Alternate Light Sources

Objectives

- A tool to add to your tool box.
- It's neat.
- CSI effect.
- Help visualize the injury.
- Document the injury.
- Provide additional detail of the injury.
- Help provide a possible cause of the injury.
- So.....

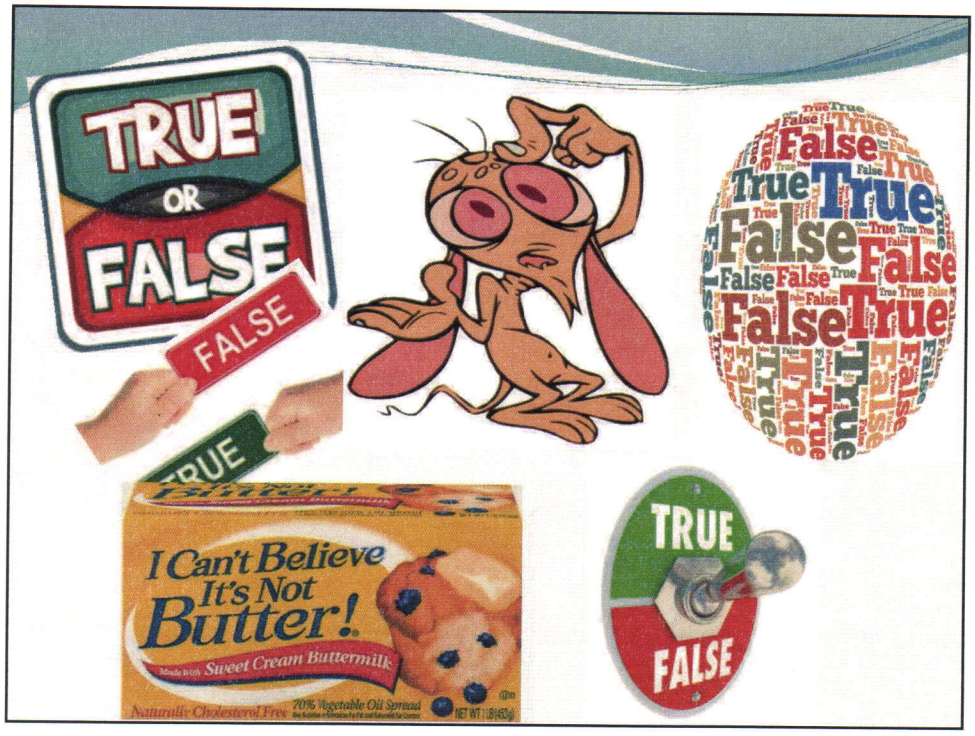
Why the

do we need this?

Corroboration

Corroboration

Corroboration



Sex Crimes are EASY investigations.

Investigating strangulation cases are easy.

Investigating late report assaults are easy.

Stats.....kinda

- Soooooooooooooo this is hard.

- False reports of sexual assault. FBI says about 8% hmmmmmmmmm K
- Where do we want to error on the side of???????
- Victims?????
- Suspects??????
- What do you think?
- Liability?

Domestic Violence

- Liability?
- Is the victim lying?
- Why doesn't the victim have marks? But he does.
- UGH another late report? What the hello kitty !!!!!!!

Balanced Investigations

That are on the level.

Victim Centered

Suspect Focused

Victim Centered

Suspect Focused

Victim Centered

1 in 3, 1 in 6

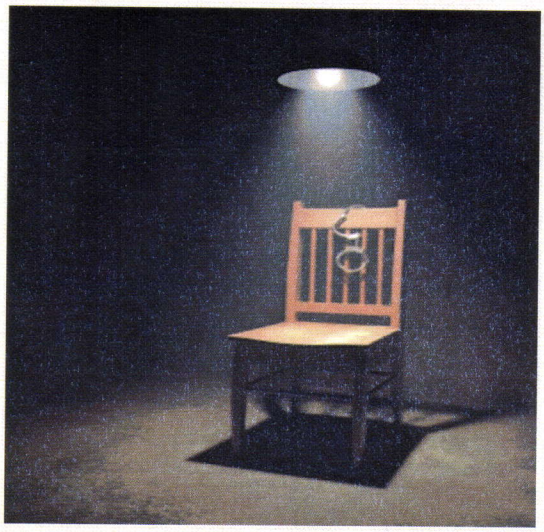
Suspect Focused

He He He He

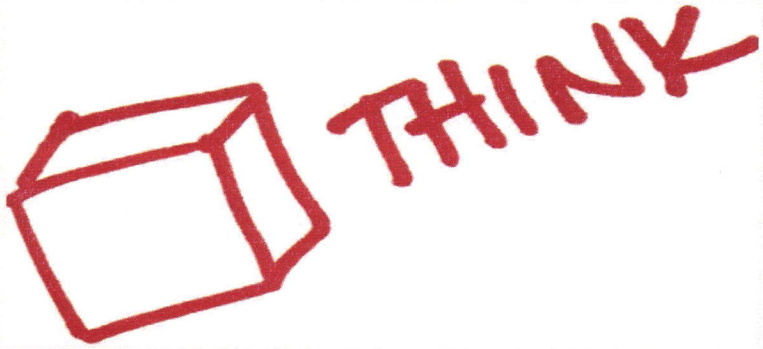
Ha Ha Ha Ha

The victim should never be in this chair.

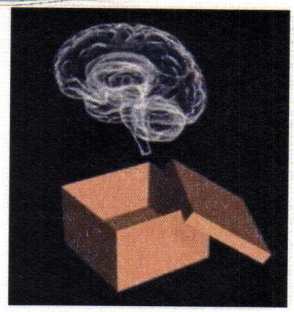
Ever!!!!

