



Scottish Dry Eye Guidelines

VERSION 1.1

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Introduction

Dry eye is prevalent on a worldwide scale, and is one of the most common reasons for patients to attend eye care practitioners. [1] To the individual, it has a significant impact on quality of life, and at the societal level in economic terms, both with respect to the cost of treatment, and to lost productivity. Dry eye disease (DED) has been defined as follows:

“Dry eye is a multifactorial disease of the ocular surface characterized by a loss of homeostasis of the tear film, and accompanied by ocular symptoms, in which tear film instability and hyperosmolarity, ocular surface inflammation and damage, and neurosensory abnormalities play etiological roles.”[2]

An extensive range of treatments are available for dry eye, although there are inherent difficulties in evaluating cost-effectiveness, due to:

- fluctuation of symptoms and signs
- variability in symptom reporting and assessment
- a rapidly-evolving market of available treatments
- a myriad of potential combinations and frequencies of treatment regimes
- lack of clear endpoints to treatment

Dry Eye Working Group

The Scottish Dry Eye working group was established, with the following aims:

- identify current practice for the management of dry eye in community and secondary care
- review existing guidelines and highlight those aspects most applicable to local practices and patients
- determine areas of service provision that need the most improvement
- develop a clear pathway for patient referral to secondary care, and how best to guide treatment upon discharge back to community
- reach a consensus on diagnosis and treatment of DED at a national level
- devise a formulary that balances choice and cost

Invitations to participate in the working group were sent to the following groups:

- community lead optometrists, and those with a special interest in DED
- ophthalmologists specializing in cornea and anterior segment
- hospital pharmacists
- general practitioners and representatives from NHS Education for Scotland
- specialist nurses
- health board leads / managers

Meetings were hosted on 15/11/16 and 20/06/17. Preparatory and summative documentation was sent out to attendees, inviting comments and amendments to ensure that the documents reflected the consensus of the group.

Contributors to Dry Eye Working Group

- | | | |
|---------------|--------------|---------------|
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Abbreviations

- | | |
|---------|------------------------------|
| • ADDE | Aqueous Deficient Dry Eye |
| • DED | Dry Eye Disease |
| • EDE | Evaporative Dry Eye |
| • HES | Hospital Eye Service |
| • IP | Independent Prescriber |
| • MGD | Meibomian Gland Disease |
| • OSDI | Ocular Surface Disease Index |
| • PVA | Polyvinyl Alcohol |
| • TFBUT | Tear Film Breakup Time |

Overview of Guidelines

Dry eye assessment strategy

Step 1	OSDI ¹	Evaluation at community optometrist - onward referral to IP optom as needed
	Background and risk factors	
	Ocular signs - including Oxford grading system, TFBUT	
	Eyelid disease	
	Documentation of previous treatment strategies	
If symptoms inadequately controlled, consider referral to HES		See referral letter
Step 2	Evaluation as above	Hospital-only
	Consider auto-immune testing	
	Referral to Rheumatology	

Dry eye treatment strategy²

Step 1	Education ³	Initiate in community
	Environmental measures	
	Diet / supplements	
	Systemic & topical medication review	
	Lid hygiene / hot compresses	
	Ocular devices - patient to initiate at their discretion	
	Ocular lubricants - see formulary table below	
Step 2 *	Punctal occlusion (primarily for ADDE)	Specialist dry-eye practitioners
	Topical steroids (aim for minimal duration / dose to achieve effect)	
	Topical antibiotics (Azithromycin)	
	Oral antibiotics (Doxycycline / Azithromycin)	
	Contact lenses	
Step 3	Topical ciclosporin (initiate and monitor in hospital)	Hospital-only
Step 3	Serum tears, surgery, etc.	

