

Managing Refractive Conditions from a Developmental Viewpoint

Glen T. Steele, O.D. FCOVD FAAO
Southern College of Optometry

New since Paper submitted

- *Summary:* Psychologists have shown that a baby's most likely first words are based upon their visual experience, laying the foundation for a new theory of infant language learning.
- "Difficulty learning words could stem from visual processing problems," Smith added. "Children who are late talkers have slow or age-delayed visual processing skills for objects, for example. Children with autism have object-processing problems as well."

New since Paper submitted

- "Taking account of the visual brings a whole new dimension of word-learning into view," she added. "If all you ever worry about is the word side of word-learning, you may be missing half the problem: visual cues that aid language learning."
- Clerkin, Hart, James, Chen Yu, Smith - Real World Visual statistics and infants' first-learned object names – Biological Sciences 2016

Overall Development and Refractive Conditions

- Recently told, "We don't teach things that way." Three countries including the US
- "That is so different from the traditional way of managing refraction."
- Does this mean that the distance refraction – as determined by cycloplegia - is the foundation for all eye and vision care
- I find that contrary to the concept of development

Purpose of Examination

- Where/how is this patient operating at this moment in time?
- Where are they in terms of what they are expected to do?
- Where are they in terms of Bubba's Seven A's?

Bubba's Seven A's

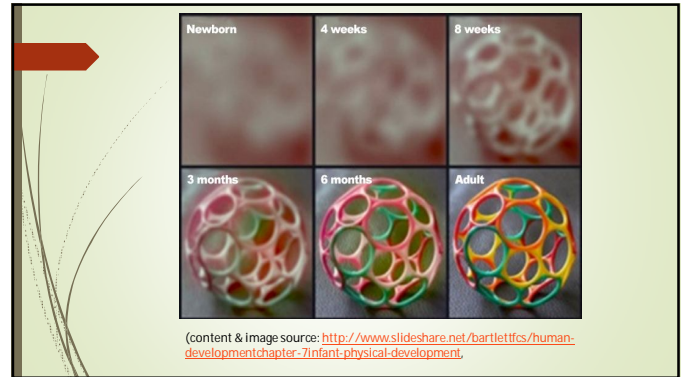
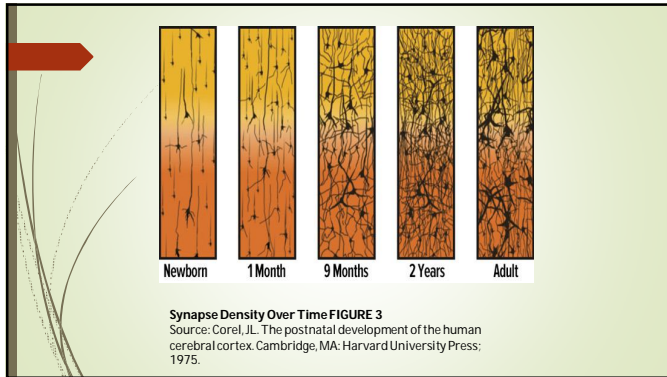
- Last year I talked about Bubba's 5 A's – now there are seven
- Activation – whoa! There's a world out there
- Awareness – Hey, what's that
- Attention – Let me see you better
- Anticipation – I want it
- Action – I'm getting it - maybe
- Adjustment – Let's get it right this time
- Acquit – OK, what's next?

Using the Seven A's

- Where are they in the bigger scheme of things?
- Where should they possibly be?
- Is intervention necessary to move them there? always

Forget Refraction for the Moment

- What level of visual function do you expect of the following?
 - A nine year old
 - A five year old
 - A three year old
 - A nine month old



Nine Year Old

- Must sit in a classroom for seven hours a day
- Must have stable visual function measured through accommodation
- Must have efficient visual focus measured through accommodation
- Must have efficient facility and should be accurate
- All these can be observed and assessed through retinoscopy observation

Five Year Old

- Must be able to sit for long periods although not for seven hours
- Must be able to focus but not as intently nor as stable as the nine year old
- Must be able to change focus but not to the level of the nine year old
- Must be showing development of accommodative facility - ability to change although not the accuracy of a nine year old

Three Year Old

- Must be showing an ability of self-regulation and that can be measured using the retinoscope as a tool
- Must be showing proficient alignment and binocular function
- Must be showing an ability to sustain for an appropriate length of time although not for seven hours and not for extended short periods of time.
- May still show variability in the process of developing sustained visual function
- May not be showing full accommodation when looking at a target

Nine Month Old

- Beginning the process of looking more efficiently
- May still be showing moderate variability when looking at a near target although should be well underway
- Focusing is more dependent on fixation than on the target
- Focusing should be in the process of development and should be able to accurately focus for brief periods on an interesting target
- Self regulation as measured with a retinoscope is periodic and not sustained – this often leads to a rush to cycloplegia.

Managing

- Observation over several seconds is necessary before moving on.
- The key with infants and young children has more to do with their looking ability than with refraction. How do you measure the efficiency of “looking?” With Just Look! Retinoscopy
- Why is it necessary to begin with distance if the foundation begins internally and moves out?

