

**‘Dry Eye’: Potentially a Self Fulfilling Prophecy.
Clinicians must question the conventional
paradigm.**



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Classification criteria are not necessarily appropriate for use in diagnosis and may lead to misclassification of a disease. In an individual patient, a classification scheme can provide a guide, but an expert clinician, applying appropriate diagnostic criteria, is needed to establish a diagnosis.

Vitali (2003)

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Introduction: Defining ‘Dry Eye’.

Except in a minority of situations the descriptor ‘Dry Eye’ is at best misleading but at worst engenders mismanagement of inter-related but distinct co-morbidities. A common theme in ‘Dry Eye’ literature is the quest for a unified test strategy with discriminatory power to diagnose ‘Dry Eye’ (McCarty et al 1997, Schaumberg et al 2003, Perry and Donnenfeld 2004, McCarty et al 1998, Khanal et al 2008, Lee et al 2002). This search, universally unsuccessful, does not consider the underlying complexities of ‘Dry Eye’ and devalues the essential skill of individualised clinical investigation and imbues a recipe following ethos.

The continued use of the term ‘Dry Eye’ was questioned by Behrens et al (2006). This group felt ‘Dry Eye’ does not reflect pathophysiological events nor does it intuitively differentiate tear deficient and evaporative conditions; the expression ‘Dysfunctional Tear Syndrome’ was recommended. Regardless the Dry Eye Workshop (DEWS 2007), now considered the benchmark text of ‘Dry Eye’, rejected this argument considering the term ‘Dry Eye’ to have much to recommend it and its use was embedded in the literature. Historical precedence is not a rationale for maintaining any standard; it must demonstrate independent clinical robustness and utility. The term ‘Dry Eye’ demonstrates neither.

DEWS further rejected the suggestion of introducing a sub-division based on lid disease arguing that differentiating relative contributions to the overall dry eye state was difficult. The Lacrimal Functional Unit, representing the integrated system of glands, ocular surface, lids and sensory and motor nerves, was re-introduced by DEWS (2007) effectively neutralising this potential debate.

The final definition of 'Dry Eye' introduced by DEWS (2007) and now widely accepted states:

Dry eye is a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance and tear film instability with potential damage to the ocular surface. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface.

