

Hippotherapy

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Next Review: January 2024

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IMPORTANT REMINDER

Medical Policies are developed to provide guidance for members and providers regarding coverage in accordance with contract terms. Benefit determinations are based in all cases on the applicable contract language. To the extent there may be any conflict between the Medical Policy and contract language, the contract language takes precedence.

PLEASE NOTE: Contracts exclude from coverage, among other things, services or procedures that are considered investigational or cosmetic. Providers may bill members for services or procedures that are considered investigational or cosmetic. Providers are encouraged to inform members before rendering such services that the members are likely to be financially responsible for the cost of these services.

DESCRIPTION

Hippotherapy, also referred to as equine movement therapy or equine-assisted therapy, describes a treatment strategy that uses equine movement to engage sensory, neuromotor, and cognitive systems to achieve functional outcomes.

MEDICAL POLICY CRITERIA

Hippotherapy is considered **investigational** for all indications.

NOTE: A summary of the supporting rationale for the policy criteria is at the end of the policy.

CROSS REFERENCES

None

BACKGROUND

Hippotherapy, also referred to as equine movement therapy or equine-assisted therapy, describes a treatment strategy using equine movement to engage sensory, neuromotor, and cognitive systems to achieve functional outcomes. Hippotherapy has been proposed as a technique for muscle and neurological reeducation in patients with lower extremity spasticity

secondary to neuromuscular disorders (e.g., cerebral palsy, spinal cord injury). The natural swaying motion of the horse induces pelvic movement in the rider that simulates human ambulation while variations in the horse's movements may prompt natural equilibrium movements in the rider.

Horseback riding is also being investigated as a social therapy for children with profound social and communication deficits, including autism spectrum disorder and other developmental disorders such as Down syndrome.

Simulated hippotherapy using a new device has been studied in European centers. Therapeutic interventions using such a device would be conducted in the physical/occupational therapy setting and are outside the scope of this policy.

EVIDENCE SUMMARY

To determine whether hippotherapy results in sustained improvements in clinically meaningful health outcomes, comparisons to conventional therapies in well-designed comparative studies (ideally randomized controlled trials [RCTs]) are needed using standardized functional measurement tools. Appropriate non-riding therapeutic comparisons to hippotherapy could include conventional physical/occupational therapy programs or simulated riding experiences. Publications providing a historical survey of research trends in hippotherapy such as horizon scans or mapping reviews^[1, 2] are not included as evidence, as they do not report on specific health outcomes.

The focus of the following evidence summary is on systematic reviews (SRs) and RCTs.

SYSTEMATIC REVIEWS

Pantera (2022) published a SR examining functional outcomes of hippotherapy in children with Cerebral Palsy (CP).^[3] They applied the international classification of functioning and assigned a "level of proof" (A: strong, B: Moderate and C: Poor) based on the methodological quality of the studies. The authors report that seven RCTs and one SR reported an improvement in motor function, symmetry for muscle contraction, spasticity, posture and walking with a moderate (B) level of proof. Fifty additional nonrandomized studies confirmed a poor level of proof for balance, motor coordination, lumbopelvic mobility, walking speed, functional development and social behavior.

Heussen (2022) published a SR with a meta-analysis comparing the effectiveness of equine-assisted treatments to standard of care in children with CP.^[4] A total of 24 studies (with data from a total of 755 patients) were included in the meta-analysis. The primary outcome was motor function with quality of life (QOL) measured by various instruments as secondary outcomes. A positive effect of equine-assisted therapies, particularly hippotherapy, on global gross motor function and motor capabilities during walking in children with cerebral palsy was identified. No evidence for the improvement in QOL was shown in the global assessment, nor in any subscore. Limitations included heterogeneity of assessments and the small number of studies addressing QOL outcomes.

Santos de Assis (2022) published a SR with meta-analysis comparing the impact of physical therapy with hippotherapy to physical therapy alone on the gross motor function of children and adolescents with CP.^[5] Six studies (N=315) were included in the review. Studies were at high risk of bias and the level of evidence was very low. No significant difference in Gross

Motor Function Measure scores, cadence, stride length, or speed during gait was found between groups. Small sample sizes and high risk of bias were considered limitations to the available evidence.

