

# Importance of colours in teledermatology

Summit on Colour in Medical imaging

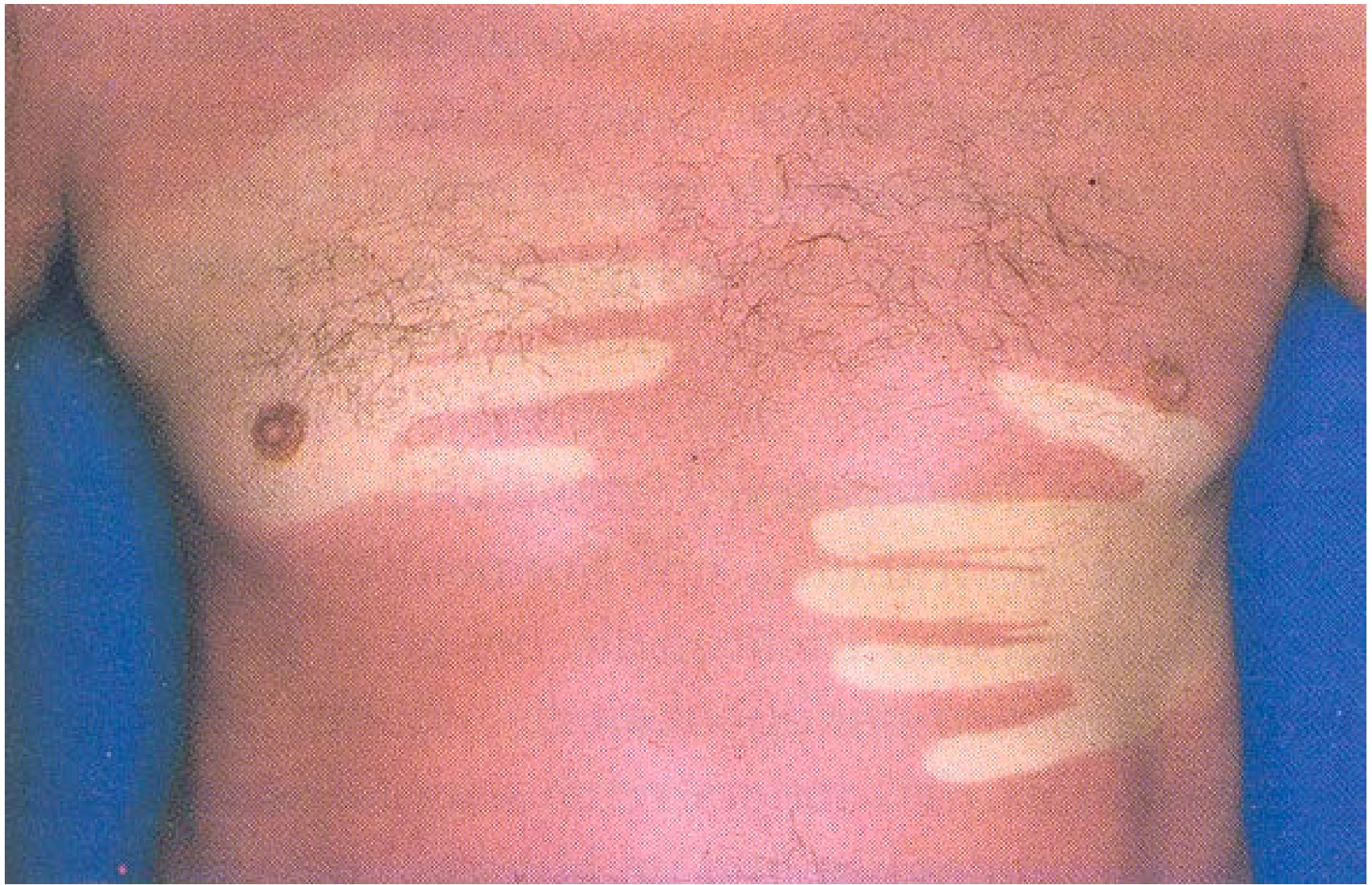
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# Importance of colours in teledermatology

- Diagnosis of skin disease:
  - Visual inspection essential
  - Diagnosis at a glance
  - Many clinical variants



