METHODOLOGICAL ASPECTS CONCERNING THE CONTRIBUTION OF PALEOANTHROPOLOGY AND BIOARCHAEOLOGICAL TECHNIQUES ON RECONSTRUCTING THE PREHISTORIC HUMAN PAST

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Introduction**

Funerary archaeology deals mostly with studying the human remains, making paleoanthropology indispensable to funerary discoveries research. Over the past decades, the human bones research analysis and techniques have become more and more diverse and perfected.

J. Buikstra redefined at the end of the '70s the bioarchaeology term to designate the use of biological techniques on archaeological human skeletal remains to find out more about the ancient populations.

The methods of age and sex estimation, considered traditional, have lately been enhanced with diet reconstruction, violence traces identification, together with bioarchaeological techniques.

Age at Death

Skeletal age reflects the biological patterns of each individual's degeneration and remodelling, and is different from the chronological age. The older the skeleton, the more difficult to determine its age.[1]

A widely used method of determining age is based on the epiphyseal union of bones. The epiphysis fuses at different ages for each bone, ranging from 14-15 years for the radius head or humerus distal epiphysis, to 25-28 years in the case of the sternal end of the clavicle.[2] The final stage of this process marks the end of bone growth, and is associated to adulthood. This

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1 Appleby 2011, p. 235.

2 Brown 2006.

approach has several drawbacks, the most notable being the large number of intra- and inter- observer errors that it generates.[3]

The Todd pubic symphysis analysis describes 10 stages, and it was later amended by Suchey-Brooks which restricts them to just 6, separated by gender. It has been proven less accurate, but remains popular because of its easiness of application.[4]

Auricular surface of the ilium method has several advantages over the pubic symphysis one. There is a higher chance of sample survival rate, and it provides results for individuals over the age of 50.[5] Loss of granularity increases with age, with complete loss around 45-50 years. Young individuals present a definitive anteroposterior organisation of the surface, which declines with age and the surface no longer have a clear directional structure. Macroporosity is more frequently identified in individuals older than 50. Most younger individuals present regular undulations of the surface (billows) that decrease with age, while striae are characteristic for individuals in their 4th decade. The apex is sharp before 35, and becomes broader and changes shape after that, being an indicator of arthritic changes. Buckberry and Chamberlain introduced a revised version[6] that uses a quantitative scoring system for each of the auricular surface features and eliminating the retroauricular area from analysis. More recently, Rissech *et alii* described a method based on seven traits of the fused acetabulum to estimate age of adult males, which Calce simplified and extended to adult females.[7]

The most accurate methods are the dental ones, with particular accuracy for younger individuals. Deciduous teeth growths and tooth eruption information allows for precise age determination, as detailed in the Atlas of Human Tooth Development and Eruption.[8] Going further, Liversidge and Molleson[9] document in detail the variations in crown and root formation of the deciduous teeth.

It is more complicated to assess age for older individuals, and improved estimations are always obtained by considering more indicators. Degenerative changes in different parts of the body do not have a linear relationship with each other, therefore making more difficult the data correlation. Furthermore, some are results of aging, like the degenerative arthritis, others (hip fractures) are unrelated but cause changes in the aging

[3] Chapeskie 2006, p. 35.
[4] Meindl *et alii* 1985, p. 30.
[5] Lovejoy *et alii* 1985, p. 15.
[6] Buckberry, Chamberlain 2002, tables 2-6.
[7] Calce 2012, p. 11-21.
[8] AlQahtani *et alii* 2010, fig. 6.
[9] Liversidge, Molleson 2004, p. 172-178.

process. For example, a woman from Gemeinlebarn F (Early Bronze Age, Austria) with osteoarthritis of the spine and hands, and a vertebral crush fracture (probably from osteoporosis), could only be aged as osteologically "senile", 60-80 years old.[10]

Sex Estimation

In addition to age at death of the individual, establishing the gender adds important information in the biological profile and helps establishing the population structure.

Metric methods that use the pelvis have been introduced in the '40s by Letterman, who measured the maximum dimensions of the sciatic notch, which proved to be wider for women and higher for men.[11] The maximum acetabular diameter measurements together with SPSS analysis provided great accuracy in assessing gender of a prehistoric New Zealand sample.[12]

The morphological methods use visual observations and are usually more subjective, due to the human observer involved. However, by looking at 5 characters of the hip bone (preauricular surface, greater sciatic notch, form of the composite arch, inferior pelvis morphology and ischiopubic proportions), Bruzek was able to achieve 95% accuracy.[13]

Garvin and Ruff attempted to quantify morphological variation in two specific cranial traits: the skeletal brow ridge (supraorbital torus) and chin (mental eminence). They used 3D surface laser scans to isolate the regions of interest (ROIs) and to extract relevant information for each such region, like surface areas, volume, base areas and projections.[14] The analysis was performed on 119 crania and mandibles of adults aged less than 55 years, showing browridge accuracy is over 80%, while the chin morphology is lower, between 66% and 81%.[15]

Biomolecular methods like DNA analyses proved great accuracy in sexing ancient individuals, by examining the amelogenin gene using polymerase chain reaction (PCR) and a non-radioactive dot blot procedure[16] or by targeting the alphoid repeats on the sex chromosomes.[17]

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[10] Appleby 2011, p. 243, fig. 2.
[11] Letterman 1941, p. 99.
[12] Murphy 2000, p. 39-42.
[13] Bruzek 2002, p. 158, p. 166-167, table 1.
[14] Garvin, Ruff 2012, p. 661-662.
[15] *Ibidem*, p. 662-669.
[16] Stone *et alii* 1996, p. 232-233.
[17] Matheson, Loy 2001, p. 570-574.

