The Van Orden Star

Alisa McMahon

Pacific University

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THE VAN ORDEN STAR

By

ALISA McMAHON

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Adviser:

Paul Kohl, O.D.
Alisa McMahon

Paul Kohl, O.D.
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INTRODUCTION

In the early 1940's, M. E. Van Orden, O.D. developed the Binocular Visual Behavior Pattern, commonly known as the Van Orden Star. The Star indicates how a patient centers with each eye individually while performing binocularly.

This manual covers the administration, interpretation and application of the Van Orden Star. It represents a synthesis of the literature, mostly in the form of Optometric Extension Program Foundation papers, as well as numerous case reports from the files of Dorothy Parrott, O.D. of Lakewood, Colorado.
ADMINISTRATION

1. materials

VO Star forms
The original Van Orden Star forms are commercially available through Keystone View. The Keystone Binocular Behavior Pattern Chart (Figure 1a) is designed for use with the Keystone Correct-Eye-Scope.

Forms may be designed according to the following specifications:
- two columns of symbols approximately 145-146 millimeters apart
- eleven symbols in each column spaced approximately seven millimeters apart
- each symbol approximately two millimeters in diameter
- use white or manila paper devoid of water marks which tend to draw fixation
- a small mark at the very bottom of the form midway between the two columns

instrument
The Van Orden Star can be administered in any Brewster stereoscope with an attached stage. The Keystone Correct-Eye-Scope and the Stereo Optical (Titmus) Biopter are most commonly used. The optical center separations of the two stereoscopes are 85 and 95 millimeters, respectively. For both instruments, optical infinity is at 20 centimeters. Both provide transillumination of the Star form and a clamp to hold it in place.

pencils
Two pencils are required. They should be alike, of equal length, and sharpened to similar points.

Dr. Amorita Treganza prefers to use two different pencils, a red pencil in the dominant hand and a soft blue pencil in the other hand. The blue pencil generates relatively darker lines which makes up for the relatively firmer lines produced by the dominant hand. However, she notes that "some prefer to use the same pencil hardness to compare the pressure applied by each hand, which may have some significance." (21)

For those patients who try, consciously or otherwise, to "do it right," Dr. Dorothy Parrott suggests using two red pencils and red filters over both eyes. With proper cancellation, the lines cannot be seen as they are drawn. (13)

template
The template (Figure 1b) is optional. Made of clear plastic, it is laid on top of completed VO Stars for a quick appraisal regarding the position of their centers. The same information can be gained by simply measuring the center separation, however, the template can be very useful when explaining a VO Star pattern to the patient and/or parent.

Templates may be designed as follows:
- reproduce the VO Star test form on stiff, clear plastic
- draw a bold horizontal line between the two central symbols
- draw two bold vertical lines, equidistant from the center of the form, at the designated orthophoric position (see the section entitled "orthophoria" below)
Figure 1a. Keystone Binocular Behavior Pattern Chart

Figure 1b. Template
2. set-up

Position the stage at the infinity setting (20 centimeters). Center the VO Star form on the stage such that the two columns are equidistant from the center of the shaft. This is easily accomplished when the form is marked midway between the two columns. Be sure the form is level, so as not to induce vertical disparity.

In the OEP series *Optometric Evaluation of Children with Academic Dysfunction*, Drs. Treganza and Wold wrote: "[The Van Orden Star] is considered a hand/eye performance and we think of it in relation to the academic situation... The results are usually interpreted in terms of nearpoint performance and described thusly... Yet, the test is made using optical infinity on the stereoscope shaft." (22) This dichotomy has resulted in differing opinions regarding the appropriate control lens and positioning of the patient.

Dr. Treganza and others use lenses which compensate for the distance refraction. (4, 21) Dr. Parrott utilizes several different lenses, including the potential near prescription. This topic is further discussed in the Applications section entitled "to probe for the best near prescription."

Dr. Dorothy Parrott and others advocate the use of standing VO Stars. The patient is instructed to stand with feet shoulder-width apart, parallel to each other, and bearing equal weight. Dr. Parrott and her therapists observe the patient's posture before and during the test from some distance behind. Dr. Parrott notes that amblyopes often rotate to place their preferred eye on midline. (13) Drs. Amorita Treganza, Robert M. Wold and others prefer to have the patient seated because most schoolwork involving eye-hand coordination is done in the sitting position. (22)
3. instructions

Many different instructional sets have been employed in VO Star testing and training. This section will cover testing instructions. Training instructions will be discussed in the "Applications" section below.

sample instructional sets

A. Larry Macdonald (8)
1. "I will place this target into the stereoscope and give you two pencils, one for each hand. Hold your pencils with your usual writing posture. Look into the instrument. You will see two rows of dots."
2. "Place your right hand pencil on the upper right hand dot. Place your left hand pencil on the lower left hand dot."
3. "Draw the two pencils toward one another in a straight line until they look like they are touching one another. At that moment take your pencils from the paper."
4. "Place your pencil on the next dot down on the right and on the next dot up on the left and repeat. Continue this for all of the dots."
5. "Notice the feeling of symmetry in your body as both pencils approach one another at the same rate of speed."

B. Amorita Treganza (21)
"Put your right hand pencil on the top dot and your left hand pencil on the bottom dot. Look at the center of the paper. There is no spot to look at, but look where you think the center is. Now slowly draw a line toward the center of the paper. Keep your eyes on the very center of the paper. Do not look at your pencils or your hands. See them out of the corner of your eyes. Make your right hand come down toward the center and your left hand come up toward the center. Move your hands at the same time and at the same speed so one won't be ahead of the other. Raise your hands off the paper so that only the tips of the pencils are touching the paper. Don't let the pencil tips touch. Stop when they look like they are about to touch."
"Keep your elbows up. Keep the tips of your pencils on the paper and don't let your hands touch the paper. Ready? Good! Now start to draw your lines toward each other and STOP WHEN IT LOOKS LIKE YOUR PENCILS ARE TOUCHING. DON'T WAIT TO FEEL THEM TOUCH. STOP WHEN IT LOOKS LIKE THEY'RE TOUCHING."

Continue, following Sequence II described below.

C. Charles B. Margach and Jane B. Carmichael (9)
The [right-handed] patient is instructed to place his left pencil-point on the top symbol in the left row and his right pencil-point on the bottom symbol in the right row. His elbows should not be on the table-top although his fore-arms (sic) may be rested on it. Only the pencil-points, never the hands also, should touch the stage.
"Draw lines on the paper by starting your pencils toward each other. Move them both at the same rate of speed until you see them meet in the middle of the paper. Do not look back and forth between the pencils, but look straight ahead, through the paper, at the light behind. Steer the pencils with your side vision."
"Do not expect to feel the pencils touch, but as soon as you see them touch, stop drawing. Now move both pencils back to the starting rows. Put your left pencil down
one symbol from where you first started it; put your right pencil up one symbol. Before starting to draw again, look at each pencil-point to make sure it is in the right place then look back at the light. Do this each time before starting to draw. Now make a second pair of lines by moving your pencils toward each other until you see them touch in the middle."