# Importance of colours in teledermatology

- Diagnostic classes:
  - Inflammatory disease
  - Skin cancer

# Importance of colours in teledermatology

- Teledermatology:
  - Use of telemedicine in dermatology
  - Aim: Reduced travelling and increased access to specialist health care

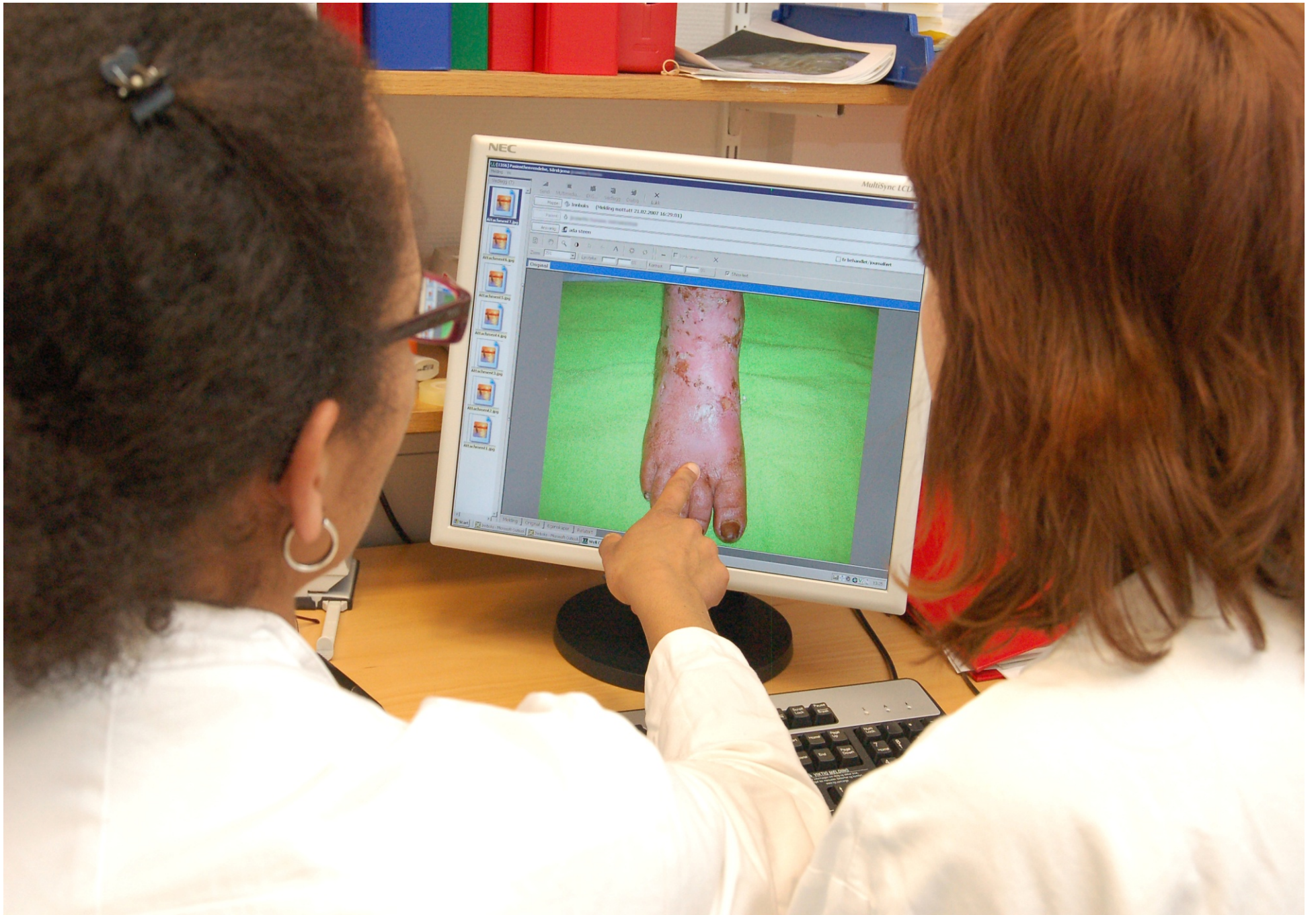
# Importance of colours in teledermatology

