

AHA conference, St. Louis, MO, March 2013 **Overview of the Literature on Hippotherapy, Tim L. Shurtleff, OTD, OTR/L**

| Peer Reviewed research Studies | | Study Type/Category Or, with 100% correspondence | | Control | n |
|--|------|--|---|---------|--------------|
| Authors | Year | Title (may be abbreviated) | Study Type/Category Or, with 100% correspondence | Control | n |
| 1 Araujo, Silva, Costa, Pereira, Safons | 2011 | Effect of equine-assisted therapy on the postural balance of the elderly | Convenience w/ control | Y | e=10 c=7 |
| 2 Benda, McGibbon, Grant | 2003 | Improvements in Muscle Symmetry in Children w CP after EAT (HPOT) | pre-post w 1/2 rand. control | Y | n=15(c=half) |
| 3 Bertoli | 1988 | Effectiveness of THR on Posture in children with CP | Baseline-pre-post | N | n=11 |
| 4 Casady, Nichols-Larsen | 2004 | The effect of hippotherapy on ten children with cerebral palsy | Baseline, pre-post, washout | own | n=11 |
| 5 Debusse, Gibb, Chandler | 2009 | Eff of HPOT on people w/ CP from users perspective, a qualitative Study | Interviews & Focus groups | N | n=17 |
| 6 Drenzio, Drenzio, Baceski | 2007 | Heartrate response to TR in Children with CP, exploratory study. | Compare two groups | N | n=8 |
| 7 Encheff, Armstrong, Masterson, Fox, Gribble | 2012 | HPOT eff on Trnk, Pelv, Hip Motion During Ambulation in C w/ Neuro Impairmntn | Pre-post | N | n=11 |
| 8 Granados, Agis | 2011 | Why C w/ Spec Needs Feel Better w HPOT sessions: a conceptual review | Literature review | N | NA |
| 9 Haehi, Giuliani, Lewis | 2011 | Influence of HPOT on kinematics and funct. Perf of 2 Children with CP | 2 Case Studies, exp vs. novice | N | n=2 |
| 10 Hammer, Nisgard, Forsberg, Pepa, +2 | 1999 | Eval of TR/HPOT, sgl subj exp design in 11 patients with MS | Sgl Subj Exp design, ABA | own | n=13 |
| 11 Hamil, Washington, White | 2005 | Eff of HPOT on Post. Ctrl in sitting for children with CP | Conv. Sample | N | n=3 |
| 12 Herrero, Asensio, Garcia, Marco, +2 | 2010 | Stud. Of Ther. Eff of Adv. HPOT simulator in C. w. CP, a RCT./ | RCT | in plan | none |
| 13 Ionatamishvili, Tsverava, Loriya, +2 | 2002 | Riding therapy as a method of rehab of children with Cerebral Palsy | RCT | Y | e=50, c=50 |
| 14 Kuznysky, Slonka, | 1999 | Infl of Artificial Saddle riding on Postural Stability of children with CP. | RCT | Y | e=25, C=33 |
| 15 Kwon, Chang, Lee, Ha, Lee, Kim | 2011 | Eff of HPOT on gait parameters in children with bilateral CP | RCT | Y | CP |
| 16 Lechner, Tanja, Kakebeke, Hegemann, Baumberger | 2007 | Eff of HPOT for children with Language-learning disabilities | RCT | Y | CP |
| 17 Macauley, Gutierrez | 2004 | Trunk Postural reactions in C w/ and w/o CP during THR | RCT | Y | CP |
| 18 MacPhail, Edwards, Golding, Miller, Mosier, Zwiers | 1998 | Immed Eff of a HPOT session on Gait parameters in C w. Spastic CP | Immed & Long Term eff of HPOT on symmetry & Funct in Children w/ SCP I | N | n=12 |
| 19 Mcgee, Reese | 2009 | Immed & Long Term eff of HPOT on symmetry & Funct in Children w/ SCP II | Immed & Long Term eff of HPOT on symmetry & Funct in Children w/ SCP II | N | n=3 |
