

# Answers to Audience Questions - WSPOS Worldwide Webinar 16: Amblyopia - How and When



## WWW 16 Panellists



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### 1. How do you maintain attained iso visual acuity after successful amblyopia treatment?

AH: Intermittent monitoring. If they have regressed previously, I might carry on very intermittent occlusion (an hour or two a week) until I was sure it was stable.

CM: With gradual and controlled reduction of the treatment, for example: if the patient had 1 hour of patch per day, I leave it with 1 hour 3 times a week during a month. I do a check and if the visual acuity was maintained, I lower patches to 2 times a week. I keep checking and going down like this until I suspend the treatment. If at any time I detect worsening visual acuity, I return to the previous treatment.

SC: Best way is attainment of normal binocular vision. I do not worry about anisometropic amblyopes who have random dot stereopsis post-treatment. If have constant unilateral strabismus, I can do some limited part-time patching, decreasing patching dosage over time given no regression of VA.

YM: repeat examination every 6 months. If I see regression, I will prescribe patching for 30 min a day.

### 2. How do you plan for very dense amblyopes?

AH: I very rarely see them because, with screening, they are picked up early and usually do well. If they were older, I would treat them with occlusion / atropine if, after discussion, they wanted to pursue treatment.

CM: I start with little patch time and very bright stimuli, maybe a big toy, for 10 minutes 2 or 3 times a day. It is not about putting the patch on and letting the child fall asleep; it is about parents playing with the child with big, bright and eye-catching toys while the child is wearing the patch. This usually works, so I keep patching for 30 to 60 continuous minutes.

SC: I do not like having to treat "very dense" amblyopia. Optimal refractive correction and part-time patching works well for 20/100-20/400 strabismic or combined-mechanism amblyopia. Dense deprivation amblyopia is always more difficult to treat in my opinion. Fortunately, I do not see many of these patients.

YM: If there is hypermetropia I give plano lens and atropine 1% twice weekly.

### 3. Is there global variations in the treatment plan?

AH: Countries have a national consensus, and some have formal guidelines. I think they do probably differ between countries. In the UK many people are wary of treating older children or teenagers.

CM: I believe that each country does what works best for them according to their resources.

SC: It is likely that there are treatment differences because of differences in training, cultural differences, or differences in practice patterns. There are also differences in the allowed scope of practice for optometrists in different countries.

YM: Yes. Atropine is problematic in sunny countries

4. Larger degrees of strabismus are more difficult to tackle with patching; how would the panel address this?

AH: Not sure I agree unless they have a longstanding esotropia and eccentric fixation, so cannot fix with the amblyopic eye. Any strabismus with anisometropia will lead to mixed aetiology amblyopia, which is more resistant to treatment.

CM: Of course, I use very important stimuli, even cartoons or video games.

LK: if glasses / patching are working, continue. If not, realign surgically and glasses / patching may become more effective

SC: I don't understand. The depth of amblyopia does not correlate with the size of strabismus. If you are referring to patching as a mode of treatment for IXT, there is no good evidence that this form of treatment works.

YM: Patching rarely cures large angle strabismus. Other treatment options like surgery are advised.

5. How often should we follow up a patient who has been advised patching?

AH: My preference is 6-8 weeks, although in many countries that is not possible due to distance etc. A large part of successful treatment is to keep everyone motivated and counselled about difficulties. An appointment just around the corner keeps people's mind's focused.

CM: I usually do a first check one month after of prescribing the patches. Then according on the results every 2 or 3 months.

LK: when I was a student, 1 cycle of treatment before review was 1 week/year of age. I still find that useful

SC: Depends on how far they have to travel and how good you expect adherence with treatment to be. Approximately, 6-10-week intervals in the beginning.

YM: First visit after 2 months to avoid compliance problems. Every 4-6 months afterwards.

6. I think implementing photo screening with immunization visits in Saudi Arabia is better. Like in 12 m, 24 m and 4 years well baby visits; What does the panel feel about this?