- Modes of teledermatology:
  - Real time
  - Store-and-forward



- Real time vs store-and-forward







## Importance of colours in teledermatology

- Store-and-forward is the predominant mode.
- Easy to use
- Asynchronous, greater flexibility

# Importance of colours in teledermatology

- Typical scenario:
  - Referrals from primary care
  - Arranged by GP or nurse
  - Reviewed by teledermatologist for diagnosis and treatment recommendation

# Importance of colours in teledermatology

- Second opinion
- Monitoring
- E-learning

Helsekompetanse.no : Modul 1 Kortison og calcineurinhemmere - UNN

http://www2.helsekompetanse.no/ator/hjelpdetklar/content/7780/

helsekompetanse.no Hjelp det klar, høst 2010 Min startside Inbox | Logg av

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### Modul 1 Kortison og calcineurinhemmere

Skriv ut side

- Snarveier
- Ekspert av innhold
- Editer denne siden
- Legg til toppside
- Legg til underside
- Slett denne siden



I denne modulen gjennomgås den praktiske bruken av kortisoner (steroider) og calcineurinhemmere ("Protopic", "Elidel"). Videre gis en rekke retningslinjer i forhold til pasientens alder og eksemets lokalisasjon.

**Læringsmål:**

Kursdeltaker skal lære på hvilket grunnlag kortisonpreparater velges ut og kunne utarbeide en individuell behandlingsplan med adekvat nedtrapping og vedlikeholdsbehandling. Kjenne til forutsetninger for bruk av Elidel/Protopic samt vanlige årsaker til behandlingssvikt.

**Oppgaver:**

Etter å ha gått gjennom modulen tester du deg selv ved å svare på en rekke multiple choice spørsmål der rett svar gis til slutt.

Gjennom en pasientkasuistikk kan du prøve deg i et klinisk scenario og foreslå behandling. Besvarelsen på kasuistikken sendes inn og blir rettet individuelt.

#### Innholdsnavigasjon

Hjem

- Beskrivelse av kursopplegget
- Basiskunnskaper om atopi...
- Modul 1 Kortison og ca...**
- Forskjellige kortiso...
- Lokalisasjon
- Dosering
- Praktisk bruk av kor...
- Bivirkninger av kortison
- Eksempler
- Kortisonfrykt
- Protopic og Elidel (...)
- Praktisk bruk av cal...
- Bivirkninger og lang...
- Oppsummering
- Viktige begreper i m...
- Multiple choice test
- Kasuistikk nr. 1
- Modul 2 Infeksjoner
- Modul 3 Allergier
- Innleggelse på sykehus
- Spørsmål og svar
- Atopisk ordbok
- Evaluerer av kurset Hje...
- Om oss

