ARCHAEOTHANATOLOGY — CONCEPTS, CONTRIBUTIONS, AND A TERMINOLOGICAL PROPOSAL FOR CROATIAN

ARHEOTANATOLOGIJA — KONCEPTI, DOPRINOSI I PRIJEDLOG STRUKOVNOG NAZIVLJA NA HRVATSKOM JEZIKU

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Archaeothanatology, originally known as field anthropology, is a discipline that emerged in France in the 1970s and has since gained significant recognition in English-speaking academic contexts. It focuses on investigating the biological and social dimensions of death in past populations by re-centring the deceased within the interpretative framework. A central objective of archaeothanatology is the reconstruction of the funerary operational sequence through the study of the deceased in their grave, taphonomic processes, the sequence of body disarticulation, and deviations and anomalies in the positioning of skeletal remains. This article revisits the fundamental principles of the discipline, with particular emphasis on the importance of field-based observations in interpreting mortuary practices. Additionally, we propose a Croatian translation of key terminological concepts specific to this precise approach to mortuary contexts, with the aim of fostering wider collaboration and comparisons in the application of archaeothanatological methods in mortuary contexts. This article is an initiative of the ARTHA network (ARchaeoTHAnatology Working Group for Central Europe, https://www.artha.at/) supported by the "Programme Hubert Curien (PHC) Amadeus ARTHA.

Keywords:
archaeothanatology, field anthropology, terminology, funerary practices, taphonomy

Arheotanatologija, izvorno poznata kao terenska antropologija, razvila se u Francuskoj tijekom 70-ih godina 20 stoljeća i od tada je stekla značajno mjesto u anglofonom akademskom okruženju. Usmjerena je na istraživanje bioloških i društvenih dimenzija smrti u prošlim populacijama, pri čemu se interpretativni fokus ponovno usmjerava na pokojnika. Temeljni cilj arheotanatologije jest rekonstrukcija slijeda pogrebnih postupaka na temelju proučavanja pokojnika u grobu, tafonomskih procesa, slijeda disartikulacije, odnosno nepovezanosti tijela te odstupanja i anomalija u položaju skeletnih ostataka.
U ovome se radu razmatraju temeljna načela discipline, s posebnim naglaskom na važnost terenskih opažanja u interpretaciji pogrebnih praksi. Nadalje, predlaže se hrvatski prijevod ključnih terminoloških pojmova specifičnih za ovaj pristup analizi grobnih cjelina, a s ciljem poticanja šire suradnje i usporedbe u primjeni arheotanatoloških metoda. Ovaj članak proizlazi iz inicijative mreže ARTHA – Radne skupine za arheotanatologiju u srednjoj Europi (ARchaeoTHAnatology Working Group for Central Europe) – https://www.artha.at/, uz potporu programa PHC Amadeus ARTHA.

Ključne riječi:
arheotanatologija, terenska antropologija, stručno nazivlje, pogrebne prakse, tafonomija

Introduction

The term 'archaeothanatology', derived from the French *archéothanatologie*, is composed of the combining form 'archaeo-', derived from the Greek adjective *arkhaîos* ('old, ancient'), and 'thanatology', from the Greek word *thánatos* ('death'). It represents both an archaeologico-anthropological approach that integrates the biological, social and cultural aspects of death, including the originally-named *anthropologie de terrain*, and an excavation protocol focusing on taphonomic processes. As a discipline, it aims to interpret the mortuary behaviour of past societies by closely examining human remains in their depositional context and by reconstructing original funerary practices, particularly through the application of a field protocol as an initial and fundamental step.[1]

Archaeothanatology emerged from a broad intellectual movement shaped by French archaeologists such as A. Leroi-Gourhan, G. Bailloud and M. Brézillon during their work at the Mournouards site.[2] The discipline was later formalized and developed by H. Duday, starting in the 1970s.[3] By treating the deceased and the grave as archaeological objects at the centre of analysis, archaeothanatology introduced a major shift in how mortuary contexts are studied. It marked a profound conceptual and methodological shift that provides new ways to investigate the social relationships and cultural identities of past populations through their burial practices.[4]

One of its key contributions is the reading of taphonomic processes and the analysis of the funerary sequence, also known as the 'sequence of funerary actions' (*gestes funéraires* or *chaîne opératoire funéraire* in French; *slijed pogrebnih postupaka* in Croatian).[5] This sequence encompasses the stages of body treatment from the moment of death to the final steps of the mortuary process.[6] Identifying and investigating these often complex and multi-stage processes offers insight into social organization and helps distinguish patterns and anomalies. In the most recent contexts, an archaeothanatological approach including biological analysis can help demonstrate the existence of certain mortuary practices documented in historical sources, and even nuance or refine them.[7] In earlier contexts, archaeothanatological analyses are often among the only available avenues of investigation.[8]

Rooted in the French academic tradition, particularly in Bordeaux and Paris,[9] the terminology and principles of archaeothanatology have been discussed and refined extensively since the

Uvod

Pojam arheotanatologija, hrvatska inačica francuskoga termina *archéothanatologie*, sastavljen je od tvorbenoga elementa *arheo-*, izvedenoga iz grčkoga pridjeva *arkhaîos* ('star, drevan'), i *tanatologija*, prema grčkoj riječi *thánatos* ('smrt'). Označava arheološko-antropološki pristup koji integrira biološke, društvene i kulturne aspekte smrti te uključuje ono što se izvorno nazivalo *anthropologie de terrain* (terenska antropologija), kao i protokol arheološkoga iskopavanja usredotočen na analizu tafonomskih procesa. Cilj arheotanatologije jest razumijevanje pogrebnoga ponašanja prošlih društava detaljnim proučavanjem ljudskih ostataka u njihovu izvornom depozicijskom kontekstu te rekonstrukcija izvornih pogrebnih praksi. Pritom je primjena terenskoga protokola početni i temeljni korak analize.[1]

