



Kansas City

An Independent Licensee of the Blue Cross and Blue Shield Association

Hippotherapy

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Next Review: 7/2024

Blue KC has developed medical policies that serve as one of the sets of guidelines for coverage decisions. Benefit plans vary in coverage and some plans may not provide coverage for certain services discussed in the medical policies. Coverage decisions are subject to all terms and conditions of the applicable benefit plan, including specific exclusions and limitations, and to applicable state and/or federal law. Medical policy does not constitute plan authorization, nor is it an explanation of benefits.

When reviewing for a Medicare beneficiary, guidance from National Coverage Determinations (NCD) and Local Coverage Determinations (LCD) supersede the Medical Policies of Blue KC. Blue KC Medical Policies are used in the absence of guidance from an NCD or LCD.

NCDs

<https://www.cms.gov/medicare-coverage-database/search-results.aspx?keyword=&keywordType=starts&areaId=s29&docType=NCD&contractOption=all>

LCDs

<https://www.cms.gov/medicare-coverage-database/search-results.aspx?keyword=&keywordType=starts&areaId=s29&docType=F,P&contractOption=all>

Policy

Blue Cross and Blue Shield of Kansas City (Blue KC) will not provide coverage for Hippotherapy. This is considered investigational.

When Policy Topic is covered

Not Applicable

When Policy Topic is not covered

Hippotherapy is considered **investigational**.

Description of Procedure or Service

Populations	Interventions	Comparators	Outcomes
Individuals: <ul style="list-style-type: none"> • With cerebral palsy 	Interventions of interest are: <ul style="list-style-type: none"> • Hippotherapy 	Comparators of interest are: <ul style="list-style-type: none"> • Standard clinical management 	Relevant outcomes include: <ul style="list-style-type: none"> • Symptoms • Functional outcomes
Individuals: <ul style="list-style-type: none"> • With multiple sclerosis 	Interventions of interest are: <ul style="list-style-type: none"> • Hippotherapy 	Comparators of interest are: <ul style="list-style-type: none"> • Standard clinical management 	Relevant outcomes include: <ul style="list-style-type: none"> • Symptoms • Functional outcomes
Individuals: <ul style="list-style-type: none"> • With stroke 	Interventions of interest are: <ul style="list-style-type: none"> • Hippotherapy 	Comparators of interest are: <ul style="list-style-type: none"> • Standard clinical management 	Relevant outcomes include: <ul style="list-style-type: none"> • Symptoms • Functional outcomes
Individuals: <ul style="list-style-type: none"> • With gait and balance disorders other than cerebral palsy, multiple sclerosis, or stroke 	Interventions of interest are: <ul style="list-style-type: none"> • Hippotherapy 	Comparators of interest are: <ul style="list-style-type: none"> • Standard clinical management 	Relevant outcomes include: <ul style="list-style-type: none"> • Symptoms • Functional outcomes

Hippotherapy, also referred to as equine-assisted therapy, describes a treatment strategy that uses equine movement to engage sensory, neuromotor, and cognitive systems to achieve functional outcomes. Hippotherapy has been proposed as a therapy for patients with impaired walking or balance.

For individuals who have cerebral palsy, multiple sclerosis, stroke, or gait and balance disorders other than cerebral palsy, multiple sclerosis, and stroke who receive hippotherapy, the evidence includes systematic reviews, randomized trials, and case series. Relevant outcomes include symptoms and functional outcomes. Studies in cerebral palsy, multiple sclerosis, stroke, and other indications have had variable findings. The randomized trials are generally small and have significant methodologic problems. In the largest randomized trial conducted to date (92 children), which had blinding outcome assessment, hippotherapy had no clinically significant impact on children with cerebral palsy. There are no RCTs showing that hippotherapy is superior to alternative treatments for patients with multiple sclerosis. Hippotherapy for other indications has been compared primarily with no intervention and, although some benefits have been seen, it has not been shown to be more effective than other active therapies. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Background Hippotherapy

Hippotherapy has been proposed as a technique to decrease the energy requirements and improve walking in patients with cerebral palsy. It is thought that the natural swaying motion of the horse induces a pelvic movement in the rider that simulates human ambulation. Also, variations in the horse's movements can prompt natural equilibrium movements in the rider. Hippotherapy is also being

evaluated in patients with multiple sclerosis and other causes of gait disorders, such as strokes.