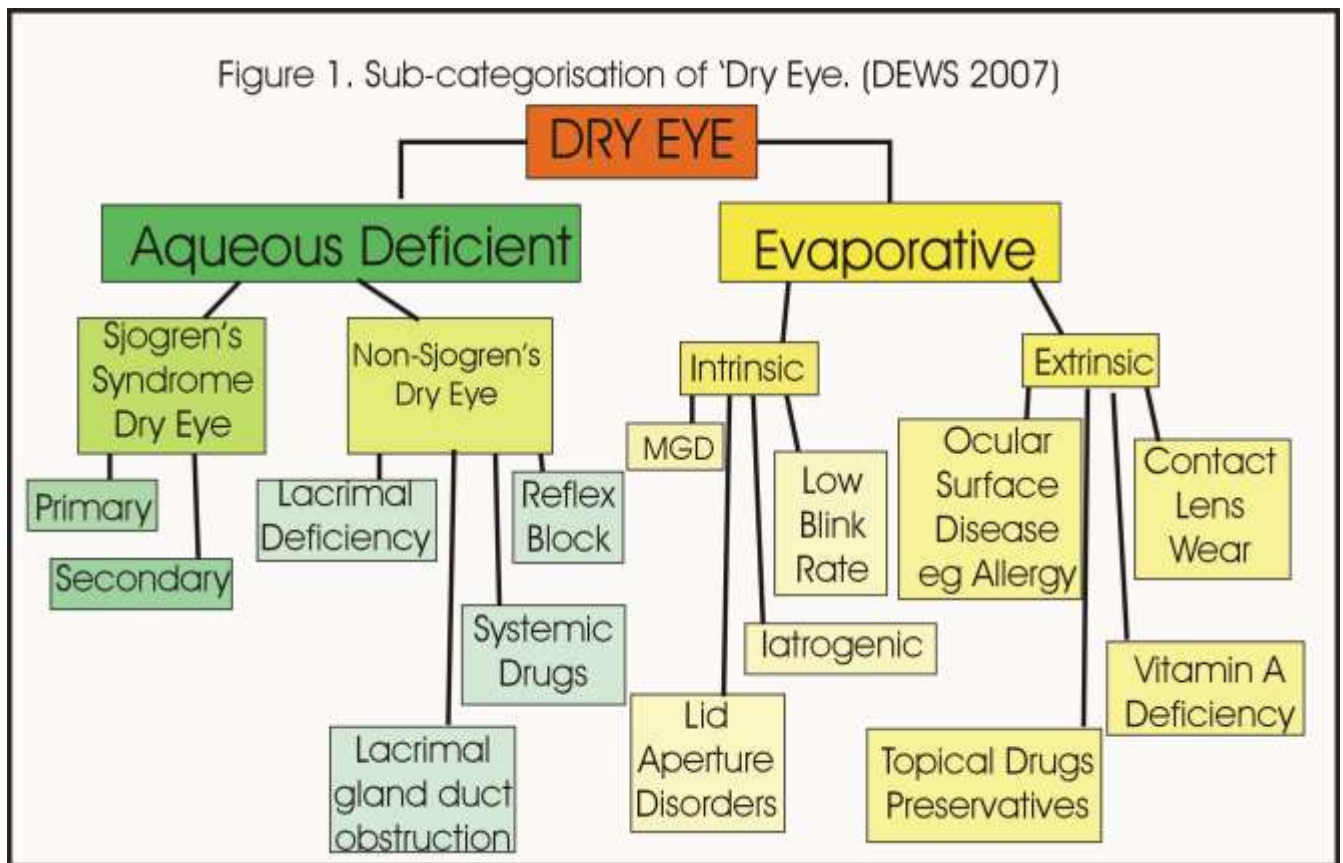
The inclusion of increased osmolarity of the tear film and ocular surface inflammation was essential to the definition of 'Dry Eye'. Tomlinson et al (2006) state osmolarity is the only biophysical measure reflecting the balance of inputs and outputs of tear film dynamics.

Regardless, the ability of clinical tests to identify a meticulously defined condition may fulfil a diagnostic process but without diagnosing the underlying aetiologies the clinician will be unable to proceed in anything but a most superficial palliative fashion. Indeed, from a clinician's point of view 'Dry Eye' is not a multifactorial disease but rather a multitude of inter-related but distinct morbidities, subjectively resulting in irritable, uncomfortable eyes. If unmanaged, these distinct morbidities will result in increased tear osmolarity and ongoing ocular trauma. Regardless of the trigger, increasing osmolarity damages the conjunctiva with loss of goblet cells, mucoid layer and tear adherence (Matheson 2008).

Further, it activates an inflammatory response producing direct tissue

damage and corneal anaesthesia compromising parasympathetic nerve function (Fox and Michelson 2000) and hence lacrimal and salivary gland secretion (Neal 2009).

DEWS decision to consider 'Dry Eye' as a single entity reflects this final common pathway. Clinically impossible to manage as a distinct morbidity, 'Dry Eye' must be subdivided, and DEWS did just that (Figure 1) identifying the plethora of distinct morbidities capable of inducing this end point pathway.



A clinical management plan can only be instigated once the real diagnosis is made. Optometrists must be clinicians not recipe followers.

Investigating the Nebulous.

Osmolarity is an objective measure in a largely subjective definition. The overwhelming subjectivity is reflected by the inconsistencies and vagaries of associated literature.

Nichols et al (2002) and DEWS (2007) state dry eye syndrome is a symptom based disease. Schaumberg et al (2003) further point out it is unlikely ocular surface damage would occur without symptoms. This is undoubtedly true but the assertion that subjective assessments, perhaps via validated questionnaires, are important diagnostic tests, and not simply screening tools, is a serious clinical misapprehension.