AH: It is always good to screen at a time when the maximum number of children are seen. Photoscreening in infancy and toddlers has high untestable rates and many children will emmetropise out of a problem. If referred, few will get immediate treatment (Halegoua J, Schwartz RH. Vision photoscreening of infants and young children in a primary care pediatric office: can it identify asymptomatic treatable amblyopic risk factors? Clinical pediatrics. 2015;54(1):33-9.). You will, however, pick up severe problems earlier. Screening at this age will mean many will be referred, then need observation for many years. Do you have the health infrastructure and parental motivation for that to deal with many referrals? 4 years is a good time to screen – and you could test vision too (or instead). If you are setting up a new service, please do a comparative trial of the outcomes of two methods, it is desperately needed!

CM: It is a good idea, although the ideal would be a control at those ages with the pediatric ophthalmologist. In this way, ocular diseases could be found earlier.

LK: sounds good. Is there any data?

SC: Sounds like a great idea; there are other countries in Europe that do that. For example, Groenewoud *JH, et al. Rotterdam Amblyopia Screening Effectiveness Study: detection and causes of amblyopia in a large birth cohort. Invest Ophthalmol Vis Sci. 2010;51(7):3476-3484. doi:10.1167/iovs.08-3352* and another paper where they determine that they could skip the 24-month visit. “*The effect of omitting an early population-based vision screen in the Netherlands: A micro-simulation model approach by F Sloot et al is another good paper on this.*”

YM: Agree. Babies show more for immunizations than for vision screening therefore it's better to combine the two.

7. Do they get reverse amblyopia after using atropine as treatment for long?

AH: The only time I have seen severe reverse amblyopia is with atropine occlusion – but mainly in poorly compliant families. As the treatment is easy, they think it's OK to miss appointments, so go on too long.

CM: I almost do not prescribe atropine because in my experience it works less than patches. The times I have used Atropine and it worked, instead of suspending it I changed it to patches for a while.

LK: rare, but first described over 100 years ago

SC: This is very uncommon. Basically, we have not had any in the ATS studies (maybe a temporary 1-line decrease), but there ARE cases in the literature. The paper I can think of had 2 cases of reverse amblyopia from treatment with combined atropine and optical penalization, and patients did not follow up with the treating ophthalmologist as requested (*Morrison D. J Pediatr Ophthalmol Strabismus 2005;42:52-53*).

YM: only if you give plano lens. This is why you need to monitor closely these children.

8. Susan: if you can treat amblyopia up to 17 years when should you stop maintenance patching or stop following the patient?

CM: I think that as in children, after treatment when visual acuity has already improved, treatment discontinuation should be gradual.

SC: If child has anisometropic amblyopia I keep them in their refractive correction and don't worry about regression much, particularly if have stereo after treatment. For strabismic or combined-mechanism amblyopia, PEDIG had very little regression in 7-12-year olds over a 1-year period (only 7% of the kids regressed) (*Arch Ophthalmol. 2007;125:655-659*). Sometimes I just have them patch for a few hours per week and if VA is maintained, and gradually reduce the patching over time.

Please note that all PEDIG publications can be found and downloaded at no cost at <https://public.jaeb.org/pedig/pubs>

YM: When you reach plato.

9. From PEDIG study, we can see active patching can result 53% successful. Is there any option that we can do like give a medication that can get the better result?

CM: I don't usually use oral medication in children. I add visual stimulation when the patch fails.

LK: no reliable data yet

SC: Nothing that I know of yet.

YM: Levodopa or citicoline were used in the past but the effect did not last.

10. Has anyone here have experience in the use of the new hybrid MRI / pet to study amblyopia?

AH: Sorry, no.

CM: Sorry, I have no experience

KK: While I know research groups have used functional MRI (i.e. Farivar et al, 2019, NeuroImage) and PET (most recent Mizoguchi et al, 2005, Graefes Arch Clin Exp Ophthalmol) separately to study amblyopia, I'm not aware of any hybrid MRI/PET studies of amblyopia.

