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MIRRORING AGAINST HARMFUL ULTRAVIOLET RADIATION

Awareness and prevention of skin damage caused by ultraviolet (UV) radiation

DE HAAGSE
HOGESCHOOL

UNIVERSITY OF TWENTE. **TECHMED
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Dermal therapy

Research Group – Relational care

Research Group – Assistive Technology for Inclusive Sport



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Chair Health Technology Implementation

TechMed Center, University of Twente



A large, leafy tree stands in the center of a lush green field. A blue and white checkered picnic blanket is laid out on the grass at the base of the tree. On the blanket sits a white wicker picnic basket filled with various items, including a bottle of water, a loaf of bread, and some vegetables. The background is filled with more green trees and a clear sky, suggesting a bright, sunny day.

Who seeks shade on a sunny day?

A pair of dark sunglasses with blue frames is resting on a yellow and white striped beach towel. The background is a blurred beach scene with waves and a sandy shore. The text "Who puts on clothes and glasses on a sunny day?" is overlaid in white, bold font across the center of the image.

Who puts on clothes and glasses on a sunny day?

Who uses sunscreen or a day cream?

- On a sunny day

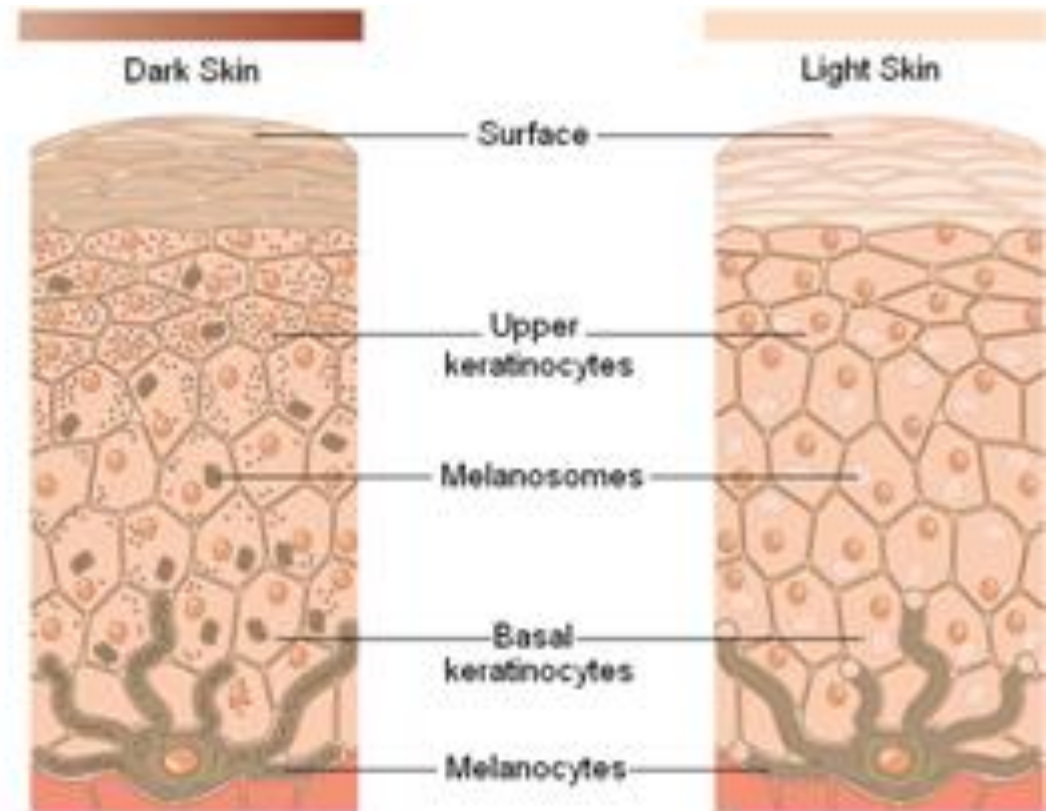
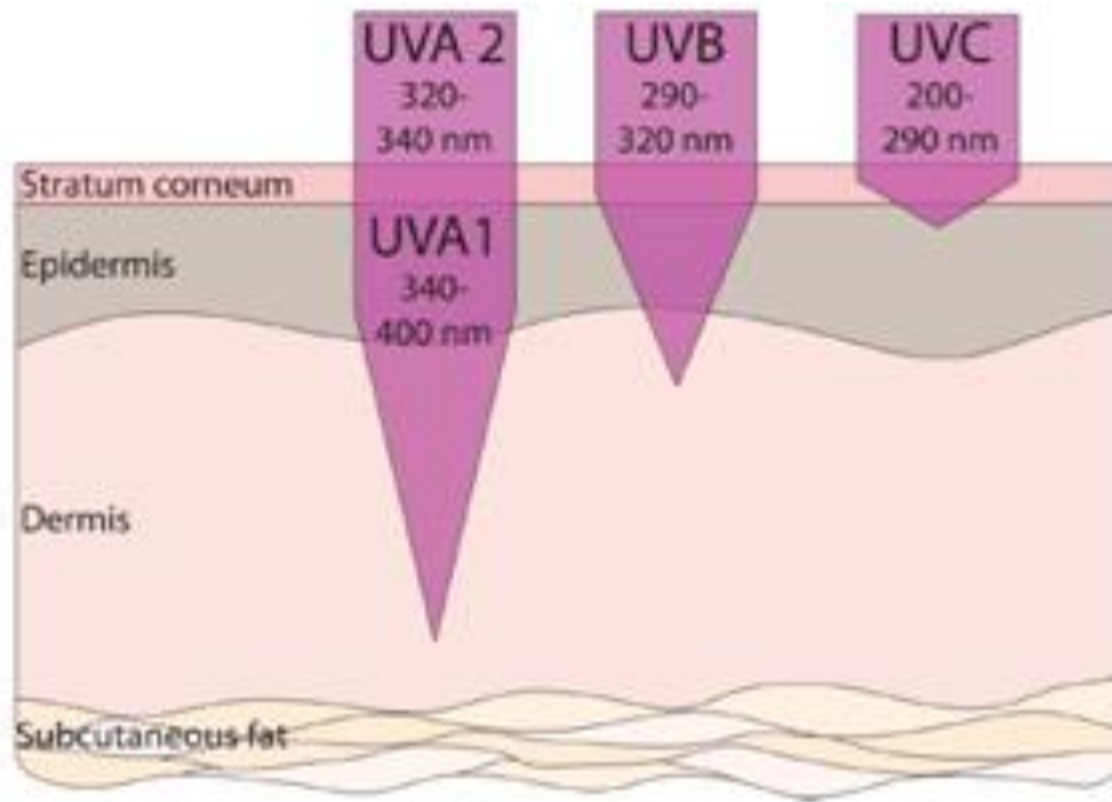


