Clinical Policy Bulletin:
Spasticity Management

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Policy

I. Aetna considers neurosurgical procedures medically necessary for the management of members with refractory spasticity when all of the following selection criteria are met:

   A. The member has good intrinsic lower extremity motor power, but is limited in ambulation by spasticity; and
   B. The member has the functional capacity and motivation to participate in post-operative rehabilitation; and
   C. The member has tried and failed non-surgical, medical management for spasticity including baclofen or other muscle relaxants.

Aetna considers the following procedures medically necessary for the management of members with spasticity:

   A. Longitudinal myelotomy
   B. Microsurgical dorsal root entry zone lesion (DREZotomy)
   C. Percutaneous radiofrequency (or thermal) rhizotomy
   D. Peripheral neurotomy
   E. Selective posterior (dorsal) rhizotomy*

Members 2 to 6 years of age are optimal candidates for selective posterior rhizotomy.

* Based on a review of the medical literature, Aetna considers selective posterior rhizotomy experimental and investigational when the member has any of the following contraindications:

   A. Concomitant dystonia or rigidity; or
   B. Profound weakness in lower extremity muscles such that the spasticity actually serves to assist in standing; or
   C. Progressive neurological disorders, choreoathetosis, or cerebellar ataxia; or
   D. Severe damage to basal ganglia; or
E. Severe fixed joint deformities or scoliosis.

II. Aetna considers selective posterior rhizotomy experimental and investigational for the treatment of spasticity in children with hemiplegic cerebral palsy because these children are unlikely to benefit from this procedure.

III. Aetna considers spinal cord stimulation (dorsal column stimulator) or neurectomy experimental and investigational for the treatment of spasticity because the effectiveness of these approaches has not been established.

IV. Aetna considers magnetic stimulation (transcranial or peripheral) experimental and investigational for the treatment of spasticity due to multiple sclerosis and other causes because the effectiveness of these approaches has not been established.

V. Aetna considers the use of whole-body vibration experimental and investigational for individuals with spasticity associated with multiple sclerosis or spinal cord injury and other indications because its effectiveness has not been established.

VI. Aetna considers kinesiotaping for lower extremity spasticity experimental and investigational because its effectiveness has not been established.

VII. Aetna considers tibial nerve neurotomy experimental and investigational as treatment for spastic equinovarus foot because its effectiveness has not been established.

VIII. Aetna considers focal muscle vibration experimental and investigational for the treatment of limb spasticity in persons with chronic stroke and other indications.

IX. Aetna considers percutaneous myofascial lengthening experimental and investigational for the treatment of cerebral palsy because the clinical evidence is not sufficient to permit conclusions on the health outcome effects of the use of selective percutaneous myofascial lengthening in the treatment of cerebral palsy.

X. Aetna considers acupuncture for the treatment of spasticity following stroke experimental and investigational because its effectiveness has not been established.

See also CPB 0113 - Botulinum Toxin, CPB 0161 - Infusion Pumps, and CPB 0677 - Functional Electrical Stimulation and Neuromuscular Electrical Stimulation.

Background

Cerebral palsy (CP) refers to a wide variety of non-progressive brain disorders resulting from insults to the central nervous system during the perinatal period. Traditionally, the adverse effects of spasticity such as contractures and bony deformities in patients with CP are managed by means of drug therapy, phenol
injections, spinal blocks, physical therapy, bracing, and orthopedic surgeries. In the last 3 decades, selective posterior rhizotomy (SPR) has been used in the management of these patients for reduction of spasticity which may result in an improvement of their active functional mobility. The use of total posterior rhizotomies of lumbar and sacral nerve roots in reducing lower limb spasticity commenced approximately 80 years ago. However, the lack of functional improvement despite a reduction in spasticity as well as the adverse side effects such as stasis ulceration, sensory ataxia, and hypesthesia (sensory loss) stimulated the development of partial rhizotomy and SPR is the most sophisticated version of the partial rhizotomy. Currently, SPR is increasing being used for the treatment of lower extremity spasticity in patients with CP.

The rationale for SPR is that intra-operative electro-stimulation of spinal nerve rootlets in conjunction with electromyographic (EMG) monitoring and direct observation of muscle activity in the lower extremity allow for the identification of afferent posterior rootlets that terminate on relatively uninhibited alpha motoneurones. Direct observation allows for identification of the diffusion of contraction to other muscle groups. If these uninhibited rootlets are severed, spasticity can be reduced without the unacceptable side effects. This technique employs microsurgical dissection of nerve rootlets from the level of L2 to S1 or S2 (if there is a spastic toe flexion). Individual sensory rootlets (usually 3 to 8 comprising the posterior roots from L2 to S1) are isolated and electrically stimulated. Those rootlets which produce an abnormal response are cut, while those generating a normal response are preserved. Responses which are considered to be abnormal include (i) clonus, (ii) contraction of ipsilateral muscles not normally innervated by that nerve, (iii) contralateral muscle contraction, (iv) clinical or EMG contraction that continues after the cessation of stimulation, and (v) an EMG crescendo pattern during the stimulus. If no abnormal responses are observed, the 30 to 60 % of the rootlets giving the strongest tetanic contraction are severed. In general, no more than 75 % of the sensory rootlets are sectioned.

