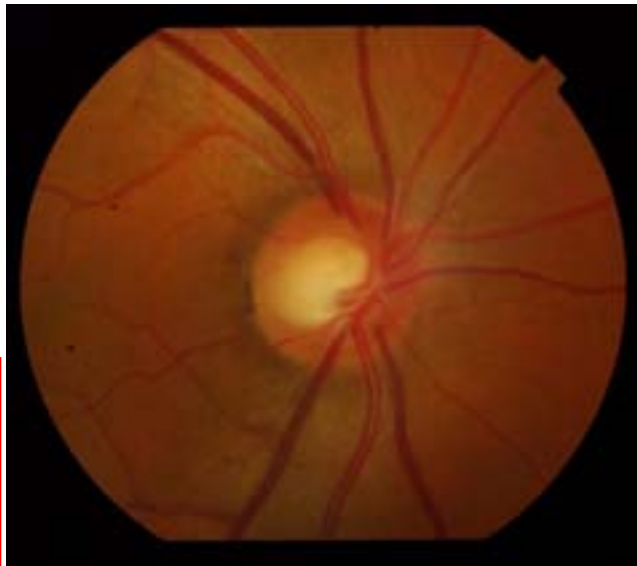


Recognising Glaucomatous Discs

Glaucoma Referral Refinement Training
9th February 2011
Hereford

Prof David Henson
University of Manchester and Manchester
Royal Eye Hospital

Example



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

Example



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

Instructions

- You will be presented with 20 optic disc images.
- 16 images come from patients who have definitely normal visual fields and 4 from patients with definite visual field loss.
- Your task is to grade the optic disc as:
 - definitely healthy,
 - probably healthy,
 - not sure,
 - probably damaged,
 - definitely damaged.
- Each image will be displayed 10 seconds.
- Your decision should be based on the amount of optic disc damage.

1.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

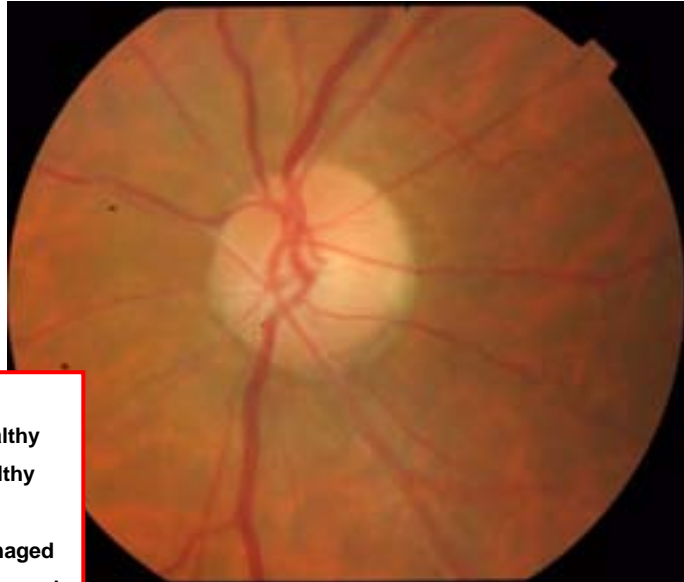
2.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

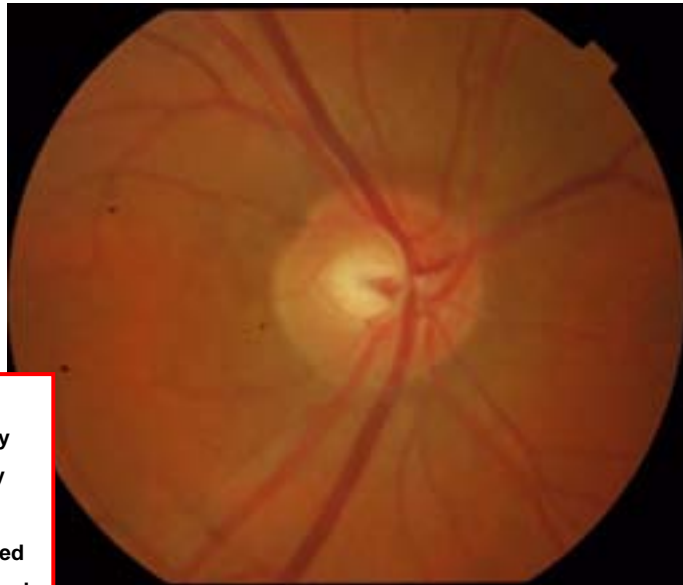
3.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

4.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

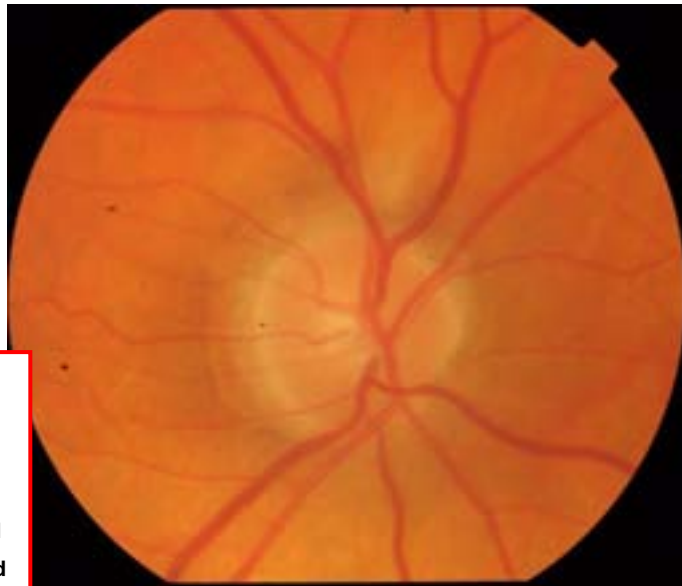
5.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

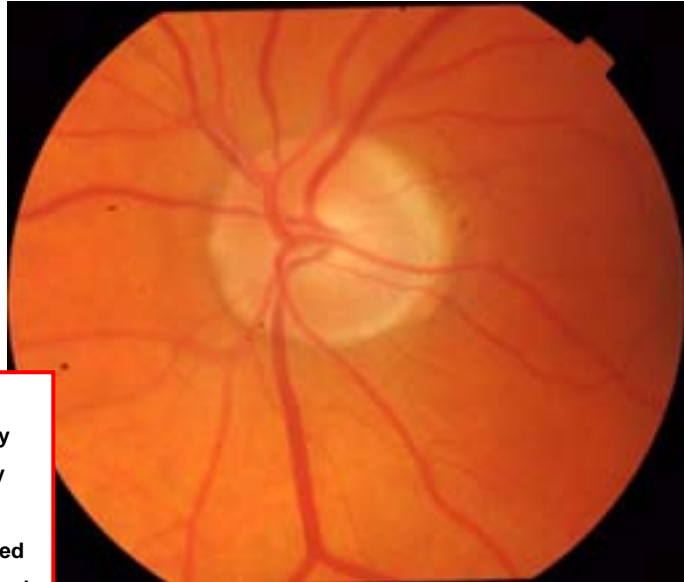
6.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

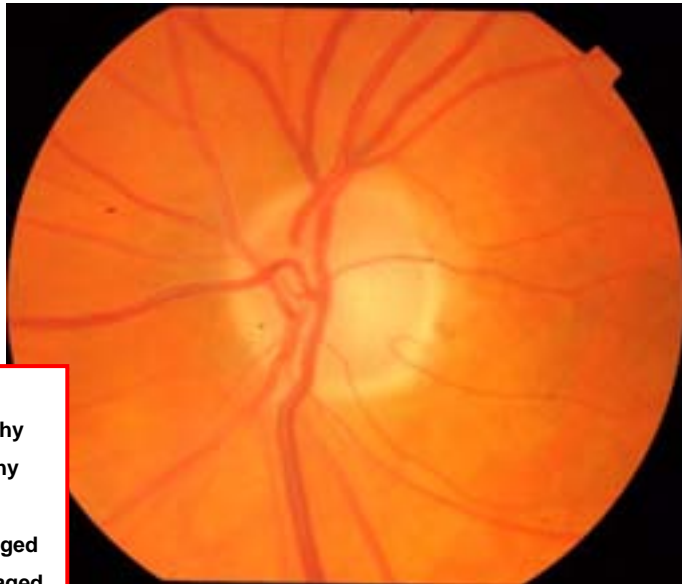
7.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

8.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

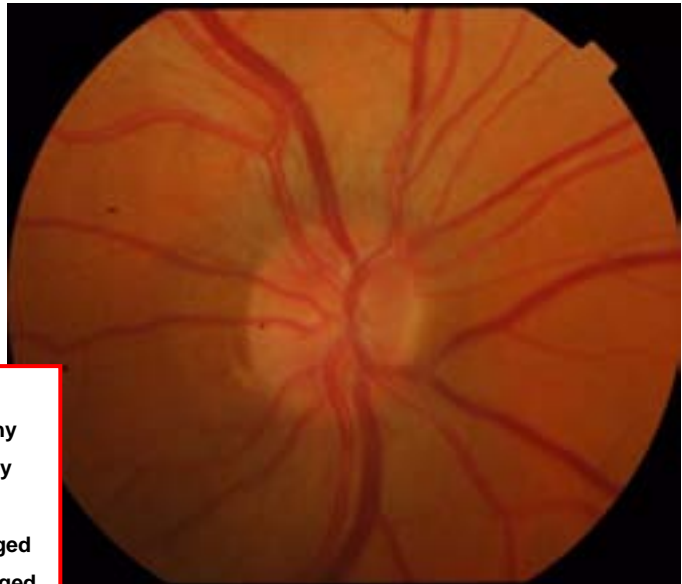
9.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

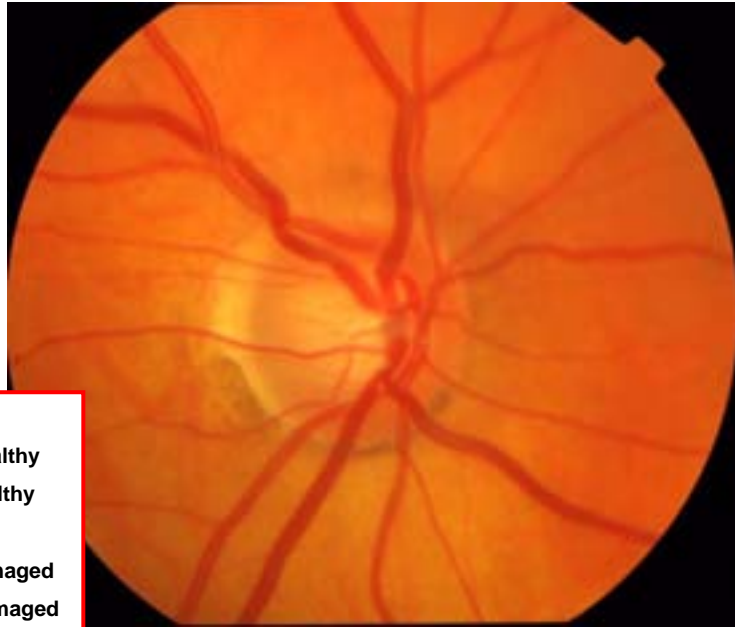
10.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

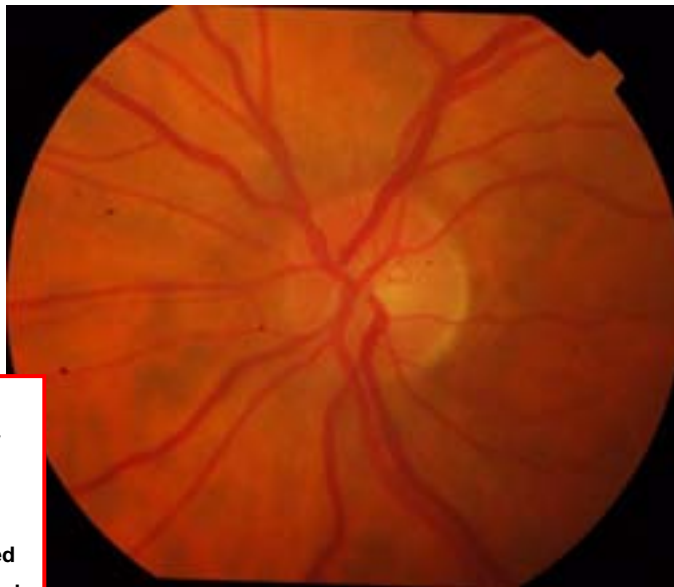
11.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

12.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

13.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

14.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

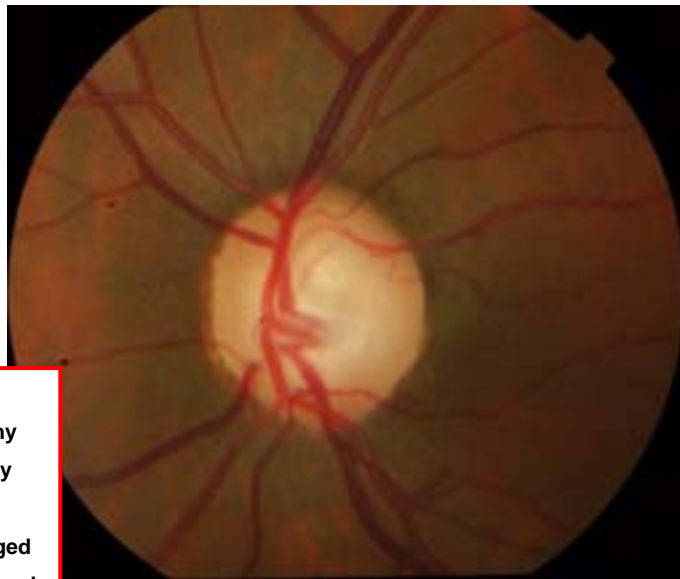
15.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

16.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

17.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

18.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

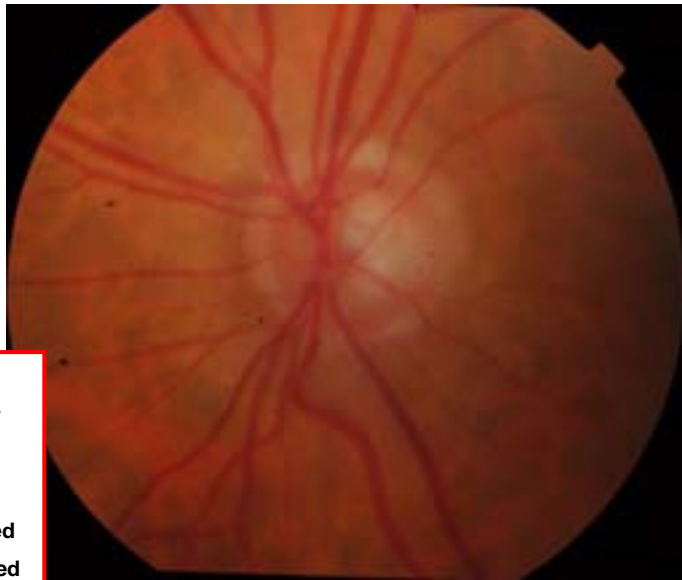
19.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

20.



