VISION AND LEARNING
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Outline
1. Vision vs Eyesight
2. Testing for Learning Related Vision Problems (LRVP)
3. Vision and Learning
   a. Prevalence
   b. Treatment
4. School System
5. Role of the Optometrist

VISION VS EYESIGHT
Definition
Vision is Learned
Visual Skills in Reading

Vision vs Eyesight
Eyesight – the ability to see something clearly = 20/20

A child that sees like this can pass a vision screening.

https://goo.gl/images/BQUL66
Vision vs Eyesight

Vision – the understanding of what is seen


Vision is Learned

http://goo.gl/images/LaFfBV
Testing for LRVP
Three Tiers of Vision
Binocular Vision Testing
Management

Three Tiers of Vision

How does the brain process visual information?
Can the information get into the brain efficiently?
Can the information get into the eye?

Case History
Chief complaint or concern
Educational history
Medical history: prenatal, childhood
Developmental history
Previous assessments and treatment: visual history, psych-ed eval, audiology, OT/PT, neurology, other
Behaviour and attention
Family history

Chief Complaint: Parent
- Not performing up to potential
- Frequent reversal errors
- Poor reading performance
- Frequent loss of place while reading
- Unable to finish written work in time allotted
- Distractibility or short attention span
- Difficulty copying from whiteboard
Chief Complaint: Child

- Tired, Sore Eyes
- Headaches
- Difficulty Reading
- Difficulty Concentrating
- Words Overlap like this
- Sleepiness

Education
- Classroom setting
- Special interventions
  - Specialized reading program?
- Academic achievement
- Speak with teacher
  - questionnaire

Supplemental History Form

<table>
<thead>
<tr>
<th>Please check all that apply</th>
<th>Blurred vision when reading or when looking from near to far</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reversals when reading/writing</td>
<td>Headaches associated with near tasks</td>
</tr>
<tr>
<td>Reading below grade level</td>
<td>Double vision at near</td>
</tr>
<tr>
<td>Poor reading comprehension</td>
<td>Closes or covers eye when performing near tasks</td>
</tr>
<tr>
<td>Letter/number transposition</td>
<td>Uses finger or marker when reading</td>
</tr>
<tr>
<td>Poor/sloppy handwriting</td>
<td>Often loses place, skips or rereads words/letters when reading</td>
</tr>
<tr>
<td>Uses finger or marker when reading</td>
<td>Avoids reading, writing or other near tasks</td>
</tr>
<tr>
<td>Often loses place, skips or rereads words/letters when reading</td>
<td>Short attention span, easily distracted, extensive daydreaming</td>
</tr>
</tbody>
</table>

COVID: Quality of Life Checklist
What is Binocular Vision?

Stereopsis

How is Binocular Vision Tested?

Eye examination tests for important binocular visual skills:

- Accommodation = focusing
- Vergence = eye teaming
- Oculomotor = eye tracking

http://www.vision3d.com/stereo.html
Do All Optometrists Test for BV?

**YES!**

- Tracking – Extraocular Motility (EOM)
- Fusion – Suppression (W4D)
- Stereopsis – Randot Stereopsis
- Convergence – Near Point or Convergence (NPC)

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Accommodation = Eye Focusing

Failing to clean off your desk before lunch not only raises the risk of salad dressing spilling onto your work, but it could also increase your chances of getting sick. A new report shows that close to half of Americans don’t clean their desks before eating at them, and a third don’t wash their hands, which may foster the spread of infectious diseases like colds and flu.

Due to a shortage of the flu vaccine this year, health officials have urged the public to take measures to reduce their risk, and researchers say improving at-work hygiene and hand washing habits could have a major impact in reducing sick days. “Desks, phones, door knobs, conference tables, fax machines and other common workplace areas can be breeding grounds for bacteria-spreading germs,” says Brian Samson, spokesman for the Soap and Detergent Association, in a news release.

https://goo.gl/images/MCchGE

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Vergence = Eye Teaming

Oculomotor = Eye Tracking

Observations:
- Undershooting/overshooting
- Midline jump
- Head and body movements
- Facial grimaces
- Rhythmic timing
- Jerkiness of movements
- Fixation loss
- Meridional difficulties

https://goo.gl/images/kmMctX

https://goo.gl/images/7UB7S3
Oculomotor: Pursuits

Observations:
- Physical limitations (palsy, paralysis, OA/UA)
- Differences between eyes
- Quality of fixation - Accuracy
- Quality of movement - Midline Jump
- Head/ Body movement, facial grimace, discomfort

https://goo.gl/images/kMMcRX

Vision and Learning

- one in six children has a vision problem serious enough to affect their learning
- 60% of students identified as problem learners have undetected vision problems
- 39% of adults understand that behavioral problems can be an indication of vision problems

Prevalence of Learning Problems

- 5% of all school children are diagnosed with a learning disabilities


Prevalence of LRVP

- At least 20% of individuals with learning disabilities have a prominent visual information processing deficit
- Similarly, the prevalence of clinically significant visual efficiency problems is 15-20%
- AI most common accommodative anomaly
- CI most common vergence anomaly


Original Article
Visual and binocular status in elementary school children with a reading problem
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n = 121, age 6 – 14 years
Purpose: review of binocular anomalies seen in elementary school children identified with a reading problem
Results: > 3/4 of the students had no significant Rx, but when tested for binocular vision > 1/3 of the students scored below what was considered normal

Binocular Vision and Learning

- 80% of learning during a child’s first 12 years is based on visual information

Treatment

Forms of treatment for binocular vision impairments:
1. Lenses
2. Prisms
3. Surgery
4. Vision therapy

Vision Therapy

- Series of eye exercises that help patients develop or recover normal visual skills
- Unique for each patient
- Combination of in-office therapy and home reinforcement
- Done in 10 session “blocks” with reassessment after

Purpose of Vision Therapy

- Improvement of visual skills such as:
  - Stereopsis
  - Binocular fusion
  - Eye teaming skills
  - Vergence disorders
  - Visual Acuity
  - Binocular Coordination
  - Eye tracking
  - Fixation skills
  - Focusing/Accommodation

Vision Therapy Techniques

- lens sorting
- loose lens rock
- Brock string
- aperture rule
- Lifesaver cards
- eccentric circles
- Hart chart rock
- tranaglyphs and vectograms
- Home Therapy System (HTS)
Letter Tracking

Pegboard Rotator

Marsden Ball Pursuits
Hart Chart Saccades

SCHOOL SYSTEM
School System

- Identifies students performing below chronological age and grade placement
- Assessment:
  - Multidisciplinary team conducts formal evaluation and plans remedial program
  - Teacher conducts informal assessment and resolves problem within the classroom

Development of IEP

- Multidisciplinary staff works to:
  - Understand child’s problems
  - Determine educational needs
  - Eligibility for services
    - Dependent on: severity of condition, financial situation, availability of services and money in the school system

OPTOMETRISTS ROLE

Optometrists do not treat learning problems.
Primary role: to diagnose and manage vision problems which may prevent or interfere with the normal learning process.
Remediation (e.g. VT) allows children to benefit more fully in the educational instruction.
Role in education:
1. Provide general information about vision disorders on learning
2. Provide specific information about the vision disorders of the educator’s student
M. Taub:

“In the field of eyecare, to put it simply, we help people to see. Whether dispensing spectacles or contact lenses, co-managing LASIK, or cataract surgery, treating diseases such as glaucoma or fitting a low vision device, the ultimate goal is improved vision. Rarely do we get the opportunity to alter the outcome of patients’ lives. Binocular vision allows you to take a child’s or an adult’s life and put them on a better path.”


Thank you!
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