There is sufficient evidence that selective posterior rhizotomy is safe and effective for the management of children with CP. Studies have consistently shown that selective posterior rhizotomy can reduce spasticity and improve motor function. Additionally, if performed during early childhood, it may prevent the development of muscle contractures and orthopedic deformities. On the other hand, due to the minimal degree of their impairment, children with hemiplegic CP are unlikely to benefit from this procedure.

In a review published in the New England Journal of Medicine, Park and Owen (2002) concluded that SPR can reduce spasticity and improve motor function, and if the operation is performed during early childhood, it may prevent the development of muscle contractures and orthopedic deformities. Additionally, a Diagnostic and Therapeutic Technology Assessment of SPR published by the American Medical Association stated that in selected patients who have ambulatory potential, this procedure can reduce spasticity and facilitate walking and other movement (Brown, 1990).

An assessment of SPR by the National Institute for Health and Clinical Excellence (2006) concluded that current evidence on the safety of SPR for spasticity in cerebral palsy "appears adequate; however, there is evidence of only limited
efficacy." The assessment cites the results of a meta-analysis of 3 randomized controlled trials (McLaughlin et al, 2002) comparing physiotherapy and SPR with physiotherapy alone, which found that, compared with physiotherapy alone, gross motor function improved by an additional 4 % with physiotherapy and SPR (8 % and 4 % improvements, respectively; p = 0.008). The follow-up period in the primary studies was 9 to 12 months. Specialist advisors to NICE commented that there is some controversy about the role of SPR in relation to other management options for spasticity in CP. They also commented that a reduction in spasticity does not always improve motor function. The NICE assessment noted that adverse events seen clinical studies of SPR included bladder and bowel disturbances, severe postoperative pain, and dysthesia. The specialisty advisors to NICE also noted among adverse events limb weakness, joint subluxation, progressive scoliosis or kyphosis, and sensory disturbance. Theoretical adverse events included paralysis, dividing the wrong nerve rootlets, hypotonicity, weight gain and death.

Appropriate candidates for SPRs should have tried and failed other more conservative types of medical management for spasticity including baclofen or other muscle relaxants. In addition, candidates should have good intrinsic lower extremity motor power, but are limited in ambulation by spasticity. It is also important that candidates have capacity and motivation to participate in post-operative rehabilitation. Children 2 to 6 years of age are optimal candidates for this procedure.

Patients with one or more of the following condition(s) are generally not considered candidates for selective posterior rhizotomy: concomitant dystonia or rigidity; severe damage to basal ganglia; severe fixed joint deformities or scoliosis; progressive neurological disorders, choreo-athetosis, or cerebellar ataxia; or profound weakness in lower extremity muscles, and spasticity serves to assist in standing.

Bolster et al (2013) evaluated the long-term effect of selective dorsal rhizotomy (SDR) on the gross motor function of ambulant children with spastic bilateral CP, compared with reference centiles. The study used a prospective cohort design and subjects comprised 29 children classified using the Gross Motor Function Classification System (GMFCS) in level I (n = 7), II (n = 4), or III (n = 18); 18 males, 11 females; median age at time of surgery 6 years 4 months; range of 2 years 10 months to 12 years 1 month), who were examined 5 years and 10 years after SDR. These researchers used individual centiles based on Gross Motor Function Measure (GMFM-66) scores and age, corresponding to the GMFCS levels. Individual improvement or deterioration was defined as a change of more than 20 centiles. Side effects experienced and additional treatment received after SDR were also recorded. Five years after SDR, 10 out of 28 children (35.7 %) showed improvement, and 10 years after SDR 6 out of 20 children (30 %) had improved. Spinal side effects were noted in 2 children and hip subluxation in 3. Additional treatments included subtalar arthrodesis (n = 13), endorotational osteotomy of the tibia (n = 5), and botulinum toxin treatment (n = 13). The authors concluded that none of the children showed deterioration of gross motor function based on centile ranking. Five and 10 years after SDR, gross motor function in some children had improved more than would have been expected according to the reference centiles. They noted that this suggested, taking the limitations of
this study into account, that the applied criteria for selection were adequate. However, the children still needed additional treatment after SDR.