The difficulties in quantifying, rationalising and consequently treating 'Dry Eye' is a constant research theme (Schaumberg et al 2003, Perry and Donnenfeld 2004, McCarty et al 1998, Khanal et al 2008, Lee et al 2002). Reported prevalence of 'Dry Eye', ranges from 5% to 35% (Behrens et al 2006, DEWS 2007 Lee et al 2002, Schaumberg et al 2003, Craig 2009a, Moss et al 2000) with as many as 50% of contact lens patients reporting 'Dry Eye' (Morris 2006, Ramamoorthy et al 2008, Glasson et al 2003). Variations depend on the sample demographics, diagnostic tests and criteria utilised (Gayton 2009). DEWS (2007) list eight epidemiological studies; all used various subjective questionnaires alone to quantify the problem. The use of questionnaires is certainly attractive, relating directly to the subjective portion of the 'Dry Eye' definition while avoiding the need for a raft of clinical tests. Clinical tests, at least in isolation, demonstrate extremely poor sensitivity and specificity for the diagnosis of 'Dry Eye' (Behrens et al 2006, McCarty et al 1998); a frequently quoted rationale for preferentially pursuing symptomatology alone (Perry and Donnenfeld 2004, DEWS 2007,

McCarty et al 1998, Khanal et al 2008). DEWS (2007) indicate there is no consensus as to which combination of objective tests should be used to define the disease. Poor correlation between symptoms and objective signs, it is suggested, reflects poor repeatability of the objective tests while the same group present the possibility that the symptoms discernable via a questionnaire relate to parameters not measured by the objective tests employed. DEWS conclude questionnaires are the most repeatable diagnostic tests.

There are, however, other explanations. Objective tests evaluate different ocular characteristics (Khanal et al 2008), no reflection on the inadequacies of the test in question but rather the magnitude of the task of amalgamating a multitude of varying pathologies into a single defined disease. Further, the tests may not appear subtle enough to identify objectively all the subjective symptoms because the symptoms are not relating to a disease process. Khanal et al (2008) state symptoms alone are inadequate for a differential diagnosis as they can be experienced with a variety of ocular surface conditions. A poor quality or badly fitted contact lens, for instance, will profoundly impact on ocular surface symptomatology without any bearing on a diagnosis of 'Dry Eye'.

Table 1 lists the subjective symptoms proactively elicited from participants involved in 'Dry Eye' research; the subjects do not appear to have been masked to the study goals.

TABLE 1 Symptomatology categories in 'Dry Eye' Surveys

AUTHORS	SYMPTOMS
Nichols et al (2002)	Discomfort, Dryness, Soreness, Irritation, Grittiness, Scratchiness, Foreign Body Sensation, Burning, Itching.
Richdale et al (2007)	Dryness, Discomfort, Grittiness, Itchiness, Soreness, Pain.
Schaumberg et al (2003)	1) Have you ever been diagnosed by a clinician as having dry eye syndrome? 2) How often do your eyes feel dry (not wet enough)? 3) How often do your eyes feel irritable?
McCarty et al (1998)	Discomfort, Foreign Body Sensation, Itching, Dryness
Moss et al (2000)	For the past three months or longer, have you had dry eye? For subjects requiring more prompting this was described as: Foreign Body Sensation, Itching, Burning, Sandy Feeling, not related to allergy.
Lee et al (2002)	1) Do your eyes feel dry? 2) Do you ever feel a gritty or sandy sensation in your eye? 3) Do your eyes ever have a burning sensation?

Since none of the papers defined the subjective terms, what are they differentiating? Nichols and co-workers (2002) even compared the significance of individual descriptive words to predict 'Dry Eye' and found Dry Eye, Self Diagnosis of Dry Eye and Photophobia the most predictive. Does differentiating between responses such as discomfort, dryness, grittiness, scratchiness, foreign body sensation and burning have any meaning or do the results simply reflect the descriptive vocabulary of the subjects involved? It is also little wonder, in a 'Dry Eye' survey the term dry eye was a dominant descriptor. Intuitively it seems utterly implausible that subjects could categorise the various qualitative terms presented; they are quite simply describing the same thing.