For subadults, determining sex is even more problematic,[18] since the sexual dimorphism is less evident than in adult individuals. Most of the methods developed have great accuracy for the sample studied, but this decreases once applied on another sample, due to variations in nutrition, activity patterns, or living conditions, which influence the degree of sexual dimorphism. The methods which are based on the skeletal morphological features tend to be more subjective, while the ones based on metrics are not only easier to apply, but also more accurate. The tooth dimension measurements and analysis have shown that the canines are the teeth that present the highest sexual dimorphism, with accuracies over 80%.[19] In order to avoid sample specificity issues, several methods have been proposed to determine subadult gender, using either regression formulae based on adult teeth dimensions, or the sectioning point procedure using the tooth diameter as the discriminant criteria.[20]

Most of the above methods make use to a certain degree of various statistical methods to analyze the significance of the difference between the sexes within a population. The t-test is based on calculating t-value relative index of sexual dimorphism for each sample. Linear regression of variable Y (physical characteristic) on variable X (sex) is used to determine if the t-values of different samples are statistically different.[21] The Mann-Whitney U-test verifies the null hypothesis that two samples have the same median, indicating that they come from the same population. It is assumed that the two distributions have similar shapes.

Reconstruction of Diet

In spite of the difficulty in finding out the nature of the diet of the prehistoric populations, this provides important information related to their eating habits and health status. Various bones of the same skeleton have same isotope ratios. Bone collagen in adults reflects the last 10 years' diet, while teeth have different isotopic compositions, and the dentine collagen reflects childhood diet.[22]

The absence of caries and presence of calculus were associated with a protein-based diet at Dnieper Rapids and low carbohydrates.[23] δ13C and δ15N analyses of 21 individuals from Mesolithic and Neolithic graves in the

[18] Chapeskie 2006, p. 38.
[19] Cardoso 2008, p. 164.
[20] *Ibidem*, p. 159, tables 1-2.
[21] Relethford, Hodges 1985, p. 56.
[22] Sealy *et alii* 1995, p. 290-291.
[23] Lillie 1996, p. 138, 140.

Ukrainian Dnieper Rapids have shown that the river fish was predominant in the diet of the analysed populations,[24] no significant isotope signatures or dental pathology being observed between males and females, and that most of the proteins in the diet were coming from plant foods.[25] The sulphur δ34S isotopes have been used to identify consumption of freshwater fish in 5 sites from the Danube Gorges region, in addition to the δ13C and δ15N analyses carried out on 24 human and 8 animal samples. The results from Vinča-Belo Brdo indicated a diet based on terrestrial animals, while the slight enrichment of the carbon ratio at Padina, Vlasac, Lepenski Vir and Hajdučka Vodenica suggested a minor input of freshwater fish.[26]

In the Oronsay island Mesolithic site, the isotope analyses have shown predominant marine resources providing the proteins in diet for all 6 human samples suitable for analysis, with one individual demonstrating presence of terrestrial protein,[27] which was explained as a permanent group living on the island, with others visiting it for short periods.

Analysis of diet in LBK Vedrovice site indicates that some adult males and mature females had access to significant levels of meat, while most adult females were restricted to a vegetal diet; no significant use of marine foods was revealed by the stable carbon isotopes. The offered interpretation is that social status could have increased with age and allowed access to more animal protein.[28]

Isotopic evidence from bone collagen has been used to reconstruct paleodiet at Yarnton, Oxfordshire, by analysing 57 human and 97 animal samples[29] with data indicating lower level of animal protein consumption and that the animal protein consumed by the prehistoric individuals had lower consumption of C4, and a diet lacking freshwater resources. No statistically significant difference between sexes was observed.

