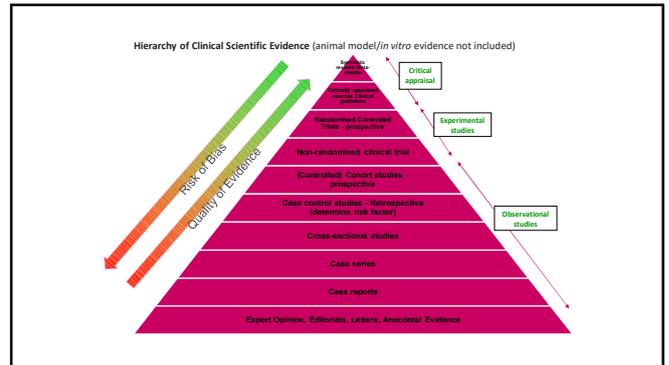




Safety & Compliance Speciality Soft Lenses

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~19,000 papers X average length 10¼ pages
X 4.09 mins/page

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Workload

- ▶ 796,527.5 minutes
- ▶ 13,275.5 hours
- ▶ 1,659.5 working days
- ▶ 331.9 weeks
- ▶ 6.4 years (with no holiday)

BUT

- ▶ 1,508 more papers in 2020
- ▶ x 10¼ x 4.09 = 63,219mins or 29.3 more weeks

RESULTS BY YEAR



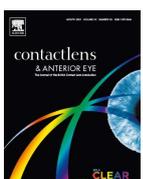
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Executive Chair: James Wolffsohn
Executive Vice-Chair: Philip Morgan

- Anatomy and physiology of the anterior eye -
- Biochemistry of lens materials, coating, comfort drops and solutions -
- Effect of lens materials/design on the anatomy and physiology of the eye -
- Orthokeratology -
- Scleral lenses -
- Contact lens complications -
- Medical use of contact lenses -
- Contact lens optics -
- Future applications of contact lenses -
- Evidence based contact lens practice -

Dr Laura Downie
Prof Mark Willcox
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SCAN ME

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CATEGORY	FACTOR	EVIDENCE	SOFT	RIGID CORNEAL
Refractive vision (RV)	Contact lens VA in normal emmetropia [170]	CORNEAL VA, astigmatism in both CLs, increasing RV with CL wear [170]	Consider soft CLs	Consider rigid contact lenses
			SOFT: Risk of sensory adaptation (such as regression) in children with astigmatism [169]	
Hygiene habits	Handing/ wiping	SOFT: Risk of MRSA on contact lens [169-170] Risk of GPC on contact lens [169,171] Practice should not affect eye exposures and resting in CL wearers [169]	Consider DD [169]	Unknown
	Pre-soak hygiene	SOFT: Disinfection due to adsorption of CLs, dry eye symptoms and 1 year inflammatory outcomes [169] Lid hygiene in long-wearing CLs exposure [169]	Advise DD, or provide hand rubs with contact lens [169, 172]	Unknown
Environment/ occupation	Increased levels of dust, wind, heat, temperature, rain or cigarette smoke. Low relative humidity	SOFT: Discomfort due to adsorption of CLs, dry eye symptoms and 1 year inflammatory outcomes [169] Lid hygiene in long-wearing CLs exposure [169]	Advise low water content, SiHy, water gradient [169-170]	SOCL may be indicated rather than rigid contact lenses to prevent foreign bodies getting beneath the lens, but see no evidence evidence in support
			Age	SOFT: VA in CL wearers in children or adults for DD, overnight wear, SiHy, and oxygen [169-170]
Refractive Indicators	Anticipation	General and individual anticipation	SOFT: Consider VA and quality of vision in long-term and contact adaptation [169,171]. Prescribe more rigid contact lenses in case of residual astigmatism [169]	Advise rigid contact lenses (RCL) or RCL in case of residual astigmatism
	Presbyopia	SOFT: Increase if fully corrected to near-vision [169] 1. Extension of fully corrected, not uncorrected [169] RIGID CORNEAL: near VA with bifocal and multifocal rigid contact lenses and 1. Nonlinear contrast sensitivity [169]	Advise multifocal soft lens	Advise rigid contact lenses
Myopia progression	SOFT: Myopia progression with DD correction stops normal CD wear [169,170], with bifocal and multifocal design [171] and Reduced Depth Of Focus [171]. Higher near addition, 1. progression [171] RIGID CORNEAL: no effect of rigid contact lens wear on myopia progression in children [170,171]	SOFT: Near addition with bifocal lens [171] 1. Change surface staining due to SiHy CL wear [171]	Advise multifocal soft lens	Advise orthokeratology, use rigid contact lens [169]
			Ocular Surface Health	SOFT: Near addition with bifocal lens [171] 1. Change surface staining due to SiHy CL wear [171]

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4. Evaluation of fitting

Accurate assessment of lens fit is a crucial step in any contact lens examination because poor fitting lenses can impact ocular physiology and comfort performance which in turn is associated with drop out. Soft lens fit should be accurately assessed after 10 mins (figure 2), along with measures of visual performance.

