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COVERAGE RATIONALE
Occlusion therapy is proven for the treatment for amblyopia (lazy eye).

Prism adaptation therapy is proven for the treatment of esotropia (a form of strabismus when eye deviates inward).

Orthoptic or vision therapy is proven for the treatment of convergence insufficiency (ability of eyes to fix on the same point).

Orthoptic or vision therapy is unproven for the treatment of the following:
- Exotropia (eye deviates outward) without convergence insufficiency


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• Nystagmus (involuntary movement of the eyeballs)
• Convergence excess (esotropia is greater for near vision than for far vision)
• Divergence insufficiency
• Divergence excess
• Stroke or traumatic brain injury with visuospatial deficit, hemispatial neglect, or visual loss

The available data supporting the use of vision therapy for these indications is weak and inconclusive, and derived primarily from uncontrolled or poorly controlled studies with significant methodological flaws.

**The use of visual information processing evaluations to diagnose reading or learning disabilities is unproven.**

There is inadequate clinical evidence to support the use of visual information processing evaluations for diagnosing reading or learning-related disabilities. Additional well-designed studies with larger sample sizes are needed to establish the diagnostic utility of this procedure.

**Orthoptic or vision therapy including colored lenses, filters, and overlays is unproven for treatment of dyslexia and other learning and reading disabilities.**

There is a lack of robust data available on the efficacy of orthoptic therapy for treating dyslexia and other reading and learning disabilities. Several small randomized controlled trials of vision therapy have been published, but these studies were flawed by design limitations (including small sample size and poorly defined patient selection criteria). The American Academy of Pediatrics has published a statement that concludes that vision therapy is ineffective for the treatment of learning and reading problems.

**Visual perceptual therapy is unproven for any type of learning disability or language disorder, including developmental delay.**

The available data supporting the use of visual perceptual therapy to treat learning or developmental disabilities is weak and inconclusive, and derived primarily from uncontrolled or poorly controlled studies with significant methodological flaws.

**Vision restoration therapy is unproven as a treatment for visual field deficits following stroke or neurotrauma.**

There is inadequate evidence of efficacy for this treatment. The number of participants in the few available published studies is small and follow-up time is short.

**BENEFIT CONSIDERATIONS**

When deciding coverage for this service, the enrollee-specific document must be referenced. Most Certificates of Coverage (COC) and some Summary Plan Descriptions (SPD) contain explicit exclusions of coverage for orthoptic and eye exercise treatment.

**BACKGROUND**

Vision therapy is sometimes called eye exercise therapy, visual therapy, visual training, vision training, orthoptic therapy, orthoptics, orthoptic vision therapy, or optometric vision therapy. Vision therapy encompasses a wide range of optometric treatment modalities, with the therapeutic goal of correcting or improving specific dysfunctions of the vision system. There is no clear consensus on the exact definition of vision therapy. The American Academy of Optometry (AAO) and the American Optometric Association (AOA) broadly define it as an individualized treatment program that utilizes the use of special lenses, prisms, filters, occlusion, and other appropriate materials, methods, equipment, and procedures, including eye exercises and behavioral modalities. These therapies are used for eye movement and fixation training to eliminate or improve conditions such as lazy eye (amblyopia), crossed eyes (strabismus), focusing, eye-teaming, and tracking disorders. Vision therapy is administered in the office under the optometrist's guidance and requires a number of office visits, with the length of the program usually ranging from several weeks to several months, depending on the severity of the diagnosed conditions. For purposes of...
this policy, orthoptic or vision therapy does not include the use of refractive treatment including refractive lenses.

Visual perceptual therapy is a psychoeducational intervention intended to correct visual-motor or perceptual-cognitive deficiencies that are claimed to contribute to delay in speech and language development in preschool children.

Vision restoration therapy (VRT) targets the vision center of the brain and is intended to improve visual function in patients with visual field deficits that may result from stroke or brain injury. Patients utilize a computer screen to focus on a displayed central point and respond every time they see light stimuli appear. The light stimuli are presented in the area most likely to recover visual function, an area which will change as therapy progresses and vision is improved (Nova Vision).

Visual information processing evaluation (VIPE) identifies problems with processing of information for enhanced school and/or social development. Visual processing refers to a group of skills used for interpreting and understanding visual information. The evaluation may include testing for visual spatial orientation skills, visual analysis skills, including auditory-visual integration, visual-motor integration skills and rapid naming.

**CLINICAL EVIDENCE**

**Vision Therapy for Amblyopia**

Amblyopia, sometimes called lazy eye, is characterized by poor vision in an eye that did not develop normal sight during childhood. This condition affects approximately 2% to 3% of the population. There are three major causes of amblyopia: strabismus (misaligned or crossed eyes), unequal focus (a refractive error) and cloudiness in normally clear tissues (such as from cataracts). To correct amblyopia, the patient must be made to use the weak eye. This is accomplished through patching the good eye. This treatment is known as occlusion therapy and is a standard treatment. Atropine sulfate has also been used to blur the good eye (Kushner, 2002).

In a randomized controlled clinical trial, Rutstein et al. (2010) evaluated whether visual acuity improvement with Bangerter filters is similar to improvement with patching as initial therapy for children with moderate amblyopia. The study enrolled 186 children, 3 to <10 years old, with moderate amblyopia. Children were randomly assigned to receive either daily patching or to use a Bangerter filter on the spectacle lens in front of the fellow eye. Study visits were scheduled at 6, 12, 18, and 24 weeks. At 24 weeks, amblyopic eye improvement averaged 1.9 lines in the Bangerter group and 2.3 lines in the patching group. The authors concluded that because the average difference in visual acuity improvement between Bangerter filters and patching was less than half a line and there was lower burden of treatment on the child and family, Bangerter filter treatment is a reasonable option to consider for initial treatment of moderate amblyopia. The authors indicated that although the mean difference between groups was only 0.38 line, the end of the confidence interval on the difference was 0.76 line, and thus, treatment with Bangerter filters did not quite meet the prespecified definition of non-inferiority to patching when initiating therapy for moderate amblyopia. However, the authors also did not find that patching was statistically superior to Bangerter filters. Therefore, the authors could not conclude that the Bangerter filter treatment effect is similar to that seen with patching (based on our predefined definition of non-inferiority), but they also could not conclude that patching is definitely better.

