

Digital Dermatology: Practical Tips



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Overview of this Presentation

- Film to Digital
 - Needs Assessment
- Choosing a Digital Camera
- Practical Tips
- Archiving Images: Database Software
- Electronic Health Records and Images
- Lexical Standards
- HIPAA, Lawsuits, Security etc...
- Digital Education Tools

Disclosure

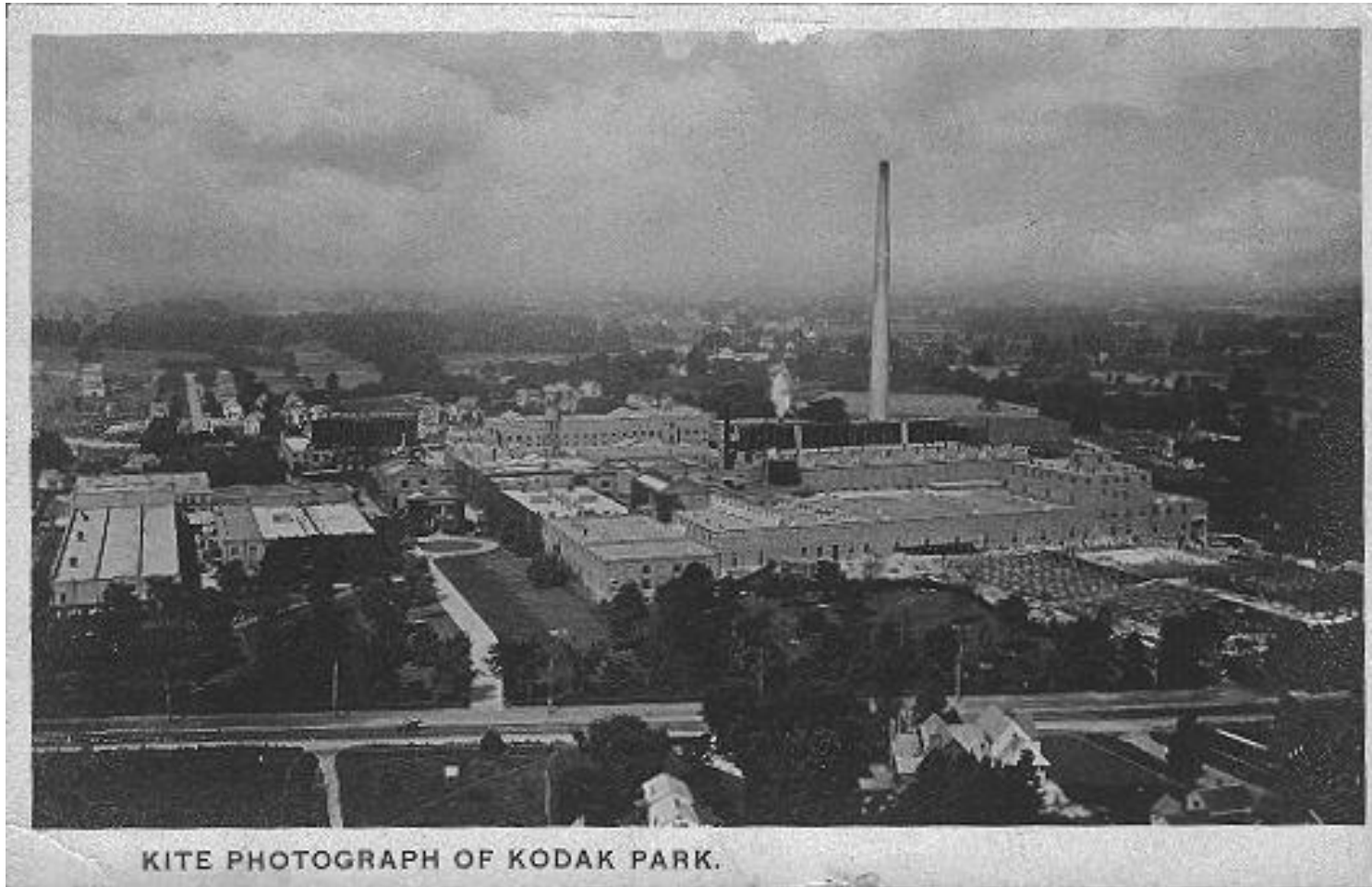
Art Papier, MD is Chief Scientific Officer of Logical Images and has a conflict of interest in Logical Images

Film to Digital



Kodak Building 23, October 2007

Film to Digital



KITE PHOTOGRAPH OF KODAK PARK.

