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## Medical Policy



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**\*Current Policy Effective Date: 3/1/21**  
(See policy history boxes for previous effective dates)

### **Title: Orthoptic Training/Vision Therapy for the Treatment of Vision or Learning Disabilities**

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#### **Description/Background**

The American Optometric Association (AOA) broadly defines vision therapy as an individualized treatment regimen that involves the systematic use of lenses, prisms, filters, occlusion and other appropriate materials, methods, equipment and procedures. It also includes eye exercises and behavioral modalities for eye movement and fixation training. The therapeutic goal of vision therapy is to correct or improve specific visual dysfunctions (e.g., amblyopia, strabismus and accommodative and convergence disorders) as well as reading disorders such as dyslexia that purportedly are related to the lack of eye coordination. Components of vision therapy include:

- **Orthoptics:** Orthoptic training is a technique of eye exercises intended to improve eye movements and/or visual tracking. In addition to its use in the treatment of convergence insufficiency (CI), orthoptic training has been investigated for treatment of attention deficient disorders, dyslexia, dysphasia, and reading disorders.
- **Pleoptics:** Pleoptics are exercises designed to improve impaired vision when there is no evidence of organic eye diseases. Pleoptics is a term introduced by Professor Alfred Bangerter to include all forms of treatment for amblyopia particularly that associated with eccentric fixation. Pleoptics involves stimulating parts of the retina with bright lights.
- **Vision therapy:** Vision therapy is a sequence of neurosensory and neuromuscular activities individually prescribed and monitored by the doctor to develop, rehabilitate and enhance visual skills and processing. One of the techniques used in vision therapy involves syntonics or optometric phototherapy, which is the branch of ocular science dealing with the application of selected light frequencies through the eyes. Syntonics, from the word syntony (to bring into balance), refers physiologically to a balanced, integrated nervous system.

#### **CONVERGENCE INSUFFICIENCY**

Convergence insufficiency (CI) is a binocular vision disorder in the ability for the eyes to turn inward towards each other (e.g., when looking at near objects). Symptoms of this common

condition may include eyestrain, headaches, blurred vision, diplopia, sleepiness, difficulty concentrating, movement of print, and loss of comprehension after short periods of reading or performing close activities. Prism reading glasses, home therapy with pencil push-ups\*\* (See Inclusionary guidelines-FYI), and office-based vision therapy and orthoptics have been evaluated for the treatment of convergence insufficiency.

Some learning disabilities, particularly those in which reading is impaired, have been associated with deficits in eye movements and/or visual tracking. For example, many dyslexic persons may have unstable binocular vision and report that letters may appear to move around, causing visual confusion.

### **Treatment**

Orthoptic training refers to techniques designed to correct accommodative and convergence dysfunction/convergence insufficiency, which may include push-up exercises with additional base-out prisms; jump-to-near convergence exercises; stereogram convergence exercises; and recession from a target.<sup>1</sup> A related but distinct training technique is behavioral or perceptual vision therapy, in which eye movement and eye-hand coordination training techniques are used to improve learning efficiency by optimizing visual processing skills.

In addition to its use in the treatment of accommodative and convergence dysfunction, orthoptic training is being investigated for the treatment of attention deficient disorders, dyslexia, dysphasia, and reading disorders.

Some providers are offering optometric vision therapy (a type of physical therapy for the eyes and brain), which is a non-surgical treatment for many common visual problems such as lazy eye, crossed eyes, double vision, convergence insufficiency and some reading and learning disabilities. In the case of learning disabilities, vision therapy is specifically directed toward resolving visual problems that interfere with reading, learning and educational instruction. The optometric vision therapy program consists of supervised in-office and at home reinforcement exercises performed over weeks to months. In addition to exercises, lenses (“training glasses”), prisms, filters, patches, electronic targets, or balance boards may be used.

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### **Medical Policy Statement**

The safety and effectiveness of orthoptic training/vision therapy for specific medical conditions have been established. It may be considered a useful therapeutic option for the treatment of any of the following:

- Amblyopia for which **occlusion therapy** is administered
- Acquired esotropia that involves the **use of prism adaptation prior to corrective surgery**
- Strabismus, intermittent exotropia, convergence insufficiency and accommodative deficiencies (such as accommodative insufficiency and infacility) **which also involves the use of orthoptics or prisms**

Orthoptic training (including “optometric vision therapy”) for the treatment of learning disabilities, dyslexia, mild traumatic brain injury and other conditions not listed above is experimental/investigational. It has not been scientifically demonstrated to improve patient clinical outcomes.