In a prospective, randomized clinical trial, Agervi et al. (2010) compared spectacles plus patching 8 hours or more daily 6 days a week with spectacles plus patching 8 hours or more on alternate days to treat amblyopia in 40 children 4 to 5 years of age. The main outcome measure was median change in best corrected visual acuity (BCVA) of the amblyopic eye after 1 year. The median change in BCVA of the amblyopic eye did not differ significantly between the 2 groups. Binocular function improved in both groups with no significant differences between the groups at 1 year. The investigators concluded that the magnitude of change in the BCVA 1 year after
spectacles plus prescribed alternate-day patching was not significantly different than that after spectacles plus prescribed daily patching to treat amblyopia in children 4 to 5 years old. The effect of patching was not separate from that of optical correction with a period of refractive adaptation. Thus, the improvement in visual acuity is a combined effect of spectacle wear and occlusion therapy.

A large randomized controlled trial supported by the National Eye Institute involved 419 children. The participants were assigned to either patching or atropine drops as treatment for amblyopia. Visual acuity improved in both groups (79% in the patching group and 74% in the atropine group). Both treatments were well tolerated, but the parents of the atropine treated group reported a slightly higher degree of acceptability (PEDIG, 2002).

Shotton and Elliott (2008) systematically reviewed the available evidence to establish the most effective treatment for strabismic amblyopia. This review aimed to examine the impact of conventional occlusion therapy for strabismic amblyopia and analyze the role of partial occlusion and optical penalization for strabismic amblyopia. Two randomized controlled trials (RCTs) were included in the review. The authors concluded that occlusion, while wearing necessary refractive correction, appears to be more effective than refractive correction alone in the treatment of strabismic amblyopia.

In a Cochrane review, Taylor et al. (2011) evaluated the most effective treatment for strabismic amblyopia. The review found that occlusion, while wearing necessary refractive correction, appears to be more effective than refractive correction alone in the treatment of strabismic amblyopia.

**Vision Therapy for Strabismus**

Strabismus is an ocular misalignment. The most common types are esotropia (inwardly deviating eyes) and exotropia (outwardly deviating eyes). Less common is hypertropia, when one eye turns upward and hypotropia, when one eye turns downward. Prevalence estimates of strabismus range from 1% to 6% in different populations.

**Esotropia:**

The goal of strabismus surgery is to align the eyes and permit fusion with a minimum number of operations. Prisms have proposed as a way to more accurately determine the angle of deviation, or the target angle, for strabismus surgery. The National Eye Institute (NEI) sponsored the Prism Adaptation Study (PAS), a randomized, multicenter, controlled, clinical trial to determine the overall effect of prism adaptation. The PAS defined prism adaptation as the preoperative wearing of Fresnal prisms to offset the angle of esotropia, with adjustment of prism power over time to accommodate buildup to larger angles of esotropia, until fusion is achieved or it is demonstrated that fusion cannot be attained. Prism-adapted surgery refers to surgery for the angle of deviation at which the prism wearer achieves fusion. The study randomized 333 eligible patients who were at least 3 years of age, had no previous eye surgery, and had acquired deviations of 12 to 40 prism diopters. All patients had 20/40 or better visual acuity in each eye, and amblyopic patients underwent occlusion therapy before entry. Two levels of randomization were used. Sixty percent of the patients (n=199) underwent prism adaptation and 40% (n=134) did not. Those who did not have prism adaptation underwent conventional surgery for their entry angle of deviation. Of those who responded to prisms with motor stability and sensory fusion (n=131), half (n=67) underwent a conventional amount of surgery, i.e., surgery for angle at entry, and half (n=64) underwent augmented surgery based on the prism-adapted angle of deviation. A successful outcome was defined as a deviation of less than or equal to 8 prism diopters of esotropia or exotropia. Success rates 6 months after surgery were highest in prism adaptation responders who underwent augmented surgery and lowest in patients who did not undergo prism adaptation (89% versus 72%). The estimated overall rate of success for patients who went through the prism adaptation process was significantly better than the success rate of patients who did not undergo prism adaptation but underwent surgery for their deviation at entry into the study (83% versus 72%). The investigators concluded that there was a beneficial overall effect of the prism adaptation process for patients with acquired esotropia (PAS, 1990). A second report included the 1-year...
motor and sensory outcomes for patients enrolled in the PAS. Of the 333 patients originally randomized in the study, 305 (92%) completed the 1-year postoperative follow-up. The overall 1-year motor success rate for all patients in the study was 74%. The authors concluded that prism adaptation identifies those patients who can undergo enhanced or augmented surgery without increasing the risk of overcorrection (Repka, 1996).

Exotropia:
O’Leary and Evans (2006) evaluated when prismatic corrections improve performance at a measure of dynamic visual function using the Wilkins Rate of Reading Test (WRRT). All participants manifested an aligning prism (associated heterophoria) on the near Mallett Unit of 0.5Δ or greater. There were 80 participants: 58 had exophoria, 15 esophoria, and seven hyperphoria. The effect of the aligning prism on the WRRT was compared with a control lens using a double-masked randomized design. For exophoria, an aligning prism of 2Δ and above has a sensitivity of 67% and a specificity of 79% for improving performance at the WRRT by 5% or more. According to the investigators, it was not possible from the data to achieve a good compromise between sensitivity and specificity for the other types of heterophoria. The patients whose visual performance is improved by prismatic correction are not necessarily those who report the most symptoms. According to the investigators, this study suggests that exophoric patients of any age are likely to have improved visual performance with an intervention if they have an aligning prism of 2Δ or more, even in the absence of symptoms. These findings require confirmation in a larger study.

Coffey et al. (1992) compared the findings of 59 published studies over a 25-year period that evaluated the efficacy of 5 different treatment modalities used for intermittent exotropia: 1) over-minus lens therapy to stimulate convergence, 2) prism therapy to compensate for exodeviation, 3) occlusion therapy to reduce suppression, 4) extra-ocular muscle surgery to surgically reduce the exodeviation, and 5) orthoptic vision therapy to increase fusional vergence ranges and normalize sensory function. Using the studies' success measures, pooled success rates were: over-minus lens therapy, 28% (n=215); prism therapy, 28% (n=201); occlusion therapy, 37% (n=170); extraocular muscle surgery, 46% (n=2530); and orthoptic vision therapy, 59% (n=740). While the studies reportedly used generally stringent functional success criteria, lack of uniformity of definitions of success, diagnostic conditions and treatments; and methodological flaws including retrospective design, lack of control group and randomization, selection bias, and absence of statistical analysis, confounds conclusions that might be drawn from the results of the studies. Coffey concluded that the results of his analysis emphasize the need for well-designed, controlled clinical trials comparing the efficacy of various treatment approaches for intermittent exotropia.