As a therapeutic intervention, hippotherapy is typically conducted by a physical or occupational therapist and is aimed at improving impaired body function. Therapeutic horseback riding is typically conducted by riding instructors and is more frequently intended as social therapy. It is hoped that the multisensory environment may benefit children with profound social and communication deficits, such as autism spectrum disorder and schizophrenia. When considered together, hippotherapy and therapeutic riding are described as equine-assisted activities and therapies.

This evidence review addresses equine-assisted activities that focus on improving physical functions such as balance and gait.

Rationale

This evidence review was created in July 1999 with searches of the PubMed database. The most recent literature update was performed through January 23, 2023.

Evidence reviews assess the clinical evidence to determine whether the use of technology improves the net health outcome. Broadly defined, health outcomes are the length of life, quality of life, and ability to function, including benefits and harms. Every clinical condition has specific outcomes that are important to patients and managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of technology, 2 domains are examined: the relevance, and quality and credibility. To be relevant, studies must represent 1 or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. Randomized controlled trials are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

Promotion of greater diversity and inclusion in clinical research of historically marginalized groups (e.g., People of Color [African-American, Asian, Black, Latino and Native American]; LGBTQIA (Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual); Women; and People with Disabilities [Physical and Invisible])

allows policy populations to be more reflective of and findings more applicable to our diverse members. While we also strive to use inclusive language related to these groups in our policies, use of gender-specific nouns (e.g., women, men, sisters, etc.) will continue when reflective of language used in publications describing study populations.

Cerebral Palsy

Clinical Context and Therapy Purpose

The purpose of hippotherapy in individuals with cerebral palsy is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with cerebral palsy. Individuals with spastic cerebral palsy frequently have impaired walking ability due to hyperactive tendon reflexes, muscle hypertonia, and increased resistance to increasing velocity of muscle stretch. These abnormalities result in a lack of selective muscle control and poor equilibrium responses.

Interventions

The treatment being considered is hippotherapy. Hippotherapy is conducted by a physical or occupational therapist and a horseback riding instructor in an outdoor setting.

Comparators

The following practices are currently being used to treat cerebral palsy: standard physical, occupational, and speech therapy; surgery; and/or medication.

Outcomes

The general outcomes of interest are symptoms and functional outcomes. Cerebral palsy is a lifelong disorder, and patients may be managed from infancy through adulthood and monitored throughout their lives.

Available studies show that the duration of hippotherapy can range from a total of 8 minutes in a single session to 24 hours over several weeks. The possible benefits of hippotherapy include improving walking and equilibrium in cerebral palsy patients.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

1. To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
2. In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.

3. To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
4. Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Systematic Reviews

A number of systematic reviews on hippotherapy in children with cerebral palsy have been published. The Agency for Healthcare Research and Quality (AHRQ) conducted a systematic review (Selph et al 2021) summarizing the evidence for physical activity in people with multiple sclerosis, cerebral palsy, and spinal cord injury.¹ Seven RCTs, 2 nonrandomized studies, and 1 cohort study enrolled children with cerebral palsy (N =464). Evidence on functional outcomes with hippotherapy in children with cerebral palsy was based on 7 studies and provided low-strength evidence that found hippotherapy associated with improved function and balance compared to control groups. The largest trial (Kwon et al 2015; N =92) was the only good-quality trial and demonstrated significantly higher Gross Motor Function Measure (GMFM)-66 scores after 8 weeks of hippotherapy compared with at-home exercises. The effect of hippotherapy on balance was assessed in 4 fair- and 2 poor-quality studies using the Pediatric Balance Scale. These low-strength evidence trials demonstrated improved balance scores in pooled analysis with hippotherapy compared to control measures. The inclusion of poor-quality studies in meta-analysis limited clinical interpretation.

Heussen and Häusler (2022) published a meta-analysis including 24 nonrandomized or randomized studies (N=755) on equine-assisted therapy in children with cerebral palsy.² Fifteen of the included studies were specific to hippotherapy while others focused on therapeutic riding or use of artificial horses. Global motor function was measured with the GMFM-66 or -88, and quality of life (QOL) assessments were analyzed. Although overall improvements in motor function were found with equine-assisted therapy (n=10 studies; SMD, 0.24; (95% confidence interval [CI], 0.05 to 0.43; p=.01) when using either GMFM-66 or -88 (whichever was reported by the study, with a preference for GMFM-66 when both were reported), the results specific to GMFM-66 did not show a significant benefit to equine-assisted therapy (n=8 studies; Table 3). The analysis is also limited by the heterogeneity of the study protocols, the inclusion of small nonrandomized studies, and the lack of QOL data.

