Features of translation of some rarely used anthropometric terms from Ukrainian into English

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Nowadays, anthropometric researches have confidently taken its place in medicine. They are useful not only for health assessment, but also are used in many fields: forensic medicine (to estimate the age of the subject), forensic dentistry (it is an interdiscipline of forensic medicine and stomatology) for the identification of individual and age estimation, dentistry (anthropometric diagnostic methods of dentognathic anomalies and deformations, and there is a potential correlation among number of teeth, chewing ability and anthropometric profile), pediatrics, obstetrics and gynecology, as well as for the diagnosis of overweight (important indicators of nutritional status in the children and adults), for sports control and for the standardization purpose. The symptoms of many diseases are expressed in anthropometric changes. Unfortunately, in Ukraine there is still no generally accepted translation of anthropometric terms from Ukrainian into English. Often for the same medical anthropological term, different names and definitions are used in foreign scientific works. Therefore, the aim of the work was to unify and standardize the translation of rarely used anthropometric terms from Ukrainian into English, as well as determination of the place of the anthropometric point measurement and its schematic representation. We have used the standardized techniques proposed by Shaparenko P.P. and Burikh, M.P. (2000), set out in the "Anthropometric data analysis sets manual" (1994), in the works of Hobbs P.C. (1975) and Brinkley, J.F with co-authors (2016), where some anthropometric terms were described that are used when measuring the head, determining the height above the floor of some points of the trunk and upper limb of a person, and anthropometric parameters of the hand. The conclusion is made about the correctness of the proposed translation from Ukrainian into English, considering the specialized terminology. We hope that in the future this list will be supplemented with the new terms related to measurements of the auricle, upper and lower extremities.

Key words: anthropometric terminology, anthropometric measurements, translation, English language.

Introduction

Anthropometry is directly or indirectly related to all branches of medical science. Nowadays, anthropometric researches have confidently taken its place in medicine. So they are useful not only for health assessment, but also are used in many fields: forensic medicine (to estimate the age of the subject) [13], forensic dentistry (it is an interdiscipline of forensic medicine and stomatology) for the identification of individual and age estimation [24], dentistry (anthropometric diagnostic methods of dentognathic anomaly, and there is potential correlation among number of teeth, chewing ability and anthropometric profile) [7, 9, 29], pediatrics, obstetrics and gynecology [17, 21, 27], as well as for the diagnosis of overweight (important indicators of nutritional status in the children and adults) [11, 16, 20], for sports control [22] and for the standardization purpose [3, 15, 23, 26, 30]. The symptoms of many diseases are expressed in anthropometric changes [12].

So on the basis of the research center of the National Pirogov Memorial Medical University, Vinnytsya, as a part of the general university scientific project "Development of normative health criteria of the various age and sex groups of the population based on the study of anthropogenetic and physiological characteristics of the body in order to determine markers of multifactorial diseases", for many years, scientists and employees working in different departments of the university have been performing
scientific work and using anthropometric terminology.

Today, scholars often have problems working with anthropometric articles and textbooks in English. To date, we have published 2 methodological articles [5, 6] which include the translation from Ukrainian into English of the most commonly used anthropometric terms with a description of the place and methods of determining the corresponding anthropometric points or sizes and also figures that schematically show determination of human head parameters.

Unfortunately, there is still no generally accepted unified use of the translation of anthropometric terms from Ukrainian into English on the territory of Ukraine.

Therefore, the aim of the work was to standardize and unify the translation from Ukrainian into English of some anthropometric terms that are rarely used.

Materials and methods

Thus, to determine some anthropometric points and parameters of the human head measure the following:

   *bitragion* - coronal arc: the surface distance between the right and left tragion landmarks across the top of the head is measured with a tape (tape tension sufficient to flatten hair). The head is in the Frankfort plane (Fig. 1) [2, 25];

   *bitragion breadth*: as a result of this measurement, we obtain the digital value of the breadth of the head which is determined by measuring the distance from the right to the left tragion with a head caliper (Fig. 2) [2, 25];

   *tragion to top of head (vertex)*: measure the distance from the tragion to the vertex [2, 25];

   *palpebral fissure length*: measure the horizontal length of the eye fissure, from corner to corner. (i.e., as a result, we receive the digital value of the horizontal dimension, or width, of the palpebral fissure) (Fig. 3), [4, 25];

   *interocular distance*: carry out a horizontal measurement between the inner corners of the eyes, as a result of which a digital value of the inner distance between the eyes is obtained [2, 25];