Gnanaraj and Richardson (2005) conducted a systematic review to clarify the effects of various surgical and nonsurgical treatments for management decisions in intermittent distance exotropia. No randomized controlled trials were found that met selection criteria. The authors found that the current literature consists mainly of retrospective reviews and these are difficult to compare and analyze due to variations in definition, intervention criteria, and outcome measures. Data from individual studies on suggested intervention criteria were found to be variable, although there was some consistency in suggesting that small-angle deviations (less than 20 prism diptres) may be improved by nonsurgical treatments such as exercising fusion, eliminating suppression, or inducing accommodation using minus lenses. According to the authors, the efficacy of these treatments remains debatable.

Hatt and Gnanaraj (2013) analyzed the effects of various surgical and non-surgical treatments in randomized trials of people with intermittent exotropia, to report intervention criteria and determine the significance of factors such as age with respect to outcome. The authors searched for randomized controlled trials of any surgical or non-surgical treatment for intermittent exotropia. One randomized trial was eligible for inclusion in the review. This trial showed that unilateral surgery was more effective than bilateral surgery for correcting basic intermittent exotropia. According to the authors, measures of severity and criteria for intervention were poorly validated for all identified studies. The authors concluded that there is a need for improved measures of
severity, a better understanding of the natural history and carefully planned clinical trials of
treatment to improve the evidence base for the management of this condition.

Buck et al (2012) investigated the current patterns of management and outcomes of intermittent
distance exotropia in an observational cohort study which recruited 460 children aged < 12 years
with previously untreated distance exotropia. Data collected included angle, near stereoacuity,
visual acuity, control of distance exotropia measured with the Newcastle Control Score (NCS),
and treatment. The main outcome measures were change in clinical outcomes in treated and
untreated distance exotropia, 2 years from enrolment (or, where applicable, 6 months after
surgery). At follow-up, data were available for 371 children (81% of the original cohort). Of these:
53% (195) had no treatment; 17% (63) had treatment for reduced visual acuity only (pure
refractive error and amblyopia); 13% (50) had no-surgical treatment for control (spectacle lenses,
occlusion, prisms, exercises) and 17% (63) had surgery. Only 0.5% (2/371) children developed
constant exotropia. The surgically treated group was the only group with clinically significant
improvements in angle or NCS, but rates of overcorrection are high. Non-surgical treatment of
intermittent distance exotropia had less significant impact on angle of deviation or scores on the
NCS.

Vision Therapy for Convergence Insufficiency with or without Accommodative Disorders
Scheiman et al. (2011a) systematically assessed and synthesized evidence from randomized
controlled trials (RCTs) on the effectiveness of non-surgical interventions for convergence
insufficiency. The review included six trials (three in children, three in adults) with a total of 475
participants. The authors concluded that for children, office-based vision therapy is more effective
than home-based convergence exercises (i.e., pencil push-ups) or home-based computer vision
therapy. The evidence of the effectiveness of nonsurgical treatments of CI in adults was
considered less consistent.

Cacho Martinez et al. (2009) conducted a systematic review of reports published from 1986 to
2007 to analyze the scientific evidence available on the nonsurgical treatment of accommodative
and non-strabismic binocular dysfunctions, identifying the types of treatment used and their
efficacy. Of the 565 articles identified, 16 met the inclusion criteria. Only 3 were clinical trials. All
analyzed treatment of convergence insufficiency. According to the authors, results of clinical trials
support the conclusion that vision therapy improves symptoms and signs for convergence
insufficiency. The authors stated that the evidence indicates that pencil push-up treatment is not
as effective as vision therapy and that prism glasses are no more effective than placebo glasses.
They also stated that for the other non-strabismic binocular conditions and accommodative
disorders, there is a lack of published randomized, clinical trials that support the evidence for the
efficacy of each treatment.

Rawstron et al. published a systematic review of eye exercises in 2005. The review concluded
that small controlled trials and many case reports support the use of eye exercises in the
treatment of convergence insufficiency. However, there was no clear evidence supporting the use
of eye exercises for other vergence disorders, myopia, amblyopia, accommodative dysfunction,
and learning disabilities and dyslexia; thus, their use for these indications remains controversial.

The National Eye Institute (NEI) sponsored the Convergence Insufficiency Treatment Trial (CITT)
study, a randomized controlled trial comparing the effectiveness of different treatment options for
convergence insufficiency (CI) in 221 children (age 9 to 17 years). Three types of vision therapy
were compared with a placebo therapy intervention. Vision therapy included: (1) office-based
vision therapy with at-home exercises; (2) home-based pencil push-ups with additional computer
vision therapy; and (3) home-based pencil push-up therapy alone. The placebo therapy group
was given placebo vision activities that simulated office-based therapy. The study found that after
12 weeks of treatment, nearly 75% of children who received office-based vision therapy with at-
home reinforcement achieved normal vision or had significantly fewer symptoms of CI. In
comparison, only 43% of patients who completed home-based therapy alone showed similar
results, as did 33% of patients who used home-based pencil push-ups with computer therapy,
and 35% of patients who underwent office-based placebo therapy (NEI 2008).
Four randomized controlled trials evaluated office-based vision therapy/orthoptics with home exercises in children [Scheiman et al., 2005a (ages 9-18 years); CITI Study Group, 2006 (ages 9-17 years)], young adults (ages 19 to 30 years) (Scheiman et al., 2005b), and adult males ≥ 40 years of age (Birnbaum et al., 1999). The two studies by Scheiman and colleagues (Scheiman et al., 2005a; Scheiman et al., 2005b) were considered pilot studies for a later study by the CITI group (CITI Study Group, 2008). Sample sizes were small to moderate and ranged from 46 to 221 participants. Office-based vision therapy was superior to home-based therapies and office-based placebo therapy for improving CI symptoms and clinical signs in children in all of the studies.

The findings were equivocal regarding office-based vision therapy in young adults with CI (Scheiman et al., 2005b). Twelve weeks of office-based vision therapy with home exercises was superior to placebo office-based therapy with home exercises for improving both near point of convergence (NPC) and positive fusional vergence (PFV) at near. Office-based vision therapy also resulted in a significantly greater PFV break level than treatment with home-based pencil push-ups (HBPP), but the two groups did not differ on the NPC measure. In addition, no significant group difference in CISS symptom scores were found between groups undergoing office-based vision therapy with home exercises, placebo office-based therapy with home exercises, and HBPP.