What is known for soft lenses

- Assess rotational position and stability of toric lenses
- MFs: Vision assessment is recommended using real-world tasks. Predicting visual performance of complex optical designs (MFs) with standard visual acuity tests have been suggested to be inadequate. One MF design does not work for all patients, and initial fit performance may not predict long-term performance
- Toric and MF designs perform well visually, with little difference in high contrast distance vision with some soft MF compared to single vision lenses¹⁸ CLEAR [169,170,171]

What is known for RCLs

- Optimum window for observation of fluorescein pattern is 30 seconds to 3 minutes post-installation
- Revised scheme for standardised recording of RCL fit proposed that includes rating subjective comfort, and grading lens coverage, centration, movement and fluorescein fitting pattern¹⁹

Simplified, standardised recording of soft lens fit

Primary predictive measures of overall soft lens mobility²⁷

- Post-blink movement in up gaze (B 0.25-0.50mm)
- Horizontal lag (L: 50-100% change in overlap of the lens onto the limbus)
- Push-up recovery speed (P: 2-4mm/s/non-slaggy, visible recovery)

Record on a fitting cross using a 3 point scale +, o, -, combine with marking lens centration and a subjective 0-10 comfort score from the patient. Example:

Left Eye: Adaptation time 10 min. Centration: 1/2/3 Coverage: ✓
 observation rotation to control of centration. MF = 0.25-0.50mm guideline movement in up gaze. P = 3-5mm/s increase in vertical overlap (B) at horizontal gaze. BCLA = suitable, non-slaggy recovery at push-up (P) pattern.

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Care Regimen

- Choice not governed by efficacy alone [Wilcox et al., 2019]
 - Also ease of use and comfort (e.g. solution pH, tonicity, osmolality and wetting agents)
- Multipurpose disinfecting solutions (MPDS) most commonly prescribed (~89%) [441-445], despite mid-2000s recalls [442,446,447]
- One-step hydrogen peroxide cleaning systems promote more favourable compliance, efficacy, comfort and ocular surface outcomes, avoiding exposure to preservatives [448] - decreased risk CIEs/SICS [37,449], reduced lid papillae [450] and longer SiHy comfortable wearing times [252]; more than troubleshooting??
- Older generation polyhexamethylene biguanide-based solutions and some high water lens materials caused SICS (peak after ~2 h) and discomfort [451]
- High water ionic or early generation SiHy benefit from solutions with enhanced wetting agents, as do patients with dry eye, ocular surface disease or CLD [451]
- Lens parameters may be affected through cleaning and immersion of lenses [452]

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Care Regimen

- Rub and rinse essential [454]
- Case contamination is common [456-458], occurs rapidly, and can persist despite the use of MPDS/ hydrogen peroxide-based systems [456]. Diversity maybe greater than that of lenses [459]
- Many modern soft lens solutions help inhibit biofilm in storage cases [460,461], most effective case cleaning incorporate manual rubbing or wiping [462-464] and once clean, at least in the case of polypropylene cases, air drying (upside down) in non-humid environment [465]
- Tap water avoidance still needs promoting despite guidance from professional bodies and manufacturers contradictory on replacement freq & need to rub [467].
- Future improvements: non-ridged [468] / cylindrical cases [469]; limiting biofilm formation with compounds embedded into polypropylene CL cases [470-472]

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Minimising Risks (compliance)

- Non-compliance common, but differs with patient demographics [310,473,474], psychological traits [475] and contact lens modality [476].
- Related complication risks also vary [477] (Stapleton et al., 2021)
- DD reduced reliance on some compliance steps.
- Discrepancies between information ECPs believe to have provided patients versus that which they recall receiving [400].
- Other factors include financial constraints, purchase of service schemes and environmental influences [27,96,478].
- Non-modifiable variables**
 - Generally female sex [310,473,479], but not age [206,311,475,479-488]
 - Country (Acanthamoeba keratitis) [473,474] due to water storage and legal requirements, but also ECP guidance [474].

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Minimising Risks (compliance)

- Modifiable factors**
 - Poor handwashing: ~4.5x [477], but ~50-60% admit to failures [484,487]. Better in health care workers (by 70-100%) [479,488,489]. Minimal evidence education strategies improve [407]
 - Overnight wear: ~4x [477]
 - Improper use of solution: ~2.5x (topping up) [477]. 10-35% of wearers top up [311,480,484,487,490,491]. Also expired lens care products [492,493]
 - Extending lens use beyond the replacement interval - DD better, but ~9% of daily wearers reuse [310,494] to save money or had run out of lenses [310]
 - Inadequate case cleaning: ~4x [477]. Common [466,485,489] & 2/3rds use tap water [311]. Compounded by lack of regular case replacement [311,490,492]
 - Failure to rub and rinse lenses: ~3.5x [477]
 - Use of tap water and water sports: risk of Acanthamoeba keratitis [499,500,125,501,502] - no water graphic improves [505]
 - Online purchasing: not conclusive [504,506], but unregulated purchasing behaviour associated with ocular complications [87,507,508]

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Which strategy leads to better compliance?

