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IDENTIFICATION OF UNKNOWN INDIVIDUALS BY FEATURES ON SKELETAL REMAINS

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Abstract. Identification of a person based on the individual characteristics of bone remains is a complex and very important task in the work of a forensic medical expert-criminalist. Thanks to individual characteristics, it is possible to establish not only gender, age or height, but also to identify a person. The armed russian aggression against Ukraine has led to the death of a large number of military and civilian personnel, whose identification is not always possible, and every person deserves to be identified and properly buried.

The aim of the study. Analysis of individual characteristics revealed in skeletal remains which led to the identification of unknown persons.

Materials and methods. Practical cases are presented, utilizing Expert Findings from the archive of the Lviv Regional Bureau of Forensic Medical Examination.

Scientific research. This investigation is part of the scientific research project of the Department of Pathological Anatomy and Forensic Medicine at the State Institution "Danylo Halytsky Lviv National Medical University" entitled "Study of pathogenetic mechanisms and pathomorphological features of diseases of the endocrine, cardiovascular, respiratory, nervous, digestive, urinary, and reproductive systems aimed at enhancing their morphological diagnosis" (state registration number 0123U201668, implementation period: 2023-2027).

Bioethics. The research materials were approved by the Bioethics Committee of the State Institution " Danylo Halytsky Lviv National Medical University " (Protocol № 14, December 20, 2023).

Results: Practical cases demonstrate individual features on the skeletal remains that were discovered during forensic examination, which allowed the identification of the deceased individuals.

Conclusion: These cases demonstrate the importance of conducting forensic medical examinations of bone remains with the determination of individual identifying features.

Keywords: skeletal remains, identification, unknown person, forensic examination.

ІДЕНТИФІКАЦІЯ НЕВІДОМИХ ОСІБ ЗА ОСОБЛИВОСТЯМИ НА КІСТКОВИХ РЕШТКАХ

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Резюме. Встановлення особи за індивідуальними особливостями кісткових решток – є складним та дуже важливим завданням в роботі судово-медичного експерта-криміналіста. Завдяки індивідуальним особливостям можна встановити не тільки стать, вік чи зріст, але й ідентифікувати особу. Збройна російська агресія проти України призвела до загибелі великої кількості військових та цивільних осіб, опізнати яких не завжди надається можливим, а кожна людина заслуговує бути упізнаною та належно похороненою.

Мета. Проаналізувати індивідуальні особливості, які були виявлені на кісткових рештках, завдяки яким невідомі особи були ідентифіковані.

Матеріали дослідження. Наведено практичні випадки з використанням Висновків експерта з архіву Львівського обласного бюро судово-медичної експертизи.

Науково-дослідна робота. Проведене дослідження є частиною науково-дослідної роботи кафедри патологічної анатомії та судової медицини ДНП «Львівський національний медичний університет ім. Д. Галицького» «Вивчення патогенетичних механізмів та патоморфологічних особливостей захворювань ендокринної, серцево-судинної, дихальної, нервової, травної, сечовидільної та репродуктивної систем з метою удосконалення їх морфологічної діагностики» (номер державної реєстрації 0123U201668, термін виконання 2023-2027 рр.).

Біоетика. Матеріали роботи схвалено комісією з питань біоетики ДНП «Львівський національний медичний університет ім. Д. Галицького» (протокол №14 від 20 грудня 2023 року).

Результати. Практичні випадки демонструють індивідуальні особливості на кісткових рештках, які були виявлені під час проведення судово-медичної експертизи, за допомогою яких вдалося ідентифікувати померлих осіб.

Висновок. Дані випадки демонструють важливість проведення судово-медичних експертиз кісткових решток з визначенням індивідуальних ідентифікуючих ознак.

Ключові слова: кісткові рештки, ідентифікація, невідома особа, судово-медична експертиза.

Introduction. Both following the onset of full-scale russian aggression, which resulted in a large number of military and civilian casualties, and during peacetime, the issue of identification based on skeletal remains is always of paramount importance and relevance. In Ukraine, the problem of identifying individuals who died during armed conflicts and other disasters is studied by forensic medicine specialists in the context of developing a comprehensive approach to this process and organizing the work of forensic institutions [1]. The identification of the deceased from skeletal remains in a legal context is an essential component of forensic personal identification. The primary task of identification is to establish whether the skeletal remains are human [2-7]. If they are human remains, the next stage of

identification employs anthropological methods to determine sex, stature, and racial affiliation [3,4]. Subsequently, individual characteristics are examined, through which a person can be identified [6,7].

Personal identification based on skeletal remains is a complex task requiring specialized procedures and knowledge, as well as a clear, well-coordinated system of cooperation between relevant departments of the forensic examination bureau and investigative authorities.

When conducting examinations of skeletal remains of unknown individuals, a complex of forensic, criminalistic, anthropometric and other types of examinations is utilized [5,7].

The aim of the study. Analysis of individual characteristics revealed in skeletal remains which led to the identification of unknown persons.

Materials and methods. Practical cases are presented, utilizing Expert Findings from the archive of the Lviv Regional Bureau of Forensic Medical Examination.

