



# Dental photography in dental education

Graduate prosthodontic programs

Vichet Chindavanig

วิเชษฐ์ จินดาวงนิค





# Objectives

- 1. Understand camera's mechanisms & their functions ..... Know-how รู้
- 2. Able to control camera mechanisms for quality photo recording ... Practice ฝึกฝน
- 3. Able to take pictures of the following...  
intra & extra-oral views, X-rays, and other dental objects ..... Expertise ชำนาญ





STUDENTS GET TO CLASS  
(AND STAY WARM AND DRY)  
ALONG UNIQUE CAMPUS PATHWAY

You are here.

**Point A to Point B**





# Camera

- Components & their functions
  - Lens, types : normal lens, telephoto lens, zoom lens, macro lens ( or micro lens... Nikon)
  - Body
  - Electronic flash : flash synchronization speed, flash guide number (G.N.)







# Anatomy of a camera: Body





# Lens, electronic flashes, bellow & extension tubes, close-up lens, view finders, data-back







# Lens

- Normal lens
- Telephoto lens
- Zoom lens
- Macro lens
- Fish-eye lens
- Shift lens etc.





# Lens





# Lens selection



- Portrait
- View
- Special purposes





# Effect of lens to pictures

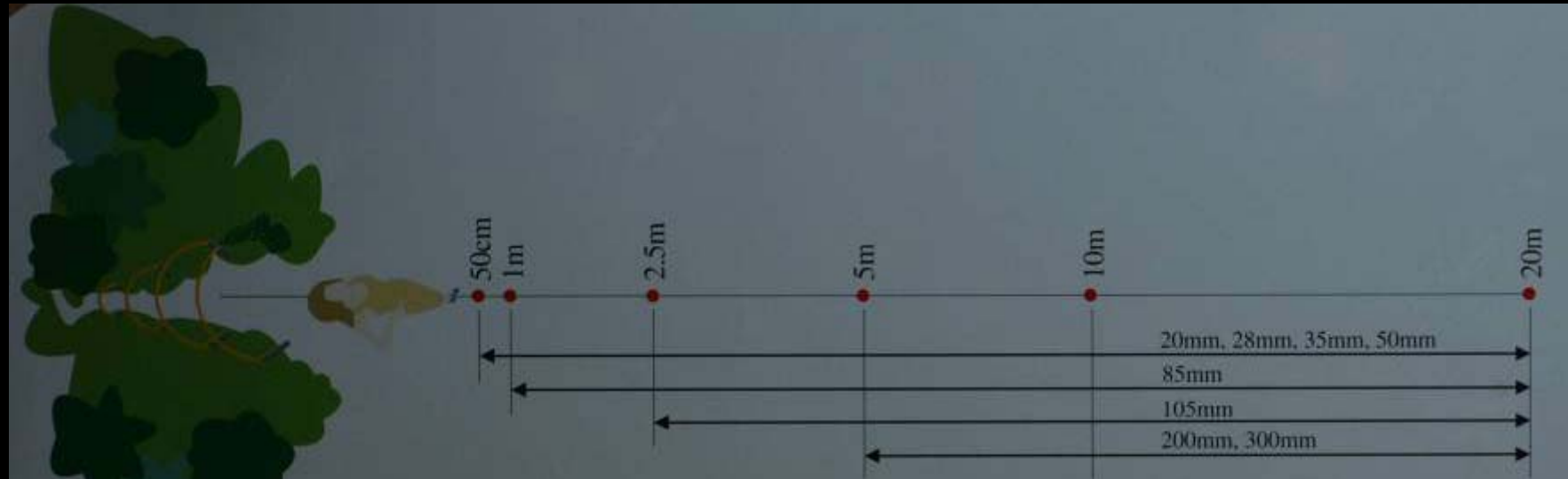


## Telephoto lens

- Distance between camera to the object
- Distortion of the object
- Convenience of photographer



# Lens selection: Macro-lens



This spread demonstrates how the same subject looks different, depending on the focal length of the lens and the shooting distance. All the pictures show the same model standing at exactly the same place. The photographer, however, used eight different lenses and varied the camera-to-subject distance, thus obtaining a wide range of effects.

For macro photography:

55 mm. Lens

90 mm. Lens

105 mm. lens

What are the differences?





# Exposure

- Over-exposure
- Under-exposure
- Normal exposure







# Exposure

- Over-exposure
- How much do we know? How to prevent..
- And how to do correction...
- Light metering.... What feature is appropriate







# Exposure

- Stop... ( a technical term in photography), over one stop means...
- Correct exposure depends on the following factors...
  - Internal factors
  - External factors





# Exposure

- Internal factors
  - Film speed (ASA or ISO)
  - Shutter speed... (exposure time 1/60 sec., 1/125 sec.)
  - F-number (lens aperture, similar to eye iris, f-8, f-11, f-16 etc.)





# Exposure

- External factors
  - Lighting environment
  - Light metering systems : average metering, spot metering
  - Contrast, background







# Electronic flashes

- Flash light control -- built-in, external flash
- Flash control
  - Manual
  - TTL (Through The Lens), automatic light intensity control by camera CPU







# Electronic flashes

- GN (Flash Guide Number)
- $GN = C \times \sqrt{ASA}$  (C = distance in meter, ASA usually refer to 125 or 100) or...
- $GN = C \times f\text{-number}$
- $20 = 5 \times f\text{-number}$ , there by  $f\text{-number} = 4$