Managing

- If development truly begins at nearpoint with things that can eventually be touched and understanding of things farther away takes longer and becomes almost an artificial activity, then management should begin at this near distance rather than repositioning the artificial distance target. - Bubba

Managing

- Watchful waiting?
- Activities?
- “Triggering” lenses in which you encourage a movement towards a more desirable manner of looking?
- Compensatory lenses that match the artificial means the patient has developed?

Gesell

- “The goal of evolution and development is not to make a more perfect end organ (the eye) but rather to develop a system to serve the needs of the organism.”

Gesell

- “The infant is born with visual hunger. Although he resists excessive illumination by blinking, he very soon uses his waking time for the accumulation of visual experience and the exercise of ocular functions. Indeed, so fundamental is the sense of vision that it is the traditional criterion of wakefulness as opposed to sleep. An infant does not really wake up until he begins to look; and when he ceases to look he goes to sleep.”

Gesell

- “The child is never a miniature adult. He is not even a pocket edition. He is an ever-changing, growing organism. His main task in life is to grow up, to mature, and to develop. His well-being depends on how his growth potentials are realized and organized.”

Gesell

- "Vision is a social sense as well as an intellectual sense."
- "The eyes are pathfinders"
- **"So interfused are vision and action system, that the two must be regarded as inseparable. To understand vision, we must know the child; to understand the child, we must know the nature of his vision."**

So a Developmental Approach

- What is most important from a developmental point of view?
- As a means of initiating development and more efficiently allowing the child's curiosity to become real, the initiation of the looking response is critical.
- If the infant or young child does not learn to purposefully look with increasing curiosity, development will be slowed(delayed).

So a Developmental Approach

- Early intervention with lenses or activities to link a child's ever present curiosity with their looking response is always a primary goal in care from a developmental point of view.

Purpose of Examination

- From a developmental viewpoint, it is simply to determine if some intervention is necessary to either initiate, expand, or enhance one's rapport with the world about them and as they age, the task at hand.

Purpose of Examination

- I am looking for an initial change toward what would be considered an ideal response to a lens.
- In order to do this, my initial suggestion would be to use an interesting target for the patient to observe at nearpoint that also contains an accommodative component.

What is a Refractive Measure

- What do findings of minus, plus, astigmatism, anisometropia mean?
- From a developmental point of view, we understand this is an assessment of how the patient is looking out at the world
- Stable or variable?
- What does a lens do? Plus lens? Minus lens? Cylinder lens

Minus lens

- 2.00 myope looking at a distance target – posture?
- -2.00 lens – what does this lens do?
- Place virtual image at 20 inches
- Matches “far” posture of patient
- Same 2.00 myope looking at a target at 20 inches – posture?
- With -2.00 lens in place where is posture?

Minus lens

- Does this makes myopic progression an iatrogenic condition?
- Especially if the majority of activity is at nearpoint

Bubba's Method

- Observe the patient as he begins to look and preferably before he begins to look.
- Often, the child will continue to look at something other than the target.
- What does it take to draw their attention to the target?
- What is their initial response as they come to the target?

Bubba's Method

- Add lens power until you can identify the point where a minimum or initial response to the target can be recognized.
- The goal is to guide the child in developing the looking response which is critical in overall development.
- Any initial brightening indicates that the child is beginning or at a level where they can begin the looking process.

Method

- If hyperopic, start even with +0.50 and then +1.00. The goal is to identify the power that initiates an internal response. Increase as necessary.
- If seeing myopia, use similar process – where is the initial response that engages development. Sometimes even low plus initiates the process.

Bubba's Method

- If seeing astigmatism, also a similar process – where is the initial point that begins to move toward a round reflex rather than the typical astigmatic presentation, especially as the child is reaching.
- If anisometropia, again a similar process – begin with equal lenses and observe the response in motion, color, and brightness. If equal lenses allow a move toward more equal appearance, then this is a good sign

Bubba's Method

- Check accuracy with reach and touch with and Wolff Wand and observe as he looks with the different lenses.
- Too much plus will cause him to reach beyond the target (or even forcefully hitting the target) which means he is projecting beyond the target.

Bubba's Method

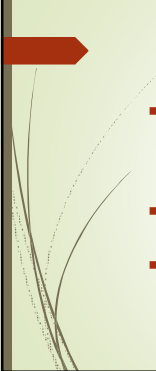
- Way too much plus as you approach the neutral point will usually bring him back inside the target.
- With too little plus, they will start reaching closer to themselves and slowly move toward the target.

Bubba's Method

- Don't be intimidated by what you might determine as the "full" measurement and that you have to prescribe that. Use a lens that will get him to looking more carefully and accurately and let the developmental process take over.

Bubba's Method

- Simply engaging the process of development is a huge step toward overall development
- What is the minimum amount of power that initiate an outward awareness of the world



Summary

- Our responsibility is not to find an exact power but a power that allows him to facilitate more accurate looking and projecting farther in space.
- Minimum power to maximum response and output.
- The younger the child, the more important these recommendations are AND the less power it takes to initiate the process of looking