Who uses sunscreen or day cream?

- On a sunny day
- On a cloudy day with uv-index 3 or higher



What will happen if you don't protect yourself?



Skin type and skin cancer risk



Race/ethnicity:

	male	female	all
white	0.09%	0.04%	0.06%
black	≈ 0%	< 0.01%	< 0.01%
Asian	≈ 0%	≈ 0%	≈ 0%
Hispanic or Latino	< 0.01%	< 0.01%	< 0.01%
Amerindian Alaska native	≈ 0%	≈ 0%	≈ 0%
Pacific Islander	≈ 0%	≈ 0%	≈ 0%



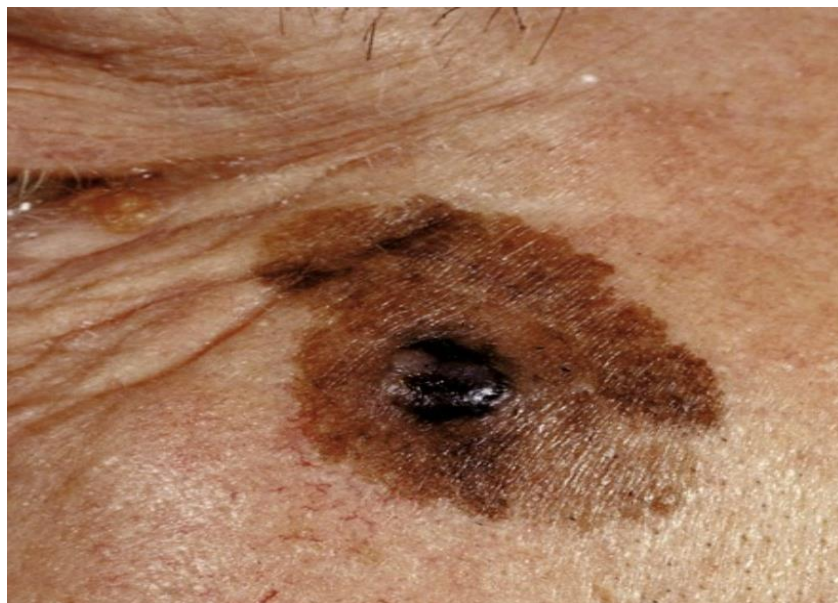
What will happen if you don't protect yourself?

UVA

DE HAAGSE
HOGESCHOOL

What will happen if you don't protect yourself?

- People should become aware of the risks of UV light exposure by visualizing the damage to the skin.
- Skin cancer:
 - 1 in 5, will be
 - 1 in 4.



UVB

Prevention

Motivate people to use sunscreen during outdoor activities especially at high risk situations/locations:

- winter sports
- beaches
- outdoor work/sports



- Sun Protection Factor 30 = 30 x time of redness (Minimal Erythema Dose)
- Filter = chemical or mineral



How to raise public awareness of damaging effect of UV light ?