Score

- 1 Definitely Healthy
- 2 Probably Healthy
- 3 Can't tell
- 4 Probably Damaged
- 5 Definitely Damaged

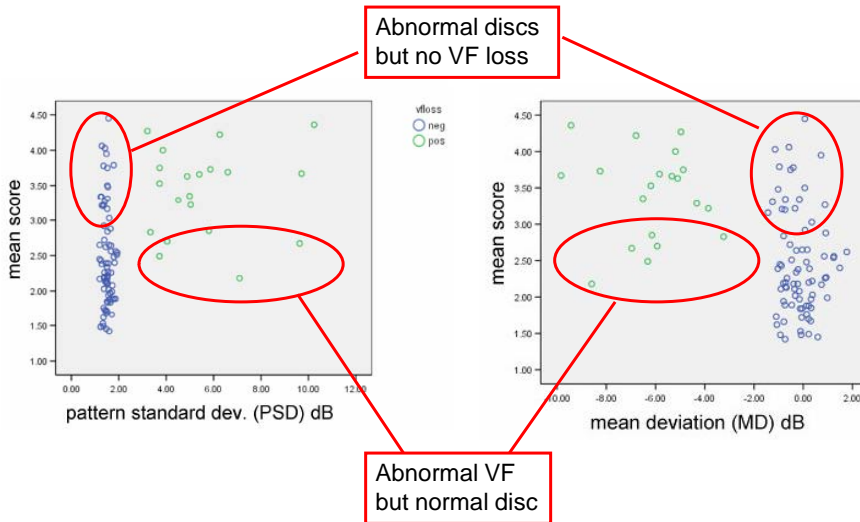
Image Selection

- Taken from database of patients attending Manchester Royal Eye Hospital glaucoma clinics:
 - high proportion of 'suspect' discs
- Images classified as normal or glaucomatous on the basis of visual field data- independent classifier
- Inclusion criteria
 - Minimum of 4 HFA SITA Std visual field records
 - VF results consistent
 - Good quality images

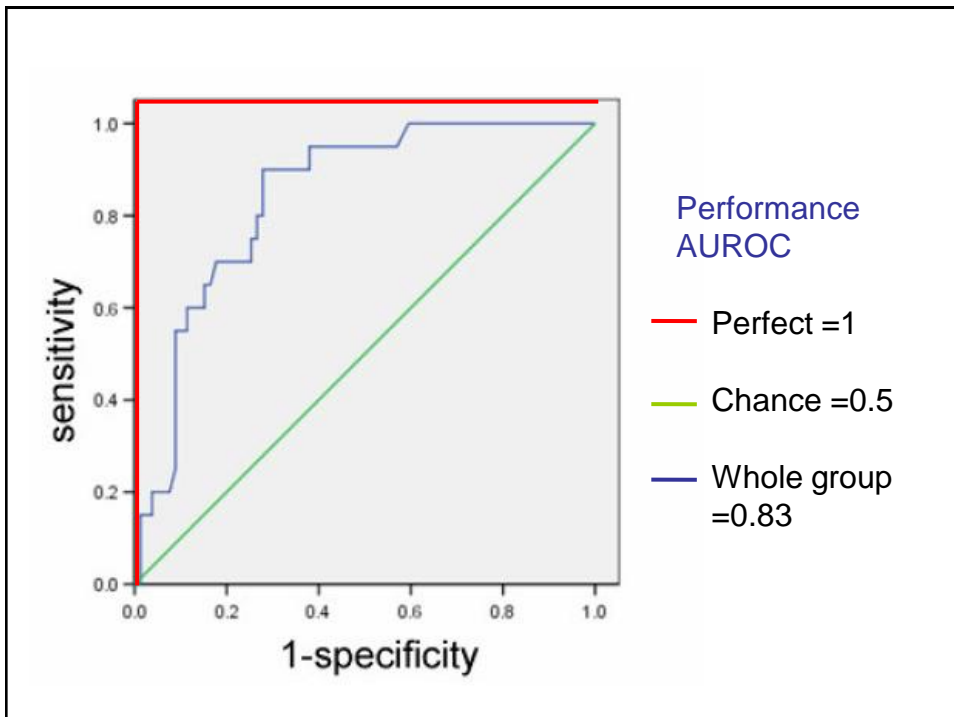
Pilot data

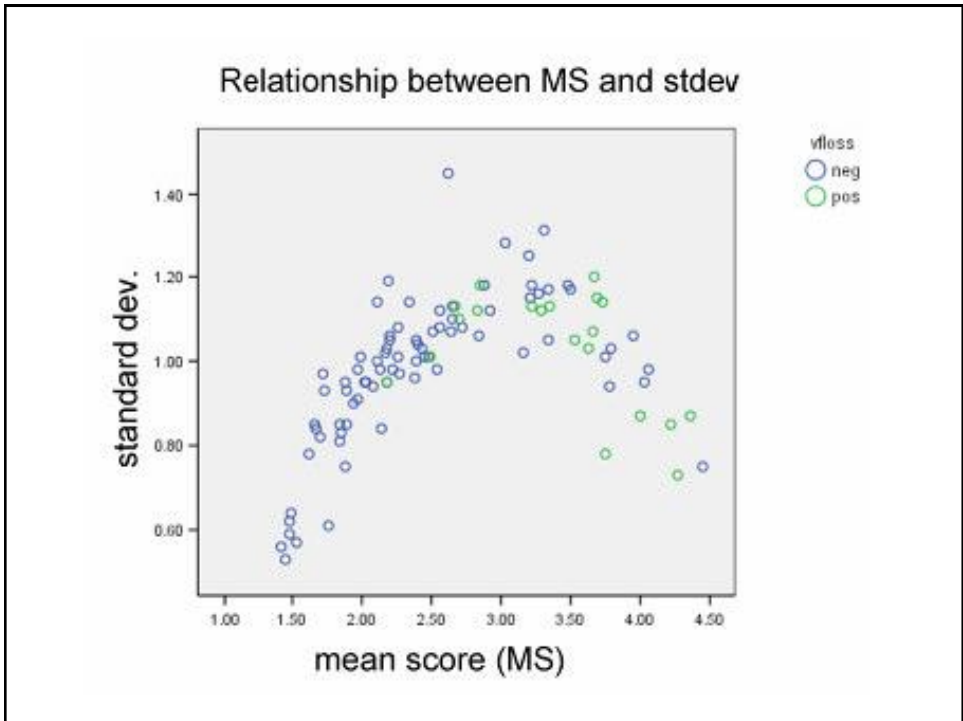
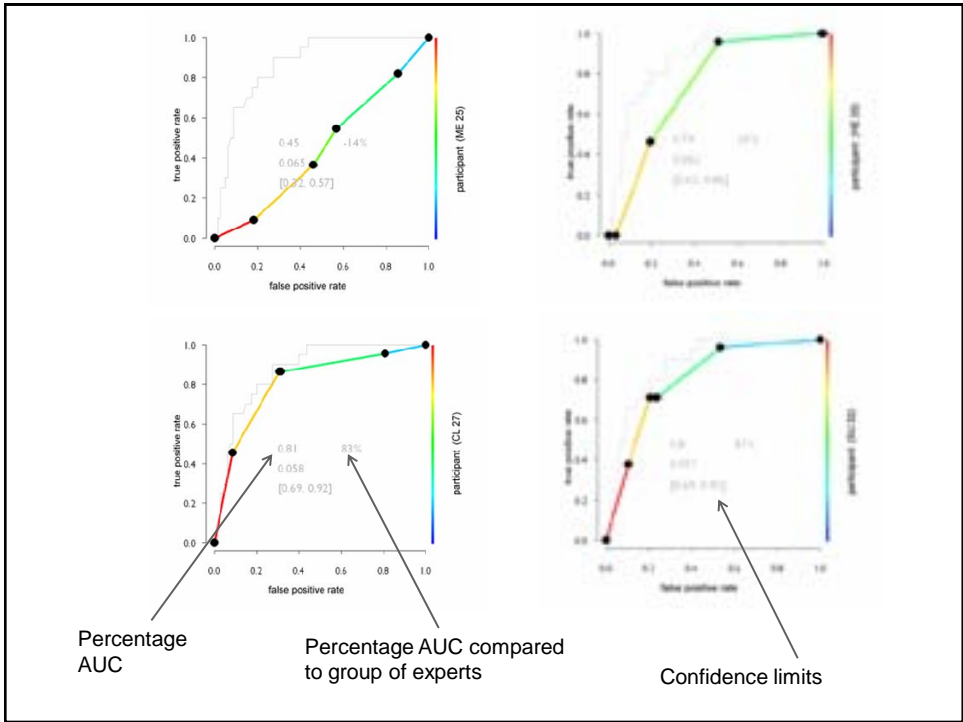
- 26 clinicians
 - Specialist consultants
 - Consultant trainees
 - HES optometrists working in glaucoma clinics
 - Community optometrists

Visual field data



Note: 100 eyes in database, you have been shown a subset of 20





Answers

- Independent classifier
 - No Visual field loss in either eye on 4 consecutive examinations with SITA Std
 - Glaucomatous visual field loss on 4 or more consecutive SITA tests

1.



ParkK_040547_R_070905.bmp

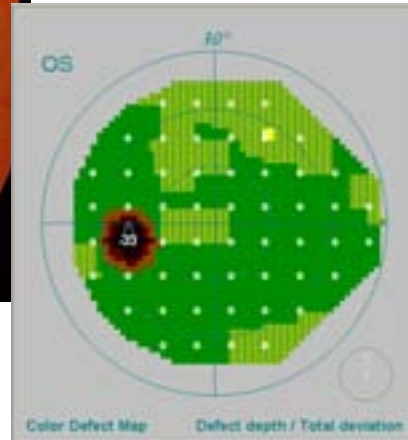
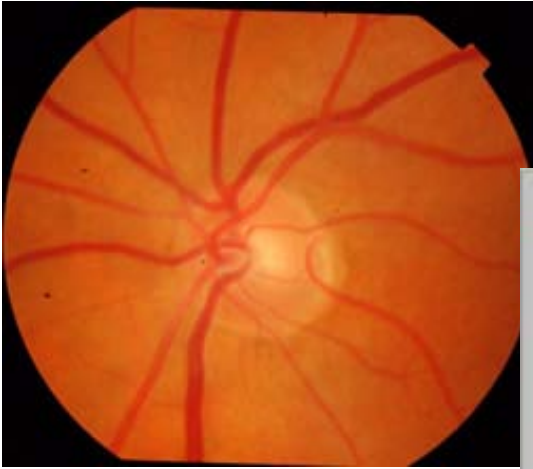
Mean Score 1.88



2.

PownB_101043_L_100206.bmp

Mean score 1.96



3.

Da SS_100541_L_130504.bmp

Mean score 2.0



4.

LowN_010338_R_031104.bmp

Mean score 1.76



5.

PrioS_010340_R_030505.bmp

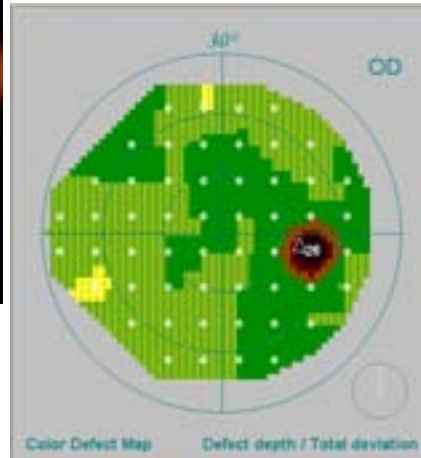
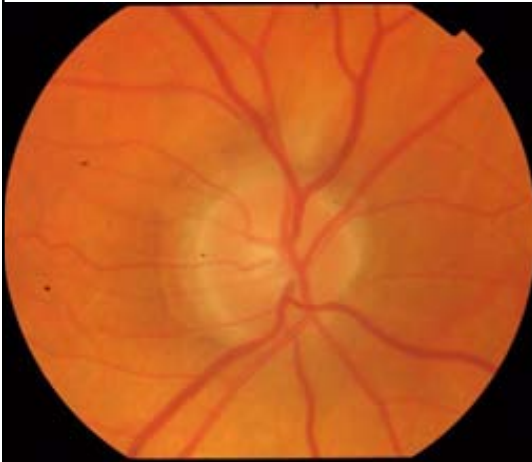
Mean score 1.80



6.