SC: No experience

YM: no

11. When do we start patching? Is when the patient comes we can do patching with the spectacle prescribing? When after we give the correction?

AH: As Sue and the UK MOTAS studies say, definitely give glasses a good period to work first.

CM: In children is often too much to prescribe glasses and patches at the same time, I usually prescribe the glasses and later (1 month) the patches.

LK: give glasses first

SC: You can give glasses and patching simultaneously or prescribe a refractive correction and patching sequentially. I do it sequentially because it appears to be easier for the family. PEDIG is just about to start a clinical trial (ATS22) to answer this question.

YM: for very mild amblyopia we can try only glasses but usually I start patching in combination with the glasses. I usually give the child one week to adjust to the glasses and then start patching.

12. When do u stop patching? What is the deadline?

AH: When VA has stopped improving after 3 months of good compliance. After age 7 I get much more cautious and monitor suppression carefully

CM: There is no age. When the patient improves.

LK: when there has been no improvement after 2 cycles of treatment, and you have re-checked the refraction and retina/disc exam. If possible, do an OCT macula to rule out retinoschisis

SC: When I feel that there will be no more improvement. If the patient still has residual amblyopia, I always recheck my cycloplegic refraction and eye health, and also patient adherence with patching. If those are okay, then I may increase the hours of patching, or switch to atropine, or sometimes do both atropine and patching at the same time. If they have anisometropic amblyopia, I might prescribe active vision therapy that includes binocular anti-suppression therapy. If I have considered all of that, and the patient has not made an improvement for 2 -3 subsequent office visits, then we stop.

YM: I stop patching when I reach a plato with good vision (6/7.5 or better) or if I see no improvement after at least 6 months of maximal patching.

13. Does anyone from the panel have experience with amblys system?

AH: No

CM: Sorry, I have no experience.

KK: I have not heard of this and couldn't find it online. But I think the question may be referring the Ambly-Z Electronic Eye Occluder glasses. A pilot study of these glasses show significant improvement from baseline, similar to the improvement seen with patching (Wang et al., 2016, J AAPOS)

SC: I don't, but I have a colleague (Jingyun Wang, PhD, SUNY College of Optometry) who has does research evaluating the system and she likes it. Here is her publication. Jingyun Wang, et al. A pilot randomized clinical trial of intermittent occlusion therapy liquid crystal glasses versus traditional patching for treatment of moderate unilateral amblyopia. J AAPOS 2016, 20: (4): 326-331. Also: Wang J. Investigative Ophthalmology & Visual Science July 2019, Vol.60, 1029

YM: no

14. During the follow up visits do we test for VA only or other aspects of BSV also tested?

AH: I'm an orthoptist, I always assess BV, any deviation and suppression!

CM: I check vision acuity from far and near, stereopsis if applicable and the complete examination.

LK: I do several tests @ each visit.

SC: I do a cover test and stereopsis and sometimes a Worth Dot test, but not at every visit. And sometimes I check the refraction. There are some follow-up visits that I only measure VA and others where I might do more testing than already mentioned as it depends on the case.

YM: I test vision only

15. How about give citicholine or levodopa for treatment amblyopia?

AH: I don't have that option and I'm not convinced anyway

CM: No, I never used it.

LK: no reliable data.

SC: For children 7 to 12 years of age with residual amblyopia after patching therapy, oral levodopa while continuing to patch 2 hours daily did not produce a clinically or statistically meaningful improvement in VA compared with placebo and patching. This is the conclusion from a PEDIG randomized trial (PEDIG. Ophthalmology 2015;122:874-881)

YM: effect doesn't last so the treatment was abandoned.

16. Do you study the stereopsis before patching?

AH: Yes – and throughout. It is important to use the same test, and I would use something more naturalistic like a Frisby test rather than a random dot stereogram, because so many amblyopes would fail it.

CM: Yes, If possible of course.

LK: yes.

SC: Yes - always

YM: No

17. Don't you find problems in near vision in schoolchildren treated with atropine?

AH: In the UK, most children being treated are under 6 years of age, so school print is large and it does not seem an issue.