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## **Inclusionary and Exclusionary Guidelines (Clinically based guidelines that may support individual consideration and pre-authorization decisions)**

### **Inclusions:**

Office-based vergence/accommodative therapy is considered established for patients whose symptoms of convergence insufficiency have failed to improve following a minimum of 12 weeks of home-based therapy, including but not limited to:

- Push-up exercises (pencil push-ups) using an accommodative target
- Push-up exercises (pencil push-ups) with additional base-out prisms
- Jump to near convergence exercises; stereogram convergence exercises;
- Recession from a target; and
- Maintaining convergence for 30-40 seconds)

Conditions treated by pleoptic therapy include:

- Accommodative dysfunction disorders (focusing problems),
- Acquired esotropia (the turning inward of the eye) that involves the use of prism lenses prior to corrective surgery
- Amblyopia (lazy eye) for which eye-patching therapy is being used
- Amblyopia (poorly developed vision in one or both eyes),
- Convergence insufficiency
- Intermittent exotropia
- Non-strabismus binocular dysfunction disorders (inefficient eye teaming),
- Nystagmus (rapid, involuntary eye movement)
- Strabismus (misalignment of the eyes)

Documentation should include the following:

- The initial evaluation must include measurable data supporting the diagnosis in order to establish a baseline against which follow-up evaluations can be measured.
- There should be a written treatment plan that includes the projected period of treatment.
- There should be reasonable expectation that vision therapy will produce improvement that can be measured in a reasonable period of time. If there is no improvement after the first two months of therapy, the need for further therapy should be questioned.
- There should be monthly re-evaluations with documentation of percentage of improvement from the start of therapy.
- There should be written documentation of any changes in the patient's treatment plan. All progress should be documented.
- Vision therapy includes both office visits and a home treatment program. There should be documentation of the patient's compliance or noncompliance.
- Because all patients are different, each vision therapy program may differ in the number of visits per week and the total number of visits. Vision therapy programs may require from 24 to 32 visits over the course of a few months, with follow up instructions for continuing the program in the home. Vision therapy is performed in an optometrist or ophthalmologist's office once or twice a week for a number of months with instructions for a follow-up program to continue at home.

**Exclusions:**

- Any other conditions not listed under the inclusions listed above, including but not limited to learning disabilities, dyslexia and mild traumatic head injury.
- Orthoptic training (including “optometric vision therapy”) for the treatment of learning disabilities, dyslexia, mild traumatic brain injury and other conditions not listed above

**Additional background information (FYI):**

This policy addresses office-based orthoptic training. In general, up to 12 sessions of office-based vergence/accommodative therapy, typically performed once per week, has been shown to improve symptomatic convergence insufficiency in children aged 9 to 17 years. If patients remain symptomatic after 12 weeks of orthoptic training, alternative interventions should be considered.

A diagnosis of convergence insufficiency is based on asthenopic symptoms (sensations of visual or ocular discomfort) at near point combined with difficulty sustaining convergence. Convergence insufficiency and stereoacuity is documented by:

- Exodeviation at near at least 4 prism diopters greater than at far; AND
- Insufficient positive fusional vergence at near (positive fusional vergence (PFV) less than 15 prism diopters blur or break) on PFV testing using a prism bar; AND
- Near point of convergence (NPC) break of more than 6 cm; AND
- Appreciation by the patient of at least 500 seconds of arc on stereoacuity testing.

**\*\*Pencil Push-Ups:**

- Hold a pencil, with the tip facing up, at arm’s length in front of your face. Focus your eyes on the tip of the pencil
- Bring the pencil toward your nose slowly. Continue to focus on the pencil tip.
- Note the spot that when, instead of seeing 1 pencil you see 2 pencils. Hold the pencil still and focus on it for 10 seconds.
- Move the pencil slowly back to its original position.
- Repeat the process for 1 minute
- Take a 1-minute break to rest your eyes
- Resume the pencil push-ups. Do 3 sets total of the pencil push-ups. Each set should consist of moving and focusing on the pencil for 1 minute and resting your eyes for 1 minute.
- Repeat the 3 sets of pencil push-ups 2 to 4 times daily or as directed by your doctor.