Kodak Park 1940's

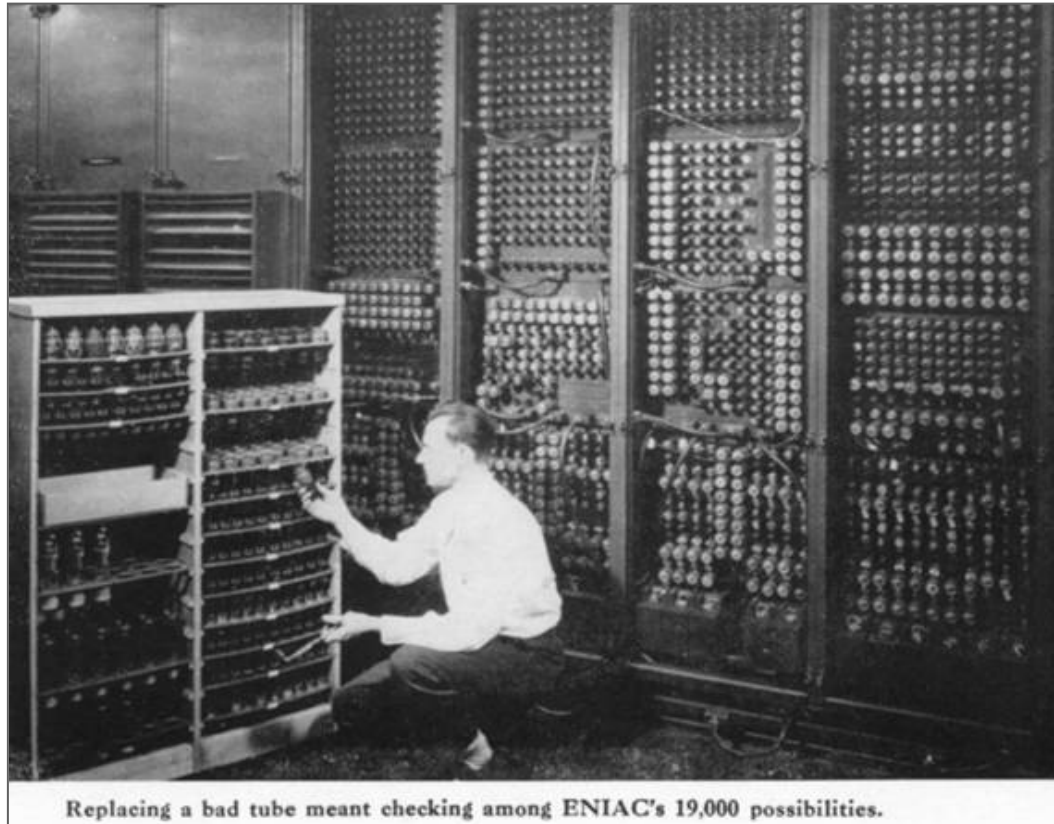
Film to Digital



Kodak Park 1983

Computing 1940's

Caption: Replacing a bad tube meant checking among ENIAC's 19,000 possibilities



Replacing a bad tube meant checking among ENIAC's 19,000 possibilities.

Computing by 1990's

50 years to move to from room-sized computers to laptops, Notebooks, Handheld, Treo etc...