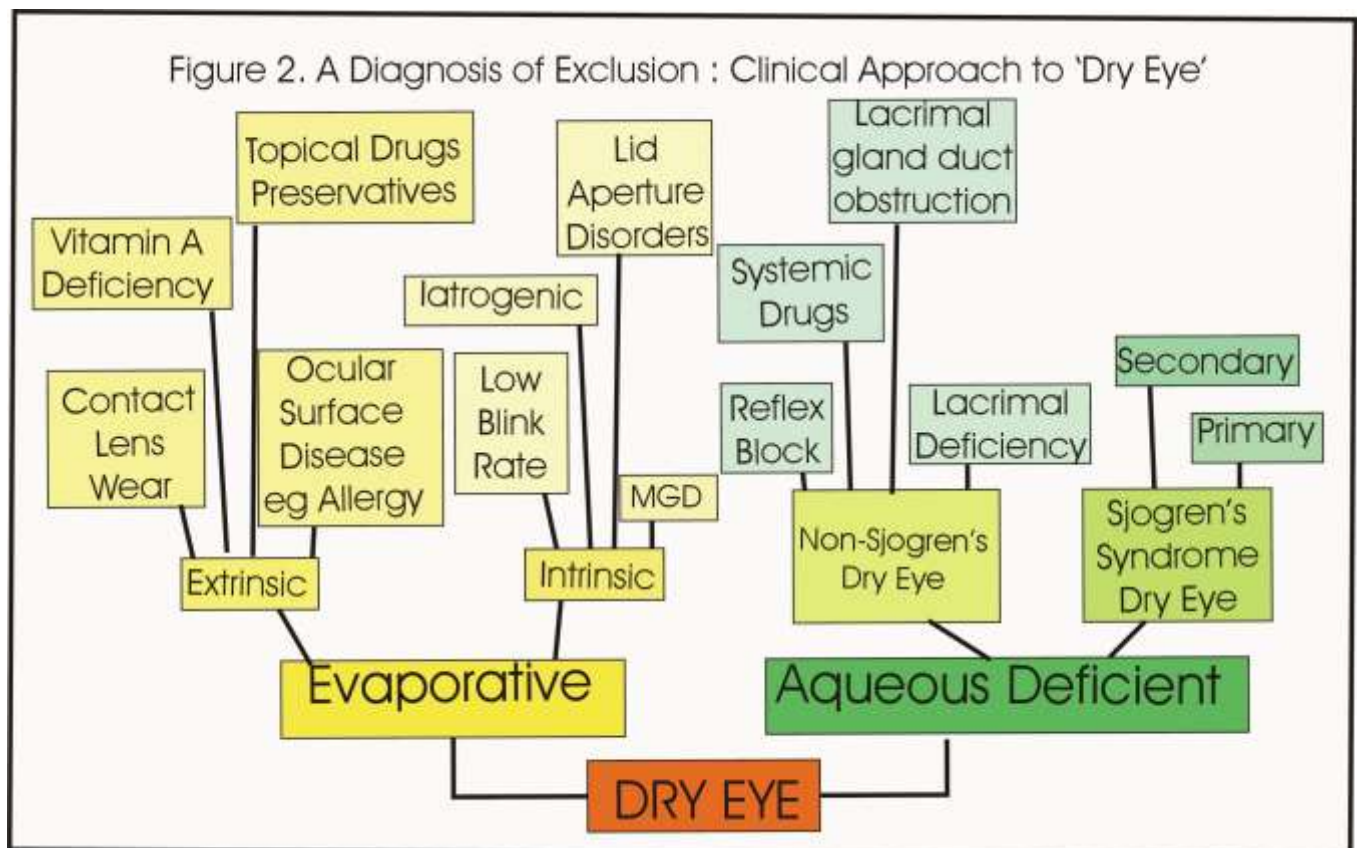
Regardless, some key papers describe subjective questionnaires as diagnostic (DEWS 2007, Nichols et al 2002, Craig 2009a). Craig (2009a) even suggests validated questionnaires allow rapid assessment in the waiting room as a pre-test. Optometrists and Contact Lens Practitioners must be disabused of this misconception; questionnaires do not allow the abdication of clinical expertise. Gothwal et al (2010), discussing the McMonnies questionnaire, specifically state this was always intended as a screening tool; more extensive use diagnostically is a misappropriation. DEWS (2007) further indicate the suitability of validated questionnaires for use in epidemiological studies, as screening tools prior to diagnosis and to assess treatment efficacy. While specifically discussing Sjogrens Syndrome, the sentiment expressed by Vitali (2003) is crucial: unless demonstrating both sensitivity and specificity of 100% classification criteria are not diagnostic, if used as such they may lead to misclassification of a disease; an expert clinician,

applying appropriate diagnostic criteria, is essential in establishing a diagnosis.