ThorR_210828_R_241104.bmp

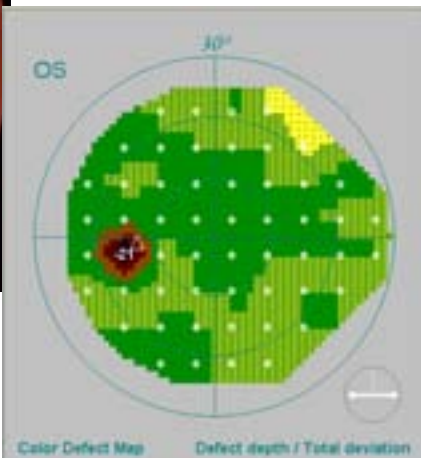
Mean score 1.96



7.

CummR_040839_L_090804.bmp

Mean score 1.65



8.

DoddA_230525_L_120905.bmp

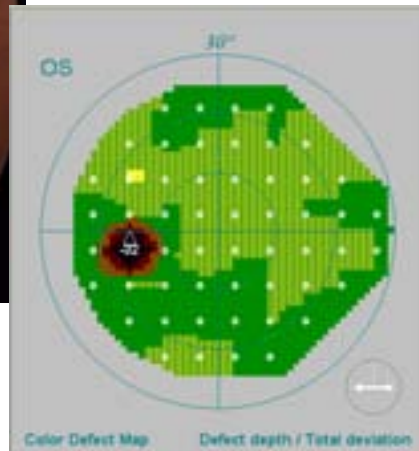
Mean score 2.76



9.

ChadP_300154_L_200406.bmp

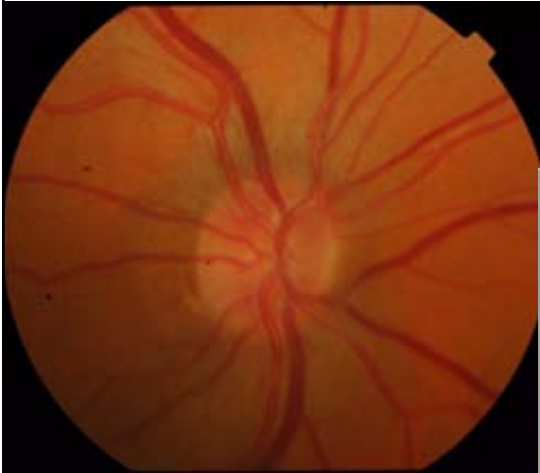
Mean score 2.19



10.

AppIP_210346_R_010803.bmp

Mean score 1.35



11.

BradM_260540_R_090305.bmp

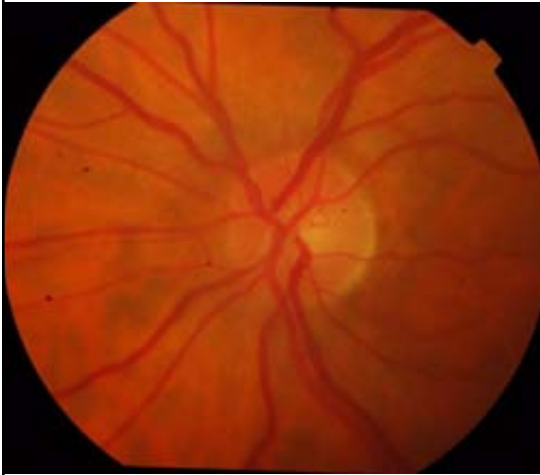
Mean score 3.38



12.

EdenM_201236_L_220305.bmp

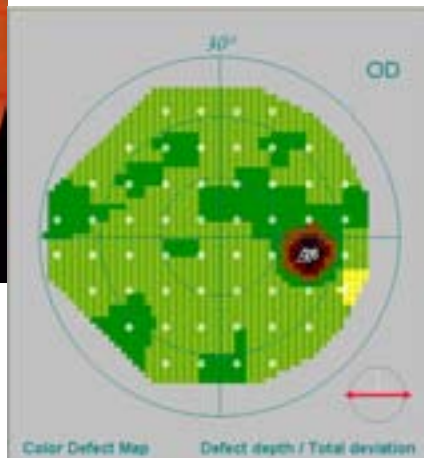
Mean score 1.5



13.

McgaK_300331_R_140504.bmp

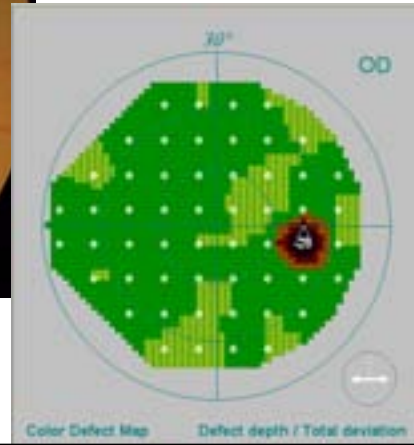
Mean score 1.96



14.

HamIE_071257_R_271006.bmp

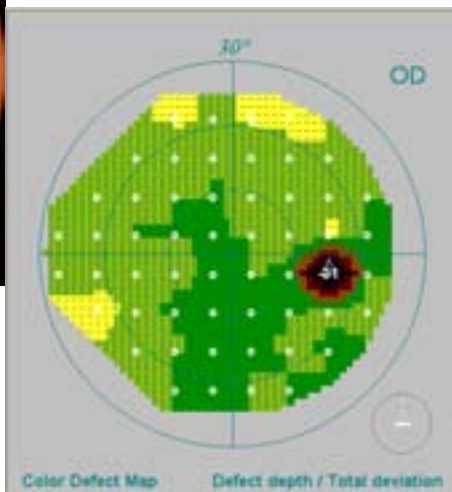
Mean score 2.0



15.

OgunM_181037_R_040903.bmp

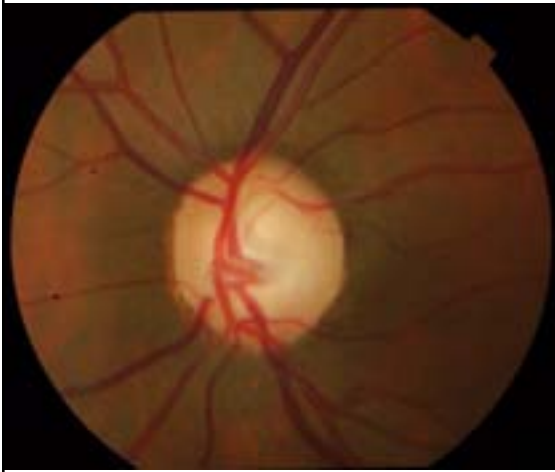
Mean score 2.8



16.

Milly_300558_L_180804.bmp

Mean score 4.19



17.

LambI_171139_R_170904.bmp

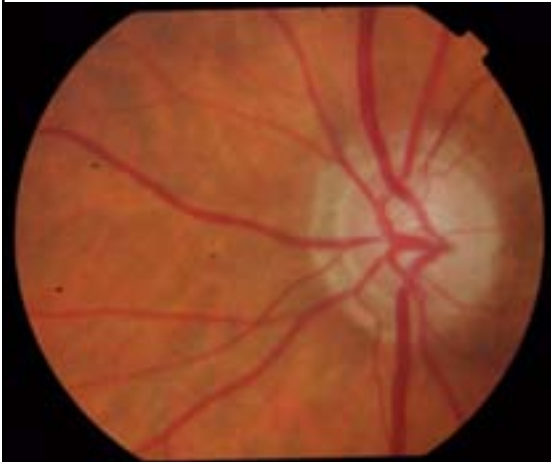
Mean score 2.3



18.

BrinD_111119_L_050204.bmp

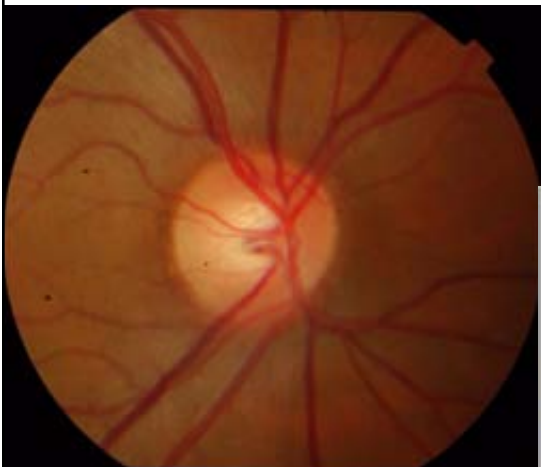
Mean score 3.69



19.

SalIM_250459_R_090205.bmp

Mean score 2.23



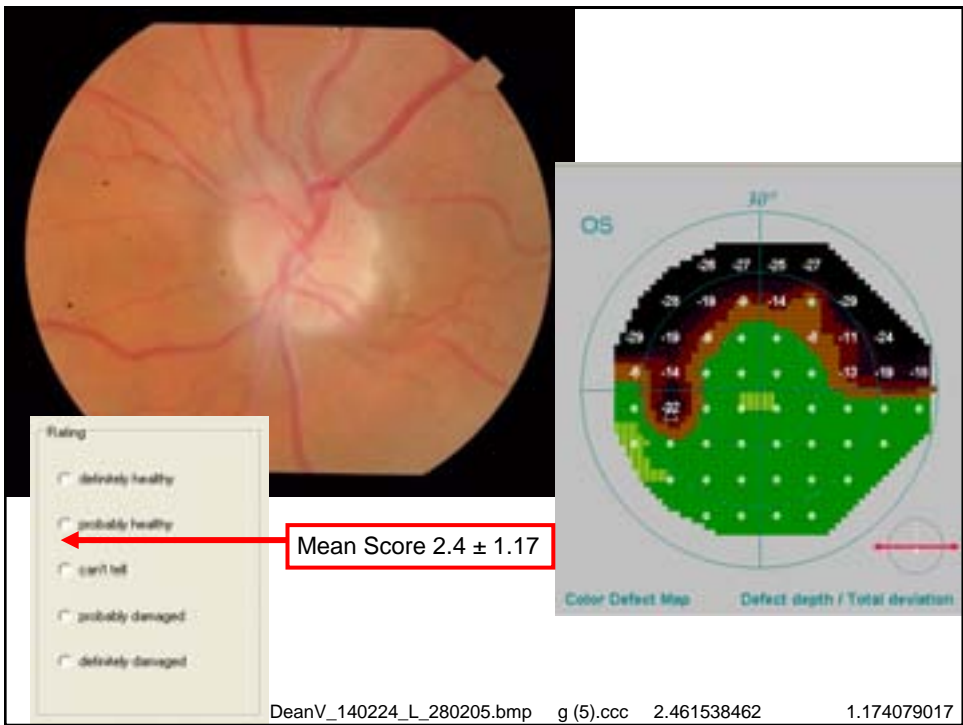
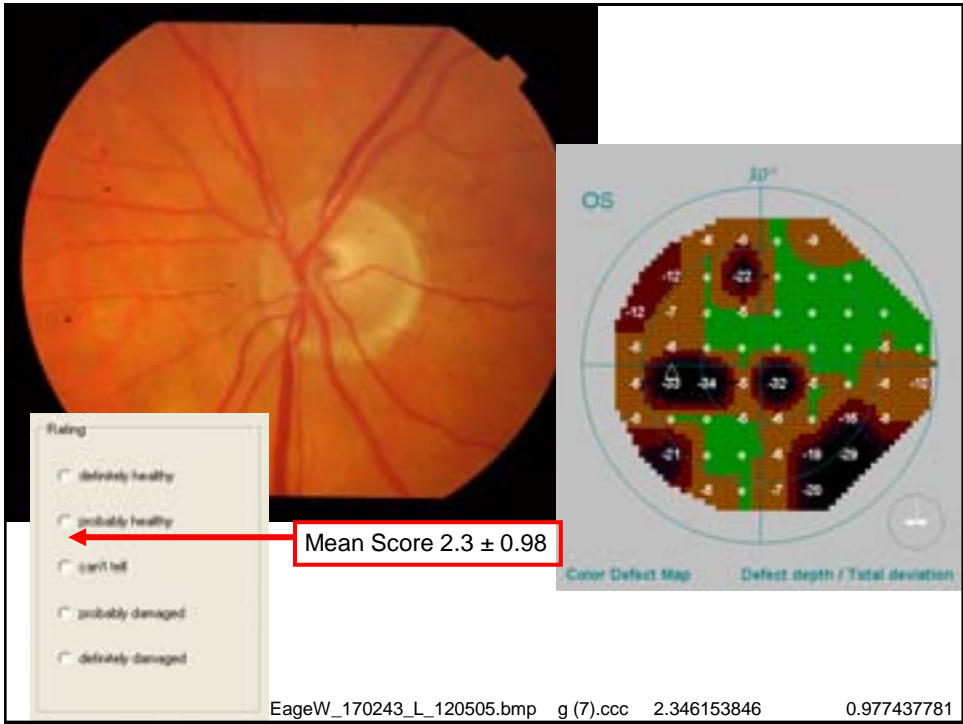
20.