Residents and Teaching Collections circa 1990

Film- based collections were primarily organized by diagnosis



Digital Photography 1993

- Kodak-Nikon SLR sold to Associated Press Photographers
 - Limited resolution - 2 megapixel
 - Heavy
 - Expensive - \$32,000



Digital Photography 2007

- Consumer and Professional cameras at very affordable price
- Equivalent SLR Camera of Kodak-Nikon 1993 costs \$700
- Cameras on a chip
- Further miniaturization
- Imaging everywhere
 - Phones
 - PDA's
 - Convergence of camera and phone



Are the Images Better?

- Film vs. Digital



Fox's Photographic Atlas of the Diseases of the Skin,
1910

Are the Images Better?

- Sometimes...
- Typically, film images were taken with more care than digital



1992 (Kodachrome)

Needs Assessment: What is Your goal?

- Private Practice
 - Medical
 - Surgical
- Academic Practice
 - Teaching
 - Patient care
 - Resident Portfolios
- Publications?
- Volume?
- Who's taking the photos?
- Patient care
 - Prints for patients
 - EHR integration

Choosing a Camera

- Consumer

- Small and portable
- Lower cost
- Image distortion
- No options for lenses



- Professional SLR

- Larger and heavier
- More expensive
- Better Images
- More options for lenses and flash



Who Should Get a Consumer Grade Camera?

- Not publishing
- Ease of use
- Taking few pictures
- Taking the pictures yourself (expedience: keep it in your pocket)



Who Should Consider a SLR Digital?



- Publishing Images
- Research
- Truly enjoys taking great images
- Loves photography
- Have great lenses from film SLR and can still use
- Have children to photograph!

Consumer camera considerations

- Can take photo with flash on without over-exposing the image
- Excellent re-chargeable battery system (Lithium ion as opposed to AA batteries)
- Best lens possible
- Memory Card form that works with your peripherals



The Essentials of Taking a Great Derm Photo

- Same as film photography
 - Composition
 - Standardized lighting
 - Neutral background (grey or blue)
 - Remove clothes and jewelry
 - Focus!!



Common Digital Problems

- Out of focus
- Too casually composed
- Poor lighting
- Resolution too low
- Visible compression artifacts

Focus and Zoom Features

- Choose a camera with
 - A large LCD display and review images by zooming on edge and checking to insure focus
 - Macro Focus – required for sharply focused close-ups
 - An optical zoom of at least 4:1 for close-up to full-body range



Large LCD display



Macro Focus

Composition

- Consider your environment - don't be too casual
- Use neutral background if possible
 - Blue or gray will provide adequate contrast for all skin types



Cluttered and distracting background



Greater emphasis on subject

Lighting

- Flash
 - Standardizes color and brings out depth
- Better to have ambient light with flash
- With Flash off more artifacts from camera movement, photos will have different color from room to room



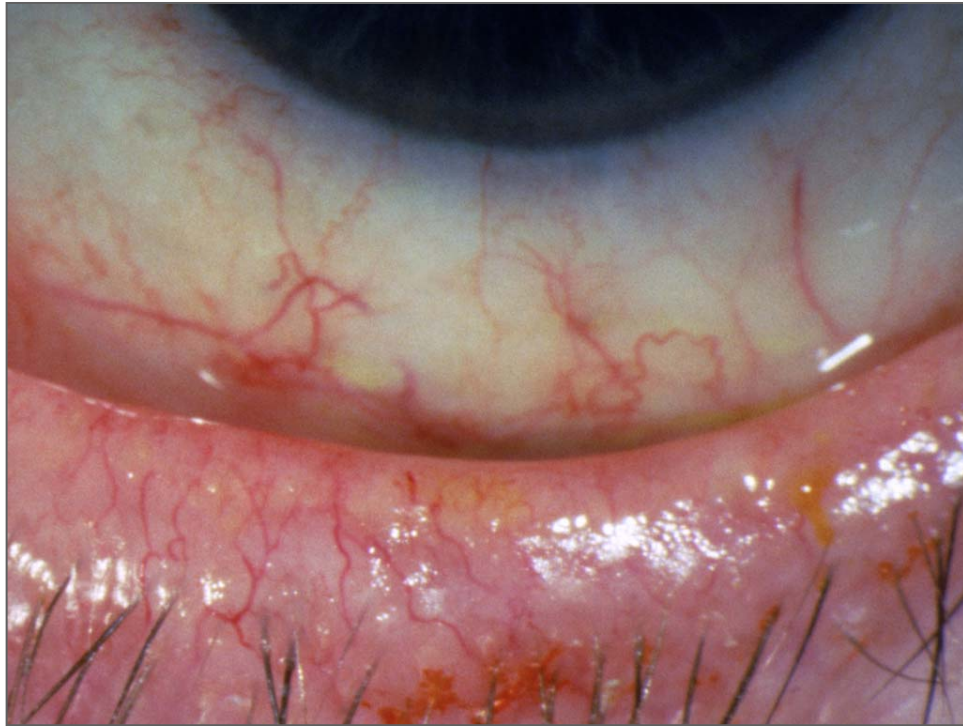
Camera mounted flash with inadequate ambient light – no detail in highlights



