**Forensic medical identification in Russia**

**Slide** 2. More than 35,000 people are missing every year in Russia, as a result of accidents, crimes, natural and technogenic disasters, local armed conflicts and other causes. Two thirds of the detected corpses remain unidentified. Some corpses have signs of violent death and crime traces, and their passports are in the hands of criminals.

Corpses of unknown people are buried unidentified, this fact leads to violation of the rights of persons who lost their relatives (there is impossibility of creating new families, entering into the rights of inheritance of the property of the missing family member, receiving social support, et cetera).

**Slide** 3. Various agencies are involved in the search for missing people, forensic medical institutions play the main role in identifying of unidentified corpses.

**Slide** 4. Personality mean the bearer of individual biological and mental properties, as well as a certain social and legal status, registered in the relevant documents.

Identification of the person is the establishment of the identity of the unidentified person with the person being known. To provide a comprehensive approach for the identification purposes is necessary when a corpse of an unknown person is found.

**Slide** 5. The main identification method in the absence of identifying documents is the visual identification of a missing person by relatives or co-workers.

**Slide** 6. In the cases of study of a skeletonized corpse for subsequent identification, it is possible to perform graphic reconstruction of the external appearance with an identification goal using the Gerasimov method.

**Slide** 7. Graphic reconstruction of the external appearance of Vitus Bering.

**Slide** 8. Method of graphic reconstruction of a person's life appearance based on computer graphics using the skull.

**Slide** 9. Forensic identification of a person consists of the study and comparison of two types of objects - the unknown corpses and comparative materials of the wanted persons.

**Slide** 10. The ability to identify a person is based on the individual physical characteristics of each person. Common attributes of a person are: sex, age, height, race and ethnic group, body type, body weight, antigenic properties.

**Slide** 11. Forensic medical definition of sex is the macroscopic establishment of primary and secondary sexual characteristics. In the cases of examination of skeletonized remains, sex is determined by bones, the most informative are the human skull and pelvis.

**Slide** 12 If it is impossible to determine the sex by macroscopic data, for example, in the study of body fragments, the sex can be determined by the results of a microscopic study - by Barr bodies.

The molecular genetic method for determining the sex of a person is developing at present.

**Slide**13. The growth of a person can be established by the examination of bones. The dimensions of each bone of the skeleton depend on the length of the body.

**Slide** 14. In the 1870s, Bertillon developed the first scientific methods of identifying a person for criminal registration: anthropometric method and verbal portrait.

**Slide** 15. Various anthropometric data, including the length of the body, the presence of sexual characteristics, the dental status, the severity of involutive changes in tissues, is used for forensic age determination.

**Slide** 16. There are three main racial groups: Caucasoid, Negroid, Mongoloid. Each of them is characterized by features of the structure of the skeleton. Racial signs are well pronounced in the structure of the skull. The Caucasoid.

**Slide** 17. Mongoloid.

**Slide** 18. Negroid.

**Slide** 19. The body type is determined by comparing the quantitative characteristics of the bones of the upper shoulder belt, spine, thorax, pelvis and extremities. There are asthenic, normostenic and hypersthenic types of physique.

**Slide** 20. Determination of human antigenic properties is carried out with the help of serological reactions. The method has the great importance in the impossibility of carrying out molecular genetic research.

**Slide** 21. The basis of molecular genetic identification is the individual genetic uniqueness of each organism; genetic identity of all its cells and tissues; stability, safety and immutability throughout the life of individualizing traits.

**Slide** 22. The basis of molecular genetic diagnosis of age is the analysis of T-cells. T-cells constantly update new receptors on their surface. At the same time, they "cut off" the DNA fragments and express new sequences from them. The "wastes" of this process are the circular fragments of DNA that do not have any function.

**Slide** 23. Unlike common signs, personal characteristics of the person are more informative.

Private personality traits are divided into congenital and acquired.

**Slide** 24. The innate signs of personality are individual characteristics and anomalies of the development of the organism.

**Slide** 25. The method of verbal portrait: the features of a person are described using special standard notations.

**Slide** 26. In the cases if using of the method of photo matching, the photo of the person being searched is compared with the image of the skull. Evidence is only negative.

**Slide** 27. The method of quantitative "verbal portrait" increases the evidence of a positive result in the study of a single photograph

**Slide** 28. Complete three-dimensional models of skulls, allow to:

• conduct remote studies using a virtual skull,

• store information about the skull for subsequent studies.