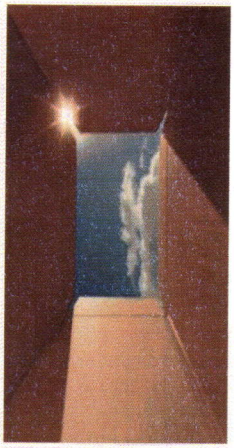


Sometimes we need to

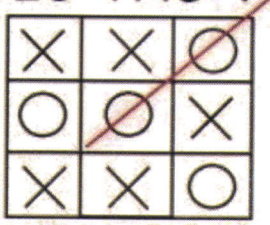


YEAH?





TIC TAC TOE

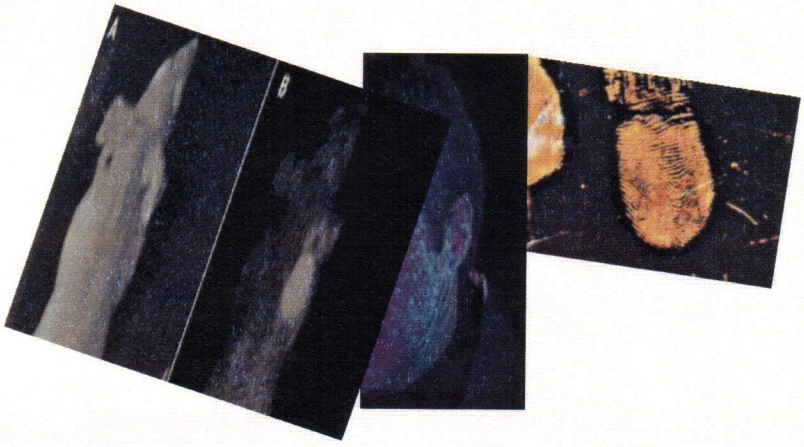


Think Out of The Box

Alternate Light Source (A.L.S.)

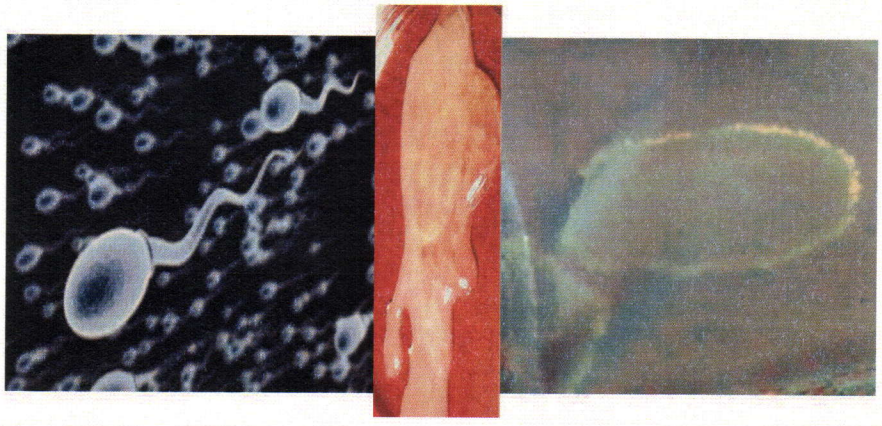
Equipment used to produce visible and invisible light at various wavelengths to enhance OR VISUALIZE items of evidence (fluids, fibers, bruising and other)

Numerous uses of A.L.S.

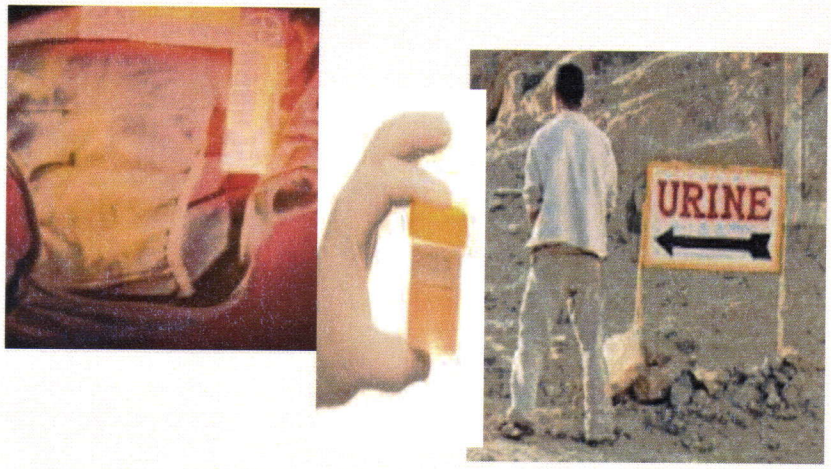


Let's start with a few items that reflect the light.