Valle et al (2007) examined the use of low- and high-frequency repetitive transcranial magnetic stimulation (TMS) for the treatment of spasticity. A total of 17 subjects (8 males, 9 females; mean age of 9 years 1 month) with CP and spastic quadriplegia were randomized to receive sham, active 1-Hz, or active 5-Hz repetitive TMS of the primary motor cortex. Stimulation was applied for 5 consecutive days (90 % of motor threshold). The results showed that there was a significant reduction of spasticity after 5-Hz, but not sham or 1-Hz, stimulation as indexed by the degree of passive movement; however, this was not evident when using the Ashworth scale, although a trend for improvement was seen for elbow movement. The safety evaluation showed that stimulation with either 1-Hz or 5-Hz did not result in any adverse events as compared with sham stimulation. The authors stated that results of this trial provide initial evidence to support further trials exploring the use of cortical stimulation in the treatment of spasticity.

In a randomized sham-controlled trial with a 4-week follow-up, Barros Galvao et al (2014) assessed the effectiveness of inhibitory repetitive TMS (rTMS) for decreasing upper-limb muscle tone after chronic stroke. Patients with stroke (n = 20) with post-stroke upper limb spasticity were enrolled in this study. The experimental group received rTMS to the primary motor cortex of the unaffected side (1,500 pulses; 1 Hz; 90 % of resting motor threshold for the first dorsal interosseous muscle) in 10 sessions, 3 days/week, and physical therapy (PT). The control group received sham stimulation and PT. Main outcome measure included Modified Ashworth scale (MAS), upper-extremity Fugl-Meyer assessment, FIM, ROM, and stroke-specific quality-of-life scale. All outcomes were measured at baseline, after treatment (post-intervention), and at a 4-week follow-up. A clinically important difference was defined as a reduction of greater than or equal to 1 in the MAS score. Friedman test revealed that PT is efficient for significantly reducing the upper limb spasticity of patients only when it is associated with rTMS. In the experimental group, 90 % of the patients at post-intervention and 55.5 % at follow-up showed a decrease of greater than or equal to 1 in the MAS score, representing clinically important differences. In the control group, 30 % of the patients at post-intervention and 22.2 % at follow-up experienced clinically meaningful changes. There were no differences between the groups at any time for any of the other outcome measures, indicating that both groups demonstrated similar behaviors over time for all variables. The author concluded that rTMS associated with PT can be beneficial in reducing post-stroke spasticity. However, they stated that more studies are needed to clarify the clinical changes underlying the reduction in spasticity induced by non-invasive brain stimulations.

Ness and Field-Fote (2009) stated that individuals with spinal cord injury (SCI) often have involuntary, reflex-evoked muscle activity resulting in spasticity. Vibration may modulate reflex activity thereby decreasing spasticity. These researchers examined the feasibility of using whole-body vibration (WBV) to decrease quadriceps spasticity in individuals with SCI. Participants were individuals (n = 16) with spastic quadriceps hypertonia due to chronic SCI (greater than 1 year). Quadriceps spasticity was measured by gravity-provoked stretch (Pendulum Test) before (initial) and after (final) a 3 day/week, 12-session WBV
intervention. In addition, differences between immediate (immediate post-WBV) and delayed (delayed post-WBV) within-session effects were quantified.

Finally, these investigators assessed response differences between subjects who did and those who did not use anti-spastic agents. There was a significant decrease in quadriceps spasticity after participation in a WBV intervention that persisted for at least 8 days. Within a WBV session, spasticity was reduced in the delayed post-WBV test compared to the immediate post-WBV test. The WBV intervention was associated with similar changes in quadriceps spasticity in subjects who did and those who did not use anti-spastic agents. The authors concluded that vibration may be a useful adjunct to training in those with spasticity. They stated that future studies should directly compare the anti-spastic effects of vibration to those of anti-spastic agents.

In a randomized cross-over pilot study, Schyns et al (2009) examined the effectiveness of WBV on tone, muscle force, sensation and functional performance in people with multiple sclerosis (MS). A total of 16 individuals with MS were randomly allocated to one of two groups: (i) group 1 received 4 weeks of WBV plus exercise 3 times per week, 2 weeks of no intervention and then 4 weeks of exercise alone 3 times per week, and (ii) group 2 were given the 2 treatment interventions in the reverse order to group 1. Ten-meter walk, Timed Up and Go Test, Modified Ashworth Scale, Multiple Sclerosis Spasticity Scale (MSSS-88), lower limb muscle force, Nottingham Sensory Assessment and Multiple Sclerosis Impact Scale (MSIS-29) were used before and after intervention. The exercise program had positive effects on muscle force and well-being, but there was insufficient evidence that the addition of WBV provided any further benefit. The Modified Ashworth Scale was generally unaffected by either intervention, although, for each group, results from the MSSS-88 showed WBV and exercises reduced muscle spasms (p = 0.02). Although results for the 10-meter walk and Timed Up and Go Test improved, this did not reach statistical significance (p = 0.56; p = 0.70, respectively). For most subjects, sensation was unaffected by WBV. The authors concluded that exercise may be beneficial to those with MS, but there is limited evidence that the addition of WBV provides any additional improvements. They stated that further larger scale studies into the effects of WBV in people with MS are essential.