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**CPT/HCPCS Level II Codes** *(Note: The inclusion of a code in this list is not a guarantee of coverage. Please refer to the medical policy statement to determine the status of a given procedure)*

**Established codes:**

92065

**Other codes (investigational, not medically necessary, etc.):**

N/A

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## Rationale

This review was informed by a 1996 TEC Assessment, which found that the available evidence did not support the conclusion that orthoptic training improves reading comprehension.<sup>2</sup> Specifically, the study populations in the available published reports were not well-defined, and while the subjects were reported to be “poor readers,” it could not be determined whether they had a verifiable diagnosis of a reading disorder. Also, objective outcomes of reading comprehension were lacking in the published studies.

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

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

## ORTHOPTIC TRAINING FOR CONVERGENCE INSUFFICIENCY

### Clinical Context and Therapy Purpose

Convergence insufficiency is a binocular vision disorder associated with defects in the eyes' ability to turn inward toward each other (e.g., when looking at near objects). The diagnosis of convergence insufficiency is made when patients have a remote near point of convergence or difficulty in sustaining convergence in conjunction with sensations of visual or ocular discomfort at near vision. Symptoms of this common condition may include eyestrain, headaches, blurred vision, diplopia, sleepiness, difficulty concentrating, movement of print, and loss of comprehension after short periods of reading or performing close activities. Prism reading glasses, home therapy with pencil push-ups, and office-based vision therapy and orthoptics have been evaluated for the treatment of convergence insufficiency.

The purpose of orthoptic training in patients who have convergence insufficiency is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does the use of orthoptic training in patients who have convergence insufficiency improve net health outcomes?

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

### **Patients**

The relevant population of interest is patients with convergence insufficiency.

### **Interventions**

The treatment being considered is in-office orthoptic training. Orthoptic training refers to techniques designed to correct accommodative and convergence insufficiency (or convergence dysfunction).

In-office orthoptic training is administered by ophthalmologists, optometrists, or orthoptists in an outpatient clinical setting.

### **Comparators**

The comparator of interest is standard management of convergence insufficiency with at-home vision training exercises.

The comparator described is prescribed by ophthalmologists, optometrists, orthoptists to be conducted at home.

### **Outcomes**

The general outcomes of interest are symptoms and functional outcomes.

Timing of intervention is approximately 12 weeks of in-office training, followed by 6 months of at-home training. Follow-up at 1 year or more is preferable.

### **Study Selection Criteria**

Methodologically credible studies were selected using the following principles:

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

### **Systematic Reviews**

At least two systematic reviews have addressed the role of orthoptic training for convergence insufficiency. A 2005 systematic review of the applicability and efficacy of eye exercises found that small controlled trials and a large number of cases support their use in the treatment of convergence insufficiency (CI).<sup>3</sup> A 2011 Cochrane review by Scheiman and colleagues evaluated the evidence on non-surgical interventions for convergence insufficiency.<sup>4</sup> Six trials (3 in children and 3 in adults) with a total of 475 participants were included in the review, which searched the literature through October 2010. The three trials in children (described below) and one of the trials in adults were conducted by the multicenter Convergence Insufficiency Treatment Trial (CITT) study group. Scheiman and colleagues concluded that current research suggests that outpatient vision therapy/orthoptics is more effective than home-based

pencil push-ups\*\* or home-based computer vision therapy/orthoptics for children. In the adult population, evidence of the effectiveness of various non-surgical interventions is less consistent. A number of gaps in current knowledge, including whether different therapy combinations or durations of therapy might be more effective, were identified.

### **Randomized Controlled Trials**

In 2008, the CITT study group reported a randomized controlled trial (RCT) of 221 children (9 to 17 years of age) with symptomatic CI.<sup>5</sup> The children were randomly assigned to 1 of 4 treatment conditions: home-based pencil push-ups; home-based computer vergence/accommodative therapy and pencil push-ups; weekly office-based vergence/accommodative therapy with home exercises; or weekly office-based placebo exercises with home reinforcement of the placebo exercises. Symptoms were evaluated by the Convergence Insufficiency Symptom Survey [CISS], a 15-item survey with a final score ranging from 0 (least symptomatic) to 60 (most symptomatic). Scores of less than 16 were considered “asymptomatic” and a decrease of 10 or more points was considered “improved”. Near point convergence (NPC) and positive fusional vergence (PFV) were used as secondary outcomes. A “normal” NPC was defined as less than 6 cm and an “improved” NPC was defined as an improvement (decrease) in NPC of more than 4 cm from baseline to follow-up. To be classified as having “normal” PFV, a patient had to pass Sheard’s criteria (i.e., PFV blur/break of more than 15 prism diopters ( $\Delta$ )). Improvement in PFV was defined as an increase of 10  $\Delta$  or more from baseline to follow-up.

