Hippotherapy

Indexing Metadata/Description

› Procedure: Hippotherapy
› Synonyms: Equine-assisted therapy
› Area(s) of specialty: Neurological Rehabilitation, Pediatric Rehabilitation
› Description/use: The term hippotherapy is derived from *hippos*, the Greek word for horse. It refers to the use of the movement of a horse as a tool or strategy to influence impairments, functional limitations, and disabilities in patients with neuromuscular dysfunction.\(^3\) In hippotherapy, a physical therapist (PT) or occupational therapist (OT) guides the patient’s posture and movement while on a horse, and the therapist or therapy team, rather than the patient, controls the horse. It differs from therapeutic horseback riding (THR), which focuses on horseback riding skills for riders with disabilities by teaching specific skills to control the horse’s movement\(^2\)

• Objectives of hippotherapy
  – Improving core strength, balance, and coordination
  – Utilization of the movement of the horse to facilitate the rider’s pelvis to simulate walking movement
• The rationale for hippotherapy is based on principles of motor learning and control
  – Learning to respond to perturbations under variable conditions is achieved by intense practice

› Indications: Hippotherapy is indicated for children or adults with neuromuscular dysfunction.\(^1\) Persons with cerebral palsy (CP) constitute one of the main groups of users of hippotherapy. Other conditions for which it is indicated include:
  • autism spectrum disorder (ASD)
  • developmental delay
  • learning disabilities
  • sensory integration disorders
  • traumatic brain injury (TBI)
  • stroke
› CPT codes: S8940
› Reimbursement: Many insurance carriers (e.g., Aetna) consider the use of hippotherapy to be experimental or investigational because there is insufficient literature in peer-reviewed medical journals to support its effectiveness

Indications for Hippotherapy

› Abnormal muscle tone
› Impaired balance responses
› Impaired coordination
› Impaired communication
› Impaired sensorimotor function
› Postural asymmetry
› Poor postural control
› Decreased mobility
› Limbic system dysfunction related to arousal and attentional skills
Guidelines for Use of Hippotherapy

The team providing hippotherapy includes a therapist, at least one side walker (a person who supports the rider from the ground), a horse handler, and the horse

- The therapist may ride along with the rider or handle the rider from beside the horse
- A typical hippotherapy session lasts 45 minutes to 1 hour. There is a lack of evidence regarding the optimal frequency or duration for this treatment
- In the United States, PTs can receive training and certification in hippotherapy from the American Hippotherapy Association. Specialized training and certification to do hippotherapy are required in Australia and many European countries
- Therapists establish the treatment plan and goals for each patient
  - Each horse’s movements are modified during treatment sessions depending on the needs of the patient
  - While the horse walks, patients are encouraged to maintain postural alignment and symmetrical positioning of the trunk, pelvis, and lower extremities and to sit independently with little or no assistance
- Riders wear helmets for safety purposes
- Hippotherapy does not typically use a saddle. A sheepskin or soft pad better allows the rider to be treated in various positions on the horse’s back
- Depending on the patient, stretching, relaxation techniques, or other preparatory activities may be necessary before mounting the horse

Contraindications/Precautions to Hippotherapy

Contraindications

- Severe osteoporosis
- Osteogenesis imperfecta
- Severe scoliosis
- Painful hip subluxation
- Severe behavioral problems
- Complete spinal cord injury (SCI) above T6
- Atlantoaxial instability
- Lack of head control
- Anxiety around animals
- Pressure sores
- Excessive hip adductor or internal rotator tone accompanied by potential hip subluxation or dislocation

Precautions

- Care must be taken to ensure that the patient does not fall from the horse
  - Sufficient staff must be present to support the rider and control the horse
- Hip subluxation
- Scoliosis
- Impaired cognition
- Rider’s weight
  - Specific weight restrictions of the rider may vary. Approximate maximum weight of the rider is 165 pounds
- Incomplete SCIs
- Medical complications (e.g., seizures) that could increase the risk of injury during hippotherapy
- Allergies to horse or environment

Examination

Contraindications/precautions to examination

- Obtain parental consent prior to assessment or treatment of a minor

History

- History of present illness/injury for which the procedure is needed
Mechanism of injury or etiology of illness: Describe the history of patient’s condition, including onset, progression, complications, and treatment. Document initial Glasgow Coma Scale (GCS) score for TBI patients and initial American Spinal Injury Association (ASIA) score for SCI patients