1. providing written rationale for lens care measures suggested
2. promoting gain from performing action e.g. improved vision/ comfort
3. regular review exercise
4. combining written and oral instructions
5. intense instruction
6. re-instruction
7. reduced cost care products

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Which strategy leads to better compliance?

1. providing written rationale for lens care measures suggested [408,517] ✗
2. promoting gain from performing action e.g. improved vision/ comfort [518] ✗
3. regular review exercise [519] ✗
4. combining written and oral instructions [482] ✗
 - although this can improve case cleaning compliance [520]
5. intense instruction [521] ✗
6. re-instruction [522] ✓
7. reduced cost care products ✗

Note: Even having a significant health condition does not appear to affect patient compliance [523].

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Recommended aftercare routine.

<p>Update</p> <ul style="list-style-type: none"> • The date of last full eye examination and aftercare • Reason for visit - any issues with lens wear / precipitating factors • Comfortable and average wearing time • Any changes in health or medication • Any changes in work/hobbies, driving or environment • Spare spectacle visual correction in case of eye infection or systemic viral infection [531] • Any challenges with compliance such as napping or swimming/showering in lenses; case cleaning for frequent replacement soft and rigid corneal lens wearers <p>Current Aspects</p> <ul style="list-style-type: none"> • How long have the lenses been worn today and age of current lenses • Check lens and care system brand • Ask patient to demonstrate cleaning regimen; observe case cleanliness • Vision with contact lenses and over refraction • Check lens fitting (sections 5.1.6 and 5.2.4) and wettability/deposition • Observe patient washing and drying hands • Observe patient removing lens • Check anterior eye health and documentation with a slit-lamp bionicroscope [130] <ul style="list-style-type: none"> ◦ Tear film assessment ◦ Lid eversion [153] to inspect palpebral conjunctiva ◦ Corneal staining with fluorescein illuminated with an appropriate blue light and observed through a yellow band-pass filter [180] 	<ul style="list-style-type: none"> • Corneal topography if needed (rigid corneal lens wearers, unexplained changes in vision/or prescription etc) • Explore history and symptoms further if necessary • Manage complications (see section 7.4) • Consider upgrading/optimising lens (material, design or replacement frequency) and/or care system • Observe patient reapplying lens (if appropriate) <p>Reiterate</p> <ul style="list-style-type: none"> • Reason for visit and how issues have been addressed • Reteach lens application and removal if necessary <ul style="list-style-type: none"> ◦ Compliance [510] ◦ Handwashing with soap and dry hands ◦ Replace lenses when scheduled ◦ Sleeping in contact lenses ◦ Inappropriate lens purchase and supply ◦ Exposure of lenses to tap water (including showering and swimming) ◦ Failure to clean and replace lens cases regularly ◦ Inappropriate use of care systems ◦ Potential future vision changes if approaching presbyopia ◦ Children/young adults - myopia progression rates, learning to drive etc ◦ Follow RCP recommendations for lens wear if unwell with the 'cold' symptoms • Next aftercare and eye examination dates
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Managing Complications

Relate to

- ▶ hypoxia (microcysts and vacuoles, folds, striae, oedema, corneal thinning, neovascularisation, endothelial blebs and polymegethism, warpage) ⇒ **SiHy, DD**
- ▶ mechanical (such as blink rate/completeness, ptosis, meibomian gland dysfunction, dry eye, LWI, an acute red eye, papillary conjunctivitis, staining, corneal warpage) ⇒ **modulus, lubricity, tear film [handling]**
- ▶ toxic (papillary conjunctivitis, staining) ⇒ **solution/material match, DD, allergy management**
- ▶ microbial (such as infiltrates and microbial keratitis) ⇒ **compliance (sleeping/napping, hygiene), DD**

Temporarily discontinue to allow healing
Vision optimisation
CLD results from infection, exposure to toxins and mechanical [141] ⇒

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Practical Conclusions

- ▶ Best practice from the evidence-base
 - ▶ Anterior eye assessment
 - ▶ Lens selection
- ▶ Optimise lens
 - ▶ material
 - ▶ Oxygen permeability
 - ▶ Modulus
 - ▶ Lubricity
 - ▶ Modality
 - ▶ DD
 - ▶ Planned overnight
 - ▶ Solution
 - ▶ Avoid water – remind with stickers
 - ▶ Case
- ▶ Detailed instruction
- ▶ Reinstruction

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