

American Academy of Forensic Sciences



Student Academy Case Study February 20, 2024

9:00 a.m. – 2:00 p.m.

Case Scenario:

Bob Black, the owner of a black Toyota Prius with VA license plates, reported his car stolen on Sunday. Bob claims to have been home all day on Sunday, never leaving his house, watching college basketball. The following Thursday, Bob filed a missing persons report for his girlfriend, Julie Jones. Julie is a known drug addict and has gone missing before, but never longer than two days. Additionally, Julie has threatened suicide in the past.

Bob's car is found on Saturday (6 days after being reported stolen) mostly submerged in a river. There is a female body inside. The car is found less than two blocks from Bob Black's house.

On the riverbank, shoe prints are found. On the opposite side of the road, Julie's purse is found containing a gas station receipt. A partial fingerprint in what appears to be blood was noted on the receipt. There were skid marks on the highway leading up to near where the car was found.

The woman in the car sustained trauma and what appears to be a gunshot wound. Because the victim's head was above the water line and badly damaged, there has been significant insect activity to areas of her body above the water line. Multiple samples were drawn at autopsy for toxicology testing.

The police asked the media to publish photos of Julie to see if anyone saw her on the day that she went missing. Gas station employees recognized a photo and contacted the police. After interviewing employees at the gas station, it is discovered that Julie signed a receipt from the gas station on the day she was reported missing.

Based on a reported history of mental illness, Mr. Black's attorney raised the issue of whether Mr. Black was competent to stand trial.

The following ten stations will contain evidence that you will evaluate to determine its relevance to the case. You must determine if the presented analysis is valid or "junk science" to assess what is truly important. You will present your findings after lunch to the Jurisprudence representative.

AAFS Student Academy

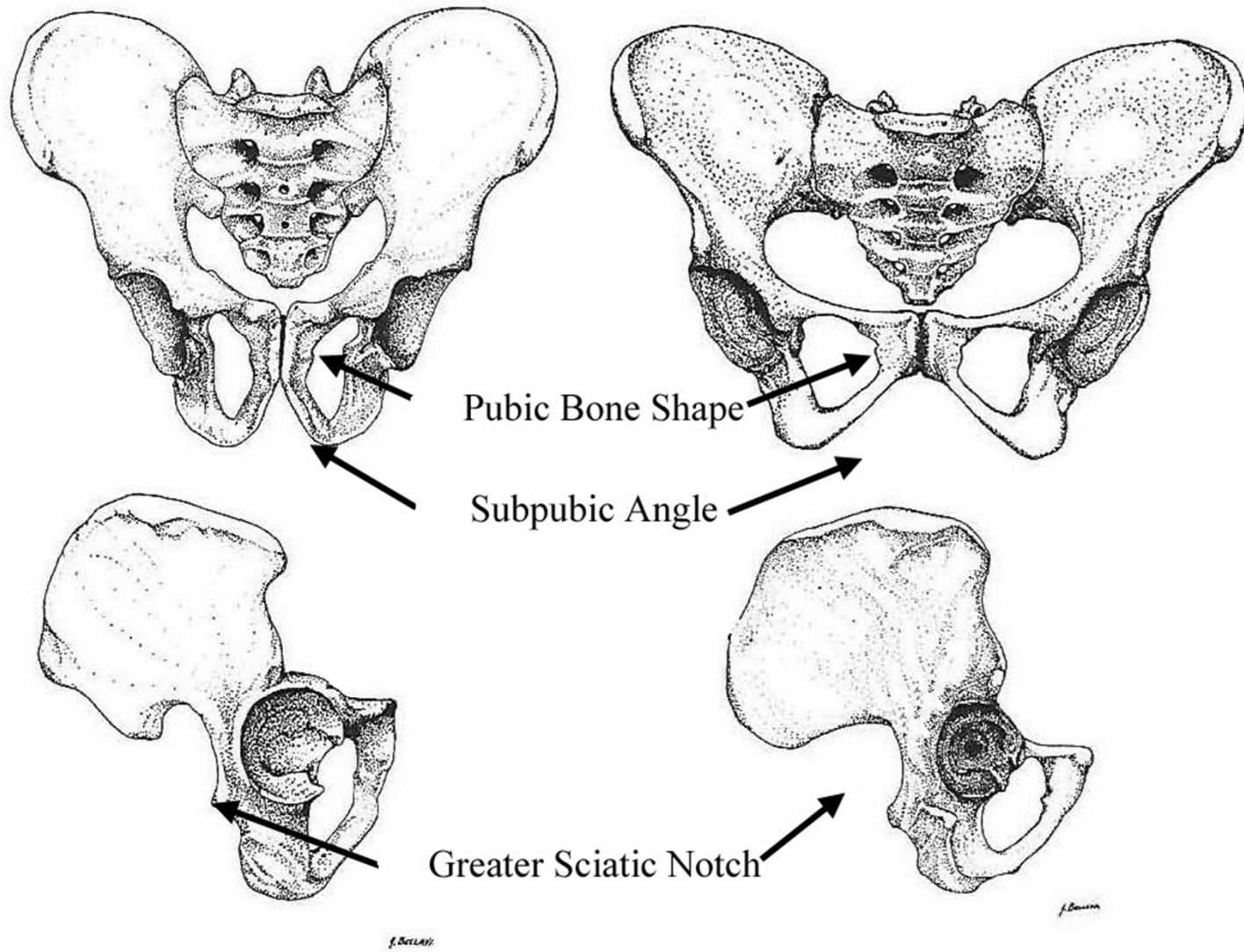
February 20, 2024

Anthropology Handouts

Presentation by:

Dr. Ginesse Listi, Louisiana State University

Estimation of Sex: Hip Bone



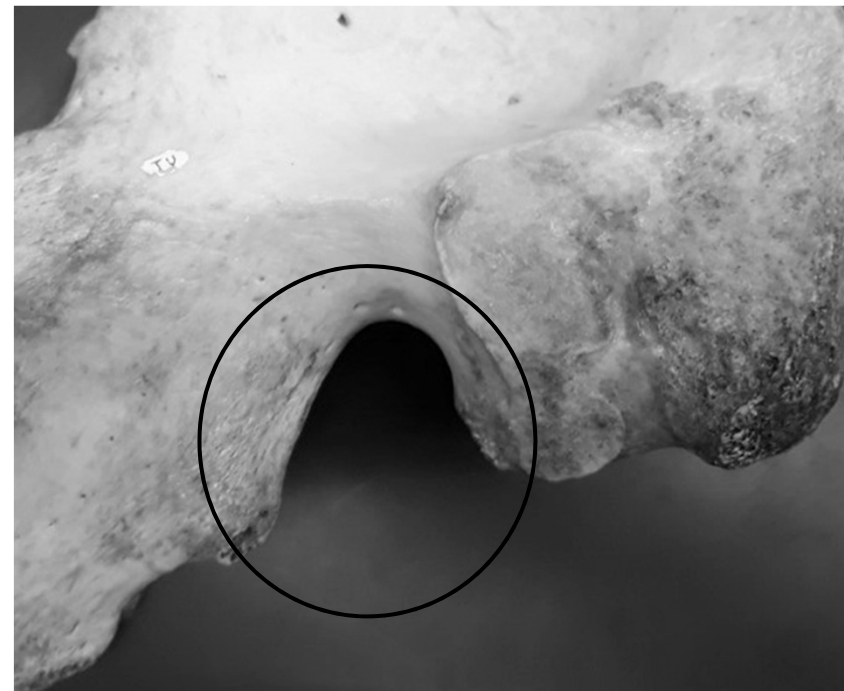
Male Pelvic Girdle

Female Pelvic Girdle

Are hip features consistent with male or female?