**Slide** 29. With the help of computer technology, all skulls from the burial of the royal family were analyzed. Skulls that could have been belonged to Nicholas II and Alexandra Feodorovna were identified.

**Slide** 30. It is possible to identify the person by comparing the skull with the X-ray made in the lifetime.

**Slide** 31. There is a way of identifying a personby comparative X-ray study of the life and postmortem material.

**Slide** 32. Separate elements of the bone system differ in individual features of the structure. This slide shows an inborn defect of the sternum with a rim of sclerosis of bone tissue.

**Slide** 33. Identification of the person by the auricle is possible using the method of biometric identification. The shape of the person's ears does not change with age.

**Slide** 34. Dactyloscopy. This most simple and reliable method of identifying a person. Patterns remain unchanged throughout the life of a person.

**Slide** 35. Also a unique combination of healthy and missing teeth, the presence and localization of carious cavities, seals and sealed canals, broken crowns, the presence and type of prostheses are used for identification purposes.

**Slide** 36. The radiological method of identification radiographs of the jaws is a comparative method of study by photographing of the intravital and postmortem images of the bones of the skull.

**Slide** 37. There are direct radiograph of the patient with left-sided chronic sinusitis; In the projection of the sinus, the shadow of foreign object is visible.

**Slide** 38. The signs described in the slide (necrosis and deformation of the femoral bone head) in two different patients may become the acquired signs of the certain person.

**Slide** 39. The number of military conflicts

**Slide** 40. man-made disasters

**Slide** 41. and cases of terrorismhas significantly increased

**Slide** 42. In the cases of mass death of people, it is important to sort the parts of the destroyed corpses by common signs: gender, age, race, height, etc. The most important feature is the age.

**Slide** 43. To solve the problems of personal identification we carried out the next innovative studies of age-related changes.

**Slide** 44. We developed the method of determining the age of a person by the morphological parameters of the histological preparations of the thyroid cartilage.

**Slide** 45. Also we developed computer technologies for the establishing of the biological age of individuals (with accuracy of establishing the age to 3 years), according to morphometric parameters of cuts of bone tissue of the rib and tibia.

**Slide** 46. Differences in the mineralization of the articular cartilage line of the lower epiphysis of the tibia are significant for establishing of the age.

**Slide** 47. The cartilages of 18 years old and 35 years old male persons.

**Slide** 48. Osteones with a rebuilt central section in a compact bone material of the tibia.

**Slide** 49. Osteocytes in the cortical layer of the rib.

**Slide** 50. Also biological age characteristics may be studied by hand radiographs.

**Slide** 51. To assess the age by non-metric traits, we developed a methodology taking into account the signs of aging of the hand bone and the degree of expression of these characteristics, regression equations were created, the use of them makes it possible to determine the age of men and women according to changes in the hand bones with high accuracy and almost 95% reliability.

**Slide** 52. Osteometric method of age determination by the morphometric parameters of the Turkish saddle

Studies of the structure of bone tissue were carried out, qualitative and quantitative parameters were established.

**Slide** 53. A method for determining the age of a person by the morphometric parameters of a Turkish saddle was developed.

**Slide** 54. It is established that its length and depth are individual in various life periods; in mature, elderly and senile periods; there is a tendency to change the size during life.

**Slide** 55. As a result of the analysis, a regression model of the age forecast was developed.

**Slide** 56. Evaluation of the biological age of the corpse by morphological changes of the skin with immunohistochemical method.

**Slide** 57. Identifying signs of a person's genetic predisposition to various diseases that can be used in identification were studied.

**Slide** 58. We proposed an algorithm for identifying a person in a mass death of people.

**Slide** 59. We have created a new scientific direction: the establishment of the biological age of a person using methods of quantitative age morphology.

A new theory of age diagnosis is formulated, taking into account the morphometric parameters of the vascular, nervous and bone tissues.

**Slide** 60. Problems of forensic medical identity of a person

1. Preservation of biological material;

2. The lack of a single identity bank in Russia makes it difficult to compare information on missing persons and unidentified corpses;

3. In cases of mass deaths, comparison of large amounts of information;

4. Absence of strictly individual biological signs.

**Slide** 61.It is needed to: look at this slide please!