Birnbaum et al. (1999) conducted the first controlled study to assess the efficacy of vision therapy for symptomatic convergence insufficiency in an adult male population. Sixty patients were randomly assigned to three groups: (1) office-based therapy with supplemental home therapy (n=21); (2) home therapy alone (n=20); and (3) no treatment control group (n=19). Successful outcomes were reported in 61.9% of patients who received in-office plus home therapy, 30% of patients who received home therapy only, and 10.5% of controls. The success rate for patients receiving active in-office vision therapy supplemented with home procedures was significantly greater than that for controls, but no other two-way comparisons were significant. The authors concluded that vision therapy is effective in eliminating asthenopia and improving convergence function in adult male patients, with in-office therapy combined with home therapy producing better results than home therapy alone.

The CITI Study Group (2009) conducted a long-term follow-up of 79 patients who were classified as asymptomatic after 12 weeks of treatment in the CITI Study Group (2008) trial. All patients were assigned maintenance home therapy exercises for the first 6 months after end of treatment, with exercises varying depending on original group assignment. The study had high completion rates, with 90% and 89% of patients completing the 6-month and 1-year follow-ups, respectively. Most children who were asymptomatic after 12 weeks of treatment maintained their improvement in symptoms and clinical signs ≥ 1 year after treatment was discontinued. In general, there were no significant changes from end of treatment in Convergence Insufficiency Symptom Survey (CISS) scores, near point of convergence (NPC) measures, and positive fusional vergence (PFV) measures at the 1-year follow-up. The proportion of patients who remained classified as improved or successfully treated was 88% for the office-based vergence/accommodative therapy with home therapy exercises group, 67% for the home-based pencil push-ups (HBPP) group, 80% for the home-based computer vergence/accommodative therapy with pencil push-ups (HBCVAT+) group, and 69% for the office-based placebo therapy with home therapy exercises group.

In a randomized controlled trial, Scheiman et al. (2010) evaluated the kinetics of change in symptoms and signs of convergence insufficiency (CI) during 12 weeks of treatment with commonly prescribed vision therapy/orthoptic treatment regimens. The trial included 221 children aged 9 to 17 years with symptomatic CI who were assigned to home-based pencil push-ups (HBPP), home-based computer vergence/accommodative therapy and pencil push-ups (HBCVAT+), office-based vergence/accommodative therapy with home reinforcement (OBVAT), or office-based placebo therapy with home reinforcement (OBPT). Based on the study results, the authors concluded that the rate of improvement is more rapid for clinical signs (NPC and PFV) than for symptoms in children undergoing treatment for CI. They also stated that OBVAT results
in a more rapid improvement in symptoms, NPC and PFV, and a greater percentage of patients reaching pre-determined criteria of success when compared with HBPP, HBCVAT+, or OBPT.

Shin et al. (2011) conducted a prospective controlled trial comparing office-based vision therapy with no vision therapy treatment. The study included 57 children aged 9-13 years who were diagnosed with symptomatic CI (n = 27) or combined symptomatic CI and accommodation insufficiency (AI) (n = 30). They were independently divided into a treatment and a control group, matched by age and gender. Office-based vision therapy significantly improved symptoms and clinical signs including NPC, PFV, mean accommodative amplitude, and mean accommodative facility relative to no treatment in children with CI and accommodative insufficiency. Of the patients with concurrent CI and accommodative insufficiency who received vision therapy, 77% were considered improved and 61% were consider cured. Of the 11 patients who completed the 1-year follow-up, symptom scores had deteriorated to abnormal levels in 2 children and 1 child also showed regression of the NPC. The authors concluded that this study supports the use of vision therapy as a successful method of treating CI and CI combined with AI.

In a randomized clinical trial, Scheiman et al. (2011b) assessed the effectiveness of various types of vision therapy for improving accommodative amplitude or accommodative facility in 221 children with deficiencies in these measures at baseline. All types of vision therapy (i.e., office-based vision therapy, HBCVAT+, and HBPP) were superior to office-based placebo vision treatment for improving mean accommodative amplitude. With regard to accommodative facility, only the office-based vision therapy group exhibited a significantly greater improvement than the placebo group. This study did not report the results of symptoms or other clinical signs. One year after completion of therapy, reoccurrence of decreased accommodative amplitude was present in only 12.5% and accommodative facility in only 11%. The authors concluded that vision therapy/orthoptics is effective in improving accommodative amplitude and accommodative facility in school-aged children with symptomatic CI and accommodative dysfunction.

Vision Therapy for Nystagmus
No well-designed clinical trials evaluating the use of vision therapy for nystagmus were identified.

Vision Therapy for Convergence Excess
To evaluate the effectiveness of vision therapy for convergence excess, a common ocular motility disorder, Gallaway and Scheiman (1997) retrospectively reviewed the records of 83 consecutive patients with this condition, seen in two private practices over a 3-year period and treated with vision therapy. The mean age of subjects was 11.8 years, with a range of 7 to 32 years. Therapy consisted of once- or twice weekly 45-minute office visits, and home therapy for 15 minutes 3 to 4 times per week. The mean number of vision therapy sessions was 18.5, with a range of 9 to 32. The investigators observed statistically and clinically significant changes in direct and indirect measures of negative fusional vergence, with 84% of patients reporting a total elimination of initial symptoms. The design of the study, a retrospective case series, and possible patient selection bias limit the value of these findings.

There are no well-designed clinical trials that support the use of vision therapy for convergence excess.

Vision Therapy for Divergence Insufficiency:
No well-designed clinical trials evaluating the use of vision therapy for divergence insufficiency were identified.

Vision Therapy for Divergence Excess:
The literature review did not identify any controlled studies evaluating vision therapy for divergence excess. A 1987 review of the evidence of eye exercises for divergence excess exotropia showed that few studies specifically evaluated the efficacy of vision therapy for divergence excess exotropia (Kran and Duckman, 1987). In addition, a recent review of intermittent exotropia did not specifically discuss intermittent exotropia of divergence excess type and was not considered further for this report (Thorburn et al., 2010). Thus, few studies
specifically evaluated the efficacy of vision therapy for divergence excess exotropia (Hayes Directory Vision Therapy for Accommodative and Vergence Dysfunction, 2011).

Vision Therapy for Stroke and Traumatic Brain Injury
Mizuno et al. (2011) conducted a multicenter, double-masked, randomized, controlled trial to evaluate the effects of a 2-week prism adaptation (PA) therapy on unilateral spatial neglect (USN). A total of 38 USN patients with right-brain damage were divided into prism (n = 20) and control (n = 18) groups. Patients were divided into mild and severe USN groups according to Behavioral Inattention Test (BIT) parameters (mild ≥ 55 and severe<55). The prism group performed repetitive pointing with prism glasses that induce rightward optical shift twice daily, 5 days per week, for 2 weeks, whereas the control group performed similar pointing training with neutral glasses. The Functional Independence Measure (FIM) improved significantly more in the prism group. In mild USN patients, there was significantly greater improvement of BIT and FIM in the prism group. The authors concluded that PA therapy can significantly improve ADL in patients with subacute stroke. These findings require confirmation in a larger study.