- **Confronting people by showing UV skin damage**
- **Showing effect of protection by sunscreen**
- **Inspiration by youtube video
‘ How the sun sees you ‘
by photographer Thomas Leveritt**

‘ how the sun sees you ’



excerpt from Youtube video by Thomas Leveritt



Research: Mirroring against harmful radiation

- **Using an UV imaging system to raise public awareness of the risks of UV light exposure by showing skin damage and the protective effect of sunscreen**

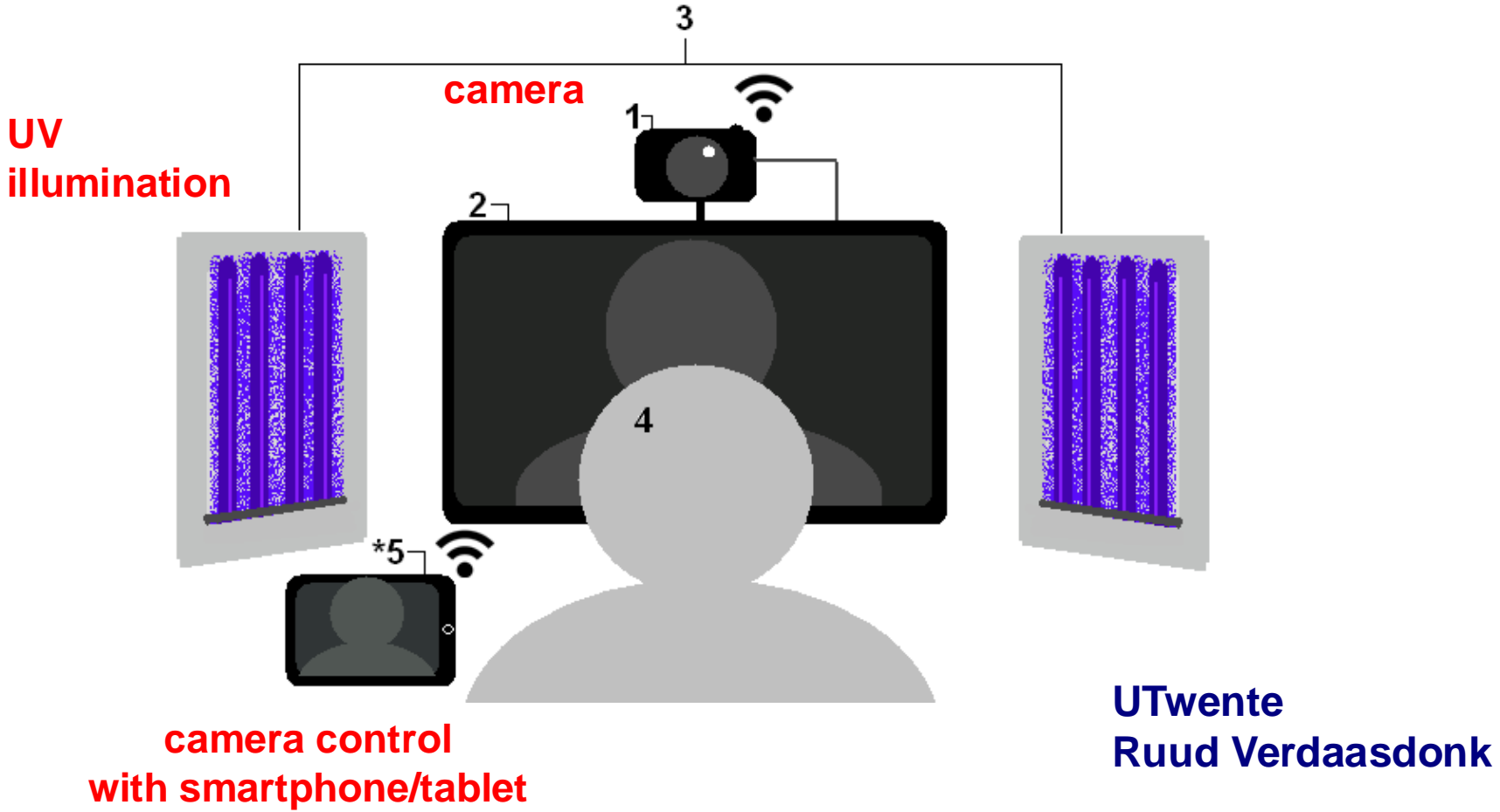
Requirements UV imaging system

- **Camera sensitive in UV-A range**
 - **UV transmitting objective**
 - **UV low pass filter**
 - **UV light source (safety regulations)**
 - **'mirror' like display**
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- **User friendly**
 - **safe**
 - **for in- and out-door use**

