

TRACE EVIDENCE IDENTIFICATION OF A KNIFE – CASE OF MURDER

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Abstract

A case of murder of 12-year-old child, committed by a minor, is presented. A total of 97 incised-stabbed and incised wounds have been detected. During the autopsy, a piece with metal origin in the parietal bone of the skull has been established. After a macroscopic and stereomicroscopic examination, it has been concluded that the piece is the sharp point of a knife. The investigation was able to provide a tool found at the crime scene thus enabling further trace-evidence examination. The forensic trace-evidence comparative examination has proved that the established metal piece during autopsy and the provided tool from the crime scene comprise a single knife. The results from this examination are actually the only proof for determining the murder weapon.

Key words: trace-evidence, murder.

INTRODUCTION

A case of murder of 12-year-old child, committed by a 15-year-old minor, is presented. During the autopsy, a total of 97 incised-stabbed and incised wounds have been established. Given the morphological characteristics of the wounds, a conclusion has been drawn that they were all caused by one and the same weapon with a single cutting edge. At the moment of initial crime scene investigation, no weapon has been found at the crime scene. During the autopsy of the body, in the area of one of the wounds, a piece with metal origin stuck in the parietal bone of the skull has been established. After macroscopic and stereomicroscopic examination of this piece it has been concluded that it is a part of the sharp point of a knife. Given this information, the investigation has held extensive search in the premises far from the crime scene, leading to the detection of a knife. It has been found at a local dumpsite. Thus the main task towards the forensic medical expertise has been the establishment of a possible connection between this knife and the murder.

MATERIALS AND METHODS

For the purpose of this case study, written and graphic data from the forensic medical expertise, a part from the parietal bone with the stuck metal piece and the provided knife have been used.

A morphological analysis of the established traumatic injuries on the murdered body has been held. An evaluation of the possible mechanisms of occurrence, direction and size of the skin wounds, as well as examination of the wound canals has been made. A trace-evidence comparative analysis between the established during autopsy metal piece and the provided knife has been held. All graphic images have been edited with Adobe Photoshop CS2 via standardizing their scales and further juxtaposition of all possible contact surfaces of the knife with the established traumatic injuries.

RESULTS

The analysis concerning the length of all skin incised-stab wounds, their morphological characteristics and the depth of the wound canals has given ground for the following conclusions on the appearance of the murder weapon:

- at a distance of 0,5-0,7 cm from the tip, the weapon has a width of 0,5-0,6cm and spine measuring at around 0,1cm;
- at a distance of 0,8-1 cm from the tip, the weapon has a width of 1cm and spine measuring at around 0,1cm;
- at a distance of 3-7-9-10cm and a maximum of 11cm from the tip, the weapon has a width of 1,1-1,6cm and spine measuring at around 0,1cm;

From this morphologic characteristics of the injuries could be drawn the following conclusions:

- it is possible that the knife's blade is longer since no indications for bolster action around the skin wounds have been established;
- all injuries have been caused ante mortem as:
 - those on the frontal surface of the neck and on the back (mainly in the right inferior half) have a significant stereotype of occurrence – relatively fixed position of the body of the victim with straight thorax, most likely lying;
 - all other injuries have been established on different surfaces of the head, thorax and abdomen; they having different directions, which means that there has been distinctive dynamics between the position of the victim and the attacker; the possible contacts between the two people could be either in a standing or lying position, as for the latter correspond the extensive black spotting on the forearms, wrists, palms and knees of the victim;

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- the incised injuries on the upper extremities of the victim, given their location, could be a result of attempts for self-defense and diverting contacts from a sharp weapon, the latter aiming vital areas of the body – head, neck, thorax.