Course of treatment
- Medical management: Describe hospitalizations, surgeries, immobilization, and weight-bearing status as relevant to the condition
- Medications for current illness/injury: Determine what medications the clinician has prescribed; are they being taken? Medications commonly prescribed for neurological conditions include:
  - Seizure prevention medications (e.g., levetiracetam [Keppra], phenytoin [Dilantin])
  - Medications for spasticity (e.g., tizanidine [Zanaflex])
  - Antidepressants
- Diagnostic tests completed: Depend on underlying condition. Diagnostic imaging results such as radiograph and MRI results and EMG test results should be obtained where available
- Home remedies/alternative therapies: Document any use of home remedies (e.g., ice or heating pack) or alternative therapies (e.g., acupuncture), what they are used for, and whether or not they help
- Previous therapy: Document whether the patient has had occupational or physical therapy for this or other conditions and what specific treatments were helpful or not helpful

Aggravating/easing factors (and length of time each item is performed before the symptoms come on or are eased): Document any changes in symptoms that occur with activity or fatigue

Body chart: Use a body chart to document location and nature of symptoms

Nature of symptoms: Document nature of symptoms (e.g., pain, spasticity, weakness, sensory impairment)

Rating of symptoms: Use a visual analog scale (VAS) or 0–10 scale to assess symptoms at their best, at their worst, and at the moment (specifically address if pain is present now and how much). In very young children or nonverbal patients, the FLACC (Face, Legs, Activity, Cry, Consolability) scale can be used

Pattern of symptoms: Document changes in symptoms throughout the day and night, if any (a.m., mid-day, p.m., night); also document changes in symptoms due to weather or other external variables

Sleep disturbance: Document number of wakings/night

Other symptoms: Document other symptoms the patient may be experiencing that could exacerbate the condition and/or symptoms that could be indicative of a need to refer to physician (dizziness, bowel/bladder/sexual dysfunction, saddle anesthesia)

Respiratory status: Document any history of respiratory compromise or use of supplemental oxygen

Barriers to learning
- Are there any barriers to learning? Yes__/No__
  - If Yes, describe

Medical history
- Past medical history
  - Previous history of same/similar diagnosis
    - What is the patient’s age? At what age was diagnosis made?
  - Comorbid diagnoses: Ask the patient or parent/caregiver about other problems, including diabetes, cancer, heart disease, complications of pregnancy, psychiatric disorders, orthopedic disorders, etc.
  - Medications previously prescribed: Obtain a comprehensive list of medications prescribed and/or being taken (including OTC drugs)
  - Other symptoms: Ask the patient about other symptoms he or she may be experiencing

Social/occupational history
- Patient’s goals: Document what the patient hopes to accomplish with hippotherapy and in general
- Vocation/avocation and associated repetitive behaviors, if any: Does the patient attend school? If so, what grade, and what activities are included in a typical day? Is the patient employed? What are the job requirements? Does the patient participate in any recreational activities?
- Functional limitations/assistance with ADLs/adaptive equipment: Does the patient require assistance with functional activities and ADLs? Do family members feel they have adequate assistance and support available? What adaptive equipment does the patient use? Does the patient receive assistance with transportation?
- Living environment: stairs, number of floors in home, with whom the patient lives, caregivers, etc. For pediatric patients, describe family structure, including parents, siblings, and extended family if relevant. Identify if there are
barriers to independence in the home; any modifications necessary? Does the patient have access to community resources?

**Relevant tests and measures** (While tests and measures are listed in alphabetical order, sequencing should be appropriate to the patient’s medical condition, functional status, and setting)

• **Anthropometric characteristics:** Measure height and weight and calculate BMI. The rider’s weight may affect ability to participate in hippotherapy

• **Arousal, attention, cognition** (including memory, problem solving): Assess orientation to name, place, time, and situation; attention; short- and long-term memory; and problem solving as indicated. Obtain neuropsychological testing results where available
  – Problems occurring in neurological conditions may include:
    - poor memory
    - poor attention and concentration
    - poor decision-making
    - impulsivity
    - disorientation
    - language and communication difficulties
    - inability to speak
    - inability to understand when spoken to
  – Hippotherapy has been linked to improved attention, decreased impulsivity/hyperactivity, and increased quality of life in children with ADHD\(^\text{11}\)

• **Assistive and adaptive devices:** Describe any assistive and adaptive devices that the patient uses. Assess need for splints or orthoses (e.g., ankle-foot orthoses) as indicated

• **Balance:** Assess sitting and standing balance using a standardized test such as Berg Balance Scale (BBS) or Pediatric Balance Scale (PBS)

• **Cardiorespiratory function and endurance:** Monitor blood pressure, heart rate, respiratory rate, and oxygen saturation as indicated