*NB No order preference and not mutually exclusive

Proposed combined formulary

Category	Product	List price*	Preservative-free ⁴	List price*
Historic	Hypromellose	£1.21	Hypromellose ⁵	£5.72 (30 vials)
1 st line	Carbomer / PVA	£0.68 / £1.93	Carbomer / PVA	£5.42 (30 vials)
2 nd line	- ⁶		Carmellose, Hyaluronate	£7.49 / £10.80
Ointments ⁷	-		Xailin Night / VitA-Pos / LacriLube	£2.49 / £2.75 / £3.88
MGD	Systane Balance	£7.49	Optive Plus	£7.49
Filamentary	iLube (<i>PoM</i>)	£15.68		
Severe DED			Topical ciclosporin (<i>PoM</i>)	£72.00

*Indicative list price per item. Subject to variation over time.

¹ Ocular Surface Disease Index, as a minimum baseline dataset

² Based on DEWS II treatment guideline

³ See IGA patient info booklet

⁴ Consider preservative-free if > 4 drops applied per day, or if allergy to preservatives

⁵ Preservative-free hypromellose unlikely to be cost-effective

⁶ 2nd line agents will all be preservative-free

⁷ Ointments for use at night-time may be added as required; additionally during the day for more severe disease

Decision to move from 1st to 2nd line and on is driven by no improvement in symptoms and/or signs after 6 - 8 weeks.

Dry Eye Assessment Strategy

Tools for evaluating dry eye

A range of tools were for evaluating the symptomatology of DED. These included:

- Undirected history & examination
- Ocular Surface Disease Index (OSDI) [3]
- Speed questionnaire [4]
- Symptom Assessment in Dry Eye (SANDE) [5]
- McMonnies [6]

All of the above tests have been validated in comparative studies, and may be used for both clinical and research purposes. Of these tests, the group decided in favour of OSDI, as it is relatively simple to follow and score, and is already familiar to many practitioners working with DED patients.

Relevant medical history

In addition to the symptoms reported by the patient, it is important to record any relevant risk factors or precipitating factors. As a minimum dataset, this would include:

- Contact lenses
- Medications
- Arthritis / Sjögren's syndrome
- Thyroid disease
- Smoking
- Laser refractive surgery

A note should also be taken of any eye drops or other treatments for DED currently / previously used, and negative findings, both in history and examination.

Eye examination

A routine eye examination should be performed at every visit, with specific attention paid to any changes associated with DED. These include:

- Redness
- Blepharitis / eyelid disease
- Fluorescein staining & mucus filaments
- Tear film height & break-up time

A tool such as the Oxford grading scheme [7] may assist in more accurately recording objective signs at each visit. However, it is important to note that there is often discordance between the symptoms of dry eye and the observable signs.

Dry Eye Treatment Strategy

Patient-centred care

Patients must be empowered to trial a range of treatment options, and to settle on a combination that suits them as an individual. With clear explanations of the treatments available, the nature and purpose of treatment, and encouragement to adjust regimes pre-emptively, it is anticipated that most patients may be managed in community. It is often helpful to invest time with patients in these explanations, to help them manage dry eye disease more independently and to come to terms with it as a chronic condition.

A holistic approach

Treatment for dry entails more than a combination of lubricating eye drops. Beyond the general measures outlined in the above table, and the use of physical devices (Appendix 3), patients may benefit from support groups, online material and other educational resources.

Drop delivery

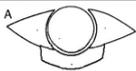
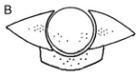
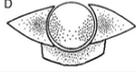
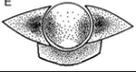
In addition to the multitude of preparations available for treating dry eye, many of these are supplied in a range of delivery systems, including traditional 5-10ml bottle (often with preservatives), single-use vials, pump-action and valve-based bottles, as well as gels and ointments (See Appendix 3). Patients - particularly those with arthritis - may find some of these quite difficult to use. Selection may ultimately depend upon the bottle type as much as the lubricant it contains.