Arheotanatologija je proizašla iz širega intelektualnog pokreta oblikovanoga radom francuskih arheologa poput A. Leroi-Gourhana, G. Baillouda i M. Brézillona tijekom njihovih istraživanja nalazišta Mournouards.[2] Disciplinu je potom od 70-ih godina prošloga stoljeća nadalje formalizirao i razvio H. Duday.[3] Promatrajući pokojnika i grob kao središnje arheološke objekte analize, arheotanatologija je uvela značajnu promjenu u način proučavanja pogrebnih konteksta. Time je označila dubok konceptualni i metodološki zaokret, koji je otvorio nove mogućnosti istraživanja društvenih odnosa i kulturnih identiteta prošlih populacija na temelju njihovih pogrebnih praksi.[4]

Jedan od ključnih doprinosa arheotanatologije jest interpretacija tafonomskih procesa i analiza slijeda pogrebnih postupaka (franc. *gestes funéraires* ili *chaîne opératoire funéraire*; engl. *funerary sequence* ili *sequence of funerary actions*).[5] Ta sekvenca obuhvaća sve faze postupanja s tijelom od trenutka smrti do završnih etapa pogrebnoga procesa.[6] Prepoznavanje i analiza tih često složenih i višefaznih procesa pružaju uvid u društvenu organizaciju zajednice te omogućuju razlikovanje obrazaca i anomalija. U kontekstu kasnijih arheoloških, odnosno povijesnih razdoblja arheotanatološki pristup, u kombinaciji s biološkim analizama, može potvrditi postojanje određenih pogrebnih praksi zabilježenih u povijesnim izvorima, ali može ih i nijansirati ili precizirati.[7] Za ranija razdoblja arheotanatološke analize često su jedan od rijetkih dostupnih istraživačkih pristupa.[8]

Ukorijenjeni u francuskoj akademskoj tradiciji, osobito u Bordeauxu i Parizu,[9] terminologija i načela arheotanatologije predmet su intenzivnih rasprava i metodoloških razrada još od 70-ih go-

1 Duday *et al.* 1990, 29–49; Duday 2009; Knüsel, Schotsmans 2022.

2 Chambon, Blin 2011, 23–133.

3 Duday 1990, 193–196; Duday 2006; Duday 1978, 55–101; Duday, Masset 1987; Duday 2005, 153–215.

4 Blaizot 2022, 22–41; Boulestin, Duday 2006.

5 e.g. Valentin *et al.* 2014; Bocquentin 2023.

6 Sellier 2016, 45–52.

7 e.g. Partiot 2018; Partiot *et al.* 2026; Partiot, Zabrana 2026.

8 Knüsel, Schotsmans 2022.

9 Knüsel, Maureille 2018, 57–80.

1 Duday *et al.* 1990, 29–49; Duday 2009; Knüsel, Schotsmans 2022.

2 Chambon, Blin 2011, 23–133.

3 Duday 1990, 193–96; Duday 2006; Duday 1978, 55–101; Duday, Masset 1987; Duday 2005, 153–215.

4 Blaizot 2022, 22–41; Boulestin, Duday 2006.

5 Npr. Valentin *et al.* 2014; Bocquentin 2023.

6 Sellier 2016, 45–52.

7 Npr. Partiot 2018; Partiot *et al.* 2026; Partiot, Zabrana 2026.

8 Knüsel, Schotsmans 2022.

9 Knüsel, Maureille 2018, 57–80.

1970s. Deeply embedded in field research and rescue archaeology,[10] the discipline remained largely limited to France until the 2000s, until the transcriptions of Duday's lectures, delivered in Rome in 2004, were published in both French and Italian.[11] The English translation of these lectures[12] marked a major milestone in the international dissemination of the discipline. This growing engagement and interest ultimately led to the publication of international works like the *Routledge Handbook of Archaeothanatology*, by Knüsel and Schotsmans,[13] which includes an English terminology. This extensive body of publications accumulated over several decades now provides a crucial foundation and resource for fostering effective international collaboration, although such collaboration remains constrained by the fact that, to our knowledge, university-level training continues to be offered exclusively in French and only in France.

More recently, in Southeastern Europe, particularly within linguistically related contexts, the need for this method has increasingly been recognized.[14] The importance of an archaeothanatological approach is especially emphasized in theoretical reinterpretations of burials that deviate from the customary practices of the periods under study (Late Roman and medieval contexts; in the latter case, particularly those that differ from Christian conventions). Furthermore, the application of this approach to existing documentation[15] – despite the fact that the site was excavated in the late 1970s – demonstrates the discipline's significant potential, as the author convincingly argues that taphonomic processes, rather than social or cultural factors, are the primary cause of the perceived 'unusualness' of these medieval burials.

In this context, the aim of this article is to contribute further to the wider accessibility of the discipline by proposing (1) a concise overview of the key steps in archaeothanatological analysis, and (2) a Croatian translation of the reference vocabulary, "*multi-lingual terminologies [being] the foundation on which to build*",[16] followed by (3) an example of a study. The translation is based on both the English and French lexicons, as well as key reference publications, with the objective of fostering collaboration with the Croatian academic community.

dina 20. stoljeća. Duboko povezana s terenskim istraživanjima i zaštitnom arheologijom,[10] disciplina je do 2000-ih godina uglavnom ostala ograničena na Francusku, sve dok transkripti Dudayevih predavanja, održanih u Rimu 2004. godine, nisu objavljeni na francuskome i talijanskome jeziku.[11] Engleski prijevod tih predavanja[12] označio je važnu prekretnicu u međunarodnome širenju discipline. Taj rastući interes i angažman naposljetku su doveli do objave publikacija međunarodnoga dosega, poput *The Routledge Handbook of Archaeothanatology* urednika Knüsela i Schotsmansa,[13] koje uključuje terminologiju na engleskome jeziku. Brojne publikacije nastale tijekom nekoliko desetljeća danas su ključna osnova za razvoj učinkovite međunarodne suradnje iako je ona i dalje ograničena činjenicom da se, koliko je poznato, sveučilišna nastava iz arheotanatologije još uvijek izvodi isključivo na francuskome jeziku i samo u Francuskoj.

