, Inc.
9. **Sensory Integration and learning disorders** by A. Jean Ayres, copyright 1972, Los Angeles: Western Psychological Services (can be obtained at www.amazon.com too)
10. **The Child's Conception of the World**, by Jean Piaget (1969), Littlefield, Adams & Co., Totowa, New Jersey (can also obtain from www.amazon.com)
11. **The Origins of Intelligence in children** by Jean Piaget (1952) New York: W. W. Norton
12. **The Mechanisms of Perception** by Jean Piaget (1969), New York: Basic Books
13. Any books by T. Berry Brazelton, M.D, and others by Stanley Greenspan (check all bookstores.)

Some Additional Articles of interest:

1. **"Translating Motor Control and Motor Learning Theory into Occupational Therapy Practice for Children and Young Adults,"** Part One, Nov. 17, 2008, Part Two, Jan .19, 2009, American Occupational Therapy Associations (AOTA Publications) OT Practice.
2. **"Prognosis for Gross Motor Function in Cerebral Palsy"** by P.Rosenbaum, S. Walter, S. Hanna, JAMA (Journal of American Medical Association), Sept 18, 2002; 288; 1357-1363
3. **"Prevention of serious contractures might replace multilevel surgery in cerebral palsy"** Journal of Pediatrics Orthopaedics, Part B/European Pediatrics Orthopaedics, 2005, July 14 (4) 269-73
4. **"Therapeutic interventions for tone abnormalities in cerebral palsy"** Journal of the American Society for Experimental Neuro Therapeutics, 2006, April 3(2) 217-27
5. **"Effect of intrathecal baclofen on dystonia in children with cerebral palsy and the use of functional scales"** Journal of Pediatric Orthopaedics, 2008, vol. 28 pp 213-217
6. **"Abnormalities of tactile sensory function in children with dystonic and diplegic cerebral palsy"** By Sanger, Dept of Neurology, Journal of Child Neurology, (2007) vol. 22, 289-293
7. **"Can spasticity, dystonia be independently measured in cerebral palsy"** By Gordon, Keller, Stashinski, Hoon, Bastian, Pediatric Neurology (2006), Vol. 35, p. 375-381
8. **"Driving to Learn: a new concept for training children with profound cognitive disabilities in powered wheelchairs"** By, Nilsson and Nyberg (from Sweden), published, 2003, American Journal of Occupational Therapy, March/April 2003, 57,2
9. **"Use of Power Mobility for a Young Child with Spinal Muscular Atrophy":** by Maria Jones., McEwen, and Henson, Journal of American Physical Therapy, Volume 83, No. 3, March 2003
10. **"Powered Mobility and preschoolers with complex developmental delays:** By Deitz, Sunth, and White, American Journal of Occupational Therapy, 2002, 56, p.86-96
11. **"Evaluation of Powered Mobility Use in Home, and Community Environments,"** By Wiatt, Darrah, Cook, Hollis, May; Physical, Occupational Therapy, Pediatrics, 2003, 23 (2), 59-75
12. **"Evaluation Needed for Powered Mobility for Young Children or children with significant Developmental Delays,"** By Karen M. Kangas OTR/L, International Seating Symposium Paper, p.96-98, ISS 2006, published 2006
13. **Who Needs Power?** By Liebel, OTR, and Fischer, OTR, International Seating Symposium, 2005, P. 195-197
14. **"Family priorities in Activity and Participation of Children and Youth with Cerebral Palsy"** ByChiarello, Palisano, Maggs, Orlin, Almasri, Lang and Chang *Physical Therapy Sept 2010 (Journal of APTA), pp. 1254-64.*
15. **"Pediatric Outcomes Data Collection Instrument Scores in Ambulatory Children with Cerebral Palsy: an Analysis by Age Groups and Severity Levels"** By Barnes, MD; Linton, PT; Sullivan, PhD; Bagley, PhD; Oeffinger, PhD.; Mark,MD; Daminao, PT; Romness, MD; Rogers, Tylkowski, MD, *Journal of Pediatric Orthopaedics*, Jan/Feb 2008, Volume 28; Issue 1, pp. 97-1032
16. **"Analysis of the Pediatric Outcomes Data Collection Instrument in Ambulatory Children with Cerebral Palsy Using Confirmatory Factor Analysis and Item Response Theory Methods"** By Allent, Foteon, Oeffinger, Tylkowski, Tucker, Haley *Journal of Pediatric Orthopaedics, March 2008, Volume 28, Issue 2, pp. 192-198*