Bibliography

- [1] J. Craig, J. Nelson, D. Azar, C. Belmonte and A. Bron, "TFOS DEWS II Report Executive Summary," *The Ocular Surface*, vol. 15, pp. 802-812, 2017.
- [2] J. Nelson, J. Craig, E. Akpek and A. Bron, "TFOS DEWS II Introduction," *The Ocular Surface*, vol. 15, pp. 269-275, 2017.
- [3] R. Schiffman, M. Christianson, G. Jacobsen, J. Hirsch and B. Reis, "Reliability and validity of the Ocular Surface Disease Index," *Arch Ophthalmol*, vol. 118, p. 615-21, 2000.
- [4] W. Ngo, P. Situ, N. Keir and D. Korb, "Psychometric Properties and Validation of the Standard Patient Evaluation of Eye Dryness Questionnaire," *Cornea*, vol. 32, pp. 1204-1210, 2013.
- [5] F. Amparo, D. Schaumberg and R. Dana, "Comparison of Two Questionnaires for Dry Eye Symptom Assessment: The Ocular Surface Disease Index and the Symptom Assessment iN Dry Eye," *Ophthalmology*, vol. 122, pp. 1498-1503, 2015.
- [6] C. McMonnies and A. Ho, "Responses to a dry eye questionnaire from a normal population.," *J Am Optom Assoc*, vol. 58, p. 588-91, 1987.
- [7] A. Bron, V. Evans and J. Smith, "Grading of corneal and conjunctival staining in the context of other dry eye tests," *Cornea*, vol. 22, pp. 640-50, 2003.

Appendix 1

Oxford Grading Scheme

Panel	Grade	Dot count per sector
	0	1
	I	10
	II	32
	III	100
	IV	316
>E	V	>316

Appendix 2

Ocular Surface Disease Index (OSDI)

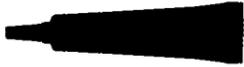
	All the time (4)	Most of the time (3)	Half of the time (2)	Some of the time (1)	None of the time (0)	N/A
Have you experienced any of the of the following during the last week?						
1. Eyes that are sensitive to light?						
2. Eyes that feel gritty?						
3. Painful or sore eyes?						
4. Blurred vision?						
5. Poor vision?						
Subtotal for section 1	(max 20)					
Have problems with your eyes limited you in performing any of the following during the last week?						
6. Reading?						
7. Driving at night?						
8. Working with a computer?						
9. Watching TV?						
Subtotal for section 2	(max 16)					
Have your eyes felt uncomfortable in any of the following situations during the last week?						
10. Windy conditions?						
11. Places with very low humidity?						
12. Areas that are air conditioned?						
Subtotal for section 3	(max 12)					
Add subtotals (= "D")	(max 48)					
No. questions answered (= "E")	(max 12)					
OSDI score	(max 100)					
= (D ÷ E) x 25						

Appendix 3

Devices for treating dry eye

Treatment	Details	Examples	Guide price approx
Tear retention			
Punctal plugs	Absorbable plugs		£6.20 / pair
	Permanent plugs		£25.67 / pair
Moisture chamber spectacles			£45 - £115
Contact lenses	Silicone hydrogel lenses		£4.05 / pair
	Scleral lenses		£120/ pair
Meibomian gland dysfunction			
Nutritional supplements	Essential fatty acids	Omega 3	£18.93 / mth
“At home” heat treatments	Warm compresses / eye masks		£3.33 - £30 / mth
	Goggles	Blephasteam	£175.40
“In office” heat treatments	Thermal pulsation treatment / pulsed light therapy	Lipiflow, E-eye	Cost to pt £700
Blepharitis			
Eye lid hygiene	Lid wipes and cleaning products		£7 - £8 / mth
“In office” eyelid cleaning		Bleph-ex	Machine £835 Disposable tips £12 / use
Demodex blepharitis	Lid wipes with tea tree oil	Cliradex	£30 / mth

Bottle / Device types for artificial tears

Bottle / Device	Artificial Tear Product Examples			
	Standard bottle	Pump-action / valve	Single-use vial	Gel tube
				
Carbomer	-	-	Carbomer 980 SDU Viscotears SDU	Carbomer 980 Viscotears Xailin Gel
Carmellose	Lumecare Optive Refresh Tears Plus	-	Carmize Celluvisc Xailin Fresh	-
Hyaluronate	Blink Intensive Xailin HA	Clinitas Soothe Multi Hylo-Forte Vismed Gel Multi	Vismed Gel SDU	-