Scientific research. This investigation is part of the scientific research project of the Department of Pathological Anatomy and Forensic Medicine at the State Institution " Danylo Halytsky Lviv National Medical University " entitled "Study of pathogenetic mechanisms and pathomorphological features of diseases of the endocrine, cardiovascular, respiratory, nervous, digestive, urinary, and reproductive systems aimed at enhancing their morphological diagnosis" (state registration number 0123U201668, implementation period: 2023-2027).

Bioethics. The research materials were approved by the Bioethics Committee of the State Institution "Danylo Halytsky Lviv National Medical University" (Protocol № 14, December 20, 2023).

Results of the study. In the practical case, according to the official request, in 2023 a woman contacted a police department in Lviv region regarding the disappearance of her brother, born in 1963, with whom contact had been lost a month prior. Approximately a year later, in 2024, during a scene examination involving a forensic medical expert in a rural area, about 150-200 meters north of a village cemetery in one of the villages of Lviv region, within a forested area, skeletonized human remains were discovered. Parts of the bones of the upper and lower limbs were absent. The skeletal components were found separately; in particular, the skull was located approximately 1.5 meters away from the spine, likely due to animal activity.

In the Department of Forensic Medical Criminalistics, the research material consisted of the following bones: skull, mandible, clavicle, two scapulae, a conglomerate of the right tibia, right fibula, and soft tissues of the shin and thigh, left tibia with soft tissues of the shin, left fibula, two radii, one ulna, 16 ribs, a conglomerate of seven thoracic vertebrae with four ribs, 17 vertebrae (2 vertebrae fused together and 6 vertebrae fused in groups of 3), the manubrium of the sternum, a fragment of a sock with remnants of soft tissues and foot bones, and 3 foot bones with soft tissues.

To determine sex based on the anatomical and morphological features of the skull, the method of V.I. Pashkova was used, which established the sex as male. The

conical shape of the pelvis, narrowing inferiorly, and the heart-shaped shape of the pelvic inlet allowed for confirmation that the pelvic bones belonged to a male. Stature was estimated using the humerus and femur, indicating a potential height of 165-175 cm. The age of this individual was estimated to be approximately 60 years, as complete ossification (closure) of the sagittal suture, the upper parts of the lambdoid suture, and the lower parts of the coronal suture was observed.

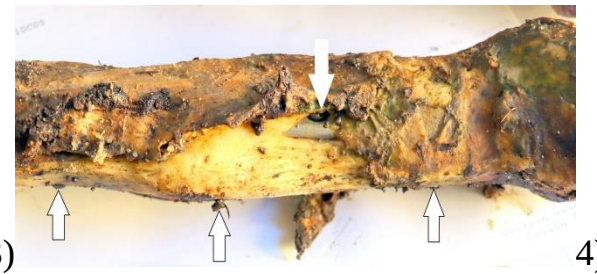
Furthermore, individual characteristics were identified. Specifically, proliferations of bone tissue were observed on the bones. These were significantly pronounced on the spine, manifesting as fusion (ankylosis) of vertebrae with each other and fusion of the sacrum with the pelvic bone (Fig. 1). The aforementioned changes may indicate the presence of spondylosis, which in a living person would manifest as pain and stiffness in the back and spine area. Thickenings were found on the ribs, which may represent old, healed, ante-mortem fractures. A significant elongation (up to 5.2 cm, with the norm being 2-3 cm) of the left styloid process of the temporal bone was observed (Fig. 2). This feature may indicate the presence of Eagle's syndrome (stylohyoid syndrome) in the living individual, which could have manifested with complaints of pain in the left throat area, left ear, left temporo-mandibular joint, worsening with swallowing or turning the head, and a sensation of a foreign body in the pharynx.

In the proximal third of the left tibia, a defect was discovered through which a silvery-colored metal was visible; moreover, three metal elements in the form of small rods protruded from the bone. The aforementioned likely indicates a surgical procedure involving the placement of metal hardware (an implant) into the left tibia (Fig. 3,4).

1) 

2) 

Fig. 1. Proliferation of vertebral bone tissue and intervertebral fusion.
Fig. 2. Significant elongation of the left styloid process.

3) 

4) 

Fig. 3.4. Presence of metallic orthopedic hardware (implant).

Discussion. The sister of the missing person confirmed that during his lifetime, her brother had exhibited the aforementioned symptoms and had undergone a surgical procedure involving the implantation of orthopedic hardware in his left lower leg.

Regarding the next case, according to the official request, in 2014, within a densely overgrown, marshy area in a village of Lviv region, the remains of an unidentified individual, comprising a skull and skeletal bones, were discovered. The submitted research material consisted of the following osteological specimens: the right clavicle, right scapula, right ulna, a fragment of the right radius, the sacrum, two pelvic bones, two tarsal bones and two tarsal bone fragments, seven phalanges, one phalangeal fragment, sixteen vertebrae and vertebral fragments, and twenty-four ribs and rib fragments.

Upon anatomical articulation of the pelvic bones with the sacrum, the following morphological features were observed: the pelvic structure was notably narrow and elongated. The pelvic cavity exhibited a conical shape, tapering inferiorly, with the pelvic inlet approximating a "heart" shape. These characteristics are definitive for a male pelvis.