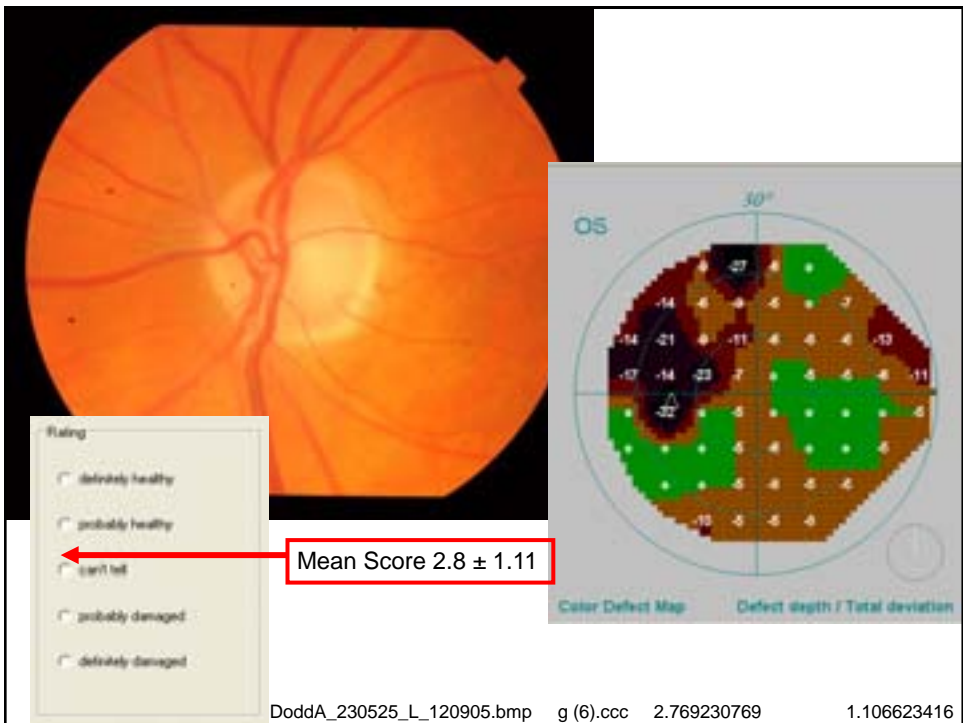
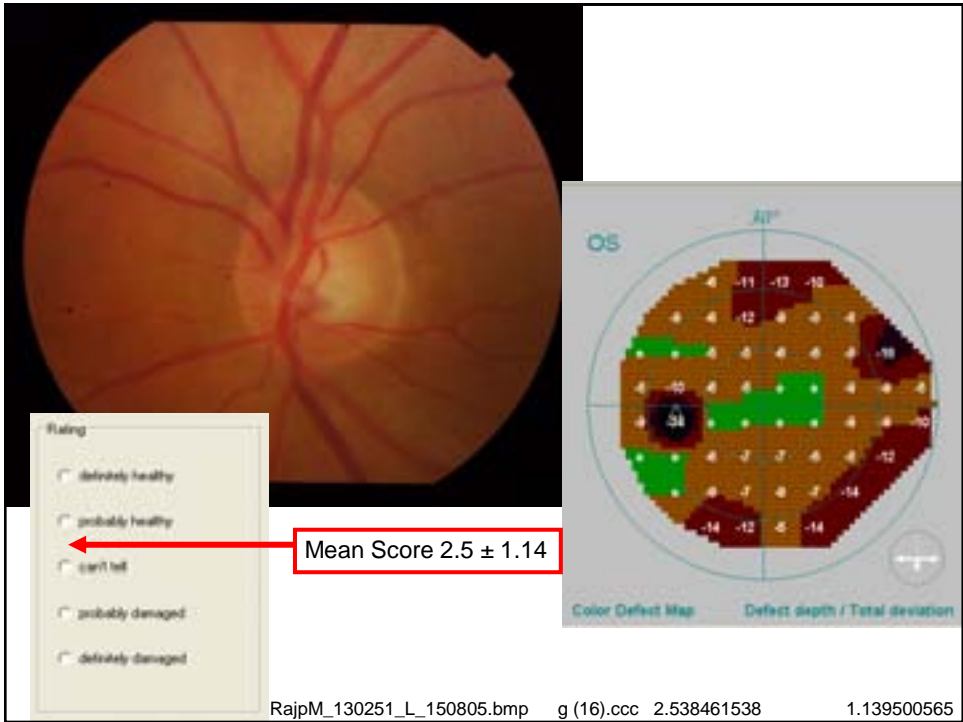
CowsE_220828_R_240305.bmp

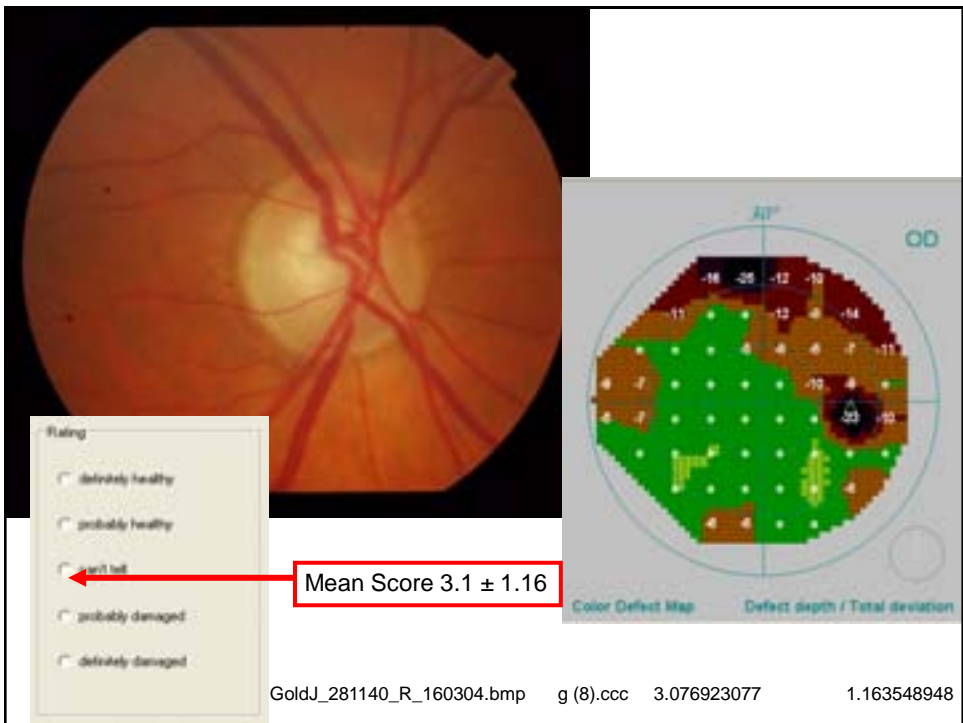
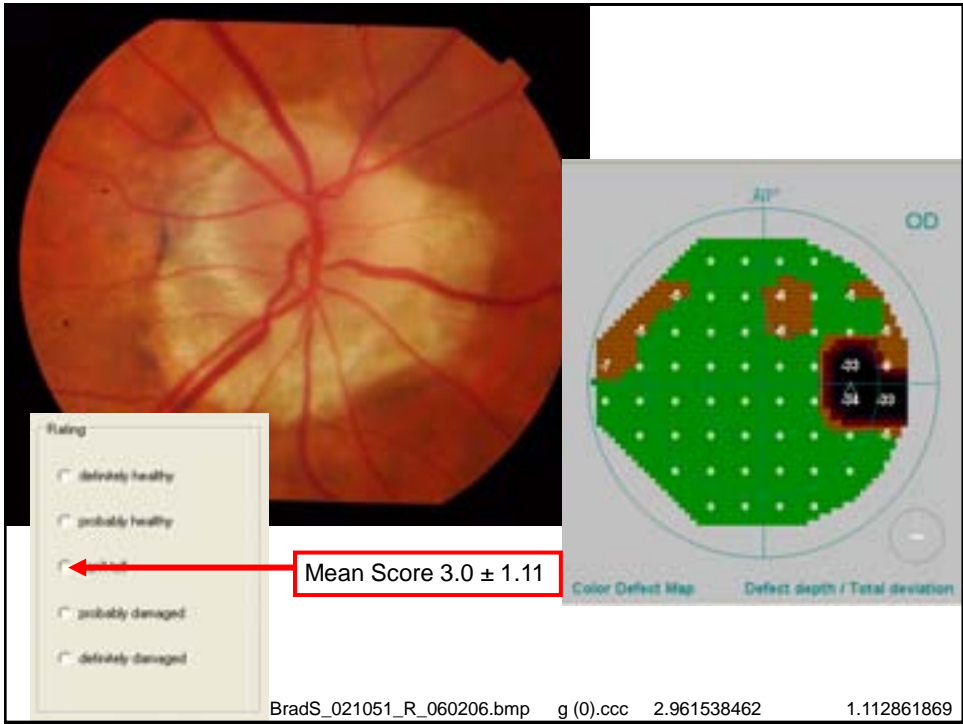
Mean score 3.73



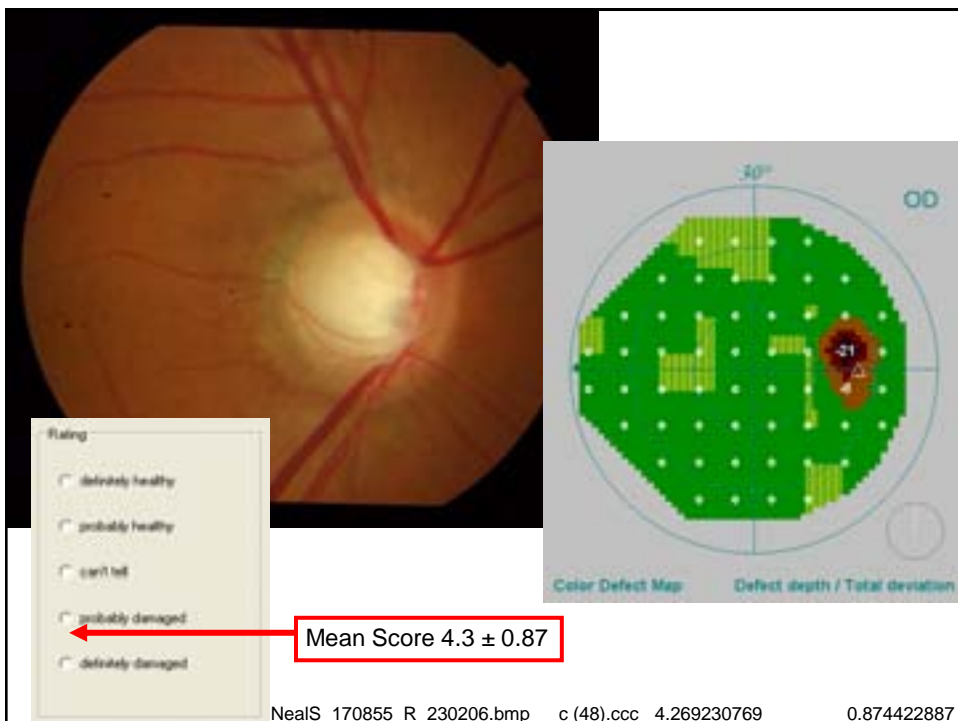
Damaged eyes miss classified

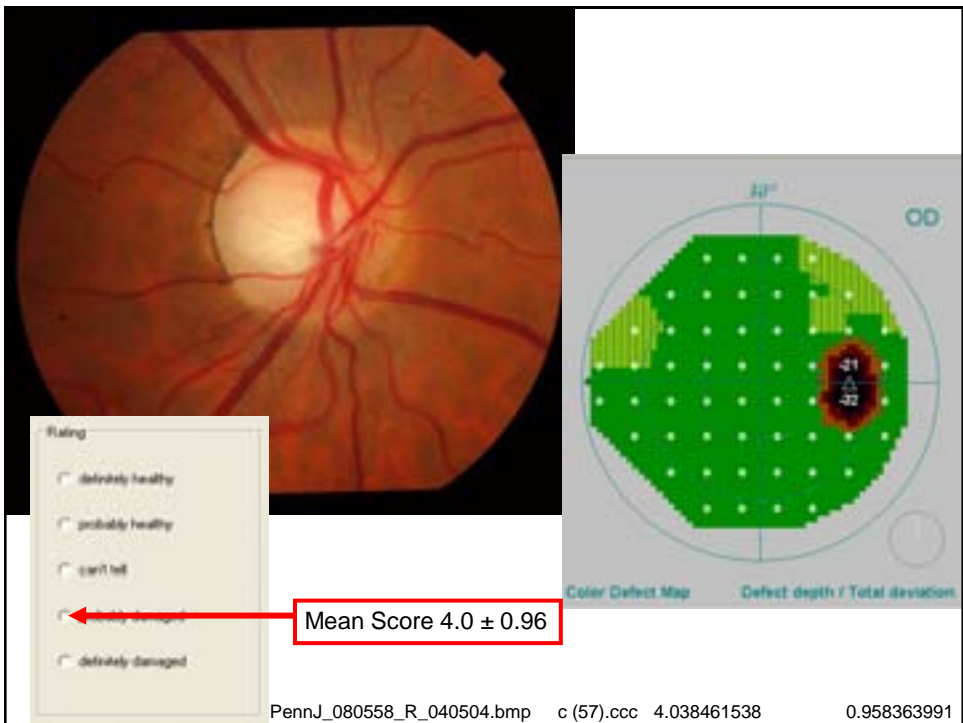
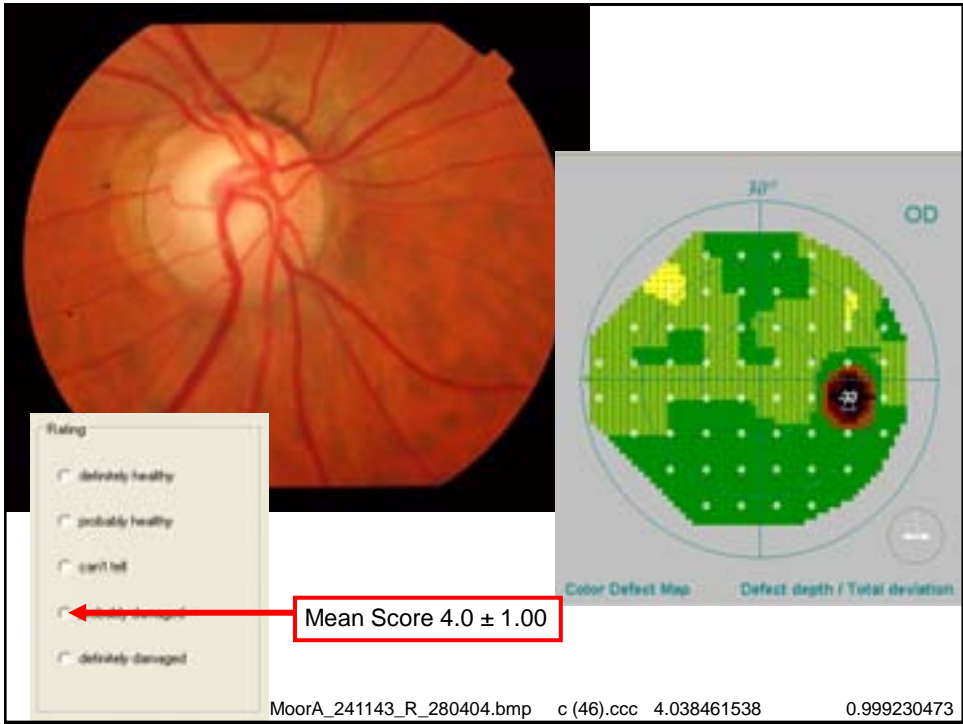