In a randomized, controlled, pilot trial with 6 weeks' follow-up, Tankisheva et al (2014) examined the effects of WBV training program in patients with chronic stroke. Adults with chronic stroke (n = 15) were randomly assigned to an intervention (n = 7) or a control group (n = 8). Intervention was supervised, intensive WBV training. The vibration group performed a variety of static and dynamic squat exercises on a vibration platform with vibration amplitudes of 1.7 and 2.5mm and frequencies of 35 and 40 Hz. The vibration lasted 30 to 60 seconds, with 5 to 17 repetitions per exercise 3 times weekly for 6 weeks. Participants in the control group continued their usual activities and were not involved in any additional training program. The primary outcome variable was the isometric and isokinetic muscle strength of the quadriceps (isokinetic dynamometer). Additionally, hamstrings muscle strength, static and dynamic postural control (dynamic posturography), and muscle spasticity (Ashworth Scale) were assessed. Compliance with the vibration intervention was excellent, and the participants completed all 18 training sessions. Vibration frequencies of both 35 and 40 Hz were well-tolerated by the patients, and no adverse effects resulting
from the vibration were noted. Overall, the effect of intensive WBV intervention resulted in significant between-group differences in favor of the vibration group only in isometric knee extension strength (knee angle, 60°) (p = 0.022) after 6 weeks of intervention and in isokinetic knee extension strength (velocity, 240°/s) after a 6-week follow-up period (p = 0.005), both for the paretic leg. Postural control improved after 6 weeks of vibration in the intervention group when the patients had normal vision and a sway-referenced support surface (p < 0.05). Muscle spasticity was not affected by vibration (p > 0.05). The authors concluded that these preliminary results suggested that intensive WBV might potentially be a safe and feasible way to increase some aspect of lower limb muscle strength and postural control in adults with chronic stroke. Moreover, they stated that further studies should focus on evaluating how the training protocol should be administered to achieve the best possible outcome, as well as comparing this training protocol to other interventions.

In a single-center, randomized, and double-blind study, Karadag-Saygi and colleagues (2010) evaluated the effect of kinesiotaping as an adjuvant therapy to botulinum toxin A (BTX-A) injection in lower extremity spasticity. A total of 20 hemiplegic patients with spastic equinus foot were enrolled into the study and randomized into 2 groups. The first group (n = 10) received BTX-A injection and kinesiotaping, and the second group (n = 10) received BTX-A injection and sham-taping. Clinical assessment was done before injection and at 2 weeks and 1, 3, and 6 months. Outcome measures were modified Ashworth scale (MAS), passive ankle dorsiflexion, gait velocity, and step length. Improvement was recorded in both kinesiotaping and sham groups for all outcome variables. No significant difference was found between groups other than passive range of motion (ROM), which was found to have increased more in the kinesiotaping group at 2 weeks. The authors concluded that there is no clear benefit in adjuvant kinesiotaping application with botulinum toxin for correction of spastic equinus in stroke.

Morris et al (2013) examined the effect of KTT from randomized controlled trials (RCTs) in the management of clinical conditions. A systematic literature search of CINAHL; MEDLINE; OVID; AMED; SCIENCE DIRECT; PEDRO; www.internurse.com; SPORT DISCUS; BRITISH NURSING INDEX; www.kinesiotaping.co.uk; www.kinesiotaping.com; COCHRANE CENTRAL REGISTER OF CLINICAL TRIALS; and PROQUEST was performed up to April 2012. The risk of bias and quality of evidence grading was performed using the Cochrane collaboration methodology. A total of 8 RCTs met the full inclusion/exclusion criteria; 6 of these included patients with musculoskeletal conditions; 1 included patients with breast-cancer-related lymphedema; and 1 included stroke patients with muscle spasticity; 6 studies included a sham or usual care tape/bandage group. There was limited to moderate evidence that KTT is no more clinically effective than sham or usual care tape/bandage. There was limited evidence from 1 moderate quality RCT that KTT in conjunction with physiotherapy was clinically beneficial for plantar fasciitis related pain in the short-term; however, there were serious questions around the internal validity of this RCT. The authors concluded that there currently exists insufficient evidence to support the use of KTT over other modalities in clinical practice.

