

Introduction to Fundus Camera

MOH Diabetic Retinopathy
Screening Team
2012



Introduction

- There are various tools available for screening of diabetic retinopathy
- Examples:
 - Direct Ophthalmoscope
 - PAN- ophthalmoscope
 - Binocular Indirect ophthalmoscope (BIO)
 - Slit lamp
 - Fundus camera – mydriatic (pupil dilated) and non-mydriatic

Introduction

- Most tools require the user to have some basic skill and knowledge which is time consuming
- The non-mydriatic fundus camera can be easily used by healthcare personnel at all levels.
 - Recommended by the CPG for diabetic retinopathy screening

Non-mydriatic fundus camera



- Easy to use
- Patient-friendly
- User-friendly
- Time and cost effective
- Pupil dilatation only if necessary

Non-mydriatic Fundus camera

Components of the non-mydriatic fundus camera

- Digital camera
- Computer
- Software system

Digital camera

Internal

- Camera inside



External

- Camera outside



Digital Camera

- High quality digital photographs
- Fundus photos can be viewed immediately and shown to the patients
- Improves patient's understanding of the disease

Software System

- Easy to manage

- System:

- ❖ Digital system – photos can be edited/ deleted

- ❖ Enables photos to be analysed, recorded and archived

The screenshot shows a software application window titled "Input ID" with a subtitle "<Input Patient Information>". The form contains the following fields and controls:

- Patient Name:** Two text input fields labeled "Last" and "First".
- Patient ID:** A single text input field.
- Doctor:** A dropdown menu with a "Delete Doctor" button next to it.
- Birth Date:** A date selection field.
- Sex:** Two radio buttons labeled "Male" and "Female".
- Diagnosis1:** A text input field with a dropdown menu showing options: "1 - MALAY", "1 - CHINESE", and "1 - INDIAN".
- Diagnosis2:** A text input field with a dropdown arrow.
- Diagnosis3:** A text input field with a dropdown arrow.
- Buttons:** "Cancel" and "OK" buttons at the bottom.

The window is running on a Windows operating system, as evidenced by the taskbar at the bottom showing the "start" button and various application icons.

Digital Photography

- Two images are required for DR screening
 1. Optic disc at centre
 2. Macula at centre
- Pupil dilatation not required unless necessary
- Quality images:
 - Requires skill and knowledge in photography and the software system

Non-mydriatic fundus camera

- Various models in the market
 - KOWA non mydriatic fundus camera – KOWA software
 - Canon non mydriatic FC – Eyecap software
 - Topcon non mydratic FC – Imagenet software

Non-mydriatic fundus camera

- Important factors to consider in purchasing a fundus camera:
 - **Package must include software specific for fundus photography**
 - **Should request for dehumidifier**
 - User friendly
 - The non-mydriatic fundus camera can be easily used by healthcare personnel at all levels.
 - High quality photographs and cost effective
 - **Good after sales services**
 - Provides training program for users

Non-mydriatic fundus camera



Good fundus photography technique

- Check the camera
- Check the computer and software system
- Clean the lenses***
- Clear explanation to patient

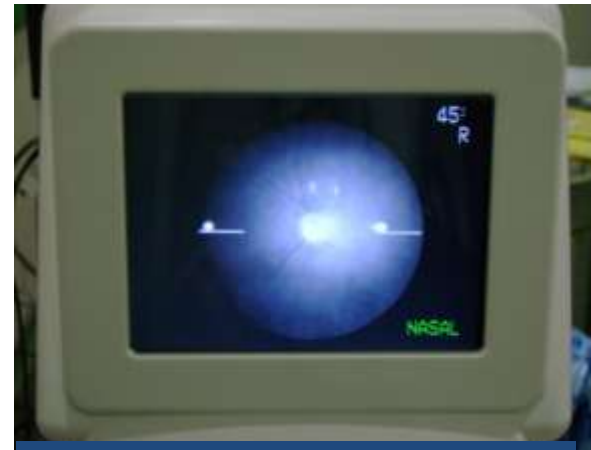
Good fundus photography technique

- Position patient
 - Ensure correct forehead and chin position
 - Ensure eye-level corresponds to marker