U novije vrijeme u jugoistočnoj se Europi, osobito u jezično srodnim kontekstima, sve više prepoznaje potreba za tom metodom.[14] Važnost arheotanatološkoga pristupa posebno se ističe u teorijskim reinterpretacijama ukopa koji odstupaju od uobičajenih praksi razdoblja koja se proučavaju (kasnorimsko i srednjovjekovno razdoblje; u potonjem slučaju osobito oni koji se razlikuju od kršćanskih običaja). Dobar je primjer rad Nevene Pantić,[15] koja je arheotanatološki pristup primijenila na postojeću dokumentaciju s nekropole u Trnjanu, istražene još krajem 70-ih godina 20. stoljeća, i ponudila novo tumačenje ranije zabilježenih „neobičnih" ukopa. Niz „neobičnih" pojava, prethodno tumačenih kao tragovi poganskih vjerovanja i straha od vampirizma, objašnjava tafonomskim procesima i okolnostima raspadanja tijela i drvenih kovčega; položaj novorođenčeta reinterpretira kao mogući postmortalni porođaj, a dislokacije kostiju kao posljedicu postdepozicijskih procesa. Time dovodi u pitanje raniju interpretaciju, prema kojoj su nekršćanski pogrebni običaji bili dominantni.

Cilj ovoga rada jest dodatno pridonijeti široj dostupnosti discipline (1) sažetim pregledom ključnih koraka arheotanatološke analize, (2) prijedlogom hrvatskoga prijevoda referentnoga terminološkoga rječnika, pri čemu se polazi od pretpostavke da su „višejezične terminologije temelj na kojem se može graditi",[16] i (3) prikazom studija slučaja. Prijevod se temelji na engleskome i francuskome leksiku, kao i na ključnim referentnim publikacijama, s ciljem poticanja suradnje s hrvatskom, ali i širom jezično srodnom akademskom zajednicom.

10 Guillon 2022, 619–635.

11 Duday 2005; Duday 2006.

12 Duday 2009.

13 Knüsel, Schotsmans 2022.

14 Milosavljević 2021, 835–865; Pantić 2024, 901–918; Janković, Petrović 2025, 793–821.

15 Pantić 2024.

16 Knüsel, Schotsmans 2022, 10.

10 Guillon 2022,619–35.

11 Duday 2005; Duday 2006.

12 Duday 2009.

13 Knüsel, Schotsmans 2022.

14 Milosavljević 2021, 835–65; Pantić 2024, 901–18; Janković, Petrović 2025, 793–821.

15 Pantić 2024.

16 Knüsel, Schotsmans 2022, 10.

1. Key stages and specific features of archaeothanatological analysis

Archaeothanatological studies are defined as "*a reverse journey through the taphonomic events observed in the field and the correlation of these events with one another*".[17] These studies emphasize the observation of both skeletal and non-skeletal remains during excavation, immediately after their exposure and before removal, within their original discovery context. This stage offers the final opportunity to record critical information. As a result, the observation of human remains *in situ* requires the presence of archaeologists trained in anatomy, capable of documenting all positional changes of the bones from burial to discovery and applying a standardized recording protocol for the taphonomic study of the deposit.

Traditional excavation methods often involve rapid procedures such as excavating the grave, exposing the skeleton, recording basic locational data, and general observations like the number and position of the deceased. In contrast, archaeothanatological protocols involve the detailed recording of the position of each bone relative to the anatomical reference position (standing with the upper limbs supinated, i.e., with the palms facing forward) and to the excavation's coordinate system, the dislocation or preservation of joints, as well as taphonomic anomalies in relation to the structure and the skeleton. According to Blaizot,[18] these anomalies are cases "*when the position, orientation, or placement of a bone or set of bones does not correspond to that expected in a given situation (as determined by the overall position of the remains of the skeleton)*". The protocol typically relies on paper forms tailored by the archaeothanatologist for each context. Increasingly, documentation also includes photogrammetry of the structure, providing an additional safeguard for preserving essential information.[19]

The key phases of recording include:

• Careful exposition of the skeleton, with special attention to the articulation between bones.

• Identification of each bone and pre-removal recording of their exposed surfaces (for example, a skull viewed from the front is described as showing its anterior aspect, with a lateral or superior component depending on whether the skull is slightly turned to the side or tilted downward), using international anatomical terminology and based on the anatomical reference position (see Supplement 1).

• Observation of the joints, and documentation of whether they are in anatomical (strict) articulation, loose articulation, or fully disarticulated.

• Recording of the spatial position of each element, either manually or with a total station, ideally with at least two measure-

1. Ključne faze i specifična obilježja arheotanatološke analize

Arheotanatološka istraživanja definiraju se kao *obrnuto putovanje kroz tafonomske događaje opažene na terenu te njihovo međusobno povezivanje*.[17] Takva istraživanja naglašavaju promatranje skeletnih i neskeletnih ostataka u njihovu izvornom kontekstu nalaza – tijekom iskopavanja, neposredno nakon njihova otkrivanja i prije uklanjanja. S obzirom na to da je ta faza istraživanja jedinstvena, ujedno i posljednja prilika za bilježenje ključnih informacija, opažanje ljudskih ostataka *in situ* zahtijeva prisutnost arheologa s odgovarajućom izobrazbom iz anatomije, sposobnih dokumentirati promjene u položaju kostiju od trenutka ukopa do njihova arheološkog otkrivanja i primijeniti standardizirani protokol bilježenja za tafonomsku analizu depozita.