On blinded evaluation after 12 weeks of treatment (99% completion rate), 73% of patients treated with office-based orthoptic training were considered to be successful or improved on the composite outcome of CISS, NPC, and PFV, as defined above, compared with 43%, 33%, and 35% of those treated with home pencil push-ups, home computer exercise, or placebo, respectively. For office-based orthoptic training, the average CISS improved from 30 at baseline to 15 at the final assessment, which was significantly better than the other 3 groups. The group practicing pencil push-ups at home improved from an average CISS score of 28 to 21 at 12 weeks; similar scores were obtained for the home computer exercise group (from 32 to 25) and the office-based placebo group (from 30 to 22). At completion of the 12-week treatment programs, patients were classified as either asymptomatic (CISS <16) or symptomatic. Symptomatic patients were offered alternative treatment at no cost. Asymptomatic patients were assigned to home maintenance therapy for 15 min per week for the initial 6 months after treatment. At 1-year follow-up, 88% of the 32 children who were asymptomatic at the completion of the 12-week office-based treatment program remained successful or improved; 67% of the home-based pencil push-up group remained successful or improved.<sup>6</sup> A limitation of this RCT is that near-point exercises generally consist of multiple therapies making it difficult to correlate outcomes with specific modalities.

Following publication of the main results of the CITT trial, a number of re-analyses have been performed. The effectiveness of these forms of vision therapy (pencil push-ups\*\*, home computer exercises, and office-based vision therapy) in improving accommodative amplitude in 164 of the children (74% of 221) who had co-existing accommodative dysfunction with convergence insufficiency was reported by the CITT study group in 2011.<sup>7</sup> Of the 164 children with accommodative dysfunction, 63 (29%) had a decreased amplitude of accommodation, 43 (19%) had decreased accommodative facility (latency and speed of the accommodative response), and 58 (26%) had both. After 12 weeks of treatment, increases in amplitude of accommodation were significantly greater in the 3 active groups (range of 5.8 to

9.9 D) compared to office-based placebo therapy (2.2 D). The percentage of children who no longer showed decreased amplitude of accommodation was 91.4% for office-based therapy, 79.3% for home computer therapy, 74.1% for home pencil push-ups, and 35.7% for placebo treatment. Accommodative facility improved by 9.4 cycles per minute (cpm) for office-based therapy, 7.0 cpm for home computer-based therapy, 5.0 cpm for home pencil push-ups, and 5.5 cpm for office-based placebo therapy; only the office-based therapy was significantly greater than in the office-based placebo therapy group. One year after completion of therapy, decreased accommodative amplitude recurred in 11% of 44 children and accommodative facility recurred in 12.5% of 32 children who did not undergo subsequent treatment.

The effect of successful treatment of CI on parent's perception of academic behavior in the 218 children who completed this study was also reported by the CITT group.<sup>8</sup> Participants were classified as successful (n=42), improved (n=60), or non-responder (n=116) after 12 weeks of treatment. This study used the Academic Behavior Survey (ABS), a 6-item survey developed by the CITT study group that quantifies parents' perceptions of the frequency of adverse behaviors exhibited by their children when reading or performing school work (5 questions) and overall parental concern about the child's academic performance (1 question). The mean ABS score at baseline was 12.85 out of a total possible of 24 points and improved by 4.0, 2.9, and 1.3 points in children classified as successful, improved, and non-responder, respectively. The improvement in the ABS score was correlated with reduction in symptom level ( $r=0.29$ ), but not to changes in measures of convergence. Although the ABS has not been validated outside of this study, the effect sizes in the successful and improved groups were 0.9 and 0.7, representing a clinically meaningful change.

In 2012, the CITT group reported findings from a post hoc analysis of this RCT related to the effect of convergence insufficiency treatment on specific types of symptoms.<sup>9</sup> Outcomes were measures on the CISS, which was divided into 2 subscales: a performance-related subscale consisting of 6 symptoms related to visual efficiency when reading or performing near work, such as loss of place with reading, and the eye-related subscale consisting of nine symptoms specific to visual function or asthenopic-type complaints, such as eye pain. Each subscale was reported as an average of the items in its category, with a range of values from 0 to 4. Subjects were grouped into those with or without a "treatment response," defined as an improvement of at least 8 points in their CISS scale. At baseline, scores on the overall CISS scale and the performance-related subscale were statistically significantly higher for children with parent-reported attention deficit hyperactivity disorder (ADHD) than for those without parent-reported ADHD (34.1 vs. 29.5 for the overall CISS scale; 2.8 vs. 2.2 for the performance related subscale). Those with a "treatment response" on the overall CISS score demonstrated improvements in both the performance-related subscale and the eye-related subscale of a mean 1.1 points. Further research is needed into whether the treatment-related improvement in performance-related symptoms seen with orthoptics training translates into improvements in reading performance and attention.