# Depth of field

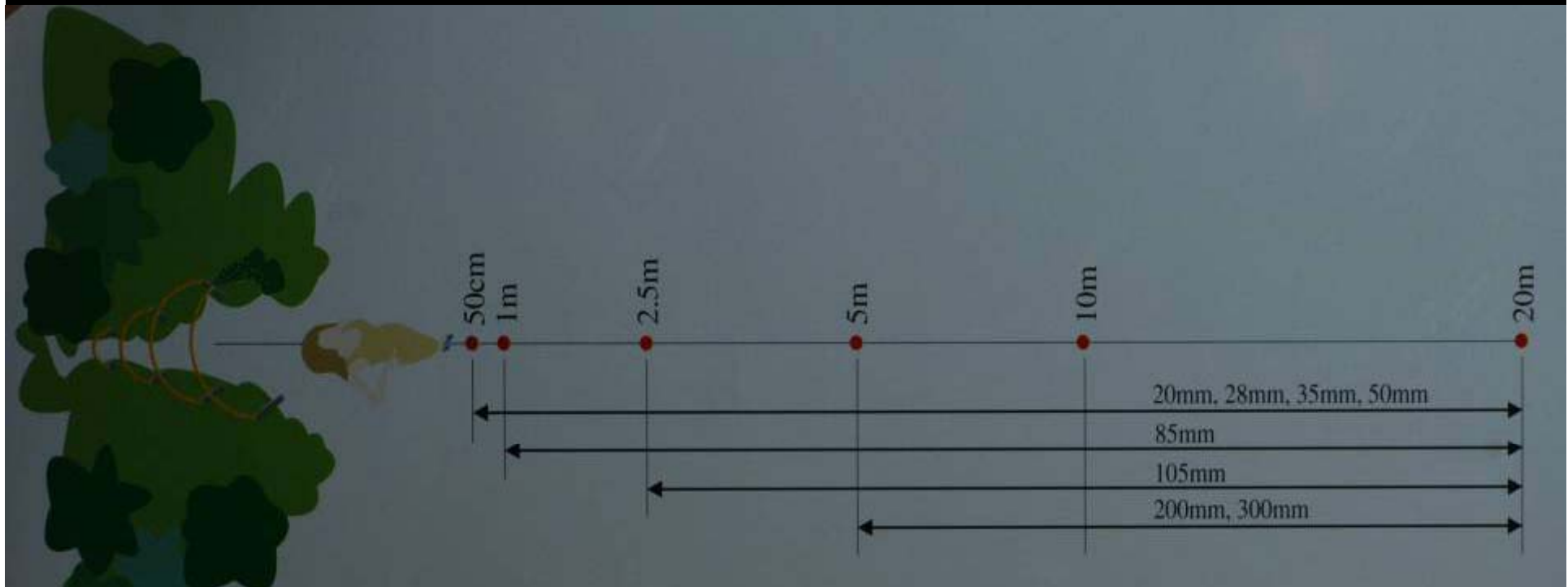
- Depends on two factors
  - F-number or lens aperture ...and...
  - Film plane to object distance
- Depth of field affects directly to intra-oral photography: suggested aperture for intra-oral photograph are f-16 and f-22





# Depth of field

- Relation to f-number (lens aperture)
- Relation to film plane-object distance
- Fore-ground / back-ground effects







# Depth of field

- Required depth of field for macro photography (in dentistry) is f-11 or smaller apertures at 20-30 cm. distance.
- Sample pictures of incorrect depth of field, f-5.6 and f-4







# Shutter speed

- Flash synchronization speed usually at 1/60 sec., the higher speed 1/125 and 1/250 sec. assure still photograph.
- Example: Flash did not work, photo was taken at low shutter speed, probably 1/8 second

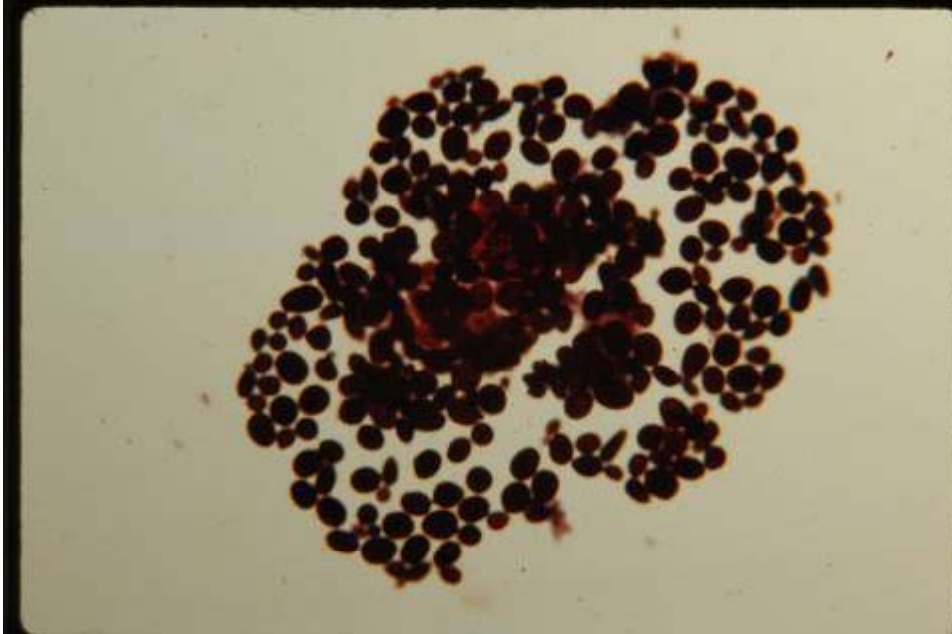






# Special purposes

- Pictures taken from microscope
- What is shutter release cable?
- When to use shutter release cable



*Candida albicans*



Critical surface tension/contact angle



# Films



The image displays a variety of Fujichrome Professional film products. In the background, two large boxes of Fujichrome Professional 50 D (RFP) and 100 D (RDP) are visible. In the foreground, several smaller boxes and rolls of film are arranged. The boxes are labeled with the Fujichrome logo, the ISO speed (50 or 100), and the film type (RFP or RDP). The rolls of film are also labeled with the Fujichrome logo and the ISO speed.

FUJICHROME 50 D PROFESSIONAL RFP	
<ul style="list-style-type: none"> <li>Roll Film</li> <li>135 36- exposures</li> <li>35mm 30.5 m (100 ft)</li> <li>120</li> <li>120 5-roll pack</li> </ul>	<ul style="list-style-type: none"> <li>Sheet Film</li> <li>4 x 5 in. (10/50 sheets)</li> <li>8 x 10 in. (10/50 sheets)</li> <li>11 x 14 in. (10 sheets)</li> <li>9 x 12 cm (10 sheets)</li> <li>13 x 18 cm (10 sheets)</li> </ul>
Cellulose triacetate	Cellulose triacetate

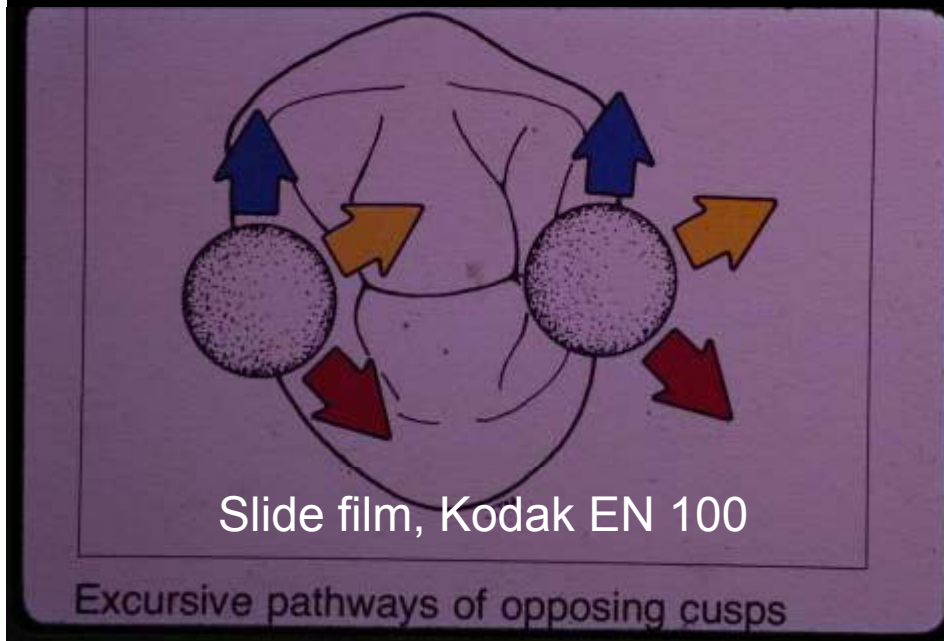
FUJICHROME 100 D PROFESSIONAL RDP	
<ul style="list-style-type: none"> <li>Roll Film</li> <li>135 36- exposures</li> <li>35mm 30.5 m (100 ft)</li> <li>120</li> <li>120 5-roll pack</li> <li>220 5-roll pack</li> </ul>	<ul style="list-style-type: none"> <li>Sheet Film</li> <li>4 x 5 in. (10/50 sheets)</li> <li>8 x 10 in. (10/50 sheets)</li> <li>11 x 14 in. (10 sheets)</li> <li>9 x 12 cm (10 sheets)</li> <li>13 x 18 cm (10 sheets)</li> </ul>
Cellulose triacetate	Cellulose triacetate