Violence and Death

Analysis of violence in prehistory is based on studying ante- and perimortem trauma. The perimortem period is generally referred to as the interval between approximately 2 weeks before death until at least 2 months after death.[30] Most commonly, bone trauma causes fractures, which can happen before death, and they will be characterized by the fact that the

[24] Lillie et *alii* 2003, p. 749.
[25] Lillie, Richards 2000, p. 968.
[26] Nehlich *et alii* 2010, p. 1137-1138, table 3.
[27] Richards, Mellars 1998, p. 178-182.
[28] Zvelebil, Pettitt 2012, table 4, fig. 3-6.
[29] Lightfoot *et alii* 2009, tables 1-2.
[30] Bennike 2008, p. 311.

bone will be part of a healing process. When broken at or around the time of death, the bone presents no healing traces. After burial, breakages can occur while the bone is still in the soil, or while being handled after excavation.[31]

Examination of human remains in search for traumatic lesions starts with visual observation, and is sometimes the only method available. X-ray scans have been used to provide more information, like the amount of healing, particular deformities.[32] The newest non-invasive method is the computed tomography (CT) scanning, which generates a three-dimensional image by measuring simultaneous transmission of X-rays through the analysed object. High-resolution CT scanning uses higher energies and smaller spot sizes of the X-ray, to produce better images to be able to penetrate objects like rocks and fossils.[33] The cellular activities that happen in response to trauma are best observed through microscopic analysis; this method is less popular because of its destructive nature.[34]

Some recent case studies are helpful in showing the relevance of the new methods applied to identifying various violence types.

The challenging discovery of Mesolithic populations at the Danubian Iron Gates has excellent examples of interpersonal violence. From the 263 adults of both sexes, one mature adult from Vlasac stands out in terms of the violent injuries, the unhealed fracture on the left half of the frontal bone suggesting it has been performed with a blunt instrument from anterosuperior direction. The X-ray scans indicate the radiating fractures in the area to be peri- or post-mortem trauma. The individual also presents another small healed depressed fracture.[35]

An adolescent male found at the Chalcolithic site of Shiqmim, Israel, whose skull presents three depressed skull fractures, a mandible and teeth fractures. None of them is healed, and there are no signs of infection, suggesting the individual died after a very short period, of maximum two days.[36]

Four closely grouped multiple burials have been revealed at Eulau, Germany, with 13 individuals, some of which were biologically related. Some of the individuals presented healed injuries, but the most important were the recent ones, that are believed to have led to their death. Stone axes

[31] Mays 1998, p. 165.
[32] Lovell 2008, p. 342.
[33] Ryan, Milner 2006, p. 872-873, fig. 2-4.
[34] Lovell 2008, p. 343-344.
[35] Roksandic *et alii* 2006, fig. 5-6.
[36] Dawson *et alii* 2003, p. 116-118, fig. 2; 4a.

which probably have been used to cause some of the fatal injuries were found in 3 of the graves.[37] One of the two women in grave 6-0090 was killed by a flint arrowhead found in her 4th lumbar vertebra, the macroscopic examination and the CT-scan indicating no bony reaction in the contact area.[38]

In Bavenstedt, Lower Saxony, out of a group of seven skeletons 6 were found in a squatting position but one was supine, a completely atypical posture for burial. Part of a double inhumation, the individual had a flint tip between the 8th and 9th thoracic vertebra, which probably caused meningitis.[39] The unnatural position of the hands support this idea, and the histological sections from the cranial base and the 10th thoracic vertebra do not have visible signs of osseous inflamatory reactions, leading to the interpretation that the acute bacterial meningitis caused death to occur within a few days.[40]

Bioarchaeological Techniques

Isotopes (C, N, Sr). The first stable isotope analyses were carried out in the mid-1970s, and used to be a very expensive method, due to the time consumption and constant human involvement needed. In the late 1980s the method was simplified due to technical advancements, opening it to more applications.[41] The analyses have been extended from just human remains and now include faunal bone and plants, to enhance information with potential foods. The analysis of more human samples is now able to also provide insights into population variances, age differences, residence patterns, and disease.

Plants presence in the diet is assessed by measuring the stable carbon isotopes (13C/12C), whose values remain constant even after the organism is not alive anymore. C3 (wheat, rice, vegetables, trees, shrubs, barley) have low 13C/12C ratios, while C4 (maize, millets, sorghum) present high values. In the sea, 13C is greater in ratio when compared with the terrestrial values, enabling us to find out the proportion of marine and terrestrial foods. Nitrogen isotope ratios (15N/14N) are also used to differentiate marine and terrestrial diets[42] and to provide insight into the trophic level of an organism in the ecosystem, as the bone collagen of the consumers is 2-4‰ than the

[37] Meyer *et alii* 2009, p. 420, fig. 1/A, C-D; 13.
[38] *Ibidem*, p. 416, fig. 8.
[39] Schutkowski *et alii* 1996, fig. 3-4.
[40] *Ibidem*, p. 183; fig. 5-6.
[41] Katzenberg 2008, p. 414.
[42] Sealy *et alii* 1995, p. 291, fig. 1.

protein they consume.[43] Relationships between nitrogen isotope values and climate have shown that the δ15N value interpretations need to be considering both the diet and the climate.[44]

Strontium is another common element in bone, which has been used for paleodiet and residence information.[45] Even if the human δ44/42Ca was lower than the faunal average in the sites analysed, this difference could not be attributed to dairy consumption because it was noticed also in the Mesolithic site of Abu Hureyra, where this is considered to be extremely unlikely.[46] The 18O was used to determine the breastfeeding duration (based on the fact that breast milk incorporates body water, which has a higher value of this isotope than the ingested one) and residence and migration.[47]

