

Contact lenses for children: changing lives for the better

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PLAN

BACKGROUND

WHY

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CONCLUSIONS

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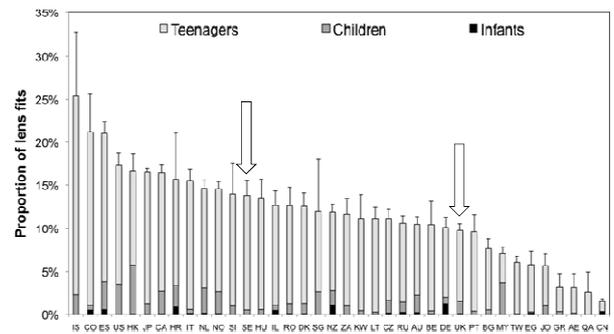
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DISCLOSURE

- Paid lectures & KOL/product feedback programmes:
 - Alcon, American Academy of Optometry (UK), Association of Optometrists, Birmingham Focus on Blindness, Black & Lizars, Central (LOC) Fund, Cerium Visual Technologies, College of Optometrists, Coopervision, ESRC, General Optical Council, Hoya, Institute of Optometry, International Institute for Colorimetry, Iris Fund for Prevention of Blindness, Johnson & Johnson, Leightons, MRC, Norville, Optos, Paul Hamlyn Trust, Perceptive, Scrivens, Specsavers, Thomas Pocklington Trust.
 - Gratefully acknowledge funding for attendance today
- Lecture content always my own



Johnson & Johnson Vision Care | SUPPORTING YOUR SUCCESS



- International survey of 100,000 fits for 2005-2009...UK data
 - Teenagers (13-17): ~14%
 - Children (6-12): ~1%
- Efron, Morgan, Woods (2011)

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Q: What is the top reason for adults wanting CL?

- | Reason | Percentage |
|--------------------------------------|-------------|
| 1. Cosmetic | 31% |
| 2. Sports | 8% |
| 3. Convenience (e.g., rain, cooking) | 34% |
| 4. Better vision | 5% |
| 5. Hate glasses | 3% |
| 6. Optical (e.g., anisometropia) | [not asked] |
| 7. Medical (e.g., keratoconus) | 2% |
| 8. Other | 17% |
- Main reason (Gupta & Naroo, 2006)

Bowden & Harknett (2006)

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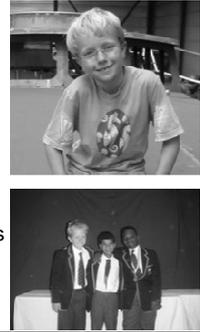
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Cosmesis

- CL better than specs for cosmesis
- Q: in which decade of your life did you worry most about your appearance?
 - 1-10 years
 - 11-20 years
 - 21-30 years
 - 31-40 years
 - 41-50 years

Cosmesis

- 31% of children experience bullying
Cawson et al. (2000, NSPCC)
- Spectacle wearers 35% more likely to be victims of bullying (Horwood et al., 2005)
 - Avon study of 6,536 children aged 8.5 years
 - Paper does not mention CL!
- Fitting children (8-11y) with CL improves physical appearance, athletic competence, social acceptance
Walline et al. (2009)



Edinburgh, Scotland [More]
 Serious assaults and deaths
 19 May 2005: 16-year-old Becky Smith is left unconscious after a slap attack by fellow school pupils from Plant Hill High School in Blackley, Manchester. The slap attackers record the assault on their mobile phone and distribute the video at school. [More] Josh Belluardo case
 27 November 2000: 10-year-old Damiola Taylor is attacked on his way home from school and bleeds to death in a stairwell in south London's North Peckham Estate [More] [More]
 May 1999: community opinion in Canton, Cherokee County, Georgia was split after 15-year-old Jonathon Miller was found guilty of the murder of Josh Belluardo. The court heard how Miller, who had been bullying 13-year-old Josh Belluardo for some

Sports

- CL better than specs for sports
- Q: in which decade of your life did you do most sport?
 - 1-10 years
 - 11-20 years
 - 21-30 years
 - 31-40 years
 - 41-50 years

Q: What is the top reason for adults wanting CL?