Bollens et al (2011) noted that spastic equinovarus foot is a major cause of disability for neurorehabilitation patients, impairing their daily activities, social
participation and general quality of life. Selective tibial nerve neurotomy is a
eurosurgical treatment for focal spasticity, whose acceptance as treatment for
spastic equinovarus foot remains controversial. These investigators performed a
systematic review of the literature to evaluate the effectiveness of tibial nerve
neurotomy as a treatment for adult patients presenting with spastic equinovarus
foot. They queried PubMed, Science Direct, Trip Database and PEDro databases
with the following keywords: "equinus deformity" OR "muscle spasticity" AND
"neurotomy". They selected a total of 11 non-randomized and uncontrolled
studies, suggesting that neurotomy could be an efficient treatment to reduce
impairments in spastic equinovarus foot patients. The authors noted that their
conclusions were based primarily on case series studies. The effects of tibial
everneurotomy had not been compared with a reference treatment through a
randomized controlled trial, which would be necessary to increase the level of
scientific evidence. Moreover, further studies using quantitative, validated and
objective assessment tools are needed to evaluate the effectiveness of tibial nerve
neurotomy accurately based on the International Classification of Functioning,
Disability and Health from the World Health Organization.

Bollens et al (2013) noted that selective neurotomy is a permanent treatment of
focal spasticity, and its effectiveness in treating spastic equinovarus of the foot
(SEF) was previously suggested by a few non-randomized and uncontrolled case-
series studies. This study was the first assessor-blinded RCT evaluating the
effects of this treatment. A total of 16 chronic stroke patients presenting with SEF
were randomized into 2 groups: (i) 8 patients underwent a tibial neurotomy and (ii)
the remaining 8 received BTX injections. The soleus was treated in all patients,
and the tibialis posterior and flexor hallucis longus were treated in about 50 % of
patients. The primary outcome was the quantitative measurement of ankle
stiffness (L-path), an objective measurement directly related to spasticity.
Participants were assessed by a blind assessor before their intervention and at 2
and 6 months after treatment. Evaluations were based on the 3 domains of the
International Classification of Functioning, Disability and Health (ICF). Compared
with BTX, tibial neurotomy induced a higher reduction in ankle stiffness. Both
treatments induced a comparable improvement of ankle kinematics during gait,
whereas neither induced muscle weakening. Activity, participation, and quality of
life were not significantly modified in either group. The authors concluded that the
findings of this study demonstrated that the tibial nerve neurotomy is an effective
treatment of SEF, reducing the impairments observed in chronic stroke patients.
Moreover, they stated that future studies should be conducted to confirm the long-
term effectiveness based on the ICF domains.

Ashworth et al (2012) systematically reviewed treatments for spasticity in
amyotrophic lateral sclerosis (ALS), also known as motor neuron disease. These
investigators searched the Cochrane Neuromuscular Disease Group Specialized
Register (July 4, 2011), CENTRAL (2011, Issue 2), MEDLINE (January 1966 to
July 2011), EMBASE (January 1980 to July 2011), CINAHL Plus (January 1937 to
July 2011), AMED (January 1985 to July 2011) and LILACS (January 1982 to July
2011 ). They reviewed the bibliographies of the randomized controlled trials
identified, and contacted authors and experts in the field. They included quasi-
randomized or randomized controlled trials of participants with probable or definite
ALS according to the El Escorial diagnostic criteria (or a revised version) or the
Airlie House revision. They included trials of physical therapy, modalities,
prescription medications, non-prescription medications, chemical neurolysis, surgical interventions, and alternative therapies. The primary outcome measure was reduction in spasticity at 3 months or greater as measured by the Ashworth (or modified Ashworth) spasticity scale. The secondary outcome measures were: validated measures based on history, physical examination, physiological measures, measures of function, measures of quality of life, all adverse events, and measures of cost. Two authors independently screened the abstracts of potential trials retrieved from the searches. Two authors extracted the data. They also contacted the author of the paper and obtained information not available in the published article. All 3 authors assessed the methodological quality of all included trials independently. These researchers identified only 1 randomized controlled trial that met inclusion criteria and no further trials were identified in subsequent updates. The included study was a trial of moderate intensity, endurance type exercise versus “usual activities” in 25 patients with AML. The risk of bias was high and no adverse events were reported. At 3 months patients performing the 15-min twice-daily exercises had significantly less spasticity overall (mean reduction of -0.43, 95 % confidence interval (CI): -1.03 to +0.17 in the treatment group versus an increase of +0.25, 95 % CI: -0.46 to +0.96 in the control group) but the mean change between groups was not significant (-0.68, 95 % CI: -1.62 to +0.26), as measured by the Ashworth scale (possible scores 0 to 5, where higher is worse). The authors concluded that the single trial performed was too small to determine whether individualized moderate intensity endurance type exercises for the trunk and limbs are beneficial or harmful. No other medical, surgical or alternative treatment and therapy has been evaluated in a randomized fashion in this patient population; more research is needed.