Selph (2021) and the Agency for Healthcare Research and Quality (AHRQ) published a broad SR with meta-analysis of the specific benefits and potential harms of physical activity in wheelchair users, with a focus on people with multiple sclerosis (MS), CP, and spinal cord injury (SCI).^[6, 7] Overall, the review included 168 studies (N=7511) of which 146 were RCTs, 15 were quasi-experimental studies, and seven were cohort studies. Hippotherapy was considered among interventions impacting postural control. Studies of hippotherapy consisted of 10 RCTs (two in MS populations, eight in CP populations), two quasi-experimental studies, and one cohort study in CP populations. There were no studies of hippotherapy in SCI. Five studies compared hippotherapy versus usual care, four studies compared hippotherapy versus no hippotherapy (either waitlist or inactive hippotherapy simulator), one trial compared hippotherapy versus home aerobic exercise, one RCT compared hippotherapy versus outdoor recreation, and one RCT examined the effects of hippotherapy versus a hippotherapy simulator. Among the trials, one met criteria for good quality, six for fair quality, and one was rated poor quality and deemed to have high risk of bias due to unclear reporting of randomization method, allocation concealment, blinding of outcome assessors, and high loss to followup. One quasiexperimental study was rated fair quality and one quasiexperimental study and one cohort study were rated poor quality due to unclear enrollment methods and lack of clear adjustment for prognostic clinical or demographic confounders. Although data from two fair-quality trials favored hippotherapy over usual care on walking, short-term quality of life, and balance in adults with MS, the authors state no firm conclusions can be drawn due to insufficient strength of evidence. Low-strength evidence found hippotherapy associated with improved function and balance in CP. Larger, well-conducted RCTs of longer duration are needed to overcome evidence gaps.

A SR with meta-analysis by Suárez-Iglesias (2021) evaluated data from RCTs and comparative studies on the effectiveness of hippotherapy or therapeutic riding for improving health outcomes in people with MS.^[8] While nine studies with a methodological quality ranging from good to low quality met the inclusion criteria, only six of them focused on hippotherapy and four were included in the quantitative analysis (N=225). Meta-analysis found that therapy improved static (SMD = 0.42; 95% CI: 0.05, 0.78) but not dynamic balance (SMD = 0.51; 95% CI: -0.04, 1.06), and significant benefits were observed on the patients' QoL (SMD = 0.37; 95% CI: 0.00, 0.73). In addition, hippotherapy was found to reduce self-perceived fatigue (SMD = 0.70; 95% CI: 0.33, 1.07).

Guindos-Sanchez (2020) published a SR with meta-analysis of the effectiveness of hippotherapy interventions on gross motor function in patients with cerebral palsy (CP).^[9] Ten RCTs (N=452) were included in the review, however, only two studies were included in the meta-analysis due to different scales and measuring instruments used to assess clinical outcomes across trials. The overall sample size ranged from 15 to 73 participants across studies. Three studies analyzed the effects of HPT interventions on gross motor function, four studies analyzed effects on balance, two studies analyzed spasticity, and two studies analyzed muscle activity through electromyography. The two studies included in the meta-analysis quantified gross motor function using of the Gross Motor Function Measure (GMFM)-66 and the GMFM-88 scale, which is divided into five dimensions (A: lying and rolling, B: sitting, C: crawling and kneeling, D: standing, and E: walking, running, and jumping). The total score ranges from 0 to 100. Significant effects of the intervention were found for gross motor function

(GMFM-66, standardized mean difference (SMD)=0.81, 95% confidence interval (CI)=0.47-1.15, Gross Motor Function Measure-88 dimension A SMD=0.64, 95% CI=0.30-0.97, dimension B SMD=0.42, 95% CI=0.09-0.75, and dimension E SMD=0.40, 95% CI=0.06-0.73). Overall result of the meta-analysis was inconclusive for GMFM-88 dimensions C and D. The overall methodological quality was acceptable (average Physiotherapy Evidence Database scale total score=5.1, range 3–7). The primary limitation of the studies was that blinding of the participants and therapists was not possible in most studies due to the unconcealable nature of the intervention. Further, concealed allocation was only possible in two studies and assessor blinding was carried out in four studies. Future RCTs are needed to overcome the lack of blinding and long-term follow-up, as well as heterogeneity of the protocols across trials.