Two earlier RCTs from the CITT group addressed various vision therapies, not specifically office-based vergence training, for convergence insufficiency. A 2005 RCT with 72 children compared base-in prism glasses or placebo reading glasses for all reading and near tasks.<sup>10</sup> Base-in prism glasses were found to be no more effective in alleviating symptoms, improving NPC, or improving PFV at near than placebo reading glasses. Another RCT from the CITT group compared a 12-week program of home-based pencil push-ups with office-based vision therapy/orthoptics or office-based placebo therapy in 47 children.<sup>11</sup> Pencil push-ups, performed



15 minutes a day, 5 days a week, did not alleviate symptoms or signs associated with convergence insufficiency in this small study. Office-based vision therapy (sessions once a week for 12 weeks), supplemented by home exercises, was more effective than home-based pencil push-ups or office-based placebo therapy in reducing symptoms and improving signs of convergence insufficiency in children.

### **Non-randomized, Comparative Studies**

Shin et al reported a non-randomized comparative study of office-based vision therapy in 2011.<sup>12</sup> Fifty-seven children with symptomatic CI, or combined CI and accommodative insufficiency, were divided into a treatment and untreated control group, matched by age and gender. Vision therapy was performed in the school clinic 2 times per week with instructions for home exercises to be performed for 15-25 minutes a day during the week. After 12 weeks of office-based vision therapy, the mean COVD-QOL [College of Optometrists in Vision Development – Quality of Life] symptom score decreased from 27.07 to 10.40 and the near point of convergence (NPC) improved from 8.67 to 3.20 in the children with CI. The mean positive fusional vergence (PFV) improved from 13.93 to 26.80. Sixty-seven percent of the children were considered to have been cured and 82% were improved. There were no significant changes between baseline and 12-week follow-up for the control group. Of the 20 children in the treatment group who completed a 1-year follow-up, 3 (15%) showed recurrence.

In 2011, Dusek et al reported a non-randomized comparative study of 134 children with CI who had been referred to a tertiary care center in Austria for reading difficulties.<sup>13</sup> Thirty-two participants refused all treatment offered (control group), and the remaining children were given either base-in prism reading glasses (n=51) or computerized home vision therapy (n=51) based on preference. Parents were instructed to ensure that their child was carrying out the procedure correctly; compliance was verified on a weekly basis. All participants were examined for total reading time, reading error score, amplitude of accommodation, and binocular accommodative facility at baseline and after 4 weeks. Prismatic reading glasses were not worn during testing. Significant improvements were found in the prism glasses and computer exercise groups for total reading time, reading error score, amplitude of accommodation, binocular accommodative facility, and vergence facility. For example, reading speed improved by 21 seconds in the reading glasses group, 12 seconds in the computer exercise group, and 4 seconds in the control group. The mean amplitude of accommodation improved by 1.4 D in the reading glasses group, 1.0 D in the computer exercise group and 0.3 D in the control group. The only significant improvement for the control group was vergence facility. Although this non-randomized study is limited by the potential for selection and performance bias, the results suggest that base-in prism reading glasses may be an effective treatment for CI and associated reading problems in children.

Lee et al (2014) reported results from a small nonrandomized, controlled trial of vision therapy in children with vergence insufficiency and symptomatic ADHD.<sup>14</sup> Of 1123 children (age range, 8-13 years) who were screened for ADHD, 81 were identified as having symptomatic ADHD; of those, 16 were identified as having accommodative dysfunction on binocular function testing. Eight subjects received vision therapy, and the remainder acted as a control group; eligibility criteria for vision therapy included: high exophoria at near vision ( $\geq 6 \Delta$ ), exophoria at near vision at least 4  $\Delta$  greater than at distant vision, a receded near point of convergence break ( $\geq 6$  cm), or insufficient PFV at near vision, failing Sheard's criterion (PFV less than twice the near phorias), or minimum PFV 15 or less  $\Delta$  base out blur or break. Vision therapy included progressive home- and office-based convergence and accommodative exercises over 12

weeks. At 12-week follow-up, intervention group subjects demonstrated improvements in near point of convergence (11.50 to 4.38 cm;  $p < 0.05$ ), break point of near PFV (11.88 to 32.38 cm;  $p < 0.01$ ), recovery point of near PFV (6.38 to 19.75 cm;  $p < 0.01$ ), and near exophoria (12.00 to 7.81 cm;  $p < 0.05$ ). ADHD symptoms, as measured by the parent-reported Korea-ADHD Rating Scale (K-ARS), improved from 23.25 at baseline to 17.13 ( $p < 0.05$ ) after vision therapy. Only within-group comparisons were reported. Control group subjects did not demonstrate improvements in vision metrics or K-ARS scores.