A meta-analysis by Tseng et al (2013) included 5 studies on therapeutic horseback riding and 9 studies on hippotherapy (N=277 children with spastic cerebral palsy).³ Included in the analysis were RCTs and observational studies that compared pre- with post-riding results; 10 of the 14 studies provided level 4 evidence. Reviewers evaluated GMFM across studies; meta-analysis indicated that short-term hippotherapy (8 to 10 minutes of total riding time) significantly reduced the asymmetrical activity of the hip adductor muscles and could improve postural control in cases of spastic cerebral palsy (Gross Motor Function Classification System level <5). However, long-term hippotherapy or therapeutic riding (8 to 22 hours) did not have a statistically significant effect on GMFM in

children with spastic cerebral palsy. Methodologic limitations included the use of nonvalidated outcome measures, lack of clinically meaningful differences between groups, and in the meta-analysis specifically, the inclusion of observational studies (pre-post comparisons) without control groups.

Zadnikar and Kastrin (2011) published a meta-analysis of hippotherapy and therapeutic horseback riding in children with cerebral palsy.⁴ Eight studies meeting inclusion criteria (quantitative study design, outcomes that included postural control or balance) were selected. The meta-analysis included 84 children with cerebral palsy in the intervention groups and 89 children in the comparison groups (39 with cerebral palsy, 50 with a disability). The treatment effect on postural control or balance showed a positive effect in 76 (90%) of the 84 children in the intervention groups. In the comparison group of 39 children with cerebral palsy, 21 (54%) experienced positive effects from the comparison treatment, which consisted of a continuation of their weekly physical therapy and/or occupational therapy, or sitting on a barrel or in an artificial saddle. Although this difference was statistically significant ($p < .001$), the clinical significance of the effect cannot be determined from this analysis. Also, the analysis found heterogeneity among the studies, which typically would preclude meta-analysis, and a funnel plot showed asymmetry, indicating possible publication bias. Finally, the inclusion of poor-quality studies in the meta-analysis further limited clinical interpretation.

Tables 1 and 2 summarize included studies and characteristics of included studies of the systematic reviews and meta-analyses. Table 3 summarizes results from the meta-analyses.

Table 1. Comparison of Trials/Studies Included in Systematic Review and Meta-analysis

Study	Zadnikar and Kastrin (2011) ⁴	Tseng et al (2013) ³	Selph et al (2021) ¹	Heussen and Häusler (2022) ²
Bertoti (1988)	●	●		
MacKinnen et al (1995)	●	●		
MacPhail et al (1998)	●			
Quint and Toomy (1998)	●			●
McGibbon et al (1998)		●		
Haehl et al (1999)	●			
Kuczynski and Słonka (1999)	●			

Sterba et al (2002)		●		
Benda et al (2003)	●	●		●
Cherng et al (2004)		●		●
Casady et al (2004)		●		
Hamill et al (2007)		●		
Shurtleff et al (2009)	●	●		
Davis et al (2009)		●		●
McGibbon et al (2009)		●		●
McGee and Reese (2009)		●		
Shurtleff and Engsberg (2010)		●		
Kwon et al (2011)		●	●	●
Silva and Borges (2011)			●	
Herrero et al (2012)			●	●
Park et al (2014)			●	●
Lee et al (2014)			●	●
Kwon et al (2015)			●	●
Matusiak-Wieczorek et al (2016)			●	●
Deutz et al (2018)			●	●
Mutoh et al (2019)			●	●
Matusiak-Wieczorek et al (2020)			●	
Ahn et al (2021)				●
Alemdaroglu et				●

al (2016)				
Baik et al (2014)				●
El Meniawy et al (2012)				●
Kang et al (2012)				●
Kang et al (2013)				●
Lerma-Castano et al (2017)				●
Lucena-Anton et al (2018)				●
Park et al (2020)				●
Silkwood-Sherer et al (2020)				●
Suk and Kwon (2022)				●
Fernandes et al (2008)				●
Temcharoensuk et al (2015)				●

Table 2. Systematic Review and Meta-analysis Characteristics

Study	Dates	Trials	Participants	N (Range)	Design	Duration range
Zadnikar and Kastrin (2011)⁴	1988-2009	8	Children and adults with CP	84 (2-25)	RCTs (n=3), PED (n=1), QED (n=4)	8 mins to 26 wks
Tseng et al (2013)³	1988-2011	14	Children with spastic CP	277 (3-71)	RCTs, observational studies	8 mins to 26 wks
Selph et al (2021)¹	2011-2020	10	Children with CP; none of the studies reported race or ethnicity	464 (23-335)	RCTs (n=7), nonrandomized studies (n=2), cohort study (n=1)	6 wks to 48 wks
Heussen and Häusler (2022)²	Through Feb 2022	26 (24 included in M-A)	Children with CP	755 (13-91)	RCTs, nonrandomized studies	1 day to 48 wks

CP: cerebral palsy; M-A: meta-analysis; PED: pre-experimental design; QED: quasi-experimental design; RCT: randomized controlled trial;.