   *menton-crinion length*: measure the distance from the bottom surface of the chin to the midpoint of the hairline. Not measured on bald and balding [2, 25];

   *minimum frontal arc* these measurements are performed using a tape - measure the arc across forehead between points of the greatest indentation of temporal crests (Fig. 4), [14, 25];

   *maximum nose breadth*: researcher is placing recording parts of the caliper on broadest part of nose then moving horizontally across to other side of nose, measurement of maximum nose breadth without applying a pressure (Fig. 5), [14, 25];

   *upper facial height*: this measurement is designed to principally capture the vertical length or height of the upper portion of the face or viscerocranium. Despite its name, this measurement contains segments of the classically defined middle and lower facial thirds which are determined by measuring the straight distance between nasion and stomion. (Fig. 6), [4, 25];

   *lower facial height*: this measurement is designed to principally capture the vertical length or height of the lower portion of the face or viscerocranium. Straight distance between subnasale and gnathion is measured. (Fig. 7), [4, 25];

   *upper lip height*: vertical measurement designed to capture the length or height of the entire upper lip including the skin and vermillion segments. Other common names for this measurement include: total upper lip height or length. The upper lip height is determined by measuring the distance between subnasale and stomion [4, 25];

   *lower lip height*: vertical measurement designed to capture the length or height of the entire lower lip including the skin and vermillion segments. Other common names for this measurement include: total lower lip height or length. The lower lip height is determined by measuring the distance between stomion and sublabiale [4, 25];

   *ear length*: measure the distance from the highest to the lowest points on a line parallel to the long axis of the ear [2, 25];

   *ear breadth*: measure the maximum breadth of the right ear, which is perpendicular to its long axis [2, 25];

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Fig. 1. Поперечна дуга. Bitragion - Coronal Arc.

Fig. 2. Вушний діаметр. Bitragion Breadth.

Fig. 3. Ширина очної щілини. Palpebral fissure length.
It should be noted that ear length and ear breadth are measured with a sliding caliper. During research, the subject should sit erect looking straight ahead. The head is in the Frankfort plane (the Frankfort plane is a plane formed by drawing a straight horizontal line from the top of the ear canal to the inferior margin of the eye along either side of the human skull provided that the median plane of the head is vertical). The researcher carries out measurements with a caliper without applying pressure. All measurements are performed with a caliper or a tape according to the method described by Hobbs in 1975 [14], set out in the "Anthropometric data analysis sets manual" 1994 [2], in the work of Shaparenko P.P. and Burikh, M.P. in 2000 [25], as well as by Brinkley, J. F et al., who provided the appropriate methodology in their work in 2016 [4].

To determine the height of the torso point's locations above a standing surface measure the following:

- **Substernale height**: established by measuring the vertical distance between a standing surface and the substernale landmark on the bottom of the right side of the rib cage [2, 25];
- **Tenth rib height**: established by measuring the vertical distance between a standing surface and the tenth rib landmark at the bottom of the right side of the rib cage [2, 25];
- **Iliospinale height**: established by measuring the vertical distance from the floor to the left iliospinale [2, 25];
- **Iliocristale height**: established by measuring the vertical distance between a standing surface and the iliac crest landmark on the top of the right side of the pelvis [2, 25];
- **Cervicale height**: established by measuring the vertical distance between a standing surface and the cervicale landmark on the spine at the base of the neck [2, 25];

It should be noted that in the study, the subject should stand erect, looking straight ahead, his head should be in the Frankfort plane, shoulders and upper extremities should be relaxed. All measurements are performed with an anthropometer according to the method described by Shaparenko P.P. and Burikh, M.P. in 2000 [25] and by "Anthropometric data analysis sets manual" (1994) [2].

To determine the height of the anthropometric points of the upper limb above a standing surface and the anthropological parameters of the human hand measure the following:

- **Acromion height**: established by measuring the vertical distance between a standing surface and the acromion landmark on the tip of the right. The subject should stand upright looking straight ahead. The measurement is performed with an anthropometer [2, 25];
- **Radial-styliion length**: established by measuring the distance between the radiale landmark on the right elbow and the styliion landmark on the right wrist. It is measured with a beam caliper held parallel to the long axis of the forearm. Subject stands with the arms relaxed at the sides. The hand and fingers are held straight in line with the long axis of the forearm [2, 25];
- **Hand length**: established by measuring the length of the right hand between the styliion landmark on the wrist and the tip of the middle finger. The subject places the palm on a table with the fingers together, and the thumb
abducted. The middle finger is parallel to the long axis of the forearm. The measurement is carried out with a Poech sliding caliper [2, 25];

*Palm length*: established by measuring the distance from the base of the hand to the furrow where the middle finger folds upon the palm [2, 25];

*Hand breadth at metacarpale*: established by measuring the breadth of the right hand between the landmarks at metacarpale II and metacarpale V. The subject places the palm on a table, the fingers together and the thumb abducted. The middle finger is parallel to the long axis of the forearm. The measurement is carried out with a sliding caliper [2, 25];

Currently, we have proposed a number of unified anthropometric terms in Ukrainian, which are rarely used with their translation into English, as well as the places of the anthropometric point determination and its schematic representation.