The isotope analyses are performed on bone collagen, and the method of extracting it from the human bone samples is described in detail by Richards and Mellars[48] and Lillie *et alii*.[49] Because of the high risk of contamination, the preferred approach is to measure in duplicate or even triplicate. The marine archaeology is benefiting from superior bone preservation, due to the fact that the diagenetic alteration of the bone usually only affects the periosteal surface, as opposed to the terrestrial contexts which degrade the microarchitecture of the bone even if the subperiosteal surface looks well preserved.[50]

Ancient DNA (aDNA). Nuclear DNA is present in one copy in each cell nucleus, recombines each generation, is passed down from both parents, and consists of 22 pairs of autosomes and 1 pair of sex chromosomes. Even if it allows to test hypotheses more rigorously, it is more difficult to recover from ancient skeletal remains, and it was less used.[51]

The high copy of mtDNA per cell makes it more likely to survive over time compared to nuclear DNA.[52] It is passed from women to their

[43] Lillie, Jacobs 2006, p. 882.
[44] Katzenberg, Harrison 1997, p. 274; Mays 1998, p. 184.
[45] Katzenberg 2008, p. 417.
[46] Reynard *et alii* 2010, p. 3747; Reynard *et alii* 2011, p. 658, 663.
[47] Katzenberg 2008, p. 430.
[48] Richards, Mellars 1998, p. 183.
[49] Lillie *et alii* 2011, p. 61.
[50] Mays 2008, p. 125-127, fig. 1.
[51] Stone 2008, p. 463.
[52] O'Rourke *et alii* 2000, p. 218.

children, does not recombine, and it been used in determining migration rates and effective population sizes.[53]

Most of the Y chromosome does not recombine, is passed from father to male offspring, and mutates less rapidly than mtDNA. It allows assessing not only the male population history, but also individual sexing.[54]

aDNA analyses have been used to provide independent verification of disease diagnoses made through other methods, for example tuberculosis or syphilis.[55]

The optimal aDNA source is a bone without lesions (preferably a spongy one, like the ribs), which presents less degraded DNA information. A secondary choice is the teeth without caries, because of the lower risk of contamination. Soft tissue and hair are considered less reliable, because some don't even contain the full DNA root, and usually only very small samples can be extracted, and the contamination potential is very high.[56]

After extraction the aDNA needs to be identified and amplified to obtain quantities which can be studied.[57] This is realised by applying polymerase chain reaction (PCR)[58] analysis and one of the "hot start" procedure, "touchdown" PCR or "booster" PCR to improve yield from the reaction.[59]

Human Bones

In reconstructing the past of humans, one of the most commonly observed paleopathological conditions is trauma. The associated analysis needs to identify and describe the lesions, interpret the causes, relationship to the age and sex of the individual, together with temporal and geographical patterning. Blunt force trauma is caused by a blunt object, while the penetrating injuries are referred to as sharp force trauma.[60] The post-mortem fractures present a smaller number of fragments, the coloration of the fracture ends is different from the adjacent bone surface (lighter colored edges), and there is no fracture pattern since on impact the dry bone is more likely to break. In the case of ante- and peri-mortem fractures, there is evidence of inflammation of healing, water/soil/vegetation stains are present uniformly on broken and adjacent

53 Relethford 2003, p. 123.
54 Stone 2008, p. 464.
55 Collins Cook, Powell 2006, p. 307-308.
56 O'Rourke *et alii* 2000, p. 221-223.
57 Mays 1998, p. 199.
58 Larsen 2006, p. 364.
59 O'Rourke *et alii* 2000, p. 224-225.
60 Lovell 2008, p. 341-342.

bone surfaces, and the fracture lines present definite patterns, fracture edges have oblique angles.[61] The anatomical summary of fractures[62] is extremely helpful in identifying possible cause of death and existence of violence in prehistoric communities.

In handling human bones, it is important to use a standardised recording system, that leave less room for human errors, and that covers scattered, fragmentary remains. Knüsel and Outram propose the zonation method,[63] an adaptation of the method of Dobney and Rielly for animal remains combined with Minimum Number of Elements (MNE) counts and employs indices of fragmentation.

The "Percent Completeness" is determined by expressing the number of found zones per bone fragment as a percentage of the maximum possible zones of that element, each of the fragments being recorded by all present zones. They follow the Dobney and Rielly method by detailing the zones for the mandible, vertebrae, ribs, scapula, humerus, radius, ulna, os coxae, femur, tibia, metapodials and phalanges, calcaneus and talus.[64] The cranium, sternum, clavicle and fibula[65] are additions specific to human bone remains.

An application of the zonation method is performed on the Middle Bronze Age bone deposits at Velim Skala, Czech Republic. The same data is recorded for human and animal bones, using the same protocols. Human and animal osteologists have worked together for the first time during the analysis stage, and in close collaboration with the excavator. The same methods and protocols have been identified: identification, zonation and quantification; trauma; analysis of the fractures; fragmentation patterns; burning/heating; post-depositional surface modifications.[66] The zonation method integrated approach provided important tools to compare the different deposits, their taphonomic processes and direct comparisons between humans and animal species in the corresponding contexts.

