



Physical Anthropology Section - 2013

H89 The Chaotic Numerology of Anthropometry: A Proposal for a Univocal Numeric Codification of Bone Measurements

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After attending this presentation, attendees will value the state-of-the-art anthropometrical measurement's classification and develop a better understanding of a new code that could be adopted by international scientists.

This presentation will impact the forensic science community by illustrating a new univocal and versatile three-number code for cranial and skeletal measurements.

Osteometrics have very important roles in forensic anthropology because they allow for the objective quantification of morphological characteristics when developing the biological profile of unknown skeletons, rather than relying purely on qualitative descriptions that are often subjective.

Various measurement coding systems have been developed in Europe and the United States; some of the most popular include those developed by Martin-Saller, Howells, and by Buikstra and Ubelaker.¹⁻³ As a scientific community that is becoming ever more global and international, a nonshared language can create impasses and lead to miscommunications between scientists. Similar problems have been faced by odontologists that are involved in mass fatality and international scenarios. The odontological community has addressed this problem with the FDI World Dental Federation notation (i.e., the ISO 3950 notation), where quadrants are numbered from 1 to 4 for adult dentition and from 5 to 8 for deciduous dentition. The numbers proceed clockwise from the upper right quadrant to the lower right and teeth are numbered from the midline to the posterior.

In order to develop a new shared codification model, some imperfections in the main coding systems must be overcome. For instance, one issue with the Martin-Saller system is that all measurements are divided in chapters corresponding to single bones and are numbered with an arithmetic progression. This system can be ambiguous because the numbers are not univocal: for example the number "1" indicates the maximum length of the skull, of the femur, and of all the other long bones. The Howells coding system identifies measurements by an abbreviation of its description, which is problematic when a measurement has a very long or complex name, or if new measurements are acquired. The system developed by Buikstra and Ubelaker is problematic because codes are sequentially assigned from the skull to the calcaneus, so new measurements cannot be easily introduced into the sequence without creating confusion.

A coding system based on a three-number codification, where numbers are delineated by periods is proposed. The first number will indicate the anatomical area of which the measurement is referred:

- 1 – Cranium
- 2 – Upper Limb
- 3 – Lower Limb
- 4 – Spine
- 5 – Thoracic Girdle
- 6 – Pelvic Girdle

The second number will indicate the single bone or the topographic region in the cranium:

- Neurocranium, 1.2 Facial Skull, 1.3 Orbital Skeleton, 1.4 Nasal Region, 1.5 Maxillary Area, 1.6 Mandible
- Humerus, 2.2 Ulna, 2.3 Radius
- Femur, 3.2 Tibia, 3.3 Fibula, 3.4 Patella
- Vertebrae, 4.2 Atlantoaxial Joint, 4.3 Sacrum
- Scapula, 5.2 Clavicle, 5.3 Sternum
- Innominate, 6.2 Pelvis

The first two numbers in the code can be used to rapidly identify the anatomical area, where the bone is in the body, and in which bone the anthropometrical data is recorded; the third and last number is an arithmetic progression that allows operators to continually introduce new measurements without scrambling the entire series. A selection of the most representative measurements are selected and presented on the web site www.restiurmani.it.

This presentation outlines a novel anthropometric coding system. The proposed coding system is an integral part of the "Forensic Protocol for Anthropometric Measurement of Human Skeletal Remains" developed at the University of Tor Vergata. The coding system and the protocol have been successfully utilized on a variety of historical and forensic Italian cases in a five-year research project at the University of Florence and are used by various Italian universities and by forensic investigators for the Italian State Prosecutor's Office.

References:

- ¹ Martin R, Saller K. Lehrbuch der Anthropologie. Stuttgart: Gustav Fischer Verlag, 1957.
- ² Howells WW. Cranial variation in man: a study by multivariate analysis of patterns of difference among recent human populations. Cambridge (MA): Peabody Museum of Archaeology and Ethnology, Harvard University, 1973.
- ³ Buikstra JE, Ubelaker, DH. Standards for data collection from human skeletal remains. Proceedings of a Seminar at the Field Museum of Natural History. Fayetteville, Arkansas Archaeological Survey Press, 1994.

Anthropometry, Standards, Codification

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