A broad SR of 23 studies on the effects of hippotherapy in individuals with disabilities was published in 2020 by Prieto.^[10] The total sample consisted of 914 individuals (458 experimental and 456 control) from clinical populations including children and adolescents with CP, autism spectrum disorder, Down syndrome, or intellectual disability, and adults after stroke, and adults with MS. The eligibility criteria of studies were: randomized controlled trial; Equine-Assisted Therapy as one of the interventions; comparison with another noninvasive intervention or control; studies in which subjects mounted horses and experienced three-dimensional movement; study sample composed of individuals with disabilities with no age limit; at least one result of functioning and disability analyzed; published in English, Spanish, or Portuguese. Studies using simulated horse riding were excluded, as were studies that scored below five on the PEDro (Physiotherapy Evidence Database) scale. The Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system was used to summarize the evidence of the effects and strength of recommendations. The time and frequency of interventions ranged from 30 to 60 minutes, once to three times a week, from eight to 48 weeks. Meta-analysis of mobility and interpersonal relationships showed significant differences favorable for EAT ($p=0.002$ and $p<0.0001$, respectively) as well as significant improvement favorable for the EAT group for activity and participation outcomes [SMD=0.22 (95% CI=0.10–0.34), $p = 0.0003$, $I^2=54.7\%$, $Chi^2p=4.42$]. No significant difference in communication outcomes ($p=0.28$) was found. The quality of evidence was *low* for “Communication” and *moderate* for the other activity and communication components. Significantly more improvement in quality of life was found with EAT compared to control [SMD = 0.44 (95% CI 0.23–0.64), $p<0.0001$, $I^2 = 0\%$, $Chi^2 p = 6.4$], with a high quality of evidence, however only three studies provided data for this component. GRADE scoring also was provided for each body structure and function. Resultant summaries were that the quality of evidence of EAT was *very low* for “mental function,” “muscle tone function,” and for “structure of trunk.” The quality of evidence was *low* for “sensory function and pain” and was *high* for “exercise tolerance function.” Heterogeneity in the protocols used for intervention and the instruments used for assessment were noted limitations in the meta-analysis. The limited number of properly controlled trials in the available evidence also was noted, ultimately leading the authors to conclude that “further studies are required to verify the intensity and frequency required to achieve the desired results and to evaluate the cost benefit of EAT.”

A SR published by Marquez (2020) evaluated the evidence from controlled trials of hippotherapy-based interventions to improve motor function in adults with acquired brain injury (ABI).^[11] Movement related function was the primary outcome and secondary outcomes included impairment, quality of life, and adverse events. Nine studies (N=256) were included, of which six studies (N=204) were included in the meta-analysis. Pooled analysis found no statistically significant improvements in balance (SMD = 0.24, 95% CI -0.05, 0.54, $p = 0.1$) or gait parameters (SMD = -0.04, 95% CI -0.79, 0.72 $p = 0.92$) with hippotherapy compared to

control immediately following treatment. Long-term outcomes are not established due to lack of long-term follow-up data.

Pérez-Gómez (2020) published a SR of the evidence for hippotherapy in children with attention-deficit/hyperactivity disorder (ADHD).^[12] Nine publications met the inclusion criteria of 1. an intervention program based on hippotherapy with pre- and post-data, 2. in children with ADHD, and 3. published in English. The authors concluded that there are too few studies with high enough methodological quality to draw conclusions regarding the effectiveness of hippotherapy as a treatment for children with ADHD. These conclusions are generally consistent with another SR published in 2020 by White, which examined the effect of hippotherapy on behavioral, psychological, and physical symptoms in children with ADHD.^[13] Ten studies were included in this review. While positive trends were identified in behavioral, psychological, and physical outcome measures following hippotherapy, the authors ultimately conclude that further methodologically robust research is required before definitive recommendations for hippotherapy in the treatment of ADHD can be made.