These instructions are continued until the pencils are moving along the "180" line. "When you see your pencils touch this time, instead of going back to the sides right away, hold them touching at the middle and look at the lines drawn so far. Are your pencil-points still touching? If not, move them until they are touching." Record the correction made both as to direction and distance.

"Go back to the sides again, ready to draw the next pair of lines, but first look back at the lines drawn so far. Do they have a gap in them, do the overlap, or are they continuous?" Record the answer.

The drawing of the "star" is continued, with the last pair of lines being made with the left pencil starting at the bottom symbol in its row and the right pencil starting at the top symbol in its row.

Margach and Carmichael also present a variation in which Sequence IV is replaced by Sequence VI (see "sequences" section below). The patient is asked to make the "180" line observations twice, once when he first draws it and again when he completes the Star.

"Thus when he finishes he is back at the horizontal level of the figure and the two observations of the relations of the pencil points and the star points can be repeated to determine if there has been any shift in his visual organization of the figure during the second half of the drawing."

Margach and Carmichael recommend left-handed patients start with the left pencil at the bottom of the left column and the right pencil at the top of the right column.
There are diverging opinions regarding the "best" order in which to complete the VO Star. Six sequences presented in the literature are shown below. Sequences I, IV and VI give consideration to the effects of handedness.

**Sequence I**

1. the right-hand pencil on the top symbol of the right column and the left-hand pencil on the bottom symbol of the left column
2. proceed down the right column and up the left column
3. alternate between steps a and b
4. central symbols are last

**Sequence II**

1. the right-hand pencil on the top symbol of the right column and the left-hand pencil on the bottom symbol of the left column
2. the right-hand pencil on the bottom symbol of the right column and the left-hand pencil on the top symbol of the left column
3. alternate between steps a and b
4. central symbols are last

**Sequence III**

1. central symbols
2. the dominant hand pencil on the bottom symbol and the non-dominant hand pencil on the top symbol
3. the dominant hand pencil on the top symbol and the non-dominant hand pencil on the bottom symbol
4. alternate between steps b and c
5. (In this example, the right hand is dominant.)
Sequence IV

1  ●
2  ○
3  ●
4  ○
5  ●
6  +
7  ●
8  ○
9  ●
10 ○
11 ●

○ 11 a) the dominant hand pencil on the bottom symbol and the non-dominant hand pencil on the top symbol
+ 6 b) proceed up the right column and down the left column
○ 4 (In this example, the right hand is dominant.)
● 3
○ 2
● 1

Sequence V

1  ●
2  ○
3  ●
4  ○
5  ●
6  +
11 ●
10 ○
9  ●
8  ○
7  ●

 Sequence V

a) the right pencil on the top right symbol and the left pencil on the top left symbol
b) proceed down both columns until the central symbols have been completed
c) the right pencil on the bottom right symbol and the left pencil on the bottom left symbol
d) proceed up both columns until all figures have been completed

Sequence VI

1  ●
2  ○
3  ●
4  ○
5  ●
6  +
11 ●
10 ○
9  ●
8  ○
7  ●

● 7 a) the dominant hand pencil on the bottom symbol and the non-dominant hand pencil on the top symbol
+ 6 b) proceed up the right column and down the left column until the central symbols are completed
c) the dominant hand pencil on the top symbol and the non-dominant hand pencil on the bottom symbol
d) proceed down the right column and up the left column
(In this example, the right hand is dominant.)
● 3
○ 2
● 1
special considerations for children

Most six year olds and some five year olds are physically capable of performing the VO Star, however, the instructional set may be quite confusing. The following techniques have been suggested for young children, and may also prove helpful with patients who have difficulty processing directions.

1) In most instructional sets, patients are asked to look at the center of their field. To obtain a valid Star, make certain your younger patients understand this concept by simply asking them to show you the center of the VO Star form out of instrument. If the youngster is not able to do so, demonstrate the center by folding the test pattern in half as follows: 1) right to left with the right and left symbols overlapped and 2) top to bottom across the middle set of symbols. The intersection of these two folds marks the center of the paper. (4)

2) Demonstrate the mechanics of the VO Star procedure out of instrument. This may be accomplished on a chalkboard or in free space. (21)

   Chalkboard Method: Place a dot on the chalkboard at about nose level. This will serve as a central fixation point. Draw a VO Star test pattern around that point. Make it wide enough to utilize the full breadth of the patient’s arms. Give the patient two pieces of chalk, one for each hand, and assist him in placing them on the appropriate symbols. Then instruct him to look at the central fixation point and to draw both pieces of chalk toward the fixation point at the same time. Continue through the sequence of symbols. This method is disadvantageous in that the chalk sticks look and feel like they touch simultaneously.

   Free Space Method: Stand facing your patient. Assist him in placing his hands in the starting position, e.g., right hand up and to his right and left hand down and to his left. Then mirror his image. Next, go through the motions together, e.g., make a diagonal line in the air with your left hand coming downward and your right hand coming upward to meet at midline. Continue through the sequence, e.g., make a horizontal line at shoulder height and a diagonal line in the opposite direction.

3) Pointers can be quite useful for alleviating confusion over sequence. Simply direct the patient to the next set of symbols with two pointers, one on each side. (10)

4) Lastly, little ones and others with a short attention span may be instructed to do every other symbol. (13)
The sum and substance of VO Star interpretation is the quality and location of the centers. The "centers" represent the perceived center of the field of view for each eye (Figure 2a).

Interpretation of the Van Orden Star is both qualitative and quantitative. Qualitatively, all lines on each side should terminate at a single point, forming a distinct center. Quantitative assessment focuses on the location of the centers in relation to each other, to lateral orthophoria, and to vertical orthophoria (Figure 2a).

Phoria in this context refers to the relationship between centering and the actual location of objects in space. For example, an esophoric Star pattern indicates that the patient centers between himself and the object of regard. Figure 2b is a schematic illustration of centering in real space. Such schematic drawings are utilized throughout the Interpretation chapter in an effort to relate the two-dimensional Star pattern to centering in three-dimensional space. These drawings are adapted from Dr. Robert S. Byall's paper entitled "Interpretation of the Van Orden Star," published in the OEP series Visual Training at Work. (1)
Figure 2b. Schematic drawing and legend. Note: In this drawing, the z-axis is coincident with the median anatomical plane, and is therefore not shown.

The finished VO Star product is replete with information, but much is also to be gained by observing the process of creating it. How much effort is expended? Does the patient perform impulsively or reflectively? At what speed is the activity completed? How does the patient process instructions? How are the pencils held? Posture? These observations not only provide additional understanding of the patient, but may also be helpful when interpreting the completed VO Star pattern.

A few caveats from Dr. Parrott regarding interpretation: (13)

- The VO Star should be used and interpreted in conjunction with other procedures. As is true of all optometric tests, it does not give all the answers; it is merely one more tool in the toolbox.
- Keep in mind that the VO Star may be illustrating the underlying problem or the patient's compensation for that problem.
- Ignore differences created by handedness (dominant/non-dominant).