SEMEN !!!!! REFLECTS LIGHT



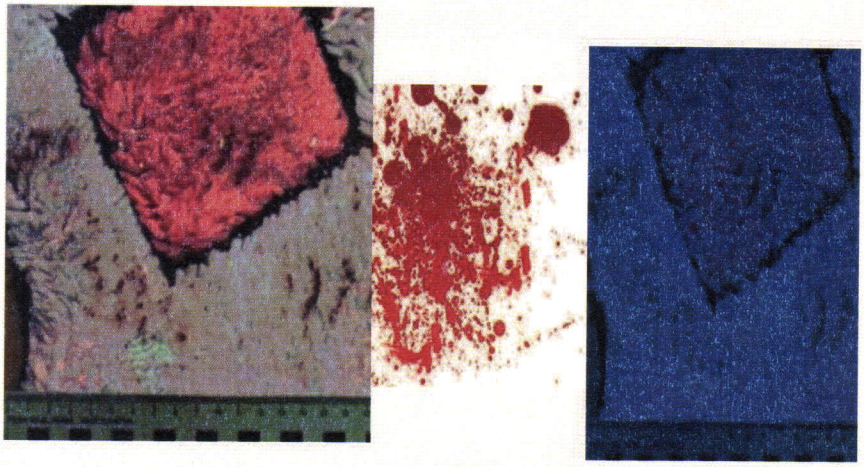
URINE REFLECTS LIGHT



Hairs and fibers

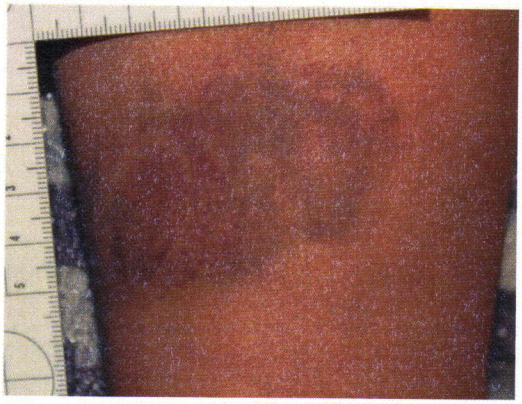
REFLECT LIGHT

BLOOD ABSORBS THE LIGHT



Let's play

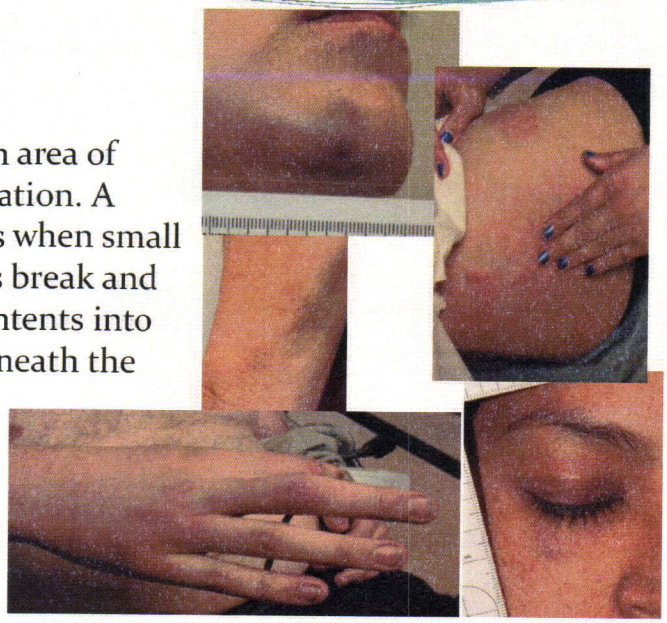
Today we will concentrate on one aspect of it's use.

