FORENSIC AND TRACE EVIDENCE ANALYSIS OF A BLUNT OBJECT IN A CASE OF MURDER

Al. Alexandrov, At. Christov, T. Kiryakova, I. Brainova-Michich, D. Nikolov, M. Goshev, F. Odzhakov

Department of Forensic Medicine and Deontology, Medical University-Sofia
Corresponding author:
Alexandar E. Alexandrov, MD, Phd
Medical University, Sofia-1431, Bulgaria
Department of Forensic Medicine and Deontology
2 Zdrave str.
Tel: +359+29230666
Fax: +359+29230412
E-mail: sashko_forensic@yahoo.com

ABSTRACT

We are presenting a murder case in which, through forensic methods and trace evidence analysis the object the crime was committed with was identified, as well as the specific part of the object that the hit was made with. A wooden table board was presented for our analysis, as well as the autopsy results with a picture of the head trauma. The fundamental questions we had to answer were: is it possible part of traumatic injuries found during the autopsy of the victim to be caused by a part of that same wooden board or these injuries are a result of a field trauma. After the examination, analysis and comparisons of all evidence we excluded the possibility that the trauma could be caused by a fall from someone's own height with subsequent head impact to the ground, contrary to the testimony of the accused. In this case, the results and conclusions drawn from the overall forensic examination, with the results from the trace evidence analysis appear to be a solid material foundation for the correct judgment of the Court.

Keywords: trace evidence analysis, bio trace analysis, blunt object, murder.

INTRODUCTION:

We present a murder case committed after a row between two men influenced by alcohol. The witnesses did not see the exact hit on the victim, the saw only his sudden fall on the ground. The victim was urgently admitted to hospital where, despite the emergency surgery and attempts for resuscitation, death occurred. The autopsy showed severe head trauma expressed in bruises of the inner surface of the soft tissues of the skull on both temporal areas, massive bruising around the left temporal muscle, surgically treated wound in the left temporo-parietal area with underlying fragment fracture of the skull bone and impressional sinking of the front and top edges of the defect, condition after trepanation and intracranial bleeding, injury to the brain in area underneath the fracture. In addition, other mild traumatic injuries such as limited bruising and abrasions located in different parts and surfaces of the body, we also observed. During the autopsy photographs of the morphological charcteristics of the fracture were taken. They showed the following: - an impression fracture with generally rounded shape in front-upper part sinking of the bone (as compared to the rest of the fracture the sinking here is the most significant); - Both ends (top and bottom) of the same fracture continue backwards, where their lines intersects with almost linear transverse fracture, which continues to the left half of the occipital bone; The last described line fracture occupies almost central position between the other described fracture

lines, and it has basically parallel direction with them.

OBJECTIVE:

Based on the autopsy conclusion that the trauma to the head was caused by a blunt object with limited contact surface, the police provided for trace evidence analysis and comparative study a kitchen wooden board. We had to answer what is the mechanism of the head injury of the victim and whether it is due to head impact on the ground or it could be obtained from the previously mentioned kitchen board.

MATERIALS AND METHODS:

To achieve the objective we used data from the autopsy, including photographs, and the provided evidence – the wooden board.

A morphological analysis of the traumatic injuries was performed and it's mechanism of occurrence was examined, the wooden board was investigated, and everything was compared using photo superimposition of the images of the fracture and various possible contact surfaces of the board in two-dimensional space, using Adobe Photoshop CS2.

RESULTS:

The analysis of the physical evidence presented, representing domestic wooden cutting board with a classic shape (pictures №№ 1 is 2), showed the following characteristics:

- Total length of 36.2 cm (from the top of the handle to the opposite side of the board);
- A width in the distal portion 20.7 cm, a width at the proximal end 20 cm and thus the shape of the cut surface forms a marked regular trapezoid;
- Thickness of the wooden profile - 1.6 cm (photo № 3 of photo applications);
- Distal (far situated from the handle) corners profile form an acute angle, close to right, but less of it;
- Proximal (nearest to the handle) "corners" are round shaped with a smooth transition from one to the other intersecting surfaces;
- The side profiles of the board are also a kind of rounded, thus the central part of the same is the most projecting part. In other words, the intersection of these profiles in its different points have a common U-shaped (photo № 4 of photo applications);
- The handle is standard cut a hole through the entire thickness - for hanging on the board;
- On the two broad surfaces, provided for cutting on the board, were observed multiple linear cuttings, more hollow sections with different directions, some of which intersecting (traces of the tangential action object with a linear contact surface, such characteristics have the cutting edges of knives);
- Traces of blood or filamentary objects like hair were not observed on the wooden board.