| 20 McGibbon, Benda, Duncan, Silkwood-Sherer phase I | 2009 | Eff of Equine Mvmt. Therapy pgm on gait, energy, motor func in C w SCP | Pre-Post RCT, clinical followup | N | n=3 |
| 21 McGibbon, et al Phase II (2nd study in above article) | 2009 | The Effect of HPOT on Func Outcomes for C with Disabilities: A Pilot Study | base, pre, post, followup meas | Y | e=6, c=7 |
| 22 McGibbon, Andrade, Widener, Cintas | 1998 | Changes in Trunk/Head stability after HPOT, a pilot Study | Convenience/Pre-post | N | n=9 |
| 23 Murphy, Kahn-D'Angelo, Gleason | 2008 | Changes in dynamic trunk/head stability and functional reach after HPOT | Pre-Post RCT, clinical followup | N | n=47 |
| 24 Shurtleff, Engsborg | 2010 | Effects of Hippotherapy on Postural Stability in persons with Multiple Sclerosis | base, pre, post, followup meas | own | n=6 |
| 25 Shurtleff, Standeven, Engsborg | 2009 | HPOT: Intervention to habituate balance deficits in children w mvmt disorders | base, pre, post | own | n=5 |
| 26 Silkwood-Sherer, Warmbier | 2007 | Volitional Chg in C w Autism: A Sgl-Case Study of Impact of HPOT on Motivation | base, pre, post | own | n=4 |
| 27 Silkwood, Sherer, Killian, Martin | 2012 | | base, pre, post | own | n=6 |
| 28 Taylor, Kielhofner, Smith, Butler, Cahill, Ciukaj, Gehman | 2012 | | A-B (8wks)-B(8wks) | own | n=16 |
| 29 Aldridge, Schweighart, Easley, & Wagoner | 2011 | Eff of HPOT on motor performance and function with bilateral DDH | Single Case; A-B design | own | n=1 |
| 30 Champagne, Dugas | 2010 | Improving gross mot. funct. & post. ctrl w HPOT in down syndrome: cases | 2 Case Studies, pre-post | own | n=1 |
| 31 Collins, Jamieson, Knueven, Hakim, & Sensbach | 2005 | Case Report: Eff of HPOT on Bal and Func Perform in child w Neurological Disorder | Single Case | N | n=2 |
| 32 Frank, McCloskey, Dole | 2011 | Eff of HPOT on self-competence&particip. in a child with cerebral palsy | Single Case | N | n=1 |
| 33 Shurtleff & Engsborg | 2012 | Long-term effects of HPOT on 1 child w CP: A research case study | Single Case | N | n=1 |
| 34 Wehofer, Goodson, Shurtleff | 2013 | Equine Assisted Activities and Therapies: A Case Study of an Older Adult | Single case | own | n=1 |
| 35 Zadnikar & Rugelj | 2011 | Postural stability after HPOT in adolescent with CP | Single Case | own | n=1 |
| 36 Bronson, et al. | 2010 | Does HPOT improve balance in persons w MS: a systematic review | Systematic Review | mixed | n=3 studies |
| 37 Whalen, Case-Smith | 2012 | Therapeutic Eff of HBRT on GMF in C w CP: A syst. Rev. | Systematic Review | Mixed | n= 9 studies |
| 38 Rollandelli & Dunst | 2003 | Influences of HPOT on motor and socio-emotional behav of young children w disabilities | Systematic Review | N | n=13 studies |
| 39 Snider, Korner-Bitensky, Kamman, Warner, Saleh | 2007 | Horseback Riding as Therapy for Children w CP: evidence of effectiveness? | Systematic Review | NA | n=9 studies |
| 40 Zadnikar & Kastrin | 2011 | Effects of HPOT and THR on postural control or balance in children with CP | Meta-analysis | NA | n=8 studies |