1. ☞ Applies more to children
2. ☞ Applies more to children
3. ☞ Applies more to children
4. Better vision
5. Hate glasses
6. Optical (e.g., anisometropia) ☞
7. Medical (e.g., keratoconus)
8. ☞

Other reasons for kids in contacts

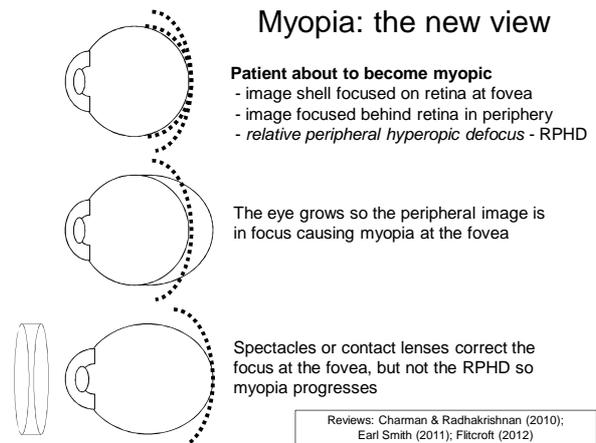
- Precision tinted contact lenses – specialist & rare
-
- Myopia control – very common & increasing
- UV protection

Anisometropia & contact lenses: conclusions

- Contact lenses are the best optical approach for correcting anisometropia
- Contact lenses may also treat anisometropic amblyopia
- Optimal clarity is the goal, so toric lenses often needed
 - If fitting a toric soft lens to one eye then choose a design that does not have a vertical prism in the optic zone; e.g., Acuvue Oasys for Astigmatism (Hawke et al., 2013)

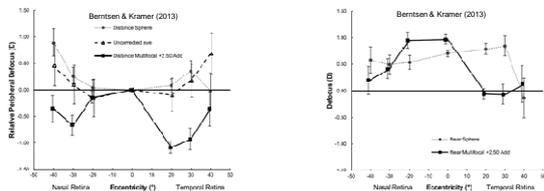
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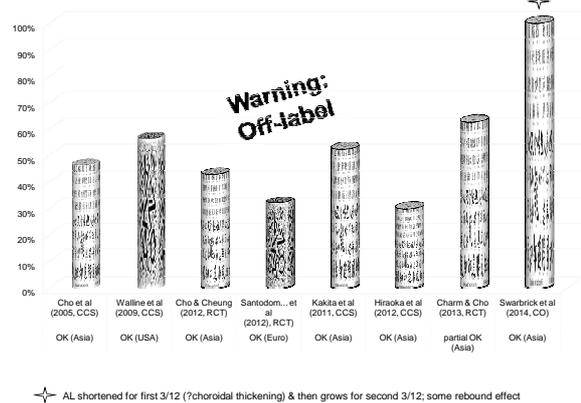


How to reduce peripheral hyperopic defocus?

- RPHD eliminated by OK, but not by CD BFSCL (Ticak & Walline, 2013)
 - But authors note small N and lens movement could be artefact
- Large pupil diameters facilitate the effect of OK to slow axial growth in myopia (Chen et al., 2012)
 - Speculate because enhance myopic shift in peripheral retina
 - No effect of pupil size on axial growth in spectacle lens group
- Centre-distance multifocal SCL creates peripheral myopic defocus during DV and to lesser extent during NV (Berntsen & Kramer, 2013)



Slowing of axial elongation with OK contact lenses



Safety of overnight orthokeratology (OOK)

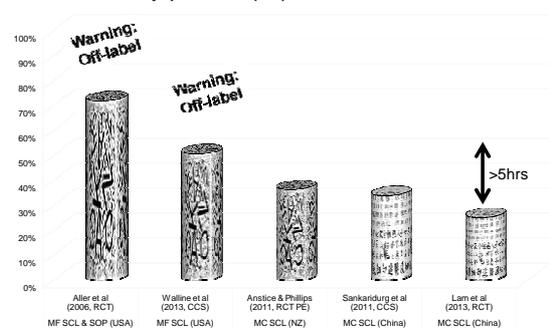
- For soft contact lenses, overnight wear increases risk of microbial keratitis (MK) by 10x
- Several cases of (MK) reported, mainly in Asian countries thought to be associated with poor hygiene
 - Tap water, old contact lens cases, suction holders
 Watt & Swarbrick (2007)
- Prevalence of complications from OOK has not been established
 - Van Meter et al. (2008)
- Risk of OOK similar to other overnight wear of contact lenses
 - Bullimore et al. (2013)

