Amblyopia: Evidence based Management



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Education

B.Optom – IOM, Nepal (2003)

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Work





See the world better

Learning objectives

- → Understand the basic pathophysiology of vision impairment in amblyopia
- → Recognise different visual functions affected in amblyopia
- → Be able to create management plan based on current evidence
- → Effectiveness of newer treatment methods for amblyopia



What is the site of defect in amblyopia?

(i) Start presenting to display the poll results on this slide.

•David Hubel and Torsten Wiesel worked on visual development since 1959

• Nobel prize for medicine in 1981

 For characterizing the functional organization of the primary visual cortex

•Studied effect of visual deprivation early in the life of cats and later monkeys





Ocular dominance



Monocular occlusion

Induced strabismus





Binocular Dominance Category



Binocular Dominance Category



What aspects of vision are affected in amblyopia?

(i) Start presenting to display the poll results on this slide.

Characteristic amblyopic contrast sensitivity data from three macaque monkeys.



Lynne Kiorpes J. Neurosci. 2016;36:11384-11393



Sensitivity Spatial frequency (cycles/degree

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Other visual functions









Give the ages of the people. Sumilie v been doin



Remember positions of people and objects in the room.



Estimate how long the visitor had been away from the family

Estimate material circumstances of the family

Remember the clothes worn by the people.

> 3 min. recordings of the same

subject





Barrett et al. (2003)



which picture ?

weak signal...







blur...





spatial distortions...





Clinical investigation





Image: Prof. A J Simmers

Treatment







Amblyopia Treatment Study (ATS)



Images: Wikipedia

Refractive correction





Chen AM, Cotter SA. The Amblyopia Treatment Studies: Implications for Clinical Practice. Advances in ophthalmology and optometry. 2016;1(1):287-305. doi:10.1016/j.yaoo.2016.03.007.

Α

Strabismic Amblyopia

18

18

Weeks

9

27

36

45

Weeks

Combined-Mechanism Amblyopia

27

36

45

9



ARVO. JOURNALS

From: Treatment Dose-Response in Amblyopia Therapy: The Monitored Occlusion Treatment of Amblyopia Study (MOTAS) Invest. Ophthalmol. Vis. Sci.. 2004;45(9):3048-3054. doi:10.1167/iovs.04-0250



Date of download: 6/11/2020

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Severe amblyopia

Moderate amblyopia



VA = 6/30 - 6/120, *n* = 175 (< 7 years)

VA = 6/12 - 6/24, n = 189 (< 7 years)

Summary - patching

- → Children < 7 with VA 6/30 to 6/120
 - ◆ Patching 6 hrs vs. full waking hrs no difference
- → Children < 7 with VA 6/12 to 6/24
 ◆ Patching 2 hrs vs. 6 hrs no difference
- → Children < 8 with VA 6/12 6/120
 - Patching 2 hrs better VA improvement than specs alone
- → Children 7 18 years
 - Patching 2 6 hrs daily improves VA by at least 2 lines if no h/o previous patching, more variant if already treated

Atropine



VA = 6/12 - 6/30, *n* = 419 (< 7 years), 6hr or more patching vs. Atropine VA = 6/12 - 6/30, *n* = 168 (< 7 years) Daily vs. Weekend Atropine



Near active treatment







Amblyopic Eye Visual Acuity at 8-Week Outcome Exam

n = 425 (3-7 yrs) VA: 6/12 - 6/120

Summary - atropine/ near activities

- → Trial of 6-8 hours/ day patching vs. atropine Similar gains for moderate amblyopia
- → Atropine has a higher degree of acceptance and concordance
- → Reduced atropine scheduling (weekend) appears as effective as daily

→ <u>No evidence for children with severe amblyopia</u>

Near

- \rightarrow No concrete evidence
- → "Common near activities" not VT aimed at accommodation, anti suppression etc.



What is the max age that you have Rxed for amblyopia?

(i) Start presenting to display the poll results on this slide.

Critical period - What age to treat?

- → In the sutured monkeys reverse suturing 3 8 wks, improved vision but not after 1 year.
- → Traditional critical period of development: 7 9 years
- → PEDIG study: upto 18 years if no prev. Patching
- → Show improvement even in late 60s after onset of AMD



New treatment





Perceptual learning

- → Repeated practice of the same task results in improved performance visual plasticity.
- → Transfer of learning practice on specific tasks (vernier <u>acuity</u>) can improve visual performance Snellen acuity









Binocular iPad Game vs Patching for Treatment of Amblyopia in Children - A Randomized Clinical Trial

JAMA Ophthalmol. 2016;134(12):1402-1408. doi:10.1001/jamaophthalmol.2016.4224







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