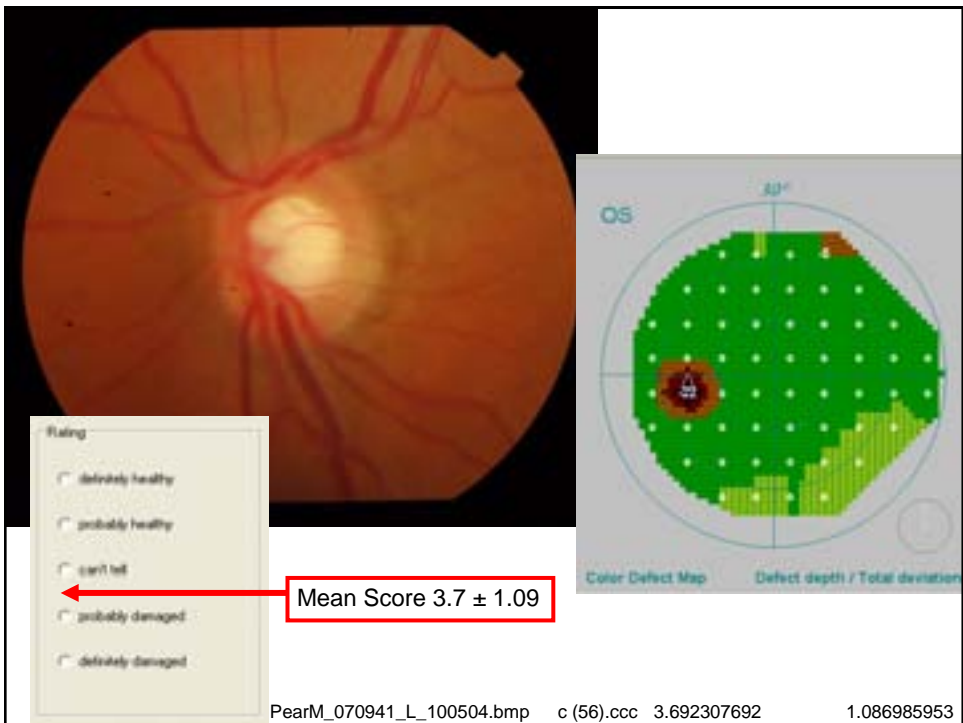
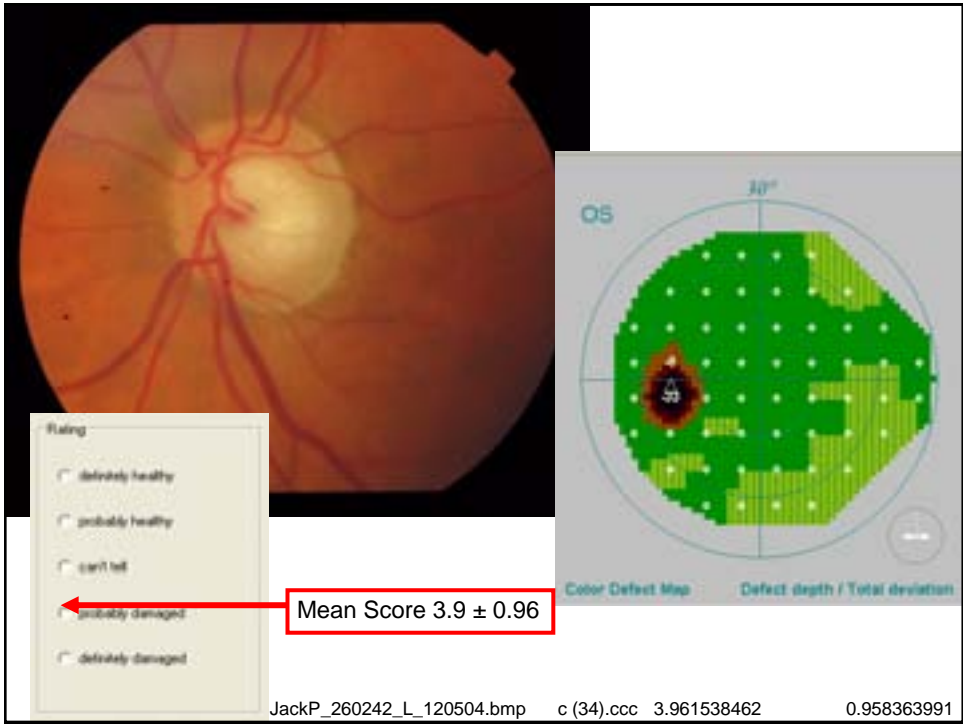




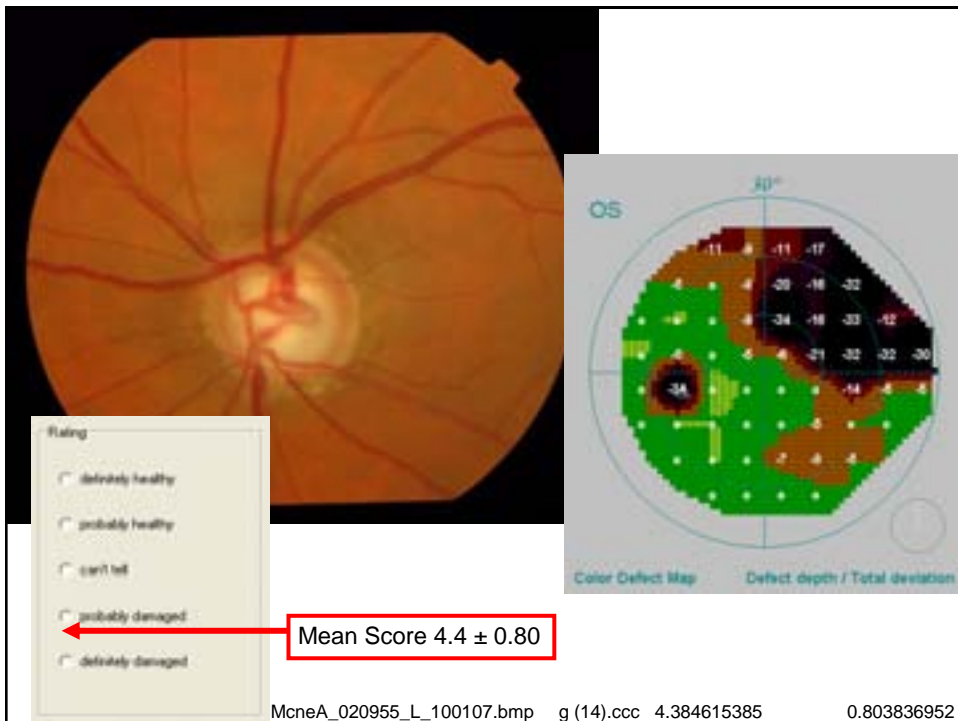
Healthy eyes miss classified

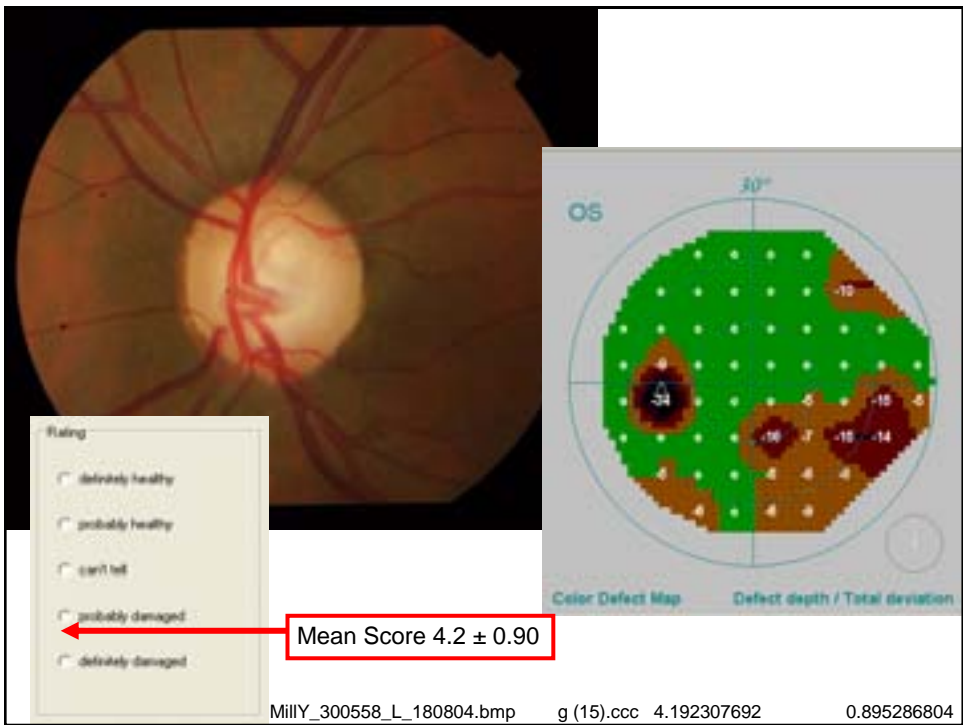
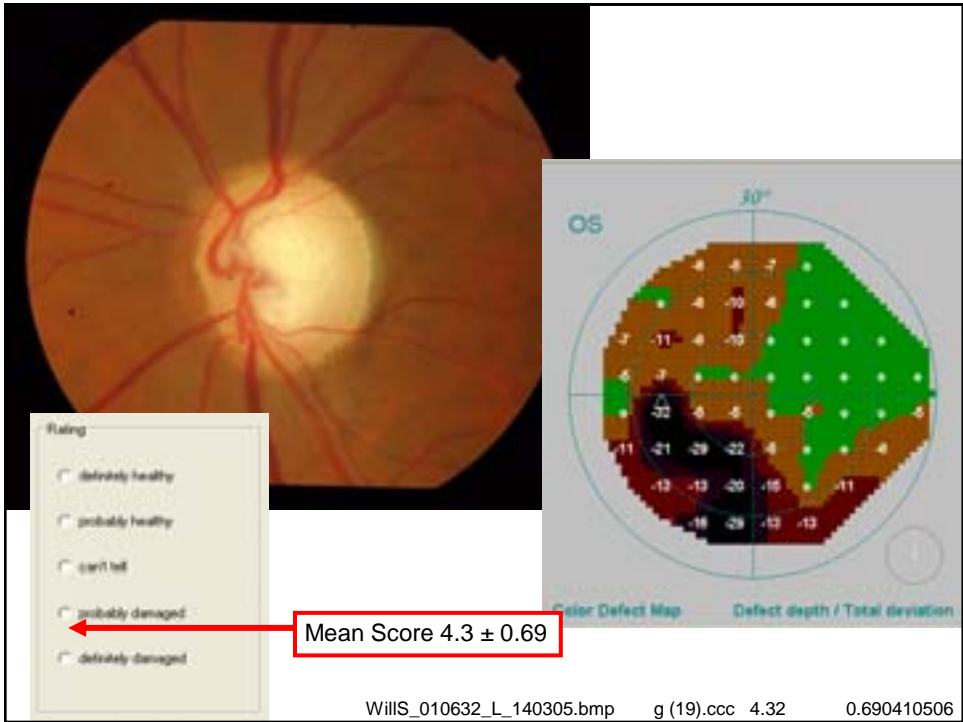