In a Cochrane review, Pollock et al. (2011) determined the effects of interventions for visual field defects after stroke. Thirteen studies (344 randomized participants, 285 of whom were participants with stroke) met the inclusion criteria for this review. However, only six of these studies compared the effect of an intervention with a placebo, control or no treatment group and were included in comparisons within this review. The authors concluded that there is insufficient evidence to reach generalized conclusions about the benefits of visual prisms (substitutive intervention) for patients with visual field defects after stroke.

The Veteran’s Administration (VA) issued a technology assessment for vision problems and interventions for patients with blast-related traumatic brain injury (TBI). The report was a systematic review intended to evaluate 2 issues: (1) The frequency of visual problems associated with mechanisms of TBI and (2) The effectiveness of rehabilitation interventions (including prisms) for vision problems in patients with these mechanisms of TBI. No studies met inclusion criteria for mild TBI. Two studies with controls and one prospective cohort study met inclusion criteria for moderate to severe TBI. All were small studies evaluating various visual rehabilitation interventions. The authors concluded that given the low level of certainty in the study results, there was insufficient evidence to assess the net benefits of the interventions in this review, and if offered, patients should understand the uncertainty about the balance of benefits and harms of the interventions (Veteran’s Administration, 2009).

In a single blinded pilot randomized controlled trial, Turton et al. (2010) evaluated the feasibility of delivering prism adaptation treatment in a clinically valid sample and assessed its impact on self-care in 37 right hemisphere stroke patients with unilateral spatial neglect. The patients were randomized into either prism adaptation or sham treatment (using plain glasses) groups. Treatment was delivered each weekday for two weeks. Thirty four patients received treatment: 16 with prisms, 18 with sham treatment. Mean compliance was 99% and 97%, respectively. Over the treatment days only the prism treated group showed increased leftward bias in open loop pointing to targets on a touch screen. However, despite the group level changes in pointing behavior no overall effect of the treatment on self-care or Behavioral Inattention Test (BIT) were found.

A total of 20 patients with visual field defects were studied between 3 and 24 weeks primarily after stroke. Patients were randomly assigned to separate groups performing either audiovisual stimulation training or a visual stimulation training (20 sessions, each lasting 30 minutes). Both groups improved their performance after compensatory eye movement training. Comparisons between the 2 forms of training revealed a significantly greater improvement for all outcome variables for the audiovisual group. The authors concluded that multimodal audiovisual exploration training appears to be more effective than exploration training alone and may improve function beyond spontaneous recovery soon after ischemia of the occipital lobe (Keller 2010).

Nys et al. (2008) evaluated sixteen neglect patients using a randomized controlled design in which six patients received four-day-in-a-row placebo treatment (CG) and ten patients received...
four-day-in-a row experimental treatment with 10 degrees rightward deviating prisms (EG) during their stay on the stroke unit. Patients were examined to determine if the EG group demonstrated a better long-term outcome at one month post-treatment. Patients in the EG improved faster on spatial tasks than the CG but not on visuo-construction. Patients in the EG group showed no differences with the CG in neglect outcome at one month post-treatment. The investigators concluded that 4 consecutive prism sessions produced beneficial effects in patients with acute neglect. However, prism effects were either short-term, or placebo treatment with repeated pointing and/or repeated neglect testing was more helpful than anticipated. The study results emphasize the importance of a placebo condition and a follow-up in rehabilitation studies.

Ciuffreda et al. (2008) conducted a computer-based query for acquired brain injury patients to retrospectively determine the effectiveness of conventional optometric vision therapy for oculomotor disorders of vergence and version in a sample of ambulatory, visually symptomatic, predominantly adult outpatients who had either mild traumatic brain injury (TBI) or cerebrovascular accident (CVA). The study included 33 patients with TBI and 7 with CVA. The criterion for treatment success was denoted by marked/total improvement in at least 1 primary symptom and at least 1 primary sign. Ninety percent of those with TBI and 100% of those with CVA were deemed to have treatment success. These improvements remained stable at retesting 2 to 3 months later. Nearly all patients in the current clinic sample exhibited either complete or marked reduction in their oculomotor-based symptoms and improvement in related clinical signs, with maintenance of the symptom reduction and sign improvements at the 2- to 3-month follow-up. According to the investigators, these findings show the efficacy of optometric vision therapy for a range of oculomotor abnormalities in the primarily adult, mild brain-injured population. Furthermore, it shows considerable residual neural plasticity despite the presence of documented brain injury. The small study population limits the conclusions that can be reached from this study.

Vision Therapy for Dyslexia and Other Reading and Learning Disabilities

Dyslexia is a neuro-developmental condition that causes reading difficulties in 5% to 10% of children. A deficiency in processing linguistic units (phonemes) that make up written and spoken words is believed to be the major etiologic factor for dyslexia. Proponents of vision therapy hypothesize that many dyslexics have impaired development of the magnocellular component of the visual system, which is important for timing visual events and controlling eye movements. They believe that poor control of eye movement may cause unstable binocular fixation with unsteady vision and may explain why some patients report that the words move around the page (Stein, 2000).

Hall et al. (2013) conducted a randomized, double blind trial with 73 delayed readers to compare changes in reading and spelling as well as irregular and non-word reading skills after 3 months of wearing either the Harris or the Dyslexia Research Trust (DRT) filters. Reading improved significantly after wearing either type of filter, with 40% of the children improving their reading age by 6 months or more during the 3 month trial. However, spelling ability and non-word reading improved significantly more with the DRT than with the Harris filters. The authors concluded that education and rehabilitation professionals should consider colored filters as an effective intervention for delayed readers experiencing visual stress. According to the authors, this research will help to support the use of colored filters for visual reading capacity but further more rigorous research is needed.

Harris and MacRow-Hill (1999) conducted a randomized, crossover, double-masked, placebo-controlled trial to evaluate ChromaGen haploscopic lenses, a series of precision tinted lenses, in 47 volunteers who have been formally diagnosed with dyslexia. The volunteers were ages 9 to 40 years. The study investigated the effects of using these colored filters on reading speed, accuracy, and comprehension, as well as on perception of academic ability. Subjects were randomized to two groups, receiving either the placebo (n=23) or ChromaGen lenses (n=24) first. Data analysis showed that the mean percentage improvement in the rate-of-reading scores, a measure calculated to reduce the impact of the wide variability in baseline reading scores, did not show a significant improvement for the ChromaGen lenses compared with the placebo lenses.