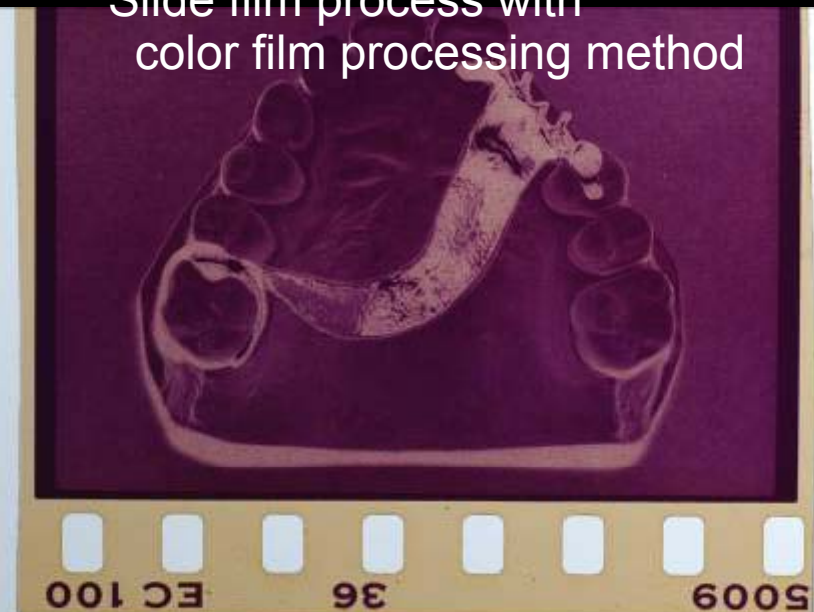


# Films

- Slide films
  - Ektachrome (e.g. Kodak EN 100 or 5039, EC 100 or 5009)
  - Kodakchrome 25, Kodakchrome 64



Slide film process with color film processing method

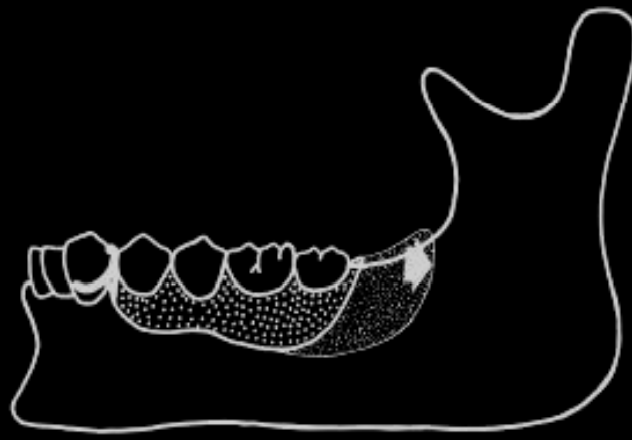






# Films

- Reverse text slide films
  - Color slide film (e.g. 5072)
  - Black & White film (e.g. Kodalith: high contrast film)
  - Color negative film (e.g. Kodak Gold 200-4, process with E-6 solution technique)