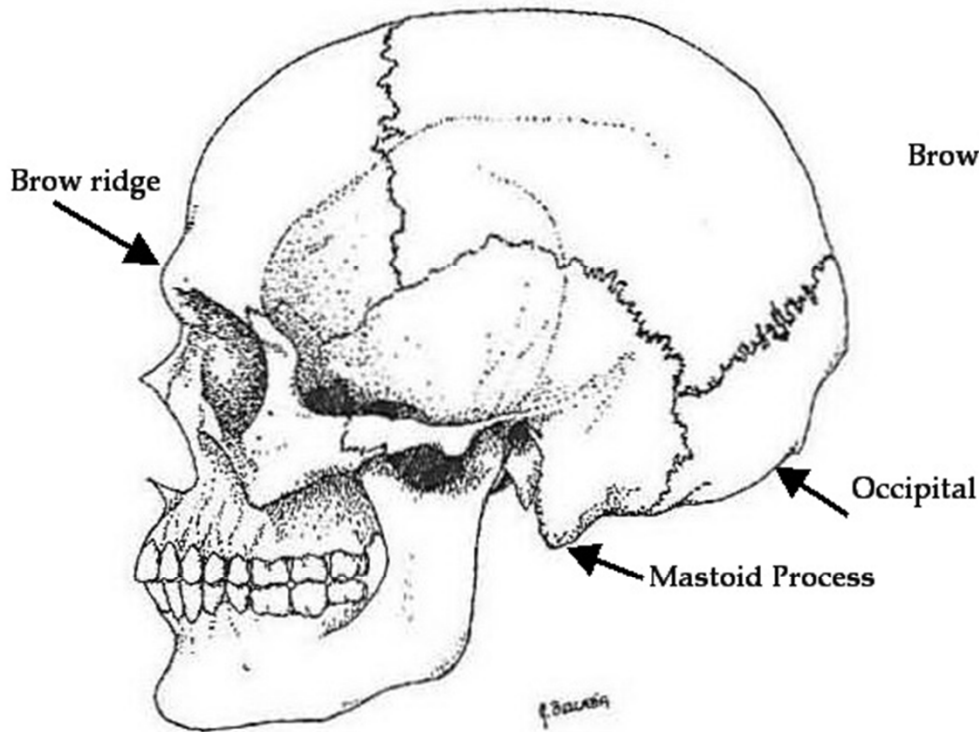


Subpubic Angle

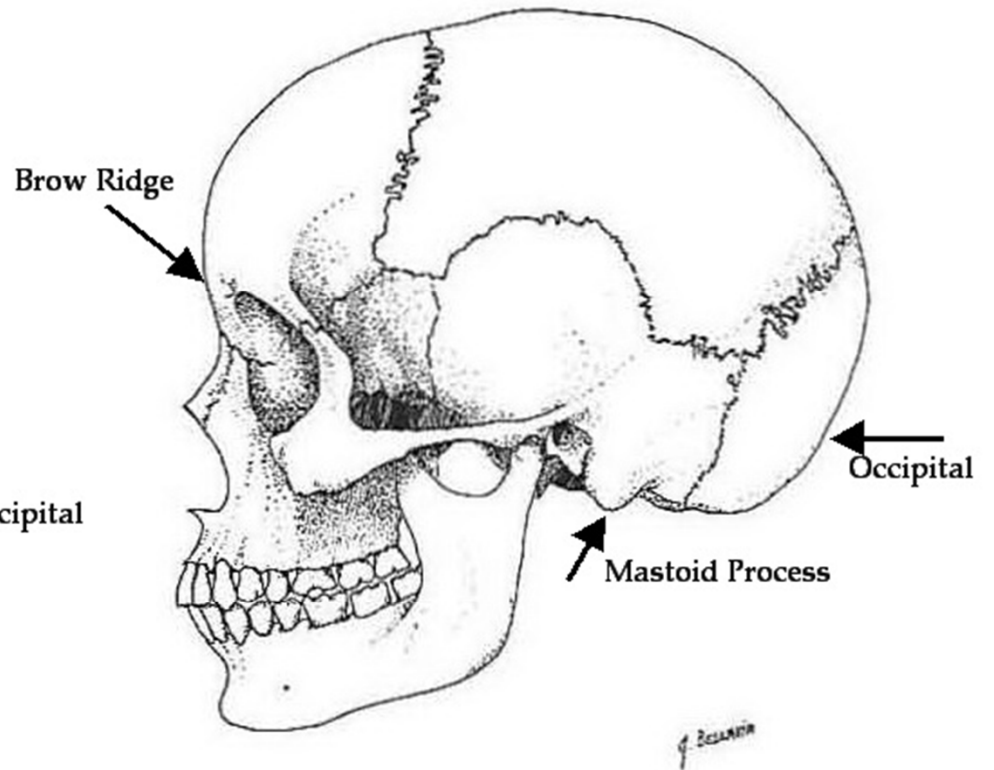


Greater Sciatic Notch

Estimation of Sex: Skull

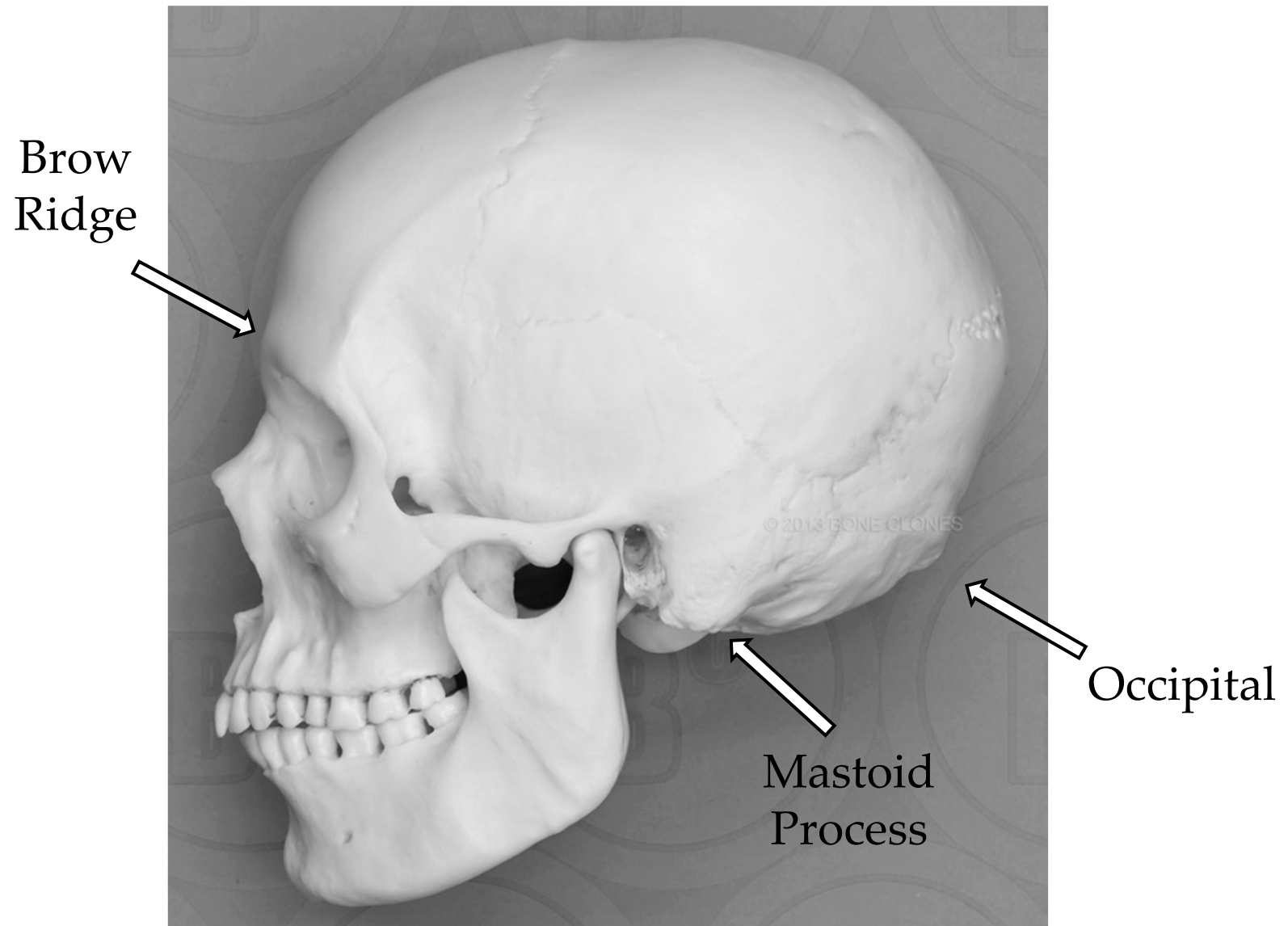


Male Skull

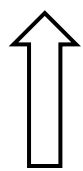
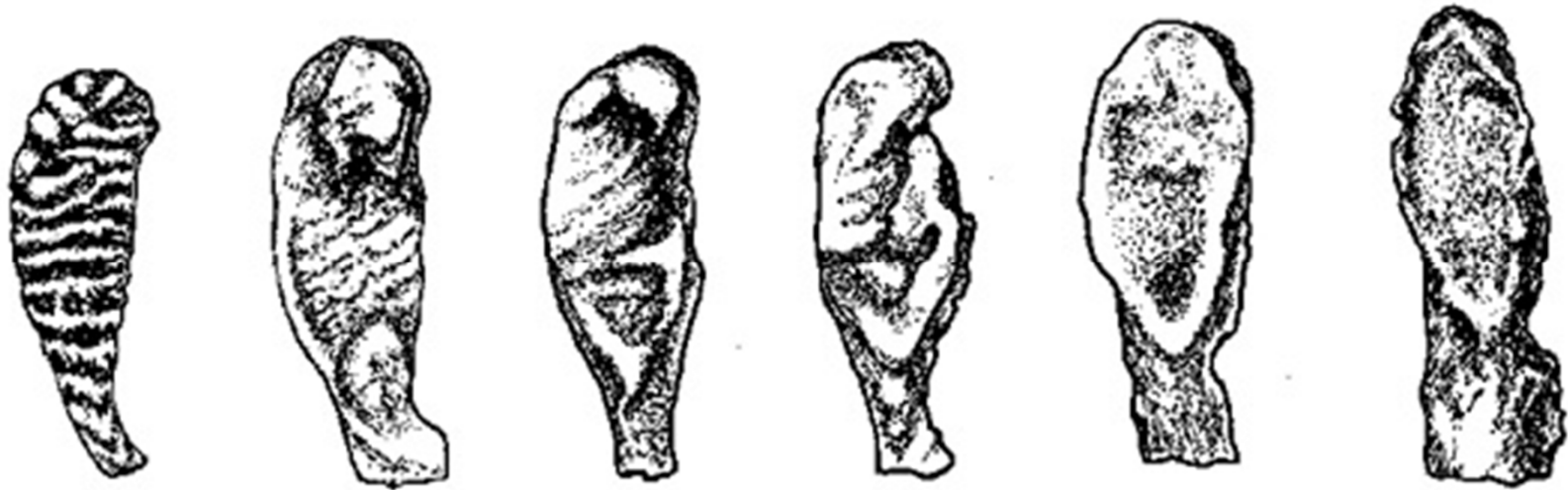


