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Procedures and methodology in the diagnostic evaluation of the manipulatory skills test

John L. Battin
Pacific University

Duane T. Brooks
Pacific University

Edwin H. Glur
Pacific University

Gordon C. Stelting
Pacific University

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Abstract
Procedures and methodology in the diagnostic evaluation of the manipulatory skills test

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PROCEDURES AND METHODOLOGY IN THE

DIAGNOSTIC EVALUATION OF THE

MANIPULATORY SKILLS TESTS

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———————

by

John L. Battin
Duane T. Brooks
Edwin H. Glur
Gordon C. Stelting

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APPROVED

Graduate Thesis Committee

_____
                                  Chairman

_____
                                  Advisor

_____

ACKNOWLEDGMENT

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CHAPTER I

INTRODUCTION AND OBJECTIVES

This video tape has been prepared to aid the optometric student in developing a technique and routine for the administration of the manipulatory skills tests. With this objective in mind, a subject was selected who demonstrated responses that are within established clinical norms.

The video tape offers an excellent method to be followed and points out a few of the many important observations that can be seen during these tests.

In conjunction with clinical instruction and lecture material this program, with the accompanying study guide, may be a supplement in optometric procedures.

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CHAPTER II

EQUIPMENT

The clinical equipment necessary to perform the manipulatory skills as shown in the video tape, is a fixation light, preferably with a very fine filament for a precise target, two colored beads of contrasting color, a set of loose prisms, and a paddle occluder.

CHAPTER III

SUGGESTIONS FOR VIEWING THE VIDEO TAPE

Throughout this tape strict clinical procedure was followed. However, instructions to the patient were modified in an attempt to facilitate observation of the visual responses. These modifications were required due to the limitations of the video equipment.

The study guide is a transcript of the audio portion of the video tape with additional explanatory remarks regarding further techniques and refinements. It was designed to be studied prior to and following the viewing of the tape.

After the clinician has performed the techniques shown on several patients, a review of the program is suggested.

The following outline of the manipulatory skills tests was used in preparing the script for this production.

    1. Monocular light fixation O.D. and O.S.

        Clinical functions:

        a. Normal monocular fixations

    b.   Estimate of Angle lambda or kappa
    c.   Eccentric fixations
    d.   Initial probability of presence of
        amblyopia and/or strabismus

2. Binocular Versions

3. Binocular Rotation

4. Monocular rotation and versions
    (Monocular rotation and version are
    recommended only when the binocular
    performance shows abnormal responses
    in children under 5 years of age.)

    Clinical Functions:

    a.   Concomitancy vs. non concomitancy (gross)
    b.   Extent of monocular motor field
    c.   Extent of binocular motor field
        (combined with unilateral cover test)
    d.   Pursuit or tracking skill
    e.   Head and other bodily involvements
    f.   Responses to verbal instructions

5. Near Point of Convergence (N.P.C. or N.P.B.)

    Clinical Functions:

    a.   Quantitative measurement of break point
    b.   Quantitative measurement of recovery point
    c.   Qualitative evaluation of tracking skill
    d.   Asymetric presentation of the fixation
        target and its relationship to the
        binocular motor field
    e.   Evidence of eye dominance
    f.   Pupil reactions
    g.   Suppression responses
    h.   Near binocular fixation range (NBFR)
        in strabismic cases (predominantly
        esotropic)
    i.   Asthenopic and evasion symptoms

6. Unilateral and alternating Cover Test

Clinical Functions:

a. Binocular versus strabismic fixation
at various test distances
b. Magnitude of phoric and tropic responses
at varying distances (estimate as loose
prism measurements)
c. Classification of strabismic behavior
by deviation
d. Comitancy or non concomitancy
e. Observation of phoria-recovery response
f. Gross estimation of the change in phoric
behavior as a function of time of
disassociation
g. Quantitative measurement of the NBFR
(near binocular fixation range)
h. Possible to calculate or graph the linearity
or alinearity of phoric or tropic responses.
Calculation of slope of response or lag of
convergence.

7. Saccadic Fixations

a. Near to near fixations
b. Near to far (N $\rightarrow$ F & F $\rightarrow$ N)
c. Lateral saccadics

Clinical Functions:

a. Landings and release of fixations
b. Corrective movements
c. Response to verbal instructions
d. Involvement of head and other body parts

CHAPTER IV

LIST OF EQUIPMENT USED

Video Tape Recorder Sets

Ampex Video Recorder (for video taping)
Model VR-7500
Serial No. 2814

Ampex Video Recorder (for editing)
Model VR-7800
Serial No.

Camera Complete Units

Video Camera
GPL 990
Model No. 473

Video Camera
GPL 990
Model No. 33

Camera Lens

Canon TV Zoom Lens
V 5x20
20-100 mm
3 to 1

Videcon Zoom Lens
15-150 mm
10 to 1

Camera Mounts

(2)   Samson Tripods
Model 7301

(2)   Samson TV Heads
Model 7201

(2)   Samson Dollies
       Model 7601

Microphones

Shure Lavalier Microphone
Model 560 Dynamic

Miscellaneous

(1)   Tapes

(3)   Photo-flood lamps
       (3) hundred watt bulbs

CHAPTER V

SUMMARY

This video tape has been prepared to make the beginning optometric clinician aware of the many observations which can be made by employing a few simple techniques. Once the clinician has mastered these techniques and understands their functions, he will quickly recognize any deviations from the norms and find the manipulatory skills as an invaluable aid in making an accurate optometric diagnosis.

APPENDIX

STUDY GUIDE

STUDY GUIDE

For the Procedures and Methodology in the Diagnostic
Evaluation of the Manipulatory Skills Tests

INTRODUCTION

This video tape has been prepared to aid the student
in developing his own checklist of diagnostically signifi-
cant information that can be extracted from the manipulatory
skills tests. The testing techniques have to be modified
depending on the type of case and the diagnostic information
the examiner is seeking. The clinician should carefully
study how he needs to modify his testing in order to be
able to observe the many responses and clinical functions.
Special consideration should be given to the limitation of
these tests since they are largely qualitative rather than
quantitative. Where quantification is possible the clini-
cian should become adept in accurate measurement. The
following patients demonstrate clinically normal responses.

I. MONOCULAR LIGHT FIXATION

    A. Clinical Technique

        When doing a monocular light fixation, the patient-
        clinician distance is 16-24 inches.[1] The fixation

light is placed between the patient and the doctor
on their respective visual axes, with the patient's
eyes in the primary position of gaze. It is prefer-
able to occlude the unobserved eye.[2] The instruc-
tions are, "Look at the tip of my light."

[1]When examining children, it is advisable to
place fixation light 6-9 inches from the
patient. Giving the child a task such as
touching the tip of the light or placing a
transparent soda straw over it enhances
fixation.

[2]The clincian should be aware of the pos-
sibility of cover nystagmus under unilateral
cover conditions.

B. Clinical Functions

Observations are made to determine the character-
istics of the monocular light fixation: is the
fixation steady or unsteady?[1] By observing the
light reflex in relation to the center of the
pupil, a determination is made of angle lambda.
Angle lambda may be positive, negative, or zero.
A comparison of this angle is made between the
right and left eyes. It is expected that steady
fixation and equality of angle lambda will be
observed. Deviation of the expected suggests the
possibility of amblyopia and/or eccentric fixation.

[1]It is important to have ample illumination
upon the eyes so fixation characteristics
can be observed with ease.

II. BINOCULAR AND MONOCULAR VERSIONS AND ROTATIONS

A. Clinical Technique

Binocular versions and rotations are performed at
approximately 16 inches with the center of movement
on the midline and slightly below the patient's eye
level.[1] The instructions are, "Watch the tip of my
light." If head movement is noted further instruc-
tions are, "Now keep your head still and watch the
tip of the light." Monocular rotations and versions
are recommended only when binocular performance
shows abnormal responses.

[1]Some clinicians prefer to do versions before
rotations. The question is academic, however,
the importance of doing both cannot be over-
emphasized.

B. Clinical Functions

The primary and most important observation to be
made during rotations and versions is the deter-
mination of gross motor capability. Constant
binocular fixation throughout all phases of these
tests indicates gross concomitancy. The absolute
extent of binocular eye movements is observed by
moving the fixation light laterally until the
corneal light reflex moves or disappears from the
cornea.[1] The limit of the binocular motor field
is determined by employing the unilateral cover

test while moving the fixation light toward the
midline. Measurement of the binocular motor field
and the monocular motor field can be determined in
any meridian using the same technique. Norms for
the binocular motor field and the monocular motor
field have been established.

[1]A differentiation should be made between the
limits of the binocular motor field and mon-
ocular motor field. The absolute extent of
the monocular motor field is reached when the
light reflex moves on the eye ipsilateral with
the fixation target.

The extent of binocular movements under bin-
ocular motor field conditions is apparent when
the light reflex moves on the cornea on the
same side of the light, or anatomical features
of the face interfere with the opposite eye.
Either can occur first.

III. NEAR POINT OF CONVERGENCE

A. Clinical Technique

The near point of convergence is determined by
moving the fixation light toward the patient along
his midline at eye level. When doing an asymetric
near point of convergence the light is presented
in front of the right eye and moved directly
toward it. The procedure is repeated for the
left eye. Again the instructions are, "Watch
the light."

B. Clinical Functions

Various observations are made during this proce-
dure. Quantitative measurements are made of the
break and recovery, evaluations of tracking skills,
eye dominance, pupillary reactions, asthenopic and
evasion symptoms, and suppression responses are
noted.[1] First the break and recovery are measured.
The break is observed when the light reflex moves
on the cornea or the eye is seen to turn outward.
The patient is asked, "How many lights do you see?"
A response of "One light" indicates the possibility
of suppression. After moving the fixation light
well inside the break point it is moved out slowly
until binocularity is re-established. This point
is reached when the light reflex on the cornea is
again centered or at points corresponding to that
seen under conditions of the monocular light fix-
ation testing. Binocularity is always confirmed
with the unilateral cover test. A re-fixation
movement in the non-occluded eye indicates lack
of recovery. Quantitative measurements of the
near point of convergence should be the result of
at least five repetitions. Consistency and sus-
tained performance is expected. Tracking skills,

pupillary reactions, asthenopic and evasion symptoms should be evaluated. The eye that maintains fixation longest is most often the dominant eye. The preceeding observations should also be applied in the asymetric near point of convergence. Quantitative comparisons of break and recovery are made between the two eyes.

> [1]Five repetitions of the near point of convergence should be adequate to acquire the necessary information from this procedure. Smooth and accurate tracking of the target is expected. Avoidance reactions such as head movements and tenseness should be recorded. Wrinkling of the brow, tearing, squinting, and expressions of discomfort are asthenopic symptoms.

IV. UNILATERAL AND ALTERNATING COVER TEST

A. Clinical Technique

The unilateral and alternating cover test is normally done at two distances, at 16 inches using a fixation light as a target, and at 20 feet with the target being a small acuity letter.[1] It consists of three parts: unilateral, alternating, and again the unilateral.

> [1]There is no prescribed order specifying at which distance the cover test should first be performed. However, since it is easier to direct children's attention to near objects, the near cover can be done first.

There are several techniques that can be
used with children to obtain far cover test
results. We suggest placing a muscle light
on the test chart and having the child
"cover" this light using a hand-held pointer
flashlight.

B. Clinical Functions

The initial unilateral cover test is used to clas-

sify the patient as phoric or tropic at that

specific distance. The key observation is obtained

by watching the unoccluded eye at the moment of

occlusion. A binocular recovery under these con-

ditions indicates a phoric response. Lack of

binocular recovery indicates a tropic response.

The near testing distance will have to be modified

if the near point of convergence is not within

normal limits.[1] The alternate cover is used to

determine the magnitude of phoric or tropic

responses, and secondly, to determine the change

in either response as a function of the time of

dissociation.[2] The unilateral phase is repeated

to differentiate between constant and periodic

strabismus. Usually a periodic strabismic will

show a phoric response during the first unilateral

cover test and a tropic response during the sec-

ond. The magnitude of the phoric or tropic

response can be established with loose prisms using the alternate cover, first with the eyes in the primary position. The alternate cover is then performed in the other eight directions of gaze. Any change in response in these positions indicates non-concomitancy. To facilitate observation in the lower fields of gaze the head can be tipped backward.

[1] A receded near point of convergence necessitates a modification of the near cover testing distance. The near cover should be performed well outside the recovery of the NPC. If done at or near the NPC's recovery, a tropic response may be elicited which is an artefact of the testing distance.

[2] Under alternate cover conditions if a change in phoria or tropia is noted, it should be continued until the magnitude is stabilized.

V. SACCADIC FIXATIONS

A. Clinical Technique

Saccadic fixations are performed at about 16 inches with the beads approximately 8 inches apart and equidistant from the midline. The instructions to the patient are, "Look at the red bead when I say red, and the green when I say green." Testing is done in the vertical, oblique, and horizontal meridians. The beads are then held at approximately 10 and 20 inches repeating the instructions

to the patient. This procedure is the near to near saccadic test. The near to far saccadic test is performed with a white spot of light at 20 feet and a colored bead held at 16 inches. The patient is told to "Look at far, then at near."

B. Clinical Functions

The quality of saccadic movements is observed and recorded.

CONCLUSION

This video tape presents a systematic technique necessary to administer the manipulatory skills tests. To acquire valid and clinically significant information the sequence demonstrated should be followed. It is suggested that several viewings of this tape will be needed if the clinician wishes to master the techniques and fully understand their functions. The study guide should be used in conjunction with the viewing of the video tape to obtain maximum benefit.