Only in the subgroups of individuals who self reported distortion such as blurring of text not corrected refractively, movement of words or letters, and distracting patterns formed by the spaces between words and lines, was there a significant difference in this measure. The authors concluded that the significant increase in the reading rate among those who reported distortion of text suggests that by decreasing this distortion, a substantial proportion of dyslexic patients would benefit from ChromaGen lenses. Among the limitations of this study were small sample size, treatment effect measurement on a short-term basis only, lack of objective testing of distortion, heterogeneity of subjects, and potential selection bias due to recruitment of volunteers.

Robinson and Foreman (1999) used a double-masked, placebo-controlled, crossover, experimental design to investigate the long-term effects of using colored filters on the frequency and type of errors in oral reading. The study randomized 113 children, ranging in age from 9.2 to 13.1 years, with reading difficulties into 1 of 3 experimental treatment groups: placebo tint (n=34), blue tint (n=41), and diagnosed tint (n=35). A control group consisted of 35 children of approximately the same age range who had reading difficulties. The investigators reported a significant improvement for all groups in all categories of oral reading error over the 20-month study period, but there was no significant difference in improvement between the experimental groups overall and the control group, suggesting that colored filtering does not improve reading skills.

Bouldoukian et al. (2002) reported results of a randomized controlled trial to determine whether individually prescribed colored overlays/filters had a significant effect on reading performance. Subjects were 29 children and 4 adults who had consulted a specific learning difficulties clinic; had received treatment to normalize any conventional optometric and orthoptic anomalies, including refractive, binocular, and accommodative problems; still complained of symptoms of asthenopia and/or perceptual distortions while reading; and subsequently reported symptomatic relief from colored filters. Small sample size; heterogeneity of subjects with respect to age, diagnosis, prior orthoptic exercises, and length of time using the colored overlays prior to testing were limitations of this study.

In a double-masked, placebo crossover randomized controlled trial, Ritchie et al. (2011) tested the efficacy of Irlen colored overlays for alleviating reading difficulties thought to have been caused by Irlen syndrome, a proposed perceptual disorder with controversial diagnostic status. Sixty-one school children (aged 7-12 years) with reading difficulties were included in the study. Based on the study results, the authors concluded that Irlen colored overlays do not have any demonstrable immediate effect on reading in children with reading difficulties.

**Visual Perceptual Therapy**

The clinical evidence was reviewed on July 15, 2013 with no additional information identified that would change the unproven conclusion for visual perceptual therapy.

Mukai et al. (2007) used functional magnetic resonance imaging to track brain activations during the course of training on a contrast discrimination task in order to understand the underlying neural mechanisms of perceptual learning. Based on their ability to improve on the task within a single scan session, subjects were separated into two groups: “learners” and “non-learners.” As learning progressed, learners showed progressively reduced activation in both visual cortex, including Brodmann's areas 18 and 19 and the fusiform gyrus, and several cortical regions associated with the attentional network, namely, the intraparietal sulcus (IPS), frontal eye field (FEF), and supplementary eye field. Among learners, the decrease in brain activations in these regions was highly correlated with the magnitude of performance improvement. Unlike learners, non-learners showed no changes in brain activations during training. Learners showed stronger activation than non-learners during the initial period of training in all these brain regions, indicating that one could predict from the initial activation level who would learn and who would not. In addition, over the course of training, the functional connectivity between IPS and FEF in the right hemisphere with early visual areas was stronger for learners than non-learners. The investigators speculated that sharpened tuning of neuronal representations may cause reduced activation in visual cortex during perceptual learning and that attention may facilitate this process.
through an interaction of attention-related and visual cortical regions. This study does not demonstrate that visual perceptual training improves learning skills or treats the underlying cause of a learning disability.

The available data regarding visual perceptual therapy is relatively weak, inconclusive, and derived primarily from uncontrolled or poorly controlled studies with significant methodological flaws. There are no well-designed clinical trials that indicate that visual perceptual therapy is an effective treatment for any type of learning disability or disorder.

**Vision Restoration Therapy (VRT)**

The clinical evidence was reviewed on July 15, 2013 with no additional information identified that would change the unproven conclusion for vision restoration therapy.

In a Cochrane review, Pollock et al. (2011) determined the effects of interventions for people with visual field defects after stroke. Thirteen studies (344 randomized participants, 285 of whom were participants with stroke) met the inclusion criteria for this review. However, only six of these studies compared the effect of an intervention with a placebo, control or no treatment group and were included in comparisons within this review. The authors concluded that there is insufficient evidence to reach generalized conclusions about the benefits of visual restitution training (VRT) for patients with visual field defects after stroke.

Jung et al. (2008) evaluated the effects of vision restoration therapy (VRT) on the visual function of 10 patients with anterior ischemic optic neuropathy in a randomized controlled double-blind pilot trial. All patients were evaluated before VRT and after 3 and 6 months of treatment by Early Treatment Diabetic Retinopathy Study (ETDRS) visual acuity, contrast sensitivity, reading speed, 24-2 SITA-standard Humphrey visual field (HVF), High Resolution Perimetry (HRP) (perimetry obtained during VRT), and vision-based quality of life questionnaire. Patients were randomized between two VRT strategies (5 in each group): I) VRT in which stimulation was performed in the seeing VF of the affected eye ("seeing field-VRT"), II) VRT in which stimulation was performed along the area of central fixation and in the ARV (areas of residual vision) of the affected eye ("ARV-VRT"). The results of the HRP, HVF, and clinical assessment of visual function were compared for each patient and between the two groups at each evaluation. Visual acuity qualitatively improved in the ARV-VRT group; however the change was not statistically significant. Binocular reading speed significantly improved in the ARV-VRT group. HVF foveal sensitivity increased mildly in both groups. HRP analysis showed a similar increase in stimulus accuracy in both groups (mean improvement of about 15%). All patients reported functional improvement after VRT. A small study population limits the conclusions that can be reached from this study.

Mueller et al. (2007) performed a clinical observational analysis of visual fields of 302 patients before and after being treated with computer-based vision restoration therapy for a period of 6 months. The visual field defects were due to ischemia, hemorrhage, head trauma, tumor removal or anterior ischemic optic neuropathy. Primary outcome measure was a visual field assessment with super-threshold perimetry. VRT improved patients' ability to detect super-threshold stimuli in the previously deficient area of the visual field by 17.2% and these detection gains were not significantly correlated with eye movements. Notable improvements were seen in 70.9% of the patients. Efficacy was independent of lesion age and etiology, but patients with larger areas of residual vision at baseline and patients older than 65 years benefited most. Conventional perimetry validated visual field enlargements and patient testimonials confirmed the improvement in every day visual functions. The lack of a control group limits the validity of the results of this study.