In a small randomized comparative study, Momeni-Moghaddam et al (2015) compared the effectiveness of pencil push-up therapy and versus office-based vision therapy in 60 individuals with convergence insufficiency (mean age, 21.3 years).<sup>15</sup> Subjects received either pencil push-up therapy or office-based therapy without home intervention, and underwent reevaluation at 4 and 8 weeks after the start of treatment. With 1 exception, the 2 groups did not differ significantly in terms of the NPC, phoria, and PFV. After 4 and 8 weeks of follow-up, PFV was significantly more improved in the pencil push-up therapy group ( $p = 0.001$ ). Study authors suggested that pencil push-up therapy and office-based vision therapy were largely comparable for treatment of convergence insufficiency.

### **Noncomparative Studies**

In 2016, Borsting et al published results from a single-arm multicenter study, the Convergence Insufficiency Treatment Trial–Reading Study.<sup>16</sup> Investigators evaluated parent-reported behavioral and emotional problems at baseline among children with symptomatic convergence insufficiency and after 16 weeks of office-based vergence accommodative therapy. The intervention was consistent with that administered in the CITT trial. Parent-reported ADHD symptoms were assessed with the Conners 3 ADHD Index (Conners 3AI) and behavioral and emotional symptoms with the 120-item Child Behavior Checklist. Of the 53 children enrolled, 48 consented to office-based therapy and 44 completed therapy and provided post treatment data. After completion of therapy, there were significant within-subject improvements in CISS scores and in Conners 3AI scores ( $d = 0.58$ , significantly different from zero). Subjects also demonstrated statistically significant improvements in the Child Behavior Checklist competency-related subscale related to school performance but not to social- or activities-related performance. On Child Behavior Checklist's symptom-related subscales, there were statistically significant improvements in the anxious/depressed, somatic complaints, and internalizing problems subscales. This study provided some evidence that ADHD-like and emotional and behavior problems may improve among children with symptomatic convergence insufficiency after office-based vision therapies. However, the study's small size and lack of a control group preclude making definitive conclusions about the efficacy of this treatment.

### **Section Summary: Orthoptic Training for Convergence Insufficiency**

The most direct evidence on office-based orthoptic training comes from a 2008 RCT that demonstrated office-based vision training improves symptoms of convergence insufficiency in a greater percentage of patients than a home-based vision exercise program. Subanalyses of this RCT demonstrated improvements in accommodative vision, parental perception of academic behavior, and specific convergence insufficiency-related symptoms. However, in this trial, as in others, the home-based regimen did not include the full range of home-based therapies, which may have biased results in favor of the orthoptic training.

## **ORTHOPTIC TRAINING FOR LEARNING DISABILITIES**

Two studies were published in 2000 and 2001 that focused on the use of tinted lenses and eye patching as a technique to steady binocular vision as a therapy for dyslexia. Stein and colleagues (2000) reported results of a randomized trial in which 143 dyslexic children were instructed to wear yellow tinted glasses with or without the left lens occluded.<sup>17</sup> The children were instructed to wear the glasses whenever they were reading or writing. Significantly more of the children who were given occluded glasses (59%) gained stable binocular vision in the first 3 months compared with children given the non-occluded glasses (36%). Christenson and colleagues (2001), however, found no difference in reading ability in children with dyslexia and abnormal binocular vision who were tested both with and without occluded, blue-tinted lenses.<sup>18</sup> A 2005 systematic review of the applicability and efficacy of eye exercises found that there was no clear scientific evidence to support the use of eye exercises for other disorders aside from CI, including learning disabilities and dyslexia.<sup>3</sup>

In 2014, Ramsay et al reported results from a small nonrandomized controlled study of a computerized vergence training program in 13- to 14-year-old patients with dyslexia.<sup>19</sup> Twelve subjects with dyslexia were treated with the computerized vergence training program, receiving an average of 11.75 sessions over 5 weeks; 12 control students were included who were not treated. All subjects underwent vision testing and were not diagnosed with convergence insufficiency. The computerized training program involved the generation of a computerized stereogram, which appears in 3 dimensions with convergent vision. For the intervention groups subjects, the reading speed improved from 87.83 words read per minute to 95.58 words read per minute from baseline to follow-up ( $p < 0.006$ ), while the reading speed was unchanged from baseline to follow up for the control group (85.00 words per minute at baseline to 89.37 words per minute at follow-up;  $p < 0.123$ ). The mean improvement in reading speed from baseline to follow-up did not differ significantly between groups ( $p < 0.123$ ).

