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**METHOD OF IDENTIFICATION BY RELEVANT  
MATCHING OF X-RAY  
ORTHOPANTOMOGRAPH**

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*The authors declare that they have no conflict of interest.*

***Background:*** Analysis of identification of victims of mass disasters caused by natural disasters, acts of terrorism, military conflicts, air and car accidents show that the vast majority of identifications were made just for dental status. For a comprehensive identification of persons existing methods of identification by dental status require detailed specification of the dental status to make an expert evaluation. Due to this fact there is a need to develop a method of quantitative and qualitative assessment of radiological matches of the unique visualized characteristics of teeth-jaw apparatus to use in a computer complex program "Dental identification."

***Materials and methods:*** Experimental study consisted comparing the radiographs obtained with the database of the University Clinic (2500 images) and then carrying out analysis of the effectiveness of the relevant comparison method. Materials for the study were 220 Digital Panoramic x-rays obtained by orthopantomograph Planmeca ProOne (Finland).

*Based on dental status images were divided into seven groups:*

*group I: persons who have not been carried any dental procedures;*

*group II: those whom were conducted only therapeutic intervention, without changing the overall dental status;*

*group III: those whom were conducted orthopedic manipulation and with included or open-ended defects;*

*group IV: persons with a modified dental status;*

*V group: those with partial and complete adentia;*

*VI group: spot radiographs;*

*VII group: a control group of persons whose images are not included in the database of radiographic images;*

*Radiographic images were reduced to a uniform scale, contrast and were correlated to the database of University dental clinic. The proposed method is based on an analysis of the unique identification signs, "X-ray segments", structures, clustering matches and experimental analysis of coincidences that make it possible to assert the identity of the person studied Digital Panoramic images. For each images was found a certain number of unique characteristics of the images that are clearly a set of information, such as: color, object, texture, form between the teeth, molars torque, maxillar sinus margin, fillings and a set of structural cluster segments that characterize the X-ray picture bone structure. Unique characteristics of the image are found by the algorithm "SURF" - Speeded Up Robust Feature, SURF - a method of describing local characteristics proposed as a method that can be used in computer vision to recognize objects.*

*It is based on the combined results of calculating the descriptor "2D Haar wavelet" and the effective use of the algorithm of the integral image. Haar-like features is adjacent rectangular area in a place where they recognize and produced the sum pixel intensity in each section which calculates the difference between the summary. After receiving the results of the algorithms of the characteristic features they are grouping with the help of the method of data clustering (k-means clustering).*

*Results and discussion: 5 images are not computer analysis because of inadequate quality. 12 images could not be identified due to lack of informative fragments radiographs. For 21 image analogs in a University dental clinic database were not found. Identification of persons designated as I-IV groups possible with high probability. Identification of persons with VI group depends on the informativeness sighting shot (unique anatomical features) and its quality.*

<i>I group</i>	<i>II group</i>	<i>III group</i>	<i>IV group</i>	<i>V group</i>	<i>VI group</i>	<i>VII group</i>
<i>28</i>	<i>38</i>	<i>43</i>	<i>31</i>	<i>30</i>	<i>30</i>	<i>20</i>
<i>28</i>	<i>38</i>	<i>43</i>	<i>30</i>	<i>23</i>	<i>20</i>	<i>?</i>
<i>100%</i>	<i>100%</i>	<i>100%</i>	<i>96%</i>	<i>76%</i>	<i>65%</i>	<i>-</i>

*Conclusions: Method of identification by relevant matching of x-ray panoramic images experimentally confirms the effectiveness and can be recommended for use in modern forensic practice.*

**KEYWORDS:** Forensic Odontology, Radiological Identification, Orthopantomograph Comparison.