| 41 Clayton, Kaiser, de Pue, Kaiser | 2009 | Center of Pressure Movements During Equine-Assisted Activities | Outcome measure Evaluatio | Y | e=4, c=4 |
| 42 Janura, Peham, Dvorakova, Elfmak | 2009 | An Assmnt of pressure dist by rider on back of horse during HPOT | NA, not an intervention study | N | n=4, 1 equin |

| | Intervention outcomes | Self-Reported Improvement from HPOT | Peer review | Journal | Country |
|----|--|---|-------------|--|----------------|
| 1 | TUG improved, COPy (AP static balance). | Yes | Y | Revista Brasileira de Fisioterapia | Brazil |
| 2 | Improved L-R muscle symmetry | no | Y | J of Alt. and Comp. Med. | USA |
| 3 | Improved posture, tone, balance, function | yes | Y | Physical Therapy | US |
| 4 | Valuable TX strategy, can maximize function | yes | Y | Pediatric Physical Therapy | US |
| 5 | User perceptions: HPOT is effective: phys/psych | NA | Y | Physiotherapy Theory and Practice | UK |
| 6 | HR response to TR differs between disability levels | Unclear | Y | Pediatric Physical Therapy | USA |
| 7 | more normalized pelvic position after HPOT | p used for d, d=mid to high | Y | Pediatric Physical Therapy | USA |
| 8 | Recommend further HPOT research, min 12 wks, | NA | ? | J of Alt. and Comp. Med. | Spain |
| 9 | ↑ anticipatory Post coord., functional mobility | Yes, (PEDI norms) | Y | Pediatric Physical Therapy | USA |
| 10 | No improvement in one or more variables in 10 pts. | Diff. effect by person | Y | Physiotherapy Theory and Practice | Sweden |
| 11 | No improvement for high level of impairment | no | Y | Phys & Occ therapy in Pediatrics | USA |
| 12 | None, this is a research plan, not implemented | not yet | Unk | BMC Musculoskeletal Disorders | Spain |
| 13 | Physical and psychosocial improvements | Physical p<0.001 | Y? | Human Physiology | Russia |
| 14 | Chgs in stiffness, reduction in sway-> two planes | Yes | Y | Gait and Posture | Poland |
| 15 | HPOT improved gait & Balance in C w Bilat CP | no (gait), yes GMFM-E,66, PBS | Y | Archives of Phys Med Rehabilitation | S. Korea |
| 16 | HPOT reduces spasticity temporarily, pos mental | Yes on spasticity and mental | Y | Archives of Phys Med Rehabilitation | Switzerland |
| 17 | HPOT more successful in improving speech | Yes, on pre-post results | Y | Communications Disorders Quarterly | USA |
| 18 | CP move diff on horse vs WD. Kine works as meas | NA, CP & WD signif. different. | Y | Pediatric Physical Therapy | Canada |
| 19 | No diff in gait parameters after 1 HPOT Tx | No sig diff. | Y | Pediatric Physical Therapy | USA |
| 20 | 10 min HPOT improves walking adductor symmetry | ES (d) on one variable | Y | Archives of Phys Med Rehabilitation | USA |
| 21 | improved GMFM & Adductor symmetry | ES (d) & p reported as sig | Y | Archives of Phys Med Rehabilitation | USA |
| 22 | HPOT improves walking energy, gait & GM function | Yes | Y | Devmtl Medicine & Child Neurology | USA |
| 23 | mixed outcomes between 4 participants | 1&3 sig ↑ on GAS; 2-no, 4 sig decrease | Y | Pediatric Physical Therapy | USA |
| 24 | Significant improvement in trunk/head stability | Yes | Y | Physical and occ therapy in Pediatrics | USA |