Several studies report that poor reading in children who do not have dyslexia or attention deficits may be related to impairments in accommodation or convergence, suggesting the need for an ophthalmologic and orthoptic evaluation.<sup>20-22</sup>

### **Section Summary: Orthoptic Training for Learning Disabilities**

A 1996 TEC Assessment did not find evidence that orthoptic training improved outcomes for individuals with learning disabilities. Since that publication, peer-reviewed studies have not directly demonstrated improvements in reading or learning outcomes with orthoptic training. At least 2 earlier studies that addressed other types of vision therapies reported mixed improvements in reading.

### **SUMMARY OF EVIDENCE**

For individuals who have convergence insufficiency who receive office-based orthoptic training, the evidence includes a TEC Assessment, several randomized controlled trials (RCTs), and nonrandomized comparative studies. Relevant outcomes are symptoms and functional outcomes. The most direct evidence on office-based orthoptic training comes from a 2008 RCT that demonstrated office-based vision/orthoptic training improves symptoms of convergence insufficiency in a greater percentage of patients than a home-based vision exercise program consisting of pencil push-ups or home computer vision exercises. Subanalyses of this RCT demonstrated improvements in accommodative vision, parental perception of academic behavior, and specific convergence insufficiency-related symptoms. However, in this trial as in others, the home-based regimen did not include the full range of

home-based therapies, which may have biased results in favor of the orthoptic training. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have learning disabilities who receive office-based orthoptic training, the evidence includes a TEC Assessment as well as nonrandomized comparative and noncomparative studies. Relevant outcomes are functional outcomes. A 1996 TEC Assessment did not find evidence that orthoptic training improved outcomes for individuals with learning disabilities. Since that publication, peer-reviewed studies have not directly demonstrated an improvement in reading or learning outcomes with orthoptic training. At least two earlier studies that addressed other types of vision therapies were mixed in reporting improvements in reading. The evidence is insufficient to determine the effects of the technology on health outcomes.

### Ongoing and Unpublished Clinical Trials

Some currently unpublished trials that might influence this review are listed in Table 1.

**Table 1. Summary of Key Trials**

NCT No.	Trial Name	Planned Enrollment	Completion Date
<b>Ongoing</b>			
NCT02207517	Convergence insufficiency treatment trial-attention and reading trial (CITT-ART)	324	Apr 2019
<b>Unpublished</b>			
NCT01515943	Effectiveness of home-based therapy for symptomatic convergence insufficiency	204	June 2015 (completed)

NCT: national clinical trial

## SUPPLEMENTAL INFORMATION

### CLINICAL INPUT RECEIVED THROUGH PHYSICIAN SPECIALTY SOCIETIES AND ACADEMIC MEDICAL CENTERS

While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

In response to requests, BCBSA received input from 4 physician specialty societies (5 reviewers) and 3 academic medical centers while this policy was under review in 2010-2011. Although input supported the use of office-based orthoptic training when home-based therapy had failed, some reviewers indicated that home-based therapy would typically include more exercises than pencil push-ups. Recommended were push-up exercises using an accommodative target; push-up exercises with additional base out prisms; jump to near convergence exercises; stereogram convergence exercises; recession from a target; and maintaining convergence for 30-40 seconds.

## **PRACTICE GUIDELINES AND POSITION STATEMENTS**

### **American Academy of Pediatrics et al**

In August 2009 (reaffirmed in 2014), the American Academy of Pediatrics, American Academy of Ophthalmology, American Association for Pediatric Ophthalmology and Strabismus, and the American Association of Certified Orthoptists issued a joint policy statement concerning pediatric learning disabilities, dyslexia, and vision.<sup>23</sup> For vision therapy, the policy concluded:

“Currently, there is no adequate scientific evidence to support the view that subtle eye or visual problems cause learning disabilities. Furthermore, the evidence does not support the concept that vision therapy or tinted lenses or filters are effective, directly or indirectly, in the treatment of learning disabilities. Thus, the claim that vision therapy improves visual efficiency cannot be substantiated. Diagnostic and treatment approaches that lack scientific evidence of efficacy are not endorsed or recommended.”