Face in UV – VIS - NIR



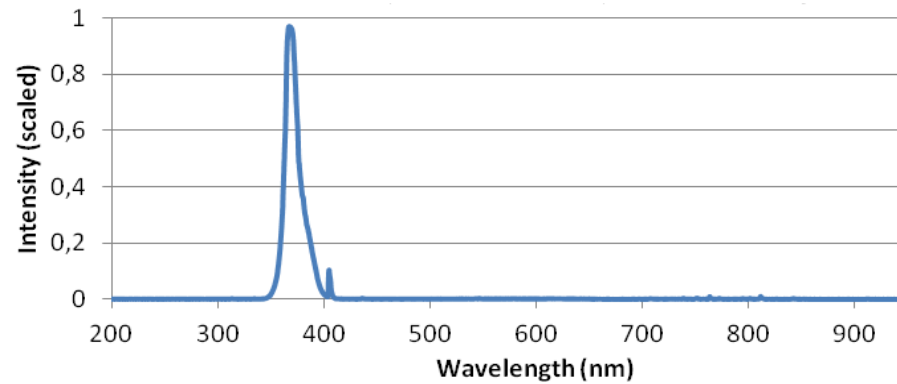
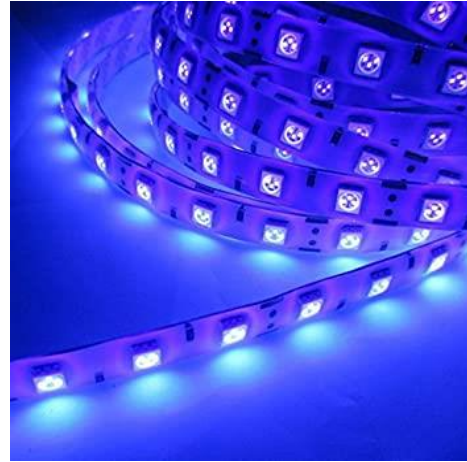
Design of UV imaging system



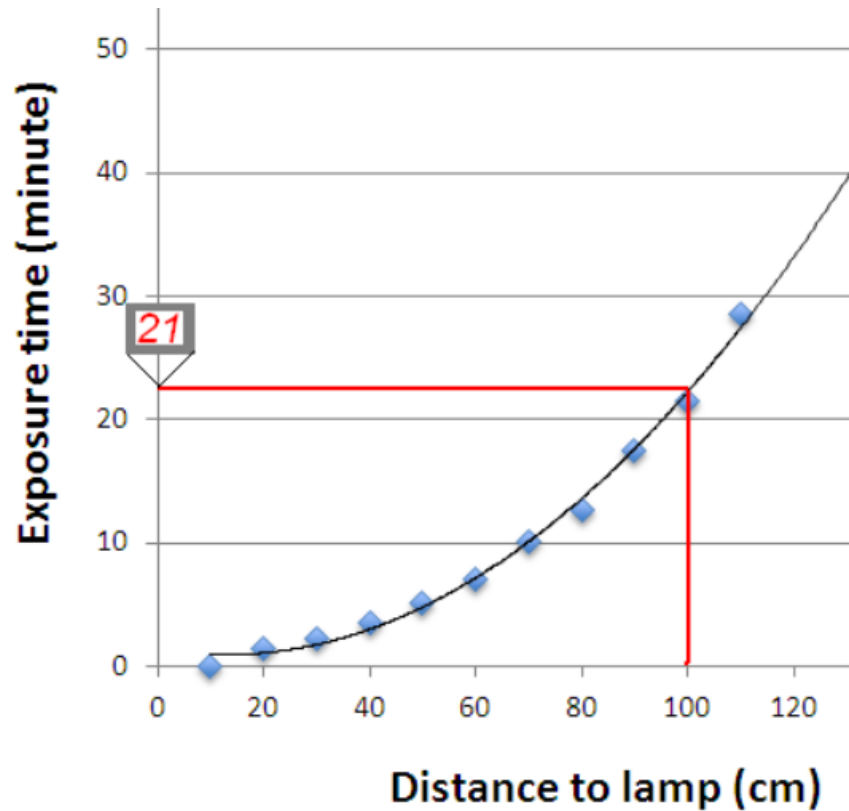
UV mirror Dermal Therapy



UV light sources 365 nm 'black lights'



Safety UV Illumination maximum exposure time



maximal dose ICNIRP
1 J/cm²

21 minutes

at 1 meter

⁹ International Commission on Non-Ionizing Radiation Protection. ICNIRP Guidelines on limits of exposure to ultraviolet radiation of wavelengths between 180nm and 400nm (incoherent optical radiation). Health physics. 2004 ; 87(2):171-186.

UV image example 'young face'



UV image example 'old face'