Table 3. Systematic Review and Meta-analysis Results

Study	Positive effect on postural control after treatment with hippotherapy	GMFM-66 score increase post-therapy	GMFM-88 score increase post-therapy
Zadnikar and Kastrin (2011)⁴,			
Pooled effect (95% CI)	OR, 25.41 (4.35 to 148.53)	NR	NR
p value	<.001	NR	NR
<i>I</i> ² (p)	60.7% (.01)	NR	NR
Tseng et al (2013)³,			
Total N	NA	40	50
Pooled effect (95% CI)	NA	MD, 3.47 (-2.64 to 9.57)	MD, 1.44 (-1.43 to 4.31)
p value	NA	.27	.33
<i>I</i> ² (p)	NA	0% (.85)	0% (.82)
Selph et al (2021)¹,			
Total N	149 ^a	NR	NR
Pooled effect (95% CI)	MD, -3.14 (-5.28 to -1.18)	NR	NR
p value	.001	NR	NR
<i>I</i> ² (p)	0% (.94)	NR	NR
Heussen and Häusler (2022)²,		GMFM-66 score^b	GMFM-88 score^b
Total N	NR	NR	NR
Pooled effect (95% CI)	NR	SMD, 0.17 (-0.02 to 0.36)	SMD, 0.62 (0.15 to 1.09)
p value	NR	.07	.01
<i>I</i> ² (p)	NR	6%	0%

CI: confidence interval; GMFM: Gross Motor Function Measure; M-A: meta-analysis; MD: mean difference; NR: not reported; ; OR: odds ratio; SMD: standard mean difference; SR: systematic review.

^a Measurement of change in balance scores on the Pediatric Balance Scale from pre to post hippotherapy.

^b From parallel-group and crossover studies (equine-based treatment vs. standard of care).

Randomized Controlled Trials

Selected RCTs are described below. Chinniah et al (2020) investigated the effects of a horse riding simulator (ie, an electronic horse, working under the principles of hippotherapy) on sitting motor function in 30 children (2 to 4 years of age) with spastic cerebral palsy.⁵ This study randomly assigned subjects to a horse riding simulator along with conventional physiotherapy (n=15) or conventional physiotherapy (n=15), with the therapist blinded to group allocation and time of assessment. Sitting motor function was evaluated via the GMFM -88 at baseline, 4, 8, and 12 weeks with pre- and post-intervention scores analyzed. Results revealed

that the mean value of GMFM improved in both groups over the 12 weeks; however, the experimental group had significant improvement over the control group at all of the assessed weeks ($p < .01$). Limitations of the study included its small sample size, lack of long-term follow-up, specific patient population (ie, children with spastic diplegia with mild and moderate disability levels), and focus on sitting motor function.

Kwon et al (2015) published an RCT of hippotherapy in children (age range, 4 to 10 years) with cerebral palsy.⁶ Ninety-two subjects were randomized to hippotherapy (30 minutes twice weekly) or home-based aerobic exercise, both for 8 consecutive weeks. Significant differences in composite measures of gross motor function improvement using the GMFM-88 and GMFM-66 were observed between groups. Trial limitations included the unclear clinical significance of the outcomes, uncertain attributes of the control group treatment, and lack of long-term outcomes.

An RCT by Davis et al (2009) included children age 4 to 12 years with cerebral palsy who completed a 10-week session of hippotherapy with pre- and post-treatment assessments obtained from 72 families (representing 35 intervention, and 37 control subjects).⁷ Randomization to hippotherapy or a waiting-list control with usual therapy was stratified by age and level of gross motor function. The physical therapist assessor was blinded to randomization, and participants were asked not to mention if they had completed the intervention at the time of the assessment. No differences between the hippotherapy and control groups were found for functional status (therapist-assessed) or child-reported quality of life. Minor differences were found in the parent-reported quality of life and child health scores in the domain of family cohesion. Overall, hippotherapy did not have a clinically significant impact on children with cerebral palsy.