Mueller et al. (2003) conducted a retrospective analysis of 69 patients with visual field deficits following stroke or neurotrauma after they had performed a 6 month regimen of VRT. Patient testimonials and pre/post VRT changes were utilized to measure vision response. Most patients (88%) reported subjective benefits in activities of daily living with VRT. In a clinical trial by Kasten et al. (1998), 38 patients with either optic nerve injury (n=19) or damage to the primary visual...
cortex (n=19) were studied utilizing VRT for 6 months. Patient questionnaires and pre/post VRT changes were utilized to measure vision response with 72% of patients reporting improvements in vision. In a retrospective study by Romano et al. (2008), 161 patients with partial blindness caused by an optic injury were evaluated. Patients were treated with 6 modules of VRT with evaluations completed at baseline and after each module. Seventy-six percent of patients had at least a 3% absolute improvement in stimulus detection over baseline. Mueller, Kasten, and Romano conclude that these studies support VRT as a useful rehabilitative intervention for a proportion of patients with visual field defects. However, these studies are flawed by lack of randomized, controlled trials with long term follow-up.

**Visual Information Processing Evaluation**

Limited clinical evidence was found to support the use of visual information processing evaluations for diagnosing learning-related or other types of visual deficits. The clinical evidence was reviewed on July 15, 2013 with no additional information identified that would change the unproven conclusion for visual information processing evaluations.

Goldstand et al. (2005) compared visual and visual-information processing skills between children with and without mild reading and academic problems and examine the incidence of visual deficits among them. Seventy-one seventh graders classified as proficient (n = 46) and non-proficient (n = 25) readers were compared with respect to scores on an accepted vision screening, on tests of visual-perception, visual-motor integration, and academic performance. Further, academic performance and visual-information processing were compared between children who failed and passed the vision screening. Visual deficits were found in 68% of the participants, and among significantly more boys than girls. Non-proficient readers had significantly poorer academic performance and vision-screening scores than the proficient readers. Participants who passed the visual screening performed significantly better in visual perception than those who failed. According to the investigators, visual function significantly distinguishes between children with and without mild academic problems, as well as on visual-perception scores. The investigators concluded that the high occurrence of visual deficits among participants warrants consideration of vision deficits among schoolchildren with academic performance difficulties. These findings require confirmation in a larger study.

**Professional Societies**

**American Academy of Pediatrics (AAP), Section on Ophthalmology, Council on Children with Disabilities; American Academy of Ophthalmology (AAO); American Association for Pediatric Ophthalmology and Strabismus (AAPOS); and American Association of Certified Orthoptists (AACO):** According to a joint policy statement issued by the AAP, AAO, AAPOS, and AACO, diagnostic and treatment approaches for dyslexia that lack scientific evidence of efficacy such as behavioral vision therapy, eye muscle exercises, or colored filters and lenses are not endorsed or recommended (American Academy of Pediatrics, 2009).

A 2011 AAP technical report reinforces the above 2009 policy statement. The 2011 report indicates that vision problems can interfere with the process of reading, but children with dyslexia or related learning disabilities have the same visual function and ocular health as children without such conditions. Currently, there is inadequate scientific evidence to support the view that subtle eye or visual problems cause or increase the severity of learning disabilities. According to the report, scientific evidence does not support the claims that visual training, muscle exercises, ocular pursuit-and-tracking exercises, behavioral/perceptual vision therapy, "training" glasses, prisms, and colored lenses and filters are effective direct or indirect treatments for learning disabilities. There is no valid evidence that children who participate in vision therapy are more responsive to educational instruction than children who do not participate (Handler and Fiersen 2011).

**American Academy of Ophthalmology (AAO):** In a separate policy statement, the AAO maintains that school-aged children who demonstrate difficulties learning to read should be referred to reading specialists, such as educational psychologists, for evaluation of language processing disorders such as dyslexia. The organization states that there is insufficient evidence...
to conclude that "defective eye teaming" and "accommodative disorders" can be underlying causes of educational impairment (AAO, Vision Screening for Infants and Children, 2007).

The Complementary Therapy Assessment on Vision Therapy for Learning Disabilities was published in 2001 by the AAO. This report reviewed the literature on vision therapy for reading disabilities and concluded that there appears to be no consistent scientific evidence that supports behavioral vision therapy, orthoptic vision therapy, or colored overlays and lenses as effective treatments for learning disabilities. No well-performed randomized controlled trials (level I evidence) were found in the literature (American Academy of Ophthalmology, 2001).

The AAO Preferred Practice Pattern Guidelines (2012) for the management of esotropia and exotropia indicate that in some patients with acquired esotropia, prisms are used to promote binocular vision and establish the full angle on which to base extraocular muscle surgery. Patients with intermittent exotropia do not typically have diplopia, so prisms are not generally prescribed. However, some patients with intermittent exotropia also have convergence insufficiency. In these cases, base-out prism can be used during convergence exercises. Training in diplopia recognition (antisuppression training) and strengthening vergence amplitudes is ineffective in the treatment of most esotropic patients and may occasionally produce permanent diplopia, especially in patients with monofixation syndrome. In cases of symptomatic convergence insufficiency exotropia that is refractory to exercises, base-in prism can be included in eyeglasses to improve comfort while reading. Orthoptic therapy may improve fusional control in patients with convergence insufficiency exotropia and with small- to moderate-angle exotropia (i.e., 20 prism diopters or less), with the goal of strengthening fusional convergence amplitudes. Patients with the convergence insufficiency type of exotropia (exotropia greater at near) and asthenopic symptoms with near viewing (typically reading) may be good candidates for orthoptic therapy. Near point of convergence exercises on an accommodative target are useful if the near point of convergence is distant. Convergence exercises with a base-out prism may be beneficial once the near point of convergence improves. Treatment is tapered as symptoms improve, and it may need to be resumed if symptoms recur. Other treatments include computer-based convergence exercises and in-office orthoptics.

The AAO Preferred Practice Pattern Guidelines (2012) for amblyopia recommend that most children who have moderate amblyopia respond to initial treatment consisting of at least 2 hours of daily patching or weekend atropine (strong recommendation, good evidence for treatment of amblyopia) and (discretionary recommendation, good evidence for dosage [amount of time] of treatment).