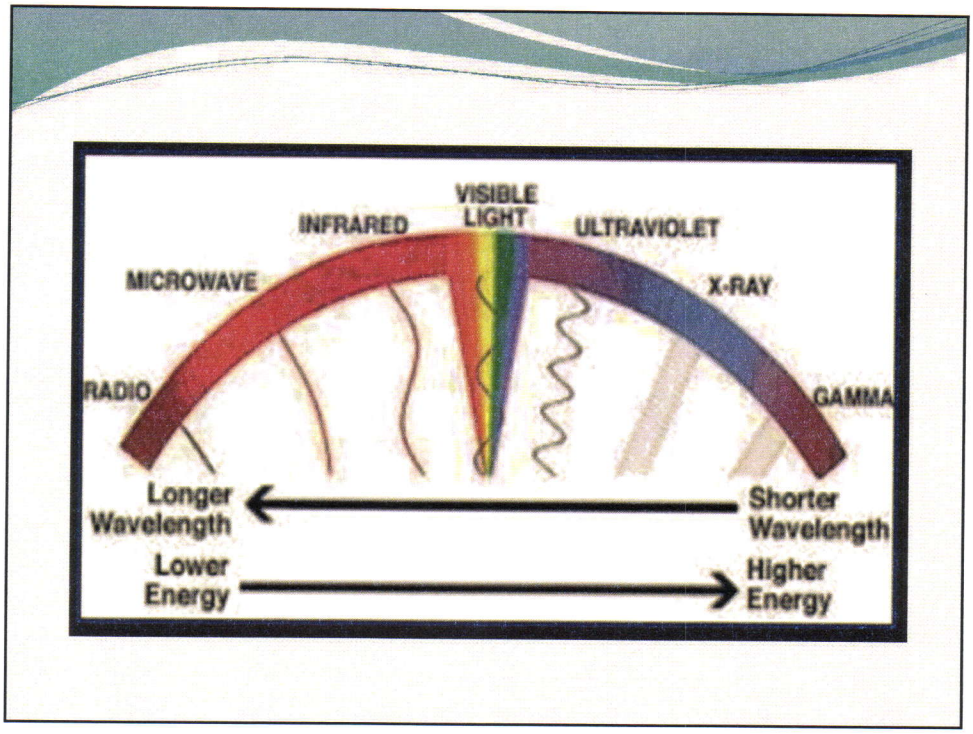


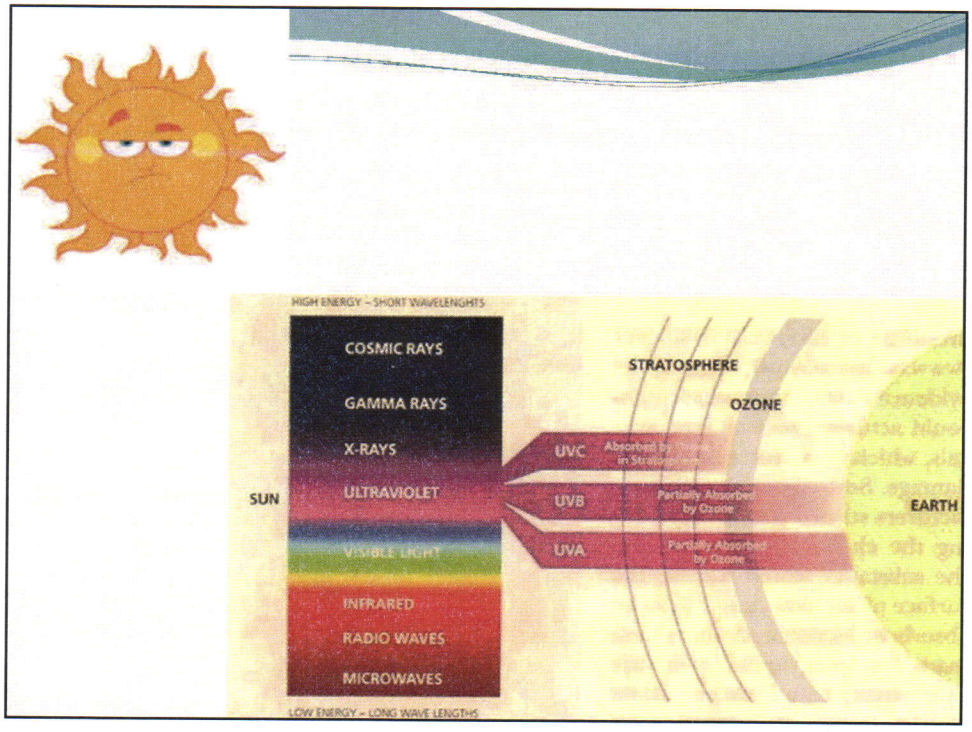
Bruising

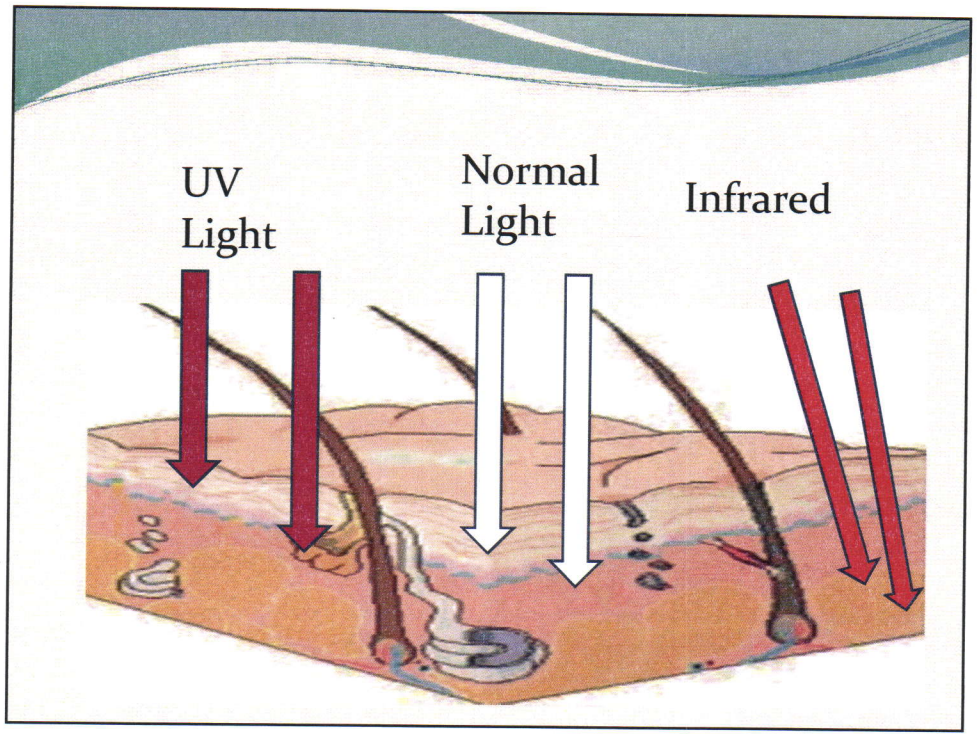
Bruise

- A bruise is an area of skin discoloration. A bruise occurs when small blood vessels break and leak their contents into the tissue beneath the skin.

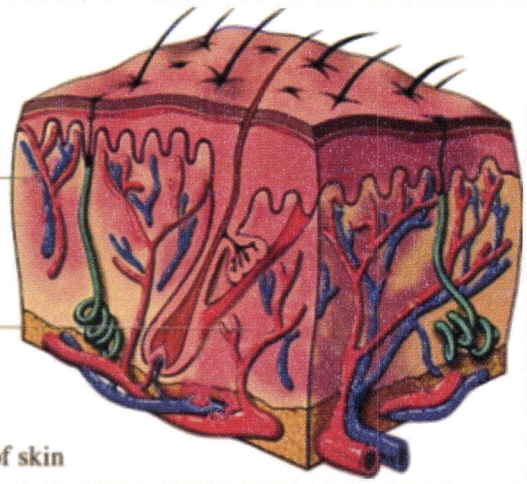



VISIBLE LIGHT
INFRARED
ULTRAVIOLET
MICROWAVE
X-RAY
RADIO
GAMMA
Longer Wavelength
Shorter Wavelength
Lower Energy
Higher Energy