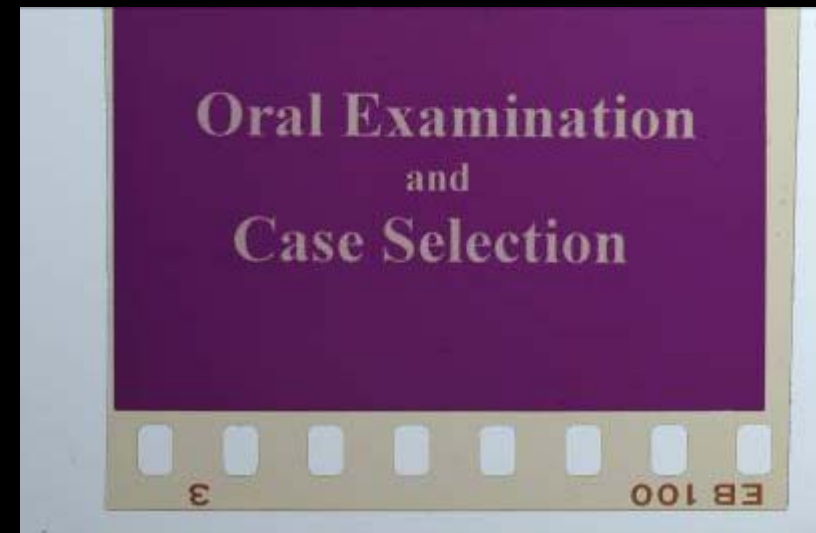




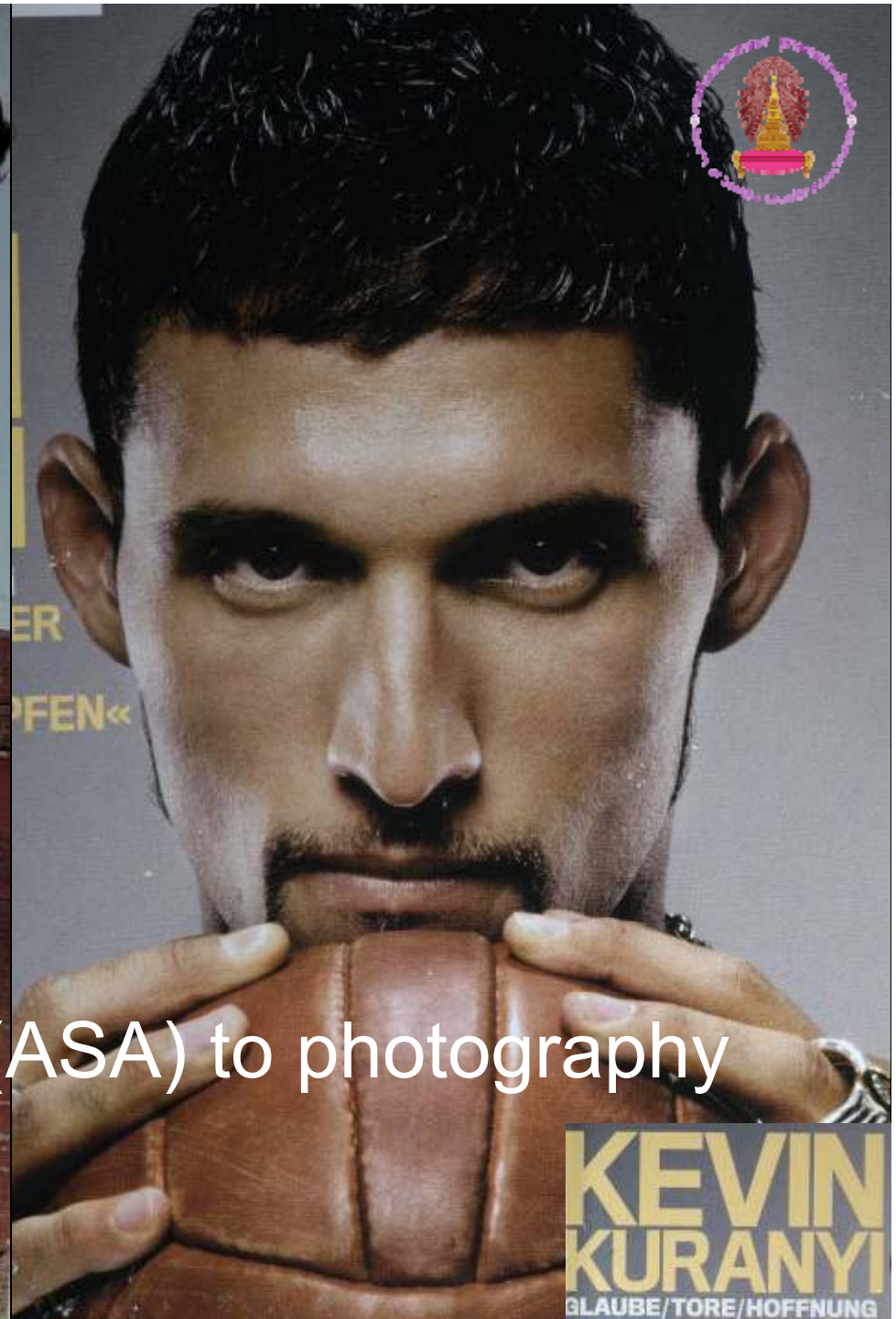


# Other Films

- Infrared film
- Tungsten film
- Duplicate slide film (Kodak 5071 ; a low speed ASA film)







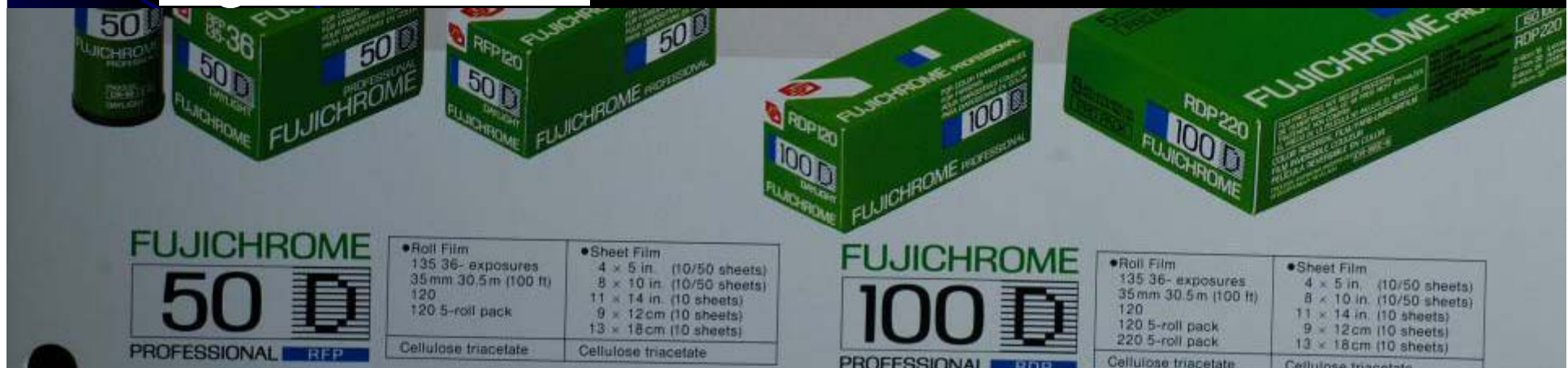
Effects of film speed (ASA) to photography





# Film speed

- ASA or ISO: determination of light sensitivity
- 25, 64, 100, 200, 400, 800, 1600, 3200
- Suggested film speed for dental photos is 100, 200 for slide film, and 200 to 400 for digital camera







# Film speed

- ASA or ISO: determination of light sensitivity
- Color grain size ---- color film, slide film
- Noise/signal ratio ---- digital camera
- The higher number ASA is set, the more light sensitivity is, and the poorer picture quality. It causes from larger grain size of silver halide, or noise of electronic signal.