Natural light without flash – uneven illumination

Resolution

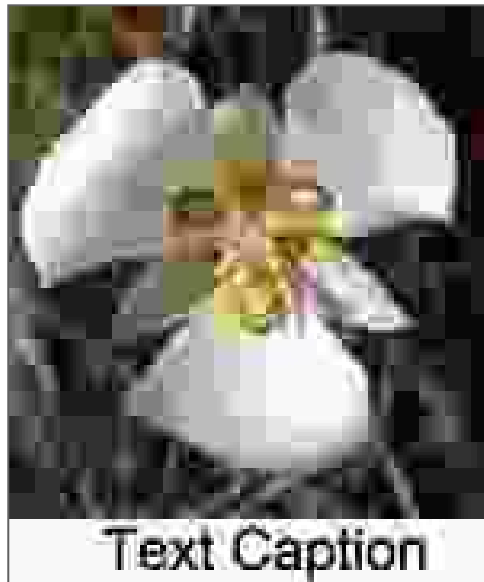
- Shoot and store pictures at a least 5 megapixels
- Archive unedited master file
 - Use derivative copies for manipulation and changes



Highest resolution to maintain detail throughout

Compression

- Lossy compression –(JPEG is an example)
 - repeated changes and saves irreversibly discards visual information
- Compression artifacts



Visibly discernable compression

File Formats

- JPEG
 - Still most prevalent compression scheme
 - Stores full color information
 - Compresses well but with loss
 - Useful for compact storage and transmission of images
 - Not for making repeated changes/saves
- PNG, TIFF, PPM, etc.
 - Lossless 24-bit format for working on the image
- GIF
 - Better for line drawings, not for continuous tone photographs

Editing and Enhancing Digital Images

- Gold Standard: Adobe Photoshop CS3 (\$699)
- Consumer Version Adobe Photoshop Elements (\$149)

- Online Image Storage
 - www.flickr.com

Memory Cards

- Inexpensive
- Purchase a 1GB or larger and
- Keep an extra to swap in



Back-up! Back-up! Back-up!

- Inexpensive
- Purchase a 200 GB or larger and make sure to back-up your hard drive frequently.
- Periodically burn to CD's



Image Archiving Software

- Part of the EHR or separate database?
- Canfield is an industry leader for cosmetic photography, (have not evaluated their software)