HIGH ENERGY – SHORT WAVELENGHTS
COSMIC RAYS
GAMMA RAYS
X-RAYS
ULTRAVIOLET
VISIBLE LIGHT
INFRARED
RADIO WAVES
MICROWAVES
LOW ENERGY – LONG WAVE LENGTHS
SUN
STRATOSPHERE
OZONE
UVC
UVB
UVA
Partially Absorbed by Ozone
EARTH


UV
Light
Normal
Light
Infrared

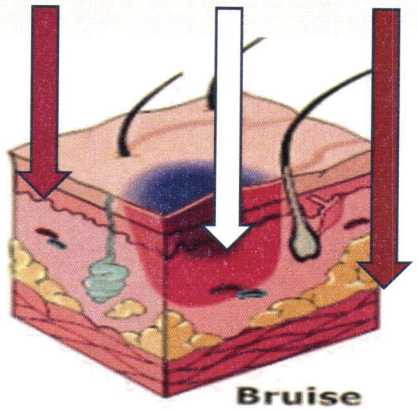
Bruise


Damage to
blood vessels
Blood leaking
into skin
causes bruising
Cut-away view of skin

UV Light

Visible

Infrared



A.L.S.

Which Goggle to use?	
WAVELENGTH	GOGGLES
300 - 400 nm	CLEAR
415 - 445 nm	YELLOW
455 - 515 nm	ORANGE
CSS	ORANGE
535 - SP575 nm	RED

Nomenclature	
ABBREVIATION	DEFINITION
nm	NANOMETER
BP	BAND PASS
LP	LONG PASS
SP	SHORT PASS
CSS	SP540

ITEM	SEARCH	GOGGLE	CAMERA FILTER
BODY FLUIDS (START)	CSS	ORANGE	1-2 ORANGE
(Dark surfaces and for saliva)	UV	CLEAR/YELLOW	YELLOW
(Dark surfaces show 'crusty' spot)	WHITE (OBLIQUE ANGLE)	CLEAR	NONE
BITE MARK/BRUISE (FRESH)	415/445	YELLOW	1-2 YELLOW
TO	455/CSS/515	ORANGE	1-2 ORANGE
(OLDER)	535/555/575	RED	RED BP600

So which light do I use?

- Practice first and foremost. Hit a friend. Wait. Then try
- You want to use a light in the 400 nm – 455 nm range.
- In this range yellow or ORANGE goggles are used.
- With older bruises or marks we want to use above the 455 nm range.

The two main ways to VISUALIZE evidence is by:

Florescence- (evidence glows)

Absorption- (evidence darkens)

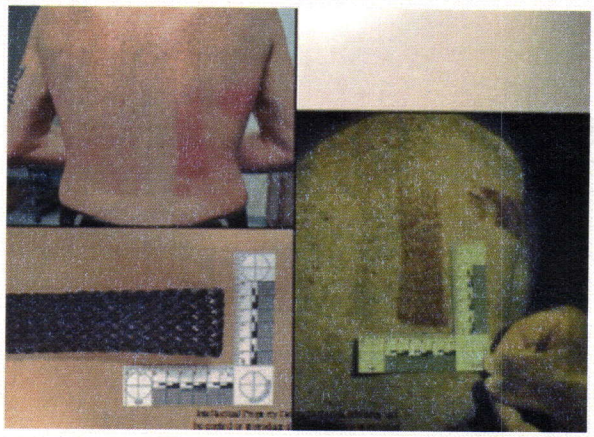
IT WORKS LIKE THIS-

The light penetrates the skin and is absorbed by the blood. This helps with visualizing the pooling blood under the skin.

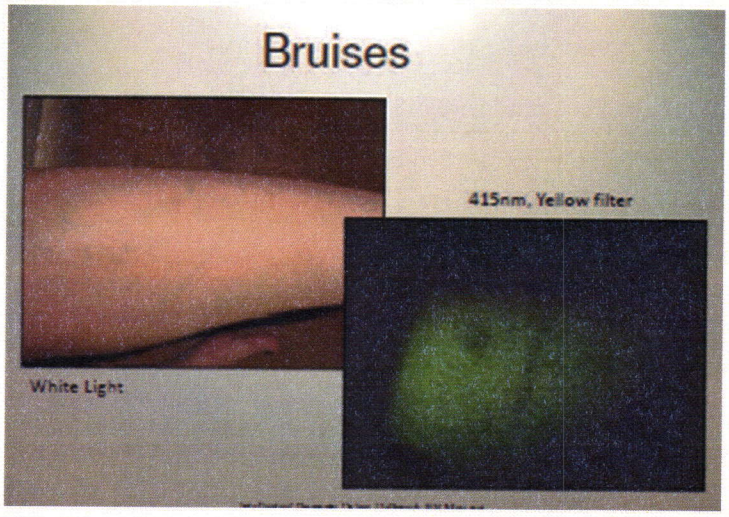
To present this evidence we want to show the photographs side by side.