McGibbon et al (2009) investigated the impact of hippotherapy on the symmetry of adductor muscle activity during walking in children with spastic cerebral palsy.⁸ In phase 1 of the trial, 47 children (age range, 4 to 16 years) with spastic cerebral palsy were randomized to a single 10-minute session of hippotherapy or barrel sitting. Adductor muscle symmetry was measured before and after the session. The hippotherapy group demonstrated a statistically significant difference in adductor symmetry after this single intervention. Six children went on to participate in a phase 2, 36-week study (12 weeks without hippotherapy [baseline], 12 weeks of weekly hippotherapy, 12 weeks without intervention). Four of 6 subjects showed improved symmetry during walking after 12 weeks of hippotherapy; this improvement was maintained for an additional 12 weeks posttreatment. All 6 children improved on the GMFM-66, and 1 child began walking without a walker after 4 weeks of hippotherapy. Five children improved in at least 1 area of the Self-Perception Profile. The authors noted that the trial had a small sample size in phase 2, spasticity was diversely distributed among subjects, and inclusion criteria led to a sample with mixed characteristics.

Section Summary: Cerebral Palsy

The evidence for hippotherapy in cerebral palsy includes systematic reviews and small RCTs. The AHRQ systematic review found the only high-quality RCT to be that of Kwon et al (2015) which enrolled 92 patients. Although this trial found improvements in gross motor function, the trial is limited by the unclear clinical significance of the outcomes, uncertain attributes of the control group treatment, and lack of long-term outcomes.

Multiple Sclerosis

Clinical Context and Therapy Purpose

The purpose of hippotherapy in individuals with multiple sclerosis is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with multiple sclerosis. Patients with multiple sclerosis frequently have impaired walking ability due to their system attacking and damaging the myelin protecting the nerve cells, which diminishes the function of the brain and spinal cord. These abnormalities result in a lack of selective muscle control and poor equilibrium.

Interventions

The treatment being considered is hippotherapy. Hippotherapy is conducted by a physical or occupational therapist and a horseback riding instructor in an outdoor setting.

Comparators

The following practices are currently being used to treat multiple sclerosis: medications and occupational therapy.

Outcomes

The general outcomes of interest are symptoms and functional outcomes. Multiple sclerosis has no cure. Patients are managed from diagnosis through the rest of their lives.

Available studies have shown a duration of hippotherapy of up to 20 sessions over 6 months. The possible benefits of hippotherapy include improving walking ability and equilibrium in multiple sclerosis patients.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

1. To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
2. In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.

3. To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
4. Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Systematic Reviews

The Agency for Healthcare Research and Quality conducted a systematic review (Selph et al 2021) summarizing evidence for physical activity in people with multiple sclerosis, cerebral palsy, and spinal cord injury.¹ Two trials of hippotherapy enrolled patients with multiple sclerosis, 1 (MS-HIPPO) with a usual care control group, and the other with a waitlist control group. Expanded Disability Status Scale scores were higher in the MS-HIPPO trial, indicating greater disability at baseline. The MS-HIPPO trial demonstrated greater improvement in quality of life based on mental (mean difference, 12.0; 95% CI, 6.2 to 17.7) and physical health scores (mean difference, 14.4; 95% CI, 7.5 to 21.3) compared with usual care. Balance was also significantly better with hippotherapy after 12 weeks (mean difference, 2.33; 95% CI, 0.03 to 4.63), however, imputed (last observation carried forward) data was used. The other hippotherapy study in patients with multiple sclerosis (Vermohlen et al 2018; N =33) found improved walking distance on the 6-minute walking test ($p<.001$) and improved walking speed on the 25-foot walk test ($p<.001$) with hippotherapy compared with the waitlist control group. Although the data from these trials favored hippotherapy on walking, short-term quality of life, and balance in adults with multiple sclerosis, no conclusions can be drawn due to only being fair-quality trials and the small included sample size.

A systematic review by Lavín-Pérez et al (2022) identified 10 studies of equine-assisted therapies in patients with multiple sclerosis (N=195).⁹ A total of 104 individuals were treated with equine-assisted therapy while 91 served as controls. Four trials were RCTS, 2 were nonrandomized, and 2 used a pre-post design without control. The interventions were heterogenous with anywhere from 1 to 10 sessions/week and session durations of 20 to 50 minutes. Study durations varied from 11 to 24 weeks. When equine-assisted therapy was compared with an active control, no significant benefits were found. When compared with an inactive control, outcomes such as fatigue perception and balance were improved. Well-designed RCTs are needed to evaluate equine-assisted therapy compared to standard of care in patients with multiple sclerosis.