Osteological Paradox

Most of the paleopathology methods work with statistical data calculated based on the skeletal samples found in the excavations. In drawing inferences on prehistoric health, researchers have identified several conceptual problems that affect the results of the analysis. The selective

[61] Lovell 1997, p. 145.
[62] Lovell 2008, p. 365-368.
[63] Knüsel, Outram 2004, p. 85-95.
[64] *Ibidem*, fig. 1-12.
[65] *Ibidem*, fig. 13-21.
[66] Outram *et alii* 2005, p. 1702-1707.

mortality problem is stated as the fact that the only available data is the individuals that actually died at a certain age, and never a sample of all the individuals who were at the risk of disease or even death at that age in the population.[67] Any of the lesions or particular conditions do not mean that those are abundant in the living population at any point in time. The hidden heterogeneity in risks means that the population from a skeletal series contains an unknown mixture of individuals who have different susceptibility to disease or death.[68] As Wright and Yoder note, this has become easier to approach due to the fact that we can now study social differentials in diet, and their implications for that disease presence in a much larger context.[69] An important point to be considered in dealing with these problems is the different potentials for skeletal morbidity and mortality that are associated with different infectious diseases, which might constitute exceptions that can be handled in a more uniform manner.[70]

Despite recent progress in bioarchaeological techniques and their usage, like employing biodistance as a strategy to overcome hidden heterogeneity, study dietary changes through the lifespan in conjunction with non-specific pathological conditions, or employing histological analysis to examine the degree of healing of diverse lesions,[71] the osteological paradox, as it was originally defined, is still a concern and needs to be taken into account when interpreting information based on osteological data.

Aspecte metodologice privind contribuţia paleoantropologiei şi tehnicilor bioarheologice la reconstituirea civilizaţiilor preistorice

- rezumat -

Studierea practicile mortuare şi a descoperirilor funerare au condus în ultimele decenii la obţinerea de informaţii deosebit de valoroase privind civilizaţiile preistorice.

Articolul de faţă îşi propune să prezinte principalele metode şi tehnici aparţinând paleoantropologiei şi bioarheologiei, cu scopul de a scoate în evidenţă contribuţiile determinante pe care acestea le au în cadrul arheologiei funerare.

Este ştiut faptul că resturile scheletice umane sunt descoperite în diverse contexte arheologice şi se găsesc în diferite stadii de prezervare. Pornind de la aceste realităţi, apelarea la mijloacele tradiţionale de estimare a sexului, vârstei şi de determinare a cauzelor morţii oferă deseori rezultate limitate. Noile metode (utilizarea tomografului computerizat, analizele de izotopi stabili de Ca, N, O, precum şi de ADN străvechi etc.) pot oferi

[67] Wood *et alii* 1992, p. 344.
[68] *Ibidem*, p. 345.
[69] Wright, Yoder 2003, p. 46.
[70] Collins Cook, Powell 2006, p. 311.
[71] Wright, Yoder 2003, p. 49, 51, 55.

arheologilor date ştiinţifice deosebit de relevante, de cele mai multe ori cu caracter de unicat.

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Keywords: paleoanthropology, bioarchaeology, age and sex estimation, aDNA, stable isotope, mortuary practices.

Cuvinte-cheie: paleoantropologie, bioarheologie, estimare vârstă şi sex, ADN străvechi, izotopi stabili, practici mortuare.

Lista abrevierilor

Acta	- Acta (Siculica). Muzeul Naţional Secuiesc. Sfântu-Gheorghe.
ActaArch	- Acta Archaeologica. Copenhagen.
ActaMN	- Acta Musei Napocensis. Muzeul Naţional de Istorie a Transilvaniei. Cluj-Napoca.
ActaMP	- Acta Musei Porolissensis. Muzeul Judeţean de Istorie şi Artă Zalău. Zalău.
AÉ	- Archaeologiai Értesitö a Magyar régészeti, müvésyt-történeti és éremtani társulat tudományos folyóirata. Budapest.
AIIA	- Anuarul Institutului de Istorie şi Arheologie Cluj. Cluj-Napoca (din 1990 Anuarul Institutului de Istorie „George Barit" Cluj-Napoca).
AIGS	- Anuarul Institutului de Cercetări Socio-Umane „Gheorghe Şincai". Târgu Mureş.
AJPA	- American Journal of Physical Anthropology. The Official Journal of the American Association of Physical Anthropologist. Baltimore.
Aluta	- Aluta (Studii şi comunicări - Tanulmányok és Közlemények). Sfântu Gheorghe.
AM	- Arheologia Moldovei. Institutul de Istorie şi Arheologie „A. D. Xenopol". Iaşi.
AnB	- Analele Banatului (serie nouă). Muzeul Banatului. Timişoara.
AnEtn	- Anuarul Muzeului Etnografic al Transilvaniei. Cluj-Napoca.
Angustia	- Angustia. Muzeul Carpaţilor Răsăriteni. Sfântu Gheorghe.
ARA	- Annual Review of Anthropology. Palo Alto.
Antiquity	- Antiquity. A Quartely Review of World Archaeology. York.
AOG	- Archiv für Kunde österreichischer Geschichtsquellen. Wien.
APA	- Acta Praehistorica et Archaeologica. Berlin.
Apulum	- Apulum. Acta Musei Apulensis. Buletinul Muzeului Regional Alba Iulia/Anuarul Muzeului Naţional al Unirii. Alba Iulia.
Archaeologia Bulgarica	- Archaeologia Bulgarica. Sofia.
Archaeometry	- Archaeometry. Research Laboratory for Archaeology & the History of Art. Oxford.
ArhSom	- Arhiva Someşană. Arhiva Someşană. Revistă istorico-culturală. Năsăud, 1924-1940.
ArhMed	- Arheologia Medievală. Reşiţa-Cluj-Napoca.
ATS	- Acta Terrae Septemcastrensis. Sibiu.
AUA	- Annales Universitatis Apulensis. Series Historica. Universitatea „1 Decembrie 1918". Alba Iulia.
AUO	- Analele Universităţii din Oradea. Istorie, Arheologie. Oradea.
BAHC	- Bibliotheca Archaeologica et Historica Corvinensis. Hunedoara.
Banatica	- Banatica. Muzeul de Istorie al Judeţului Caraş-Severin. Reşiţa.