In a pilot randomized controlled trial, Caliandro et al (2012) examined the clinical effect of repetitive focal muscle vibration (rMV) on the motor function of the upper extremity 1 month after treatment in patients with chronic stroke (n = 49). Patients assigned to the study group (SG; n= 28) received rMV, while patients in the control group (CG; n= 21) received a placebo vibratory treatment; patients and the clinical examiner were blind to the intervention. The primary endpoint was an improvement of more than 0.37 points on the Functional Ability Scale of the Wolf Motor Function Test (WMFT FAS). The Modified Ashworth Scale and the visual analog scale were the secondary outcome measures. All measures were administered before the treatment (t0) and 1 week (t1) and 1 month (t2) after the treatment. The analysis of variance for repeated measurements revealed a significant difference in the expression of the WMFT FAS score over time only in the SG (p = 0.006). The treatment was successful for 7 (33 %) of 21 patients recruited in the SG and for 2 (13 %) of 15 patients recruited in the CG. The relative risk was 2.5 (95 % CI: .60 to 10.39), and the number needed to treat was 5. The Wilcoxon test showed a statistically significant difference between t0 and t2 in the SG (p = 0.02). No adverse event was observed in the 2 groups. The authors concluded that these findings suggested that rMV treatment of the upper limb may improve the functional ability of chronic stroke patients, but a larger, multi-center, randomized controlled study is needed.

The selective percutaneous myofascial lengthening (SPML) procedure involves releasing tight bands of tendon. This is done where muscle and tendon overlap and the tendon starts to blend into a muscle (myofascial). When the myofascia is cut, the muscle under it can easily stretch and lengthen. The SPML procedure
uses micro-incisions only about 2-mm long which results in decreased scarring. Areas where the SPML procedure is performed include the back of the ankle for calf / heel cord tightness and spasticity, behind the knee for hamstring tightness and spasticity and in the groin area for scissoring gait and groin spasticity.

Mitsiokapa and colleagues (2010) published the findings of 58 children with spastic CP who underwent selective percutaneous myofascial lengthening of the hip adductor group and the medial or the lateral hamstrings. All the patients were spastic diplegic, hemiplegic, or quadriplegic. The indications for surgery were a primary contracture that interfered with the patients’ walking or sitting ability or joint subluxation. Gross motor ability and gross motor function of the children were evaluated using the gross motor function classification system (GMFCS) and the gross motor function measure (GMFM), respectively. The mean time of the surgical procedure was 14 minutes (range of 1 to 27 minutes). All patients were discharged from the hospital setting the same day after the operation. There were no infections, overlengthening, nerve palsies, or vascular complications. Three patients required repeat procedures for relapsed hamstring and adductor contractures at 8, 14, and 16 months post-operatively. At 2 years after the initial operation, all the children improved on their previous functional level; 34 children improved by 1 GMFCS level, and 5 children improved by 2 GMFCS levels. The overall improvement in mean GMFM scores was from 71.19 to 83.19.

In a Cochrane review, Amatya and colleagues (2013) evaluated the effectiveness of various non-pharmacological interventions for the treatment of spasticity in adults with MS. A literature search was performed using the Specialised Register of the Cochrane Multiple Sclerosis and Rare Diseases of the Central Nervous System Review Group on using the Cochrane MS Group Trials Register which among other sources, contained CENTRAL, Medline, EMBASE, CINAHL, LILACS, PEDRO in June 2012. Manual searching in the relevant journals and screening of the reference lists of identified studies and reviews were carried out. Abstracts published in proceedings of conferences were also scrutinized. Randomized controlled trials (RCTs) that reported non-pharmacological intervention/s for treatment of spasticity in adults with MS and compared them with some form of control intervention (such as sham/placebo interventions or lower level or different types of intervention, minimal intervention, waiting list controls or no treatment; interventions given in different settings), were included. Three review authors independently selected the studies, extracted data and assessed the methodological quality of the studies using the Grades of Recommendation, Assessment, Development and Evaluation (GRADE) tool for best-evidence synthesis. A meta-analysis was not possible due to methodological, clinical and statistical heterogeneity of included studies. A total of 9 RCTs (n = 341 participants, 301 included in analyses) investigated various types and intensities of non-pharmacological interventions for treating spasticity in adults with MS. These interventions included: physical activity programs (such as physiotherapy, structured exercise program, sports climbing); TMS (Intermittent Theta Burst Stimulation (iTBS), rTMS); electromagnetic therapy (pulsed electromagnetic therapy; magnetic pulsing device), transcutaneous electrical nerve Stimulation (TENS); and WBV). All studies scored “low” on the methodological quality assessment implying high-risk of bias. There is “low level” evidence for physical activity programs used in isolation or in combination with other interventions (pharmacological or non-pharmacological), and for repetitive magnetic stimulation
(iTBS/rTMS) with or without adjuvant exercise therapy in improving spasticity in adults with MS. No evidence of benefit exists to support the use of TENS, sports climbing and vibration therapy for treating spasticity in this population. The authors concluded that there is "low level" evidence for non-pharmacological interventions such as physical activities given in conjunction with other interventions, and for magnetic stimulation and electromagnetic therapies for beneficial effects on spasticity outcomes in people with MS. They noted that a wide range of non-pharmacological interventions are used for the treatment of spasticity in MS, but more robust trials are needed to build evidence about these interventions.