In 2011, the American Academy of Ophthalmology, American Association for Pediatric Ophthalmology and Strabismus, and the American Association of Certified Orthoptists published a joint technical report on learning disabilities, dyslexia, and vision.<sup>1</sup> The report concluded:

“There is inadequate scientific evidence to support the view that subtle eye or visual problems cause or increase the severity of learning disabilities.... 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.”

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### **Government Regulations**

#### **National:**

Medicare pays for procedure code 92065. There is no national coverage policy for orthoptic/pleoptic therapy.

#### **Local:**

There is no local coverage determination on this topic.

*(The above Medicare information is current as of the review date for this policy. However, the coverage issues and policies maintained by the Centers for Medicare & Medicare Services [CMS, formerly HCFA] are updated and/or revised periodically. Therefore, the most current CMS information may not be contained in this document. For the most current information, the reader should contact an official Medicare source.)*

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### **Related Policies**

N/A

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*The articles reviewed in this research include those obtained in an Internet based literature search for relevant medical references through November 2020, the date the research was completed.*

### Joint BCBSM/BCN Medical Policy History

<b>Policy Effective Date</b>	<b>BCBSM Signature Date</b>	<b>BCN Signature Date</b>	<b>Comments</b>
6/9/04	6/9/04	6/10/04	Joint policy established
1/1/07	10/31/06	11/21/06	Routine maintenance
11/1/07	8/21/07	10/20/07	Diagnosis codes added
5/1/08	2/18/08	5/1/08	Routine maintenance; revised diagnosis codes
7/1/09	4/21/09	5/11/09	Routine maintenance; references added
3/1/11	1/4/11	1/4/11	Updated references; added examples to the inclusions section
11/1/13	8/20/13	9/3/13	Routine review. No change in policy status. Title changed from "Orthoptic/Pleoptic Therapy" to "Orthoptic Training for the Treatment of Vision or Learning Disabilities"
11/1/14	8/19/14	8/25/14	Routine review. No change in policy status. Title changed from "Orthoptic Training for the Treatment of Vision or Learning Disabilities" to "Orthoptic Training/Vision Therapy for the Treatment of Vision or Learning Disabilities." Added discussion regarding optometric vision therapy, a type of physical therapy for the eyes that employs prisms, filters, electronic targets or balance boards.
3/1/16	12/10/15	12/10/15	Routine policy maintenance. Updated rationale and references. Policy status unchanged.
3/1/17	12/13/16	12/13/16	Updated rationale and references, no change in policy status.
3/1/18	12/12/17	12/12/17	Updated rationale and added references 15 and 19. No change in policy status.
3/1/19	12/11/18		Routine policy maintenance, no change in policy status.
3/1/20	12/17/19		Routine policy maintenance. No change in policy status.



3/1/21	12/15/20		Routine policy maintenance. No change in policy status.
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Next Review Date: 4<sup>th</sup> Qtr. 2021

**Pre-Consolidation Medical Policy History**

<b>Original Policy Date</b>	<b>Comments</b>
BCN: N/A	Revised: N/A
BCBSM: 11/28/02	Revised: N/A

## **BLUE CARE NETWORK BENEFIT COVERAGE**

### **POLICY: ORTHOPTIC TRAINING/VISION THERAPY FOR THE TREATMENT OF VISION OR LEARNING DISABILITIES**

#### **I. Coverage Determination:**

<b>Commercial HMO (includes Self-Funded groups unless otherwise specified)</b>	Covered following inclusionary/exclusionary guidelines.
<b>BCNA (Medicare Advantage)</b>	See government section
<b>BCN65 (Medicare Complementary)</b>	Coinsurance covered if primary Medicare covers the service.

#### **II. Administrative Guidelines:**

- The member's contract must be active at the time the service is rendered.
- Coverage is based on each member's certificate and is not guaranteed. Please consult the individual member's certificate for details. Additional information regarding coverage or benefits may also be obtained through customer or provider inquiry services at BCN.
- The service must be authorized by the member's PCP except for Self-Referral Option (SRO) members seeking Tier 2 coverage.
- Services must be performed by a BCN-contracted provider, if available, except for Self-Referral Option (SRO) members seeking Tier 2 coverage.
- Payment is based on BCN payment rules, individual certificate and certificate riders.
- Appropriate copayments will apply. Refer to certificate and applicable riders for detailed information.
- CPT - HCPCS codes are used for descriptive purposes only and are not a guarantee of coverage.