'Dry Eye': A Diagnosis of Exclusion

Reporting other papers Nichols and co workers (2002) state symptom assessment is the key to 'Dry Eye' diagnosis as many believe dry eye syndrome is a symptom-based disease. This is not a revelation; virtually all primary care medicine is symptom led. A thorough case history allows the expert clinician to customise examination techniques targeting the symptoms elicited; good clinical practice does not entail slavishly running a gamut of disparate tests.

Clinically investigating 'Dry Eye' is necessarily a process of exclusion. It is proposed that the original DEWS 'Dry Eye' categorisation be reversed as in Figure 2.



Correct diagnosis of the specific ocular surface disease will allow condition specific treatment and more effective management. This process starts with a thorough, comprehensive and flexible case history.

Case specific objective tests then test the clinician's hypothesis and lead toward an answer to the patient's presenting complaint. Many of the conditions listed in Figure 2 do not, in the opinion of the author, represent 'Dry Eye'; unless of course they are misdiagnosed and mismanaged in which case 'Dry eye' effectively becomes a self fulfilling prophecy with increasing tear osmolarity, inflammation and surface trauma ultimately satisfying all the requirements of a 'Dry Eye' diagnosis.

The quest for unified test strategies with discriminatory diagnostic power for 'Dry Eye' appears self defeating when faced with this surfeit of individual pathologies. The presentation of generic treatment algorithms (Craig 2009b, DEWS 2007), purportedly to aid clinicians treat 'Dry Eye' seem equally unsound considering the complexities of the real aetiologies. Craig (2009b) suggests, depending on the outcome of the evaluation, a dry eye will fall into one of four severity categories; appropriate treatments are then suggested (Table 2). Only severity is included, correct diagnosis of the ocular surface disease is not mentioned and therefore the treatments are generic; little use to a clinician.

Table 2. Proposed Treatment Algorithm for ‘Dry Eye’

(From Craig 2009b)

Severity	Features	Treatments
Level 1	Mild or episodic discomfort, often in response to environmental triggers, with or without visual symptoms. Mild (if any) signs of conjunctival hyperaemia, ocular surface staining, lid disease. Tear film stability and production are variably affected.	Educate about environmental or dietary modifications. Modify deleterious systemic medications. Use of artificial tear supplements, gels and/or ointments. Eyelid therapy
Level 2	Moderate discomfort and intermittent visual symptoms with or without exposure to provocative stimuli, more frequently exhibit corneal or conjunctival staining. Lid disease may feature, and tear film stability and production are usually affected.	<i>If Level 1 treatments insufficient, add:</i> Topical anti-inflammatory treatment Tetracyclines (lid disease and rosacea) Punctal plugs Secretagogues (if available) Goggles / moisture chamber spectacles
Level 3	Frequent or constant symptoms without provocation, and visual symptoms, which may be activity limiting. Moderate to marked ocular surface staining, possibly with filamentary keratitis, tear debris and mucus clumping. Lid disease is common and tear film stability and production are often markedly reduced.	<i>If Level 2 treatments insufficient, add:</i> Autologous serum Bandage contact lenses Permanent punctal occlusion (e.g. cautery)
Level 4	Signs and symptoms exhibited. Symptoms often severe, constant and disabling. Marked conjunctival hyperaemia and ocular surface staining with filamentary keratitis, mucus clumping, marked tear film debris and possibly even ulceration. Marked lid disease often present, associated with trichiasis, Symblepharon and keratinisation. Tear film break up is immediate and production rates minimal	<i>If Level 3 treatments insufficient, add:</i> Systemic anti-inflammatory agents / immunosuppressives Surgery: lid surgery / tarsorrhaphy mucus membrane, amniotic membrane or salivary gland transplantation.