BA	- Biblioteca de arheologie. Muzeul Naţional de Istorie a României. Bucureşti.
BAR	- British Archaeological Reports (International Series). Oxford.
Barlangkutatas	- Barlangkutatas. Hoehlenforschung. Budapest (1913-1943).
BB	- Bibliotheca Brukenthal. Muzeul Naţional Brukenthal. Sibiu.
BCŞS	- Buletinul Cercurilor Ştiinţifice Studenţeşti. Universitatea „1 Decembrie 1918" Alba Iulia. Alba Iulia.
BHAUT	- Bibliotheca Historica et Archaeologica Universitatis Timisiensis. Timişoara.
BHAB	- Bibliotheca Historica et Archaeologica Banatica. Muzeul Banatului Timişoara. Timişoara.
BMA	- Bibliotheca Musei Apulensis. Muzeul Naţional al Unirii. Alba Iulia.
BMMN	- Buletinul Muzeului Militar Naţional. Bucureşti.
BMN	- Bibliotheca Musei Napocensis. Muzeul Naţional de Istorie a Transilvaniei. Cluj-Napoca.
BMP	- Bibliotheca Musei Porolissensis. Muzeul Judeţean de Istorie şi Artă Zalău. Zalău.
Bonner Jahrbücher	- Bonner Jahrbücher. Rheinischen Landesmuseums in Bonn und des Rheinischen Amtes für Bodendenkmalpflege im Landschaftsverband Rheinland und des Vereins von Altertumsfreunden im Rheinlande. Köln/Bonn.
BOR	- Biserica Ortodoxă Română. Patriarhia Română. Bucureşti.
Boreas	- Boreas. Münstersche Beiträge zur Archäologie. Münster.
BR	- Budapest Régiségei. Budapesti Történeti Múzeum. Budapest.
BS	- Bibliotheca Septemcastrensis. Sibiu.
BSNR	- Buletinul Societăţii Numismatice Române. Societatea Numismatică Română. Bucureşti.
BSPF	- Bulletin de la Société Préhistorique Française. Paris.
BSŞC	- Buletinul Societăţii Ştiinţifice din Cluj. Cluj.
BUA	- Bibliotheca Universitatis Apulensis. Universitatea „1 Decembrie 1918" Alba Iulia. Alba Iulia.
CA	- Cercetări arheologice. Muzeul Naţional de Istorie a României. Bucureşti.
CAn	- Current Anthropology. Chicago.
CAI	- Caiete de Antropologie Istorică. Revistă Semestrială publicată de Seminarul de Antropologie Istorică. Universitatea „Babeş-Bolyai". Cluj-Napoca.
Carpica	- Carpica. Complexul Muzeal „Iulian Antonescu". Bacău.
CB	- Caiete Banatica. Muzeul de Istorie al Judeţului Caraş-Severin. Reşiţa.
CCA	- Cronica cercetărilor arheologice. Bucureşti.
CCRPM	- Cercetări de conservare şi restaurare a patrimoniului muzeal. Bucureşti.
CI	- Cercetări Istorice. Muzeul de Istorie a Moldovei. Iaşi.
Cibinium	- Cibinium. Analele Muzeului Etnografic „ASTRA". Complexul Muzeal „ASTRA". Sibiu.