Focusing technique

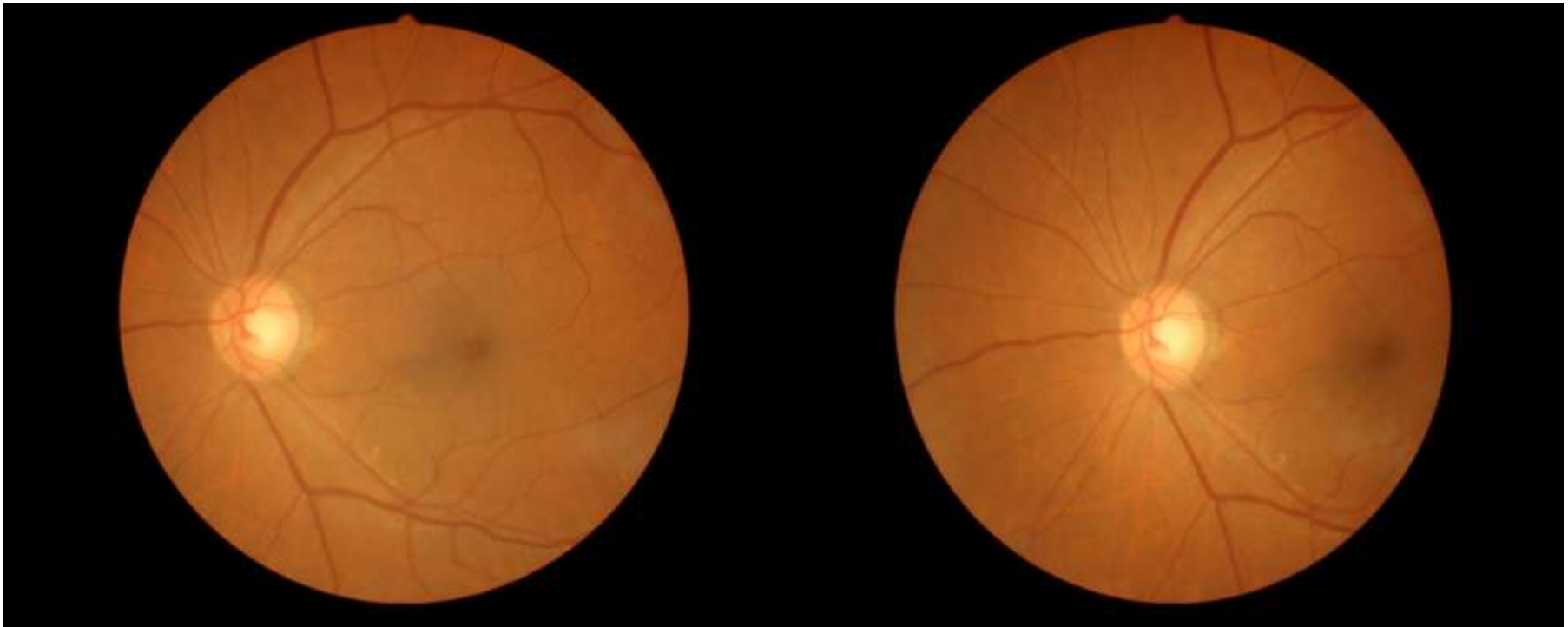
Macula as center



Optic disc as center

Good quality fundus photos

- Macula centred
- Optic disc centred



Care of camera

Responsibilities of the user:

- Ensure camera and main switch is turned off after usage
- Cover the lens with the provided cap
- Cover the camera body (cover provided)
- Lock the camera



Poor photo quality...

- Patient Factors
 - Poor patient understanding
 - Uncooperative or over cooperative patients
 - Pupil too small
 - Media problems
 - Corneal opacity, cataract, vitreous haemorrhage

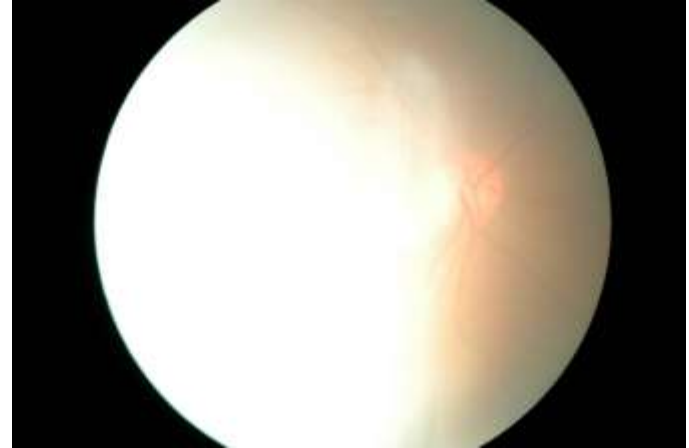
Poor photo quality...

- Equipment/ User related factors
 - Impatient operators
 - Distraction from surroundings
 - Room too bright
 - Dirty lens (externally and internally)
 - Dirty computer screen