In his OEP Series, Optometric Training in Action, Dr. Ralph Schrock described a series of experiments which beautifully demonstrate how centering affects the VO Star form as viewed in a stereoscope. (15, 17, 18) An abbreviated version of the experiments is presented in Section 1 of this chapter, and the reader is encouraged to perform these experiments for a more complete understanding of Van Orden Star pattern interpretation.

Following "the Schrock experiment," each of the remaining sections of this chapter illustrate a specific feature of VO Star pattern interpretation.
1. the Schrock experiment

The Experiment:

1. Put a VO Star test blank into the instrument.
2. Look into the instrument in a relaxed state, making no effort to manipulate your visual mechanisms.
3. Place a dot in the very center of your field of view with an ordinary pencil held in each hand. The tips of the pencils should appear to touch each other when you make the dots.
4. Remove the stereogram and, using a red pencil, place a small red cross on each side, about 3 mm away from the center of the stereogram and about 5 mm higher than the dots.
5. Using a green pencil, place a small circle on each side, about 1 cm toward the center of the stereogram and about 5 mm below the dots.
6. Place the stereogram back in the instrument and look at your central dot. You should see two red crosses with uncrossed diplopia and two green circles with crossed diplopia.
7. Fuse the green circles. Notice the total space between the two columns of the Star pattern.
8. Fuse the red crosses. Notice the total space between the two columns of the Star pattern.

Discussion:

The actual field of view is dependent upon the observer’s interpupillary distance and the stereoscope’s design. The field of view varies considerably as each symbol is fixated.

Centering at the Plane of Regard, Figure 3a, illustrates the field of view seen while fusing the central dots. The field is actually composed of three subfields, however, because the boundaries of the subfields are invisible, it appears to be a single entity. The great bulk of the field consists of normal stereoscopic field (NS), that portion of the total field which is composed of overlapping right and left eye fields. A small ribbon of binocular artifact field (BA) is located on either side. [For an explanation of binocular artifact fields, see Dr. Schrock’s papers.] If the observer maintains this posture while performing the VO Star, the resultant centers will be 34 mm from the columns.

Figure 3a. Centering at the Plane of Regard (adapted from Schrock (15))
Centering in Front of the Plane of Regard I, Figure 3b, illustrates the field of view seen while fusing the green circles. The field is now composed of five subfields. [For an explanation of the new subdivisions, the non-corresponding fields (NC), see Dr. Schrock's papers.] The normal stereoscopic field (NS) now occupies a smaller proportion of the total field, and the two columns of the Star pattern have moved farther apart to enter their respective non-corresponding fields (NC). The physical distance between the center of the visual field and each column has been functionally lengthened. If asked to perform the VO Star, the observer will draw long lines, and the resultant centers will be greater than 34 mm from the columns.

As the observer centers nearer and nearer, the normal stereoscopic field (NS) continues to shrink and the columns move even farther apart. Centering in Front of the Plane of Regard II, Figure 3c, illustrates the field of view when centering is extremely close. The observer will draw lines across the entire stereogram because he has two separate, non-overlapping fields of view.
Centering Behind the Plane of Regard I, Figure 3d, illustrates the field of view seen while fusing the red crosses. The non-corresponding (NC) and binocular artifact (BA) fields are crossed. [For a complete discussion, see Dr. Schrock's papers.] Relative to Figure 3a, the normal stereoscopic field (NS) is again reduced. However, contrary to Figure 3b, the two columns of the Star pattern have moved closer together. The physical distance between the center of the visual field and each column has been functionally shortened. If asked to perform the VO Star, the observer will draw short lines, and the resultant centers will be less than 34 mm from the columns.

As the observer centers farther and farther beyond the plane of regard, the normal stereoscopic field (NS) continues to shrink and the columns move even closer together. Centering Behind the Plane of Regard II, Figure 3e, illustrates the field of view when centering is so far beyond the plane of regard that the two columns of the Star pattern fuse. The observer can create this scenario by placing 25Δ base out into the stereoscope. Patients who naturally perceive the Star in this way find the instructional set immensely confusing. They generally place one pencil at each end of the column (as they perceive it), and draw the pencils toward each other until they appear to touch in the middle of the column. The resulting lines are drawn directly over the columns.

Figure 3d. Centering Behind the Plane of Regard I (adapted from Schrock (17))

Figure 3e. Centering Behind the Plane of Regard II (adapted from Schrock (17))
When the observer centers still farther beyond the plane of regard, the normal stereoscopic field (NS) disappears, and a pseudo-stereoscopic field (PS) emerges. The columns move into their respective right and left non-corresponding fields (NC). Centering Behind the Plane of Regard III, Figure 3f, illustrates this field of view. Both columns are again visible, however, because the fields are crossed, the column seen by the right eye appears to be on the left side of the field and vice versa. The patient who naturally perceives the Star in this way is able to follow the standard instructions, however, in so doing, he experiences a visual-tactual mismatch. When the patient places the right pencil on the top character of the right column, he feels the column is to his right, but sees it to his left. When he attempts to draw the pencils toward one another, he actually draws away from the center of the VO Star. Figure 3g is an example of the resulting VO Star pattern.

In the discussion and figures above, it is assumed the observer centers at the same distance with each eye. A patient who centers at different distances with each eye will perceive an asymmetrical field of view.

In sum, Dr. Schrock's experiments demonstrate that the largest normal stereoscopic field occurs when the observer centers on the plane of regard. Centering either nearer or farther than this plane results in a constriction of the normal stereoscopic field. The experiments also enhance our understanding of the various Star patterns which will be discussed below.
2. orthophoria

Figures 4a-b. Orthophoria (adapted from Byall)

Each center is located at the intersection of the vertical and horizontal lines: The patient is orthophoric, laterally and vertically. Input (the actual location) and output (the perceived location) coincide. There is no distortion in this patient's visual space world, objects are and appear to be in the same place. (1)

Lateral orthophoria, the ideal distance between the two centers, theoretically corresponds with accurate centering in real space. However, opinion varies regarding its precise quantification. The Keystone Correct-Eye-Scope and Stereo Optical (Titmus) Biopter have optical orthophoric separations of 85 and 95 millimeters, respectively, at the 20 centimeter infinity shaft setting. Allowance must be made for the proximal effect, however, particularly in the presence of considerable motor feedback regarding the actual working distance. At 20 centimeters, each prism diopter of vergence reduces the center separation by two millimeters. The following orthophoric separations (in millimeters) have been proposed:

<table>
<thead>
<tr>
<th></th>
<th>Keystone Correct-Eye-Scope</th>
<th>Stereo Optical (Titmus) Biopter</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>(9)</td>
<td>66 (13)</td>
</tr>
<tr>
<td>66±2</td>
<td>(4)</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>(19)</td>
<td></td>
</tr>
</tbody>
</table>

1
Figure 4c. Lateral orthophoria on this VO Star form, designed for use with the Stereo Optical (Tilms) Biotr head, corresponds with the #4's on the upper scale, a separation of 66 millimeters.
3. esophoria