In a mono-centric, randomized, double-blind, sham-controlled trial, Krewer et al (2014) investigated short-term and long-term effects of repetitive peripheral magnetic stimulation (rpMS) on spasticity and motor. Patients (n = 66) with severe hemiparesis and mild-to-moderate spasticity resulting from a stroke or a traumatic brain injury. The average time ± SD since injury for the intervention groups was 26 ± 71 weeks or 37 ± 82 weeks. Subjects received rpMS for 20 minutes or sham stimulation with subsequent occupational therapy for 20 minutes, 2 times a day, over a 2-week period. Main outcome measures included Modified Tardieu Scale and Fugl-Meyer Assessment (arm score), assessed before therapy, at the end of the 2-week treatment period, and 2 weeks after study treatment. Additionally, the Tardieu Scale was assessed after the first and before the third therapy session to determine any short-term effects. Spasticity (Tardieu greater than 0) was present in 83 % of wrist flexors, 62 % of elbow flexors, 44 % of elbow extensors, and 10 % of wrist extensors. Compared with the sham stimulation group, the rpMS group showed short-term effects on spasticity for wrist flexors (p = 0.048), and long-term effects for elbow extensors (p < 0.045). Arm motor function (rpMS group: median 5 [4 to 27]; sham group: median 4 [4 to 9]) did not significantly change over the study period in either group, whereas rpMS had a positive effect on sensory function. The authors concluded that therapy with rpMS increases sensory function in patients with severe limb paresis. The magnetic stimulation, however, has limited effect on spasticity and no effect on motor function.

Park et al (2014) noted that acupuncture has been suggested as a treatment for spasticity in patients with stroke. These investigators reviewed available literature to evaluate its effectiveness in this situation. Randomized trials assessing the effects of acupuncture for the treatment of spasticity after stroke were identified by searching the Cochrane Library, PubMed, ProQuest, EBSCOhost, SCOPUS, CINAHL, EMBASE, Alternative Medicine Database, and Chinese and Korean medical literature databases. Two reviewers independently extracted data on study characteristics, patient characteristics, and spasticity outcomes. A total of 8 trials with 399 patients met all the inclusion criteria. Compared with controls without acupuncture, acupuncture had no effect on improving clinical outcomes (as measured by validated instruments such as the Modified Ashworth Scale) or physiologic outcomes (assessed by measures such as the H-reflex/M-response [H/M] ratio at the end of the treatment period). H/M ratios did decrease significantly immediately after the first acupuncture treatment. Methodological quality of all evaluated trials was considered inadequate. The authors concluded that the effect of acupuncture for spasticity in patients with stroke remains uncertain, primarily because of the poor quality of the available studies. They stated that larger and more methodologically sound trials are needed to definitively
confirm or refute any effect of acupuncture as a treatment for spasticity after stroke.

Lui and colleagues (2015) reviewed the literature on chemodenervation with botulinum toxin (BoNT) or phenol/alcohol for treatment of limb spasticity following spinal cord injury (SCI). Embase, Medline, Cinahl, Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials were searched for English language studies published up until March 2014. Studies were assessed for eligibility and quality by 2 independent reviewers. No controlled trials were identified. A total of 19 studies were included: 9 involving BoNT and 10 involving phenol/alcohol. Owing to the clinically diverse nature of the studies, meta-analysis was deemed inappropriate. The studies produced level 4 and level 5 evidence that chemodenervation with BoNT or alcohol/phenol can lead to improvement in outcome measurements classified in the body structure and function, as well as activity domains of the International Classification of Functioning, Disability and Health framework. The Modified Ashworth Scale (MAS) was the most commonly used outcome measure. All 6 studies on BoNT and 3 of the 4 studies on phenol/alcohol measuring MAS reported a decrease in at least 1 point. An improvement in MAS was not always associated with improvement in function. The effect of phenol/alcohol has the potential to last beyond 6 months; study follow-up did not occur beyond this time point. The authors concluded that chemodenervation with BoNT or phenol/alcohol may improve spasticity and function in individuals with SCI. However, they stated that there is a lack of high-quality evidence and further research is needed to confirm the effectiveness of these interventions.