Tradicionalne metode iskopavanja često uključuju brze postupke, poput iskopavanja groba, otkrivanja kostura, bilježenja osnovnih lokacijskih podataka te općih opažanja, kao što su broj i položaj pokojnika. Nasuprot tomu, arheotanatološki protokoli podrazumijevaju detaljno bilježenje položaja svake kosti u odnosu na anatomski referentni položaj (stojeći s gornjim udovima u supinaciji, tj. s dlanovima okrenutima prema naprijed) i koordinatni sustav iskopavanja, stupnja dislokacije ili očuvanosti zglobova, kao i tafonomskih anomalija u odnosu na strukturu i kostur. Prema Blaizotu,[18] takve anomalije odnose se na slučajeve *kada položaj, orijentacija ili smještaj jedne kosti ili skupa kostiju ne odgovara onome što bi se očekivalo u danoj situaciji (kako je određeno ukupnim položajem skeletnih ostataka)*. Protokol se u pravilu oslanja na papirnate obrasce koje arheotanatolog prilagođava svakomu pojedinom kontekstu. Sve češće dokumentacija uključuje i fotogrametriju struktura, koja je dodatna mjera očuvanja ključnih informacija.[19]

Ključne faze dokumentiranja uključuju:

• Pažljivo otkrivanje kostura, uz posebnu pozornost na artikulacije između kostiju.

• Identifikaciju svake kosti i bilježenje izloženih površina prije vađenja (primjerice, lubanja promatrana sprijeda opisuje se kao ona koja pokazuje svoj anteriorni aspekt, uz lateralnu ili superiornu komponentu ovisno o tome je li lubanja blago okrenuta u stranu ili nagnuta prema dolje), uz uporabu međunarodne anatomske terminologije i u skladu s anatomskim referentnim položajem (vidi prilog 1).

• Opažanje zglobova i dokumentiranje jesu li u anatomskoj (strogoj) artikulaciji, nestabilnoj (labavoj) artikulaciji ili su u potpunosti disartikulirani.

• Bilježenje prostornoga položaja svakoga elementa, ručno ili pomoću totalne stanice, po mogućnosti s najmanje dva mjerenja

17 Blaizot 2022, 10.
18 Blaizot 2022, 24.
19 Sachau-Carcel 2012.

17 Blaizot 2022, 10.
18 Blaizot 2022, 24.
19 Sachau-Carcel 2012.

ments per bone (proximal/distal, etc.). The measurement should preferably be taken beneath the bones immediately after removal.

• Observations of 'effects': identifying linear and non-linear alignment effects, groove effects, vertical positioning of bones, etc.

Interpretation of field data for reconstructing the original arrangement and architecture of the grave, including:

• a general description of the deposit;

• discussion of the decomposition environment;

• discussion of the primary or secondary nature of the deposit;

• discussion of the original position of the deceased;

• identification of the original arrangement and presence of perishable materials (e.g. coffin, shroud, basket, footwear etc.);

• investigation of post-depositional disturbances, whether anthropogenic (e.g. grave reopenings) or natural (e.g. animal activity).

Archaeological data (including stratigraphic units, sediment characterization, materials) and historical sources must be fully integrated into the overall interpretation of the deposit. The implementation of this methodology is based on a shared conceptual and terminological framework that has been, and continues to be, the subject of extensive discussion, particularly as archaeothanatology gains broader international dissemination.

2. Proposal of a lexicon

In this section, we propose a Croatian translation of key archaeothanatological concepts, with the aim of serving as a basis for discussion and promoting international dialogue on archaeoanthropological practices. This proposed terminology is based primarily on the definitions provided by Knüsel and Schotsmans[20] and their accompanying lexicon,[21] as well as on previous foundational works.[22]

General Description of the Deposit

The term **deposit** or **deposition** (translated as *dépôt* in French, *depozit* in Croatian) refers to an archaeological deposit of human remains without assuming its intentional placement. When intentionality is involved, terms such as **burial** or **funerary deposit** (*sépulture* or *dépôt funéraire* in French, *ukop* or *pogrebni depozit* in Croatian) are used.[23] A **burial** is usually defined as the intentional placement of human remains in a grave, where the deceased serves as "the *raison d'être* (i.e. purpose) for the tomb…"

po kosti (proksimalno/distalno i sl.), koja je preporučljivo provoditi ispod kostiju neposredno nakon njihova uklanjanja.

• Opažanje tzv. „učinaka": prepoznavanje linearnih i nelinearnih učinaka poravnanja, učinaka žlijeba, vertikalizacije kostiju i dr.

Interpretaciju terenskih podataka radi rekonstrukcije izvornoga rasporeda i grobne arhitekture, uključujući:

• opći opis depozita;

• raspravu o okolišu razgradnje;

• raspravu o primarnoj ili sekundarnoj prirodi depozita;

• raspravu o izvornome položaju pokojnika:

• identifikaciju izvornoga rasporeda i prisutnosti propadljivih materijala (npr. lijesa, pokrova, košare, obuće i sl.);

• analizu postdepozicijskih poremećaja, bilo antropogenih (npr. ponovnoga otvaranja groba) ili prirodnih (npr. aktivnosti životinja).

Arheološki podaci (uključujući stratigrafske jedinice, karakterizaciju sedimenta i materijalnih nalaza) te povijesni izvori moraju biti u potpunosti integrirani u cjelokupnu interpretaciju depozita. Primjena ove metodologije temelji se na zajedničkome konceptualnom i terminološkom okviru, koji je bio i još uvijek jest predmet opsežnih rasprava, osobito s obzirom na sve širu međunarodnu primjenu arheotanatologije.