Figures 5a-b. Esophoria (adapted from Byall)

The centers are located within the vertical lines: The patient is esophoric; he centers in front of the plane of regard. Output is closer than input. This patient underestimates distances. When parallel parking, his car ends up too far away from the curb. In baseball, he is the classic pull hitter, and in basketball, tends to shoot short. (1)

Figure 5c. Esophoria (JT 8/12/86) (12)

JT is 45 years old. This Star, demonstrating esophoria, was completed during a VT progress exam. As a side note, on the day this Star was performed, JT reported an awareness of "using and trusting" the left eye more. Her unaided near visual acuity in the left eye measured 20/25-; an improvement from 20/120 measured at the initial examination.
Figure 5d. A pseudo-esophoria (12)

This looks like esophoria, but it's not. The patient actually continued drawing until his pencil tips physically touched. When patients are observed performing the Star in this manner, consider three possibilities:

1) The patient does not understand the instructions.
2) The patient relies on his kinesthetic system, as opposed to his visual system, to direct the action. The stereoscope creates a mismatch between the two systems. To resolve this mismatch, the patient ignores visual input, resulting in a "gross visual suppression." (9) This patient tends to have his hands all over everything, using touch in place of vision for identification and centering in the real world. He is likely to be an auditory or kinesthetic learner.
3) The patient is an alternator (see "Interpretation," section 12).

VO Star pattern phorias are not necessarily consistent with other measured phorias; they can be more eso or more exo. When the properly-executed VO Star demonstrates a highly eso posture in an otherwise less eso patient, consider two possibilities:

1) Proximal vergence. The kinesthetic system does not override the visual system (as discussed above), but it does provide substantial input. The resulting awareness of the near working distance stimulates proximal vergence. (10)
2) The (relative) exophoria measured elsewhere is a "defensive use of the ranges of centering," an adaptation to counterbalance the drive to center nearer demonstrated by the VO Star. (20)
Figures 5e-f. Accommodation drives centering (MJ 2/3/90) (12)

Patient MJ has accommodative esotropia. Figure 5e was performed without lenses. Figure 5f was performed through OD +6.00, OS +7.00.
Dr. Larry Macdonald, like many others, did not believe the VO Star was directly related to phorias. He utilized the Star to explore the balance between central and peripheral visual function. In Dr. Macdonald's terms, the VO Star illustrated in Figure 5a depicts "the loosely organized peripheral-central relationship." He described a similar pattern as follows:

Indicative of more loosely organized visual performance. However the pattern may be so loose as to seem "free floating." These patients may have difficulty getting events put together. Characteristically, organization of visual function that will lead to an expansion of the visual space volume would seem desirable. (8)
4. *exophoria*

**Figures 6a-b. Exophoria (adapted from Byall)**

The centers are located outside the vertical lines: The patient is exophoric; he centers behind the plane of regard. Output is beyond input. This patient overestimates distances. Cars appear to be farther away than they actually are, making him an accident-prone driver. In baseball, he is the classic push hitter. (1)

---

**Figure 6c. Exophoria (JD 3/19/92) (12)**

Patient JD is an adult non-reader. He has had a lifelong reading problem which is now impacting his ability to earn a living. When he tries to read, the print goes blurry and he loses his place. He constantly feels tired, and requires an excessive amount of sleep. #8: 13 exo, #13b: 20 exc. #12 & #18: 1-2Δ Right Hyper. Exophoria and right hyperphoria are both present in JD's VO Star pattern.
In Dr. Larry Macdonald's terms, the VO Star illustrated in Figure 6a depicts "the tight peripheral-central relationship." He described a similar pattern as follows:

Indicative of highly organized visual space volume. Organization of this degree may or may not be desirable. Patient would tend to stick closely to concrete events. May have difficulty with high order abstraction. Characteristically, greater flexibility within the visual function would seem desirable. (8)
5. **vertical phoria**

Figures 7a-b. Vertical phoria (adapted from Byall)

**One center is higher than the other:** The patient has a vertical imbalance. In this case, the left center is higher, indicating a left hyperphoria. The patient is also esophoric. (1)

Figure 7c. Vertical phoria

In this variation, there is one center on each side of the horizontal line. The right eye is hyper and the left eye is hypo.

Practitioners have found the VO Star to be sensitive and specific in the detection of vertical imbalances. However, head tilts do create false positives. Examiners are encouraged to observe patients' head posture during Star execution.
Patient RB underwent strabismus surgery at three years of age. This Star was performed during a Developmental Vision Analysis at age ten. Visual acuity: 20/20 each eye. RB subsequently suppressed during cheiroscopic tracing.
6. bilateral hypo centers

Both centers are below the horizontal line. This pattern suggests one of two possibilities. One, the patient spends a good deal of time looking below the horizontal plane, for example, watching television in the supine position. Or two, the patient maintains chronic tension in the trapezius muscles near their insertion on the scapulae. The patient will be aware of muscle ache and tightness after a brief period of concentrated activity. Additionally, since both centers are within the vertical lines, the patient is also esophoric.

Figure 8b. "The CP Star"

Dr. Dorothy Parrott has found this Star pattern in numerous patients with either frank cerebral palsy or sub-clinical organic problems. She postulates that their center of gravity is shifted forward, and that they perceive the VO Star form, and the world, as shown in Figures 8c-d.
Figures 8c-d. Patient’s perception of the VO Star form, front view and side view, respectively.

Figure 8e. "The CP Star" (MG 7/23/90) (12)
Patient MG is 9 years of age and entering the fourth grade. She is in occupational therapy and special education. She has a history of speech and motor developmental delays; she does not have cerebral palsy.
7. *bilateral hyper centers*

![Diagram of bilateral hyper centers]

Both centers are above the horizontal line. This pattern suggests one of two possibilities. One, the patient spends a good deal of time looking above the horizontal plane, for example, scanning overhead monitors. (2) Or two, the patient maintains chronic neck tension between cervical vertebrae 1 and 5. The patient will be aware of muscle ache and tightness after a brief period of concentrated activity. (1) Additionally, since both centers are within the vertical lines, the patient is also esophoric.

![Diagram of "The Detached Star"]

Figure 9b. "The Detached Star"
Dr. Dorothy Parrott has found this Star pattern typical of two patient populations: juvenile delinquents and persons having the potential to exhibit psychotic behavior. She postulates that these patients feel detached from the world around them, and that they perceive space as shown in Figures 9c-d. (13)
Figures 9c-d. Patient’s perception of the VO Star form, front view and side view, respectively.
Multiple centers imply fluctuation within the system. The patient is literally capable of centering in more than one place. Such patterns are frequently found in the early stages of visual interference. Once concessions have been made, the patterns assume greater uniformity. According to Dr. Millard Van Orden, this type of pattern is generally associated with poor performance at near. (23)
Figures 11a-b. Midline shift (adapted from Byall)

The centers are laterally asymmetric: The median plane and the z-axis do not coincide; the patient projects to the right. Night driving is difficult for this patient. In the absence of peripheral cues, he tends to wander toward the right side of the road. The constant battle to stay in his lane brings on early fatigue. Right midline shifts are more prevalent than left. (1)

Amblyopes tend to turn toward the amblyopic eye in order to place the preferred eye on midline. (13) Monitor all patients for this behavior during Star performance.