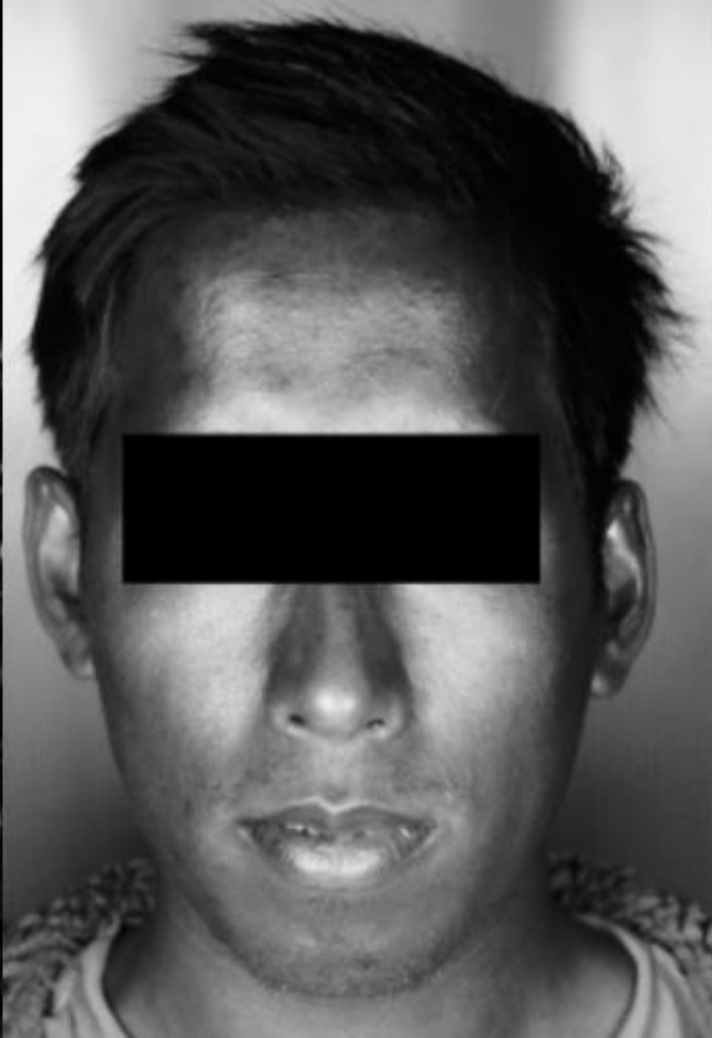
skin type I and II



skin type III and IV



skin type V



UV images effect of sun screen



Small uv mirrors



UV CAMERA



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**EVENTS
AND RAISING AWARENESS**

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Cancer prevention market Erasmus MC Rotterdam





De Haagse Hogeschool

Think Fest

Well being week

Beweefestival Apeldoorn

Special Olympics 2024



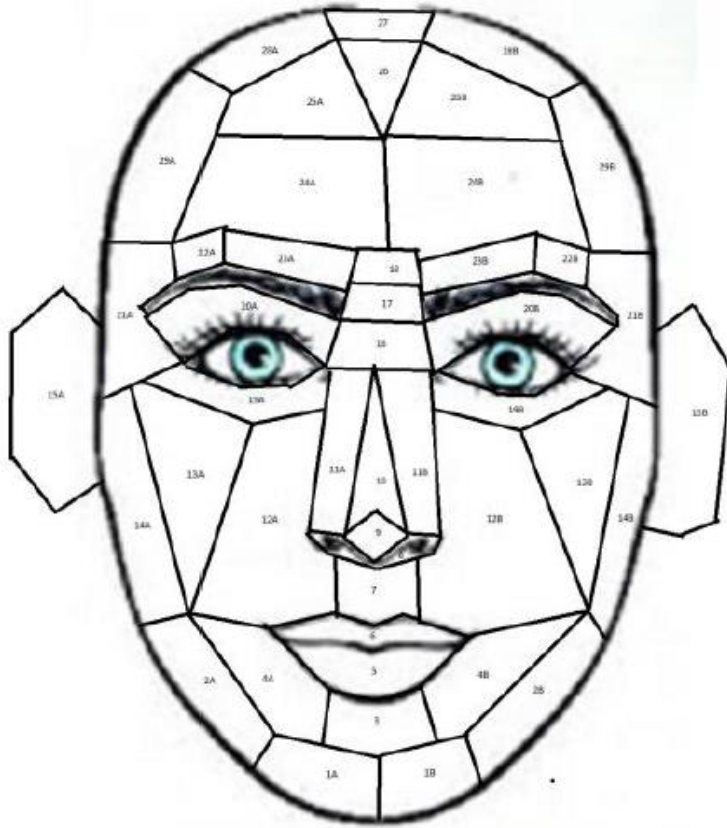
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HOW TO APPLY SUNSCREEN?