A SR published by Collado-Mateo (2020) evaluated the evidence of the effects of horse riding (real or simulated) on chronic pain.^[14] Eleven articles, inclusive of seven RCTs, were included in the review. Only two of the studies were in real horses, the others utilized horse riding simulation. When assessed as a change from baseline, horse-riding simulators significantly reduced pain levels of patients with low back pain ($p = 0.03$, with a SMD of -1.14 and a 95% CI from -2.16 to -0.11). However, when assessed as a post-intervention model, the effect did not reach statistical significance. No meta-analysis of data from studies in real horses was possible due to the low number of studies available. The authors conclude that interpretation of results must be done with extreme caution due to the large heterogeneity, the low number of studies, and the potential risk of bias.

A SR by Wood and Fields (2019) evaluated 78 studies on hippotherapy published between 1998 to 2018.^[1] The most basic definition of hippotherapy in the studies was the use of equine movement by physical, occupational, and speech-language therapists. However, the definitions also varied from a therapy to improve motor function to one that treats anything by involving a horse. The most common indication studied was CP (51%) and other conditions included MS, Down syndrome, autism spectrum disorder, intellectual disability, attention deficit hyperactivity disorder, traumatic brain injury, cerebral vascular accident. Hippotherapy sessions, on average, were 38 minutes (range=8 to 90 min; standard deviation [SD]=23.19 min), and the average number of sessions was 17.8 (range=1 to 104; SD=22.16). Across all studies, 517 outcomes were quantified by tools including the International Classification of Functioning, Disability and Health, body functions and structures (ICF-BF), ICF activity/participation (ICF-AP). Among the ICF-BF outcomes, movement/gait was most reported, with 70% positive reported outcomes. Less reported, but all predominantly positive were emotional fix (72%), muscle tone (74%), energy/drive (75%), pain (65%), and cognitive fix (100%). More or equally negative effects were reported with heart rate (53%), psychosocial fix (50%), and muscle power (58%). The ICF-AP outcomes showed mostly positive effects in daily mobility (78%) and self-care activities (67%), and interpersonal interactions/relationships, recreation/leisure, play, carrying/handling objects, and other activities were all 100% positive. No benefit was seen in education and domestic life tasks. Research into integrating equine movement as a therapy tool should continue, with more efficacy trials to identify the most promising interventions for further examination.

A SR by Trzmiel (2019) included 15 studies of equine-assisted therapy (EAT) in children with autism spectrum disorder.^[15] Most of these studies used psychosocial functioning outcomes, including Vineland Adaptive Behavior Scales (VABS) and Autism Behavior Checklist scores, and reported improvements in specific areas. However, the meta-analysis did not show any significant differences. A similar SR by Srinivasan (2018) reported that while some studies showed beneficial effects on behavioral skills, there limited evidence for perceptuo-motor, cognitive, and functional improvements.^[16]

Stergiou (2017) published a SR evaluating equine-assisted therapies, one of which was hippotherapy, to see if this treatment could improve balance, motor function, gait, muscle symmetry, pelvic movement, psychosocial factors and overall QOL. Sixteen studies met the inclusion criteria, but only eight (four for children with cerebral palsy [CP], three for adults with multiple sclerosis [MS], one for post-stroke patients, and two for elderly patients with multiple health concerns) had enough data to be included in the analysis. The authors stated studies are lacking, the included studies had methodological limitations, including small sample size and that the analysis could not be divided between separate conditions. Although hippotherapy may be a treatment option to improve health outcomes for some patients, more research is needed.

Rigby (2015) evaluated peer review articles to evaluate health outcomes from three different types of horse assisted therapies, one of which was hippotherapy.^[17] The authors state that the studies show improved physical outcomes, but do not provide objective data on why the improvements occurred. The methods used for searching and including studies was completely clear, but in general the authors conclude that more studies are needed.