**Påloggede brukere**

Thomas Schopf  
Gjester vises ikke på listen

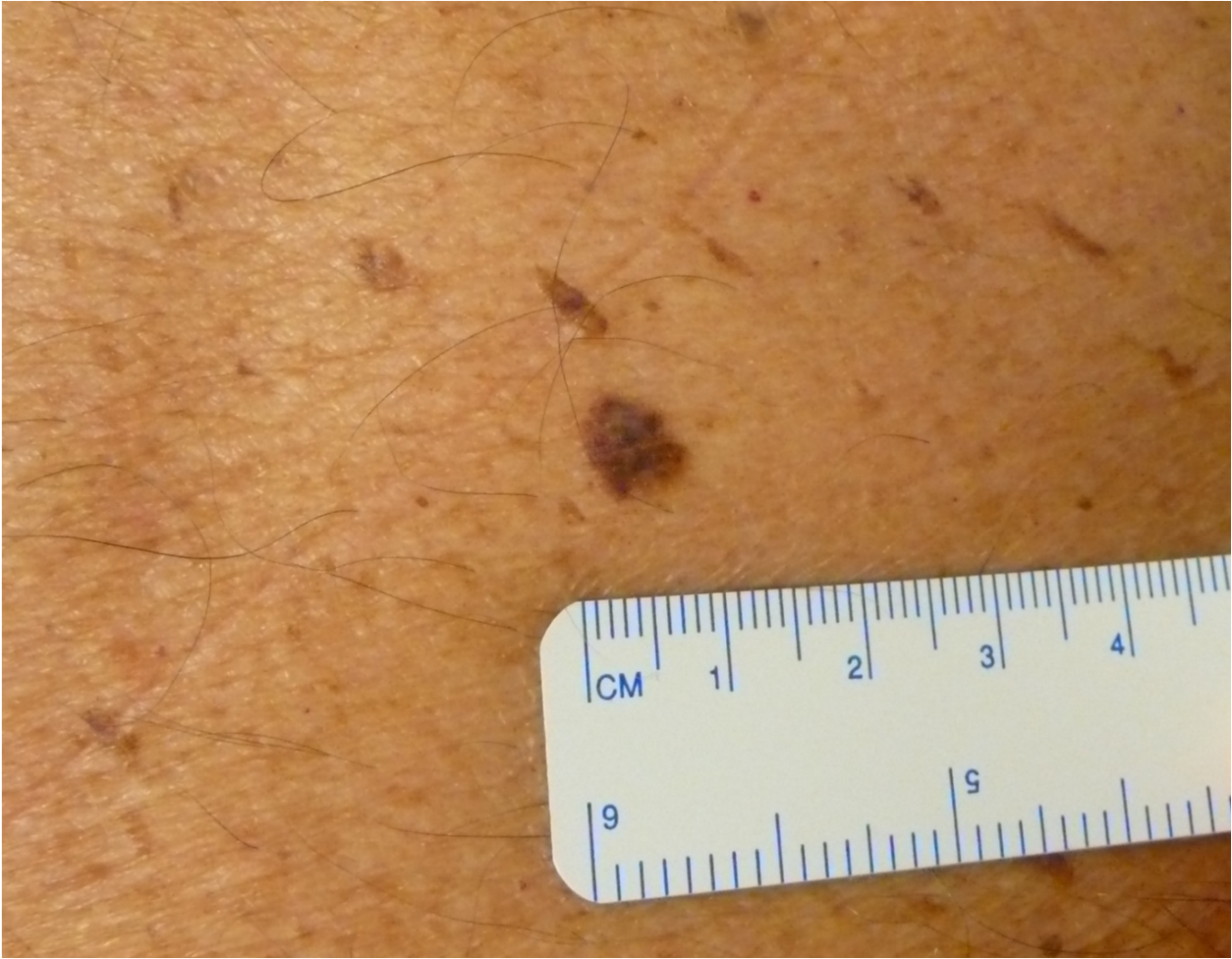
Fullført Internett 100%

# Importance of colours in teledermatology

- Diagnostic classes:
  - Inflammatory disease
  - Skin cancer
- Almost all diagnostic categories are suitable for teledermatology

