First analysis of the objectively measured disc damage likelihood scale by KOWA non mydriatic fundus camera and its correlation to Heidelberg retina tomography and optic coherence tomography.

Milena Pahlitzsch[1], Necip Torun[1], Jeanette Brünner[1], Saskia Jacob[1], Carl Erb[2], Antonia M. Joussen[1], Sibylle Winterhalter[1], Eckart Bertelmann[1], Matthias KJ. Klamann[1]

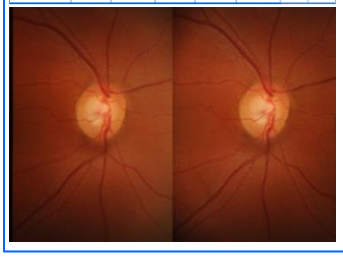
[1]Department of Ophthalmology, Charité-University medicine Berlin, Berlin
[2]Augenklinik am Wittenbergplatz, Berlin

Purpose

- To evaluate the objectively measured disc damage likelihood scale (DDLS) by KOWA wx 3D fundus camera and compare the optic nerve head (ONH) morphology to Moorfields regression analysis (MRA) and glaucoma probability score (GPS) of the Heidelberg retina tomograph (HRT) and retinal nerve fibre layer (RNFL) thickness of optical coherence tomography (OCT) in POAG

Patients and Methods

	Age	Cup disc ratio examination	GAT	Perimetry MD	Perimetry PSD	Gender	
						Male	Female
N	297	503	503	503	503	121	176
						40.70%	59.30%
Mean	62.5	0.63	15.22	3.48	3.67		
Median	69	0.7	15	2.85	3.1		
Standarddeviation	17.78	0.24	3.52	8.58	2.04		



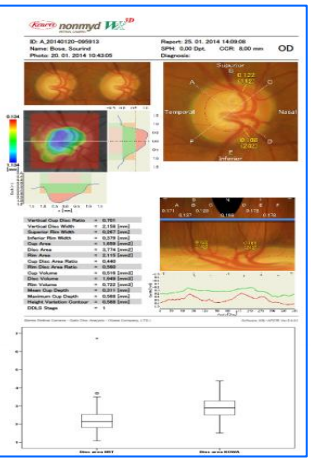
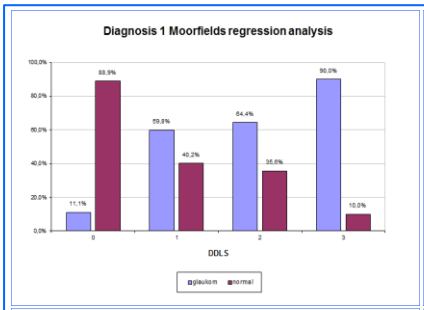


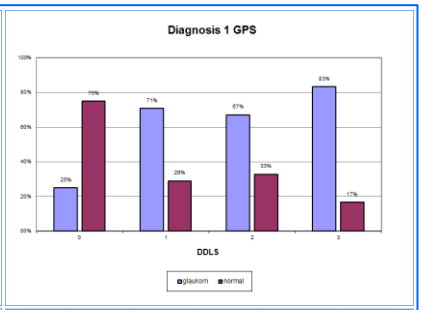
Table 1: characteristics of the study.

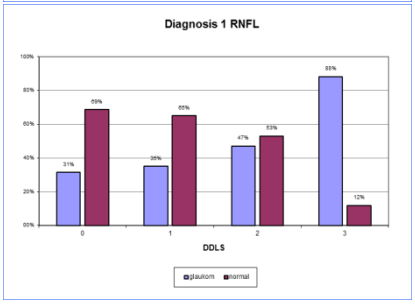
- Prospective study: 503 eyes of 279 caucasian patients (121 male 40.7%, 176 female 59.3%) with POAG were included.
- 2 simultaneous, stereometric photographs of the ONH at an angle of 34° to each other by KOWA non mydriatic wx 3D fundus camera
- Mean Moorfields regression analysis (MRA), mean glaucoma probability score (GPS) and stereometric parameters were measured by HRT 3 (Heidelberg).
- Mean global retinal nerve fibre layer (RNFL) was measured by OCT (Heidelberg HRA+OCT Spectralis).
- All 3 devices graded the optic disc topography related to the predictability for glaucomatous damage:
- Results were split in 2 groups: Diagnosis 1 was defined as “outside normal limits”, Diagnosis 2 as “borderline or outside normal limits”
- The relationship between DDLS, HRT parameters and OCT RNFL was analysed by χ^2-test, ANOVA with SPSS v20.0.

Outcome

- Mean optic disc size measured by HRT was 2.2mm² and 2.90mm² by KOWA (r=0.53, p<0.001).
- Referring to Diagnosis 1:
  DDLS showed significant correlation with MRA (p<0.001), glaucoma probability score analysis (p=0.028) and RNFL (p<0.001).
  MRA showed significant correlation to GPS and RNFL with moderate kappa (=0.3 and =0.4)
- Referring to Diagnosis 2:
  DDLS showed significant correlation with MRA (p<0.011), glaucoma probability score analysis (p<0.001) and RNFL (p<0.001).
  MRA showed significant correlation to GPS and RNFL with moderate kappa (=0.3 and =0.3)
- Significant correlation was found between DDLS 0-4 and R. Burk (p=0.003) and F.S. Mikelberg coefficient (p<0.001)







	DDLS	mean	Standard-deviation	95%-Confidence intervall lower limit	95%-Confidence intervall upper limit
FSM	0	1.83	3.00	-0.47	4.14
	1	-0.68	2.45	-1.20	-0.15
	2	-1.11	2.28	-1.64	-0.58
	3	-2.36	2.01	-3.31	-1.42
	total	-0.9	2.48	-1.26	-0.55
RB	0	1.24	0.83	0.59	1.88
	1	0.41	1.14	0.16	0.65
	2	0.47	1.10	0.22	0.73
	3	-0.34	1.13	-0.87	0.19
	total	0.39	1.15	0.23	0.56

Table 2: χ^2-test DDLS compared to Moorfields regression analysis, GPS and RNFL referring to diagnosis 1, Table 3: ANOVA - DDLS compared to FSM and RB

Summary and Conclusions

- **The objectively determined DDLS by KOWA fundus camera performed well compared to MRA, GPS and RNFL analysis. Additionally to HRT and OCT the KOWA fundus camera appeared to be a reliable and effective tool in the optic disc evaluation in glaucoma.**

Literature Spaeth GL et al.The disc damage likelihood scale: reproducibility of a new method of estimating the amount of optic nerve damage caused by glaucoma. (185-6).Trans Am Ophthalmol Soc. 2002;100:181–5. discussion.

Conflicts of interest: 1. No, 2. No., 3. No., 4. No, 5. No