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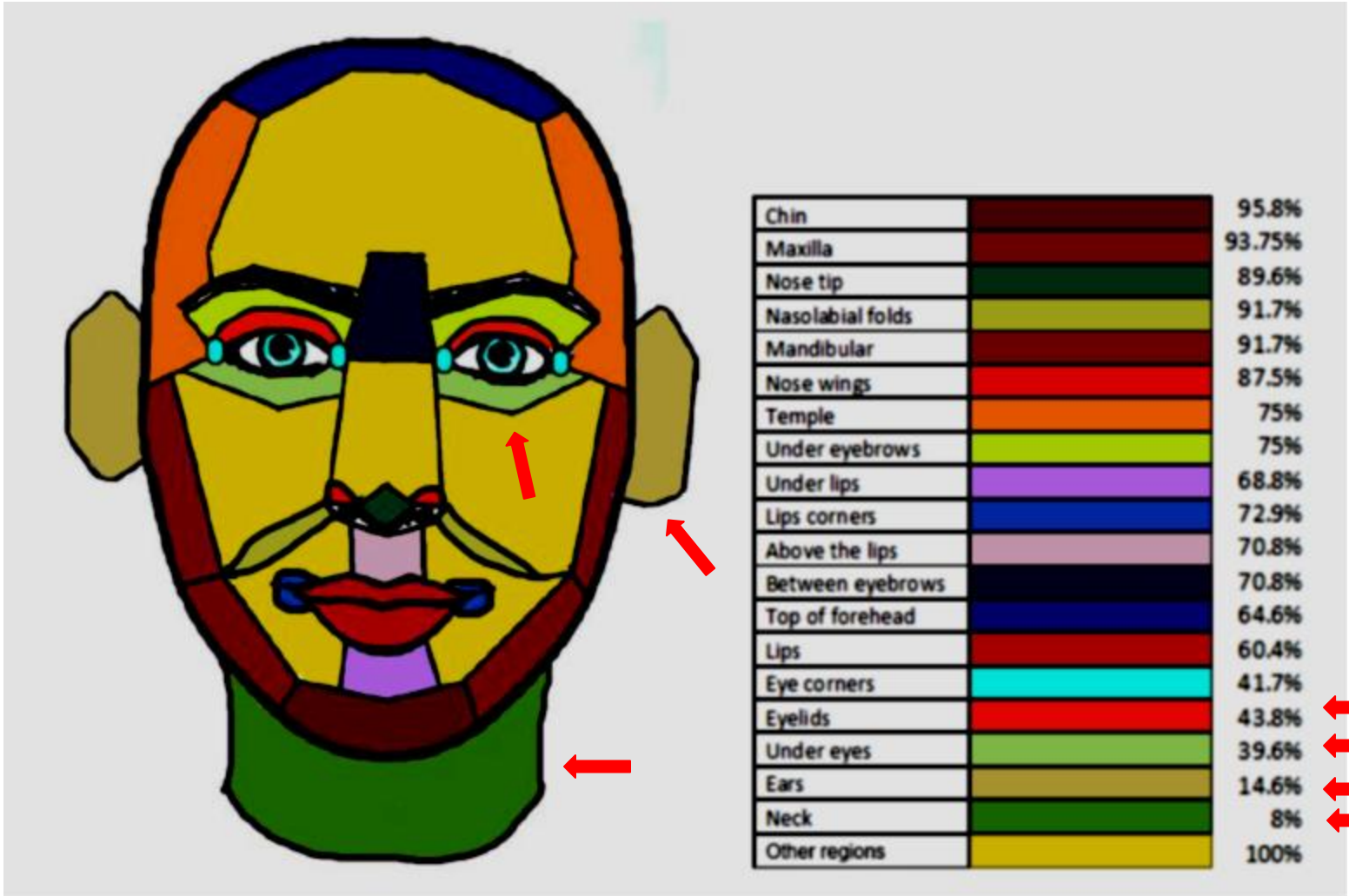


Study protective cover of sun screen in relation to facial areas



- 48 volunteers
- smearing sun screen 'blind'
- score for areas covered

Results % coverage sun screen (n=48)