This list was developed by us based on the following scientific sources: Anthropometry and systems of topographic and anatomical coordinates of the human body [25], Anthropometric data analysis sets manual [2], The Face Base Consortium: a comprehensive resource for craniofacial researchers [4], An anthropometric survey of 500 Royal air force aircrew heads [14].

**Results**

The obtained measurements of some anthropometric parameters of the head and upper limb, as well as the determination of the location of the head and torso points of a person, make it possible to use the following scientific terms in the process of translation from Ukrainian into English:

*Anthropometric points of the head*

**Поперечна дуга - Bitragion - coronal arc** (landmarks involved - tragion: the point located at the notch just above the tragus of the ear. This point corresponds approximately to the upper edge of the ear hole. Vertex: highest point on the convexity of the calvarium measured from the Frankfurt plane (auriculo-orbital plane) (Fig. 1)).

**Вушний діаметр - Bitragion breadth** (landmarks involved - tragion (Fig. 2)).

**Висота голови - Tragion to top of head** (vertex) (landmarks involved - vertex and tragion (Fig. 3)).

**Ширина очної щілини - Palpebral fissure length** (landmarks involved - endocanthion: apex of the angle formed at the inner corner of the palpebral fissure where the upper and lower eyelids meet. Exocanthion: apex of the angle formed at the outer corner of the palpebral fissure where the upper and lower eyelids meet.)

**Міжочимковая ширина - Interocular distance** (landmarks involved - endocanthion: the point of the medial angle of the eye which is located medially from caruncula lacrimalis.).

**Фізіологічна довжина обличчя - Menton-crinion length.**

**Мінімальна лобова ширина - Minimum frontal arc** (Fig. 4).

**Максимальна ширина носа - Maximum nose breadth** (landmarks involved - alare: most lateral point on the nasal ala (Fig. 5)).

**Висота верхньої частини обличчя - Upper facial height** (landmarks involved - nasion: midline point where the frontal and nasal bones contact (nasofrontal suture). Soft tissue nasion corresponds to the underlying bony landmark. Stomion: the point of contact in the midsagittal plane between the upper and lower lips. (Fig. 6)).

**Висота нижньої частини обличчя - Lower facial height** (landmarks involved - subnasale: midline point marking the junction between the inferior border of the nasal septum and the cutaneous upper lip. It is the apex of the nasolabial angle. Gnathion: Midline point on the inferior border of the mandible. It corresponds to the underlying bony landmark (Fig. 7)).

**Висота верхньої губи - Upper lip height.**

**Фізіономічна ширина губ - Ear length.**

**Фізіономічна ширина носа - Ear breadth.**

The following terms should be used to define the height of torso points when translated into English:

**Нижньогрудна - Substernale height.**

**Нижньореберна передня - Tenth rib height.**

**Клубово-остиста передня - Iliospinale height.**

**Клубово-гребнева найвища - Lliocristale height.**

**Висота шийної точки - Cervicale height.**

To determine the name of the height of the anthropometric point's location of the upper limb and anthropological measurements of the hand, when translated into English, the following terms should be used:

**Висота плечової точки - Acromion height.**

**Шилоподібна променева - Radiale-stylistion length.**

**Довжина кисти - Hand length.**

**Довжина долони - Palm length.**

**Ширина кисті або поперечний діаметр - Hand breadth at metacarpale.**

**Discussion**

Often, different terminology is used for the scientific definition of the same point, even in English scientific medical articles. So S. Tripathi with co-authors [28] and A. Dwivedi with co-authors [8] have used in their articles next terms: "interalar width" instead of "maximum nose breadth" and "intercanthal width/distance" instead of "interocular distance". Annelyse Cristine Ballin and co-authors [3] when evaluating the anthropometric measures of Caucasian noses of people living in the city of Curitiba have used the term "intercanthal distance" instead of "interocular distance" and the term "alar distance" instead...
of "maximum nose breadth". In Ukrainian, this term sounds like "міжочимковою ширину", reflecting the correctness of the meaningful use of the term in English "interocular distance" and also term "максимальна ширина носа" will be translated into English "maximum nose breadth".