• **Cranial/peripheral nerve integrity:** Assess as indicated by condition

• **Ergonomics/body mechanics:** Document any impaired body mechanics and compensatory strategies

• **Functional mobility** (including transfers, etc.): Assess using a standardized tool such as the functional independence measure (FIM), WeeFIM, or Timed Up & Go (TUG) test

• **Gait/locomotion:** Since hippotherapy typically focuses on trunk stability, posture, and pelvic movement for improvements in gait and balance, a thorough gait assessment is indicated
  – Assess gait at self-selected walking speed and at maximal velocity if possible
  – A 10-meter walk test may be performed to assess quantitative gait parameters such as stride length, cadence, single-limb support (percentage), and velocity
  – Qualitative gait observation should include posture, symmetry, joint positions, and use of assistive devices
    - Of particular interest are pelvic and hip kinematics: average anterior pelvic tilt, posterior pelvic tilt at initial contact, anterior pelvic tilt at terminal stance, pelvic ROM, maximal hip extension, hip flexion at initial contact, and range of hip flexion/extension
    - If available, use a video camera to record and analyze gait for deviations
  – Temporal and kinematic analysis of gait may be performed using a motion analysis system if available
  – Dynamic Gait Index (DGI) may be used to assess gait safety

• **Joint integrity and mobility:** Assess passive ROM and joint stability as indicated

• **Motor function** (motor control/tone/learning)
  – Assess tone and coordination in upper and lower extremities and trunk
    - Modified Ashworth Scale can be used to assess level of spasticity
  – Assess voluntary movement, noting quality of movement patterns and ability to isolate muscle groups
    - Depending on age, movement may be assessed by observing age-appropriate functional or play activities
    - Note any abnormal patterns, reflexes, or tone occurring with activity
  – Standardized tests of motor function that can be used in the pediatric population include the Gross Motor Function Measure (GMFM), the Pediatric Evaluation of Disability Inventory (PEDI), and the WeeFIM
    - The GMFM can be used to assess change in gross motor function in children with CP
    - The PEDI can be used to track change in mobility and function
Developed for use in children aged 6 months to 7.5 years
- The WeeFIM can be used to assess self-care, sphincter control, and transfers and locomotion, as well as communication and social cognition, in young children (2–5 years)

- **Muscle strength:** Assess using manual muscle testing (MMT) or handheld dynamometry as indicated. MMT is not considered valid in the presence of abnormal tone or coordination
  - Assess strength through function in young children and in patients unable to follow verbal commands
  - Assess trunk strength
- **Neuromotor development:** Use a standardized test such as the Peabody Developmental Motor Scales, Second Edition (PDMS-2) as indicated
- **Observation/inspection/palpation** (including skin assessment)
  - Document any skin breakdown, bruising, or rashes
  - Palpation may assist in detecting any subluxations
  - Inspect any bracing/orthoses for proper wear
- **Perception** (e.g., visual field, spatial relations): Visuospatial impairment may be present in patients with neurological dysfunction. Assess as indicated by condition
- **Posture:** Assess body alignment for asymmetric posture in sitting, standing, and walking. Note asymmetry in weight-bearing. Assess spinal alignment and posture of head, neck, shoulders, trunk, pelvis, and lower extremities. Is the posture stooped (head forward and shoulders rounded)? Is the lumbar curve flattened or excessively lordotic?
- **Range of motion:** Assess upper and lower extremity ROM and flexibility
- **Reflex testing:** Assess deep tendon reflexes for asymmetry and hyper- or hyporeflexia as indicated. Assess for primitive reflexes in children with CP and patients with neurological disorders
- **Self-care/activities of daily living** (objective testing): Evaluate as indicated. Self-care and ADL assessment are included in the WeeFIM, the GMFM, and the PEDI (see Motor function, above)
- **Sensory testing:** Assess light touch, temperature, and pinprick as indicated