2. Prijedlog leksikona

U ovome se poglavlju predlaže hrvatski prijevod ključnih arheotanatoloških pojmova s ciljem stvaranja osnove za raspravu i poticanja međunarodnoga dijaloga o arheoantropološkim praksama. Predloženo nazivlje prvenstveno se temelji na definicijama koje su dali Knüsel i Schotsmans,[20] na pratećem leksikonu[21] i na ranijim temeljnim radovima.[22]

Opći opis depozita

Pojam **depozit** ili depozicija (franc. *dépôt*, engl.*deposit* ili *deposition*) odnosi se na arheološki nalaz ljudskih ostataka bez pretpostavke o namjernosti njihova polaganja. Kada je prisutna namjera, koriste se termini poput **ukop** ili **pogrebni depozit** (franc. *sépulture* ili *dépôt funéraire*, engl. *burial*).[23] Ukop se obično definira kao namjerno polaganje ljudskih ostataka u grob, pri čemu je pokojnik „*raison d'être* (svrha) groba", oko kojega se odvijaju svi pogrebni postupci.[24] Taj je prostor mjesto odvijanja **pogrebnih**

20 Knüsel, Schotsmans 2022.

21 Knüsel *et al.* 2022, 652–686.

22 e.g. Duday, Guillon 2006, 117–157; Duday 2009; Duday 1990; Duday *et al.* 1990; Boulestin, Duday 2006; Duday, Masset 1987; Boulestin, Courtaud 2022, 42–54; Castex, Blaizot 2017, 277–296; Valentin *et al.* 2014.

23 Knüsel, Robb 2016, 655–673; Courtaud, Duday 2008, 16–24.

20 Knüsel, Schotsmans 2022.

21 Knüsel *et al.* 2022, 652–86.

22 Npr. Duday, Guillon 2006,117–57; Duday 2009; Duday 1990; Duday *et al.* 1990; Boulestin, Duday 2006; Duday, Masset 1987; Boulestin, Courtaud 2022, 42–54; Castex, Blaizot 2017, 277–96; Valentin *et al.* 2014.

23 Knüsel, Robb 2016, 655–73; Courtaud, Duday 2008, 16–24.

24 Duday 2009, 6.

and the central purpose of the tomb, around whom all funerary actions were performed.[24] This space is the setting for **funerary gestures,** actions or deeds (*gestes funéraires* in French, *pogrebni postupci* in Croatian), an expression encompassing all phases of the treatment of the body (e.g. preparation of the corpse before deposition, grave structure, body positioning, grave goods, potential reopening of the grave, post-depositional manipulations, etc.).[25] A central objective of archaeothanatological analysis is the reconstruction of the **burial arrangement**, organization and architecture,[26] referred to in French as *dispositif funéraire* or *appareil funéraire*, and *pogrebni raspored* in Croatian, which includes the architectural characteristics of the grave and associated objects.

When considering the different types of funerary deposits, a key distinction is made between **cremation deposits** (*dépôts de cremation* in French, *kremacijski depoziti* in Croatian,[27] "the process of reducing the corpse to ash and bone fragments characteristic of cremated remains",[28] and **interment deposits** (*dépôts d'inhumation* in French, *inhumacijski depoziti* in Croatian). The latter may include remains of distinct individuals, or disarticulated and commingled remains. In cases involving distinct individuals, two primary categories are recognized: 1) an **individual burial** (*sépulture individuelle* in French, *pojedinačni ukop* in Croatian), containing the remains of a single individual, and 2) a **multiple burial** (*sépulture plurielle* in French, *višestruki ukop* in Croatian), containing the remains of several individuals.

It is important to note that the French term *sépulture plurielle* (translated as *co-burial* in English) does not imply any chronological relationship between the deposits. In contrast, a **simultaneous burial** (*sépulture multiple* in French, *istodobni ukop* in Croatian) refers specifically to the simultaneous deposition of several individuals. When individuals are deposited sequentially or over time within the same space, the term **collective burial** (*sépulture collective* in French, *kolektivni ukop* in Croatian)[29] is used. The term **mass grav**e (*sépulture de crise*, *sépulture de catastrophe*, or *charnier* in French, *masovna grobnica* in Croatian) refers to a pit or burial context containing a large number of individuals deposited more or less simultaneously as a result of an event (e.g. an epidemic or massacre). These individuals are often found articulated and arranged in several layers.[30]

Primary or Secondary Deposits

The classification of a deposit hinges primarily on the distinction between a **primary deposit** (*dépôt primaire* or sépulture primaire in French, *primarni depozit* in Croatian) and a **secondary deposit** (*dépôt secondaire* in French, *sekundarni depozit* in Croatian), based on the location of decomposition. A deposit is considered

postupaka, radnji ili činova (franc. *gestes funéraires*, engl. *funerary gestures/actions/deeds*), izraza koji obuhvaća sve faze postupanja s tijelom (npr. pripremu tijela prije polaganja, strukturu groba, položaj tijela, grobne priloge, moguće ponovno otvaranje groba, postdepozicijske manipulacije itd.).[25] Središnji cilj arheotanatološke analize jest **rekonstrukcija ukopnoga rasporeda**, organizacije i grobne arhitekture u pogrebnome kontekstu,[26] što se u francuskoj literaturi označava terminima *dispositif funéraire* ili *appareil funéraire*, a na hrvatskome bi se mogao predložiti termin **pogrebni raspored,** koji obuhvaća arhitektonske karakteristike groba i pripadajuće objekte.

Razlikuju se različite vrste pogrebnih depozita, pri čemu se temeljna razlika uspostavlja između **kremacijskih depozita** (franc. *dépôts de crémation*, engl. *cremation deposits*),[27] koji se odnose na „proces redukcije tijela na pepeo i fragmente kostiju karakteristične za spaljene ostatke",[28] i *inhumacijskih depozita* (franc. *dépôts d'inhumation*, engl. *interment deposits*). Potonji mogu sadržavati ostatke jasno razlučivih pojedinaca ili disartikulirane, odnosno nepovezane i izmiješane ostatke. U slučaju jasno razlučivih pojedinaca razlikuju se **pojedinačni ukop** (franc. *sépulture individuelle*, engl. *individual burial*), koji sadrži ostatke jedne osobe, i **višestruki ukop** (franc. *sépulture plurielle*, engl. *multiple burial*), koji sadrži ostatke više osoba.

