

Visual Issues in FXS

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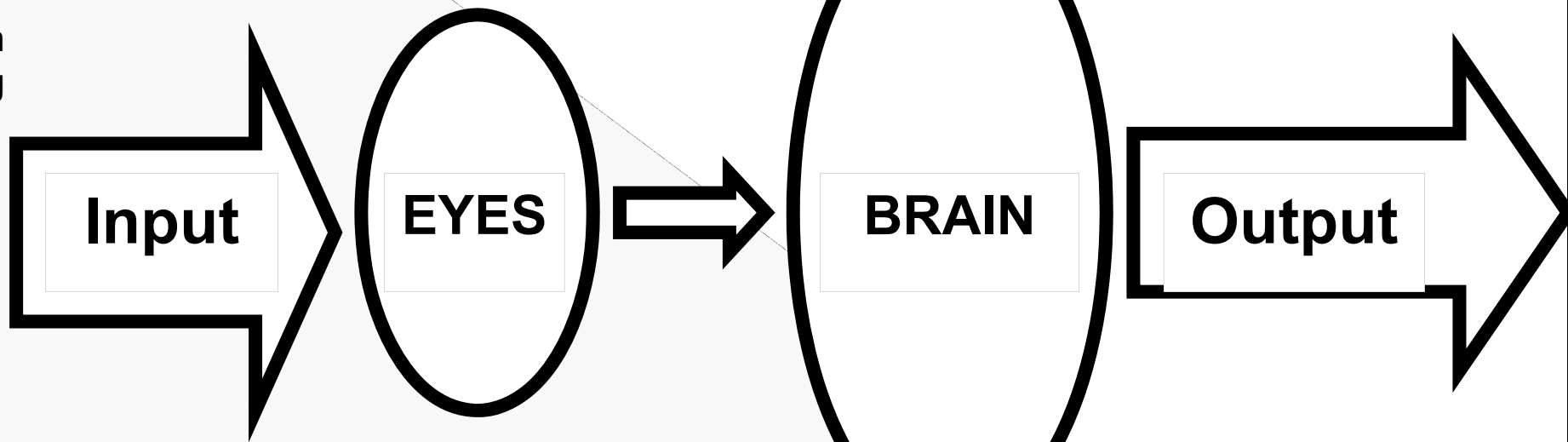
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**Visual
information**

**Spelling
Reading
Writing**



Input

EYES

BRAIN

Output

**Functional
assessment**

**Perceptual
assessment**



Classroom requirements

- 80% of information is visual
- 20% of information is auditory

Children need:

- Good distance and near vision
- Ability to change focus and eye position quickly and accurately
- Ability to look and copy
- Ability to listen and write



Functional vision - assessment

Measuring physical parameters

- Acuity - ability to distinguish fine details
- Refraction – short / long-sighted, astigmatism
- Accommodation / focussing
- Convergence
- Binocular vision
- Eye movements / oculomotor skills
- Depth perception
- Colour vision
- Eye health



Functional vision - assessment

STRABISMUS

Squint, eye turned in (eso) or out (exo)

Constant or intermittent

- 2% of normal paediatric population
- 20% in FXS ($n = 70$) = 10 x normal popn
- 50% eso / 50% exo



Fragile X
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Functional vision - assessment

REFRACTIVE ERROR (> 1D)

(n = 70)

- Hyperopia (long-sighted)
(2 x normal population) - 30 % (21)
- Myopia (short-sighted) - 3 % (2)
- Astigmatism (non-spherical) - 6 % (4)
- Anisometropia (diff refn b/n eyes) - 7 % (5)

NYSTAGMUS ('Wobbly eyes')

- 4 % (3)



Functional vision - Treatment

- Spectacles - lenses, prisms, tints
- Exercises - to help convergence, muscle strength, lazy eye (amblyopia)
- Visual hygiene advice - environmental modification, posture, lighting



Perceptual vision - assessment

- How visual info is processed (perceived)
- Standardised neuro-developmental tests
eg Piaget - R / L awareness
- Gardner - reversal recognition
- Visual motor, visual spatial, visual memory,
eye movement and visual auditory



Perceptual vision - assessment

- Visual spatial skills - R/L up, down, reversals
- Visual motor skills - ability to copy, catch ball
- Visual auditory skills - phonemic awareness
- Visual memory - visualizing, visual span
- required for spelling, sight words, math and abstract concepts
- Eye movements - pursuit (for tracking a ball), saccade (hopping type for reading words), fixation



Perceptual vision - assessment

TEST BATTERY

- Write name and numbers 1 - 10
- Visual spatial - Piaget, Bilateral integration, Gardner reversal
- Visual analysis – TVPS, MVPT
- Visual motor - VMI, TVAS
- Visual memory - VADS
- Auditory analysis - TAAS



Perceptual vision assessment

TEST

OCULOMOTOR

- pursuits, saccades, fixation Attention related

VISUAL SPATIAL

- Piaget R / L awareness 1/6 age appropriate
- Bilateral integration 4/5 unable (all M)
- Gardner reversal freq 5/5 unable