Female Skull

Are cranial features consistent with male or female?



Estimation of Age



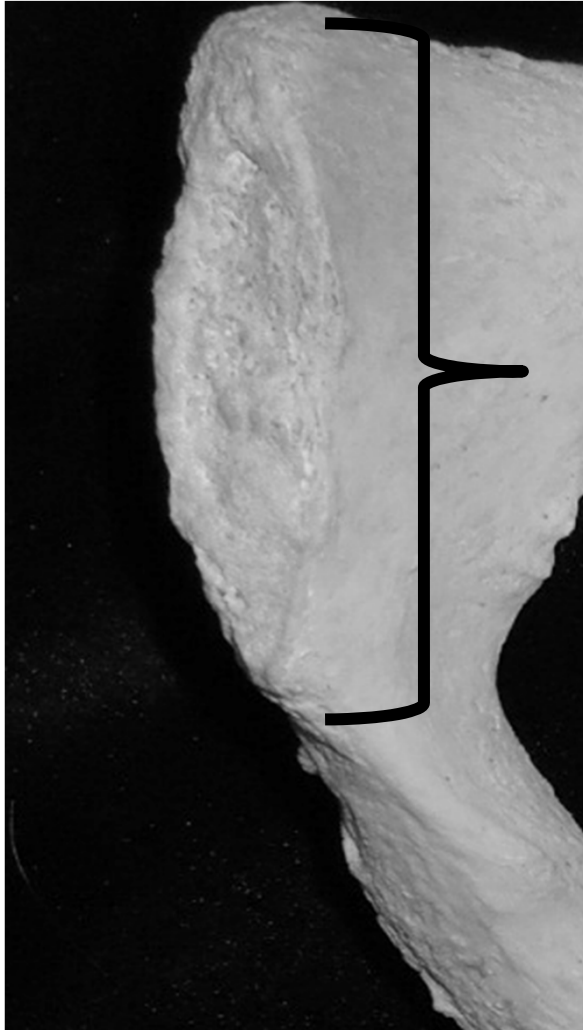
Younger

Older



Ridges &
Valleys,
No Rim

Flat &
Irregular,
Distinct rim



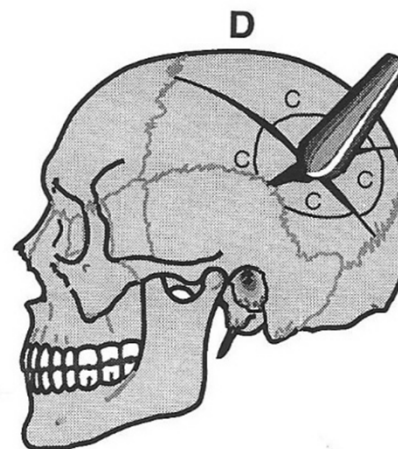
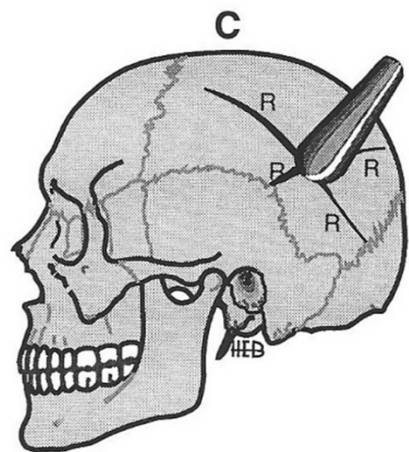
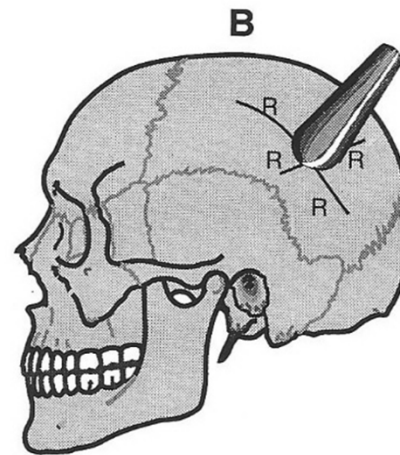
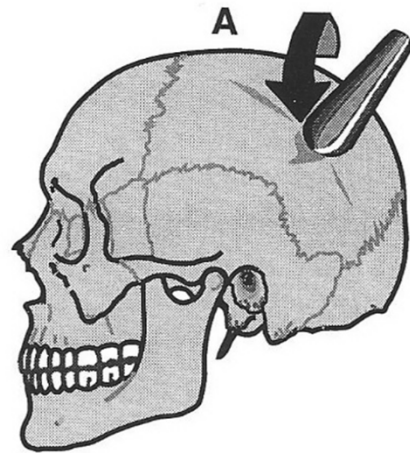
Are there ridges &
valleys?

Is there a distinct rim?

Is PS consistent with
younger, middle-aged,
or older person?

