Assessing vision in young children: Communication skills

Measurement of visual functions is critical to the detection and diagnosis of eye disease, particularly in children where eliciting symptomology can be challenging. An effective practitioner-patient relationship is crucial in optometric practice and has numerous benefits such as increased satisfaction, good compliance to assessment and treatment. The aim of this work is to share my experience of assessing visual functions (visual acuity, stereopsis, and computer-based visual psychophysical testing) in infants and children. I will discuss some unique strategies in order gain attention of children ranging from infants to preschoolers. The importance of the waiting area, use of colorful toys, appropriate use of tests and language are a few among many strategies for getting through a pediatric vision assessment. Based on my 9 years experience as a pediatric optometrist and a child vision researcher, these approaches has been quite successful in conducting hundreds of pediatric vision assessments. A friendly clinician equipped with interesting age appropriate tests and colorful toys along with some essential communication skills can easily conduct a thorough and efficient pediatric vision assessment.
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Abstract:

Measurement of visual functions is critical to the detection and diagnosis of eye disease, particularly in children where eliciting symptomology can be challenging. An effective practitioner-patient relationship is crucial in optometric practice and has numerous benefits such as increased satisfaction, good compliance to assessment and treatment. The aim of this work is to share my experience of assessing visual functions (visual acuity, stereopsis, and computer-based visual psychophysical testing) in infants and children. I will discuss some unique strategies in order gain attention of children ranging from infants to preschoolers. The importance of the waiting area, use of colorful toys, appropriate use of tests and language are a few among many strategies for getting through a pediatric vision assessment. Based on my 9 years experience as a pediatric optometrist and a child vision researcher, these approaches has been quite successful in conducting hundreds of pediatric vision assessments. A friendly clinician equipped with interesting age appropriate tests and colorful toys along with some essential communication skills can easily conduct a thorough and efficient pediatric vision assessment.
An effective doctor-patient relationship is crucial in medical practice and has numerous benefits such as improved health outcomes, increased satisfaction and good compliance to treatment\(^{(1,2)}\). The importance of communication skills in medical practice has been extensively discussed\(^{(1)}\), however, there is a paucity of such information in the optometric literature. Like in every medical practice a good doctor-patient relationship is equally important for a pediatric ophthalmology/optometry practice. Building a good rapport with children and their parents is crucial in order to improve compliance and cooperation of children who visit pediatric optometry clinics either for a clinical appointment or for a research participation. The attending clinician or the researcher must tailor his/her style of communication according to the children’s age and cognitive development in order to make most out of the visit. While an uncreative, speedy visit may not reveal a thorough assessment, a lengthy assessment may also be too boring for a child. In this article, I will share my experience of assessing visual functions (visual acuity, stereopsis and computer based visual psychophysical testing) in infants and children.

**Examining infants:**

Infants are the easiest group of children to assess ophthalmic problems. The first key thing to consider while assessing infants is to make sure that they are adequately fed and rested comfortably. A sleeping child provides a perfect opportunity to assess ocular integrity. Other assessments such as vision and ocular motility can be conducted when the child is awake. A crying baby can be calmed by bottle feeding, breastfeeding or by the use of pacifiers. Occasional use of whistleing sound can also direct the attention of a distracted infant. Use of colorful toys (Figure 1) those emits light and makes sound of animals/birds will regain attention of infants for ocular examination.

**Examining Toddlers and Preschoolers:**

Toddlers (age 1 year – 3 years) are the most difficult group of children to assess ophthalmic anomalies. Their limited attention span and hyperactive behaviour poses a major barrier in conducting a thororough assessment. The chance of a successful assessment is highly increased if the child is recently fed, had a recent sleep and had had a short waiting time\(^{(3)}\). It is important for the professional to be confident, smiling and friendly. Observation of the child as he/she enters the room gives some clues about the child’s visual status. Looking if the child returns an eye contact can offer a tentative measure of visual acuity (Table1)\(^{(4)}\). For examination, the child must be seated in a comfortable position. Most of the children prefer their parent’s lap during examination but some children like to be on their own, hence the examiner must ask what the child prefers. A couple of interesting bright and colorful toys (Figure 1) need to be handy. The principle of one toy, one gaze, one look needs to be applied as children may get easily bored with a single toy for different components of the assessment\(^{(3)}\). When a child loses attention, auditory clues...
such as singing nursery rhymes, humming, whistling or even asking questions about their school and hobbies can keep them regain their attention. Positive reinforcement is another strategy that works with kids most of the time. Encouraging children by using praise words such as “good job”, “well done”, “fantastic”, “brilliant”, “good boy/girl” when they perform correctly enhances children to cooperate even more. However, if the child performs wrong or is uncooperative, a constructive criticism approach can be applied. For instance, instead of saying “no, you are wrong”, which immediately puts off children, you can use, “I don’t think what you said is correct, can you give it an another go or “you were nearly correct, can you try a little bit harder.” Similarly, children may become bored with longer assessments and start yawning if the assessment takes more than 10 minutes. In such cases, we can use phrases such as “we are nearly there”, “we are almost done” which will help the child to engage a little bit longer.

Assessing Visual Acuity:

Tests for visual assessment need to be chosen wisely. If possible, tests that have pictures and figures must be used. In assessing visual acuity in children less than 2 years, grating acuity cards are commonly used. Verbal instructions are limited in small children as cognitive skills that are required to accomplish these tests have not yet been developed. However, children as young as 2 years may sometimes can be instructed to look at Zebra Stripes while presenting a preferential looking grating test.