Figure 11c. Midline shift (MC 8/6/91) (12)

MC's grandmother noted an habitual head turn to the left on the pre-exam developmental history form. Note also the presence of multiple centers on the left side.
Figures 12a-b. "The straight-eyed squinter" (adapted from Byall)

**The centers are laterally asymmetric:** The two eyes center at two different points along the z-axis. This patient has difficulty with nearpoint tasks and driving at night. He will suppress on various skills tests. (1)
11. anisometropia

Figure 13a. Anisometropia

The centers are laterally asymmetric: The patient is anisometric.

Figures 11a, 12a, and 13a are identical. The VO Star pattern itself does not distinguish between a midline shift, a straight-eyed squinter, and anisometropia. Patient observation and other findings must be considered in the differential diagnosis. Furthermore, these conditions may exist simultaneously.

Figure 13b. Anisometropia

OD -1.25 -0.50 X180  OS +0.50 sphere (23)
The lines on one side do not form a center: This indicates suppression. According to Byall, the eye opposite the formed center is not necessarily always the suppressing or amblyopic eye. (1)

Dr. Van Orden described the "fan-like extension of the lines" through the center as "a swinging movement of that eye to cover that part of the field not covered by [the other eye]." (23) Dr. Byall considered this phenomenon a form of midline shift.

Dr. Larry Macdonald, again interpreting the VO Star in terms of the peripheral-central relationship, described a pattern similar to Figure 14c (below) as "a mismatch between peripheral-central visual function." He continued:

Such a mismatch leads to a disjunctive organization of the visual space volume. It tends to set up an oscillation between the central-peripheral function which leads toward an either/or situation. It tends to be either central or peripheral. This has an obvious effect on the visual comprehension factors.

It is as if the visual system was directing the pencils as the pencils proceeded from peripheral to central, but when the pencils came to a particular proximity to the central area, the eyes picked up fixation of the pencil and the total visual situation shifted with the pencil. This is indeed indicative of disjunctive performance between the peripheral and the central visual function. (8)
Figure 14c. "Pattern characteristic of amblyopia and monolateral exotropia" (23)

In his description of this pattern, Dr. Millard Van Orden wrote:

This pattern is found in cases where only a small central area is responding... O.D. convergent with low visual acuity; O.S. rotates through wide arc to cover for O.D. The movement of O.S. is shown by pattern as the lines on chart meet and cross at A. The O.D. lines converged first inside A; then, as the pencil point was perceived by the central area, they reversed their direction and converged toward A. During the reversal the eyes were observed to be parallel and stereopsis was present.
A suppression may be present with or without amblyopia. GD has normal visual acuity in both eyes, but his left eye is clearly not participating equally with his right.
Figures 15a-b. Alternators without midline shift (adapted from Byail)
Figures 15c-d. Alternators with midline shift (adapted from Byall)
14. the peripheral-central relationship

Curved lines provide clues to the peripheral-central (ambient-focal) relationship. (13)

In Figure 16a, the patient was headed from the periphery toward an eso center. Once the pencil tips entered the domain of the central (focal) system, however, an adjustment was made (arrows). Although at first glance the Star looks orthophoric, projected beginnings (dashed lines) indicate esophoria.

In Figure 16b, the patient was headed from the periphery toward an exo center. Once the pencil tips entered the domain of the central (focal) system, however, an adjustment was made (arrows). Although at first glance the Star looks orthophoric, projected beginnings (dashed lines) indicate exophoria.

Dr. Dorothy Parrott notes that such curvature represents a somewhat sophisticated compensatory mechanism, and as such, is generally seen in adult patients. (13)
The tennis game of the patient who drew Figure 16c is much hampered by her habit of swinging too early. Her peripheral (ambient) system miscalculates the position of the ball, judging it to be closer than it actually is. She is committed to her swing before an adjustment can be made by the central (focal) system.

Figure 16d illustrates an exophoric peripheral (ambient) system combined with an esophoric central (focal) system in the superior field.

The peripheral-central relationship is also discussed in preceding sections entitled "esophoria," "exophoria," and "suppression."
15. poor distance acuity

Figure 17a. Poor distance acuity (adapted from Byall)

This pattern is characteristic of patients with 20/50 or poorer distance acuity. It is drawn by uncompensated myopes, incompletely compensated myopes, and previously uncompensated young children with reduced best visual acuity. (1)
APPLICATIONS

The VO Star has at least six applications:

1) to probe for the best near prescription
2) to guide vision training
3) to monitor the progress of vision training
4) a vision training technique
5) to assess preschool visual development and the impact of the primary grades upon visual performance
6) patient/parent communication

Case examples from the files of Dr. Dorothy Parrott in Lakewood, Colorado will be used to illustrate the first three applications above. Dr. Parrott does not utilize the VO Star as a training procedure. Vision therapy patients perform the Star prior to the start of therapy and at each progress evaluation.
1. to probe for the best near prescription

Although the stereoscope shaft is set at optical infinity, Dr. Parrott utilizes the VO Star to probe for the best near prescription. The Star is used routinely as part of a Developmental Visual Analysis, when other findings are inconclusive or contradictory, and when anisometropia and/or cylinder are present.

Dr. Parrott does a series of Stars when probing a new lens prescription: no Rx, distance Rx, potential near lens powers, and if indicated, 2Δ yoked prism. When probing with yoked prism, she always tries both members of a pair, e.g., if she thinks base up is indicated, she asks the patient to do two Stars: one with yoked base up and another with yoked base down. The same procedure applies to lateral yoked prisms.

The best near prescription is that which produces the most symmetrical Star. Dr. Parrott considers both qualitative and quantitative aspects. Qualitative characteristics are best assessed by intra-patient comparison, i.e., by comparing the Stars within the series. They include the presence or absence of centers and the overall quality of the lines. As mentioned previously, the influence of hand dominance is ignored. Quantitative features include lateral and vertical placement of the centers. Dr. Parrott observes overall placement, e.g., eso, exo, high, low, as well as the symmetry between the two sides.

In addition to the VO Star, Dr. Parrott employs a number of other procedures to determine the best near lens. Cheirotoscopic Tracings are generally done through the same series of lenses as the VO Stars. Pointer & Straw and Touch Point are two activities which measure the patient's ability to localize in free space. In Dr. Parrott's opinion, accurate spatial localization is a critical criterion in near lens prescribing. Bean bag catch provides information about both localization and timing. Harmon squares demonstrate postural imbalance. As with the VO Star, posture should be observed during all probe procedures. Dr. Parrott also performs Bell Retinoscopy. The best lens provides bright, full reflexes without scissors and a crisp bilateral shift at sixteen inches. By this point in a Developmental Visual Analysis, Dr. Parrott has usually reached a decision regarding the near lens. The remaining tests are often performed through that lens or through both the prospective and habitual near lenses. Those tests may include Winterhaven Copy Forms, Grooved Pegboard and the Developmental Eye Movement Test.