A systematic review by Bronson et al (2010) evaluated 3 studies on the use of hippotherapy for patients with multiple sclerosis.¹⁰ Included in the review was a comparative study by Silkwood-Sherer and Warmbier (2007), which found that 14 weekly sessions of hippotherapy significantly improved balance in 9 patients with multiple sclerosis compared with a control group of 6 patients.¹¹ Each of the other 2 studies in the review, both case series, included 11 subjects; these series also reported improvements in balance with hippotherapy. Reviewers concluded these studies provided emerging evidence that hippotherapy could improve balance in persons with multiple sclerosis, although they acknowledged the small sample

sizes, lack of randomization (especially given the variable nature of multiple sclerosis), and lack of controls in 2 studies.

Comparative Studies

A study by Munoz-Lasa et al (2011) compared therapeutic horseback riding (with non-therapist riding instructors) with traditional physical therapy in 27 patients who had multiple sclerosis.¹² The therapeutic horseback riding focused on progressively challenging the rider's motor skills and the individualized physical therapy consisted of aerobic, balance, strengthening, and flexibility exercise sessions. The interventions were self-selected and were provided in 20 sessions over 6 months. The therapeutic horseback riding group showed a significant improvement on the balance subscale of the Tinetti Performance Oriented Mobility Assessment and 2 gait parameters (stride time, ground reaction forces). Five (42%) of 12 horseback riders showed a clinically significant improvement. Gait speed and cadence and scores on the Extended Disability Status Scale and the Barthel Index did not improve. No significant change was found in the control group. It was not reported whether the changes found after therapeutic horseback riding were significantly greater than those of the physical therapy control group.

In an RCT, Frevel and Maurer (2015) compared an Internet-based home training program with hippotherapy in 18 patients who had multiple sclerosis.¹³ In this trial, hippotherapy was considered the control intervention and the home training program the experimental intervention. Although both intervention groups showed significant improvements in static and dynamic balance capacity, no significant differences were found between groups. The trial had weak statistical power to detect a difference between treatments. It cannot be determined from this trial whether hippotherapy is more effective than standard physical therapy.

Section Summary: Multiple Sclerosis

Current evidence on the use of hippotherapy to treat multiple sclerosis is inconclusive and the studies conducted have been flawed.

Stroke

Clinical Context and Therapy Purpose

The purpose of hippotherapy in individuals with stroke is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with stroke. Patients who have had a stroke frequently have impaired walking ability due to damage to the brain caused by interruption of blood supply or bleeding into the brain.

Interventions

The treatment being considered is hippotherapy. Hippotherapy is conducted by a physical or occupational therapist and a horseback riding instructor in an outdoor setting.

Comparators

The following practices are currently being used to treat symptoms following stroke: physical, occupational, and speech therapy.

Outcomes

The general outcomes of interest are symptoms and functional outcomes. A stroke can have different effects, depending on which part of the brain was damaged and the extent of the damage. As a result, the length of time a patient is under a neurologist's care varies, and the focus may become prevention of another stroke in the future.

The 1 available study showed a duration of hippotherapy of 30-minute sessions conducted 3 times per week for 8 weeks. The possible benefits of hippotherapy include improving walking and equilibrium in stroke patients.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

1. To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
2. In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
3. To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
4. Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Randomized Trials

Lee et al (2014) conducted a small randomized trial assessing hippotherapy for recovery of gait and balance in 30 patients poststroke.¹⁴ Patients were selected if they could walk independently or with a walking aid, had spasticity in a paretic lower extremity as graded by a score of less than 2 on the Ashworth Scale, and could train for more than 30 minutes. Patients were randomized to hippotherapy or treadmill for 30 minutes, 3 days a week, for 8 weeks. At the end of the training, gait speed and step length asymmetry ratio were assessed, and balance was measured with the Berg Balance Scale. The hippotherapy group showed significant improvements in balance, gait speed, and step length asymmetry, while the treadmill training group improved only in step length asymmetry. Improvements in gait speed and step length asymmetry were significantly greater for the hippotherapy group than for the treadmill group.

Bunkertorp-Kail et al (2019) completed an evaluation of horse-riding or rhythm and music-based therapy in comparison to control in 123 subjects in the late

phase after stroke (average number of days elapsed from stroke insult: 1056 days).¹⁵, Tables 4 and 5 summarize the key characteristics and results of this study, focusing on hippotherapy in comparison to control. Post-intervention, the horse riding therapy group completed the 10 minute walk test faster at both self-selected and fast speed, with fewer steps (-2.17 [95% CI, -3.30 to -1.04]; p=.002 and -1.40 [95% CI, -2.36 to -0.44]; p=.020, respectively), as compared to controls. The horse riding therapy group also showed improvements in functional task performance. The gains were partly maintained at 6 months among horse riding therapy participants. The authors noted that the study population was limited to individuals with moderate impairment after stroke and that future research should be extended to other populations of stroke survivors.