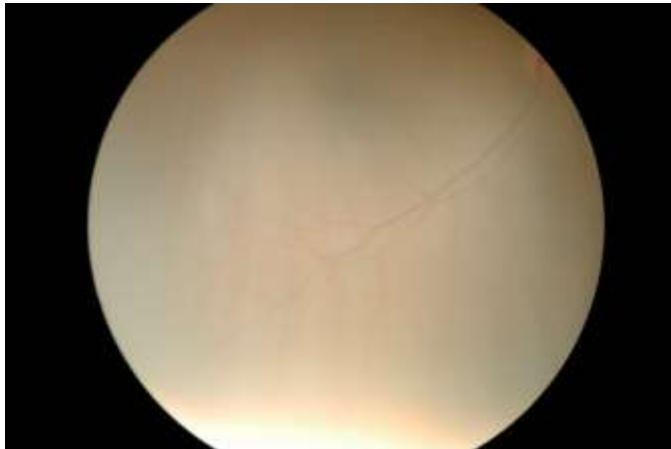
Poor photography-unreadable



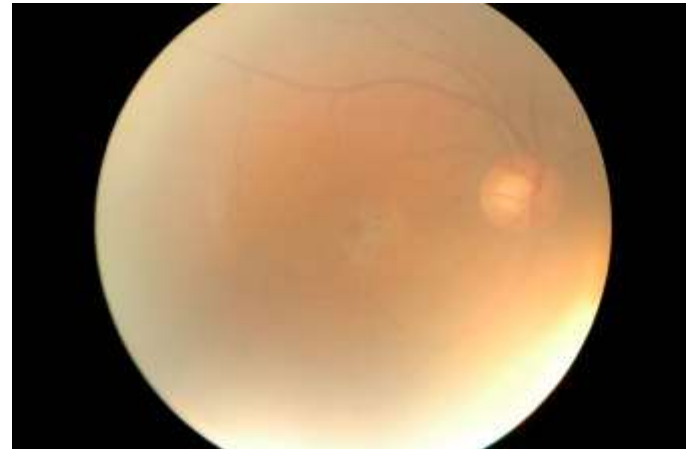
Dirty Lens



Poor positioning

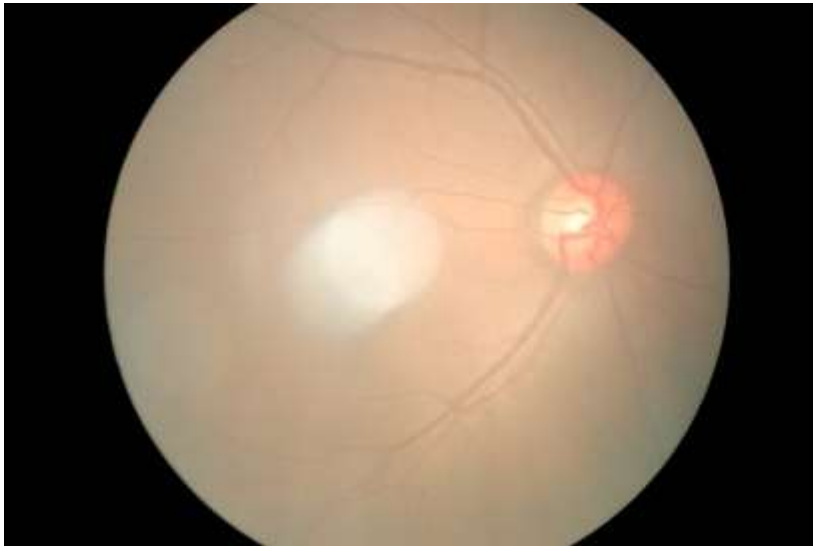


Cataract

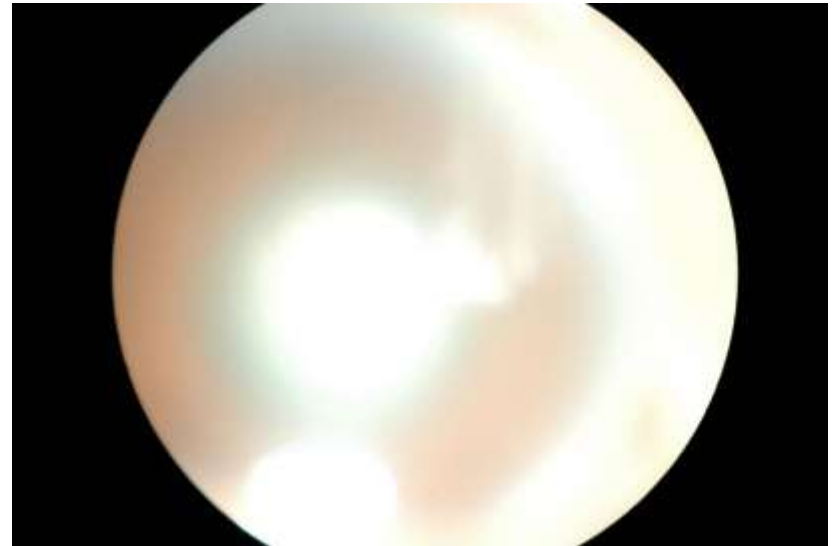


Small Pupil

More unreadable photos



Eyelashes



Small pupil

Trouble shooting in Fundus Photography

- Dark Rim around the photo/shadow on photo
 - Reason : Small pupil
 - Solution : Dim room, Pad other eye, Dilate with Gtt Tropicamide
- Artifacts on photo
 - Reason : Dry Cornea surface, Dirty camera lens
 - Solution : Patient to blink, Clean lens surface

Trouble shooting in Fundus Photography

- Poor Red Reflex
 - Reason : Cataract
 - Solution : Refer Ophthalmologist
- Out of focus point
 - Reason : Tilted head position
 - Solution : Position patient properly

THANK YOU