If, for example, a toxicity reaction to a topical drop is diagnosed, by careful questioning of dose regime and the interpretation of corneal and conjunctival staining patterns, the diagnostician should not need to refer to a treatment algorithm for appropriate clinical managements. Recently, a patient was diagnosed with toxic epitheliopathy, having been previously diagnosed with 'Dry Eye'. When re-questioned once the corneal and conjunctival staining had been interpreted, she explained the necessity for instilling preserved gels up to 15 times per day to relieve the symptoms. In this case the term 'Dry Eye' was not merely misleading but was actually the cause of the escalating problem.

Likewise many of the conditions in Figure 2 represent distinct diagnostic entities requiring specific treatments; Ocular Surface Disease, Lid Aperture Disorders, Meibomian Gland Dysfunction, Blink Rate and Closure Anomalies, Iatrogenic conditions and Contact Lens Wear are all mentioned as subcategories of 'Dry Eye' but should be considered as separate entities. Each patient should be advised accordingly and appropriate management taken.

In many instances the management might mirror palliative 'Dry Eye' treatment. Involutional changes, iatrogenic lid anomalies post therapeutic and cosmetic surgery, lid aperture disorders such as Bells Palsy, Lagophthalmos and Conjunctivochalasis may benefit from Liposomal Sprays, non-preserved Hyaluronates or gels but the patient deserves an accurate explanation.

Conjunctivochalasis, also known as Lid Parallel Conjunctival Folds (LIPCOF) (Modis and Szalai 2011) exemplifies the misrepresentation of evidence. Modis and Szalai (2011) suggest conjunctival folds are sensitive indicators of dry eye disease. Craig (2009a) quantifies the risk of 'Dry Eye' with LIPCOF (Table 3).

Table 3. Grading of LIPCOF and relative risk of 'Dry Eye'

(From Craig 2009b)

Grade	Number of Folds	Increased risk of Dry Eye relative to Grade 0
0	No folds	0
1	Single fold, less than tear prism height	15X
2	Multiple folds, up to the tear prism height	63X
3	Multiple folds, higher than tear prism height	190X

However, Meller and Tseng (1998) define conjunctivochalasis as redundant conjunctiva considered a normal senile change. The problem can cause disturbance of tear outflow with resultant surface exposure. The authors further stress the need to differentiate conjunctivochalasis from other diseases generating similar symptoms since treatment modalities will vary. The presentation of LIPCOF as a marker for 'Dry Eye' rather than a distinct pathological entity that disrupts tear dynamics is simplistic and misleading.

It serves no purpose to mislabel a problem 'Dry Eye'; potentially counterintuitive to the patient experiencing epiphora it does not aid compliance when specific managements are recommended.

Contact Lenses Wear: Causing Evaporative 'Dry Eye'?

Reported prevalence of 'Dry Eye' amongst contact lens wearers is significantly higher than non-lens wearers (Morris 2006, Ramamoorthy et al 2008, Glasson et al 2003, Nichols and Sinnott 2006). This statistic could represent four possibilities. Contact lens wearers are more likely to represent pre-existing 'Dry Eye' patients, the act of contact lens wear induces 'Dry Eye' in otherwise healthy people, contact lens wear represents a challenge for the ocular surface making borderline ocular surface disease symptomatic or the research is measuring something else.

Contact lens wearers are classically younger with a mean age of 31 years (Morgan et al 2010) making it unlikely they represent an intrinsically 'at risk' group. Ramamoorthy et al (2008) and Nichols and Sinnott (2006) speculate contact lens wear may actually reduce aqueous production and alter the structure of meibomian glands. If a pathological entity is actually induced by a medical intervention then the risk, benefit and ethics of that intervention must be seriously considered. Certainly long term lens wear can cause corneal anaesthesia (Matheson 2008) with a negative feedback loop ultimately capable of inducing the 'Dry Eye' final common pathway. However, Richdale et al (2007) indicated long term contact lens satisfaction and comfort is more likely with patients who start wear at an early age while 33% of drop outs occur in the first year of wear (Brennan 2010), before contact lens induced pathological changes would occur.