Anestis (2015) published results from a SR that examined equine-related treatments for mental disorders.^[18] Fourteen studies were included in the review, and more than half of the studies were small case series studies. All of the studies included in the review had multiple limitations, and the authors concluded that “the current evidence base does not justify the marketing and utilization of equine-related treatments for mental disorders”. Furthermore, the authors concluded that “such services should not be offered to the public unless and until well-designed studies provide evidence that justify different conclusions.”

The majority of SRs on hippotherapy have been for children with CP.^[19-26] All of these reviews reported inconsistency in study findings with some studies reporting evidence of possible therapeutic effect in gross motor function in these children while others found no significant effect. Current studies were reported to have significant methodologic limitations that preclude conclusions, including but not limited to, lack of a non-riding control group, lack of randomized treatment allocation, small sample size, heterogeneity of subjects and treatment protocols, and lack of blinded assessment in those studies that included a control group.

Bronson (2010) published results from a SR on hippotherapy for patients with MS.^[27] Three small, nonrandomized trials were included in the review. One was a case control study^[28] with nine subjects, and the other studies, both case series,^[29, 30] had 11 subjects each. The authors concluded that the studies provided emerging, but limited, evidence that hippotherapy improves balance in persons with MS, acknowledging limitations of small sample size, lack of randomization especially given the variable nature of MS, and lack of controls in two studies.

Randomized Controlled Trials Suk (2022) published the results of a evaluator-blinded, parallel, two-arm RCT evaluating the effect of equine assisted activities and therapy (EAAT) on cardiorespiratory fitness (CRF) in children with CP.^[31] Patients (n=47) were randomized 1:1 to

EAAT for 40 minutes two times per week for 16 weeks (n=23) or no intervention (n=24). Changes in the Clinical Global Impression-Severity scale and Clinical Global Impression-Improvement scale scores were not different between the groups after the intervention. Analysis of covariance revealed statistically significant differences in Gross Motor Function Measure 66 (GMFM 66) ($p < 0.05$) and Pediatric Balance Scale ($p < 0.001$) in motor capacity and resting heart rate (HR_{rest}) ($p < 0.001$), between groups. Subgroup analysis using multiple linear regression revealed that the GMFM 66 changes had a statistically significant effect on the HR_{rest} changes in the EAAT group ($p < 0.05$). The authors conclude that EAAT may be offered to children with CP to improve their CRF. More studies with direct measures of CRF are needed to confirm CRF changes with hippotherapy. Long term follow-up was not addressed.

Silkwood-Sherer (2022) report the results of a multicenter, RCT.^[32] Patients with CP (n=13; ages 3-6 years) were randomized to usual therapy or usual therapy with hippotherapy for 12 weeks. Assessments were completed at baseline (P0), immediately post intervention (12 weeks; P1), and 24 weeks (P2). The only post intervention difference between groups was on the on the Pediatric Balance Scale (PBS). Within group analysis showed no significant changes for the control group between any pretest/posttest measures. The treatment group demonstrated significant improvement on the PBS (P0-P1, $p = .02$; P0-P2, $p = .02$) and Activities Scale for Kids (P0-P1, $p = .02$; P0-P2, $p = .02$) with delayed improvement on the 1 Minute Walk Test (P1-P2, $p = .02$) and Pediatric Quality of Life - CP Module (P0-P2, $p = .03$). Limitations include a small sample size and lack of long-term follow-up.

Outcomes of an RCT in post-stroke participants was published by Bunketorp-Käll in 2019.^[33] Participants were consecutively and randomly assigned to one of three parallel groups: horse-riding therapy (H-RT, n=41), rhythm and music-based therapy (R-MT, n=41), or control (n=41). Evaluation was conducted prior to and directly after the 12-week long intervention, as well as three- and six-months post-intervention. All 123 individuals who were enrolled in the RCT were included in the reported analyses. Immediately post-intervention, the H-RT group completed the 10mWT faster at both self-selected (-2.22 seconds [95% CI, -3.55 to -0.88]; $p=0.001$) and fast speed (-1.19 seconds [95% CI, -2.18 to -0.18]; $p=0.003$), with fewer steps (-2.17 [95% CI, -3.30 to -1.04]; $p=0.002$ and -1.40 [95% CI, -2.36 to -0.44]; $p=0.020$, respectively), compared to controls. At six months follow-up, a significant between-group difference in self-selected gait speed and step length during the timed 10-meter walk was found ($p=0.009$ and 0.031). Pairwise comparisons showed that these increases were present in both the R-MT ($p=0.035$ and 0.047), and H-RT group ($p=0.031$ and 0.013). Additional research to support these findings indicating the potential for further recovery in functional mobility in late phase after stroke is warranted.

