The Wesson Fixation Disparity Card is designed to yield quick, reliable, and clinically accurate estimates of a number of important parameters in the measurement of fixation disparity. Fixation disparity appears to represent a compensatory mechanism between fusional or disparity vergence and its relationship with the underlying phoric posture. It has been demonstrated that fixation disparity does not have to be in the same direction as the phoric posture and thus should be measured independently of the dissociated phoria. It is a mistake to believe that one is measuring fixation disparity by using a prism to neutralize the misalignment noted in an AO vectographic target or a Mallet unit. The neutral point only represents the associated phoria, not fixation disparity. Fixation disparity is measured in minutes of arc clinically, while the associated phoria is measured in prism diopters.

Preparing the Patient to Measure Fixation Disparity

Years of experience with the Wesson Card has revealed what I believe is the best way to use the card.

PUT THE POLAROID GLASSES ON THE PATIENT!

1. Measure in free space. That is, have the patient hold the card rather than mounting it on the reading rod of the phoropter. Since there are so many different mounts for the reading rods of phoropters available today, I have not put holes for the mounts.
2. Have the patient hold the card at 25 cm. It is true that the card is set for two different distances based upon the table printed on the front of the card. For pre-presbyopes use the card at 25 cm, for presbyopes, 40 cm.
3. Use good lighting on the face of the card. I generally position the instrument stand lamp about 75 cm from the face of the card. This helps to bring out the colors and acts to hold accommodation at the plane.
4. Use standard instructions. As in any psychophysical task, varying the instructions varies the response, you know in your office routine this is very true. The great value of the card lies in its reliability. Therefore, use the following instructions
   “I want you to look at this card.” (Point to the card with a pick-up stick or with a closed pen). Look carefully where I am pointing. Do you see a small black arrow?” (The arrow is seen by the left eye). “Above the arrow are some colored lines; a red line, two green lines, two orange-yellow lines, and four black lines. Do you see these lines?” (The patient should acknowledge the lines). “Do you see the arrow and lines at the same time?” (Suppression of the left eye will cause the arrow to disappear; suppression of the right eye will cause the lines to disappear—try it! Close one eye and then the other to confirm the above statement). “I want you to tell me to what colored line the arrow is pointing. It may be pointing directly at one line, or it may be pointing between two lines. Where is it pointing?” (At this point the patient will describe where the arrow is generally pointing. If the arrow is pointing right at a line, the conversion to minutes of arc is simple (see below). If the arrow is pointing between two lines, question the patient further by asking if the arrow is pointing in the middle between the lines, or if it is part way). If the patient answer is that the black arrow is pointing to the red line, there is no fixation.
disparity and you would record “0”. If the arrow points to the green or orange-yellow line at the 25 cm distance the fixation disparity is 13.7' or 27.5' respectively. If the arrow is pointing half-way between two lines (for example, half-way between the red and green line, the fixation disparity would be 6.9'). All of these values are read off of the face of the card. Other positions of the arrow can be interpolated based upon the position of the arrow.

Eso or Exo Fixation Disparity??

It should occur to you by now that there are two sets of colored lines, one to the right and one to the left of the red line. If the arrow points to the lines to the left of the red line, this is eso fixation disparity (in minutes of arc). If the arrow points to the right of the red line, it is exo fixation disparity.

Fixation Disparity at Other Positions of Gaze

Fixation disparity should be checked at not only the reading position, but also in up-gaze and to the left and right. Large difference in disparity may indicate fusional difficulty.

Accommodative Instability?

I have found that when the arrow moves under the lighting conditions set up for the above testing, this almost always indicates an accommodative instability is present. Further testing of the accommodative system is definitely warranted should you note arrow fluctuation.

Vertical Fixation Disparity

Rotation of the card 90 degrees clockwise allows for the measure of vertical fixation disparity, if the arrow is above the red line this indicates a left hyper fixation disparity. If the arrow is below the red line, it is a right hyper fixation disparity.

Forced Vvergence Curves

One of the nicest features of the card is to generate a forced vergence fixation disparity curve. It's easy to do, takes about ten minutes, and provides valuable information about the visual system before visual training is started and then tracking progress in visual training, or even about the impact of lenses on the visual system.

To perform the test, it is best to have a set of loose, square prisms. First, record the fixation disparity noted without any prism. I refer to this as the unforced fixation disparity.