CPT Codes / HCPCS Codes / ICD-9 Codes

**CPT codes covered if selection criteria are met:**

63170  Laminectomy with myelotomy (e.g., Bischof or DREZ type), cervical, thoracic, or thoracolumbar  
63185  Laminectomy with rhizotomy; one or two segments  
63190  more than two segments  
63600  Creation of lesion of spinal cord by stereotactic method, percutaneous, any modality (including stimulation and/or recording)  
64708 - 64714  Neuroplasty, major peripheral nerve, arm or leg, open  
64600 - 64640  Destruction by neurolytic agent, somatic nerves  

**CPT codes not covered for indications listed in the CPB:**

27325  Neurectomy, hamstring muscle
27326 Neurectomy, popliteal (gastrocnemius)
28055 Neurectomy, intrinsic musculature of foot
63650 Percutaneous implantation of neurostimulator electrode array, epidural
63655 Laminectomy for implantation of neurostimulator electrodes, plate/paddle, epidural
63661 Removal of spinal neurostimulator electrode percutaneous array(s), including fluoroscopy, when performed
63662 Removal of spinal neurostimulator electrode plate/paddle(s) placed via laminotomy or laminectomy, including fluoroscopy, when performed
63663 Revision including replacement, when performed, of spinal neurostimulator electrode percutaneous array(s) including fluoroscopy, when performed
63664 Revision including replacement, when performed, of spinal neurostimulator electrode plate/paddle(s) placed via laminotomy or laminectomy, including fluoroscopy, when performed
63685 Insertion or replacement of spinal neurostimulator pulse generator or receiver, direct or inductive coupling
63688 Revision or removal of implanted spinal neurostimulator pulse generator or receiver

HCPCS codes not covered for indications listed in the CPB:

C1767 Generator, neurostimulator (implantable), non-rechargeable
C1778 Lead, neurostimulator (implantable)
C1816 Receiver and/or transmitter, neurostimulator (implantable)
C1883 Adapter/extension, pacing lead or neurostimulator lead (implantable)
G0295 Electromagnetic therapy, to one or more areas, for wound care other than described in G0329 or for other uses
L8680 Implantable neurostimulator electrode, each
L8681 Patient programmer (external) for use with implantable programmable neurostimulator pulse generator
L8682 Implantable neurostimulator radiofrequency receiver
L8683 Radiofrequency transmitter (external) for use with implantable neurostimulator radiofrequency receiver
L8685  Implantable neurostimulator pulse generator, single array, rechargeable, includes extension
L8686  Implantable neurostimulator pulse generator, single array, non-rechargeable, includes extension
L8687  Implantable neurostimulator pulse generator, dual array, rechargeable, includes extension
L8688  Implantable neurostimulator pulse generator, dual array, non-rechargeable, includes extension
L8689  External recharging system for battery (internal) for use with implantable neurostimulator
L8695  External recharging system for battery (external) for use with implantable neurostimulator

Other HCPCS codes related to the CPB:

J0475  Injection baclofen, 10 mg
J0476  Injection, baclofen, 50 mcg for intrathecal trial

ICD-9 codes covered if selection criteria are met:

781.0  Abnormal involuntary movements [refractory spasticity]
728.85  Spasm of muscle [refractory spasticity]

ICD-9 codes not covered for indications listed in the CPB:

330.0 - 330.9  Cerebral degenerations usually manifest in childhood [progressive neurological disorders]
331.0 - 331.9  Other cerebral degenerations [progressive neurological disorders]
333.0 - 333.89  Other extrapyramidal diseases and abnormal movement disorders [progressive neurological disorders]
340  Multiple sclerosis
342.1  Spastic hemiplegia
718.40 - 718.49  Contracture of joint
728.87  Muscle weakness (generalized) [profound in lower extremity muscles]
72982  Cramp of limb
736.71  Acquired equinovarus deformity
Spasticity Management

737.30 - Kyphoscoliosis and scoliosis
737.39

737.43 Scoliosis associated with other conditions
754.51 Talipes equinovarus [congenital]

805.00 - Fracture of vertebral column [not covered for whole-body vibration]
806.9

952.00 - Spinal cord injury without evidence of spinal bone injury [not covered for whole-body vibration]
952.9

Other ICD-9 codes related to the CPB:

343.0 - 343.9 Infantile cerebral palsy
344.00 - Other specified paralytic syndromes
344.89

781.2 Abnormality of gait
781.3 Lack of coordination

Kinesiotaping:

There are no specific CPT/HCPCS codes for kinesiotaping:

ICD-9 codes not covered for indications listed in the CPB:

781.0 Abnormal involuntary movements
781.2 Abnormality of gait

Focal muscle vibration:

No specific code

ICD-9 codes not covered for indications listed in the CPB:

438.20-438.22 Hemiplegia/hemiparesis
438.30-438.32 Monoplegia of upper limb

728.85 Spasm of muscle [limb spasticity]
781.0 Abnormal involuntary movements[limb spasticity]

Percutaneous Myofascial Lengthening - no specific code:

ICD-9 codes not covered for indications listed in the CPB:

330.0 - 330.9 Cerebral degenerations usually manifest in childhood [progressive neurological disorders]
343.0 - 343.9  Infantile cerebral palsy

**Focal Muscle Vibrations** - no specific code:

The above policy is based on the following references:


