G.N. Getman Memorial Lecture

Retinoscopy Observations Lead to Better Understanding of Human Performance

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Getman

- Jerry Getman wrote on retinoscopy for many, many years
- Honed during his experience at the Gesell Institute with Arnold Gesell and Miss Glenna Bullis
• Initial phases of this lecture
  – Describe Getman’s observations from his earlier works that he summarized in *Developmental Optometry* published by OEP
  – Add later research that supports his work
  – Describe a way to look at retinoscopy
• Last phase will be the re-introduction of today’s summary in a technique called - *Just Look! Retinoscopy*
Before there is any discussion of any retinoscopic procedure, emphasis must be given to the hard clinical fact that there must be more than a single retinoscopic observation made of ocular and visual status.

Retinoscopy is more than a number.
• The three procedures to be discussed here are:
  – Observations of the retinoscopic reflex while the patient is visually attending to a distant chart with some symbolic demand;
  – Retinoscopic reflexes while the patient is visually attending to a nearpoint chart containing some simple symbols which do not demand any response beyond identification, and;
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– Observations of the retinoscopic reflexes when the patient is required to visually discriminate and interpret a paragraph or picture which demands some degree of cognitive effort
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- “Emphasis must be given to the importance of both the appraisals while the patient attends to a distant chart, and also to a near chart. If both of these observations are not made one might just as well do neither, since the comparisons of the patient's performance on both of these can be more developmentally and clinically significant than either one alone can be.”
Steele Insertion

- When changing from a distance finding to the near finding or from near to distance, remove and cylinder and anisometropia found at either distance in order to better determine any difference between distances
The more the retinoscope is used to observe the visual performance of an individual, the more the observer will come to respect and appreciate the dynamics of the total visual system, and all of the influences the total organism will bring into the visual act.
Far Retinoscopy
Getman

• Early work at Gesell
  – Young children would not allow lenses so the examiner scoped from 16 feet
  – Differences in farpoint retinoscopy observations when the child was attending and when not attending (Miss Bullis observation)
    – Less with motion when the child was fully attending

• Interesting that the beginning of cognitive retinoscopy observations started at farpoint
Led to similar observations at nearpoint when older children were looking at books.

- Skeffington – Cognition Retinoscopy
- Did not catch on and later became “Book Retinoscopy”
Optometric information sought while using the retinoscope at any distance:

- The brightness and stability of the retinoscopic reflexes in both eyes.
- The influences of posture, and postural stresses upon these reflexes.
- The particular influences of taction and speech upon these reflexes.
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- The dioptric status of each eye, and any **shifts** of this status when distance of target, or content of target is changed.
- The immediacy of changes in brightness, stability, and/or dioptric status when lenses are introduced either in trial lens form or in the phoropter.
- The dioptric changes induced by the change in the distances of the target being visually inspected.
Getman

– The magnitude and stability of binocularity as indicated by the differences or equalities of these reflexes in each eye.

– The influence of cognitive efforts upon the brightness and color of these reflexes, and the magnitude of dioptric change when interpretations are demanded.
Cultural Relevance

- A stable, consistent and dependable visual system certainly would be advantageous to all cultural demands.
- It is important to emphasize that a visual system with less than the expected, or desired, abilities does NOT preclude surprisingly adequate visual performance in many cultural tasks.
There are many instances of individuals with severe impairments in their visual system who are more visually adept than their fellows.

It is now well established that refractive conditions that fully respond to judiciously prescribed lenses do not create any significant deviations in visual performance.
Cultural Relevance

• The major cultural relevancies will be found when there are no correlations between dioptric status and acuities, as in the Streff Syndrome.
Cultural Relevance

- One must always remember that no matter how significant the observations of the retinoscopic reflex might be, the ultimate visual performance of the individual will be determined more by his, or her, desires, motivations, needs, attitudes and experiential background than by any isolated ocular or visual factor.
Cultural Relevance

• Such is the developmental difference between sight and vision in the human.

• Damien Smith – “6/6 does not mean diddleysquat”
Near Retinoscopy
Near Retinoscopy

- Make careful note of the dioptric amounts of the meridional differences.
- Make special note of any unusual postural changes when patient's attention is maintained on the near chart.
Near Retinoscopy

- Be careful NOT to use a chart that demands interpretations and comprehension of the contents.
Cylinder Differences

- Do NOT assume that the cylindrical lens powers will be the same at "far" and at "near."
- If the cylindrical amount is less on near observations than it is at far, prescribe only the most appropriate plus lenses, with the most equal plus possible for both eyes.
If, in contrast, the cylindrical amount is more on near observations than it is at far, prescribe the least possible amount of cylinder, and "make the patient earn it" by critical judgments of discriminations at both far and near.
Cultural Relevance

• The significance of nearpoint observations made by the behavioral optometrist must be emphasized. It is these observations which allow the informed optometrist to consider and mediate so many of the cultural impacts upon the visual system.
Cultural Relevance

• “The relevance between near-point visual abilities and the nearpoint visual tasks of the classroom, or office, are so obvious it is difficult to understand the lack of attention being given to them by so many clinicians and educators. These are probably the most critical points in all of the considerations of visual performance in the contemporary culture.”
Cognitive Retinoscopy
Cognitive Retinoscopy

- This procedure's importance to the behavioral optometrist now comes as it is used to determine the immediacy and quality of the patient's response to lenses. Clinical practice now shows the following identifiable responses:
Cognitive Retinoscopy

• If there is a definitely observable brightening and stabilization of the retinoscopic reflex when the patient is reading through the analytically-determined lens powers, the immediacy of the visual benefits from this lens can be expected and predicted.
Cognitive Retinoscopy

- If, however, the reflex does not brighten, and does not show the stability expected, the necessity of the lens is NOT negated, but there will probably have to be some time for the visual system's adjustment to the lens power before the prescription benefits are fully appreciated.
This information can well mean the difference where a child avoids wearing the glasses because, “I can’t tell any difference whether I wear the glasses or not.”
There are some critical differences here. The patient must hold the target materials in his, or her, hands. There will not be the same responses if the book is held by another person.
Procedure

- The optometrist must place the retinoscope into the same plane as the book, and as close to the visual axis as possible.
- Since the observations are primarily of brightness and stability of the reflex, it is not necessary that the retinoscope be "on the line of sight."
Procedure

- Trial lenses should be used to obtain a measure of the amount of dioptic shifts which may occur here.
- Strongly urge the patient to "read for comprehension because I will be asking questions about the material later."
This instruction makes the distinct differences between this procedure and the usual nearpoint retinoscopic observations.
Watch for and Record

- The dioptric shifts into "against" motion and the exact circumstances in which it happens.
- The dioptric shifts into decreased "against" motion or into "with" motion amounts and exact circumstances in which these happen.
Watch for and Record

- Any extreme dulling of the reflex that was not observed in any previous retinoscopic observations.
- Carefully note any sort of "scissors" motion of the reflex that was not observed in other retinoscopic routines.
Watch for and Record

- Give special attention to the color, brightness and stability of the reflex when amblyopia of any degree is suspected.
- Carefully note any differences in the retinoscopic reflex when there is more interpretation and cognition being demonstrated by the patient.
“Now, with more than 40 years (Getman’s words in 1988) of acquaintance with this clinical clue, its greatest value lies in its confirmation of the most appropriate lens power for the stabilization and efficacy of the visual response during cognitive demands.”
“This clinical data thus becomes another of the viable appraisals of the visual abilities to inspect, discriminate and interpret the information coming from the lighted environment.”
In addition to this are the clues the retinoscopic reflex holds about the attitudes and decision-making capabilities of the patient being observed while engaged in visually-centered tasks.
A Timeline of Retinoscopy

- Carried through the decades for Getman’s initial observations through most recent research in 2006
Scissors motion at near - spherical at intermediate and far

(-) X 90 at near - sph at int and far
  - Playing with cars on a table or high chair

(-) X 180 at near - sph at int at far
  - Building towers
Getman - OEP Papers-1950’s

- Spherical at near, int. and far
- Went through the same process at intermediate and far distances
- Suggests that measure of refractive state closely parallels the action of the child during development
- Development involves the entire body and it’s processes
Emmetropization

- Most born with moderate hyperopia and against the rule astigmatism (-X90)
- Moves to less hyperopia and with the rule (-X180) as they mature
- Coincidence or purpose
Forrest Article AAO – 1970’s

- PI – 6.00 X 090 OU  20/20
- Auto accident - placed in traction
- C/O difficulty seeing with glasses
- PI – 1.25 X 090  20/20
- Project reported in AAO Journal
- Limitation of eye movement in the power meridian is associated with higher measurable astigmatism
• One-half ping pong ball on laboratory animal’s eye

• The part of the retina receiving stimulation showed normal growth

• The part of the retina with no form stimulation developed significant myopia – in some cases, over 10D
Earl Smith – UHCO – 1990’s

- +5.00, -5.00, +10.00, -10.00
- Eyes tend to grow toward the stimulus except for the +10.00 which also grew toward myopia
Whatham and Judge - 2001

- Ten infant marmosets (8-13 weeks of age) wore soft CTL in one eye on a daily basis for 5-9 weeks.
- Eyes with hyperopic lenses were more hyperopic (+2.39) and eye with the myopic lenses were more myopic (-2.48).
- Fellow eyes were unaffected.
- Plano lenses did not affect eye growth.
CONCLUSIONS. Heredity was the most important factor associated with juvenile myopia, with smaller independent contributions from more near work, higher school achievement, and less time in sports activity. There was no evidence that children inherit a myopigenic environment or a susceptibility to the effects of near work from their parents. (Invest Ophthalmol Vis Sci. 2002;43:3633–3640)
• Repeated Smith’s work
• The pax-6 gene expression in the retinas of the defocused right eyes was significantly higher than in those of the control left eyes.
The result of the study makes it more convincing that the increasing tendency of children to stay indoors watching televisions, playing computer games or reading books too closely to their eyes can cause short-sightedness.

Basic gene may lead to myopia.
Seminar Observation - 2005

- 10 month old
- Parent has high astigmatism
- In mother’s lap, child shows moderate to high astigmatism >2.00 X 180 when casually looking
- When looks at near target, response is spherical in both eyes
- When relaxes – goes back to astig
Just Look!
Retinoscopy
Just Look! Retinoscopy
Just Look! Retinoscopy

• After years of telling students and doctors to – Just Look!
• Similar to Getman and others
• Carefully note any sort of "scissors" motion of the reflex that was not observed in other retinoscopic routines.
Just Look! Retinoscopy

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Just Look! Retinoscopy

- What does one hope to find?
- Do the eyes look alike?
  - Likenesses and differences
    - Motion
    - Brightness
    - Color
- Variation from expected
- Response to different tasks
Just Look! Retinoscopy

- Response to lenses – not looking for neutralization
- The patient who has difficulty accommodating to the task – too much, too little, stressed, sluggish, uncontrolled, unequal, etc., is one who has a visual problem
Just Look! Retinoscopy

- A direct observation of the stability of the visual process
- A direct observation of the patient’s response to lenses
- A direct observation of the patient’s response at the specific working distance
Just Look! Retinoscopy

• You can do this:
  – At any point in your examination
  – Where the patient does most of the work
  – Do what you have to do to observe the reflex - You may have to get on the floor
  – Don’t put your patient in an unnatural position
Just Look! Retinoscopy

- STOP!
- LOOK!
- COMPARE
- Use lenses as probes and in pairs
- Evaluate responses to lenses rather than try to neutralize
- Evaluate responses in time
What to Watch For

- Excessive Plus – more than 2.00
- No plus or any minus
- Fluctuations not induced by difficulty of task indicating lack of control
- Anisometropic changes
- Anisocoria or mydriasis
What to Watch For

- Astigmatism, especially changes from far
- Difficulty in completing the task
- Interferences in the visual pathway
- Dulling or horizontal striations
- Eyes drying
Responses to Plus Lenses +

- Decrease in with motion
- Decrease in against motion
- Decrease in cylinder
- Increase in brightness
- Increase in pupil size
- Increase in equality between eyes
- Increase in color response
- Increase in reading quality
Responses to Plus Lenses -

- Increase in with motion
- Increase in against motion
- Increase in cylinder
- Decrease in brightness
- Decrease in pupil size
- Decrease in equality between eyes
- Decrease in color response
- Decrease in reading quality
Expected
Brick Red- Dirty – Reduced Contact
Intense Central – Often Associated With Hyperopia
Scanning Minus Axis 180
Scanning Minus Axis 90
Scanning Minus Axis 180
Scanning Minus Axis 90
Cyl axis 090
Decreased Central Performance
Doughnut – Avoids Contact
Just Look! Retinoscopy

- Stop!
- Look!
- Compare!
- Just Look! at the two eyes as a pair rather than an eye
Just Look! Retinoscopy

- Stop! Look! Compare!
- Probe with pairs of lenses to determine if you can change a negative appearance to a more positive appearance
- The greater the change, the greater the likelihood of making a difference in the patient’s life
Thank You!
Infant Vision and Vision Development Track

Saturday 22 April
Parent Focus Group

- All have our own involvement whether basic assessment or very in-depth assessment
- What happens when we look outside the box?
- C:\Documents and Settings\gsteele\My Documents\Videos\MomsForDVD.mpeg
Infant Vision Track

- Well Baby Examination – Rateau
- Survey of Research – Aalberg
- Special Needs Babies – Maino
- Infant Strabismus – Baxtrom
- Vision Development Activities for Human Intelligence – Kitchener
- Primitive Reflexes – Holland
- Kindy Toddler Gymbaroo - Sasse