Second, have ready 3, 6, 10, 12, and 15 prism dioptr prism. While the patient holds the card, instruct the patient that you are going to put a “lens” in front of his left eye. TELL THE PATIENT TO TELL YOU AS SOON AS YOU PUT THE LENS IN FRONT OF THE EYE WHERE THE ARROW NOW POINTS. This is very important in order to avoid prism adaptation as much as possible. Then introduce 3pd base-in prism before the left eye (the eye that sees the arrow), record the results and then do the same thing with the 3pd base-out prism. Take the time to record between exposures. This will assist in minimizing adaptation. Repeat for each prism until the patient reports diplopia, the image of the arrow or lines “go dark”, or the value reaches the second black line (which is 55’ of fixation disparity, an incredible amount without diplopia). Graph the results on a copy of the fixation disparity graph included in the package (compliments of Jim Sheedy, O.D., Ph.D.).

Prescribing Prism

Those of you familiar with fixation disparity realize that one of the great fallacies about prescribing prism from the measurement of the associated phoria (i.e., neutralizing prism necessary to obtain alignment on the nonius lines of a fixation disparity target) is that this measure is only one point on the forced-vergence fixation disparity curve. More often than not this prism is not acceptable for wearing in a spectacle lens. That is why you must
run a curve before contemplating prescribing of prism. What is the correct amount? The
canventional wisdom is that the mid-point of the flattened zone of the curve represents
the prescription. That may, or may not be true. Our research suggests that the steeper the
curve, the less adaptation and the more acceptable the prism power. It is my opinion that
the value of the curve lies in its ability to monitor and visualize changes in the system
from the use of visual training or of lens therapy.
For Vertical Forced Vvergence Curves, base-up and base down prisms may be used. The
prism amount, however, should be modified to use 1, 2, 3, 4, 6, and 8 pd. This should
allow for a good curve to be generated. With vertical prism, I find that the amount of
vertical prism which neutralizes the vertical disparity is almost always acceptable for
prescribing. Of course, try in a trial frame first.
There are other features of the card which I have included as a supplement to this
instruction sheet, based upon the latest edition (5th) of the card. I am always open to
suggestion, constructive criticism and other ideas. Should you have a “flash”, call me at
941-575-0903.
One other point: These cards are hand-laminated. Heat destroys the polarization effect.
So, there may be some loose edges around the Polaroid. It won’t affect its utility.
Dr. Michael Wesson

EARLIER INSTRUCTIONS

THE WESSON FIXATION DISPARITY CARD ©
SUPPLEMENTAL DIRECTIONS
Third Edition
0487
The third edition of the Wesson Fixation Disparity Card© is the result of research and
practical considerations to provide an even more useful card than that which has been
available for the last few years. The directions for the second edition still apply.
However, a number of important design changes have been made to the card.
Measurement of Accommodative Lag (MEM method)
On the right and left sides of the fixation disparity target, four rows of graded vocabulary
words have been added. In addition, four rows of pictures have been placed below the
target. While the patient reads the words or identifies the pictures through his or her far
point prescription, the card is held against the retinoscope and the direction and amount
of “with” or “against” motion is estimated. This is followed by the introduction of a trial
lens at the spectacle plane to neutralize the reflex. The lens should be removed quickly
(0.25 seconds) to prevent a possible change in the stimulus to accommodation. The eye
not being scoped is presumed to maintain a stable response. The value estimated
represents the accommodative lag of the eye being tested. An accommodative lag of
+0.75 D. or less, is considered within normal limits. However, it is my opinion that
symptoms of accommodative dysfunction may warrant prescription of this lens power
even at these low values. Lags of +1.00 D. or greater certainly should allow for further
prescription consideration.
Measurement of Accommodative Lag (Nott method)
The second method utilizes the Wesson Card mounted in the phoropter by means of the two small holes punched at the top of the card. (NOTE: These holes are not placed in the fourth and later editions due to different hole placement in the reading rods). The card can also be clipped to the reading card holder for quick removal. The card is positioned at 40cm (2.50 D. stimulus to accommodation) and the patient asked to read the words or identify the pictures. While the patient reads, the distance of the retinoscope to the patient is changed until a neutral reflex is achieved. For example, if neutralization is achieved at 67cm, this would be equivalent to 1.50 D. of accommodation. This value is subtracted from the 2.50 stimulus to accommodation (2.50-1.50) and the difference (1.00 D.) is the lag of accommodation.

Measurement of Accommodative Lag Using the Difference of Gaussians Function (DOG method)
On the reverse side of the fixation disparity card is a Difference of Gaussians waveform". This is a very low level accommodative stimulus that has the advantage of allowing lag measurement without the use of words or pictures. Lag may be measured with lenses or with the Nott method. Experimental studies of a clinical nature have not been performed with this stimulus, so a comparison of the values obtained should be made with the traditional form of accommodative lag from the other side of the card. Thus, the Wesson Fixation Disparity Card (third edition) now serves a dual function: Measurement of fixation disparity and measurement of accommodative lag.

"My thanks to Dr. Cliff Schor for the idea and material assistance in developing the Difference of Gaussians Function."