Case CH (Figures 18a-e)

CH is a seven year old in second grade who "sometimes looks cross-eyed." She has a habit of closing and covering the left eye and tilting her head.

Visual acuity was normal and equal in both eyes. Stereoeuity measured 100 arc seconds on animals. CH stood on her right foot at the stereoscope. "Massive suppression" was noted during Cheirotoscopic Tracing, especially with no lenses in place. Harmon Squares were done through plano, +1.50 and +1.50 with 2Δ BD. The various lenses did not appreciably alter the appearance of the Harmon Squares, however, they did induce dramatic postural changes and affected the speed of performance. Bell Retinoscopy: "Built up to +1.25 before OS held and then very fragile." In this case, all probe techniques pointed toward the same near lens: +1.50 with 2Δ BD OU. When that prospective lens was removed during Grooved Pegboard, CH covered her left eye. Rx: OU +0.50 sphere with 2Δ BD/+1.00 add. Vision therapy was recommended. (12)
Figure 18a. CH 12/7/92 plano (12)

Figure 18b. CH 12/7/92 +1.25 OU (12)
Figure 18c. CH  12/7/92  +1.50 OU (12)

Figure 18d. CH  12/7/92  +1.50 with 2Δ BU OU (12)
Figure 18e. CH 12/7/92 +1.50 with 2Δ BD OU (12)
**Case MJ** (Figures 19a-d)

MJ is a seven year old in first grade. He has had an "eye turn on and off since birth" which Mrs. J notices mostly nowadays when he is not wearing his glasses. MJ has been treated (by another doctor) with lenses and patching since the age of two.

**Current Rx:** OD +5.00 sphere, OS +5.75 sphere through which distance visual acuity is reduced to 20/40 OD, OS, OU. The distance subjective (#7a): OD +4.50, OS +5.25.

**Dr. Parrott's Rx:** OD +4.25 sphere, OS +5.25 sphere/+1.75 add. MJ has since completed a vision therapy program. (12)
Figure 19c. MJ 2/3/90 OD +5.50 CS +6.50 (12)

Figure 19d. MJ 2/3/90 OD +6.00 OS +7.00 (12)
Case RR (Figures 20 a-d)

RR is a six-year-old kindergartner. He has been complaining of frontal headaches and "dry eyes." He also "blinks a lot and holds things close for reading." According to RR's mother, his developmental history has been normal despite a difficult perinatal period. RR was born five weeks premature with a low birth weight of 2337.5 grams (5 pounds, 1 ounce), jaundice, and low blood sugar.

Rx: OU +0.37 sphere with 2Δ BD. RR is currently in vision training. Dr. Parrott notes this case is typical of subclinical organic conditions. (12)
Figure 20a. RR 2/14/92 plano (12)

Figure 20b. RR 2/14/92 +0.50 OU (12)
Case MG (Figure 8e)

MG was discussed previously in the section entitled "bilateral hypo centers." Patients with "the CP Star Pattern" typically respond well to base down or base oblique yoked prism. MG's Rx: OU +0.75 -0.75 X 180 with 3Δ BD. (12)

Patients with "the Detached Star Pattern" generally receive 1-2Δ base up yoked prism. (13)

"The straight-eyed squinter" (Figure 12a)

In the case of "the straight-eyed squinter," discussed previously in the section so named, the appropriate prescription equalizes centering in the two eyes. The patient will therefore be more comfortable and less likely to suppress. More plus or less minus is placed before the eye which projects the closest. This has the effect of making objects appear farther away. (1)
2. to guide vision training

Each practitioner utilizes the information gleaned from the Van Orden Star in her own unique way. The Star’s impact on a training program is influenced by the practitioner’s interpretation of the Star, philosophical base and mode of practicing vision therapy. As a generalization, the VO Star most profoundly influences the centering aspects of a training program.

In the OEP series Optometric Training in Action, Dr. Ralph Schrock discussed the training implications of a VO Star drawn by one his patients, Steven S. (Figure 21a). (17) According to the Star pattern, Steven centered closer to himself than the plane of regard with both eyes, left more so than right. He produced a better foci on the right side which demonstrated that his determination of the center of his visual field was more consistent with the right circuit than with the left. In other words, the right field of view was better organized.

Dr. Schrock then outlined the following implications for training:

1 ) The program should include training procedures which help Steven learn to center farther out in space.

2 ) Monocular activity is indicated to equalize the right and left circuits.

3 ) Since the findings of the analytical examination and the VO Star are in agreement as regards centering, Steven should be ready to handle the visual-tactual mismatch of the stereoscope in his visual training program.

Figure 21a. Steven S. (17)
Dr. Dorothy Parrott utilizes yoked prisms extensively in her vision training programs. The VO Star is one guide to their use.

Yoked prisms create spatial displacement. Space is expanded in all three dimensions on the side of the base and is contracted in all three dimensions on the side of the apex. Responding and adjusting to that displacement builds centering range and flexibility.

For training purposes, yoked prisms are used in pairs, e.g., base down and base up or base right and base left. For each pair, one base direction is compensatory; the other base direction is non-compensatory. The compensatory and non-compensatory base directions are determined by:

1. the Van Orden Star pattern,
2. observation of the patient's motor response during yoked prism wear, and
3. the patient's subjective response to the bases.

The compensatory base has a positive or neutral effect on visuo-motor performance and reduces Star pattern asymmetry; the non-compensatory base has a disorganizing effect on visuo-motor performance and exaggerates Star pattern asymmetry. (13)

Based upon the Star pattern, the following base pairs are used: (13)

<table>
<thead>
<tr>
<th>center separation</th>
<th>compensatory base</th>
<th>non-compensatory base</th>
</tr>
</thead>
<tbody>
<tr>
<td>esophoria</td>
<td>base down</td>
<td>base up</td>
</tr>
<tr>
<td>exophoria</td>
<td>base up</td>
<td>base down</td>
</tr>
<tr>
<td>lateral asymmetry</td>
<td>compensatory base</td>
<td>non-compensatory base</td>
</tr>
<tr>
<td>shift left</td>
<td>base left</td>
<td>base right</td>
</tr>
<tr>
<td>shift right</td>
<td>base right</td>
<td>base left</td>
</tr>
</tbody>
</table>

Figures 21b-d illustrate the effects of compensatory and non-compensatory bases on a patient manifesting lateral asymmetry.

One caveat: The Van Orden Star pattern does not always correctly predict how yoked prism will affect performance. (13) Two possible reasons are:

1. The Star pattern may illustrate either the underlying problem or the patient's adaptation to that problem.
2. In the case of lateral asymmetry, patients exhibiting three different conditions (midline shift, straight-eyed squint, and anisometropia) draw similar Star patterns (see Figures 11a, 12a, 13a). It stands to reason that, despite their shared Star pattern, these patients would respond very differently to lateral yoked prism. In Dr. Parrott's experience, lateral yoked prism is less predictable than vertical yoked prism.