CM: Yes, that's way I prefer patches, they can be removing during the school.

LK: if you do, use it once a week, on the evening of the last day of the week

SC: I usually reserve atropine for preschool-age children because I worry about them being blurred at near in school. However, if amblyopia is not particularly deep, then they might be okay at school. PEDIG did an RCT comparing 2 hours of patching versus 1% atropine in 7-12 year old children. The study found that treatment with atropine or patching led to similar degrees of improvement among these 7- to 12-year-olds with moderate amblyopia. Note that, "If the participant was unable to read grade-appropriate print, the study paid for reading glasses to be used during school and for homework." Surprisingly (to me), "only 11 children (12%) had difficulty seeing grade-appropriate print and were prescribed reading glasses." (Arch Ophthalmol 2008;126(12):1634-1642)

I was very surprised that not more children required reading glasses. In clinical practice, most parents of grade school children worry about blur from atropine and school and often choose patching (rather than atropine) because of that.

YM: sure.

18. do you give choline treatment in your country for amblyopic patient? How are the results?

AH: Not aware of anyone in the UK doing it

CM: Sorry, I have never used it.

SC: I do not

YM: if you mean citicoline – no.

19. How many adults you thought they have amblyopia and discovered they just have High Orders Aberration (HOAs) "Aberropia"; false amblyopia?!

AH: I do not assess higher order aberrations, but I do think many children have ametropic amblyopia due to high uncorrected bilateral errors and astigmatism, which improves slowly with glasses alone.

CM: Yes, many times, it is very important to do the complete exam including refraction.

LK: I have looked for this and never found it

SC: I do not assess HOA's so this has not been an experience of mine.

20. Is anyone using fluoxetine to help older patients in treatment of amblyopia, helping the CNS become "plastic" again?

AH: No

CM: Sorry, I have never used it.

SC: no one that I know of.

YM: not yet

21. There are many Mobile apps that have been suggested to treatment of amblyopia. Does anyone use it?

AH: There are the scientific studies of special devices and apps, but any task involving a child looking for something just a bit too small to see, will make sure they accommodate and work at their threshold during treatment e.g. Where's Wally (Waldo). It makes them look for a better image.

CM: I don't know them, but they could be very useful.

KK: Many Mobil apps and online games are advertised as being able to treat amblyopia but have not been properly studied using Randomized Clinical Trials or with published results in peer-reviewed academic journals. Patients have to be very careful – they should only use treatments approved by their doctors.

SC: I do not use any

YM: Not yet

22. Will this software revival vision work on CVI patients also like especially on children?

CM: I don't try it yet.

SC: There is no evidence for this, and it has not been studied as far as I know.

YM: it is not useful in children because it is too complicated and boring for children below 10 years

23. Does anyone consider refractive surgery for anisometropic amblyopia in children?

AH: No personal experience. I am not sure it is necessary for the amblyopia response if not excessive and fully corrected.

CM: I think it might be a good idea, especially in older children who do not require general anesthesia.

KK: Some studies show that refractive surgery may be useful for treating amblyopia in those who are resistant to conventional treatments. E.g., Astel et al., 2007, 2010, J Cataract Refract Surg; Paysee et al., 2006, Ophthalmology

LK: there are a few enthusiasts, with some good results

SC: I do not, but there are some pediatric ophthalmologists in the US who do this – but usually only after “conventional” treatment with patching and optical correction with contact lenses have been attempted and treatment has failed. Often a “last-ditch” effort or in special circumstances. Not many US eye care professionals do this in the US.

YM: Only for children who are not willing to wear glasses (developmental delay etc.)

24. In anisometropic amblyopia, whether the binocular status improvement after occlusion therapy will be occurred in accordance with VA improvement?

AH: Usually if there is no strabismus

CM: Yes, I think so.

KK: PEDIG studies show that even if normal visual acuity is attained with treatment in children with anisometropia, there are still many who have impaired stereoacuity. E.g. Wallace et al, 2011, J AAPOS

SC: Sometimes yes, but not all of the time.