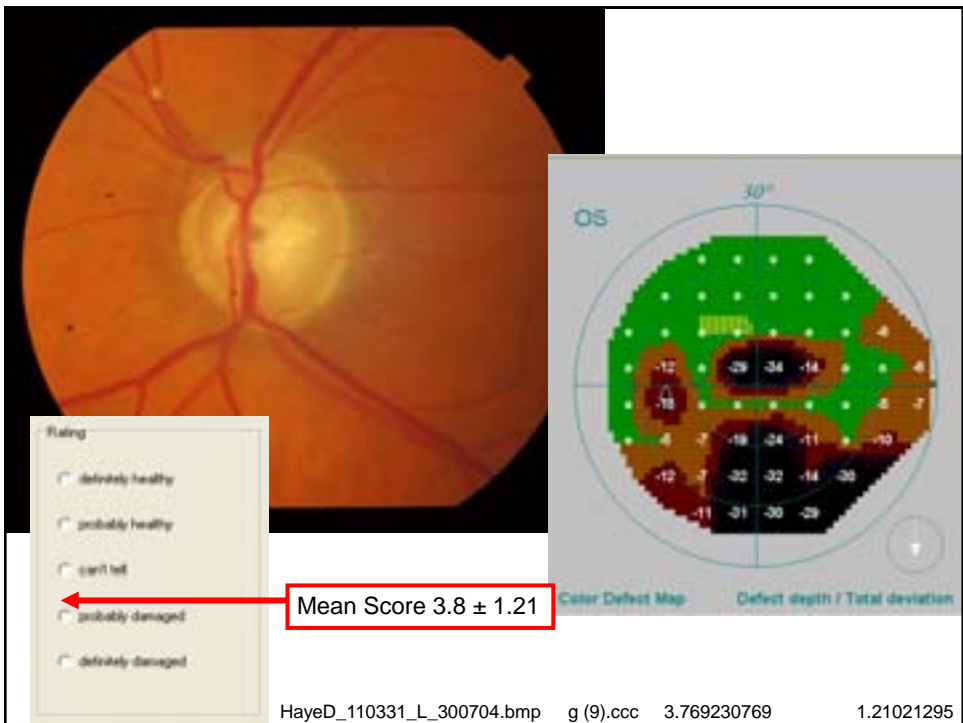
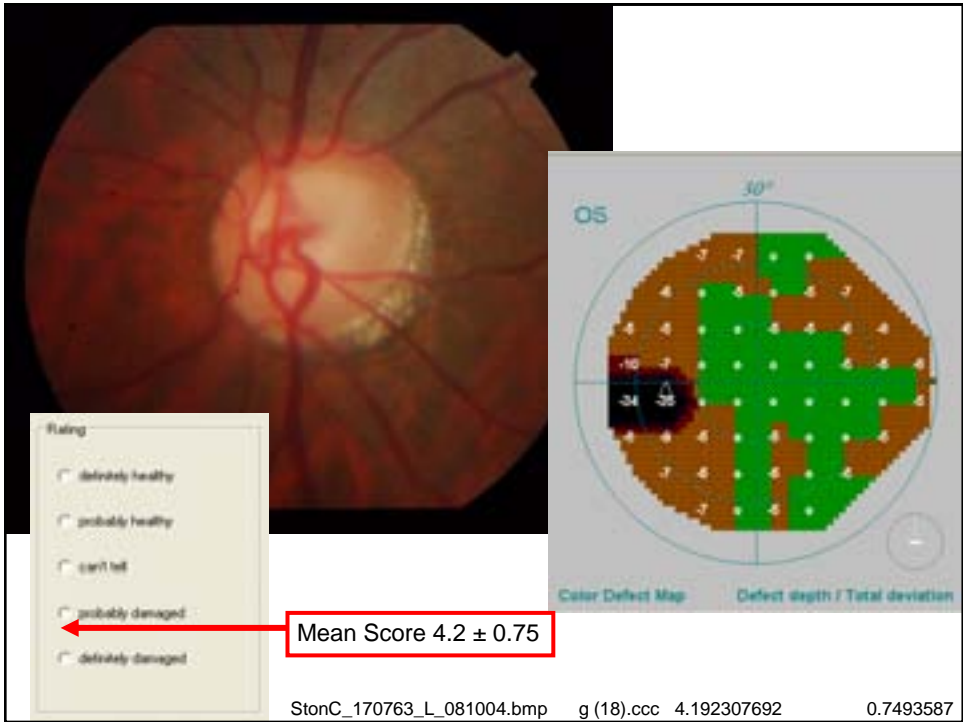




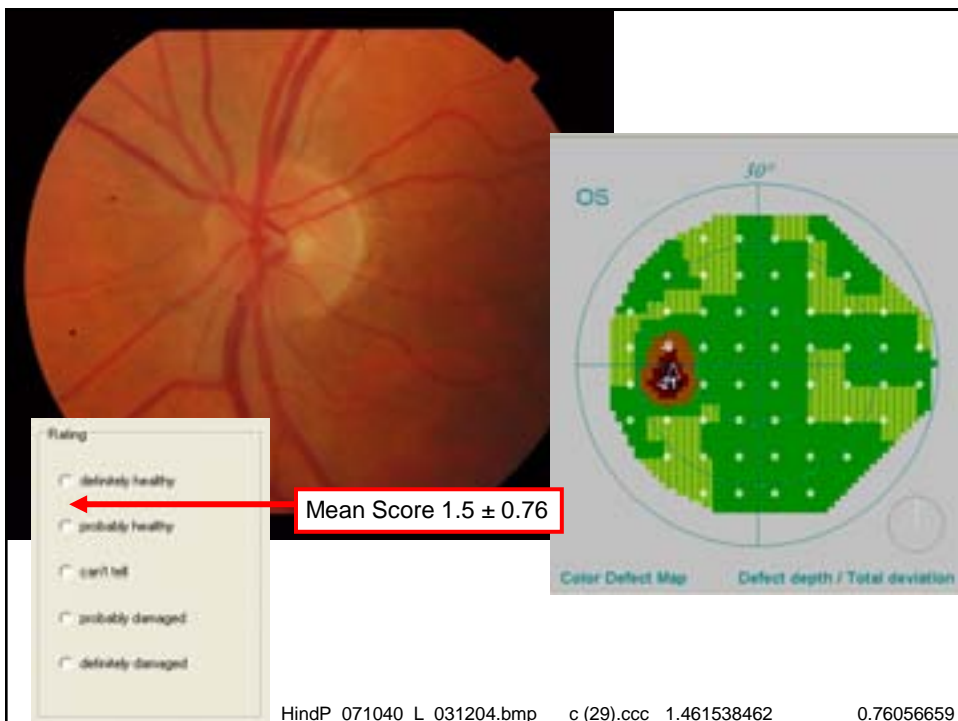
Damaged eyes Correctly classified

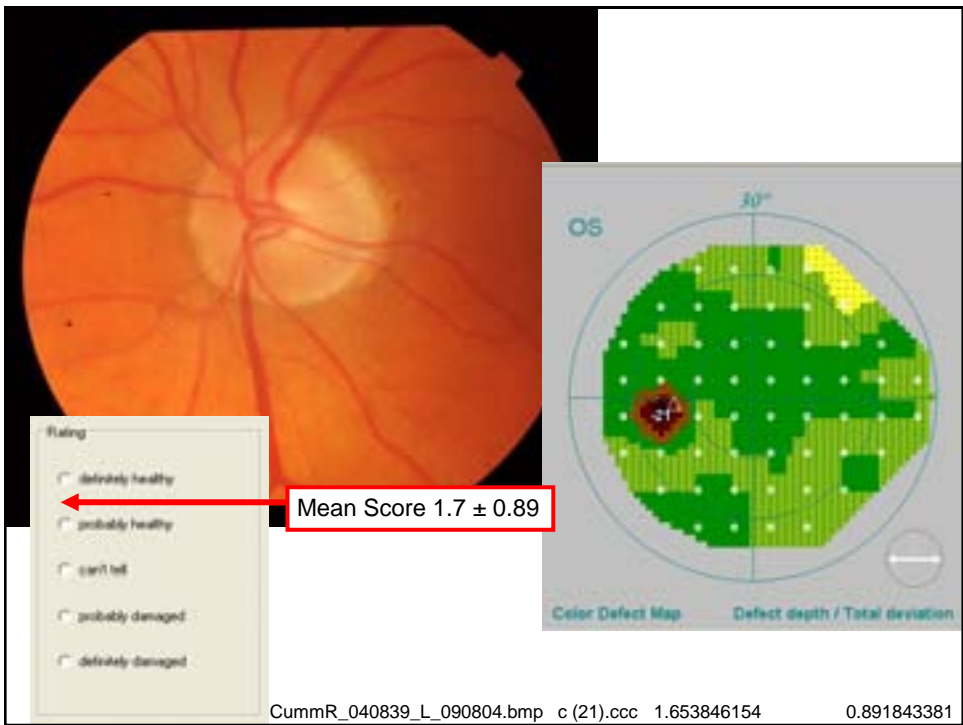
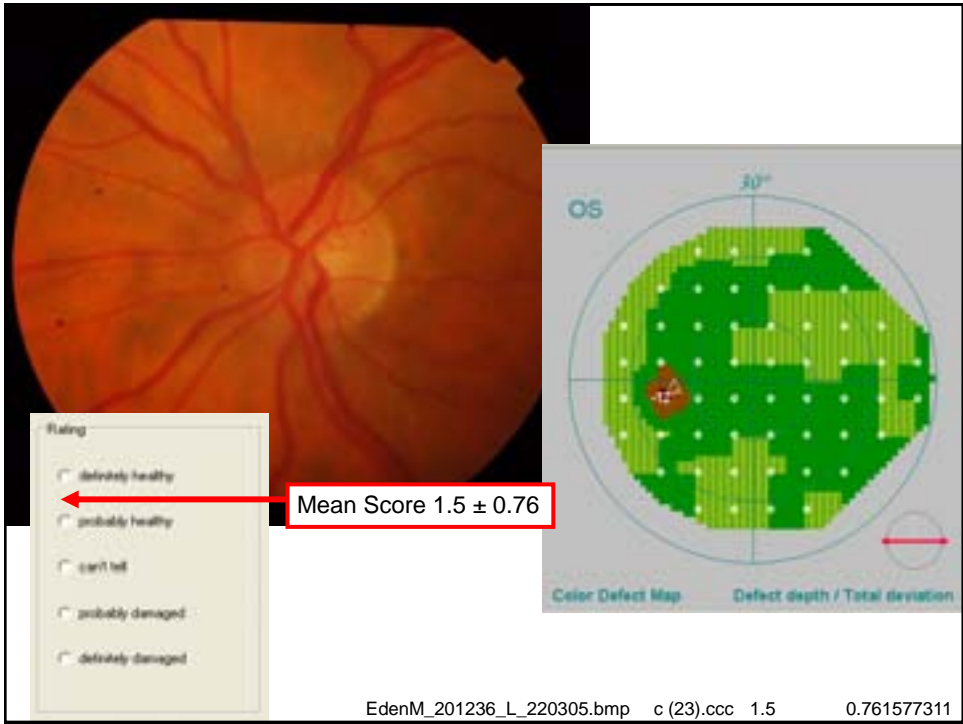


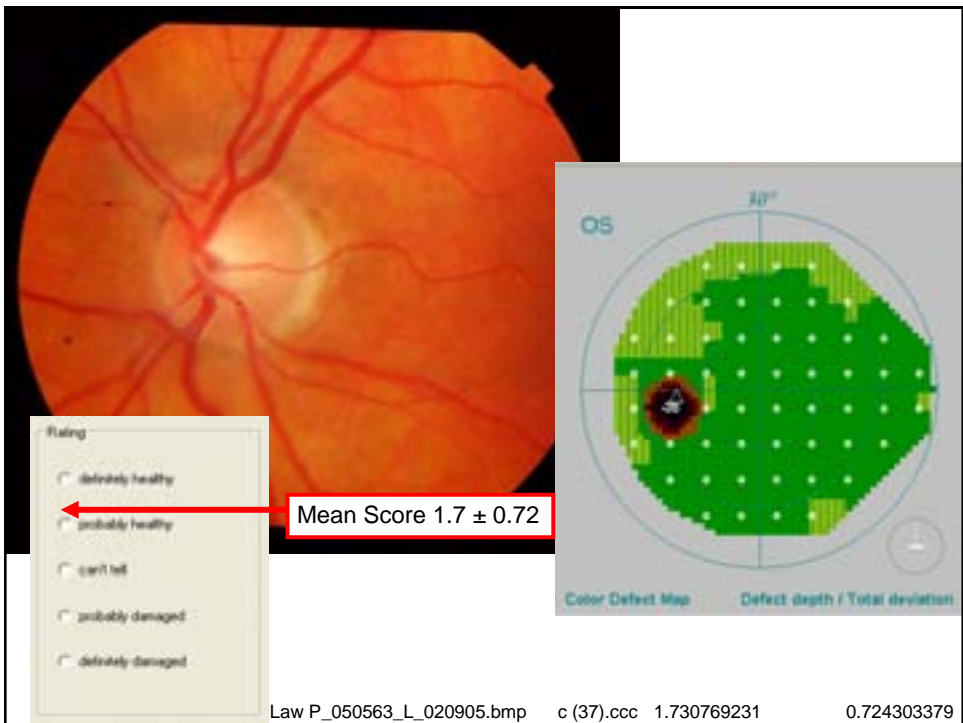
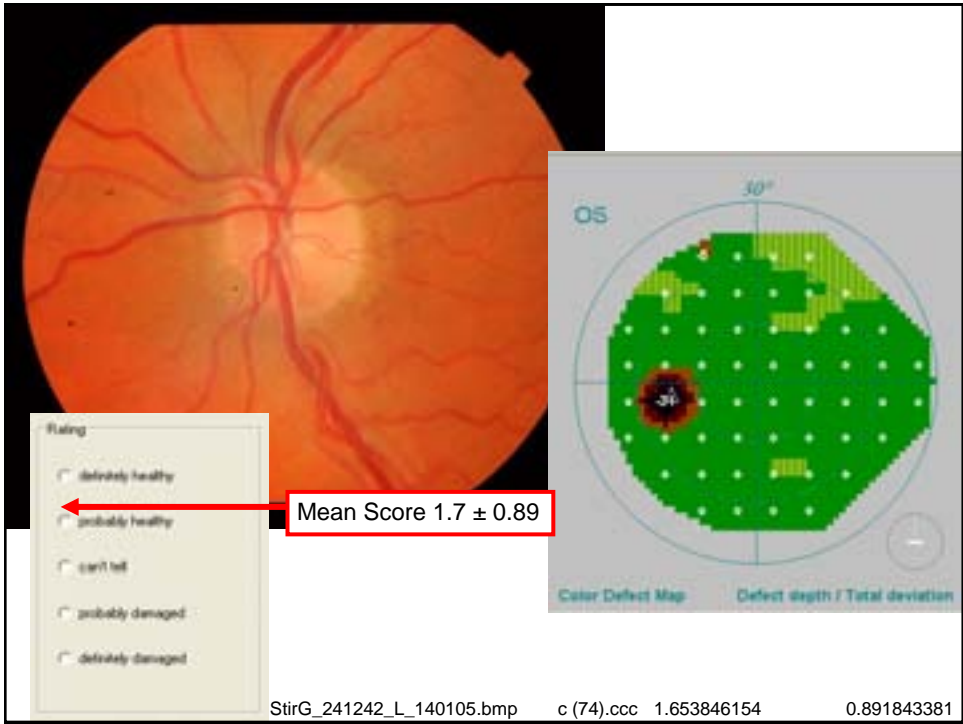