Photo № 1

Photo № 2

Wide surface of the wooden board

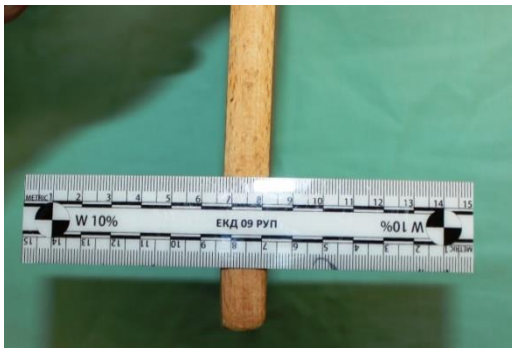

Photo № 3

Thickness of the wooden profile

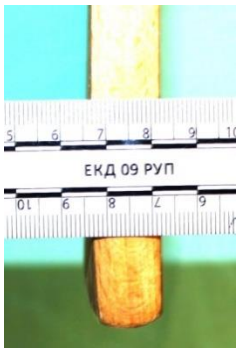

Photo № 4

U-shaped form of the profile of the board

The analysis of the overall morphology of the impression fracture in the left temporal-parietal region of the head found during the autopsy of the corpse, shows the following mechanism of occurrence: a hard hit with a blunt object limited in contact with elongated surface having in its initial configuration of edges, the form of a trapezoid with dimensions 2.5 / 0.7 / 2.5 / 0.2 cm, respectively it can cause lacerated contusion with a similar shape and size as the data contained in the autopsy report. Underlying this wound the characteristic impression fracture (photo № 5) is obtained by a single hit from a blunt object with limited elongated contacting surface, like the proximal part of the fracture (in the deepest area) indicates that:

- The subject has a starting configuration of intersecting limited surfaces, which means that here begins the length of particular limited contact surface;

- The reduction of the depth of the damage of the bone towards the left occipital region of the head with outgoing "bursting" of the occipital bone is due to a combination of factors, such as:

● rounded head;

● oblique cross-impact of a particular subject in which its initial "edge" is "driven" deeper and the remaining contact surface in the distal direction gradually moving away from the head, in which reduces the impact on the underlying tissues;

● causing a strong impact to the front part of the damage, determines the transmission power of the impact on specific bone structure in a fan-shaped common direction, the main vector directed back to the occipital bone, which due to momentary created forces

hyperextension, " splits "along the main vector of influential stretching forces distal to the outlet of the acting subject.

Detailed analysis and bio trace comparison between the morphology of the traumatic injuries in the left temporal-parietal region of the head (lacerated contusion and impression fracture underneath having characteristic shapes and sizes) have concluded that the only option for obtaining these injuries is by a hit of one of the two proximal (nearest the handle) "corner" of the presented research housework cutting board (whose characteristics are displayed photos №№ 1, 2 and 6).

The other traumatic injuries of the victim do not carry specific morphological characteristics that could be caused by a blunt object such as the presented wooden board.

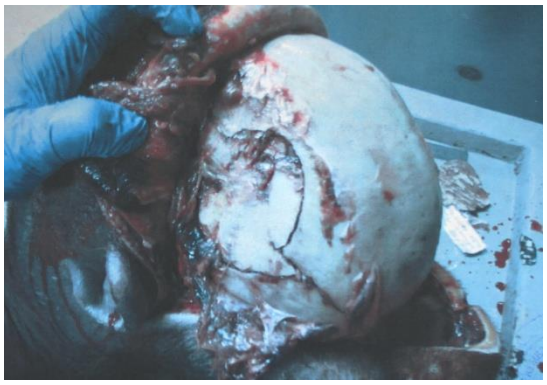

Photo № 5
Fracture of the left temporal area

Photo № 6
Trace evidence analysis and comparison

CONCLUSIONS:

The detailed morphological description of any traumatic injury through the so-called method of "verbal Photography" and fixing them through comprehensive and detailed scale images enable to perform this kind of analysis, respectively for the identification of the used weapon, the mechanism of a trauma, their overall sequence and dynamics, thereby greatly facilitating and sometimes appearing to be the only material basis for decision-making of the pre-trial and trial cases.

REFERENCES:

1. David A. Stoney *, Paul L. Stoney: Critical review of forensic trace evidence analysis and the need for a new approach, Forensic Science International 251 (2015) 159–170

2. FRANKLIN D. WRIGHT, GREGORY S. GOLDEN, Forensic Photography, 1997 CRC Press LLC;

3. Nicholas I Batalis, Forensic Autopsy of Blunt Force Trauma, 2013, http://emedicine.medscape.com/article/1680107-overview#a30

4. Siegel, J. A. (Ed.): Encyclopedia of forensic sciences (3 volumes). London: Academic Press, 2000;

5. Spitz and Fisher: Medicolegal investigation of death. Fourth edition, Illinois: Charles C Thomas Publisher, LTD, 2006;

6. Sulaiman, NA, Osman, K, Hamzah, NH, and Amir Hamzah SPA, Blunt force trauma to

skull with various instruments, Malaysian J Pathol 2014; 36(1) : 33 – 39

7. Раданов С.: Съдебна медицина и медицинска деонтология. Трето основно и допълнено издание, С. изд. Сиела, 2006;