Of particular interest was the identification of individualizing features. Ante-mortem proliferations of bone tissue, presenting as irregularly shaped tuberosities and spicules (osteophytes), were detected on the pelvic bones, scapula, ulna, and clavicle (see Fig. 5,6). These pathological changes would likely have manifested as significant pain during the individual's lifetime.

5) 

6) 

Fig. 5.6. Bone growth in the form of tubercles and spines.

These features also made it possible to identify the person among the people missing in this area based on medical documents and relatives' testimonies.

Conclusions. Thus, the comparison and agreement of individual features on bone remains and life data make it possible to identify the person with high probability.

Author Statement.

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References

1. Stepaniuk RL, Husieva OV. Orhanizatsiini zasady DNK-identyfikatsii zahyblykh unaslidok nadzvychainykh podii iz masovymy zhertvamy [Organizational principles of DNA identification of victims of mass casualty events]. Kryminalistychnyi visnyk. 2023;1:29-36. DOI: https://doi.org/10.37025/1992-4437/2023-39-1-29 (in Ukrainian)

2. Buers S, Juarez Ch. Introduction Forensic Anthropology. 6th ed. Routledge; 2023. 466 p. DOI: https://doi.org/10.4324/9781003283935

3. Sivan D, Krishan K, Sharma V, Kanchan T. Forensic age estimation from ossification centres: a comparative investigation of imaging and physical methods. An Acad Bras Cienc. 2024;96(4):e20240181. DOI: http://doi.org/10.1590/0001-3765202420240181 PMID: 39383352.

4. Bacci N, Steyn M, Briers N. Performance of forensic facial comparison by morphological analysis across optimal and suboptimal CCTV settings. Sci Justice. 2021;61(6):743-54. DOI: http://doi.org/10.1016/j.scijus.2021.09.003 PMID: 34802648.

5. Hurov O, Antonov A, Surhai N, Tatarko S, Shylan V, Uzbek T. Shliakhy vdoskonalennia sudovo-medychnoi identyfikatsii osoby v uskladnenykh umovakh [Ways to improve forensic identification of a person in difficult conditions]. Sudovo-medychna ekspertyza. 2023;1:16-21. DOI: https://doi.org/10.24061/2707-8728.1.2023.3 (in Ukrainian)

6. Belcastro M, Pietrobelli A, Nicolosi T, Milella M, Mariotti V. Scientific and Ethical Aspects of Identified Skeletal Series: The Case of the Documented Human Osteological Collections of the University of Bologna (Northern Italy). Forensic Sci. 2022;2(2):349-61. DOI: https://doi.org/10.3390/forensicsci2020025

7. Hughes C, Yim AD, Juarez C, Servello J, Thomas R, Passalacqua NV, Soler A. Investigating identification disparities in forensic anthropology casework. PLoS One. 2023;18(11):e0290302. DOI: http://doi.org/10.1371/journal.pone.0290302 PMID: 37910496; PMCID: PMC10619877.

Література

1. Степанюк РЛ, Гусєва ОВ. Організаційні засади ДНК-ідентифікації загиблих унаслідок надзвичайних подій із масовими жертвами. Криміналістичний вісник. 2023;1:29-36. DOI: https://doi.org/10.37025/1992-4437/2023-39-1-29

2. Buers S, Juarez Ch. Introduction Forensic Anthropology. 6th ed. Routledge; 2023. 466 p. DOI: https://doi.org/10.4324/9781003283935

3. Sivan D, Krishan K, Sharma V, Kanchan T. Forensic age estimation from ossification centres: a comparative investigation of imaging and physical methods. An Acad Bras Cienc. 2024;96(4):e20240181. DOI: http://doi.org/10.1590/0001-3765202420240181 PMID: 39383352.

4. Bacci N, Steyn M, Briers N. Performance of forensic facial comparison by morphological analysis across optimal and suboptimal CCTV settings. Sci Justice. 2021;61(6):743-54. DOI: http://doi.org/10.1016/j.scijus.2021.09.003 PMID: 34802648.

5. Гуров О, Антонов А, Сургай Н, Татарко С, Шилан В, Узбек Т. Шляхи вдосконалення судово-медичної ідентифікації особи в ускладнених умовах. Судово-медична експертиза 2023;1:16-21 DOI: https://doi.org/10.24061/2707-8728.1.2023.3

6. Belcastro M, Pietrobelli A, Nicolosi T, Milella M, Mariotti V. Scientific and Ethical

Aspects of Identified Skeletal Series: The Case of the Documented Human Osteological Collections of the University of Bologna (Northern Italy). Forensic Sci. 2022;2(2):349-61. DOI: https://doi.org/10.3390/forensicsci2020025

7.Hughes C, Yim AD, Juarez C, Servello J, Thomas R, Passalacqua NV, Soler A. Investigating identification disparities in forensic anthropology casework. PLoS One. 2023;18(11):e0290302. DOI: http://doi.org/10.1371/journal.pone.0290302 PMID: 37910496; PMCID: PMC10619877.

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