17. **“Sensory Processing Abilities in Children Who Have Sustained Traumatic Brain Injuries”** By Galvin, Froude, Imms, *American Journal of Occupational Therapy*, Nov/Dec 2009, Vol. 63, Nbr. 6
18. **“Can spasticity, dystonia be independently measured in cerebral palsy”** By Gordon, Keller, Stashinski, Hoon, Bastian, *Pediatric Neurology* (2006), Vol. 35, p. 375-381
19. **“Therapeutic interventions for tone abnormalities in cerebral palsy”** *Journal of the American Society for Experimental Neuro Therapeutics*, 2006, April 3(2) 217-27
20. **“Mobility experiences of adolescents with cerebral palsy”** By Palisano, Shimmel, Stewart, Lawless, Rosenbaum, Russell *Physical and Occupational Therapy in Pediatrics*, 2009; 29 (2) pp. 1355-55
21. **Powered Mobility and Socialization in Pre-school, a Case Study of a Child with Cerebral Palsy, A research report”** By Ragonesi, Chen, Agrawal and Galloway, *Pediatric Physical Therapy*, 2010, Vol 22, Issue 3, pp. 322-329
22. **Use of Manual and Powered Wheelchairs in Children with Cerebral Palsy: a cross-sectional study**, By Rodby-Bousquet, Hagglundm Dept of Orthopaedics, Lund University, Lund Sweden, Centre for Clinical Research, Uppsala University, Vasteras, Sweden, *BMC Pediatrics*, 2010 10: 59

Other Information:

1. My Streaming Video Webinars:

PaTTAN (Pennsylvania Training and Technical Assistance Network) <http://pattanat.com>

“The Challenge of Integrating the Use of Assistive Technology Equipment for Independent Control and Access of Multiple Systems”

“The Challenge of Developing Consistency of Access”

2. Other PaTTAN webinars

www.pattan.net ; Choose “Videos” Then Search my name: Karen Kangas

“AT Tools for Computer Access for Students with Complex Bodies -Hands On Lab”

“Configuring and Teaching AT Tools for Computer Access for Students with Complex Bodies”

3. Including Samuel www.includingsamuel.com

4. Gross Motor Function Classification System for Cerebral Palsy By Palisano, Rosenbaum, Walter, Russell, Wood, Galuppi, Google the title (is in various places on internet, easily downloadable)

5. Curriculum Access for Students with Low Incidence Disabilities: The Promise of Universal Design for Learning (also can google article title)

http://aim.cast.org/sites/aim.cast.org/files/LowIncidenceReport_101305.pdf

Orthotic Vest Construction Instructions

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I work with an orthotist or a certified orthotist technician to make this vest. They are very used to making TLSO's, and at first may be skeptical regarding the use of this one. This is a lightweight trunk orthosis. It can be billed as such, and should be billed at the cost of labor, materials, etc. by the orthotist. *(It has been funded here in PA by all insurance companies and by Medicaid as a lightweight trunk orthosis. I have been informed that it has also been funded in other states, where I have taught workshops and its use. The cost varies, as it is my understanding that if the orthotist must measure the child and then make a "mold" and "send it out" for construction, obviously the labor is much more extensive and expensive. If the child and family can attend an orthotist's construction site, and the vest is made right there, directly on the child, the costs appear to be less, obviously, for less time and labor. I do not "set" the costs, the orthotists bill for this "vest" as to their labor costs and time for construction.)*

A prescription for "a lightweight trunk orthosis" is needed by a physician, for the child. I suggest that the therapist and/or family talk to the child's family physician and/or pediatrician, specifically describing what the vest is and why the child needs it.

This vest is a lightweight, low temperature plastic, formed to fit the child's trunk. Plastazote, the "pink/flesh" color is soft, and it is important to use 1/2" depth. It does not matter if the plastazote is perforated or not, but the 1/2 inch dept is critical. If the child has a feeding tube, a hole can be cut out (through both layers) to readily accommodate it.

Straps are most effective if they are totally circumferential. This is a softer material and if straps are only put on in the front and attached with grommets and use a D-ring only, frequently, the straps are then "pulled" too hard, to tighten, and the grommets can pop out of the material. *However, if the grommet type strapping is chosen (both work, I have no preference, it is usually the orthotist's preference I follow), please make sure that instructions are shared with all adults who assist the child in getting in and out of the vest. This includes holding onto the grommetted part securely when pulling the strap closed. This is NOT an MAFO or AFO strap. The plastazote is a "soft" material, and the strap will pull right out of the material, if the strap is pulled too hard, without assisting it by holding onto the strap's base at the grommet.*