Certainly contact lenses challenge ocular physiology. Ramamoorthy et al (2008) report that FDA Group II and IV lenses are three times more

likely to cause 'Dry Eye' than Group I lenses and high water content lenses also cause more 'Dry Eye'. Anecdotally most clinicians will attest certain lenses give better long term comfort. Is the term 'Dry Eye' appropriate here? Ocular discomfort and drop out does not necessarily reflect a patient centred problem but rather a poorer quality or ill fitting contact lens. Many statistics purporting to measure 'Dry Eye' are in fact measuring general discomfort due to an ocular foreign body. Increased evaporation of the tear film, inflammation, dewetting of the lens surface, lipid and protein deposition (Nichols and Sinnott 2006), limbal injection, reduced lens biocompatibility (Ramamoorthy et al 2008) are reported causes of 'Contact Lens Related Dry Eye'. This term is clearly an inappropriate description of the processes listed. Creating an angry eye with poor lens parameters, resulting in injection and inflammation, and then labelling it 'Dry' is professionally inexcusable.

Clinicians must assess patients thoroughly to pre-empt subclinical ocular surface abnormalities and manage both the problem and patient expectations. The best health options must be advised and offered. We must not be prescriptive on health or cost. Contact lens practitioners must fulfil their part of the professional service; the burden of care is not solely the remit of contact lens and solution manufacturers. It is up to the profession to fulfil the clinical role of expert diagnosticians and therapists.

True Dry Eye: Drug History

Friedlaender (1992) distinguishes two sorts of 'Dry Eye' patient; those with a modest decrease in tear production associated with age or medications and those with severe dry eye, especially middle aged women with features of systemic autoimmune disease. Published in a rheumatology journal this definition reflects a medical interpretation of the problem.

Optometrists do take medical and drug histories. Certain fundamentals are well ingrained; oral contraceptives and antihistamines are accepted as inducing 'Dry Eye' (Forster 2012). Also available is the optometry targeted emedINFO (Thomson and Lawrenson 2009) and 'Meyler's Side Effects of Drugs' (Aronson 2006). Are these acceptable surrogates for clinical experience? Inconsistencies and omissions are certainly present. For Keratoconjunctivitis Sicca, neither Meyler nor emedINFO include Detrusitol. A strong antimuscarinic drug licensed for the treatment of Urge Incontinence, the Summary of Product Characteristics (SPC) (Pharmacia 2012) and the BNF (2012) specifically state 'Dry Eye' as a side effect.

Conversely there is less evidence of other drugs inducing 'Dry Eye'; Meylers does not highlight any antihistamines or oral contraceptives. BNF (2012) and associated SPCs mention dry mouth and blurred vision but not dry eye as side effects of antihistamines. Likewise for oral contraceptives the BNF (BNF 2012) only mentions contact lens intolerance and visual disturbances. Antimuscarinic effects of antihistamines and alterations in androgen and oestrogen levels are potential causes of reduced tear production (Foster 2012) but the real effects seem less apparent.

Further, these reference sources do not give any indication of ADR likelihood; the specific SPC is essential to quantify these probabilities. Finally the effects themselves can be descriptively imprecise. Amongst the ocular adverse reactions listed in the SPC for Viagra (Pfizer 2010) are Visual Disorders (Common – 1 in 10 to 1 in 100), and Conjunctival Disorders, Eye Disorders, Lacrimation Disorders, Other Eye Disorders (Uncommon – 1 in 100 to 1 in 1000), none of which carry any diagnostic meaning.

Reliance solely on reference tomes would seem less than ideal. Clinicians must be circumspect and use personal clinical judgement, based on habitual, repetitive practice to guide interpretation of often vague and sometimes contradictory evidence. Recording a drug inventory without a frame of reference serves no purpose; an intuitive feel for commonly used drugs helps distinguish facts from clinical noise.

True Dry Eye: Sjogren' Syndrome. A Lesson in Diagnosis.

The diagnosis of Sjogren's is typically delayed for up to 11 years (Derk and Vivino 2004, Jonsson et al 2000). Jonsson et al (2000) suggests the delay in diagnosis is, in part, due to lack of awareness of the disease among health care professionals.

This represents a serious indictment, particularly for a profession seemingly obsessed with 'Dry Eye'. Associated signs and symptoms of Sjogrens include fatigue, fevers, weight loss (Derk and Vivino 2004),

musculoskeletal, pulmonary, gastric, haematologic, dermatologic, renal and nervous system involvement (Jonsson et al 2000) and life threatening vasculitis (Vitali et al 1993). Complications directly attributable to dry eyes and mouth include mouth sores, malnutrition, oral candidiasis, sleep disruption, fibromyalgia, accelerated dental caries, bacterial conjunctivitis, corneal ulceration and vision loss (Vivino and Orlin 2000).