25. What is the suggested first line treatment in isoametropic binocular amblyopia after refractive correction in the light of new strategies?

AH: I would just make sure the glasses were on full-time. As mentioned in my answer to Q 21 above, I think a detailed task will make sure they accommodate properly. Uncorrected hyperopes systematically under-accommodate, and they often don't bother even when corrected bjo.2009.177378 Published Online First: 5 July 2010 doi:10.1136/bjo.2009.177378

CM: I still prescribe 1 by 1 patches and visual stimulation. I also think that the new strategies are very promising.

SC: I do nothing in particular other than optimal refractive correction –they usually get better over time with their optimal refractive correction. (Wallace DK et al. Treatment of bilateral refractive amblyopia in children three to less than 10 years of age. Am J Ophthalmol 2007 Oct;114(4):487-96)

YM: I would still start with patching

26. Is binocular treatment additional to patching?

CM: I think that possibly in the future it will replace the patches, but only if there is a possibility of binocular vision.

KK: So far, research shows that binocular treatment is effective in treating amblyopia in the short term (4-8 weeks). Binocular treatment could be used as an alternative to patching, as a first line of treatment, or if children need a break from patching.

SC: It can be added, or it can be done by itself. The problem (unfortunately) so far is that its effectiveness has yet to be demonstrated in clinical trials. That said, the concept makes total sense to me.

27. There are quite a few free apps for lazy eye. Are they recommended? How do we get the right contrast of coloured glasses for any of these games?

CM: I have no experience with them.

KK: Many Mobil apps and online games are advertised as being able to treat amblyopia but have not been properly studied using Randomized Clinical Trials or with published results in peer-reviewed academic journals. Patients have to be very careful – they should only use treatments approved by their doctors.

SC: I do not use them. If your patient has strabismic amblyopia, I would not use binocular therapy apps because of the possibility of diplopia.

28. How do you maintain interest in dichoptic games for subsequent reviews?

CM: Sometimes is not possible.

KK: You may be able to maintain interest in dichoptic treatment by providing multiple games, and by using contrast rebalanced movies and cartoons that are age-appropriate. We are researching these methods at the Retina Foundation of the Southwest.

SC: I don't use these clinically.

29. What is your thought about permanent diplopia as a result of anti-suppression training?

AH: I have seen it happen in more cases than I would have liked. Fortunately, it is rare. They are very unhappy people. It does happen, probably in patients with strabismus due to a primary BV maldevelopment who have never fused e.g. infantile ET and DVD. Suppression can be a friend to strabismic children, so only eliminate it if you are sure they have the potential for fusion.

CM: Luckily I have not had patients like this because it is a terrible complication.

KK: Permanent diplopia has never been an issue in the contrast rebalancing studies conducted in children, although we minimize risk for diplopia by only enrolling children if their misalignment is no larger than 4 prism diopters.

SC: Rare but possible. More likely with older strabismic patients so need to be somewhat careful in these cases.

YM: very rare but I have seen this.

30. What about the use of Levodopamine?

CM: sorry, I have not had experience

SC: For children 7 to 12 years of age with residual amblyopia after patching therapy, oral levodopa while continuing to patch 2 hours daily does not produce a clinically or statistically meaningful improvement in VA compared with placebo and patching. This is the conclusion from a PEDIG randomized trial (PEDIG. Ophthalmology 2015;122:874-881)

YM: since the effect is not sustainable it was abandoned.

31. Are VR games good for treating amblyopia?

AH: I would imagine not much more than everyday life. In normal VR games they would probably just suppress the amblyopic eye. I am sure a clever adaption reducing contrast would be possible though.

CM: I have no experience yet, but they seem very promising

KK: Research groups are studying VR as a means of amblyopia treatment that show promising results. However, many Mobil apps and online games are advertised as being able to treat amblyopia but have not been properly studied using Randomized Clinical Trials or with published results in peer-reviewed academic journals. Patients have to be very careful – they should only use treatments approved by their doctors.