Safety of Overnight Orthokeratology for Myopia

A Report by the American Academy of Ophthalmology

Woodford S, Van Meter, ND, David C, Musch, PhD, MPH, Deborah S, Jacobs, MD, Stephen C, Kaufman, MD, PhD, William J, Reinhar, MD, Eva J, Ukkil, MD

Slowing of myopia progression with multifocal (MF) or myopia control (MC) soft contact lenses



Not included: Fujikado et al (2014) – small pilot study of experimental lens only 0.50D add

Caveats

- Need more RCTs
 - But myopia control effective “on balance of probabilities” and need to start young
- Persistence of treatment effect
 - Unclear whether the treatment effect is sustained or wears off with time
 - May be rebound effect when stop intervention
 - Perhaps, not a problem with optical interventions:
 - We can't yet cure myopia, so still likely to need Rx
 - No significant side effects to our interventions
- Axial length changes correlated with myopia changes ($r^2 = 65\%$)
- Followers of a theory tend to ignore other theories
 - If myopia wasn't multifactorial, then we would have solved it by now!

Warning: Off-label



Conclusions: myopia control in European children

- If NV esophoria or high accommodative lag, recommend multifocals
 - MF glasses likely to reduce progression rate by 30-40%
 - MF CL may reduce progression by up to 70%
 - Aim to eliminate esophoria; typical add +2.00, CD
- If not esophoric and normal lag, effect reduced
 - MF glasses likely to reduce progression by only 15%
 - MF CL success rate ~36-50%
- OK slows myopia progression by 32-63%
- Also encourage kids to go outdoors

Warning: Off-label



Other approaches to myopia control

- Don't under-correct
- Time outdoors & sport
- Atropine (low dose promising)
- Pirenzepine

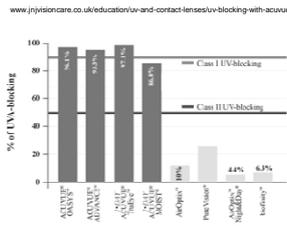
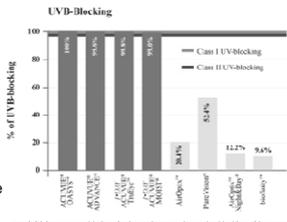
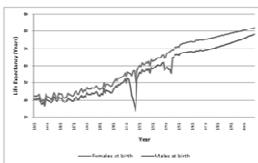
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- Myopia control – very common & increasing
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UV protection

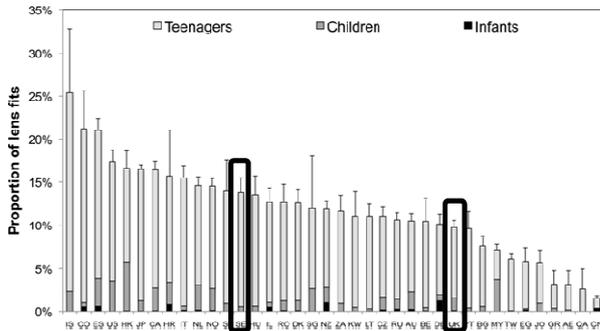
- Ocular protection required for cataract, ocular melanoma, ARM Cullen (2011)
- UV-blocking CL greatly increase safe exposure time Walsh & Bergmann (2011)
- Yam & Kwok (2013) review:
 - UV exposure linked to ocular pathologies including cataract & maybe AMD
 - UV blocking contact lenses offer effective protection

Figure 1. Mean and female life expectancy at birth (EAW 1981-2005)



The reasons for adults wearing are even more relevant for children than adults

- Cosmetic
- Sports
- Convenience (e.g., rain, cooking)
- Better vision
- Hate glasses
- Optical (e.g., anisometropia)
- Medical (e.g., keratoconus)
- Other



Why aren't we doing better?