VISUAL ANALYSIS

- TVPS (Gardner)

RESULT

Generally poor

1/6 age appropriate

4/5 unable (all M)

5/5 unable

3/4 VD strength

1/4 VC “





Perceptual vision - assessment

VISUAL MOTOR

- VMI - 20 yo M achieved 4.0 yo level
- 5.5 yo F achieved 4.9 yo level
- TVAS - range prep to grade 3 level

AUDITORY ANALYSIS

- TAAS - some are grade appropriate



Perceptual vision - Treatment

- Vision therapy is an optometric intervention designed to improve co-ordination, efficiency and processing of the visual system.
- In office and home based exercises are prescribed
- Computer programs specific for visual processing

www.homevisiontherapy.com

www.covd.org



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Kirshner Body alphabet



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KIRSHNER BODY ALPHABET

a b c d e

f g h i j k

l m n o p q

r s t u v

w x y z

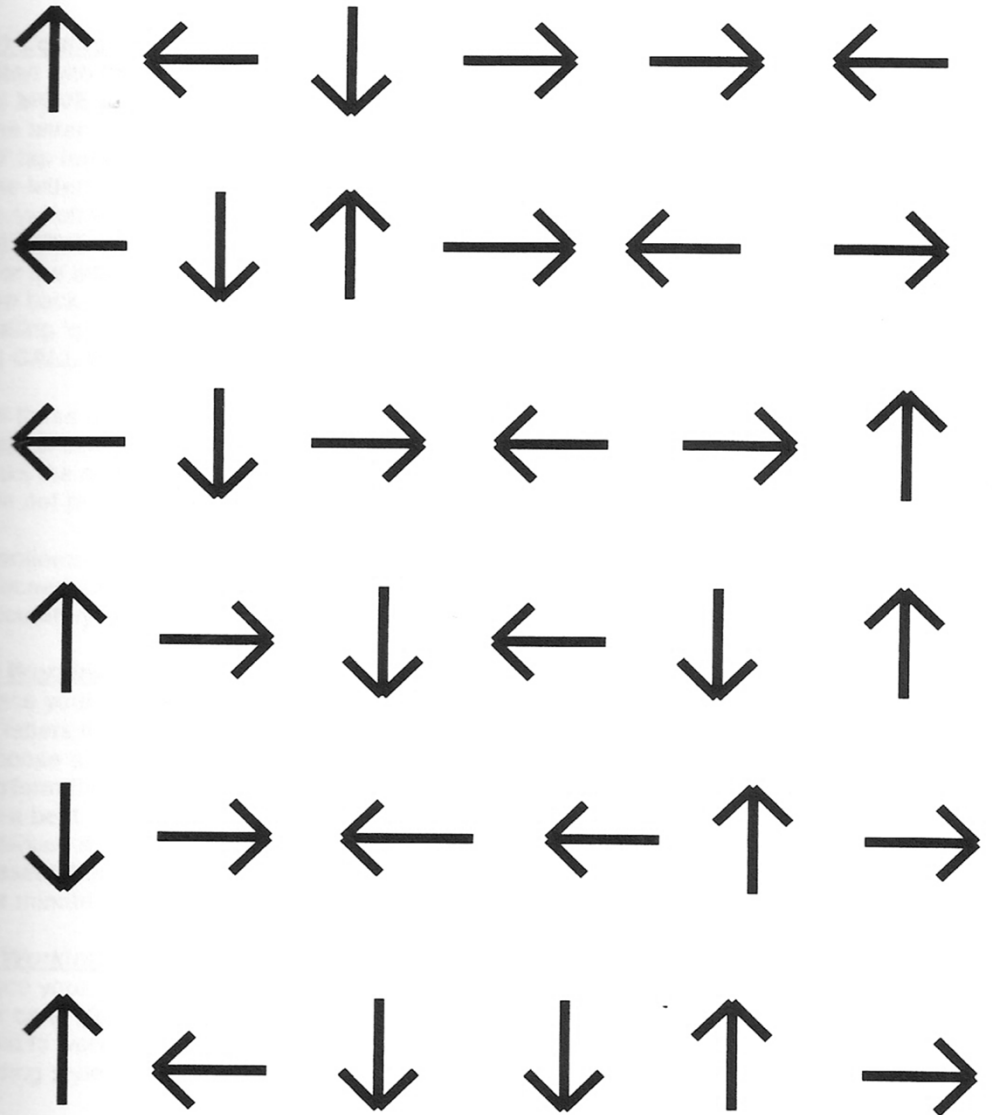


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Kirshner Arrows



Arrow Chart





Conclusion

- Both functional and perceptual assessment
- 2 yearly minimum eye checks recommended
- Remove visual / sensory obstacles to learning
- Most FXS have visual processing problems
- Visual discrimination relative strength in some
- Vision therapy important in management
- Improvement in visual processing can affect reading, writing and spelling.