For each training activity, the bases are presented in this order: compensatory, non-compensatory, and if necessary, compensatory to return the patient to a non-disrupted state. (13) For example, patient TF (Figures 21b-d) would do the Tootie Toss on Trampoline for a total of eight to sixteen minutes. The first four to eight minutes, he would wear 15Δ yoked base right; the second four to eight minutes, 15Δ yoked base left. When no particular base direction has been found to either organize or challenge a patient, the bases may be presented in any order. Both members of the pair should, however, be used.
As an alternative to yoked prism, Dr. Parrott also uses lenses to create spatial displacement. Minus is placed over one eye and plus over the other. The order of presentation is unimportant; the lenses are reversed halfway through the selected visuo-motor activity. Dr. Parrott generally uses the same power (but opposite sign) on each eye, and works within the range of 0.25 to 0.75 diopters.

Plus/minus lens techniques are indicated when the VO Star exhibits lateral asymmetry. As an example, in the case of patient MC (Figure 11c), the training program included alternate plus/minus accommodative rock and plus/minus biocular visuo-motor activities.
Figure 21b. TF manifests lateral asymmetry with centers shifted to the right

Figure 21c. TF, with compensatory prism (base right)

Figure 21d. TF, with non-compensatory prism (base left)
3. to monitor the progress of vision training

"...the Star pattern gives a fast appraisal of the response to your program."
--Dr. Larry Macdonald (8)

"No matter how one understands, interprets, or appreciates the resulting pattern or drawing, the patient's performance should be different comparing before and after visual training; if it isn't, the significance of the visual training program to the patient should be questioned."
--Dr. Robert Kraskin (7)

As mentioned previously, Dr. Dorothy Parrott's vision therapy patients perform the Star prior to the start of training and at each progress evaluation. The Stars gauge whether or not the training program is adequately addressing the patient's centering problems. Perfect VO Stars signal the completion of vision training, and are one of Dr. Parrott's goals for each patient.

Case GD (Figures 22a-i)

GD presented on April 17, 1990. He was seven years of age and in the first grade. GD cried in the bathroom for 45 minutes each morning before going to school. He had frequent stomach cramps and diarrhea. The school suspected a learning disability for which GD was currently being tested. Reading was particularly difficult. The initial visual examination revealed mild hyperopia. Unaided distance visual acuity was OD 20/20, OS 20/25, OU 20/25; near visual acuity was 20/20 OD, CS and OU.

GD received seven below average marks (S-) and three comments about poor behavior on his final quarter report card. He was staffed into special education for second grade. At that time, Mrs. D was told that with GD's 123 I.Q., the school staff did not understand his inability to read.

GD began vision therapy on May 15, 1990. In October, Mrs. D reported that reading was "going better." The fall semester report card substantiated her observation: grades were up, behavioral problems down. In January (Figure 22d), GD mentioned he was "seeing better," and in April (Figure 22e), he reported that both reading and math were getting easier.

The following October (Figure 22f), Mrs. D reported "good progress" in third grade. By February (Figure 22g), GD was receiving above-average marks (H's), and liked to read. Math was his best subject. In May, GD was staffed out of special education for fourth grade.

GD's final vision therapy session was on August 18, 1992 (Figure 22h). He was seen for a progress exam on March 19, 1993 (Figure 22i). Reading and math were going well. So far, he had earned over 15 high marks (H's) in the fourth grade. According to Mrs. D, "G's life would have been nothing without vision therapy."

The Star in Figure 22a is repeated beneath Figure 22i to provide a before/after comparison. Although the left eye was not amblyopic, there was clearly an initial imbalance between the two sides. As vision therapy progressed, the VO Stars demonstrated increasing balance (symmetry) in centering, with the left eye developing visual awareness and information processing capability. (12)
Figure 22a. GD 4/25/90 plano (12)

Figure 22b. GD 4/25/90 +1.00 OU (12)
Figure 22c. GD 8/14/90 +1.00 OU (12)

Figure 22d. GD 1/22/91 +1.00 OU (12)
Figure 22e.  GD  4/16/91  +1.00 OU (12)

Figure 22f.  GD  10/29/91  +1.00 OU (12)
Figure 22g. GD 2/11/92 plano (12)

Figure 22h. GD 8/18/92 plano (12)
4. a vision training technique

A variety of Van Orden Star training forms are available. The Base In Binocular Training Chart (Figure 23a) is typically used for esophores. When viewed in the stereoscope, two circles are seen, with the inner circle appearing farther away. The patient is instructed to "feel as though he is drawing out to the center of the far end of the pipe." (19) The centers should measure 77 mm apart (assuming the use of a stereoscope with an 85 mm optic center separation). If the patient centers on the larger circle, the separation will be only 72 mm. (19)

![Figure 23a. Keystone Base In Binocular Training Chart](image)

As performance improves, the patient graduates to forms which provide less and less structure, and therefore, fewer cues as to the location of center. The form illustrated in Figure 23b would be followed by that shown in Figure 23c. In the latter, a pencil is used to shade in a large amorphous area including the center of the field in front of each eye. (19)

![Figure 23b.](image)  ![Figure 23c.](image)
A similar training sequence is utilized for exophores. With the Base Out Binocular Training Chart (Figure 23d), the inner circle appears closer. The patient is instructed to draw lines to the center of the inner circle. If he centers accurately, the centers will be 67 mm apart (assuming the use of a stereoscope with an 85 mm optic center separation). A 72 mm center separation indicates the patient centered on the larger circle. (10) As performance improves, the forms illustrated in Figures 23b and 23c are utilized, respectively.

Figure 23d. Keystone Base Out Binocular Training Chart

As a final step in both esophoric and exophoric training sequences, the Binocular Behavior Pattern Chart can be used. It has been suggested that Sequence II (see page 7) be followed for training purposes with this chart. Sequence II has the advantage of providing an established center after two lines have been drawn (Figure 23e). (10)

Figure 23e. Sequence II with two lines drawn
training vertical phorias

Concentric circles with vertical disparity (Figure 23f) may be created for cases of hyperphoria. Again, a series of forms is used, working from the existing hyperphoria to vertical decentration in the opposite direction. Figures 23f-j exemplify a series to be used for right hyperphoria. "The patient is asked to feel when his hands are level at the meeting point and when they are not. Ultimately, we want the pencil points to look and feel level when they are level." (19)
Dr. Robert Kraskin has written extensively about the Van Orden Star training procedure in his OEP Series *Visual Training in Action*, "The Sequential Utilization of Visual Training Procedures." (5, 6, 7) Dr. Kraskin utilizes the Star at two different points in his visual training sequence.

Early in the course of training, Dr. Kraskin introduces the "Van Orden Star Procedure" using the Van Orden Binocular Training Charts. Two other techniques, Walking Rail and Motor Equivalence, must first be mastered.

