

Head Injuries

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Autopsy: External Examination

- **Hair on Scalp.** "The scalp is covered by long blonde hair which is fixed in two ponytails, one on top of the head secured by a cloth hair tie and blue elastic band, and one in the lower back of the head secured by a blue elastic band. ([artist's sketch](#))
- **No Observable Injury on Scalp.** "No scalp trauma is identified."

Autopsy: Internal Examination

- "Upon reflection of the scalp there is found to be an extensive area of scalp hemorrhage along the right temporoparietal area extending from the orbital ridge, posteriorly all the way to the occipital area." ([photo](#))
- "This encompasses an area measuring approximately 7 X 4 inches. This grossly appears to be a fresh hemorrhage with no evidence of organization." ([photo](#))
- "At the superior extension of this area of hemorrhage is a linear to comminuted skull fracture which extends from the right occipital to posteroparietal area forward to the right frontal area across the parietal portion of the skull."
- "In the posteroparietal area of this fracture is a roughly rectangular shaped displaced fragment of skull measuring one and three-quarters by one-half inch."
- "The hemorrhage and the fracture extend posteriorly just past the midline of the occipital area of the skull."
- "This fracture measures approximately 8.5 inches in length."
- "On removal of the skull cap there is found to be a thin film of subdural hemorrhage measuring approximately 7-8 cc over the surface of the right cerebral hemisphere and extending to the base of the cerebral hemisphere." [Editor's Note: 5 cc=1 teaspoon, so 7-8 cc=less than 2 teaspoons of blood].
- "The 1450 gm brain has a normal overall architecture. Mild narrowing of the sulci and flattening of the gyri are seen."
- "No inflammation is identified."
- "There is a thin film of subarachnoid hemorrhage overlying the entire right cerebral hemisphere."
- "On the right cerebral hemisphere underlying the previously mentioned linear skull fracture is an extensive linear area of purple contusion extending from the right frontal area, posteriorly along the lateral aspect of the parietal region and into the occipital area. This area of contusion measures 8 inches in length with a width of up to 1.75 inches."
- "At the tip of the right temporal lobe is a one-quarter by one-quarter inch similar appearing purple contusion."
- "Only very minimal contusion is present at the tip of the left temporal lobe. This area of contusion measures only one-half inch in maximum dimension."
- "The cerebral vasculature contains no evidence of atherosclerosis."
- "Multiple coronal sections of the cerebral hemispheres, brain stem and cerebellum disclose no additional abnormalities."
- "The areas of previously described contusion are characterized by purple linear streak-like discolorations of the gray matter perpendicular to the surface of the cerebral cortex. These extend approximately 5 mm into the cerebral cortex."
- "Examination of the base of the brain discloses no additional fractures."
- "Sections from the areas of contusion disclose disrupted blood vessels of the cortex with surrounding hemorrhage."

Autopsy: Microscopic Examination of Brain

- "All sections stained with H&E."
- "There is no evidence of inflammatory infiltrate or organization of the hemorrhage. Subarachnoid hemorrhage is also identified. Cortical neurons are surrounded by clear halos, as are glial cells."

Non-Autopsy Sources

Garland in Hair?

- **Arndt Reports Garland in Hair.** "According to Det. Linda Arndt, who witnessed the autopsy, green Christmas garland, like the garland decorating the spiral staircase in the house, was tangled in her hair" ([Denver Post](#)).
- **Not Mentioned in Autopsy Report.** However, this detail was not noted in the 9 page autopsy summary released to the public and there would appear to be no particular reason to redact it.
- **Evidence of Being Carried?** The spiral staircase into the kitchen was the staircase closest to JBR's bedroom. Some believe the garland in hair might be evidence she was carried down that staircase. Others question how easy it would have been for anyone to negotiate such narrow stairs with a 45 pound child in their arms.