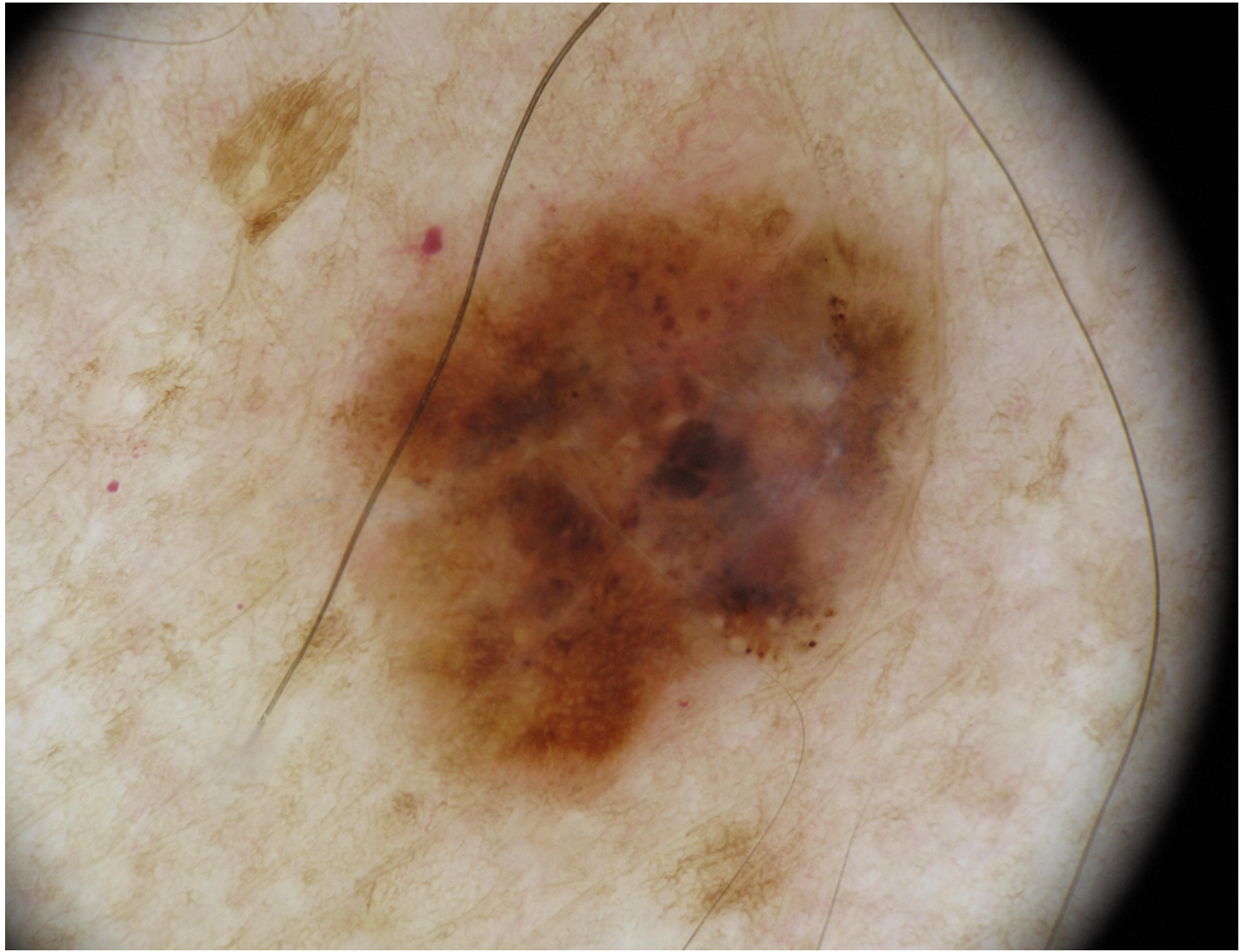
# Importance of colours in teledermatology

- Special scenario: Dermatoscopy
  - Increased use
  - Well suitable for telemedicine
  - Important for early cancer diagnosis











**Figure 1.** This dermoscopic image of a pigmented skin lesion has been captured applying the cellular phone on a pocket epiluminescence microscopy device.

doi:10.1371/journal.pone.0000483.g001

a 25 mm 10× lens (DermLite II PRO HR (3Gen, LLC - Dana Point, USA); Figure 1) has been taken. Images had



**Figure 2.** Clinical (A) and dermoscopic images (B) of a melanoma (case 9).

doi:10.1371/journal.pone.0000483.g002

Reporting the dermoscopic images, the diagnostic agreement was 89% (16/18) in teleconsultant A and 94% (17/18) in teleconsultant B, respectively. A dysplastic nevus (case 6; both teleconsultants) and a congenital nevus (case 14; teleconsultant A) were overdiagnosed as melanomas (see also Table 1). The interobserver agreement among our 2 teleconsultants was of 89% and 94% for the clinical and dermoscopic telediagnoses, respectively. Quality of clinical images has been judged poor for 11 cases (31%), fair for 14 (39%), good for 7 (19%), and excellent for 1 (3%).

## • Teledermoscopy

# Importance of colours in teledermatology

- Organizational issues:
  - Various reimbursement arrangements
  - Public or private payers
  - Economic benefits to different stakeholders

# Importance of colours in teledermatology

- Store-and-forward images, common problems:
  - Out of focus
  - Poor lighting
  - Poor colour quality
  - Casually composed

# Importance of colours in teledermatology

- What about colour quality?
  - Accuracy
  - Consistency
  - Discrimination

# Importance of colours in teledermatology

- Image quality depends on:
  - Conditions at the site where the image is being acquired
  - Conditions at the site where the image is being reviewed.
- A time and geographical gap (store-and-forward modality)

# Importance of colours in teledermatology

- Image acquisition:
  - Compact cameras
  - DSLR cameras







## Arms



Ki

## Hands / Fingernails



- Views

# Importance of colours in teledermatology

- Essential issues in image acquisition:
  - Various light sources
  - Automatic white balance?
  - Time constraints





- Flash or not?