This orthotic is to be worn by the child during an activity to assist them in using and maintaining an independent upright posture, and prevent the trunk from collapsing. As a therapist with a lot of experience with children with complex bodies (i.e. children with hypertonicity, spasticity, dystonia, athetosis, and tone fluctuations) as I handle some children, the trunk frequently collapses and the head drops. This appears to be a protective-type, tactile reaction of the trunk. This trunk collapsing is strongly activated by a singular point of pressure from my hands during treatment. The children's trunks also can be observed to "hang" on their chest straps or trunk supports. This vest prevents the collapsing, yet also acts as a "barrier" to the sensation of singular points of contact. The child is then able to more readily utilize weight bearing in the pelvis (while they are in treatment or how we have created their seating system) and learn to integrate the use of the shoulder girdle with the pelvic girdle, learning to use an increased upright alignment in the trunk and head while engaged in activity.

Frequently, orthotists have shared with me a healthy skepticism regarding the use of this material, when forming a lightweight TLSO. When they observe the child's trunk, they may see it as a "lack of control" and want to "correct" this posture by adding a much stronger, harder material, even a bi-valved TLSO with steel stays. We do not want a TLSO to "control" the trunk. We are using this low-temperature, lightweight material to assist us in handling the child during treatment to prevent the protective reaction of collapsing and instead assist the child's body in using its own righting reactions and upright postures. With this very specific, low temperature material, the child does not have difficulty getting used to it, and any adjustments needed to be made (pressure under the axilla, or at the hip) can be made by simply cutting the material, it does not have to be re-formed, nor re-heated. The material needs to be just firm enough to prevent a full trunk collapse, and to prevent the sensation of a singular point of pressure. We are using this vest not as a "corrector" but rather as an "assist" in sensory processing

within the body, during activity. We are able to assist the child in utilizing her own postural mechanisms for upright postures rather than her protective reactions which can occur from our own handling.

To make the vest, the orthotist needs to measure the child as they would for any TLSO. This measurement would usually be on an examining table, while the child is in supine. They need to measure from the axillae to the ASIS, and in the rear (with the child moved to side-lying) the PSIS. Then the circumference of the vest, is in one piece, it is NOT valved.

Measure the child's trunk from one nipple all the way around to the same nipple, then add an addition length from one nipple to the other. (In short, the vest will lay over itself on the front of the child from nipple to nipple). This will give it some additional strength, to prevent collapsing. The straps are then placed on the vest circumferentially with the closure being on the front.

The vest must be formed around the ASIS's so that it will sit properly on the hipbones, when the child is seated in an upright posture. There should be enough room, that in the fitting, the child's hip can be fully flexed.

The child wears a T-shirt for the construction (and while wearing the vest). Since this is a low temperature material it only takes only a few minutes in the oven at the orthotist's to heat the cut material. Then, the orthotist will come out, and the treating therapist needs to assist him/her by lifting up the child, laying them on the material, bringing the material around and over the front of the chest. One person pulls the material over the other, while the other adult presses in at the hips for some curvature of the material there. The vest is then taken off the child and the orthotist then completes the fabrication. They will add straps to it, on the front, and usually sand or bevel out the edges; especially at the front where the pieces lay over each other. The whole process from measuring, to heating, to fitting, to creating, has never taken more than an hour, and is often closer to 30 minutes.

It is actually a very simple process, every orthotist will recognize it as a quite simple TLSO, made of a much more lightweight material. Again, this TLSO is not meant to prevent scoliosis, or, in fact, control the body at all, but instead, it is a vest which is used during activity and treatment, to prevent an over-collapse of the trunk due to postural inexperience and to prevent the trunk from its protective reaction of collapsing when reacting to single points of pressure. This vest is not worn all day, nor for long periods of time. It is used as a part of treatment, and during treatment and activity. (Some orthotists may have made a very similar vest as a "quick" vest post surgical spinal rod insertion with children who have muscular dystrophy.)

In summary the vest is made from Plastazote; a low temperature plastic material, lightweight and less conforming than standard, valved, TLSO orthotic jackets. Pink/flesh color is SOFT too. Use the 1/2" depth. (Even on small and younger children the 1/2 inch is critical, if 3/8 inch is used, the vest is not effective, it is too soft.) The softness of this vest is critical in its application as it does NOT completely conform to the body and does not "control" the body. It is, instead, used for sensory processing and sensation issues, assisting the child's body in developing its own postural control and upright postures. Plastazote can be obtained from

From: Cascade Orthopedic Supply, www.cascade-usa.com or Friddle's Orthopedic Appliances; www.friddles.com (These manufacturer's are well known to orthotists.)

If there are any questions or concerns regarding this construction, please do not hesitate to contact me. *(I will readily email you photos of real children in the vest and its construction to accompany these instructions.)*

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Date: 4/15/18

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