Effectivity / grading test of sun screens

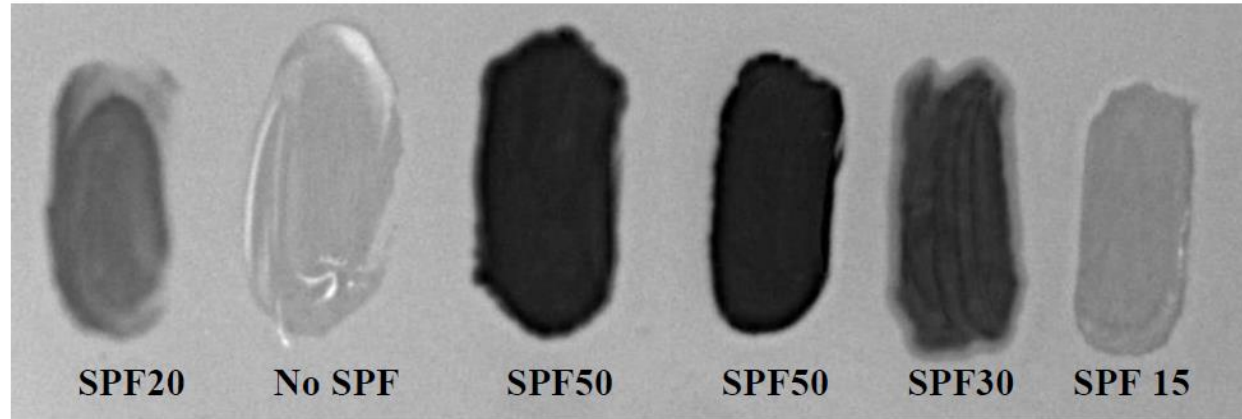
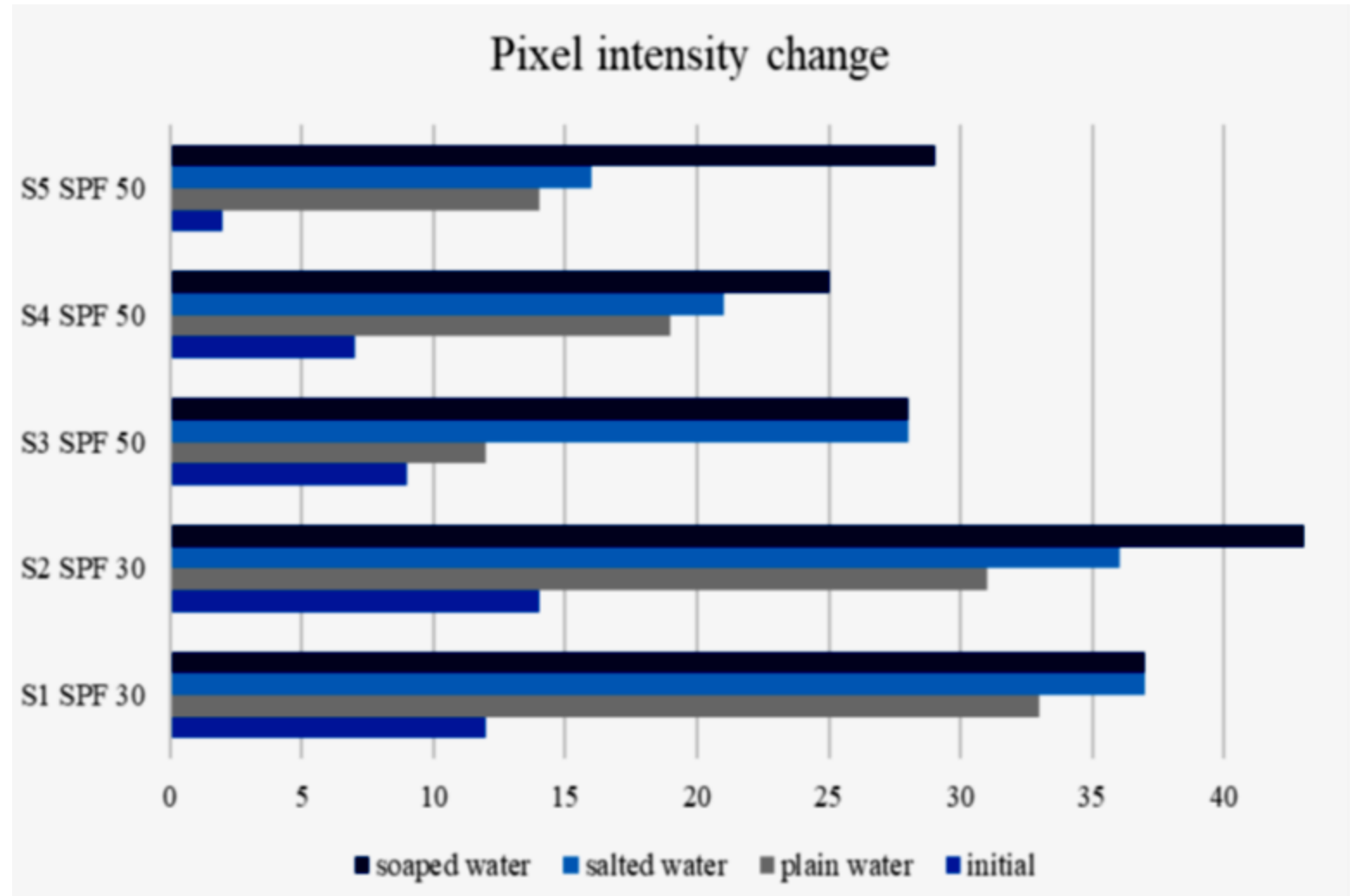


Figure-14. Image of Sunscreens applied on rough plastic film surface from Pixelteq camera.