### Assessment/Plan of Care

- **Contraindications/precautions**
  - Patients with a diagnosis for which this procedure is used may be at risk for falls; follow facility protocols for fall prevention. Ensure that patient and family/caregivers are aware of the potential for falls and educated about fall-prevention strategies. Discharge criteria should include independence with fall-prevention strategies
  - Riders should wear helmets
  - There must be sufficient staff appropriately trained in hippotherapy present
- **Diagnosis/need for procedure:** Children and adults with neuromuscular dysfunction who may benefit from the stimulus of a horse’s movement to improve pelvic movement, trunk stability, balance, and posture, with a goal to improve motor function and gait
- **Prognosis:** Depends on the underlying condition and its severity
- **Referral to other disciplines:** As indicated by each patient’s condition
- **Other considerations:** Patients may have a positive response to hippotherapy due to various other aspects of the experience besides movement facilitation
  - Hippotherapy as a treatment for socialization after sexual abuse and emotional distress was reported to be effective in a case study involving two female patients conducted in Brazil. After twenty 30-minute sessions of hippotherapy, the patients demonstrated improved posture and coordination, as well as improved sociability and self-esteem
  - The cost-effectiveness of hippotherapy is an area requiring further study. Hippotherapy requires more assistance and incurs higher costs (maintaining horses, an arena, and training volunteers) than conventional physical therapy
- **Treatment summary**
  - Authors of a 2018 systematic review concluded hippotherapy produces gains in postural alignment, head and trunk balance, adductor muscle strength, walking speed, stride length, ability to sit independently, quality of life, and ADLs in children with CP
  - Results of a 2015 RCT conducted in South Korea suggest that hippotherapy improves gross motor function and balance in children with CP of various functional levels
    - Ninety-two children with CP, aged 4–10 years, were randomized to a hippotherapy group or a control group
Hippotherapy consisted of twice-weekly 30-minute sessions, 1 child to 1 therapist, for 8 weeks, in addition to conventional physiotherapy.

Children in the control group received 30 minutes of home-based aerobic exercise (waking or cycling) twice weekly for 8 weeks, in addition to conventional therapy.

Outcome measures included the GMFM and the PBS.

Children undergoing hippotherapy had improvements in GMFM scores (both GMFM-66 and GMFM-88) and PBS scores that were significantly greater than those of children in the control group.

Authors of a 2017 quasi-experimental design study found that hippotherapy can improve gross and fine motor functions in children with CP.

Based on a study in Canada involving 13 children with CP:

- Participants performed hippotherapy for 30 minutes, once a week for 10 weeks.
- Gross motor functions and proficiency were assessed using the Bruininks-Oseretsky Test of Motor Proficiency short form (BOT2-SF) and GMFM.

Based on an RCT in Spain, hippotherapy significantly reduced (short-term) hip adductor spasticity in children with CP.

Forty-four children were randomized into two groups: a hippotherapy group (n=22) and a control group (n=22).
- Both groups received conventional therapy. The intervention group also received hippotherapy, which was given 1x/week, 45 minutes, for 12 weeks.
- Participants were tested before intervention and at 12 weeks’ follow-up via the Modified Ashworth Scale (MAS).
- Significant improvements were found in bilateral adductors in the hippotherapy group compared to the control group.

Hippotherapy promotes upright stance and gait in children with bilateral spastic CP.

Based on a randomized crossover study in Germany:

- Seventy-three children with bilateral spastic CP were randomized into two groups: early treatment or late treatment.
- Participants received hippotherapy 1–2 times per week for 16–20 weeks (mean of 17 treatments).
- Children terminating participation early had lower quality of life scores compared to children who completed the entire study. No difference in GMFM scores was found, except for a significant increase in GMFM dimension E (walking, running, and jumping).

Hippotherapy significantly increases stride length, walking speed, and acceleration in children and adolescents with CP.

Based on a study in Japan:

- Outcome measures included the GMFM-66 performed at 1 year post baseline measurement.
- Participants also showed significantly decreased horizontal/vertical gait displacement over time.

Hippotherapy can improve respiratory muscle strength in patients with Down syndrome.

Based on a study in Brazil:

- Respiratory function was measured based on Black and Hyatt measuring of maximal expiration (MEP) and maximal inspiration (MIP). Patients were seated and asked to perform a maximal expiration and a maximal inspiration while wearing a GERAR manovacuometer.
- Participants were divided into two groups: a non-practicing group and the practicing group. Those in the practicing group were positioned in the seated position with the hips and knees flexed at 90 degrees and spine supported. The participants were asked to maintain this position for a minimum of 2 seconds. Measurements were taken with the nostrils closed to prevent air from escaping through the nose.
- Results showed that hippotherapy may improve respiratory strength in patients with Down syndrome when compared with patients who do not practice hippotherapy.

Hippotherapy benefits global motor coordination in individuals with Down syndrome.