Važno je naglasiti da francuski pojam *sépulture plurielle* ne podrazumijeva nužno kronološku istodobnost polaganja. Nasuprot tomu, **istodobni ukop** (franc. *sépulture multiple*, engl. *simultaneous burial*) odnosi se isključivo na istodobno polaganje više osoba. Kada se pojedinci polažu sukcesivno, tijekom duljega vremenskog razdoblja unutar istoga prostora, koristi se pojam **zajednički ukop** (franc.*sépulture collective*, engl. *collective burial*).[29] Pojam **masovna grobnica** (franc. *sépulture de crise*, *sépulture de catastrophe* ili *charnier*, engl. *mass grave*) odnosi se na jamu ili pogrebni kontekst s velikim brojem osoba položenih više-manje istodobno uslijed određenoga događaja (npr. epidemije ili masakra). Takvi se pojedinci često nalaze u artikuliranome stanju i složeni su u više razina.[30]

Primarni i sekundarni depoziti

Klasifikacija depozita prvenstveno se temelji na razlikovanju **primarnoga depozita** (franc. *dépôt primaire*ili *sépulture primaire*, engl. *primary deposit*) i **sekundarnoga depozita** (franc. *dépôt secondaire*, engl. *secondary deposit*), prema mjestu razgradnje. Depozit se smatra primarnim kada se mjesto polaganja i razgradnje

24 Duday 2009, 6.
25 Duday *et al*. 1990.
26 Castex, Blaizot 2017, 277.
27 Depierre *et al*. 2022, 69–88.
28 Knüsel *et al*. 2022, 662.
29 e.g. Castex, Blaizot 2017; Boulestin, Courtaud 2022.
30 Castex, Kacki 2016.

primary when the initial place of deposition and the decomposition take place in the same place. In contrast, a secondary deposit occurs in a case in which decomposition occurs in a location different from that of the original placement of the body. The term **secondary position** applies in cases of **reduction(s)** of the skeleton or corpse (*réduction de corps* in French, *preslagivanje ili premještaj tijela* in Croatian), where skeletal elements have been rearranged within the primary grave, often to create space for another individual.[31] A further category, **tertiary remains** (*vestiges en position tertiaire* in French; *tercijalni ostaci* in Croatian), refers to disarticulated skeletal elements found outside the original funerary context, with no identifiable association with a specific individual.[32] Such remains typically result from manipulations that occur following the process of **skeletonization** (*squelettisation* in French, *skeletizacija* in Croatian), once the soft tissue has decomposed.

The distinction between primary and secondary deposits is generally assessed through skeletal representation and degree of disarticulation, that is, the loss of anatomical integrity in joints. A critical aspect of this assessment involves distinguishing between persistent joints (*articulations persistantes* in French, *postojani zglobovi* in Croatian) and labile joints (*articulations labiles* in French, *labilni zglobovi* in Croatian). **Labile joints** are those that disarticulate early during decomposition. Examples include hands and feet, joints between cervical vertebrae, except for the atlanto-occipital joint, and the acetabulo-femoral joint (hip joint), despite its weight-bearing function.[33] The preservation of labile joint connections strongly supports the interpretation of a primary deposit. **Persistent joints** are traditionally those subjected to significant mechanical pressure and are slower to disarticulate. Examples include knee and tibio-femoral joints, atlanto-occipital joint, lumbar spine, lumbo-sacral joints, sacro-iliac joints, ankle and tarsal joints, shoulder (gleno-humeral) and elbow (humero-ulnar), and costo-transverse joints of the rib cage, which persist longer than costo-vertebral and costo-sternal joints, producing a flattening of the rib cage during decomposition.[34]

A particular case is that of **paradoxical disarticulation** (*dislocation en ordre paradoxal* in French, *paradoksalna disartikulacija* in Croatian), where labile joints remain articulated while persistent joints become disarticulated.[35] In certain cases, however, such observations may highlight evidence of prior mummification, either intentional (artificial) or resulting from natural conditions.[36] This phenomenon, along with other observations, remains a topic of debate and is increasingly scrutinized through experimental actualistic studies.[37]

tijela podudaraju. Sekundarni depozit odnosi se na slučajeve u kojima se razgradnja odvija na mjestu različitome od izvornoga mjesta polaganja tijela.

Pojam **sekundarni položaj** primjenjuje se u slučajevima **preslagivanja ili premještaja** tijela (franc. *réduction de corps*, engl. *reduction of the skeleton* ili *reduction of corps*) kada su skeletni elementi ponovno raspoređeni unutar primarnoga groba, često radi stvaranja prostora za drugu osobu.[31] Dodatnu kategoriju čine tercijarni ostatci (engl. *tertiary remains*, franc. *vestiges en position tertiaire*), odnosno disartikulirani skeletni elementi pronađeni izvan izvornoga pogrebnog konteksta, bez mogućnosti povezivanja s određenom osobom.[32] Takvi ostatci najčešće su rezultat manipulacija koje su uslijedile nakon procesa **skeletizacije** (franc. *squelettisation*, engl. *skeletonization*), odnosno nakon razgradnje mekih tkiva.

Razlikovanje primarnih i sekundarnih depozita obično se temelji na zastupljenosti kostura i stupnju disartikulacije, odnosno gubitku anatomske cjelovitosti zglobova. Ključno je razlikovati **stabilne zglobove** (franc. *articulations persistantes*, engl. *persistent joints*) i **nestabilne** ili **labilne zglobove** (franc. *articulations labiles*, engl. *labile joints*). Nestabilni zglobovi disartikuliraju rano tijekom razgradnje: primjeri uključuju šake i stopala, zglobove između vratnih kralježaka (osim glavonosno-zatiljnoga zgloba) i zglob kuka, unatoč njegovoj nosivoj funkciji.[33] Očuvanost nestabilnih zglobova snažno upućuje na primarni depozit. Stabilni zglobovi izloženi su većemu mehaničkom pritisku i sporije se razdvajaju. U njih ubrajamo koljeno i bedreno-koljenični zglob, glavonosno-zatiljni zglob, slabinsku kralježnicu i slabinsko-križni zglob, križno-bočne zglobove, gornji nožni zglob i zglobove korijena stopala, rameni (lopatično-nadlaktični) zglob i nadlaktično-lakatni zglob, kao i kostotransverzalne zglobove prsnoga koša. Kostotransverzalne veze zadržavaju se dulje od kostovertebralnih i kostosternalnih zglobova, što dovodi do spljoštavanja prsnoga koša tijekom razgradnje.[34]