CNA	- Cronica Numismatică şi Arheologică. Foaie de informaţii a Societăţii Numismatice Române. Bucureşti (1920-1945).
Corviniana	- Corviniana. Acta Musei Corvinensis. Hunedoara.
Crisia	- Crisia. Culegere de materiale şi studii. Muzeul Ţării Crişurilor. Oradea.
Cultura creştină	- Cultura creştină. Publicaţie apărută sub egida Mitropoliei Române Unite cu Roma Greco-Catolică şi a Facultăţii de Teologie Greco-Catolică din Universitatea „Babeş-Bolyai" Cluj-Napoca, Departamentul Blaj. Blaj.
Cumidava	- Cumidava. Muzeul Judeţean Braşov. Braşov.
Dacia	- Dacia. Recherches et découvertes archéologiques en Roumanie. Bucureşti, I, (1924) – XII (1948). Nouvelle série: Revue d'archéologie et d'historie ancienne. Institutul de Arheologie „Vasile Pârvan". Bucureşti.
Delfo	- Il coltello di Delfo. Rivista di cultura materiale e archeologia industriale. Roma.
Der Anschnitt	- Der Anschnitt. Zeitschrift für Kunst und Kultur im Bergbau. Bochum.
DFS	- Deutsche Forschung im Südosten. Sibiu.
Dolgozatok	- Dolgozatok az Erdély Nemzeti Múzeum Érem - és Régiségtárából. Kolosvár (Cluj).
DP	- Documenta Praehistorica. Poročilo o raziskovanju paleolitika, neolitika in eneolitika v sloveniji. Ljubljana.
Drobeta	- Drobeta. Muzeul Regiunii Porţilor de Fier. Drobeta Turnu-Severin.
EA	- Environmental Archaeology. The Journal of Human Palaeoecology. Association for Environmental Archaeology.
EphNap	- Ephemeris Napocensis. Institutul de Arheologie şi Istoria Artei. Cluj-Napoca.
FoliaArch	- Folia Archaeologica. Magyar Történeti Múzeum. Budapest.
FSI	- Forensic Science International.
FVL	- Forschungen zur Volks- und Landeskunde. Sibiu.
GCA	- The Geochimica et Cosmochimica Acta. Washington University.
Germania	- Germania. Anzeiger der Römisch-Germanischen Kommission. Frankfurt am Main.
HTRTÉ	- A Hunyadmegyei Történelmi és Régészeti Társulat Évkönyvei. Deva (1880-1913).
IJO	- International Journal of Osteoarchaeology. United States.
Interacademica	- Interacademica. Les travaux de la VI-ème et VII-ème session annuelle Cernăuţi (1999) et Mangalia/Neptun (2000) (editori: Victor Cojocaru, A. G. Korvin-Piotrovskij, Adrian Poruciuc). Bucureşti, 2001.
Istros	- Istros. Muzeul Brăilei. Brăila.
JAA	- Journal of Anthropological Archaeology.
JAR	- Journal of Archaeological Research. New York.
JAS	- Journal of Archaeological Science, Academic Press. United States.
JFA	- Journal of Field Archaeology. Boston University.

JQS - Journal of Quaternary Science.

JRGZM - Jahrbuch des Römisch-Germanischen Zentralmuseums zu Mainz. Mainz.

JSKV - Jahrbuch des siebenbürgischen Karpathen-Vereins. Hermannstadt (Sibiu) (1881-1922).

MA - Mitropolia Ardealului. Revista oficială a Arhiepiscopiei Sibiului, Arhiepiscopiei Vadului, Feleacului şi Clujului, Episcopiei Alba Iuliei şi Episcopiei Oradiei. Sibiu (1956-1991). A continuat *Revista Teologică*, (1907-1947) şi este urmată de aceeaşi revistă.

Marmatia - Marmatia. Muzeul Judeţean Maramureş. Baia Mare.

Marisia - Marisia. Studii şi Materiale. Târgu Mureş.

Materiale - Materiale şi cercetări arheologice. Bucureşti.

Materijali - Poceci ranih zemljoradnickih kultura u Vojvodini i Srpskom Podunavlju, Materijali X, Srpsko arheološko društvo. Gradski muzej, Subotica. Beograd.

MB - Mitropolia Banatului. Timişoara.

MemAntiq - Memoria Antiquitatis. Complexul Muzeal Judeţean Neamţ. Piatra Neamţ.

MI - Magazin istoric. Revistă de cultură istorică. Bucureşti.

MN - Muzeul Naţional. Muzeul Naţional de Istorie a României. Bucureşti.

Nemus - Nemus. Alba Iulia.

Nexus - Nexus. The Canadian Student Journal of Anthropology. Department of Anthropolgy McMaster University Hamilton, Ontario, Canada.

OJA - Oxford Journal of Archaeology, Blackwell Publishing Inc., United Kingdom.

OmIA - Omagiu Profesorului Ioan Andriţoiu cu prilejul împlinirii a 65 de ani. Studii şi cercetări arheologice (ed. Cristian I. Popa, Gabriel T. Rustoiu). Alba Iulia, 2005.

OmPCI - Omagiu lui P. Constantinescu-Iaşi cu prilejul împlinirii a 70 de ani (ed. Emil Condurachi, Georges Cogniot, Pavel Reiman, Stanciu Stoian). Bucureşti, 1965.

OpuscArchaeol - Opuscula Archaeologica Radovi Arheološkog zavoda. Zagreb.