SC: Not sure. Some people are using a few of these programs in the US, but there are no controlled trials showing its effectiveness for amblyopia treatment. The systems I have seen are intriguing though, and patients like it.

YM: there are several studies that suggest that.

32. What is the fluoxetine dosage?

CM: I have never used fluoxetine so I don't know.

SC: I don't use it and I do not know anyone who does. There are only a few studies that have evaluated this treatment and with variable success. The most recent that I know of is a study by Lagas et al. *The Effect of Combined Patching*

YM: 0.5 mg/kg/day

33. If we discontinue the patching, is it possible to lose vision in amblyopic eye?

AH: VA can regress after stopping occlusion. In my experience it is often children with poorest initial VA, who have a lot of crowding.

CM: Yes of course, that is why visual acuity checks should be done and treatment should be restarted if we see worsening. If you have been checking for several months and there is no deterioration, it is possible to assume that visual acuity will remain the same in the future.

SC: Yes. My clinical impression is that it is more likely if the patient still has a constant strabismus and the patient is younger.

YM: deterioration is possible

34. How can RevitalVision be used for treatment of presbyopia?

CM: Sorry I have no experience with presbyopia.

SC: I have no idea. The website says it can be used for amblyopia, presbyopia, post cataract surgery, myopia, sports vision, after Lasik, and to improve vision in people experiencing poor vision due to various eye disease, such as retinal diseases, keratoconus, nystagmus and more. I have no experience with this system.

YM: It was proven as effective in presbyopia with binocular viewing conditions

35. Do you call it as amblyopia if it comes with organic diseases?

AH: I would say if the disease is not of the retina or visual pathway, but the disease has prevented them getting a clear image in the critical period e.g. ptosis, cataract, then what is left after the problem has been minimised is amblyopia.

CM: The definition is not exact but I use it.

SC: This is tricky in terms of semantics. It is only when the eye disease causes “complete or partial obstruction of the visual axis, resulting in a degraded retinal image” that I would call the vision loss amblyopia – in this case, deprivation amblyopia. There can, however, be true strabismic or anisometropic amblyopia that is “superimposed” on the VA loss from the organic disease if the patient also has strabismus and/or anisometropia in addition to organic disease.

YM: If the organic disease degrades the visual stimulus (Nystagmus, cataract, etc.)

36. Anyone using bangarter filters as treatment option as well?

AH: Not much direct experience, but it is partial occlusion. There is an argument that they reinforce suppression because the patient remains binocular – but in view of recent research, I am not sure that argument stands anymore!

CM: No, I have not used them.

SC: They are indeed an option and a PEDIG trial found the following when Bangerter foils were compared with 2 hours of patching. “Because the average difference in visual acuity improvement between Bangerter filters and patching was

less than half a line, and there was lower burden of treatment on the child and family, Bangerter filter treatment is a reasonable option to consider for initial treatment of moderate amblyopia.” (Ophthalmology 2010;117:998–1004)

YM: Yes, it's possible to use as an alternative to atropine

37. How soon after keratoplasty do we start patching?

CM: If you have performed keratoplasty in one eye and the fellow eye is a healthy eye, you must start as soon as the inflammation goes down, but if the involvement is bilateral, patches are not necessary but visual stimulation is required.

YM: As soon as the graft is relatively clear

38. Role of near vision work with patching in amblyopia? Any difference with grades of amblyopia?

AH: See answers to 21 & 25 above

CM: It is very important. In my experience if the patient uses the patch while working with near vision it usually improves faster and faster. Deeper amblyopia may need more work.

KK: PEDIG has shown no difference in visual acuity improvement between near versus distance activities (PEDIG 2008, Ophthalmology).

SC: There was a PEDIG trial that found, “Performing common near activities does not improve visual acuity outcome when treating anisometric, strabismic, or combined amblyopia with 2 hours of daily patching”. (Ophthalmology 2008;115:2071–2078). That said, I think many eye docs still tell parents to do near activities, if possible.