The screenshot shows the Canfield website for Mirror PhotoFile. The navigation bar includes links for Home, Company, Imaging Systems, Clinical Services, and Dermatology. The breadcrumb trail is Home > Imaging Systems > Products > Mirror Imaging Software > Mirror PhotoFile. The main heading is "Mirror PhotoFile". On the left, a sidebar lists categories: OVERVIEW, APPLICATIONS, and PRODUCTS. Under PRODUCTS, "Mirror PhotoFile" is highlighted. Other products listed include Mirror PhotoTools, Mirror Rejuvenation, Mirror Aesthetic Simulation, Mirror Body Mapping, Mirror Suite, Gunter Rhinoplasty Diagrams, and Canfield Confirm Pre-surgical Software. The main content area features a photograph of a doctor in a white coat sitting at a desk with a computer monitor displaying a software interface. To the right of the photo, text describes the software's features: "Mirror PhotoFile keeps your medical images instantly accessible, yet provides HIPAA security features. Nothing else is as comprehensive-or easy to use." Below this, a paragraph states: "All Mirror software is written with the busy practice in mind. With the industry-standard Mirror medical interface, patient chart structure and customizable diagnosis and procedure libraries, Mirror PhotoFile is simply medical image management at its best."

Image Archiving Software

- Key question to ask the Vendor:
 - What file format are the images stored in and if I stop using your database, how easy is it to “export” my images into another database
- **Make sure they are not using a proprietary format!!!**

More Questions for the Vendor

- Can I “import” a table of diagnostic terminology and define the fields I need in the database?
- Can I print easily?
- Can I back up the database easily?
- How long has this software been around?
- What kind of support is available?
- What maintenance fees do you charge?
- **Is there a dermatologist (in a similar practice to mine) using your software that I can speak to?**

What about an offsite storage service?

- No back-up concerns, they back-up for you
- HIPAA concerns
- Risk of company going “belly-up”
- Probably difficult to switch services

Images in the Electronic Medical Record

- Usually do not support the teaching library function or cosmetic practice needs but ideal in terms of patient care
- Challenge:
Moving images from camera into database without losing time!

Academic Department Photography Today



- Residents demand ease of use
 - Therefore consumer grade, pocket size cameras
- Easy data entry
- Images they can use for teaching post-residency

Dermatology Lexicon and IMx

- Fundamental building block
 - Labeling images with diagnoses using a concept oriented terminology (supports synonymy)

The Problem with ICD-9

- ICD and other terminologies do not capture the richness of dermatology
- Using an Adhoc labeling system leads to redundancy and the inability to find all images for a particular diagnosis over the long haul

Dermatology Lexicon

- Each diagnosis is represented by a unique code and includes associated synonyms.

Parents

[EPITHELIAL GENETIC NEOPLASIA](#)

[ONDONTOGENIC CYSTS AND BENIGN NEOPLASMS](#)

BASAL CELL NEVUS SYNDROME

DLP ID = 2883

Synonyms:

BCNS

FIFTH PHACOMATOSIS

GORLIN SYNDROME

GORLIN-GOLTZ SYNDROME

HEREDITARY CUTANEO-MANDIBULAR POLYONCOSIS

MULTIPLE BASAL CELL CARCINOMA SYNDROME

MULTIPLE BASAL CELL NEVI

MULTIPLE HEREDITARY CUTANEO-MANDIBULAR POLYONCOSIS

MULTIPLE NEVOID BASAL-CELL CARCINOMA SYNDROME

NEVOID BASAL CELL CARCINOMA SYNDROME

NEVOID BASAL-CELL EPITHELIOMA-JAW CYST-BIFID RIB SYNDROME

ODONTOGENIC KERATOCYSTS, AND SKELETAL ANOMALIES

Dermatology Lexicon

- Lexical Database
 - 6,147 diagnostic concepts
 - 4,067 synonyms
 - 15 pathophysiologic based categories
- Morphologies
 - 46 illustrations/animations
- Dictionary
 - 185 precisely defined morphologic terms

The Potential of the Perfect System

- Enhance patient care (view pre and post)
- Grand Rounds and Conferences
- Teaching Collections
- Portfolios and Resident Review
- Research Databases

Patient Care

- View Patient Record by
 - Patient Problem
 - View images by encounters across the timeline of disease