Perimortem Trauma

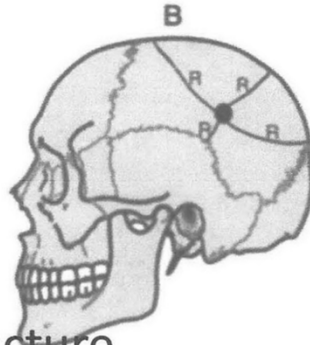
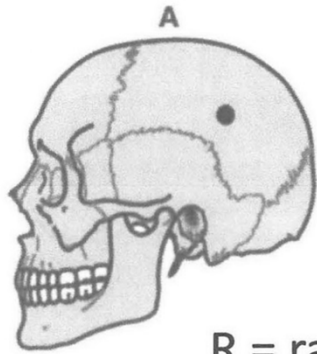
Blunt Force Trauma



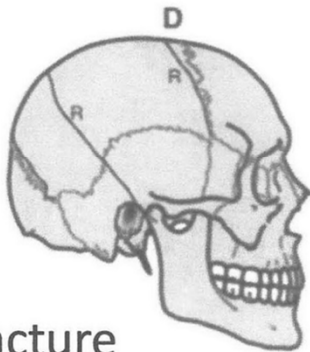
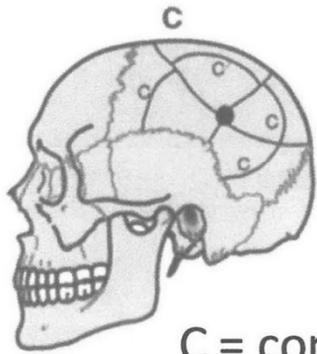
R = radiating fracture

C = concentric fracture

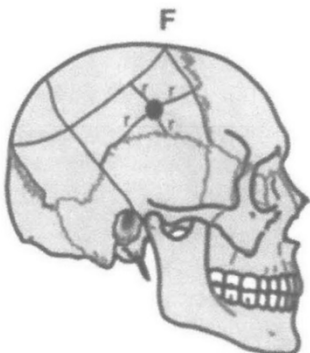
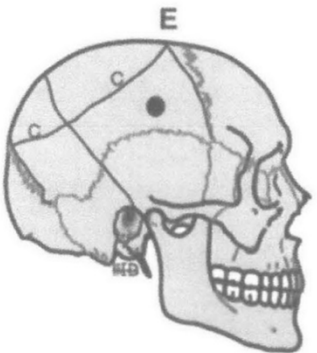
Perimortem Trauma



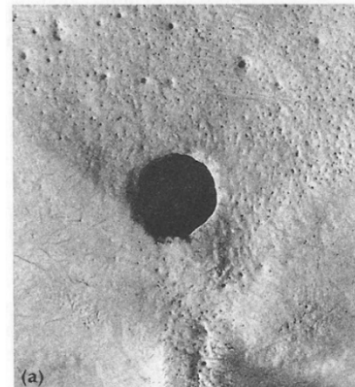
R = radiating fracture



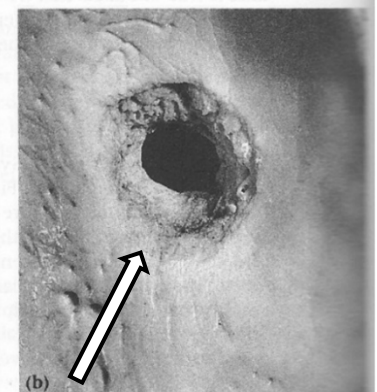
C = concentric fracture



Gunshot Trauma



Sharp
Margin,
No Bevel



Beveled
Surface

Is trauma consistent with blunt force or gunshot?



Photograph source:

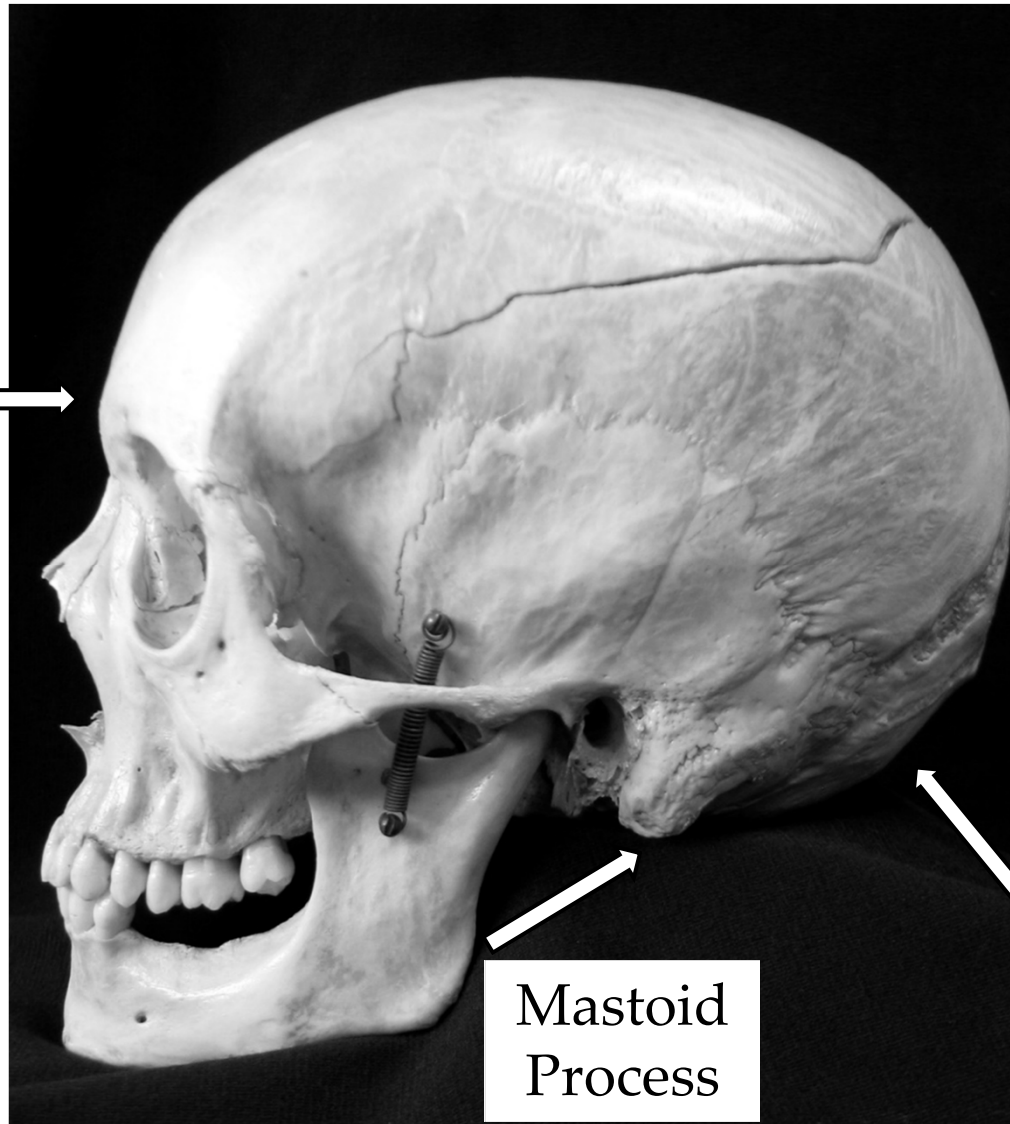
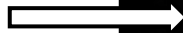
Murphy, M.S., Gaither, C.M., Goycochea, E., Verano, J., Cock, G. Violence and weapon-related trauma a Puruchcuo-Huaquerones, Peru. *Am J Phys Anthropol* 2010; 142(4):636-649.