Healthy eyes correctly classified

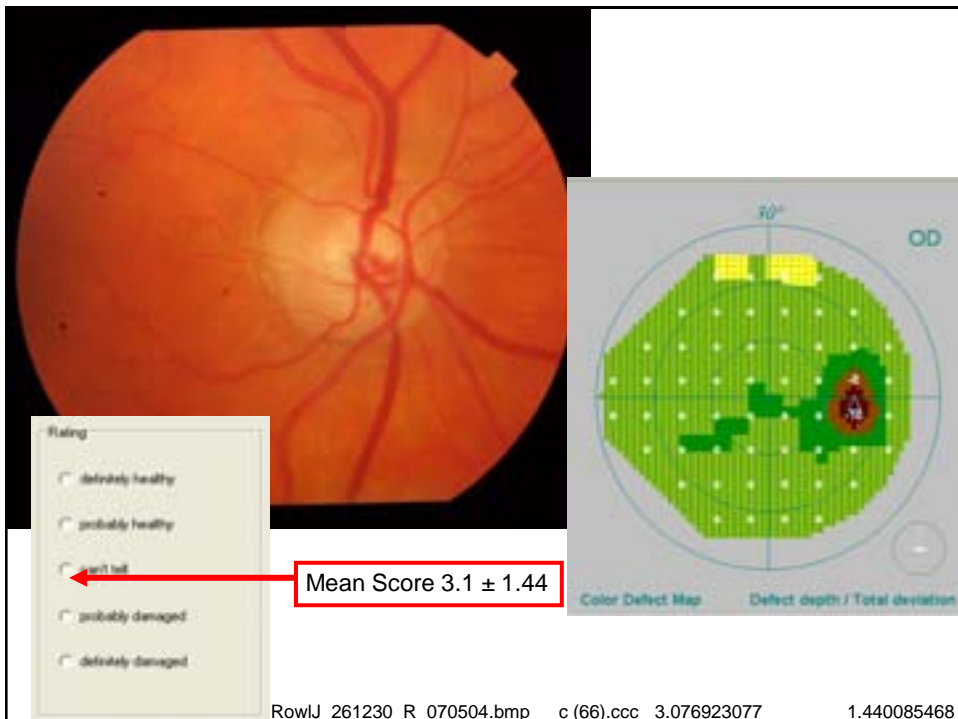


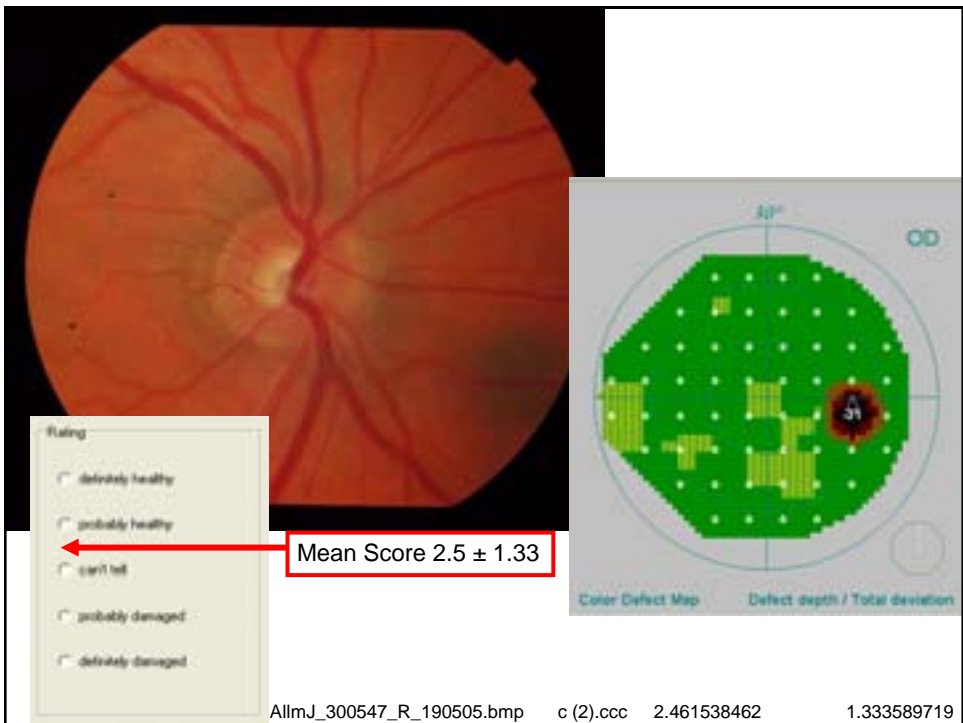
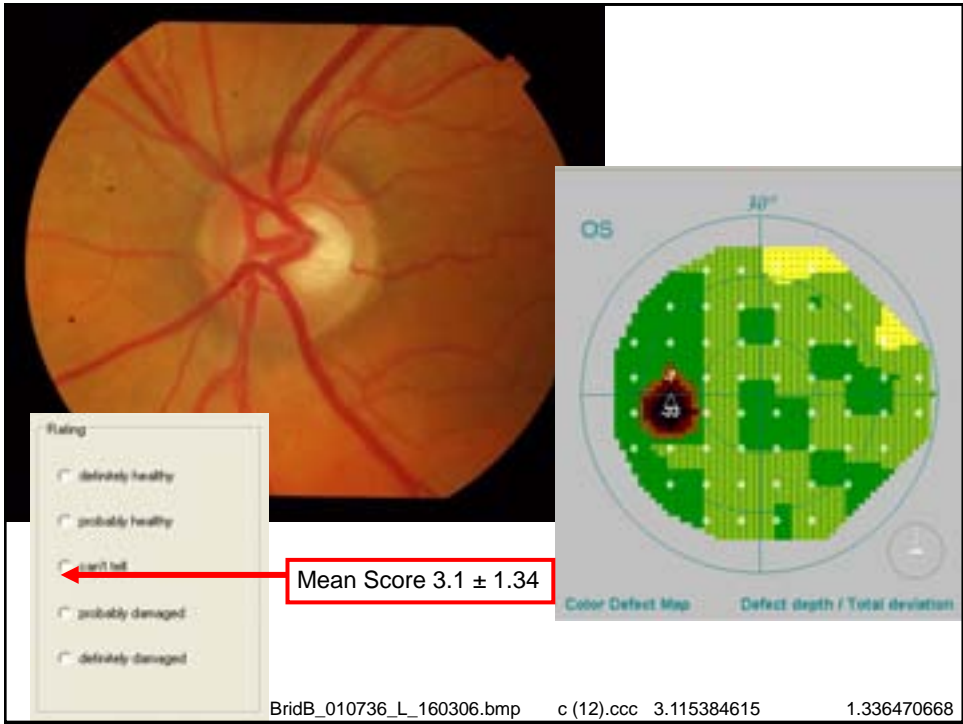


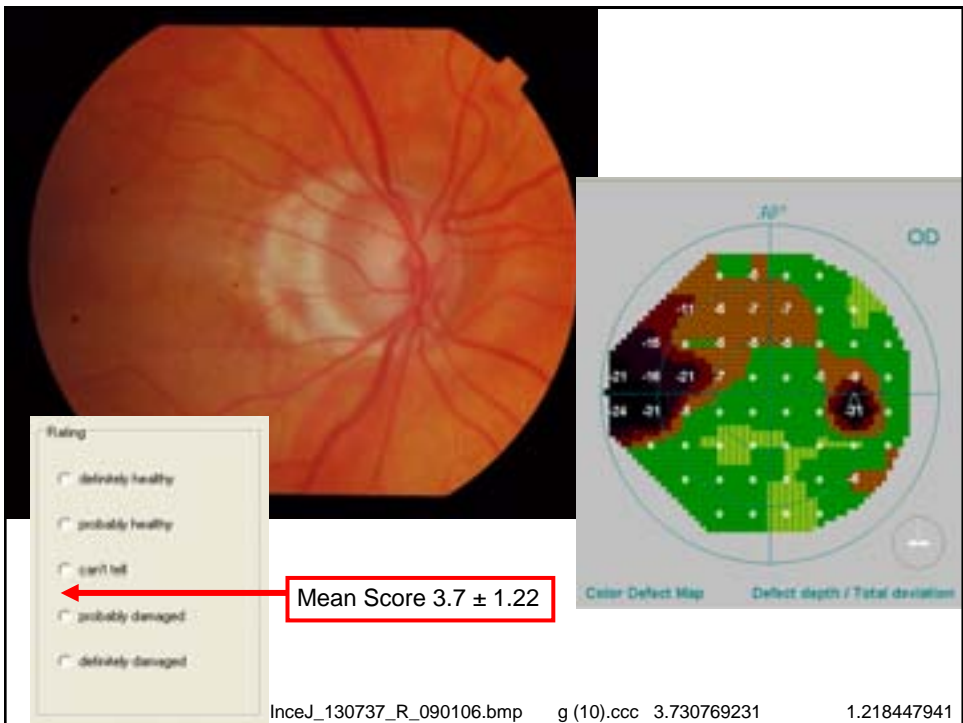
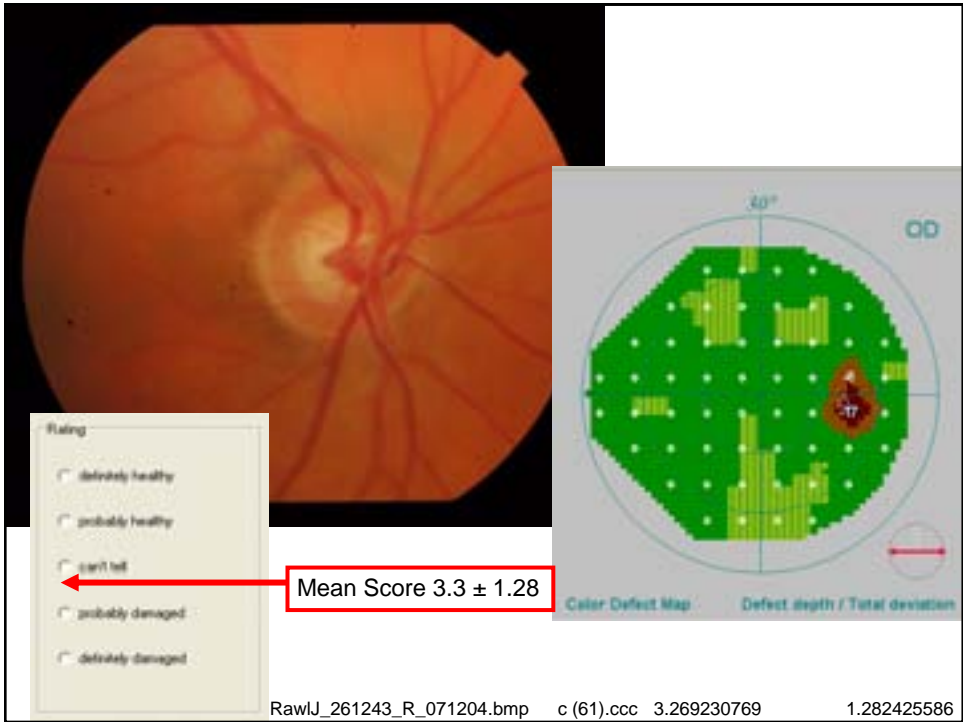