[The VO Star] is a more refined aspect of motor equivalence... It is motor equivalence with visual localization controlled. The visual demand is to compute the location of the center of the target utilizing dual visual inputs for prime information while motor equivalence is maintained. Therefore, we are asking the patient to bring to this binocular demand the bilaterality created as a result of the previous procedures of walking rail and motor equivalence... (5)

Instructions for the Kraskin Van Orden Star procedure: (5)

The appropriate Van Orden Binocular Training Chart is placed in the stereoscope. The patient is seated, squared with the stereoscope, both feet on the floor and bearing equal weight. A pencil is held in each hand in like manner as though he were going to write. The appropriate training lenses are in place. Attention is called to the fact that one circle appears closer than the other.

"Place your right hand pencil point on the upper right hand black dot and place your left hand pencil point on the lower left hand black dot. Holding your pencils in this position, look through the middle of the center circles, and at the same time draw the two pencils towards each other until they appear to touch. As you draw, do not look at the pencils but keep looking through the circles. When they appear to touch (notice they didn't really touch— you didn't feel them touch; they just looked like they touched each other), remove the pencil points..."

Continue following Sequence I (see page 7).

"The most important aspect of the procedure, however, is not the routine of simply connecting the dots...but is how you function as you connect the dots. Therefore, I want you to always keep uppermost in your mind the following as you do this procedure: As you draw the two pencils toward each other until they appear to touch, strive to do so with equal effort and equal energy put forth on each side of your body. Try to feel the balance demanded. There should not be greater effort on one side of your body as compared to the other."

The procedure is to be carried out for four minutes during which time the patient repeats the Star using the same chart.

Success on the Kraskin Van Orden Star procedure is achieved when the density of the pencil lines is equivalent on each side. The positioning of the centers is inconsequential. Following the patient's first exposure to the procedure, evaluation of the VO Star pattern should be discussed with the patient. Once he understands the goal, the VO Star pattern will provide immediate feedback to assist the patient in achieving bilateral symmetry.
The Van Orden Star Without Rings Procedure is introduced much later in the training sequence. Again, a series of prerequisites must be met. (6)

Instructions for the Kraskin Van Orden Star Without Rings procedure: (6)

The Binocular Behavior Pattern Chart is placed in the stereoscope. The patient is seated, squared with the stereoscope, both feet on the floor and bearing equal weight. A pencil is held in each hand in like manner as though he were going to write. The appropriate training lenses are in place. Attention is called to the fact that this procedure is similar to one done in the past.

"Place your right hand pencil point on the upper right hand black dot and place your left hand pencil point on the lower left hand black dot. Holding your pencils in this position, look at the middle of the plain yellow field that you see in front of you in the instrument. While looking at the middle position, this position being determined by you alone, with equal effort, draw the two pencils towards each other until they appear to touch. When they appear to touch, remove the pencil points, and place the right hand pencil on the black square beneath the black dot on the upper right hand side, and place the left hand pencil point on the black square above the black dot on the lower left side. With pencils in these positions, look at the previously drawn pencil lines in the middle of the yellow field. It should appear to be one continuous straight diagonal line appearing to be drawn from lower left position to upper right position. If it does appear to be one continuous straight line you are looking at the same position you previously determined to be the middle of the yellow field."

"However, if the previously drawn lines are either separated or overlapping, this indicates that you are looking closer or farther away than the position you previously determined to be the middle. On this technique, as is the case in real life, we want you to be consistent in your computing of visual space. Therefore, as a guide to consistency, if the lines do not appear to be the desired continuous straight diagonal line, look closer or farther away until you see such a straight line, and, when you do, realize that you have relocated the position in space that you were looking at while drawing the previous lines. Maintain this view of a continuous straight line and, once again, draw the two pencils towards each other until they appear to touch."

"This is the basic procedure, and when you complete this, continue as you have done before, always making sure that, before drawing the two pencils, the previously drawn lines always are seen as continuous straight lines crossing each other at one position. And, of course, always bear in mind that it is important to draw the pencils with equal effort."

"When you complete the connecting of the positions, on the same target, start again."

Continue until the time expires. Time: 4 minutes.

Dr. Kraskin places great emphasis on his instructional set. Performed according to less rigorous directions, the Binocular Behavior Pattern Chart is merely diagnostic, and its repetition simply reinforces a less-than-desirable performance.

The Kraskin Van Orden Star Without Rings procedure is designed to develop a stable and consistent centering system. The positioning of the centers, where the patient computes the
target to be, is incidental. Generally, by the time this procedure is introduced, accurate centering has already been established.

A measurement of improvement in performance, based upon [the patient's] ability to maintain stability and consistency within his computing process, is how many times he can complete the pattern within the time allotted. (7)
5. to assess preschool visual development and the impact of the primary grades upon visual performance

Dr. Henry Quick utilized the VO Star to appraise school readiness and the response of the young visual system to early school demands. He presented this application of the Star in the OEP Series Visual Training at Work. (14)

The Stars reproduced as Figures 24a and 24b were performed by two children of the same chronological age, Patient X and Patient Y, the day before beginning first grade. According to Dr. Quick, Figure 24a illustrates normal visual development while Figure 24b does not. Against Dr. Quick's advice, Patient Y began formal schooling, and subsequently developed visual problems. The VO Star has not been age-normed. Dr. Quick no doubt judged these two Stars from his years of experience with preschool patients.

Figure 24a. Patient X the day before first grade (14)

Figure 24b. Patient Y the day before first grade (14)
With the preschool or early primary grade Star serving as a baseline, Dr. Quick generally re-administered the Star twelve weeks after his little patients began their school reading program. He wrote, "The star seems to be particularly sensitive to the impacts of the school task and has repeatedly revealed the need for constructive help before it was demonstrable in the skills battery."

Figures 24c-23e were drawn by Patient X. Figure 24c is a duplication of Figure 24a, drawn by the patient the day before she entered first grade. At that time, neither the VO Star nor the skills battery suggested a current or impending problem. The pattern in Figure 24d, completed just five weeks later, illustrates the deleterious effect of school demands on the child's visual performance. No changes were revealed by the skills battery or the analytical at that time. A pair of +0.50 lenses was prescribed. Figure 24e demonstrates the recovery at four weeks.

This application of the VO Star has important implications for the prevention and early detection of functional visual problems. Its use may be extended to patients of all ages who undergo lifestyle changes, particularly but not limited to those changes which place new and greater demands upon the visual system, e.g., a new career involving the use of computers.
Figure 24c. Patient X the day before first grade (14)

Figure 24d. Patient X five weeks into first grade (14)

Figure 24e. Patient X nine weeks into first grade (14)
6. **patient/parent communication**

The Van Orden Star facilitates communication. In the tradition of "a picture's worth a thousand words," the Star is an excellent "visual aid." A series of Stars can clearly and quickly demonstrate the effects of proposed lenses or the progression of vision training. The lay person can easily appreciate differences in Star patterns without a thorough understanding of VO Star interpretation. In short, the Star enhances patient/parent understanding and acceptance of the problem and its remediation.
References