| 25 | Sig improvement, no loss after washout | Yes, no sig change after 12wk washout, | Y | Archives of Phys Med Rehabilitation | USA |
| 26 | Balance improved on BBS and POMA | Yes | Y | Journal of Neurologic Physical Therapy | USA |
| 27 | improvements in balance | Yes, p=sig, w high d | Y | Physical Therapy | USA |
| 28 | Motivation improved after 8 & 16 weeks | not possible with 3, non-par outcomes | Y | Occupational Therapy in Mental Health | USA |
| 29 | HPOT improved funct. motor performance | Standing and ball throwing assessment | Y | Journal of Physical Therapy | USA |
| 30 | HPOT improved funct. motor performance | GMFM-Y, Acc-no | Y | Physiotherapy Theory and Practice | Canada |
| 31 | HPOT improved perceived bal and funct measures | NA | N | Ped PT: Combined Sections Meeting | USA |
| 32 | ↑walking, Participation, peer acceptance, etc. | NA-sgl case. SD chg reptd | Y | Pediatric Physical Therapy | USA |
| 33 | Improved long-term improvement | RM amplitude decreased | Y | British Journal of Occupational Therapy | USA |
| 34 | Mounted Balance/Stability trng using HPOT tools | NA - Sgl case showed changes, no stats. | Y | Phys & Occ therapy in Geriatrics | USA |
| 35 | Positive effect on postural control | NA | Y | Journal of Novel Physiotherapies | Slovenia |
| 36 | small samples, non-random, HPOT eff is Positive | some yes, some no | Y | Eur J Phys Rehabil Med | NZ |
| 37 | Varied between studies, mostly showed improvement. | mixed | Y | Physical and occ therapy in Pediatrics | USA |
| 38 | small samples, non-random, HPOT is generally posit. | some yes, some no | N | Consulting company summary | |
| 39 | Short Term Pos Eff on muscle symm & activities | Mostly yes, some outcomes no | Y | Physical and occ therapy in Pediatrics | USA |
| 40 | HPOT and TR have positive effects on postural/balance control. | some yes, some no | Y | Developmental Medicine & Child Neurology | Slovenia |
| 41 | children with CP had greater movmment ML&AP than ND | NA | Y | AJOT | USA |
| 42 | Pressure increased with skill after 5 HPOT sessions | Yes | Y | Human Movement Science | Czech, Austria |

| Peer Reviewed research Studies | | | | Outcomes/Meas |
|----------------------------------|-------------------------------|----------------------|--|---------------|
| Population or Inlt Cond | HPOT Intervention | Type of Int | Outcomes/Meas | |
| 1 OA - 60-84 | 30 min bi-wkly, 8wks | EAT | TUG, Kinetic | |
| 2 4-12 Yrs, Spastic CP | 8 min on horse or barrel | EAT/HPOT | EMG(lumbar) | |
| 3 28-114 mos. Spastic CP | 10 wk baseline, 10 wk "THR" | "THR" (HPOT) | Clinical Scale | |
| 4 Spastic CP | 45 min wkly, 10 wks | HPOT | GMFM, PEDI | |
| 5 CP, 4-63yrs, GMFCS 1-5 | 6 wks to several years | HPOT, UK, Germ. | Qual. Codes/themes | |
| 6 CP, GMFCS II,III(4), IV(4) | 20 min wkly, 10 wks | TR | HR during TR | |
| 7 Brain injury (7/11 CP) | 45 min wkly, 10 wks | HPOT | Kinematic Gait anal. | |
| 8 Broad app of HPOT | NA | HPOT | Many | |
| 9 CP, 9 & 4 yrs, | 20-40 min, wkly, 12 wks | HPOT | Video 2D Kinematic, PEDI | |