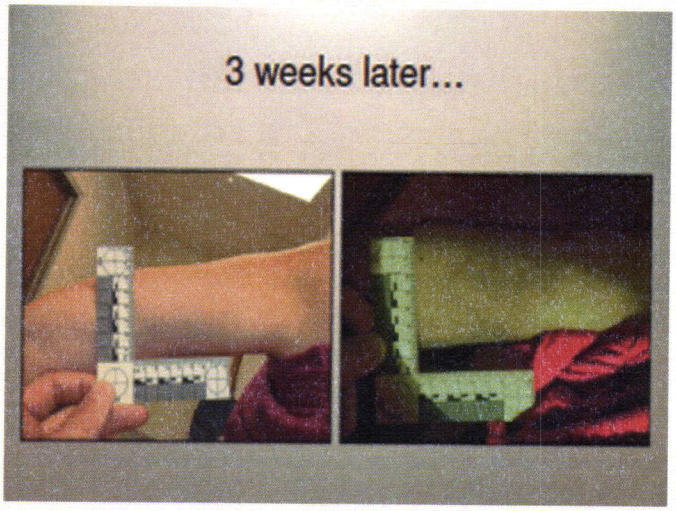
BEFORE / AFTER

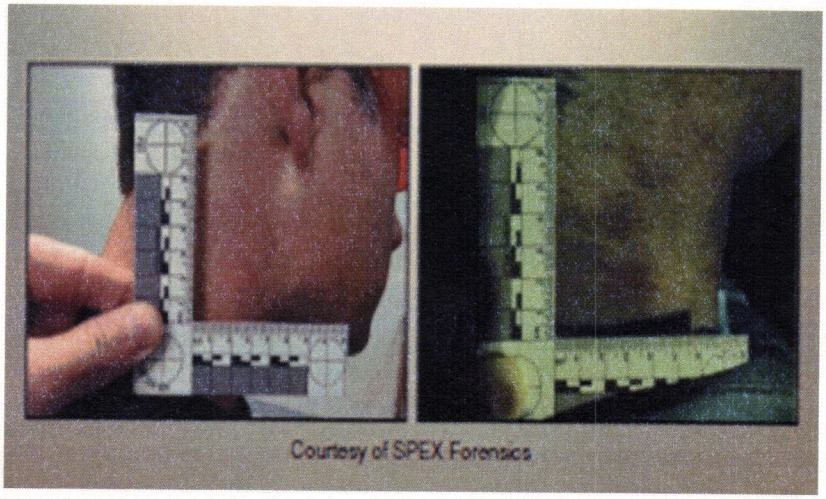
Pattern Injuries

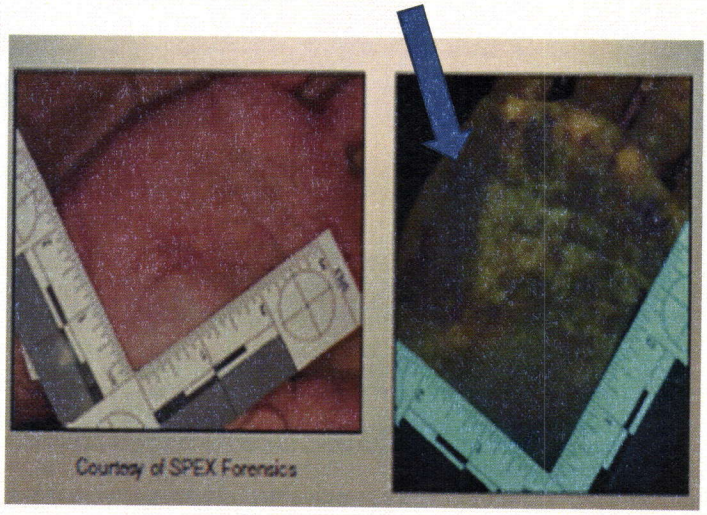


Bruises




3 weeks later...