A multi-center trial of hippotherapy for patients with MS was published by Vermöhlen (2018).^[34] The trial included 70 adults from five centers in Germany who were randomized to either standard care or standard care plus hippotherapy, and the outcomes included change in the Berg Balance Scale (primary outcome), pain, fatigue, and quality of life. While the trial did find some significant improvements in some outcomes, including the mean change in the Berg Balance Scale after 12 weeks (2.33, 95% CI 0.03 to 4.63, $p=0.047$), these were below the minimally clinically important difference threshold.

Deutz (2018) reported on an open-label cross-over randomized trial of hippotherapy for children with bilateral CP.^[35] There were 73 children in the study, which evaluated gross motor function and quality of life using the Gross Motor Function Measure (GMFM)-66, GMFM

dimension E and D, Child Health Questionnaire (CHQ 28), and KIDSCREEN-27 parental versions. Participants received hippotherapy one or two times per week for 16 to 20 weeks. There were no significant improvements with hippotherapy compared with control for any of the measures except GMFM dimension E.

Borgi (2016) evaluated EAT in relationship to adaptive and executive functioning outcomes in children with autism spectrum disorder.^[36] Twenty-eight male children six to 12 years old were randomly assigned to attend equine assisted therapy (n=15) or to a control group (n=13). Children in both the control and experimental groups had comparable age and IQ. Participants attended EAT sessions in groups of three to four once a week for six months. Each subject was evaluated at baseline and at the end of the study, using the VABS. The authors reported improvements in adaptive and executive functioning but that additional studies are needed with larger sample sizes and long-term follow-up.

Kwon (2015) published a RCT of hippotherapy in children (age range, 4 to 10 years) with CP.^[37] Ninety-one subjects were randomized to hippotherapy (30 minutes twice weekly) or home-based aerobic exercise, both for eight consecutive weeks. Significant differences in composite measures of gross motor function improvement using the GMFM-88 and -66 were observed between groups. The authors stated the RCT could not prove hippotherapy was solely responsible for improved motor function and balance and did not evaluate long-term outcomes.

Frevel (2015) compared an Internet-based home training program to hippotherapy in 18 patients with MS.^[38] In this study, hippotherapy was considered to be the control intervention and the home training program to be the experimental intervention. Although both intervention groups showed significant improvement in static and dynamic balance capacity, no significant difference was seen between groups. The study had weak statistical power to detect a difference between treatments. The study cannot determine whether hippotherapy is effective compared to standard physical therapy.

The populations in other RCTs included post-stroke patients^[39, 40] community-dwelling older adults with balance deficits,^[41, 42] adolescents and adults with behavior challenges,^[43, 44] adult female survivors of breast cancer,^[45] patients with MS,^[38] individuals with substance use disorders,^[46] adults with intertwined personality problems and traumatization,^[47] and children with autism.^[48] These studies did not permit conclusions about the impact of hippotherapy due to methodologic limitations, including but not limited to, the lack of description of randomization scheme, small sample size, study populations not representative of the broader U.S. population, heterogeneity between subjects and therapies, missing data, and moderate to large loss to follow-up.

PRACTICE GUIDELINE SUMMARY

No clinical practice guidelines with recommendations for hippotherapy were identified.

SUMMARY

There is not enough research to show that hippotherapy (horseback riding therapy) improves health outcomes for people with a variety of conditions. In addition, no practice guidelines

recommend hippotherapy. Therefore, hippotherapy techniques for any condition is considered investigational.

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CODES

Codes	Number	Description
CPT	None	
HCPCS	S8940	Equestrian/Hippotherapy; per session

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