(<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.21291>)

Case Scenario

Are cranial features consistent with female? _____

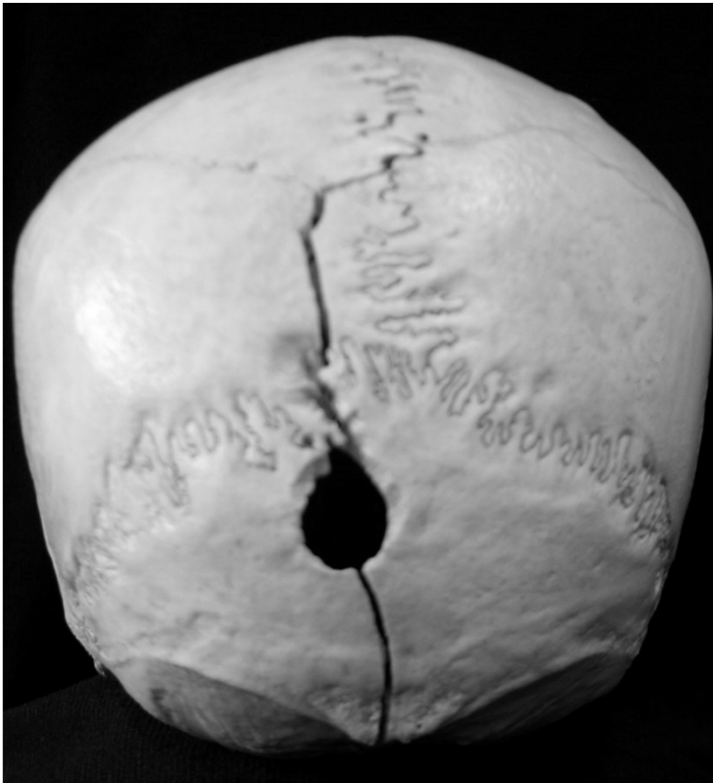
Brow
ridge



Mastoid
Process

Occipital

Is trauma consistent with blunt force or gunshot?



Posterior View

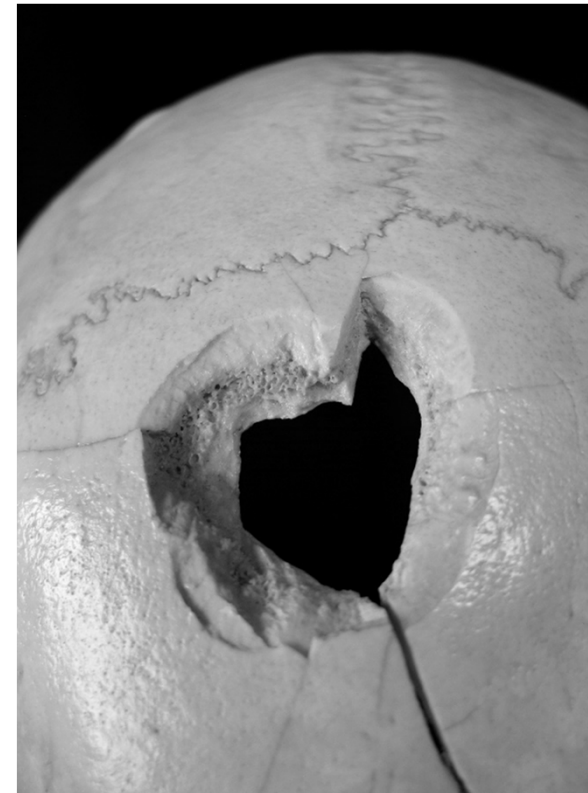


Superior View

What is the the trajectory of the gunshot?



Posterior View



Superior View

Close-up of trauma on the skull

Thank you for participating!

For more information about the LSU
FACES Lab, please visit:

www.lsu.edu/faceslab
www.identifyla.lsu.edu



Report of Toxicology Analysis
Office of the Chief Medical Examiner
Houston, TX

ME Case Number: Q102

Laboratory Number: P1234

Decedent's Name: Jane Doe

Date Received: 12/2/2020

Material Submitted: Blood, Vitreous, Urine, Liver,
Brain, Gastric contents

Hold status: 1 year

Submitted by: P. Smith MD

Medical Examiner: L. Gaga, MD

Ethyl Alcohol

Blood: 0.03% (Heart)

Vitreous: None Detected

Carbon Monoxide

Blood: None Detected

Drug Tests Performed

Blood Bases – includes CNS stimulants, CNS depressants, sedative hypnotics, antihistamines, antidepressants

Blood Acid/Neutrals – includes CNS depressants, acetaminophen, salicylate, muscle relaxants

Blood ELISA – tests for amphetamines, cocaine, opiates, PCP, barbiturates, benzodiazepines, fentanyl. Does not detect oxycodone, methadone, lorazepam, norbenzodiazepines.