Object 1: The provided evidence is a kitchen knife with total length of 26cm. It comprises of a 14cm long blade from white metal and a black plastic handle, the two parts of which are bolted together via three rivets, with the middle one missing. The handle is ergonomic for respective grip. Along the blade and the handle have been established multiple merging traces of dry red-brownish matter. There are several spots where samples for biological examination have been taken (Picture 1 and 2). The blade is made of white metal, with a single cutting edge with spine measuring between 1 and 1,5mm from the tip to the bolster. The plane of the blade from the spine is slightly diverted to the left, as around the tip it is up to 2-3° to the main axis. The cutting edge is relatively well sharpened as dents have not been detected (Picture 3 and 4). The tip of the knife is missing and the line of separation is mainly transvers and slightly oblique, as there are distinctive cracks. The continuing lines on the spine and the cutting edge form a 4mm long fragment. The width of the blade from the tip to the bolster is as follows:

Distance between the separation line at the tip and the bolster in cm

1	2	3	4	5	6	7	8	9	10	11	12	13	14
9	14	16	19	20	21	22	23	23	24	24	24	24	25

Blade width (mm)



PICTURE 1



PICTURE 2



PICTURE 3



PICTURE 4



PICTURE 5



PICTURE 6

Object 2: Parietal bone fragment with width of 3-5mm. A penetrating the skull injury has been establish. Inside the wound canal a stuck metal piece with the appearance of a knife's tip has been detected (Picture 7 and 8).



PICTURE 7



PICTURE 8

After the extraction and examination of the metal piece from the bone matter, it has been established that the latter has been triangularly-shaped, from white metal. One of its sides very well corresponds to be part of a knife's spine, with 0,5-1mm in width. The tip is sharp and the other side

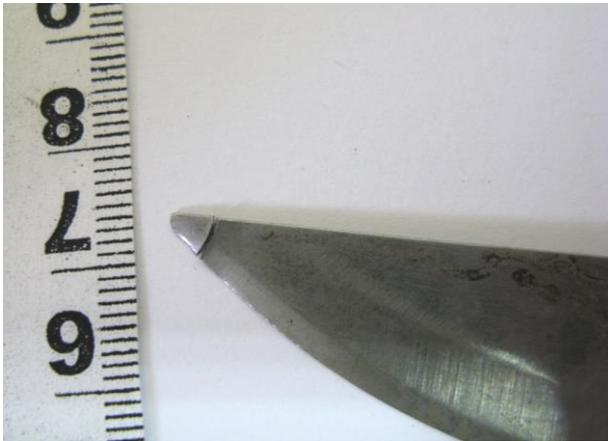
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corresponds to the cutting edge of a knife. Its base is transversely unevenly broken. The juxtaposition between the metal piece and the injury of the parietal bone has been proven to match and the fracture of the external bone layer. One of the angles is sharp and the other one – with a bridge-like shape and 0,5-1mm wide. The injury on the external bone layer is 4mm long. On the internal bone layer an injury with corresponding shape and length of about 1,5-2mm has been established. (*Picture 9*).



PICTURE 9

The metal piece extracted from the parietal bone has been juxtapositioned to the tip of the blade (object 1). The comparative macroscopic and microscopic analysis has established a full match between the two. A comparison between the continuing lines on the spine and the cutting edge has been performed as well. A full match has been established in this case as well. (*Picture 10 and 11*).



PICTURE 10



PICTURE 11

The trace-evidence analysis allows the following conclusions to be drawn:

- the metal piece, stuck in the parietal bone, is the tip of a blade with a single cutting edge'
- after the initial impact between the sharp object and the skull's bone, additional kinetic energy was given towards the object, thus causing fractures of the external and internal bone layers;
- this mechanism facilitates the blade to bent along its length resulting in the breaking of its

tip;

- the trace-evidence examination proves that the detected metal piece in the parietal bone is part of the provided from the investigation knife.

CONCLUSION

The detailed morphological description of any traumatic injury and its photographic depiction, as well as the thorough examination of characteristic and specific findings during autopsy, provides wide range of possibilities for further analysis. Thus a full and objective explanation of the mechanism, order and dynamics of occurrence of traumatic injuries could be gained. In addition, specific identification of the weapon used for committing a crime is possible leading to visiting justice which is one of the main pillars of every society.

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