

DEWS	DRY EYE: DIAGNOSTIC TEST TEMPLATE	
RAPPORTEUR	Alan Tomlinson	20 th Oct 2004
TEST	Fluorimetry - Tear Turnover	
TO DIAGNOSE	Aqueous tear deficiency (reduced lacrimal output).	REFERENCES
VERSION of TEST	[Version 1] Scanning automated fluorophotometry (Fluorotron Master, Coherent Inc, Palo, Alto, CA)	
DESCRIPTION	To measure tear turnover indirectly by observing decay of fluorescence of sodium fluorescein in the tears.	
CONDUCT of TEST	<ol style="list-style-type: none"> 1) Subject is seated at the chin rest of the Fluorotron (with the anterior segment adapter fitted). Horizontal and vertical adjustments are made to align the subject's eye in the instrument's optic beam. 2) Three scans are conducted to establish the intrinsic corneal autofluorescence. 3) One μl of 2% sodium fluorescein is instilled into the lower fornix with a pipette. 4) Initial scans are taken 1 minute post instillation, then at 2 minute intervals for a further 20 minutes. 5) The intrinsic corneal autofluorescence value is subtracted from all values obtained from tear film fluorescence, prior to data analysis. 6) Fluorescein concentration at each time point is calculated from the Fluorotron scans obtained at all time points beyond 4 minute post instillation, to avoid initial reflex tearing caused by instillation. 7) The decay in fluorescence is calculated from the log of the curve obtained from the formula: $T_0(t_0) = 100 \frac{[C_t(t_0) - C_t(t_0+1)]}{C_t(t_0)} \quad (\%/min)$ <p>Where $C_t(t)$ = fluorescein concentration in tear film at time t(min).</p> <p>Assuming a monophasic decay of fluorescence from 5 mins post instillation with a decay time constant β (min^{-1}):</p> $C_t(t) = C_t(0).e^{\beta t} \quad (ng/ml)$ <p>the following is obtained:</p> $T_t(t_0) = 100 (1 - e^{\beta t}) \quad (\%/min)$ <p>This calculation can be carried out using the software package ANT_SEGMENT tear.</p>	<p>Kuppens, 1992 Van Best, 1995</p> <p>Van Best, 1995</p>
Web Video	Not a vailable	
Materials:	Fluorotron Master 2% sodium fluorescein Mimims (Chauvin, UK)	

	Air displacement pipette P2 Pipetman (Gilson, Villiers-le-Bel, France) Disposable sterile tips (Gilson, Villiers-le-Bel, France).	
Variations of technique	Varying concentrations and instillation volumes of fluorescein can be used, e.g. 1% and 0.5µl.	
Standardization	Time of day [X] Temperature [] Humidity [] Air speed [still] Illumination [low ambient] Other:[Blink is initiated immediately prior to scan to ensure uniform tear thickness]	Pearce et al, 2000
Diagnostic value	This version : [] Determination of tear turnover an indication of aqueous tear deficiency. To obtain estimate of tear drainage from eye. Other version: []	Mathers, Daley, 1996 Mathers et al, 1996 Gobbels et al, 1992
Repeatability	<i>Intra-observer variation. [Not significant]</i> <i>Inter-observer variation. [Not significant]</i>	Mishima et al, 1966 Van Best, 1995
Sensitivity	[NA]	
Specificity	[NA]	
Test problems	High cost of basic equipment. Time required for measurement. Indirect (surrogate) measure of tear outflow as it is assumed that fluorescein and aqueous tear are eliminated at the same rate from the eye. Absorption of fluorescein into the ocular tissue may be a factor in dry eye patients and may decrease apparent rate of decay.	
Test solutions	Use of high molecular weight conjugates.	McNamara et al, 1998
FORWARD LOOK	Production of a cheaper automated scanning fluorophotometer. Development of reduced test incorporating 6 measurements for total of 10 minutes (tear turnover).	Pearce et al, 2000
Glossary		

References

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