Drug Test Results

Blood (Femoral)

Morphine – 0.02 mcg/mL

Diazepam – 0.13 mcg/mL

Urine

6-monoacetylmorphine (6-MAM) – 0.13 mcg/mL

Liver

Morphine – positive

Diazepam – positive

2/20/2021

Date

Joe Blow, Ph.D., FABFT
Chief Forensic Toxicologist

CRIMINALISTICS

Forensic Sciences Division-Laboratory Report

Victim: Julie Jones

Suspect: Bob Black

Results and Conclusions of Examination/Analysis:

Exhibit D10: One Portion of a Receipt with an Apparent Red Fingerprint Stain

A portion of the stained area was swabbed and cut for DNA. Blood was indicated.

Exhibit D11: Known Oral Standard of Victim, Julie Jones

Exhibit D12: Known Oral Standard of Suspect, Bob Black

Deoxyribonucleic acid (DNA) was isolated from exhibits D10, D11, and D12. Short tandem repeat (STR) DNA from each of these exhibits was amplified and typed at sixteen genetic loci. Typing results are below.

Typing Results

<i>Sample Name</i>	<i>D8</i>	<i>D21</i>	<i>D7</i>	<i>CSF</i>	<i>D3</i>	<i>TH01</i>	<i>D13</i>	<i>D16</i>	<i>D2</i>	<i>D19</i>	<i>vWA</i>	<i>TPOX</i>	<i>D18</i>	<i>D5</i>	<i>FGA</i>	<i>Amel</i>
D10 (Crime Scene Evidence)	13,14	29 (30)	8,12	11	16,17, 18	7,8,9	8,12, 13	8,12	18,22, 25	14,16 (15,15.2)	14,15, 18	8,9 (11,12)	13,20 (14,17)	10,11 (12,13)	20,22, 23	X,X (X,Y)
D11 (Julie Jones Reference)	13,14	29	8,12	11	16,18	8,9	8,13	8,12	18,25	14,16	14,18	8,9	13,20	10,11	20,22	X,X
D12 (Bob Black Reference)	13,14	29,30	8,12	11	17	7,9	12	12	22	15,15.2	15,18	11,12	14,17	12,13	22,23	X,Y

The results listed above in parentheses are fainter than the other results observed at that locus.

Conclusions

DNA from two individuals was obtained from the swabbing of the fingerprint (D10). The DNA profile is consistent with the combined known profiles from Julie Jones (D11) and Bob Black (D12).

The probability of the DNA profile at all genetic loci tested is approximately 880 billion times more likely if it originated from Julie Jones and Bob Black than from Bob Black and an unknown individual in the Caucasian population.

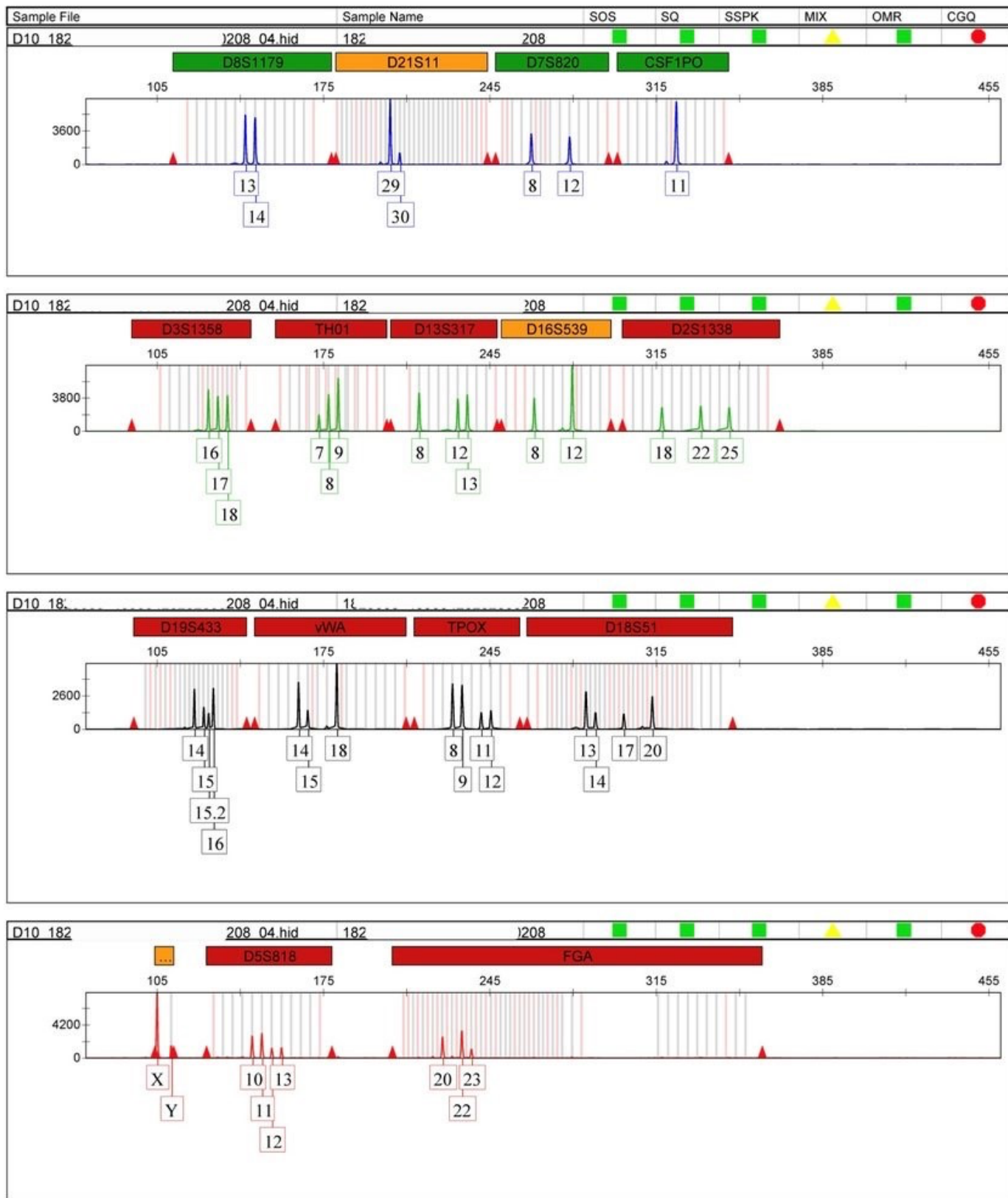
The probability of the DNA profile at all genetic loci tested is approximately 2.7 trillion times more likely if it originated from Julie Jones and Bob Black than from Bob Black and an unknown individual in the African American population.

