

THE DISC DAMAGE LIKELIHOOD SCALE

The concept of cup:disc ratio(CDR) was developed by Armaly in 1967 as a standardised way of documenting disc appearance in order to determine the damage caused to retinal ganglion cells. An enlarging cup:disc ratio is undoubtedly linked with glaucomatous loss, but this system does not take into consideration the influence of optic disc size and the focal changes seen in glaucomatous optic neuropathy. It is well recognised that there is significant intra and inter observer error with this method. This has been tried to overcome by considering various other factors like peripapillary haemorrhage, peripapillary atrophy, NFL defects, focal NRR thinning HRT evaluations, OCT evaluations. One such methodology developed to have standardised disc damage assessment is DDLS.

The disc damage likelihood scale (DDLS) was devised by Spaeth et al in 2002 to incorporate the effect of disc size and focal rim width into a clinical grading scale. The system categorises the disc as small (<1.5mm), medium(1.5-2.0mm) or large(>2.0mm). This ensures that the disc size is measured thereby reducing misclassification bias based on disc size. Disc size can be measured using a fundus lens at the slit-lamp. A slit beam is directed onto the disc and the graticule at the top used to reduce the height of the beam until it corresponds in size to the disc. The lens used will determine the correction factor. A 66D gives the exact measure from the graticule. Correction factors for the other lenses are -Volk Nikon

60D-0.88	60D-1.03
78D-1.2	90D-1.63
90D-1.33	

The next stage is to measure the width of the thinnest part of the rim. Examiner must evaluate the rim throughout its entire circumference in order to identify the area of greatest thinning. The measurement is expressed in rim:disc. Where there is no rim present at the thinnest point the value is 0. The circumferential extent of rim absence is then measured in degrees. Care must be taken when evaluating a sloping rim because a sloping rim is not an absent rim. With the help of the table one can determine the stage of glaucomatous ONH damage.

ADVANTAGES

Documenting a CDR is quick, but it is of little use in either the diagnosis or longitudinal monitoring of glaucoma. The DDLS not only forces the clinician to determine the size of the disc, alerting the observer to which discs are big and which are small but it also formalises the evaluation of the neuroretinal rim. Because each grade is assigned a numerical value the system can then be used in research settings to determine severity or degree of progression.

George L. Spaeth et al found in a study that with regard to the photographs, the intraobserver and interobserver reproducibility was better using the DDLS than the c/d ratio (98% versus 85% for intraobserver of reproducibility, and 85% versus 74% for interobserver reproducibility). The DDLS correlated better with the Humphrey Visual Field than did any Heidelberg Retina Tomograph parameter.

DISADVANTAGES

Optic nerve heads come in many shapes and forms. No method of classification will fit all of these different patterns and forms. The

DDLS cannot be used to evaluate certain types of discs, such as those that are congenitally anomalous. Myopic discs may be difficult to grade.




























Another problem with the DDLS is that a disc may show progressive damage by having a continuing generalized narrowing of the neuroretinal rim, but not have an increase in the circumferential extent of rim absence. In such a situation the disc would unquestionably

have become worse, but the DDLS score will not change. Fortunately this seems to be a rare occurrence.

It takes some effort to learn it and initially a copy of the table should always be to hand. However, given practice and used accordingly the DDLS is an excellent tool for classifying and monitoring the optic nerve in glaucoma

Notch in the rim - Highly suggestive

THE DISC DAMAGE LIKELIHOOD SCALE

DDLS Stage	Narrowest width of rim (rim/disc ratio)			DDLS Stage	Examples		
	For Small Disc <1.50 mm	For Average Size Disc 1.50-2.00 mm	For Large Disc >2.00 mm		1.25 mm optic nerve	1.75 mm optic nerve	2.25 mm optic nerve
1	.5 or more	.4 or more	.3 or more	0a			
2	.4 to .49	.3 to .39	.2 to .29	0b			
3	.3 to .39	.2 to .29	.1 to .19	1			
4	.2 to .29	.1 to .19	less than .1	2			
5	.1 to .19	less than .1	0 for less than 45°	3			
6	less than .1	0 for less than 45°	0 for 46° to 90°	4			
7	0 for less than 45°	0 for 46° to 90°	0 for 91° to 180°	5			
8	0 for 46° to 90°	0 for 91° to 180°	0 for 181° to 270°	6			
9	0 for 91° to 180°	0 for 181° to 270°	0 for more than 270°	7a			
10	0 for more than 180°	0 for more than 270°		7b	