# Films & Color saturation

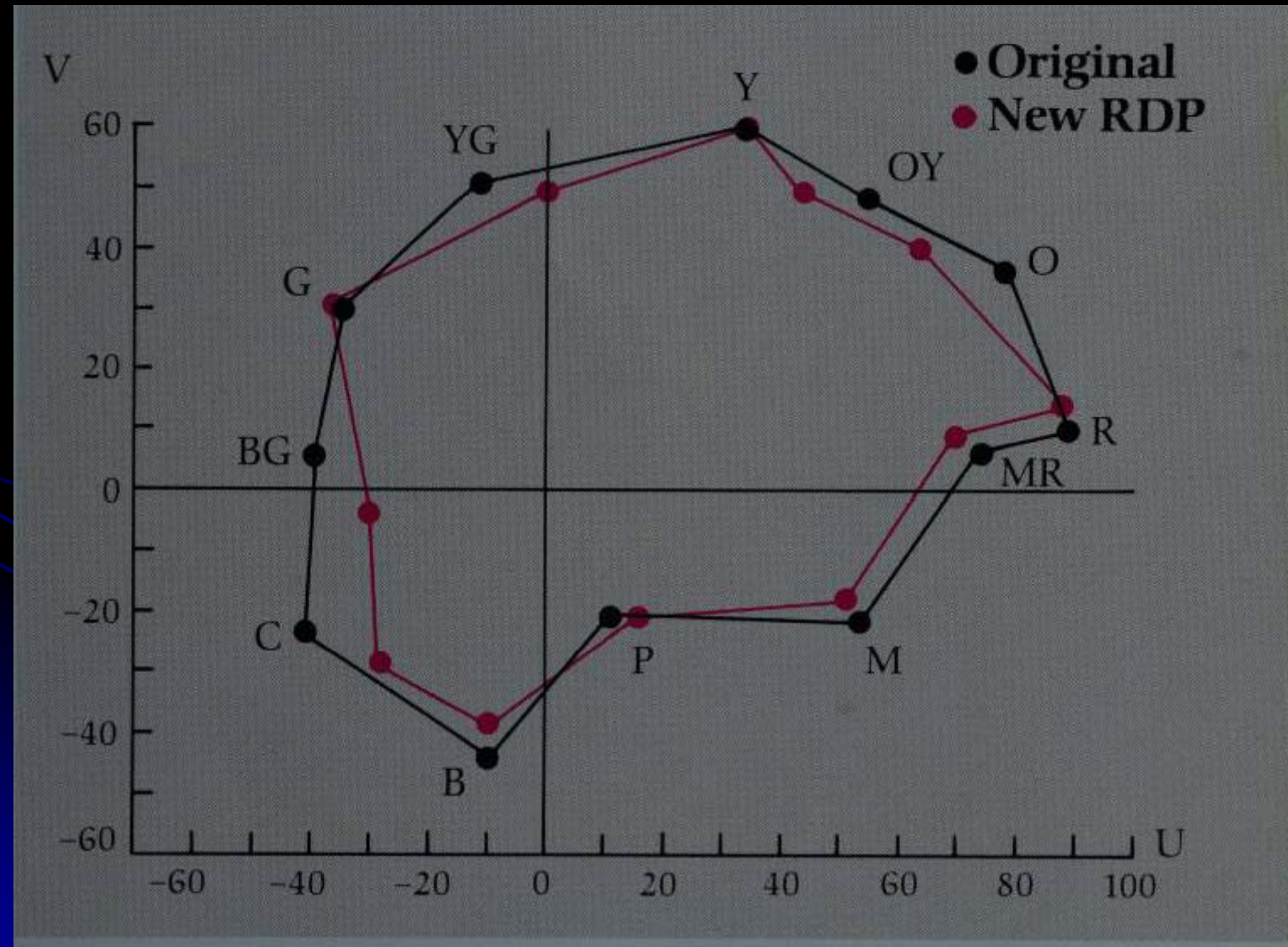


- Professional film EPR (process E-6P) provides better color than other normal films, but require constant cool storage place at 18 Celsius degree.