Mirroring the entire 'Dry Eye' conundrum, there is no single infallible test for Sjogren's Syndrome (Vitali et al 1993). Derk and Vivino (2004) suggest that minor salivary gland biopsy remains the 'gold standard' for diagnosis, but Fox et al (1986) simply suggest it is the most specific test.

Correlating and quantifying the best combinations of clinical and laboratory findings to refine and unify the diagnosis of Sjogren's has been an ongoing enterprise (Skopouli et al 1986, Manthorpe et al 1986, Fox et al 1986, Vitali et al 1993, Vitali et al 2002). Vitali et al (2002) present a 6-item criteria set (Figure 3) with demonstrated value as a diagnostic tool. Items I to III can be readily incorporated into routine optometric practice.

Figure 3. Revised Sjögrens classification

(From Vitali et al (2002))

Classification criteria for Sjögren's syndrome: a revised version of the European criteria proposed by the American-European Consensus Group.

- I. OCULAR SYMPTOMS
 - a. A positive response to at least one of the following
 - i. Have you had daily, persistent, troublesome dry eyes for more than 3 months?
 - ii. Do you have a recurrent sensation of sand or gravel in the eyes?
 - iii. Do you use tear substitutes more than 3 times a day?
- II. ORAL SYMPTOMS
 - a. A positive response to at least one of the following
 - i. Have you had a daily feeling of dry mouth for more than 3 months?
 - ii. Have you had recurrently, or persistently swollen salivary glands as an adult?
 - iii. Do you frequently drink liquids to aid in swallowing food?
- III. OCULAR SIGNS
 - a. A positive result for at least one of the following
 - i. Schirmer I test, without anaesthesia, (<5mm in 5 min)
 - ii. Rose Bengal score (>4 using van Bijsterveld's scoring system)
- IV. HISTOPATHOLOGY
 - a. In minor salivary glands focal lymphocytic sialoadenitis :
 - i. Focus score >1; defined as the number of lymphocytic foci per 4mm of glandular tissue.
- V. SALIVARY GLAND INVOLVEMENT
 - a. Objective evidence of salivary gland involvement defined as a positive result for one of the following
 - i. Unstimulated whole salivary flow (<1.5ml in 15 min)
 - ii. Parotid sialography showing the presence of diffuse sialectasias, without evidence of obstruction in the major ducts.
 - iii. Salivary scintigraphy showing delayed uptake, reduced concentration and/or delayed excretion of tracer
- VI. AUTO-ANTIBODIES
 - a. Presence on serum of
 - i. Antibodies to Ro(SSA) and/or La(SSB) antigens

NOTES

For Primary SS

- I. Presence of any 4 of the 6 indicates Primary SS but the 4 must include IV and/or VI
- II. Presence of any 3 of the 4 objective criteria (that is : III, IV, V, VI)

For Secondary SS

For patients with a potentially associated disease, the presence of items I or II plus any 2 from amongst items III, IV, V may be considered indicative of Secondary SS.

Exclusion Criteria :

1. Past head and neck radiation treatment
2. Hepatitis C infection
3. AIDS
4. Pre-existing lymphoma
5. Sarcoidosis
6. Graft versus host disease
7. Use of anticholinergic drugs

Item III includes the van Bijsterveld assessment; anathema to almost every grading, quantifying and cataloguing standard of optometry. The van Bijsterveld test exemplifies the disparate goals of clinicians and researchers. As an isolated test it demonstrates virtually no sensitivity or specificity, nor is it validated, it simply represents an extremely quick aid to a diagnostic process and must not be viewed in isolation. Items I, II or III simply help piece together a clinical jigsaw, helped by a thorough case history, including general health and medications, as well as an understanding of the demographics of Sjogren's.

The complexities of diagnosing a specific disease, considered simply a sub-category of 'Dry Eye', reiterates the futility of striving to find a global index for 'Dry Eye' diagnosis and indeed the counter-productive nature of considering it a single entity; it is not.

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