Poseban je slučaj **paradoksalna disartikulacija** (franc. *dislocation en ordre paradoxal*, engl. *paradoxical disarticulation*), pri kojoj nestabilni zglobovi ostaju artikulirani, dok se stabilni zglobovi razdvajaju.[35] U nekim slučajevima takva opažanja mogu upućivati na prethodnu mumifikaciju, bilo namjernu (umjetnu) ili prirodnu.[36] Ta pojava, zajedno s drugim opažanjima, i dalje je predmet rasprava i sve se više proučava eksperimentalnim istraživanjima.[37]

31 Duday 2009.

32 e.g. Haddow, Knüsel 2017, 52–71.

33 Duday 2009.

34 Duday *et al*. 1990.

35 Duday, Guillon 2006; Maureille, Sellier 1996, 313–327.

36 Sellier, Bendezu-Sarmiento 2013, 30–36.

37 Mickleburgh *et al*. 2022, 542–562; Schotsmans *et al*. (eds) 2017; Schotsmans *et al*. 2022, 500–541.

31 Duday 2009.

32 Npr. Haddow, Knüsel 2017, 52–71.

33 Duday 2009.

34 Duday *et al*. 1990.

35 Duday, Guillon 2006; Maureille, Sellier 1996, 313–27.

36 Sellier, Bendezu-Sarmiento 2013, 30–36.

37 Mickleburgh *et al*. 2022, 542–62; Schotsmans *et al*. 2017 (eds); Schotsmans *et al*. 2022, 500–41.

The distinction between a primary and a secondary deposit is not determined by whether the body was buried or cremated. Cremation, often placed in ceramic containers, is typically considered a secondary burial, as the body was burned before the bones were collected from the pyre. However, cremations can also constitute primary burials, as in *busta*: once the body has been burned, the remains may be treated in various ways, such as being covered with sediment, tiles or other materials.

An inhumation may include both primary and secondary deposits. Funerary deposits can vary greatly in their form and composition, which is why archaeothanatology plays such a crucial role: it enables us to distinguish between different funerary practices and to establish their chronological sequence, thereby offering detailed insights into how the living dealt with the dead.

Position of the Deceased in Primary Burials

In archaeothanatological practice and in cases of primary deposits, various body positions are most commonly recorded. Older terminology – terms such as *decubitus*, *lateral decubitus* and *ventral decubitus* – has largely been replaced by more accessible terms: 'supine', 'prone' or 'side' lying (*sur le dos*, *sur le ventre* and *sur le côté* in French; *supiniran/leđni*, *proniran/trbušni* ili *lateralan/bočni* in Croatian). Limb position is typically described as 'extended', 'flexed' or 'hyperflexed' (*en extension*, *contractée* or *hypercontractée* in French; *ispružen*, *savijen ili zgrčen*, ili *hipersavijen* in Croatian), and for the upper limbs, terms like 'pronation' or 'supination' (*pronation* or *supination* in French, *pronacija* or *supinacija* in Croatian) are used. A distinct category sometimes made is the **foetal position** (*position fœtale* in French*, fetalni položaj* in Croatian), defined by marked hyperflexion of the lower limbs, resembling the curled posture of a foetus. In some cases, individuals may be buried in a seated or squatting position (*sépulture en position assise* or *accroupie* in French, *ukop u sjedećem ili čučećem položaju* in Croatian). This refers to a burial in which the individual rests on their feet or ischial bones, with the spine oriented vertically at the time of deposition.[38]

Decomposition Environment

In interment contexts, one key factor is the nature of the depositional environment (*environnement de decomposition* in French, *okoliš razgradnje* in Croatian) in which the body or bodies underwent decomposition. When a body is deposited and decomposes within a structure that has been promptly backfilled with sediment, the burial is referred to as **full-earthen burial** or **primary earthen burial**, or **in a filled space** (*sépulture primaire en pleine terre* in French, *primarni ukop u ispunjenom prostoru* in Croatian). In such contexts, skeletal articulation and contiguity is typically preserved due to the pressure of surrounding sediments. In contrast, **decomposition in a void** (*décomposition en espace vide* in French, *razgradnja u praznom prostoru* in Croatian) refers

Razlika između primarnoga i sekundarnoga depozita ne ovisi o tome je li tijelo pokopano ili spaljeno. Kremacija, često pohranjena u keramičkim posudama, obično se smatra sekundarnim ukopom jer je tijelo spaljeno prije prikupljanja kostiju s lomače. Međutim, kremacije također mogu biti primarni ukopi, kao u slučaju *bustuma*: nakon što je tijelo spaljeno, ostatci se mogu tretirati na različite načine, primjerice prekrivanjem sedimentom, crjepovima ili drugim materijalima.

Inhumacija može sadržavati i primarne i sekundarne depozite. Pogrebni depoziti mogu se uvelike razlikovati po obliku i sastavu, zbog čega arheotanatologija ima ključnu ulogu: omogućuje razlikovanje različitih pogrebnih praksi i uspostavljanje njihove kronološke sekvence, nudeći detaljan uvid u načine na koje su se živi odnosili prema mrtvima.

Položaj pokojnika u primarnim ukopima

U arheotanatološkoj praksi, u slučajevima primarnih depozita, najčešće se bilježe različiti položaji tijela. Starija terminologija, poput izraza decubitus, lateralni decubitus ili ventralni decubitus, uvelike je zamijenjena pristupačnijim terminima: supiniran (leđni), proniran (trbušni) ili bočni položaj (franc. *sur le dos*, *sur le ventre*, *sur le côté*,engl.*extended*, *flexed*, *hyperflexed*).