Courtesy of SPEX Forensics

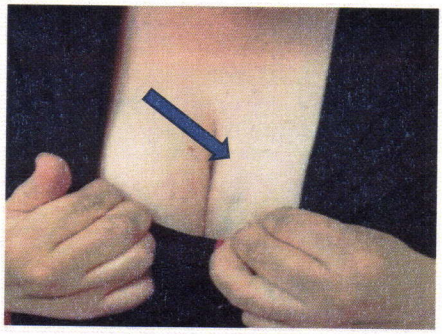


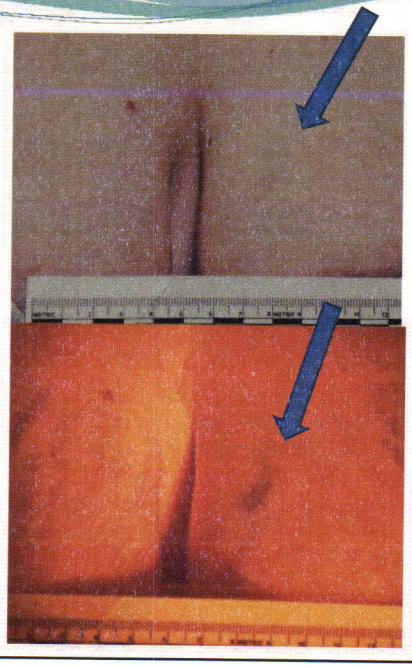
Sexual Assault

Squeeze injury

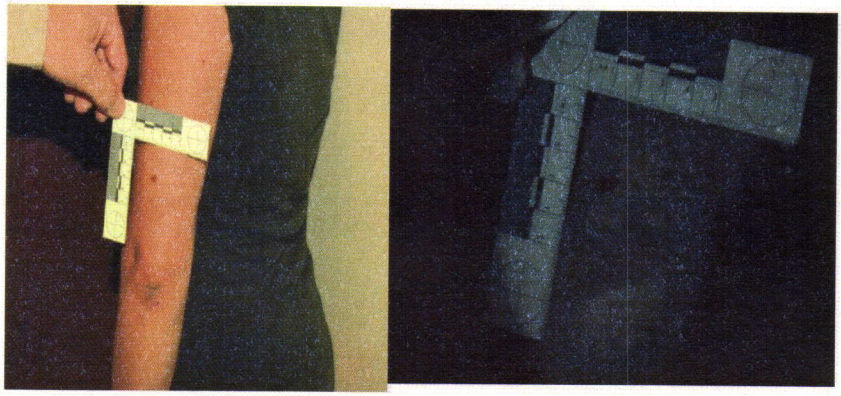
Day of injury

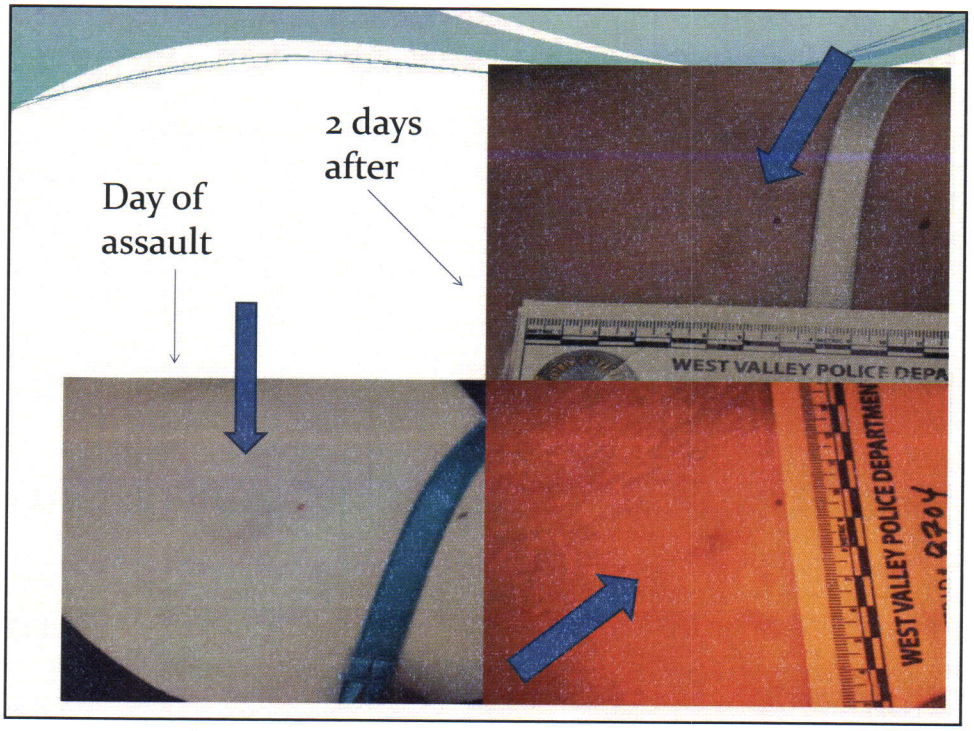
2 days after



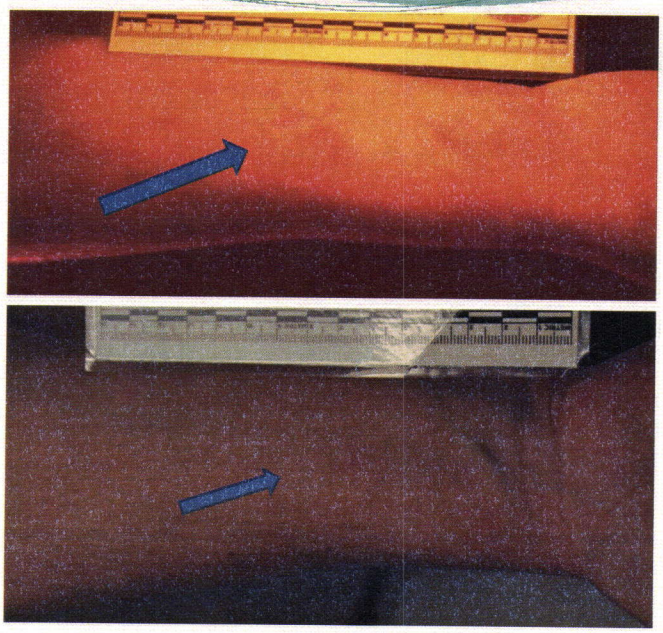


3 days after assault

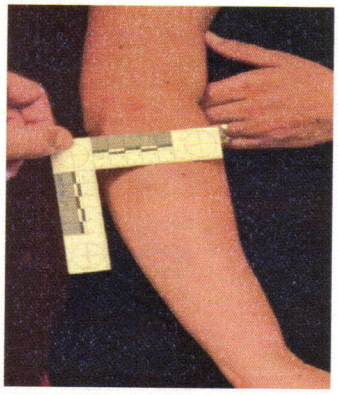


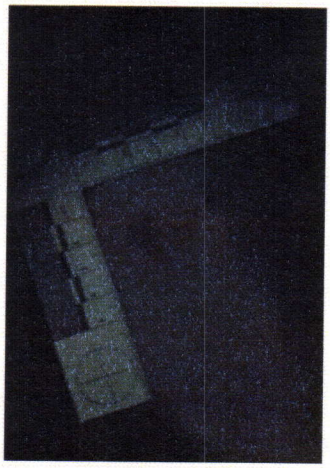


2 days after assault

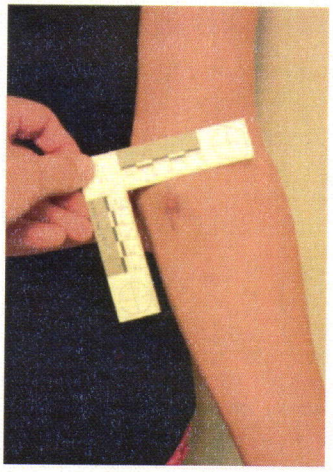


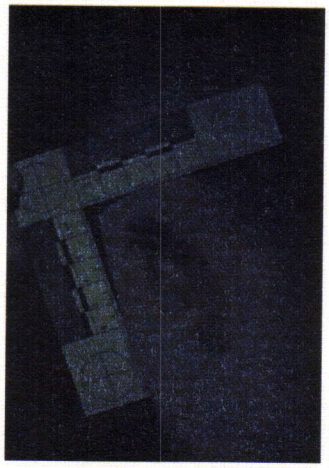
3 days after the assault





3 days after the assault

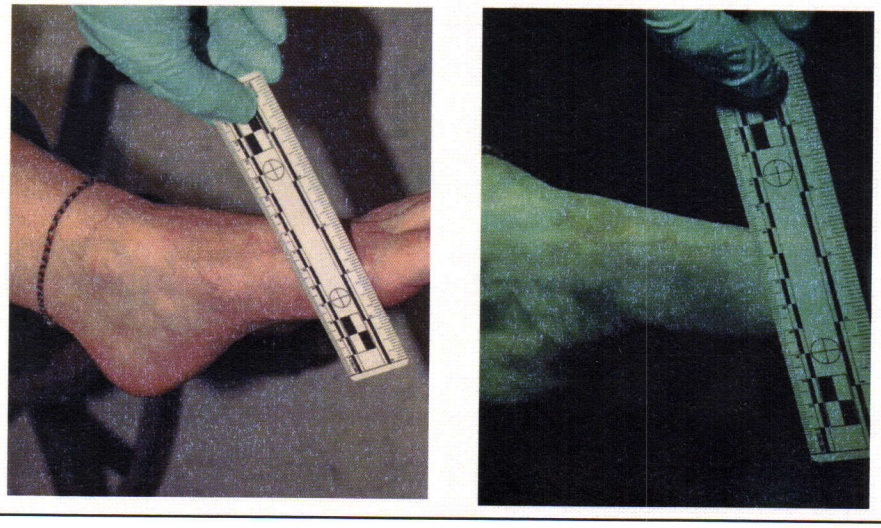




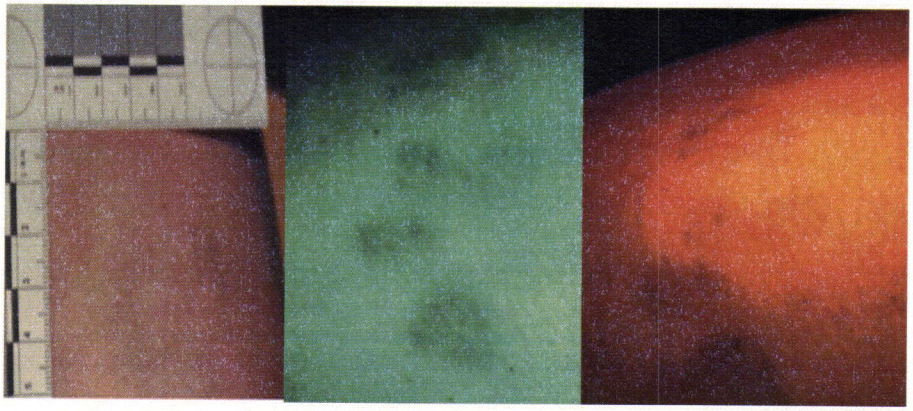
Fresh 3 days after with light

Fresh 2 days after

2 days after assault



Natural Vio w/ yellow blue w/orange

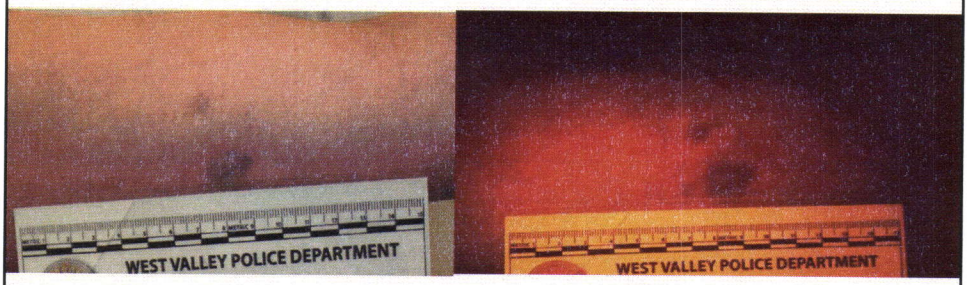


Photography tips

- Your victim is a crime scene.
- First under normal light take a full body photograph.
- Then take a full photograph of the appendage that is injured. Then one with a scale.
- Then the close up view of the injured area.

Then with the light source

Injury is 2 days old



Yes this bruise was visible with normal light, but gained additional detail.

Documentation of injuries

- Practice, Practice
- Use a tripod for the camera.
- Think about using a tripod for the light source.
- Sit your victim in a comfortable spot. Where movement is limited.
- Attach the same color filter as goggles you are using.
- Keep the distance consistent with the victim, light, and camera. No moving.
- Find a starting place and distance.

Documentation of injuries

Use a camera meter reading or a separate light meter.

- Using that reading take the photograph.
- Then bracket that photograph either by F stop or shutter speed.
- For a total of 3 photographs per injury.

- Practice
- PRACTICE
- OFTEN !!!

Test your camera

- Find a subject with liver spots or freckles.
- Photograph them in normal light.
- Then use your set up.
- If there is more detail in the freckles or spots some of the UV light is making into your camera.

Some court information

- Successful Frye Reed Hearing
  - May 2013
  - State MD vs Nelson Clifford
  - Upheld as respected technology used by forensic medical professionals.

So far as of 5-6-2014 there have been 3 successful Frye Reed hearings in MD.

..... the end.....for now?