Appendix 4

Referral template for dry eye disease

Direct Referral To Hospital Eye Service									
Dry Eye							Urgency of referral		
HOSPITAL / LOCATION CODE				HOSPITAL					
Patient Surname		Patient Forename		Title	Optometrist Details				
DOB	CHI	GENDER							
Address									
Postcode	Tel No								
Ethnicity									
Location Code	HCP Code		Date of Referral						
Patient History & Details				Patient symptomatic		<input type="checkbox"/>			
				Previous attendance at HES		<input type="checkbox"/>			
				If Yes? Date					
				If Yes? Location					
				Armed Forces Personnel, Immediate families and veterans					
				Translator required?		<input type="checkbox"/>			
If Yes? Language									
Ocular Surface Disease Index (OSDI)				Score each item 0-4			Sum		
Light sensitive	Gritty	Pain	Blurred	Poor vision					
Reading	Driving	Computer	TV						
Discomfort when:	Windy	Dry conditions	Air con						
OSDI Score = (D÷E) x 25				Subtotal (D)					
= (max 100)				Number of questions answered (E)					
Risk factors	Contact lenses	<input type="checkbox"/>	Arthritis	<input type="checkbox"/>	Sjögren's syndrome	<input type="checkbox"/>			
	Thyroid disease	<input type="checkbox"/>	Smoking	<input type="checkbox"/>	Laser eye surgery	<input type="checkbox"/>			
Medications	Antihistamines	<input type="checkbox"/>	Anti-depressants	<input type="checkbox"/>	Beta-blockers ("-olol")	<input type="checkbox"/>			
	Cancer treatment	<input type="checkbox"/>	Diuretics ("-azide")	<input type="checkbox"/>	Anti-psychotics ("-azine")	<input type="checkbox"/>			
	Other:								
Eye drops tried, including frequency				Stage 1 Tx exhausted	<input type="checkbox"/>	Compliance confirmed	<input type="checkbox"/>		
Right		Ocular Examination			Left				
(0-5)		Oxford Grading Scheme			(0-5)				
		Eyelid disease							
Vision	Sph	Cyl	Axis	VA	PH VA	Add	NVA		
Right									
Left									
GP informed of referral?				<input type="checkbox"/>		GP			
Patient given dry eye leaflet?				<input type="checkbox"/>		GP Practice			

Appendix 5

Request to GP for treatment for dry eye

Date _____

Patient details Surname: First name: DOB / CHI: General Practice:

Optometrist details [practice stamp]

Dear Doctor _____,

Your patient has been diagnosed with dry eye (READ code F4F14).

I would be grateful if the following could be added to the repeat prescription, to be used as directed to Right / Left / Either* eye:

Substance	P/F?	Cost ¹	Frequency X times per day or "PRN"
Carbomer gel			
E.g. Carbomer, Clinitas, Gel Tears, Viscotears		£0.68	
Poly-Vinyl Alcohol (PVA)			
E.g. Blink revitalizing, Liquifilm, Sno Tears		£1.93	
Carmellose			
E.g. Celluvisc, Optive, Refresh Plus	✓	£4.80	
Hyaluronate			
E.g. Hycosan, Hylo-Forte, Vismed, Xailin HA	✓	£7.50	
Combination drops			
E.g. Optive Fusion, ² Hylo Dual, ³ Thealoz Duo ⁴	✓	£9.80	
Paraffin oil ⁵ (Eye ointments, usually applied nocte)			
E.g. Lacri-lube, Vita-Pos, Xailin Night, Hycosan Night	✓	£2.75	
Other			
Other (specify):			

P/F = Preservative-free

¹ Indicative price within this category

² Carmellose and Hyaluronate

³ Hyaluronate and Ectoin

⁴ Trehalose and Hyaluronate

⁵ All contain Lanolin

Follow-up for your patient has been arranged as follows:

No follow-up is required
 Follow-up with optometrist
 Referred to / already in hospital eye service