Day 4



Day 5



Day 6



Day 7



Day 10



Day 21

Examples



Example Image



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Example



Example






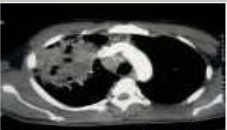


Example



Patient Record Viewer

← Patient Top | Browse Data | Upload Images | Lightbox | Search Images | Browse by Attending | Browse by Resident

Patient Name:

Problem	Onset	Encounter Date							
		1/29/04	2/4/05	2/20/05	3/25/06	4/20/07	5/30/07	5/30/07	7/23/07
Rosacea	3/25/07								
					1 of 1 Images	1 of 2 Images	◀ ▶		
Atypical Nevus	5/25/07								
					1 of 2 Images	◀ ▶			
Coccidioidomycosis	5/25/07								
				1 of 4 Images	1 of 2 Images	◀ ▶			
Nodular Basal Cell Carcinoma	5/25/07								
					1 of 2 Images	◀ ▶			
Malignant Melanoma	5/30/07								
Darier Disease	5/30/07								
AIDS Associated Kaposi Sarcoma	7/23/07								
								1 of 1 Images	

Grand Rounds

- Support retrieval of prior grand round presentations, during grand rounds

Department Teaching Collection

- Insure residents are contributing to the collection
- Insure quality of the collection during periodic review
- Ease access to images by almost any key word
 - Attending, resident
 - Diagnosis (any synonym)
 - Date, type of encounter

Review by Resident Name



Provider Diagnosis Summary

[← Patient Top](#) | [Browse Data](#) | [Upload Images](#) | [Lightbox](#) | [Search Images](#) | [Browse by Attending](#) | [Browse by Resident](#)

Resident Name: Encounter Type:

Diagnosis	Visit Type	Procedure	Number
Acute Cutaneous Lupus Erythematosus	Clinic		1
Allergic Contact Dermatitis due To Plant	Clinic		1
Alopecia Universalis	Clinic		1
Basal Cell Carcinoma	Clinic	Elliptical Excision	2
Basal Cell Carcinoma	Clinic	Shave Biopsy	1
Capillaritis	Clinic		1
Disseminated Superficial Actinic Porokeratosis	Clinic		1
Epidermal Nevus Syndrome	Clinic		1
Erythema Ab Igne	Clinic		1
Granulomatous Dermatitis	Clinic	Punch Biopsy	1
Hyperpigmentation, Drug Induced	Clinic		1
Hyperpigmentation, Drug Induced	Hospital Consult		1
Infantile Hemangioma	Clinic		2
Kawasaki Disease	Emergency Department		1
Melanocytic Nevus	Clinic		1
Necrobiosis Lipoidica Diabeticorum	Clinic		1
Neurofibroma	Clinic	Shave Biopsy	1
Nevus Flammeus	Clinic		1
Nodular Basal Cell Carcinoma	Clinic	Shave Biopsy	1
Non-Herlitz Junctional Epidermal Bullosa	Clinic		2
Pemphigus Vulgaris	Clinic	Punch Biopsy	1
Pincer Nail Deformity	Clinic		2
Pityrosporum Folliculitis	Clinic	Punch Biopsy	1
Psoriasis	Clinic		1
Seborrheic Keratosis	Clinic		1
Squamous Cell Carcinoma	Clinic	Elliptical Excision	1
Venous Malformation	Clinic		1
Vulval Intraepithelial Neoplasia, Type II	Clinic	Punch Biopsy	1
Xeroderma Pigmentosum	Clinic		1

Portfolios and Resident Review

- ACGME
 - emphasis on resident portfolios
 - Best education practice leads to best clinical practice

HIPAA, Confidentiality and Lawsuits

- HIPAA
- What really are the photography consent rules?
- What are the risks?
- No lawsuits that I am aware of

Future Trends

- Image analysis
- Body mapping
- Wireless cameras
- Convergence of wireless phone and camera
- Easy upload of images
- More telemedicine (?reimbursement)

Contact

If you are interested in learning about Logical Images' **Initiative to Preserve the Visual History of Dermatology** or would like to contribute images please contact:



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