Most of the children older than 2 years are attracted to pictures and some of them can even recognize them. Preferential looking vanishing optotype tests are ideal to be used in toddlers with a high success rate. The card must be presented at an eye level of the child. For preschool children, measuring visual acuity can be made as a game play. Most of the tests for preschool kids involve picture matching task (Lea Symbols, Kay Picture Test, Sheridian Gardiner). My approach is to first ask them whether they like to play games. Obviously, children like to play games games and hence this strategy always gets children enthusiastic at the beginning. Tell them that we are playing a picture matching game today. Hand them a key card and tell them that it’s their card and ask them to match the same picture that you (the clinician) present from a 3 meters distance. Use positive verbal reinforcement phrases after each correct answer. When children start to lose attention on the test assure them that the test is getting towards the end and that we are almost done with the test. If you have another test tell them before hand that you are going to play another cool game after you are done with this one. Most of the children below 5 years comply well with this strategy.

Assessing Stereopsis:

Commonly available clinical stereotests such as Lang I and II and Frisby serve as the best options for measuring stereopsis in children aged one to 3 years. These tests do not require glasses hence the testability is high as toddlers. For measuring
stereoacuity with Lang stereotest, ask the child to show if they can find any of the pictures that are sticking out from the plate. Or ask if the child can find a particular picture on the card. Occasionally, a gaze preference observation of the child towards a particular picture can provide a clue that the child can perceive stereopsis. For measuring Frisby stereoacuity, ask if the child can see a ball or a circle that is sticking out in one of the squares among the four squares. Provide verbal encouragement as that of testing VA. Children greater than 3 years can comply with more sensitive measures of stereopsis that measure finer levels of stereoacuity. Stereoacuity can be explained as 3D pictures which will generate some curiosity to children. We can start by saying, “Now, I want you to put these 3D glasses and look at these really cool pictures.” For children who are reluctant to put polarised glasses, I generally ask one of the parents to put on the glasses first and praise on how cool they look, and ask the child if he/she wanted to look cool too by putting the glasses on. This trick works everytime. Sometimes, the parent may need to wear the extra pair of glasses during the whole assessment. For most of the stereotests, the instruction is to tell which one of the targets is “sticking out”, “coming up”, “different from” or “closer to you” as compared to others.

**Computer-based visual psychophysics testing in children:**

Similar to other vision tests computer-based visual psychophysical tests also need to be tailored according to childrens’ age and cognitive development. Among the group of children that are below 5 years of age, infants are the easiest group to perform most of the tests as they tend look at targets that are interesting to them. This has been a strategy for years in testing visual function of infants. But as soon as children grow 1 year and older, they tend to have short attention span and become hyperactive. They do not care or understand why they are being examined. They require interesting targets/stimulus in order to sustain attention for a longer duration. Psychophysical tests generally involve presenting a single task over a number of times. This tends to be a tedious task for children. Hence, tests must be designed that sustain the attention of the child for the duration of the test. Some of the strategies could be incorporating cartoon characters based on popular TV such as “Bob the Builder”, “Dora the Explorer”, “Spongebob” or common animals and objects such as fishes and ducks, cars and trucks, pacman and so on in the testing protocol. It is ideal to design the stimulus that looks like the TV cartoons, or else, presenting a video animation of such characters between sessions of a psychophysical tests is a good approach(5).

Most of the younger children, at least children above 3 years are aware of computer games, hence it is always an easy start to a test asking if they would like to play computer games. Most of the kids that I have assessed always say “yes”. Then the examiner can explain the instructions of the test in a simplified version. For instance, for a global motion perception task the examiner may define the random dot stimuli as “snow balls”, the coherent dots as “good snow balls” and random dots as “silly snow balls.” Similarly, examiners can come up with their own version of the name of
things for the stimulus that is familiar to the child. Some previous researchers have successfully gamified visual psychophysics tests such as designing the whole platform of the testing into a rocketship(6), using a pacman based stimuli to assess contrast sensitivity and visual acuity(7), and using animated videos in between sessions of tests for global motion perception(5). Researchers can come up with other interesting ideas in order to grab children’s attention depending upon the type of visual function they want to measure and the time available to them.

**Conclusion:** In conclusion, an examiner equipped with good communication skills and child friendly tests can comfortably get through a pediatric assessment. It is advised that examiners keep certain praising phrases in the tip of their tongue to encourage children during the assessment.

**References:**

1. Stewart MA. Effective physician-patient communication and health outcomes: a review. CMAJ. Canadian Medical Association; 1995 May 1;152(9):1423–33.


Table 1. Approximate maximum distances at which eye contact with a young child can be maintained and expected visual acuities (Adapted from Blaikie and Dutton, 2015, BMJ (4))

<table>
<thead>
<tr>
<th>Age</th>
<th>Maximum eye contact distance (m)</th>
<th>Expected Snellen acuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2 days</td>
<td>0.30</td>
<td>6/540</td>
</tr>
<tr>
<td>2 weeks</td>
<td>0.75</td>
<td>6/180</td>
</tr>
<tr>
<td>6 weeks</td>
<td>1.15</td>
<td>6/90</td>
</tr>
<tr>
<td>3 months</td>
<td>1.50</td>
<td>6/60</td>
</tr>
<tr>
<td>4 months</td>
<td>1.75</td>
<td>6/45</td>
</tr>
<tr>
<td>6 months</td>
<td>2.00</td>
<td>6/36</td>
</tr>
<tr>
<td>18 months</td>
<td>3.00</td>
<td>6/18</td>
</tr>
<tr>
<td>8 years</td>
<td>6.00</td>
<td>6/6</td>
</tr>
</tbody>
</table>

Figure 1. Interesting toys and targets for use in preschool children. Printed with permission from Hoyt CS, Taylor D. Pediatric ophthalmology and strabismus. Elsevier Health Sciences; 2012.