| 10 MS, 35-61 (47.9) yrs | 30 min, wkly, 10-11 wks | TR/HPOT mix | VAS(pain), ADL, HRQOL, SLRMT | |
| 11 CP, GMFCS V, 2.25-4.5 yr | 50 min, wkly, 10 wks | HPOT, hi support | GMFM88, Sitting Assmt Scale | |
| 12 "infantile CP" | 15 min, wkly, 10 wks | Horse Simulator | sit bal, hip abd, EMG, mot dvmt | |
| 13 "ICP", mixed types | 90-120- min, 4-6 times | "RT/TR", BRPS 4-6 | multiple Clinical Scales | |
| 14 CP, 3-10 yrs, 9 M & 16 F | 20 min, 2X wkly, 12 wks | Artificial HPOT | forceplate stabilography/COP | |
| 15 CP | 30min, 2X wkly, 8 wks | HPOT | GMFM, Kinematic/Kinetic Gait, PBS | |
| 16 SCI (ASIA AorB) | 25 min, 2X wkly, 4 wks | HPOT vs 2 cntrl | Ashworth, Spas VAS, wellbeing | |
| 17 Speech dis, (1 w ADHD) | 1hr, 2X wkly, 6 weeks | HPOT | 21. item Satisfaction questionnaire | |
| 18 CP=6.7yr, WD=8.1yr | 1 ride, 3 trials each | No intervention | M/L kinematic (video), 4 markers | |
| 19 6F,3M, 7-18yrs | 1 30-45m session | HPOT | GAITrite Gold Walkway System | |
| 20 SCP | 10m HPOT vs 10m barrel | HPOT | EMG(abd), GMFM66, self percep. | |
| 21 SCP | 30 min 2X 2wkly, 6 wks | HPOT | EMG(abd), GMFM66, self percep. | |
| 22 SCP, 9-11yrs, | 30 min, 2X wkly, 8 wks | HPOT | Gait (strd, veloc, cadnc), GMFM | |
| 23 2CP, 1 seizure, DD, 5-8yr | 60 m weekly, 6 mos | HPOT | GAS X4, Visual analysis, binomial test T score | |
| 24 6CP, 6-17yrs | 45min wkly, 12 wks | HPOT | Video 3D kinematic, motorized barrel test | |
| 25 11, CP 5-11yrs | 45m wkly, 12wk bx, 12wk Wsh | HPOT | Video 3D kinematic, motorized barrel test, reach test | |
| 26 e=9, c=6 with MS | 30m, wkly, 14wks | HPOT | BBS, POMA | |
| 27 16 w balnc deficits, 5-16yrs | 45m, 2Xwk, 6wks | HPOT | PBS, ASkp | |
| 28 3 w/ autism, 4-6 Yrs | 45min wkly, 16 weeks | HPOT | Pediatric Volitional Questionnaire (PVQ) | |
| 29 DDH, ADD | 60 min wkly, 7wks/sess | Tx 8:PT+HPOT | BOTMP | |
| 30 Down Syndrome | 30 min wkly, 11 wks | HPOT | GMFM | |
| 31 Cerebellar ganglioglioma | 30 min wkly/12 wks | HPOT | PBS, Biodex Dynamic Limits of Stability test, COPM | |
| 32 6yrs, ataxic CP, GMFCS I | 45 min 2X wkly, 8 wks | HPOT | GMFM66, PSPCSAYC, PODCI | |
| 33 spastic diplegia CP | 45 min wkly, 6 mo follow-up | HPOT | mechanical barrel, | |
| 34 Older Adult, 76yr Female | 45min wkly, 10 weeks | EAT(HPOT activities) | Kinematic/Kinetic static balance, BBS, ABC | |
| 35 spastic diplegia CP, epilepsy | 30 min 3x wkly, 5 wks | HPOT | Stabilometry, modified sensory organization test | |
| 36 MS | mean = 11.2 weeks, 7.75 hrs | HPOT | BBS, POMA | |
| 37 CP, N varied 3-72 children | 8-26wks | Mixed 6 HPOT & 3 THR | Varied between studies | |
| 38 ADD, multiple disabilities | btwn 4-30 hrs over 12 wks | HPOT | Multiple outcome measures in 13 studies | |
| 39 CP | Varied | HPOT & THR | PEDRO scale | |
| 40 mixed CP | 10-26 weeks, 1 & 2X wkly | HPOT & THR | Functional reach test, barrel test, gait and balance assessments, GMGM, PDMS, BOTMP, VABS, SPPC, CBCL, Bertotti test | |
| 41 4 w CP, 4 w no disabilities | sgle ride, test of press matt | none | test utility of pressure matt as outcome measure | |
| 42 healthy fem. Avg 23yr | 20 min 2X wkly, tot of 5 | HPOT | Computerized pressure pad | |