National Eye Institute (NEI): Regarding patients with early vision abnormalities such as strabismus and amblyopia, NEI recognizes the need for clinical trials of noninvasive treatments such as orthoptics and vision training to determine the presence of improvement in eye alignment and visual function. While some kinds of controlled visual practice regimes might be effective treatments, these require convincing and systematic investigation under rigorous clinical research protocols (NEI, 1999).

American Academy of Optometry (AAO) and American Optometric Association (AOA): In the AAO and AOA 1999 joint policy statement, vision therapy is described as an effective treatment option for many visual dysfunctions, including ocular motility dysfunctions, non-strabismic binocular disorders, strabismus, amblyopia, accommodative disorders, and visual information-processing disorders (AAO/AOA, 1999). In an earlier, 1997 joint policy statement on vision, learning, and dyslexia, the AAO and the AOA maintained that while vision therapy does not treat learning disabilities or dyslexia directly, it can improve visual efficiency and visual processing to allow an individual to be more responsive to educational instruction. This statement claimed that, as such, vision therapy should be part of a multidisciplinary approach to learning disabilities (AAO/AOA, 1997). The position of the American Academy of Optometry is that management of learning related vision problems prepares the individual to take full advantage of opportunities to learn including educational instruction, remediation and programming (Christenson 1990).
American Optometric Association (AOA): The AOA issued a statement on the use of tinted lenses for the treatment of dyslexia and other related reading and learning disorders. While research does not support the validity of an actual visual perceptual dysfunction termed “scotopic sensitivity syndrome” (SSS), that has been claimed to cause reading problems and symptoms such as light sensitivity, headaches, blurring of print, and watery eyes, in most patients, the underlying symptoms associated with SSS are related to identifiable vision anomalies, such as accommodative and convergence dysfunctions, which may be responsive to vision therapy. However, since the results of research on the effectiveness of tinted lenses and filters have been inconclusive, the AOA supports further research in carefully controlled clinical studies to investigate the effect that these optical devices may have on a person’s visual function related to reading performance (AOA, 2002).

AOA has issued a clinical care publication on the definition of optometric vision therapy. The document states that research has demonstrated vision therapy can be an effective treatment option for:
- Ocular motility dysfunctions (eye movement disorders)
- Non-strabismic binocular disorders (inefficient eye teaming)
- Strabismus (misalignment of the eyes)
- Amblyopia (poorly developed vision)
- Accommodative disorders (focusing problems)
- Visual information processing disorders, including visual-motor integration and integration with other sensory modalities
- Visual sequelae of acquired brain injury
(American Optometric Association April 2009)

The AOA released a revised guideline on Care of the Patient with Strabismus: Esotropia and Exotropia in 2010. According to the AOA, vision therapy is successful in the treatment of many forms of strabismus. The AOA states that vision therapy or orthoptics involves active training procedures to improve the patient's fixation ability and oculomotor control, to help eliminate amblyopia, to improve sensory and motor fusion, and to increase facility and the range of accommodation and vergence responses. According to the AOA, the prognosis is most favorable for patients with intermittent strabismus, especially intermittent exotropia, who have sensorimotor fusion at some point in space and those with recently developed strabismus. (AOA, 2010b).

The AOA released a revised guideline on care of the patient with accommodative and vergence dysfunction in 2010. According to the guideline, improvement in both accommodative and vergence adaptation systems is the basis of the success of vision therapy. According to the guideline, data is lacking for the efficacy of home-based vision therapy by itself. Home-based vision therapy may be less effective than office-based therapy, as there is no therapist available to provide motivation or correct inappropriate procedures. Therefore, preferred clinical management involves office-based vision therapy in combination with home therapy. The AOA states that therapy combining diplopia awareness with operant-conditioning technique to reinforce alignment in the absence of visual cues has been advocated for divergence excess. The AOA also states that vision therapy is usually successful in patients with divergence insufficiency (AOA, 2010a).

American Association of Certified Orthoptists (AACO): The AACO states that orthoptics is an ophthalmic discipline, focusing on the evaluation and treatment of patients with disorders of the visual system, with an emphasis on binocular vision and eye movements. Orthoptists commonly work in pediatric opthalmology settings. However, while the majority of patients are children, due to the nature of many binocular disorders, orthoptists also work with adults in the setting of ophthalmology specific to neuro-ophthalmology and adult eye-muscle disorders (AACO, 2004).
Vision therapy is a procedure and, as such, is not subject to FDA regulation. Devices used in vision training programs may be classified under a number of different product codes. Some of these devices may be exempt from the 510(k) clearance process. For information on a specific device or manufacturer see the following Web site: http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmn.cfm Accessed July 2013.


NovaVision™, an attention task performance recorder, received FDA 510(k) approval on April 22, 2003. NovaVision™ presents visual stimuli on a computer screen, for the diagnosis and improvement of visual functions in patients with impaired vision that may result from trauma, stroke, inflammation, surgical removal of brain tumors or brain surgery, and may also be used to improve visual function in patients with amblyopia. Additional information is available at: http://www.accessdata.fda.gov/cdrh_docs/pdf2/K023623.pdf Accessed July 2013.

Centers for Medicare and Medicaid Services (CMS)

Medicare does not have a National Coverage Determination (NCD) for orthoptic or vision therapy, occlusion therapy and prism adaptation therapy. Local Coverage Determinations (LCDs) do not exist for any of the above therapies.

However, Medicare covers rehabilitation services for beneficiaries with a primary vision impairment diagnosis pursuant to a written treatment plan by the beneficiary's physician and provided by a qualified occupational or physical therapist (or a person supervised by a qualified therapist) or incident to physician services. Refer to the LCDs for Low Vision Services and Physical Medicine Rehabilitation.

(Accessed August 13, 2013)

Applicable Codes

The codes listed in this policy are for reference purposes only. Listing of a service or device code in this policy does not imply that the service described by this code is a covered or non-covered health service. Coverage is determined by the benefit document. This list of codes may not be all inclusive.

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<tr>
<th>CPT® Code</th>
<th>Description</th>
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<tr>
<td>92065</td>
<td>Orthoptic and/or pleoptic training, with continuing medical direction and evaluation</td>
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<tr>
<td>92499</td>
<td>Unlisted ophthalmological service or procedure</td>
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Coding Clarification:
Orthoptic therapy for the treatment of reading or learning disabilities is considered unproven and is not a covered service for reading or learning disability diagnoses.

References


**POLICY HISTORY/REVISION INFORMATION**

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| 10/01/2013 | • Updated description of services to reflect most current clinical evidence and references; no change to coverage rationale  
• Removed list of applicable ICD-9 and ICD-10 diagnosis codes (previously included for informational purposes only)  
• Archived previous policy version 2012T0072K |