# Importance of colours in teledermatology

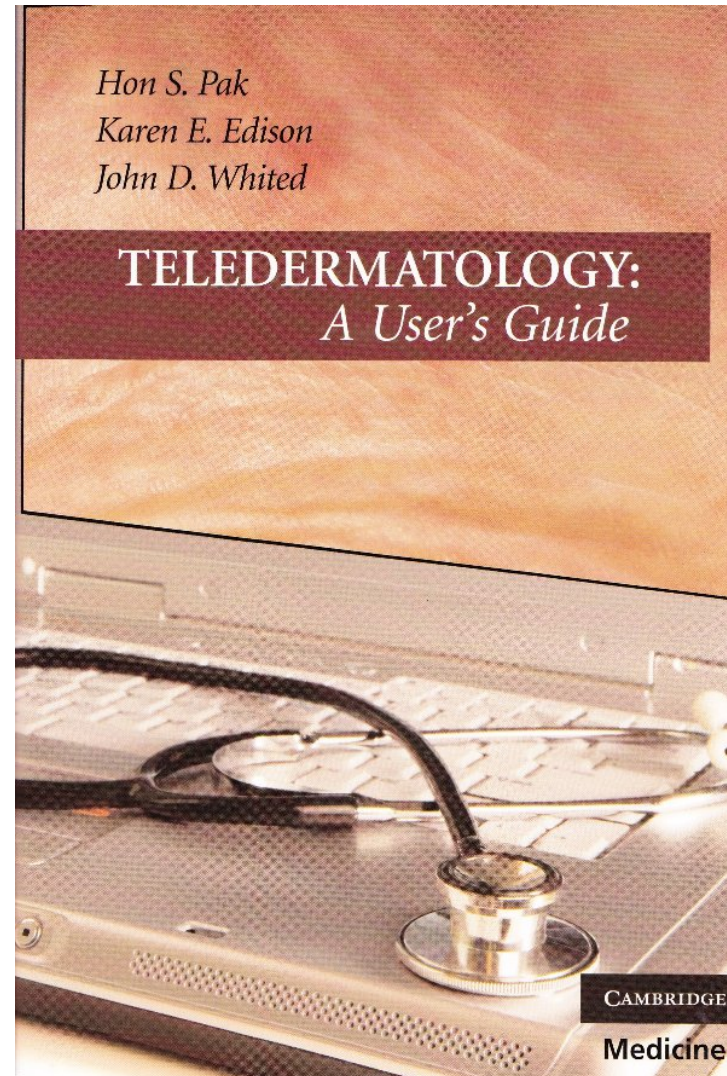
- Image display:
  - Monitors of varying quality
  - Calibration?

# Importance of colours in teledermatology

- Assessment of image quality by remote teledermatologist:
  - Views
  - Focus
  - Lighting
  - Colour?



- Teledermatology is well investigated.



# Importance of colours in teledermatology

- Research is mostly focusing on diagnostic accuracy.
- Increasing number of studies on teledermatoscopy.

# Importance of colours in teledermatology

- Search in Pubmed using „colour“ and „telemedicine“:
  - 8 papers
  - 2 addressing colour of skin (including 1 paper in German)

# Importance of colours in teledermatology

- Telederm studies investigating colour:
  - Matveev NV, Kobrinsky BA. Automatic colour correction of digital skin images in teledermatology. J Telemed Telecare 2006;12(Suppl.3):S3:62-63.

# Importance of colours in teledermatology

- Colour accuracy
  - All subgroups
  - Assessing the severity of inflammation
  - Dermatoscopy