YM: Still to be evaluated

39. In which specific cases do they indicate binocular treatment and from what age?

CM: I have not used a binocular treatment because I do not have available in my country yet.

KK: Researchers are evaluating binocular treatment in all ages. There is some evidence that it works best in younger children.

SC: I think that binocular treatment makes the most sense and is easiest to do in patients with anisometric amblyopia (no tropia). I would not limit it based on age as long as the child is old enough to do the treatment.

YM: With no improvement or no compliance with patching

40. With microtropia in one eye and best corrected visual acuity 6/6P, and affected stereoacuity (only gross stereopsis present), patient is 10 years old; what would be choice of treatment?

AH: If the 6/6p is the amblyopic eye then nothing! A good outcome, and the child will not miss the loss of SV. Chances of improving it are slim due to the microtopia suppression. I remain to be convinced that very subtle differences in fine motor skills have QALY value

CM: In this cases I think that patches could be the best option.

SC: If the microtropia is an esotropia – perhaps divergence therapy in the major amblyoscope for the esotropia.

41. What's the maximum age for starting to treat amblyopia?

AH: I have a long discussion in parents of children over 7, and probably not offer treatment for strabismic amblyopia, or proceed with caution. Anisometric or microtropic, maybe with caution.

CM: I strongly consider that treatment should be offered at any age, but it is true that the best results will be obtained in children under 5 to 7 years old.

KK: Any age, especially if they've never been treated for amblyopia before.

SC: No maximum age – although amblyopia seems to be more difficult to treat in adults.

YM: Any age if you use RevitalVision. For patching - 20

42. How often do you use penalisation in amblyopia treatment?

AH: Works well with atropine, but I would only use it to further blur the fixing eye by taking the correction away, especially significantly hyperopic children who will not wear glasses OR a patch.

CM: I think that Atropine is much less effective than patches. In addition, in school-aged children, performance in school may decrease. So I prefer patches and only offer Atropine in preschool children when there has been no adherence to treatment. In school age children if I should try, I do it during the summer holidays.

SC: Because I usually start with 2 hours of patching, many families prefer that treatment option to atropine (2 hours is easy and they don't have to worry about blurred near vision from atropine in school). But I offer both options to families.

YM: When there is no compliance and for dense amblyopia with hypermetropia (plano lens)

43. What is the oldest child that you treated successfully?

CM: I currently only see pediatric patients, but in the past I have seen adults in their 30s improve the visual acuity of the amblyopic eye following an accident in the healthy eye.

SC: My oldest patients are adults - 35, 45, 55 years old

YM: with patching - 16

44. What do you think about neurovision?

KK: NeuroVision is a computer based treatment that uses perceptual learning to improve vision (Polat et al., 2004, Proc Natl Acad Sci U S A).

SC: I am not sure. I am looking on their website at the studies they have to support their treatment. I found a clinical study for amblyopia, but patients were not randomized. But I have not read all of the studies on their website – this would be the best thing to do. The treatment is based on “perceptual learning” for amblyopia treatment, which has been shown to be effective. Here is a good paper on perceptual learning. (Levi D. Li R. Perceptual learning as a potential treatment for amblyopia: A mini-review. Vision Research Volume 49, Issue 21, 29 October 2009, Pages 2535-2549).

YM: I use it since 15 years and very satisfied

45. What is your idea for treatment of adult amblyopia?

AH: Prefer not to. I'd really want to know the motivation for seeking treatment before attempting.

CM: As I said, I no longer see adult patients, however, I think that a good option may be to start with daily patches for periods of 30/45 minutes while using cell phone or watching series and waiting for the results.

SC: Much the same as for children except I think that they often benefit from active vision therapy as well.

YM: RevitalVision

46. Some VA tests will identify children with significant ocular pathology; this may not be picked up by photo-screening instrument. How does one proceed in such a case?