Hair on Scalp

- Three explanations have been offered for how JonBenet ended up in two pigtailed; all three explanations are consistent with the Ramseys' story that JBR was asleep when they got home and none assume that the killer did this.
 - **Patsy Made the Pigtailed.** Internet poster [oneeyedJack](#) believes the ponytails were put in by Patsy prior to going to the White's, as it was not an unusual hairstyle ([oneeyedJack](#) has pointed out "The last pictures of [JonBenet](#) alive were taken on Christmas morning. She had just awakened and had the top back of her hair in a ponytail," so it wouldn't be unreasonable to think she'd been put to bed on December 25 also in ponytails).
 - **Daphne White Made the Pigtailed at the White Party.** However, Internet poster [Olivia](#), based on her experience with a 7-year old girl with long hair, has deduced that the ponytails in JBR's hair likely were put in by Daphne White at the White's party, based on several observations:
1. **Asymmetric Ponytails.** A mother generally would try to make the hair be symmetric, such as two pigtailed or braids, or a single ponytail or French braid etc.; JBR's ponytail at top of head and one below this would be more typical of a little girl.
 2. **Difficulties in Tightening Pony Tails.** "Little girls have a hard time making ponytails, pigtailed tight (I know this from experience). This would explain two ponytails, one on top, one on the bottom (at the nape of the neck). she (jonbenet or daphne) couldn't get all the hair in the top of the head ponytail... so she created another one to hold the loose hair." "It is really apparent that her hair wasn't completely secure in the lower ponytail, as her hair was caught up in the garrote... this would definitely indicate that the lower ponytail wasn't securely in place... indicating a child stylist." Internet poster [Rainsong](#) has further observed "If her hair was in ponytails at the Whites' and she slept for a time before her death, the hair would have slipped out of the hairties--thus getting caught in the garrote."
 3. **Scrunchy Combined with Elastic Band.** "A scrunchy is much harder to get in a hair than a normal elastic ponytail holder. I believe that the girls used a normal elastic ponytail holder, then put a scrunchy over it."
 4. **Patsy Would Not Undo Ponytails at Home.** "I do believe Jonbenet was asleep when she got home, and Patsy didn't want to disturb her... plus the fact her hair was in ponytails would make it easier in the morning to do her hair."
 - **Patsy Made Pigtailed After Returning from White's.** Internet poster [Tippper](#) has suggested: "If the child is a heavy sleeper, which apparently [JonBenet](#) was; it would be nothing to prop her up in bed with her head on your shoulder (still asleep) slip off the vest and grab the hair and put an elastic on with a couple twists. This action might account for jacket fibers in her hair. Alternatively - if she was on her side you could just put the ponytail in."

Severe Head Blow

- **Injury Revealed in Autopsy.** "Although no head injury was visible when she was first discovered, the autopsy revealed that she received a severe blow to her head shortly before or around the time of the murder. (SMF P 51; PSMF P 51. See also Report of Michael Doberson, M.D., Ph.D. at 6(C) attach. as Ex. 3 to Defs.' Ex. Vol. I, Part A (stating the "presence of hemorrhage does indicate that the victim was alive when she sustained the head injury, however the relative small amount of subdural hemorrhage indicates that the injury occurred in the perimortem (close to death) period.")" (Carnes 2003:21).
- **Timing of Head Blow Undetermined.** "The Court has not been able to determine from the record how close to death the perimortem period would have been." (Carnes 2003:Note 13). A more detailed discussion of that issue is [here](#).
- **Location of Injury.** Internet poster [Sue](#) has [described](#) the location of the blow on the skull.
- **Force of Blow.**
- 1. **General Expert Opinion.** A review of literature in the *Archives of Disease in Childhood* compared the effects of childhood falls to high force trauma (injuries inflicted by someone else), [observing](#):

"Fractures are more likely to be caused by high force trauma, including abuse, if depressed, wider than 3 mm, multiple, stellate, crossing a suture line or of the base of the skull." Note that 3 mm is just over 0.1 inches. JBR's fracture crossed multiple suture lines and was 1/2 inch wide in the portion of skull "punched out" by the force of the blow.

2. **Specific Opinions on JBR Head Blow.** Boulder First Assistant DA Bill Wise stated in JonBenet Anatomy of a Cold Case that JBR was hit "with enough force to bring down a 350 lb. Green Packers [sic] lineman" (quote and source from Internet poster [Autumn: post 9](#)). John Douglas indicate she had been hit "forcefully enough to deck a three hundred-pounder" (Douglas 2001:429; quote and source from Internet poster [Autumn: post 9](#)).
3. **Calculations Using Principles of Physics.** Internet poster [Dave](#) has done calculations showing the force required to punch out the piece of skull of the same size as the piece found punched out in the autopsy. His calculations suggest the force would have been considerable, ruling out an accidental fall or even a deliberate slamming of JBR's head into an object. Instead, these calculations strongly suggest use of a weapon, possibly a long weapon (e.g., golf club) in order to produce the acceleration/force required to produce the observed damage. The individual wielding this weapon would have had to be fairly strong.

What Caused the Head Blow?

Flashlight

- **Why Suspect a Flashlight?** A [flashlight](#) not belonging to the Ramseys was found on the kitchen counter on the day JBR's body was found.
- **Ronald Wright, MD**, director of the forensic pathology department at the University of Miami School of Medicine, "The blow to her head -- which Wright is convinced was not from a golf club but **more likely a blunt object such as a baseball bat or heavy flashlight** -- came first, Wright said." (Emphasis added [Rocky Mountain News](#)).

Baseball Bat

- **Ronald Wright, MD.** As noted under Flashlight, Dr. Wright is "convinced" a golf club was not the cause of the head blow.

Golf Club

- **Ronald Wright, MD.** As noted under Flashlight, Dr. Wright is "convinced" a golf club was not the cause of the head blow.