Table 4. Summary of Key RCT Characteristics

Study	Countries	Sites	Dates	Participants	Interventions
Bunketrop-Kall et al (2019) ^{15, 16,}	Sweden	Sahlgrenska University Hospital	2010 to 2014	123 subjects in the late phase after stroke (10 months to 5 years) - ethnicity or race of subjects not described	Active: Horse-riding therapy (n=41) or Rhythm and music-based therapy (n=41) Control (n=41)

RCT: randomized controlled trial.

Table 5. Summary of Key RCT Results

Study	10-minute walk test - self-selected speed (seconds)	10-minute walk test - fast speed (seconds)	6-minute walk test (meters)	Modified Motor Assessment Scale
Bunketrop-Kall et al (2019) ^{15,}	Change from baseline to post-intervention (95% CI)	Change from baseline to post-intervention (95% CI)	Change from baseline to post-intervention (95% CI)	Change from baseline to post-intervention (95% CI)
Horse-riding therapy	-2.22 (-3.55 to -0.88)	-1.19 (-2.18 to -0.18)	27.06 (15.39 to 38.72)	1.13 (0.74 to 1.52)
Control	0.37 (-0.94 to 1.68)	0.88 (-0.40 to 2.16)	8.60 (-3.28 to 20.48)	0.18 (-0.20 to 0.57)
p value	.001	.003	.177	.001

CI: confidence interval; RCT: randomized controlled trial.

Section Summary: Stroke

The current evidence base on the use of hippotherapy to treat stroke is not sufficiently robust to draw conclusions about efficacy.

Other Gait and Balance Disorders

Clinical Context and Therapy Purpose

The purpose of hippotherapy in individuals with other gait and balance disorders not caused by cerebral palsy, multiple sclerosis, or stroke is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with other gait and balance disorders not caused by cerebral palsy, multiple sclerosis, or stroke.

Interventions

The treatment being considered is hippotherapy. Hippotherapy is conducted by a physical or occupational therapist and a horseback riding instructor in an outdoor setting.

Comparators

The following practices are currently being used to treat other gait and balance disorders not caused by cerebral palsy, multiple sclerosis, or stroke: standard physical or occupational therapy or medication.

Outcomes

The general outcomes of interest are symptoms and functional outcomes. Gait and balance disorders may have many causes, and the length of hippotherapy would depend upon the underlying cause. The available studies showed a duration of 8 to 10 weeks of twice-weekly sessions.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

1. To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
2. In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
3. To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
4. Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Systematic Reviews

The systematic review by Wood and Fields (2019) evaluated 78 studies on hippotherapy dating from 1998 to 2018, some of which are described in more detail below.¹⁷ Seventy-seven of the 78 studies quantified results, and 59 studies were quasi-experimental designs. The most basic definition of hippotherapy in the studies was the use of equine movement by such providers as 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. Among the studies, the most commonly assessed condition for

hippotherapy was cerebral palsy (51%). Other conditions were multiple sclerosis, Down syndrome, autism spectrum disorder, intellectual disability, attention deficit hyperactivity disorder, traumatic brain injury, cerebral vascular accident, and others. The most often reported providers of hippotherapy were paired physical therapists and therapeutic riding instructors. 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 classified as either International Classification of Functioning, Disability and Health (ICF), body functions and structures, ICF activity/participation (ICF-AP), or other outcomes. Among the ICF-body functions 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%); 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.

Comparative and Noncomparative Studies

Comparative studies of hippotherapy and treatments for outcomes other than balance and gait have been conducted in community-dwelling subjects.^{18,19,20} Although subjects showed some improved outcomes, the study subjects did not have any balance or gait disorders, so the clinical importance of the findings is unclear. A prospective United States study by Homnick et al (2013) evaluated 9 older adults (mean age, 76.4 years) with balance deficits and found improvements in balance and quality of life measured with a pretest-posttest design.²¹ Without a comparison group, it is uncertain to what extent the improvements can be attributed to hippotherapy.