PA - Patrimonium Apulense. Alba Iulia.

Partium - Analele Universităţii Creştine Partium. Oradea.

PAS - Prähistorische Archäologie in Südosteuropa. Berlin.

PAT - Patrimonium Archaeologicum Transylvanicum. Institutul de Arheologie şi Istoria Artei. Cluj-Napoca.

Perspective - Perspective. Revista Misiunii Române Unite din Germania. München.

PB - Patrimonium Banaticum. Timişoara.

PBF - Präehistorische Bronzefunde. München.

Pontica - Pontica. Muzeul de Istorie Naţională şi Arheologie Constanţa. Constanţa.

Potaissa - Potaissa. Studii şi comunicări. Turda.

Programm Mühlbach	- Programm des evaghelischen Untergymnasium in Mühlbach und der damit verbundenen Lehranstalten. Mühlbach (Sebeş).
PZ	- Prähistorische Zeitschrift. Deutsche Gesellschaft fuer Anthropologie, Ethnologie und Urgeschichte, Institut für Prähistorische Archäologie. Berlin.
QSR	- Quaternary Science Reviews. The International Multidisciplinary Research and Review Journal.
RB	- Revista Bistriţei. Complexul Muzeal Bistriţa-Năsăud. Bistriţa.
RI	- Revista de Istorie (din 1990 Revista istorică). Bucureşti.
RM	- Revista muzeelor. Bucureşti.
RMM	- Revista muzeelor şi monumentelor istorice. Bucureşti.
RMM-MIA	- Revista muzeelor şi monumentelor. Monumente Istorice şi de Artă. Bucureşti.
RVM	- Rad Vojvodanskih muzeja. Novi Sad.
Saalburg Jahrbuch	- Saalburg Jahrbuch. Bericht des Saalburg-Museums. Berlin.
Sargetia	- Sargetia. Buletinul Muzeului Judeţului Hunedoara (Acta Musei Devensis). Deva.
SCIV(A)	- Studii şi cercetări de istoria veche. Bucureşti (din 1974, Studii şi cercetări de istorie veche şi arheologie).
SCIM	- Studii şi cercetări de istorie medie. Bucureşti.
Singidunum	- Singidunum. Muzej grada Beograda. Beograd.
SJ	- Saalburg-Jahrbuch. Publikationen des Saalburgmuseums. Saalburg.
SOA	- Südostdeutsches Archiv. München.
SlovArch	- Slovenská Archeológia. Nitra.
SMMIM	- Studii şi materiale de muzeografie şi istorie militară. Muzeul Militar Central. Bucureşti, 1968.
SP	- Studii de Preistorie. Bucureşti.
StComCaransebeş	- Studii şi comunicări. Muzeul Judeţean de Etnografie şi Istorie Locală. Caransebeş.
StComSibiu	- Studii şi comunicări. Arheologie-istorie. Muzeul Brukenthal. Sibiu.
StComSM	- Studii şi comunicări. Muzeul Judeţean Satu Mare. Satu Mare.
Suceava	- Suceava. Anuarul Muzeului Judeţean. Suceava.
SUCH	- Studia Universitatis Cibiniensis. Series Historica. Universitatea „Lucian Blaga" Sibiu. Sibiu.
SV	- Siebenbürgische Vierteljahrschrift. Hermannstadt (Sibiu).
Symposium Badener	- Symposium über die Entstehung und Chronologie der Badener Kultur. Bratislava, 1973.
SympThrac	- Symposia Thracologica. Institutul Român de Tracologie. Bucureşti.
Terra Sebus	- Terra Sebus. Acta Musei Sabesiensis. Muzeul Municipal „Ioan Raica". Sebeş.
The Bead Journal	- The Bead Journal (din anul 1978 *Ornament*). The Bead Museum, Glendale. Arizona.
Thraco-Dacica	- Thraco-Dacica. Institutul Român de Tracologie. Bucureşti.
Tibiscus	- Tibiscus. Muzeul Banatului Timişoara. Timişoara (1971-1979).

TISER	- Travaux de l'Institut de Spéléologie « Emile Racovitza ». Bucureşti.
Transilvania	- Transilvania. Foaia Asociaţiunii Transilvane pentru Literatura Română şi Cultura Poporului Român. Braşov.
UPA	- Universitätsforschungen zur Prähistorischen Archäologie. Berlin.
VAH	- Varia Archaeologica Hungarica. Budapest.
VAMZ	- Vjesnik Arheološkog Muzeja u Zagrebu. Zagreb.
VHA	- Vegetation History and Archaeobotany. The Journal of Quaternary Plant Ecology, Palaeoclimate and Ancient Agriculture - Official Organ of the International Work Group for Palaeoethnobotany.
Vigilia	- Vigilia. Budapest.
VTT	- Veszprémi Történelmi Tár a Veszprém Megyei Múzeumi Igazgatóság kiadványa. Veszprém.
ZfSL	- Zeitschrift für Siebenbürgische Landeskunde. Gundelsheim.
Ziridava	- Ziridava. Muzeul Judeţean. Arad.