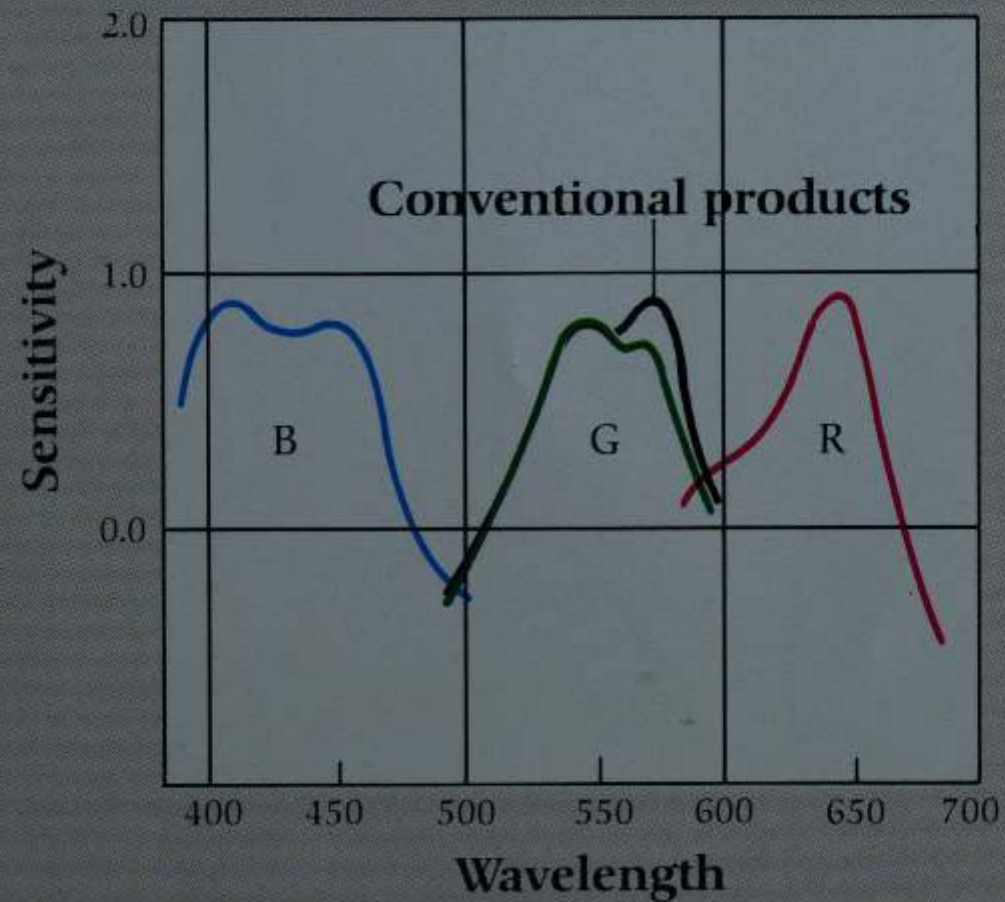


# Films & Color saturation

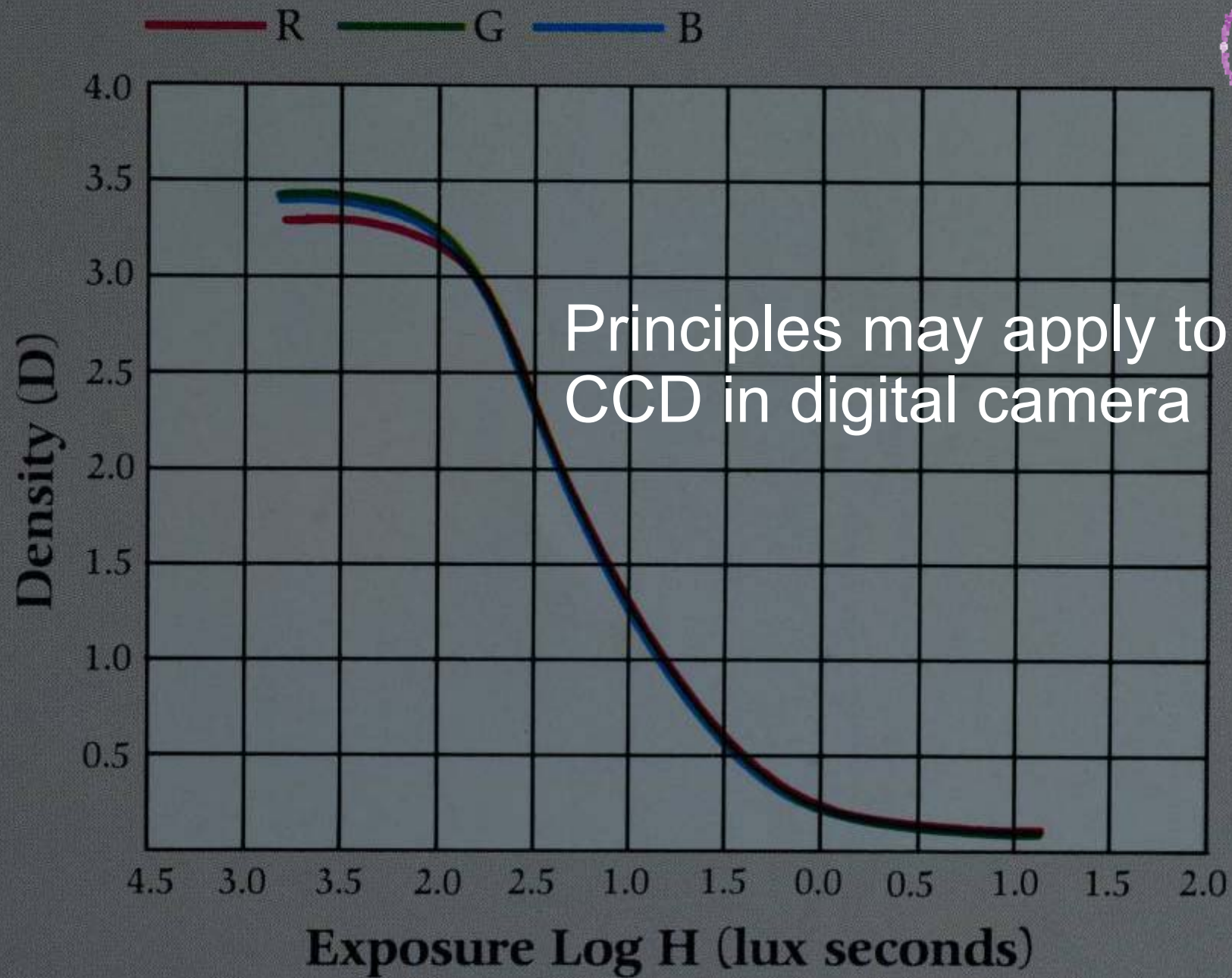




# Films & Color saturation











# Film processing

- Ektachrome slide films --- process E-6
- Color negative films ----- process C-41
- Kodakchrome slide film – use color staining technique, and has to be delivered to HK or Australia Kodak photo lab (similar to Agfa-chrome)



# Films, storage, duplication



- Film storage
- Slide picture storage
- Humidity, temperature, light exposure
- Archive film --- How long each slide film can be stored?
- Ektachrome= 50 yr. Kodakchrome= 100 yr.
- Slide duplication technique



# Filters









# Filters – Color correction



- UV and skylight filter
- Fluorescence filter (FL-W)
- Halogen light filter (light blue, e.g. Nikon B8)
- Select filter diameter that fit to your lens
- When should we use filter?
- WB mode (white balance) in VDO & digital camera for light color temperature correction



# Filters – Color correction



- Use B8 Nikon (light blue color filter) for tungsten, and halogen light; to correct light color temperature
- Set WB (white balance) of a digital camera





# Filters – Color correction



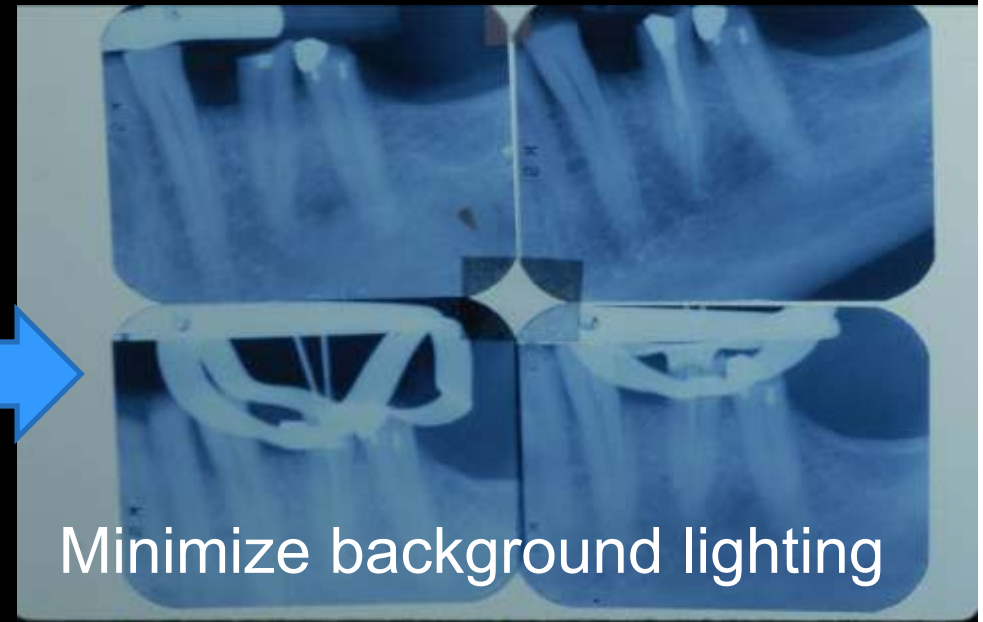
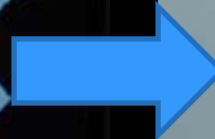
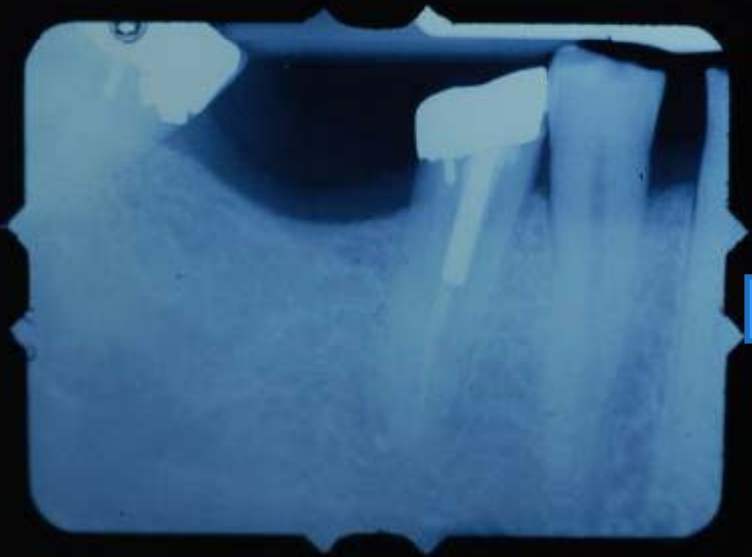
- Taken with tungsten lighting mode :  
picture turned green from cool light  
temperature from fluorescence bulbs



# Taking photo from X-ray films



- Analog films, silver halide
- Light sources
- Fluorescence filter
- Film mounting



Minimize background lighting





# Digital cameras

- All general mechanisms are similar to film loaded cameras.
- Instead of film, to be a media that receives light, it is CCD (charged couple device). CCD digitalized light from focused picture image. Then, transfer into digital information via CPU to digital memory unit.