Ma Huan and co-authors [18] when evaluating effect of aging in periocular appearances in Chinese Han population have used in their article the term "intercanthal width" instead of "interocular distance" and "outercanthal width" instead of "biocular breadth" (unified term used in our previous article [6]). In Ukrainian, this term sounds like "зовнішньо очна ширина", reflecting the correctness of the meaningful use of the term in English "biocular breadth".

S.M. Weinberg and co-authors [31] when describing hypertelorism and orofacial clefting have used in their article the term "intercanthal distance", instead of "interocular distance".

Kamlesh B. Patel and co-authors [19] when describing fronto-orbital advancement for metopic synostosis have used in their article the term "intercanthal width" instead of "interocular distance".

C.L. Fry and co-authors [10] when describing features spanning the morphologic range in the spectrum of the Latino eyelid have used the term "horizontal fissure length" instead of "palpebral fissure length". In Ukrainian, this term sounds like "ширина очній щілини", reflecting the correctness of the meaningful use of the term in English "palpebral fissure length".

Olalekan Agbolade and co-authors [1] when investigating three-dimensional (3D) soft-tissue craniofacial variation, with relation to ethnicity, sex and age variables in British and Irish white Europeans have used in their article the term "intercanthal width" instead of "interocular distance".

Thus, the given traditional unified anthropometric terms concerning anthropometric points and measurements of the head, trunk and several points of the upper limb with their translation into Ukrainian, as well as the definition of the place of anthropometric points measurement and their schematic representations, namely bitragion, coronal arc, bitragion breadth, tragion to top of head (vertex), horizontal palpebral aperture, interocular distance, menton-crinion length, minimum frontal arc, maximum nose breadth, upper facial height, lower facial height, upper lip height, lower lip height, ear length, ear breadth, substernale height, tenth rib height, iliospinale height, ilocristale height, acromion height, radiale-stylion length, hand length, palm length and hand breadth at metacarpale.

Conclusions

Thus, the given traditional unified anthropometric terms concerning anthropometric points and measurements of the head, trunk and several points of the upper limb with their translation into Ukrainian, as well as the definition of the place of anthropometric points measurement and their schematic representations, namely bitragion, coronal arc, bitragion breadth, tragion to top of head (vertex), horizontal palpebral aperture, interocular distance, menton-crinion length, minimum frontal arc, maximum nose breadth, upper facial height, lower facial height, upper lip height, lower lip height, ear length, ear breadth, substernale height, tenth rib height, iliospinale height, ilocristale height, acromion height, radiale-stylion length, hand length, palm length and hand breadth at metacarpale.

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**OSOBIVOSCIY PEREKLADU Z UKRAINSKOY MOVY NA ANGIVSKY DEYAKH ANTROPOMETRICHYKH TERMINY, ZH RYDKO VYIKORISTOVUYUTSE**

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також у роботі Brinkley, J.F. зі співавторами (2016) були описані деякі антропометричні терміни, які використовують при вимірах голови, визначенні висоти знаходження деяких точок верхньої кінцівки і тулуба людини над підлогою, а також антропометричних параметрів кисті. Зроблено висновок про правильність і коректність запропонованого перекладу з української мови на англійську, з огляду на спеціалізованість термінології. В подальшому цей переклад буде доповнено новими термінами, що стосуються вимірів вушної раковини, верхніх і нижніх кінцівок.

Ключові слова: антропометрична термінологія, антропометричні вимірювання, переклад, англійська мова.

ОСОБЕННОСТИ ПЕРЕВОДА С УКРАЇНСКОГО ІЗobraзowanie антропометричних терминов, которые редко используются, а также определения места измерения антропометрической точки и ее схематическое изображение. Используя стандартизированные методики, предложенные Шапаренко П.Ф. и Бурых М.П. (2000), выделенные в Пособи для анализа антропометрических данных (1994), Hobbs Р.С. (1975), а также в работе Brinkley, J.F. с соавторами (2016) были описаны некоторые антропометрические термины, которые используют при измерениях головы, определении высоты нахождения некоторых точек верхней конечности и тулowiща человека над полом, а также антропометрических параметров кисти. Сделан вывод о правильности и корректности предложенного перевода с украинского языка на английский, учитывая специализированность терминології. В будущем это перечень будет дополнен новыми терминами, касающимися измерений ушной раковины, верхних и нижних конечностей.

Ключевые слова: антропометрическая терминология, антропометрические измерения, перевод, английский язык.