# Importance of colours in teledermatology

- Colour consistency
  - Monitoring of inflammatory disease
  - Dermatoscopy

# Importance of colours in teledermatology

- Colour discrimination
  - Dermatoscopy














# Importance of colours in teledermatology

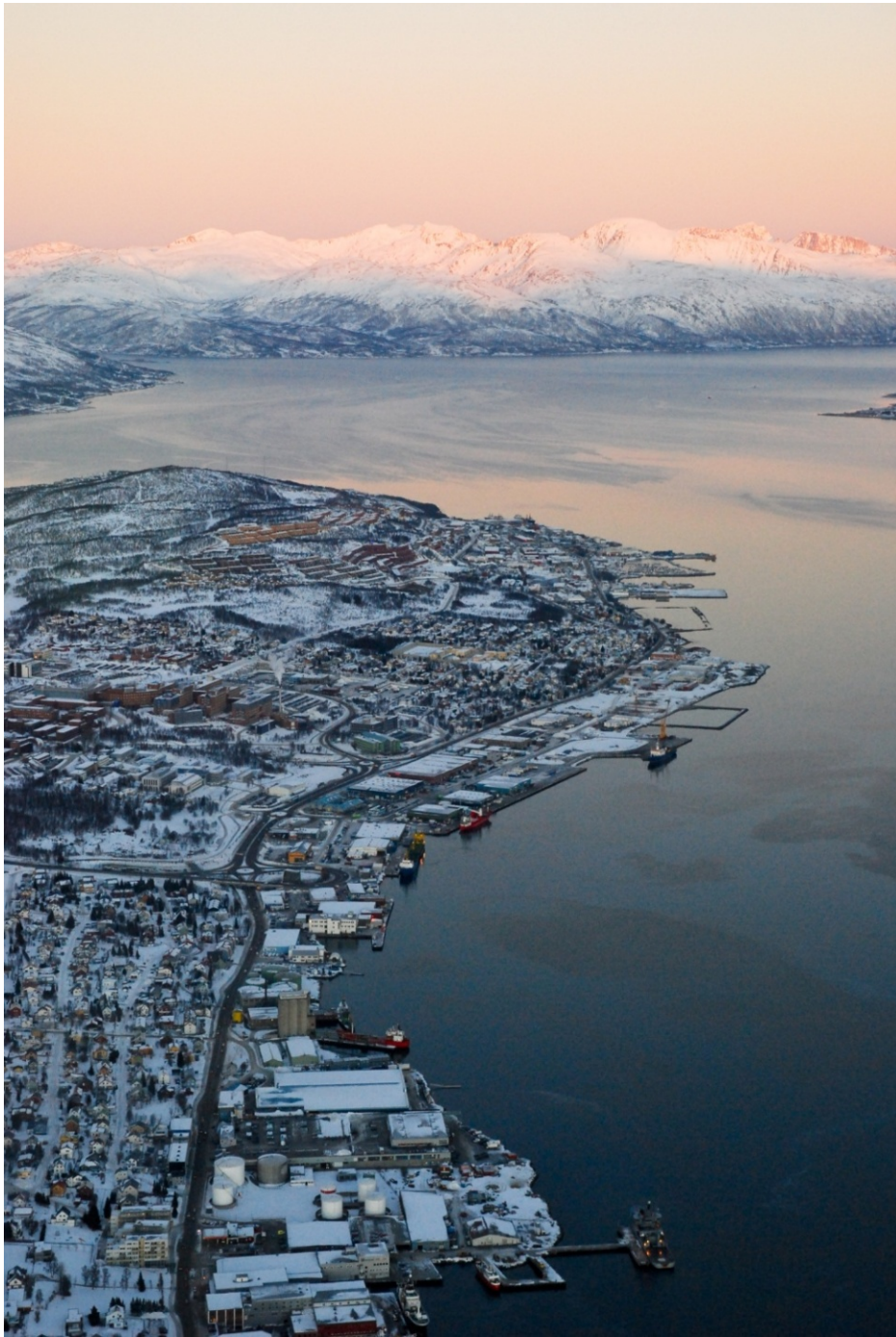
- Approaches for improved colour management:
  - Using RAW format?
  - Automated colour correction?
  - Basic photography skills
  - Increased awareness

- White balance

	Auto White Balance	<p>Fortunately, most white balances, temperature and shot. Commonly to the left.</p> <p>The first three white temperatures. A cameras and use range — usually white balance at reference under white balance for the color temper</p>
	Custom	
	Kelvin	
	Tungsten	
	Fluorescent	
	Daylight	
	Flash	
	Cloudy	
	Shade	

Increasing Color Temperature

The remaining six white balances are listed in order many compact cameras do not include a shade white "Fluorescent H" setting, which is designed to work



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