AH: That is a major problem with photoscreening! Parents need to be aware that photoscreening is not infallible

CM: In Argentina it is recommended that all children be examined by pediatric ophthalmologist at 1, 3 and 6 years with a complete examination to detect pathology before leukocoria or strabismus.

YM: Photoscreening is only one option. Good screening should combine photoscreening and VA test.

47. Do you ever get equal acuity?

AH: Yes!

CM: No, of course not always. If there is an organic disease, many times only 1 line is improved or even only the visual field. On the other hand, in cases of strabismus or anisometropia, one should try to achieve the same acuity in both eyes.

KK: With contrast rebalancing binocular treatment, we see almost 40% of children attain normal vision acuity.

SC: Yes, and that makes me very happy!

YM: Yes

LK: yes, but even if the patient sees 20/20 with the previously amblyopic eye, the quality of the 20/20 is usually not as good as the previously non-amblyopic eye

48. What are the tests we should do during the follow up visits for Amblyopia other than VA?

AH: Cover testing looking for decompensation. BV tests looking for improvement. Angle measurement looking for increase in angle and loss of peripheral fusion. In all children over 6 I would use a Bagolini Filter Bar to assess change in density of suppression. And check they don't get diplopia as they take a patch off.

CM: I check vision acuity from far and near, stereopsis if applicable and the complete examination.

KK: Stereoacuity should also be tested. Poor stereoacuity is related to fine motor impairments.

SC: Not every single visit, but some visits – stereopsis, cover testing, refraction, Worth dot test; when applicable, comprehensive eye exam

YM: cover test to pick up microtropia

49. Does atropine work for aphakic amblyopes?

CM: I don't think so. If you have only one aphakic eye nothing is very effective really. I prefer to prescribe patches for short but intense periods than atropine.

SC: I have no experience here and I am not aware of any literature on this topic.

YM: no

50. How well did the PEDIG studies translate to real life scenarios of patients?

AH: Studies look at means, so help us know what usually happens, draw up general guidelines and give our best advice. Patients don't read the papers! They may be right at the tails of the response distributions and the "best" treatment may work brilliantly, or not at all. Children live in families with lives, and sometimes treating amblyopia a non-optimal way, or deciding not to treat at all, may be the right thing to do.

CM: I think that all studies let us know what works and in what percentage. It allows us to predict results. However, each patient may respond differently, so each ophthalmologist will choose the treatment based on the evidence and their own experience.

SC: Very good translation, in my opinion.

YM: very well

51. Susan: Could you please share some good suggestions for children after keratoplasty, who had amblyopia?

CM: If you have performed unilateral keratoplasty and the fellow eye is a healthy eye, you must start with patches as soon as possible and be careful with refraction. If the involvement it is bilateral, maybe patches are not necessary but visual stimulation is required

SC: Sorry, I have not had experience with this type of amblyopic patient.

52. Dear Susan Cotter very heartening to see your slides about atropine penalization. In our experience too it works for severe amblyopia, fixation switch to amblyopia eye is not necessary. My question is many people believe that atropine penalization is less effective for anisometropia than anisohypermetropia. What's your experience?

CM: I belong this group: In my experience atropine is less effective than patches.

SC: Did you mean less for anisomyopia than anisohyperopia? If so, I understand because the kids can remove their glasses. If they do not remove their glasses, then I would think that the prognosis would be the same. Or are you asking what do I think other eye care provides "believe"? I am not sure what everybody believes now that there are randomized controlled trials that evaluated atropine and found results to be comparable to patching. Certainly, before the trials, many believed that atropine was less effective. Have the clinical trial results convinced all of these people that their clinical impression was not true? I don't know. It is often difficult to change a doctor's practice patterns.

53. How does one get the revival vision technology? Can it be used in children less than 7 years?

CM: Sorry I have no experience with this technology.

SC: I do not use it, but I think it would be a bit boring for children younger than 7 years. And I don't think you would need it for young kids as they typically do well with conventional treatment.

YM: WRT 'How does one get the revival vision technology?' - it is marketed commercially

WRT 'Can it be used in children less than 7 years?' - No. Only above 10 years