In an RCT, Abdel-Aziem et al (2021) reported on the efficacy of hippotherapy in combination with Schroth exercises (n=27) compared to traditional physiotherapy (Schroth exercises, n=25) alone in adolescents with idiopathic scoliosis.²² Both groups received Schroth exercises 3 days weekly for 10 weeks. The experimental group additionally received hippotherapy training and pretreatment and posttreatment outcomes were assessed. Both groups experienced improvements in all examined variables posttreatment, however, the group that additionally had hippotherapy had significant improvements in posture asymmetry and balancing ability as demonstrated in all movement outcomes (scoliotic angle, kyphotic angle, pelvic obliquity, pelvic torsion, and vertical spinal rotation) compared to the control group who received Schroth exercises alone ($p < .05$). This trial was limited by the small sample size and absence of long-term follow-up.

Silkwood-Sherer et al (2012) reported on the efficacy of hippotherapy in a convenience sample of 16 children with mild-to-moderate balance deficits

secondary to a variety of disorders.²³ The most common diagnoses were cerebral palsy (n=5), Down syndrome (n=3), developmental coordination disorder (n=2), and autism (n=2). Baseline and posttreatment Pediatric Balance Scale tests were videotaped and sent in random order to 3 pediatric physical therapists for scoring. The Activities Scale for Kids-Performance questionnaires were completed by the children or their parents. Hippotherapy sessions, conducted twice weekly for 6 weeks, yielded significant improvements on the Pediatric Balance Scale (from a median of 49.0 to 53.0) and the Activities Scale for Kids-Performance (from a median of 81.7 to 92.1). This trial lacked a control group.

Giagazoglou et al (2012) reported on the effect of hippotherapy on balance and strength in a controlled trial of 19 adolescents with intellectual disability.²⁴ Balance and strength were assessed using a pressure platform before and after 10 weeks of both hippotherapy (n=10) and the nonintervention control (n=9). There were no significant differences between groups in double leg stance or left leg stance; however, there were significant group-by-time interactions in balance with the right leg stance. Measures of strength were improved following hippotherapy, with significant group-by-time interactions. This study lacked an active therapy control group.

In another small study (2007) of 12 patients with spastic spinal cord injury, hippotherapy resulted in short-term improvements in spasticity and well-being.²⁵

Section Summary: Other Gait and Balance Disorders

Current evidence has suggested potential benefits in the treatment of other gait and balance disorders with hippotherapy, but the relevant studies lack control groups or long-term follow-up, which limits the conclusions that can be drawn.

SUPPLEMENTAL INFORMATION

The purpose of the following information is to provide reference material. Inclusion does not imply endorsement or alignment with the evidence review conclusions.

Practice Guidelines and Position Statements

Guidelines or position statements will be considered for inclusion in 'Supplemental Information' if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

American Hippotherapy Association, Inc.

In their 2021 statement of best practices, the American Hippotherapy Association states that hippotherapy is contraindicated during acute exacerbations of multiple sclerosis and other conditions that can flare.²⁶

United States Preventive Services Task Force Recommendations

Not applicable.

Medicare National Coverage

There is no national coverage determination. In the absence of a national coverage determination, coverage decisions are left to the discretion of local Medicare carriers.

Ongoing and Unpublished Clinical Trials

Some currently ongoing and unpublished trials that might influence this review are listed in Table 6.

Table 6. Summary of Key Trials

NCT No.	Trial Name	Planned Enrollment	Completion Date
<i>Ongoing</i>			
NCT05345886	The Benefit of Hippotherapy in the Therapeutic Management of Stroke Patients in Sequel Phase	50	Jan 2023
NCT04759326	Neurorehabilitation Through Hippotherapy on Neurofunctional Sequels of Brain Stroke: (i) Effect on Patient's Functional Independence, Sensorimotor and Cognitive Capacities and Quality of Life (ii) Effect on Caregivers' Quality of Life	52	Dec 2023
<i>Unpublished</i>			
NCT04651725	Effectiveness of Hippotherapy Simulator on Balance and Knee Strength in People With Multiple Sclerosis: a Randomized Controlled Trial	40	Apr 2022
NCT03528993	The Effect of Exercise by Mechanical Hippotherapy Device on Postural Stability and Balance in Stroke	30	May 2019 (updated 08/07/19)
NCT04465006	Efficacy of Hippotherapy Simulator Exercise Program in Stroke Patients	26	May 2019

NCT: national clinical trial.

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Billing Coding/Physician Documentation Information

S8940 Equestrian/Hippotherapy, per session

ICD10 Codes

Investigational for all diagnoses

Additional Policy Key Words

N/A

Policy Implementation/Update Information

7/1/08 New policy; considered investigational.
1/1/09 No policy statement changes.
7/1/09 No policy statement changes.
1/1/10 No policy statement changes.
7/1/10 No policy statement changes.
1/1/11 No policy statement changes.
7/1/11 No policy statement changes.
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