# Digital cameras

- Set light source menu
- Set picture size
- Set ASA/ISO
- Manual focusing
- Set flash intensity (TTL, digital TTL)
- Create folder



# Digitalized X-ray film



- File, folder management





# Intra-oral photography

- What does it mean? ...Magnification 1:1, 1:2, 1:4 when you check at your lens...
- Positioning – patient position, dentist position
- Number of frame (view) for complete intra-oral exam ---- are 11 frames.



# Intra-oral photography

- Intra-oral exam ---- are 11 frames
- 1. front 10U/10L teeth
- 2. front 6U/6L teeth
- 3. buccal Rt U/L teeth occlude
- 4. buccal Lt U/L teeth occlude
- 5. palatal Rt U posterior



# Intra-oral photography

- Intra-oral exam ---- are 11 frames
- 6. palatal Lt U posterior
- 7. lingual Rt L posterior
- 8. lingual Lt L posterior
- 9. full palatal occlusal
- 10. full mandibular occlusal
- 11. full lingual 6 anterior & lingual frenum



# Sample of required frames



- Be concentrated to framing (symmetrical objects setting)





# Intra-oral photography



- Require assistant for..
- 1.hold reflector
- 2.air blow reflector
- 3.air blow saliva



Require left and right  
lower lingual views



# Extra-oral photography



- 1. patient --- front & side (profile) views
- 2. models
- 3. books (pictures, diagram etc.)
- 4. X-ray film
- Consider --- lighting, background, shutter release button, tri-pod, copy stand



# Extra-oral photography



- 5. slide duplication --- special equipment require?
- 6. text slide
  - Direct use of 5071
  - Reverse text
  - 5072, Kodalith (black & white for print works)
  - Ektachrome color slide --- C-41 processing
  - There is no problem, with Powerpoint Program,



# Extra-oral photography



- Models & other objects
- Text slides
- X-rays



"Rise to the Occasion"  
Jeramine Jackson & La La

Produced by David Z

in Association with Ricky P

"One Moment in Time"  
Whitney Houston

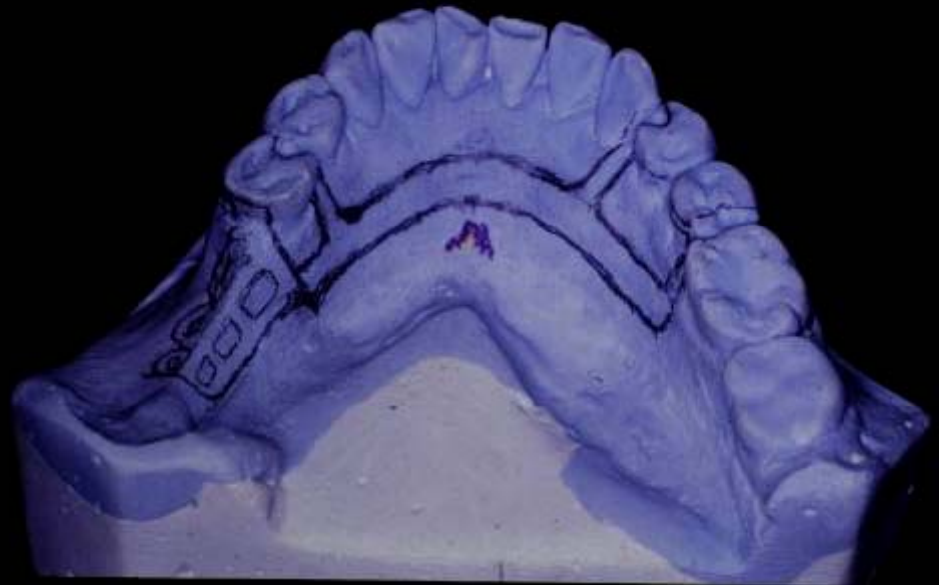
Produced by Narada Michael Walden  
for Perfection Light Production



# Lighting technique for extra-oral photography



- Dark background
- Light metering modes: average, center weight, spot
- Location & number of light source, Slave flash





# Lighting technique for extra-oral photography



- Back lighting, side lighting, above lighting
- Flash control cord length?
- Color value & shadow

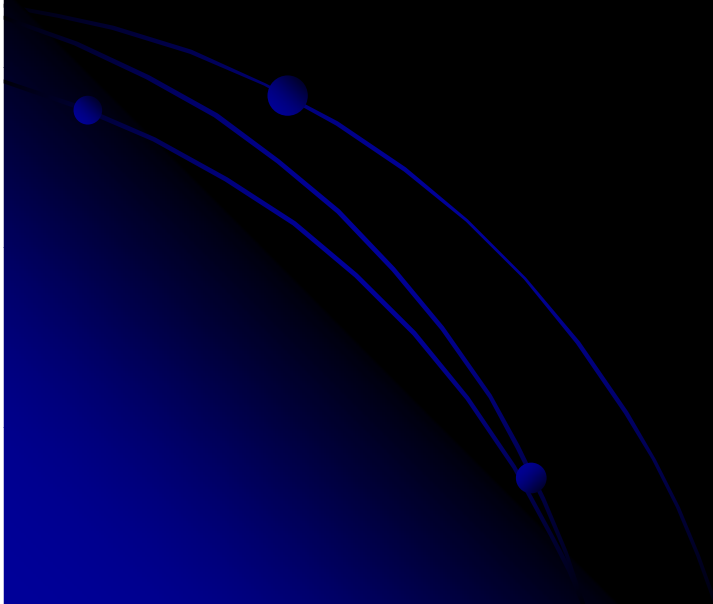




# Film processing



- C-41 for color print
- E-6 for color slide
- Push processing.. means.....





# Additional technique for film loading camera



- Positioning slide picture in a slide tray
- Remove rolled film from film cassette
- Rewind and marking unexposed film
- Checking camera if it is film loaded
- Double lighting with slave flash
- Double exposure



# Managing digital pictures



- Transfer digital information from memory unit, that incorporated in camera to a computer.
- Set file for each specific group of pictures.
- Save in hard disc, or in CD-R



# Managing digital pictures



- Presentation of dental photo
- Use *Microsoft Powerpoint* software (.ppt)
- Insert text, picture, sound or movie to .ppt file
- Compress picture digital information for Web/Screen = 96 dpi (dot per inch)
- Use custom animation feature





# Student Exercise

- Suggestion
- Student should record the following data of each exposure. These are..
  - ASA
  - F-number
  - Distance (direct or mirror image photo)
  - Flash power lighting... these are future reference for each camera.