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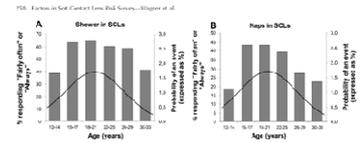
Perceived barriers to fitting CL to kids

- Eyecare practitioners!
- Perceived cost
 - Yet, only about €1.50 a day
- Some people still think CL will hurt
- Some parents think that the child won't be able to learn handling
 - Zeri et al. (2010)
- Fear of microbial keratitis
 - Our job is to allow informed choice
 - Parents accept risks if give children benefits
 - MK occurs 1 in 5,000 PA; risk minimised by good hygiene and prompt action
 - Only fit to motivated cases who can be hygienic



Does compliance matter?

- Solutions ineffective when used non-compliantly
 - Rosenthal et al. (2003)
- 55-99% are non-compliant, but think they are compliant
 - Donshik et al. (2007)
- It is difficult to improve compliance
 - Yung et al. (2007)
- Poor compliance increases microbial flora
 - Tuli et al. (2009)
- Patients who replace on time have better comfort
 - Dumbleton et al. (2010)
- 1 in 5 college-age wearers rinse in tap water sometimes
 - Wagner et al. (2014)



Some key research on CL for children

- Soni et al. (1995): age 11-13y
 - 3 successful attempts in training
 - Exam helps
- CLIP study (Walline et al., 2007a,b; Jones et al., 2009)
 - 84 children (8-12) of 85 teens (13-17)
 - "No serious adverse events were reported during the 3 month study"; biomicroscopy of children similar to teens
 - Children do as well as teens
 - Similar chair time, slightly more tuition for children
 - Improved quality of life
- ACHIEVE study (Walline et al., 2009)
 - RCT of children (8-11), CL v. Specs, 3y
 - Physical appearance, athletic competence, social acceptance all significantly better with CL
 - 91% of CL group wore CL to 3 year check



Lens types for children

- Children are fitted with the highest proportion of daily disposable lenses
 - (Efron, Morgan, Woods, 2011)
 - Safest (for preserving vision)
 - (Dart et al., 2008)
 - Better compliance with daily disposable
 - (Dumbleton et al, BCLA 2009)
- SiH monthly or fortnightly are a good lower cost option
- UV blocking is a good idea

Top tips for fitting & tuition

- Address fear of the unknown
 - Soft lenses are mostly water
 - Let the child handle lenses
- Fitting
 - Don't put fitting lens directly on cornea
 - Avoid pain
 - If RGP, use anaesthetic at first insertion
- Tuition
 - Aim tuition & literature at child & parent
 - Be positive, realistic, encouraging
 - If your personality is at all impatient/stern, then delegate!
- At aftercare, right time to be stern!
 1. Quiz
 2. Have the children show you what they do
 3. Use parents to ensure compliance at home



The quiz

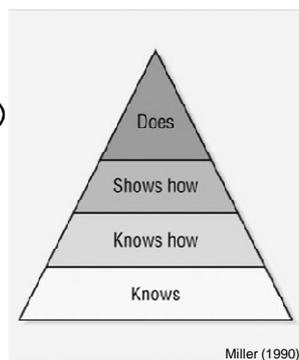
1. When do you wear your lenses?
2. What do you do in the mornings?
3. What do you do in the evenings?
4. What are the danger signs?
5. What do you do if you have a danger sign?
6. What do you do if the danger sign does not get better over the next few hours?
7. How often do you replace your lenses?

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c.f., adults: Miller's pyramid

Potential for better compliance than adults

parents
 observation at aftercare
 tuition
 the quiz



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Conclusions on when to discuss CL

- Young people have greater need than adults
- Children benefit just as much as teenagers
- When to first mention?
 - When first refractive correction
 - When issuing an Rx
- How to discuss?
 - "This can be corrected with glasses or CL"
 - CL require motivation and hygiene, but have a high success rate at this age
 - Modern CL are comfy and child-friendly
 - Specialist CL can slow myopia progression
 - The corrector becomes a treat!



Full handout of slides from www.bruce-evans.co.uk