A handwritten signature in black ink, appearing to read 'Rosalind D. Helix', written over a horizontal line.

Rosalind D. Helix

Forensic Scientist Advanced

Exhibit D10: DNA profile from partial fingerprint on receipt



Engineering Sciences Section Information

According to the Police Accident Report, on the surface of the highway leading up to where the car was found there were skid marks 71 feet long. The highway surface at the time of the incident was level, dry asphalt. Use the following equation to calculate the range of likely speeds the car was traveling to skid to a stop under the conditions:

$$\text{Speed} = \text{SQRT}(30 \times d \times \mu)$$

Where speed is in miles per hour

"SQRT" means "square root of"

30 is a coefficient of proportionality

"d" is the skid distance in feet

"mu" is the coefficient of friction, is dimensionless, and usually between about 0.6 and 0.8 for non-antilock brakes and level dry asphalt

What methods can you use to determine whether the skid marks came from the suspect car?

Within what range of speeds was the car that made these marks traveling at the beginning of its skid to stop?

If the speed limit in the area is 35 mph, was the driver speeding at the initiation of braking? How does this affect your opinion of the entire scenario of the possible crime?

AN EXTRA COMPLICATION TO WORK ON LATER IF YOU'RE INTERESTED:

Now assume you visit the site and determine from your inspection of the skid marks that there were only three rather than the usual four because a front brake was not working. How would you modify the equation to take this into account?

Would the nonfunctioning brake increase, decrease, or have no effect on the resulting initial speeds you first calculated? Why, from a physics standpoint? By how much if any? Using this additional information, was the driver violating the speed limit?

Psychiatry Handouts

Emily Gottfried, PhD
Community & Public Safety Psychiatry Division
Department of Psychiatry and Behavioral Sciences
29C Leinbach Drive
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Competency to Stand Trial of Mr. Bob Black

Mr. Black was evaluated for approximately one hour and 35 minutes at the county detention center. He reported being raised by his biological father along with two younger sisters. He did not endorse a history of abuse victimization. He received speech therapy as a child. Mr. Black graduated from high school with a diploma. He did not receive special education services. He was retained in the 10th grade due to attendance and was suspended from school 15 times from the 10th to 12th grades. He was never expelled from school. His work history includes being a city bus driver.

Mr. Black reported no major medical conditions. He is not prescribed any medications. During his senior year of high school, Mr. Black was diagnosed with depression and received mental health treatment for four years. He was never psychiatrically hospitalized.

On exam, Mr. Black was oriented to person, place, time, and situation. He was calm, appeared to be cooperative, made appropriate eye contact, and appeared to be engaged in the evaluation process. He described his mood as being “a little down.” He reported that it was difficult to stay asleep at the detention center due to noise, but did not endorse recent changes in his appetite, energy level, or weight. He was not endorsing suicidal thoughts. He said he never experienced hallucinations (i.e., perceptual disturbances), delusional beliefs (i.e., fixed, false beliefs), or mania (i.e., increase in goal-directed activity and overly elevated/irritable mood, during periods of decreased need for sleep).

Mr. Black was aware he was being charged with “Murder,” which he said meant, “Intentionally causing somebody’s death.” He said this charge was a “felony” that could be punished with a sentence of “life in prison.” He was aware that he was the defendant as he had “charges” and that defendants have the right to have an attorney who “fights for them in court.” He knew the prosecutor was “against him” and the judge was “neutral.” He said the jury would “decide the case, guilty or not.” He said that defendants could plead “guilty or not,” and that defendants who pleaded not guilty would be “taking it to trial.” He knew that “deals” for “less time” are sometimes offered to defendants who “say guilty.”

Mr. Black said that he planned to talk to his attorney about the “amount of evidence” in the case before he made any decisions on how to resolve the charge. He said he “hoped” to be found “not guilty.” He was aware that the victim’s body was found in his car but insisted that he would not have reported the car as being stolen or his girlfriend as being missing if he was guilty in this case. He was adamant that he was not guilty but knew that he was still being charged. He was aware of his attorney’s name and expressed appreciation that his family had obtained the attorney on his behalf.

Is Mr. Black competent to stand trial?

Competency to Stand Trial

Example Components:

Factual Understanding:

- Name/definitions of charges
- Severity (felony/misdemeanor)
- Possible penalties
- Roles:
 - Defense attorney
 - Prosecutor
 - Judge
 - Jury
 - Defendant
 - Witness
- Pleas:
 - Not guilty
 - Guilty
 - No contest
 - Not guilty by reason of insanity
- Plea bargains

Rational Understanding:

- Desired outcome of case
- Court's jurisdiction/authority
- Chances to be found not guilty
- Plans to resolve case
- Plans to testify
- Specific witnesses/potential for perjury
- Courtroom behavior

Ability to assist attorney:

- Relationship with attorney
- How to help attorney
- Plan to work with attorney
- Need for an attorney
- Ability to communicate relevantly