# Summary

- Select camera/electronic flash system on required dental photo capability basis
- Read camera manual carefully
- Learn new things, new technology relating to professional presentation
- Practice and improve your expertise



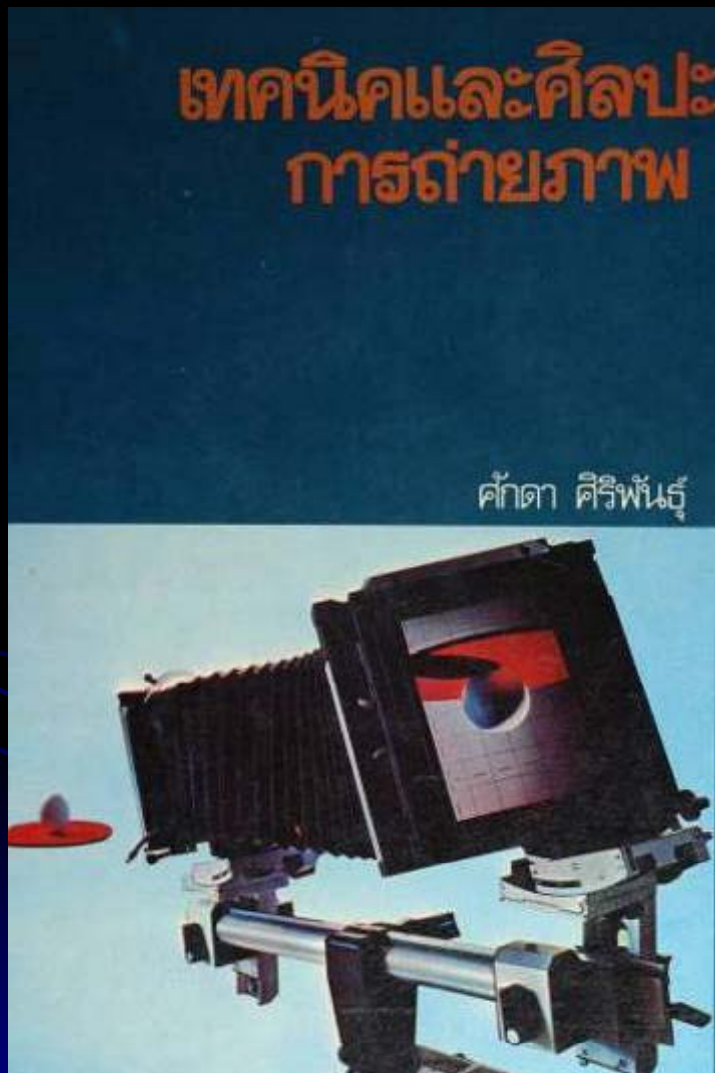
# Additional reading in dental photo.



- The Dental Clinic of North America ... book
- The New York State Dental Journal
- The British Dental Journal
- The Journal of Prosthetic Dentistry
- Other local dental magazines and journals



# References



180 Baht  
Second Edition 2523



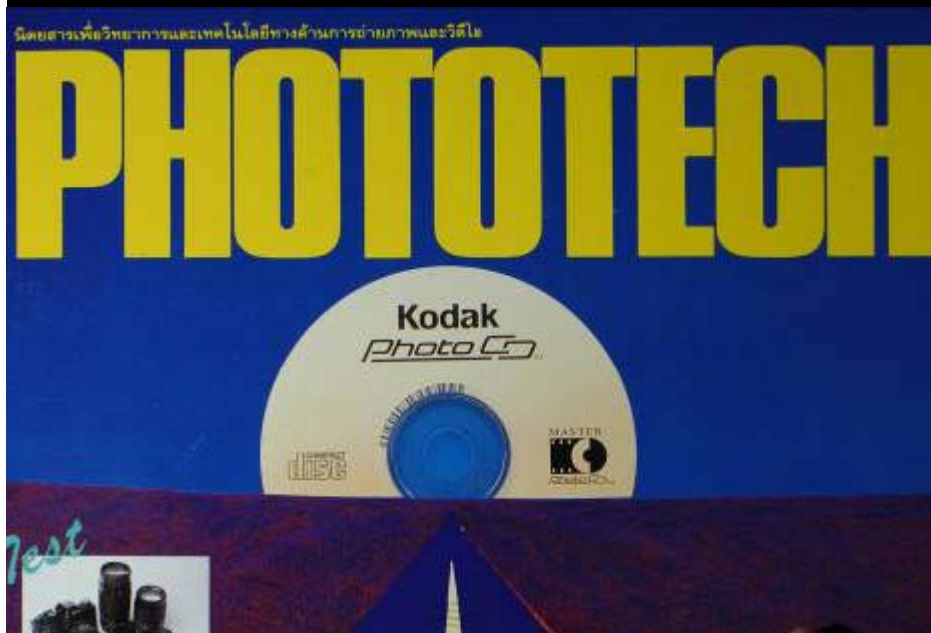
120 Baht  
Second Edition 2529





# References

- Sample of a monthly photo magazine in *Thai book market*

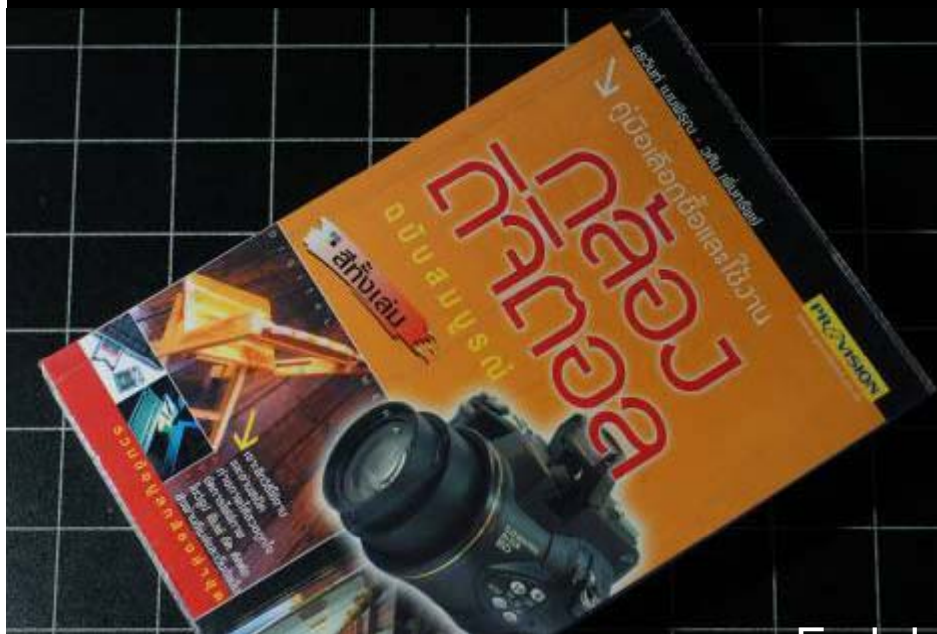




# How to select a digital camera



- A Reference Book
- 175 Baht
- Printed by Provision Co, Ltd



End document