Based on a study in Brazil:

- Global motor coordination measures included tasks such as balance beam, single jump, and side jump.
- Global motor coordination was significantly better in the hippotherapy group compared to the control group.
- Post hippotherapy, 5% of participants had high global motor coordination, 40% good, and 55% had normal scores.
- The control group had 10% good global motor coordination and 90% normal scores in global coordination at follow-up.
Based on a systematic review investigating the use of hippotherapy for adults with acquired brain injury (ABI), hippotherapy is well tolerated and safe for adults with ABI; however, it does not result in statistically significant improvements in balance or gait.\(^{(12)}\)

See Description/use, Indications for Hippotherapy, and Guidelines for Use of Hippotherapy, above.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Goal</th>
<th>Intervention</th>
<th>Expected Progression</th>
<th>Home Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impaired gross motor control.</td>
<td>Improve motor function and gait</td>
<td>Hippotherapy See Guidelines for Use of Hippotherapy, above, for details</td>
<td>Challenges may be increased by increasing the amount of perturbation or altering the rider’s position</td>
<td>N/A</td>
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<tr>
<td>Impaired balance, gait.</td>
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<tr>
<td>Increased muscle tone</td>
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<tr>
<td>Risk of fall from horse</td>
<td>Minimize safety risks</td>
<td>Patient safety</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

One or two side walkers must be present to control the rider’s position by holding onto thigh. Therapist may handle the rider from beside horse or atop horse. Horse leader must be trained in hippotherapy. Horse selection should consider rider’s size and abilities, as well as temperament of the horse.

Riders should wear helmets

<table>
<thead>
<tr>
<th>Desired Outcomes/Outcome Measures</th>
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<tbody>
<tr>
<td>› Improved core strength</td>
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<tr>
<td>› Improved lower extremity strength</td>
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<tr>
<td>• MMT</td>
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<tr>
<td>› Improved balance</td>
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<tr>
<td>• BBS, PBS</td>
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<tr>
<td>› Improved coordination</td>
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<tr>
<td>• GMFM, PEDI, PDMS-2</td>
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<tr>
<td>› Improved gait</td>
<td></td>
<td></td>
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<tr>
<td>• 10-meter walk test</td>
<td></td>
<td></td>
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<tr>
<td>• Kinematic analysis of gait, qualitative gait observation</td>
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<tr>
<td>• TUG test, DGI</td>
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<tr>
<td>› Improved functional ability</td>
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<tr>
<td>• WeeFIM, FIM</td>
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<tr>
<td>• GMFM, PEDI</td>
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<tr>
<td>• PDMS-2</td>
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</tbody>
</table>
Improved posture
Normalized muscle tone
  • Modified Ashworth Scale
Increased lower extremity ROM
  • Goniometric measures of ROM

**Maintenance or Prevention**

- Hippotherapy can be used in conjunction with standard physical therapy to improve gait and balance
- An activity program to maintain the gains obtained may be beneficial
- Studies of the long-term effects of hippotherapy are limited
- There is a need for comprehensive investigation that includes hippotherapy intervention followed by a long maintenance period to provide information about the long-term effectiveness of hippotherapy.

**Patient Education**

- American Hippotherapy Association website, [https://www.americanhippotherapyassociation.org/](https://www.americanhippotherapyassociation.org/)
- Professional Association of Therapeutic Horsemanship International (PATH Intl.), [https://www.pathintl.org/](https://www.pathintl.org/)

### Coding Matrix

References are rated using the following codes, listed in order of strength:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Published meta-analysis</td>
</tr>
<tr>
<td>SR</td>
<td>Published systematic or integrative literature review</td>
</tr>
<tr>
<td>RCT</td>
<td>Published research (randomized controlled trial)</td>
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<tr>
<td>R</td>
<td>Published research (not randomized controlled trial)</td>
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<tr>
<td>C</td>
<td>Case histories, case studies</td>
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<tr>
<td>G</td>
<td>Published guidelines</td>
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<tr>
<td>RV</td>
<td>Published review of the literature</td>
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<tr>
<td>RU</td>
<td>Published research utilization report</td>
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<tr>
<td>GI</td>
<td>Published quality improvement report</td>
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<tr>
<td>L</td>
<td>Legislation</td>
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<tr>
<td>PGR</td>
<td>Published government report</td>
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<tr>
<td>PFR</td>
<td>Published funded report</td>
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<tr>
<td>PP</td>
<td>Policies, procedures, protocols</td>
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<tr>
<td>X</td>
<td>Practice exemplars, stories, opinions</td>
</tr>
<tr>
<td>RU</td>
<td>Published general or background information/texts/reports</td>
</tr>
<tr>
<td>U</td>
<td>Unpublished research, reviews, poster presentations or other such materials</td>
</tr>
<tr>
<td>CP</td>
<td>Conference proceedings, abstracts, presentation</td>
</tr>
</tbody>
</table>

### References