Study on wear off of sun screens by water / soap



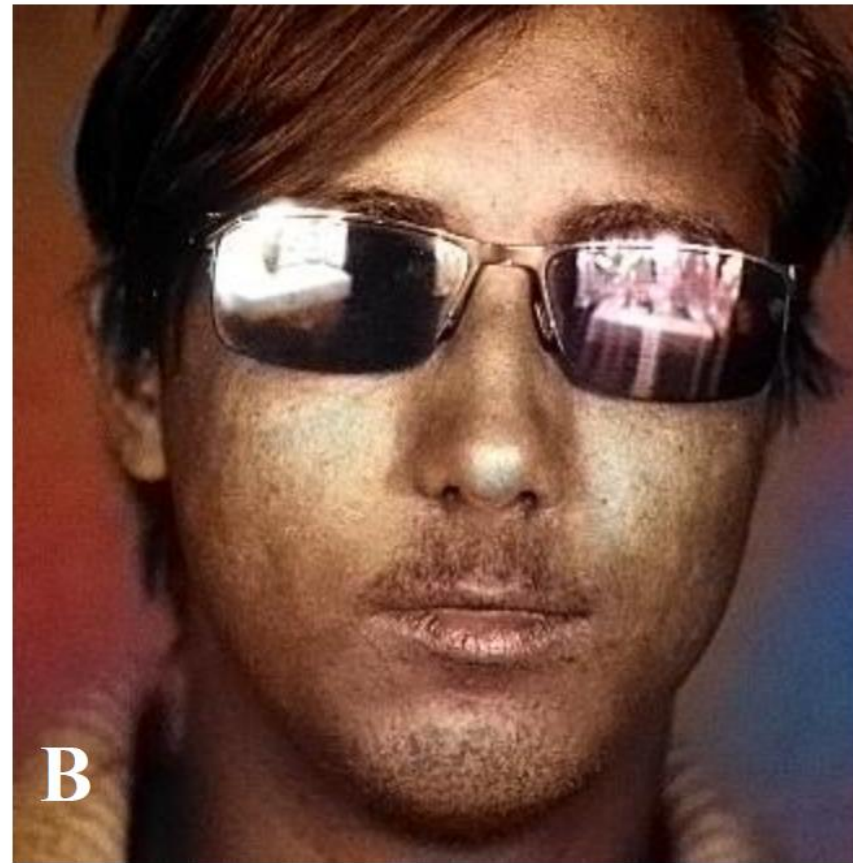
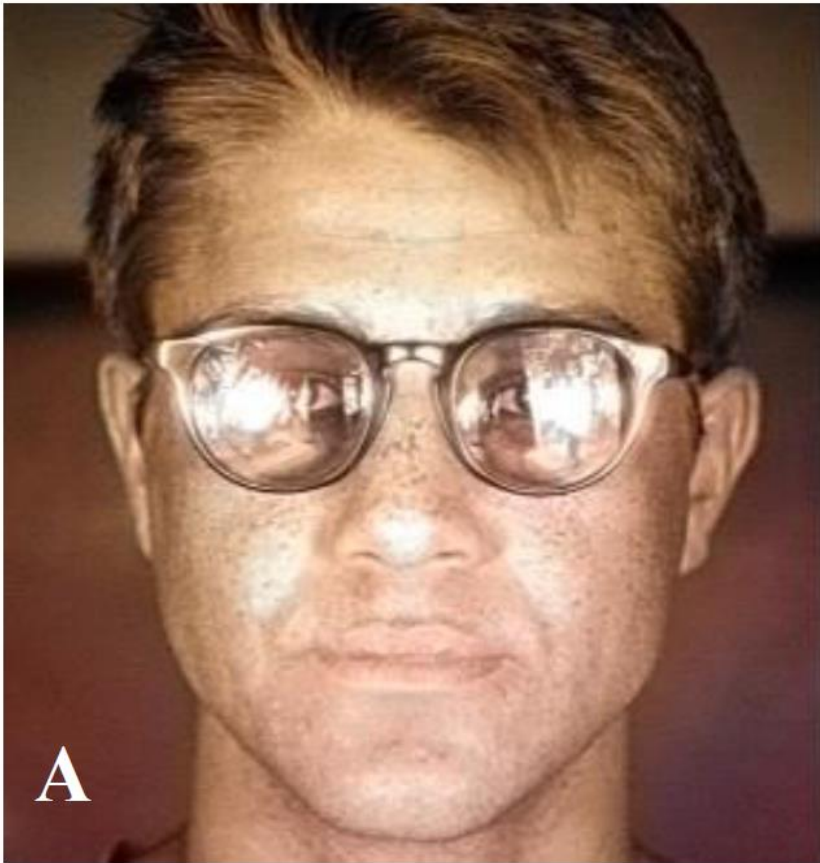
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SIDE EFFECTS

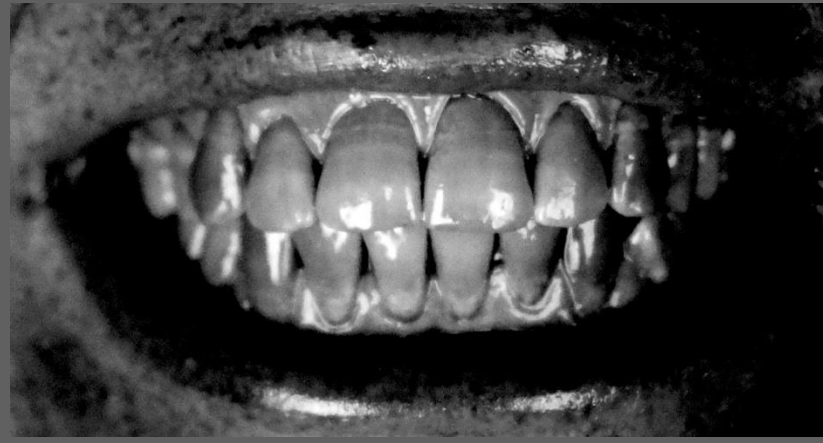
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Check UV protection coating on glasses



potential imaging the 'health' of teeth and gum





Research

Mirroring against harmful radiation

- Initiatives come together:
- GGD
- Huidfonds

Raising awareness

- The UV mirror can successfully demonstrate the right way how to apply of sunscreen.
- The black paint-effect has a significant effect on people's reaction.

UV-mirror 2.0: we seek help!

- Let's bring this technology a step further
- Movable
- Easy to use
- Affordable
- Research (target groups)
- Instruction how to apply sunscreen

Are you interested?

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