Large SDs

A lot of disagreement between graders

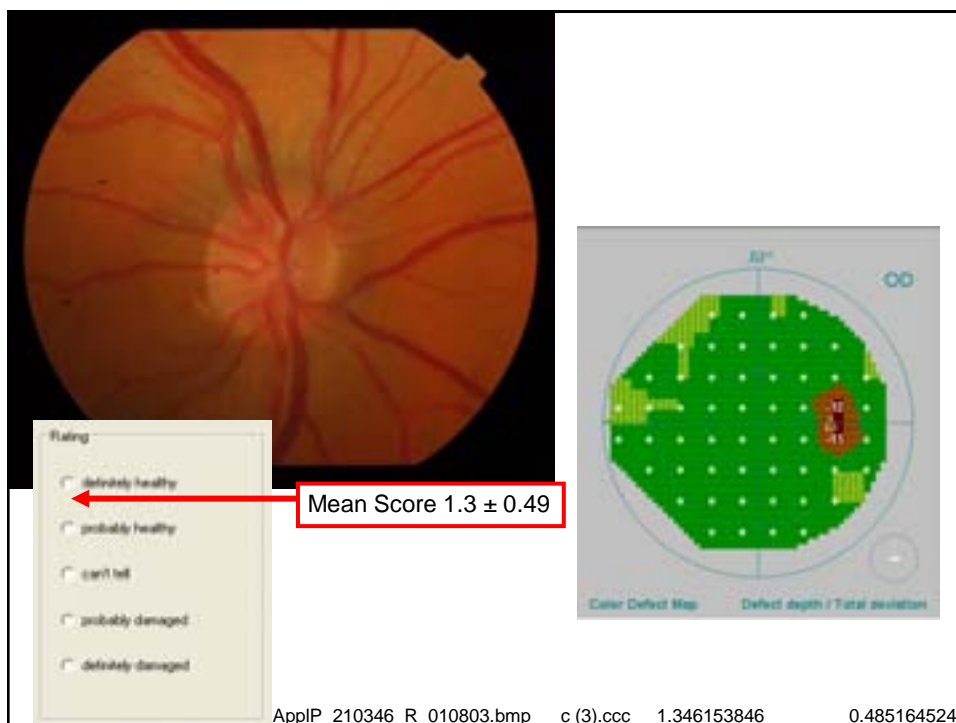


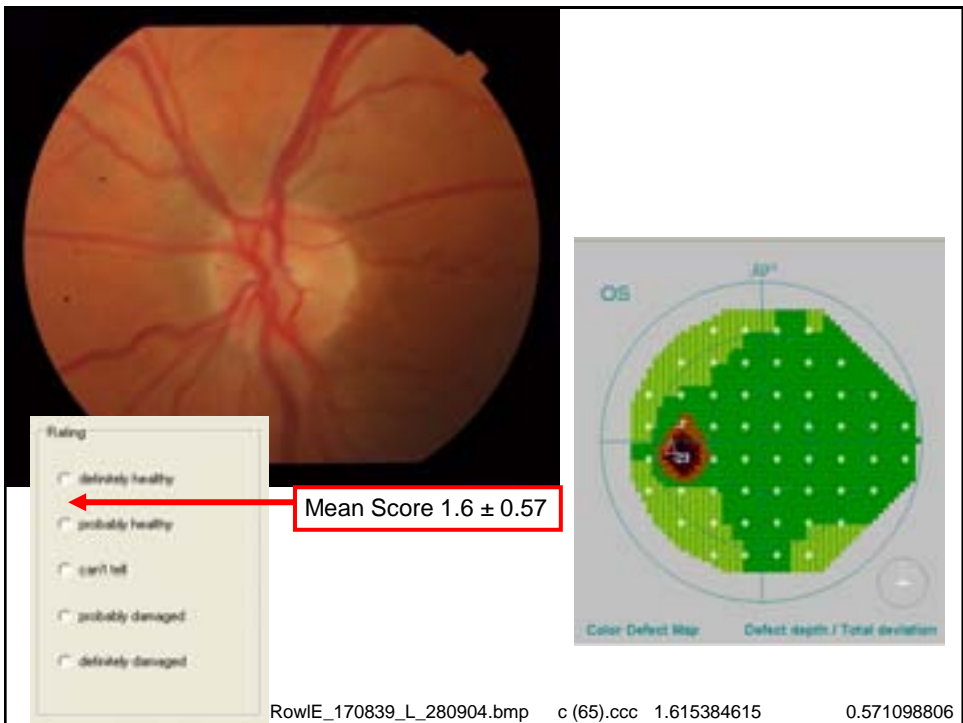
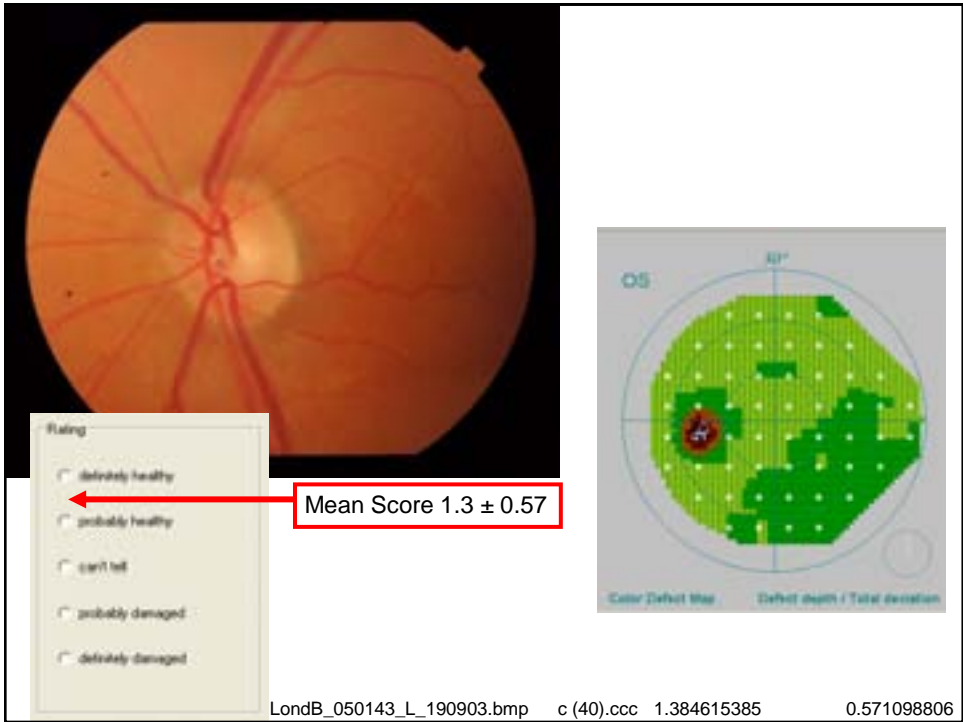


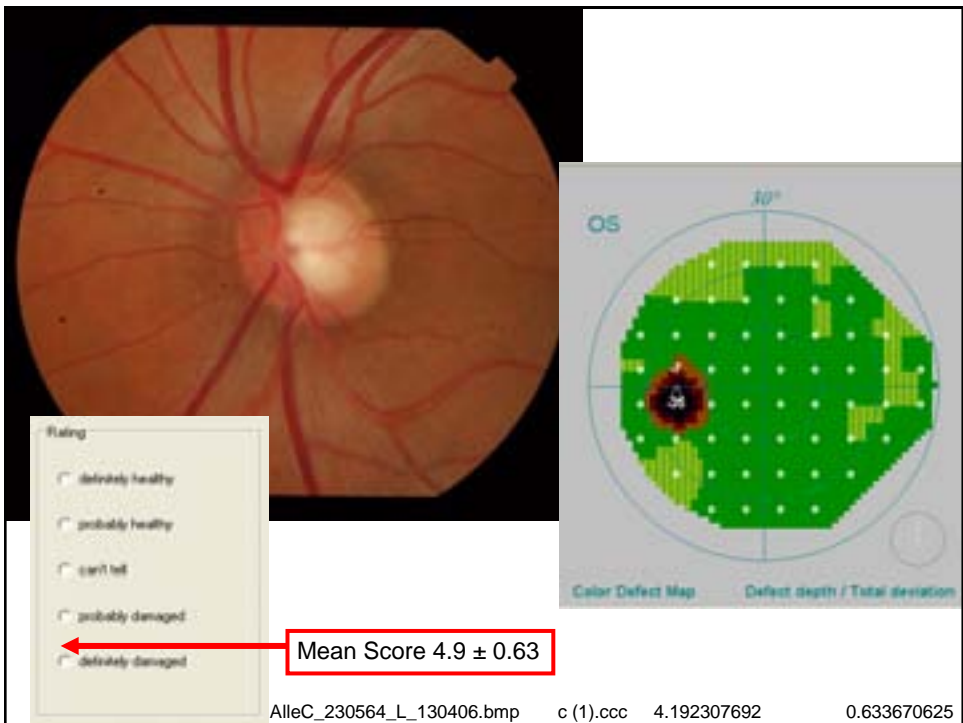
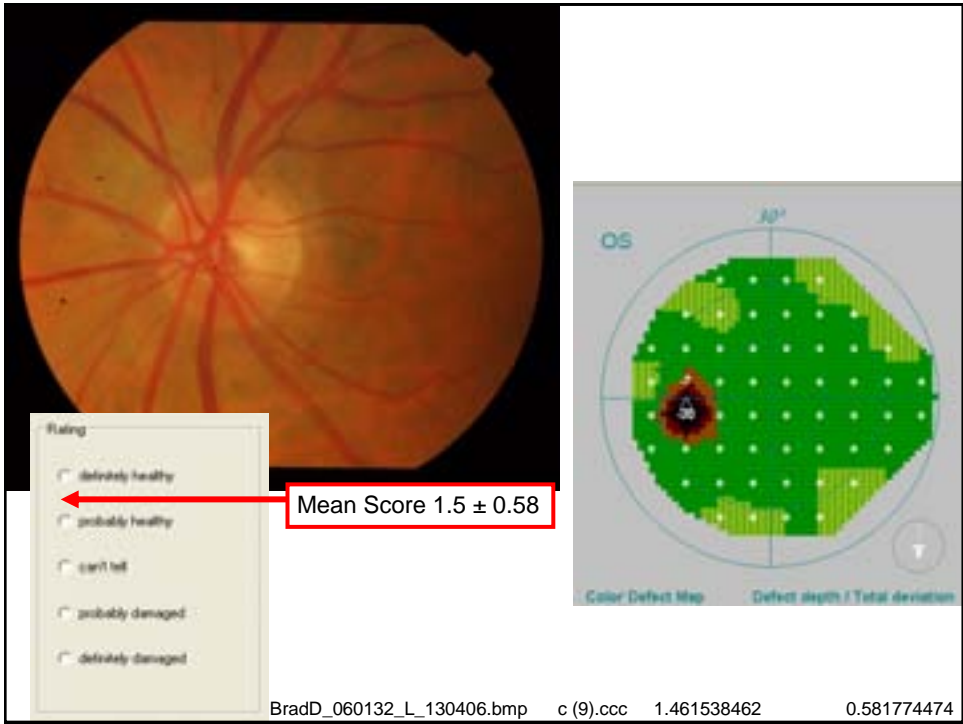


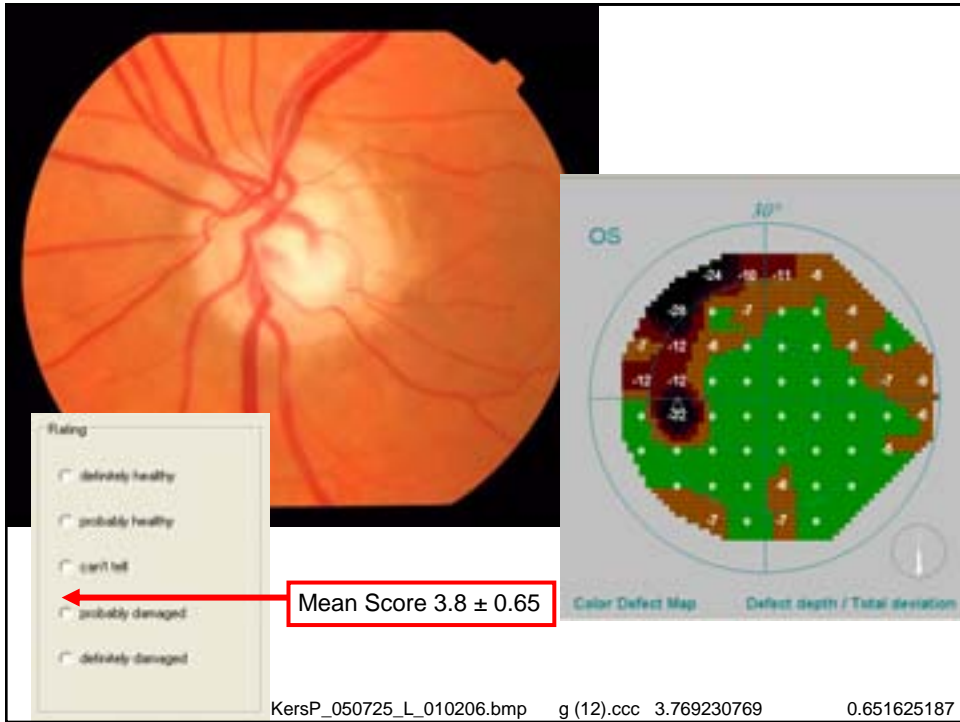
Small SDs

Good agreement between graders









Thank you!

<http://www.discusproject.blogspot.com>

Denniss J, Echendu D, Henson DB, Artes PH. Discus: Investigating subjective judgment of optic disc damage. *Optometry and Vision Science* 2011;88 ;E93-E101