Položaj udova obično se opisuje kao ispružen, savijen ili hipersavijen (franc. *en extension*, *contractée*, *hypercontractée*, engl. *extended*, *flexed*, *hyperflexed*), a za gornje udove koriste se i termini poput pronacije ili supinacije (franc./engl. *pronation*, *supination*). **Zgrčeni** položaj odnosi se na širi raspon fleksije, dok se **fetalni položaj** ponekad izdvaja kao posebna kategorija, definirana izraženom hiperfleksijom donjih udova, nalik savijenomu položaju fetusa (franc. *position fœtale*, engl. *foetal position*).

U pojedinim slučajevima pokojnik može biti pokopan u sjedećem ili čučećem položaju (franc. *sépulture en position assise/accroupie*, engl. *burial in a seated/squatting position*), pri čemu tijelo počiva na stopalima ili sjednim kostima, a kralježnica je u trenutku ukopa usmjerena vertikalno.[38]

Okoliš razgradnje

U kontekstima inhumacije ključan je čimbenik priroda depozicijskoga okruženja u kojem se tijelo razgrađivalo. Kada se tijelo polaže u strukturu koja se odmah zatrpava sedimentom, riječ je o **primarnome ukopu u ispunjenome prostoru** (franc. *sépulture primaire en pleine terre*, engl. *full-earthern burial* ili *burial in a filled-space*). U takvim okolnostima artikulacija i neprekinutost kostura obično su očuvani zbog pritiska okolnoga sedimenta. Suprotno tomu, **razgradnja u praznome prostoru** (franc. *décomposition en espace vide*, engl. *decomposition in a void*) odnosi se na slučajeve u kojima grobna struktura ostaje neko vrijeme neispunjena nakon polaganja tijela.[39] To često dovodi do pomicanja skeletnih elemenata izvan izvornih granica tijela. Takva pomica-

38 Rottier 2016, 810–18.

38 Rottier 2016, 810–18.

39 Duday 1990; Duday 2009.

to cases where the burial structure remains unfilled for a period after deposition.[39] This often results in the shifting or displacement of skeletal elements beyond the original boundaries of the body. These displacements differ from those caused by **secondary voids** (*vide secondaire* in French, *sekundarne praznine* in Croatian), the internal or external empty spaces created by the decomposition of soft tissues.[40] Common indicators of decomposition in a void include the full opening of the pelvic girdle at the pubic symphysis, the displacement of the patellae, and the tilting or collapse of the mandible.[41]

Description of Taphonomic Effects

Several recurrent patternings or 'effects' (*effets taphonomiques* in French, *tafonomski učinci* in Croatian) are commonly observed during archaeothanatological fieldwork in human remains. The **alignment effect** or **delimitation effect** (*effet d'alignement* or *effet de délimitation linéaire* in French, *učinak poravnanja / učinak linearne delimitacije* in Croatian) occurs when bones align along an axis, often due to the presence of an object or the structure of the burial.[42] This alignment may appear linear, typically influenced by constraints such as walls or objects, or non-linear, when the bones appear to be contained by a flexible element: textile, plants etc. A related pattern is the **wall effect** (*effet de paroi* in French, *učinak stijenke* in Croatian), which occurs when elements align along the edge of a structure, such as the walls of a grave or burial container, influencing the position of the bones. A **compression effect** (*effet de compression* or *effet de contraintes* in French, *učinak kompresije* ili *učinak ograničenja* in Croatian) occurs when bones are subjected to localized pressure due to the presence of a restrictive material or structure.

Sometimes, such alignment patterns can be identified by recurrent features such as the verticalization of the clavicles, meaning they are oriented cranio-superiorly rather than medio-laterally, due to lateral compression.[43] When an element remains in an unstable position due to the support of a structure or another object, this is known as a **support effect** or **stopper effect** (*effet d'appui* or *effet de butée* in French, *učinak oslonca* or *učinak graničnika* in Croatian).

Other noteworthy effects include the **gutter effect** (*effet de gouttière* in French, *učinak žlijeba* in Croatian), which occurs when elements fall beneath the body into a V-shaped longitudinal dip as the body decomposes. This effect is commonly seen when bones or other remains settle in a channel-like depression.[44] The **hourglass effect** (*effet de sablier* in French, *učinak pješčanog sata* in Croatian) refers to the progressive in-filling of internal voids (*colmatage progressif* in French, *postupno ispunjavanje* in Croatian) within the burial as sediment percolates into spaces left by decomposed soft tissues – for example, the void created by the decomposition of the tissues inside the thoracic cage.

nja razlikuju se od onih uzrokovanih **sekundarnim prazninama** (franc. *vide secondaire*, engl. *secondary voids*), odnosno unutarnjim ili vanjskim šupljinama nastalima razgradnjom mekih tkiva.[40] Uobičajeni pokazatelji razgradnje u praznome prostoru uključuju potpuno otvaranje zdjelice na simfizi preponskih kostiju, pomicanje ivera te naginjanje ili urušavanje donje čeljusti.[41]

Opis tafonomskih učinaka

Tijekom arheotanatološkoga terenskog rada na ljudskim ostatcima često se uočavaju ponavljajući tafonomski učinci (franc. *effets taphonomiques*, engl. *taphonomic effects*). **Učinak poravnanja** ili **učinak linearne delimitacije** (franc. *effet d'alignement / effet de délimitation linéaire*, engl. *alignment effect/delimitation effect*) javlja se kada se kosti poravnavaju duž određene osi, često zbog prisutnosti objekta ili strukture groba.[42] Poravnanje može biti linearno, pod utjecajem ograničenja poput zidova ili predmeta, ili nelinearno, kada su kosti zadržane fleksibilnim elementima poput tekstila ili biljnih materijala.

Srodan je **učinak stijenke** (franc. *effet de paroi*, engl. *wall effect*), koji nastaje kada se elementi poravnavaju uz rub strukture, primjerice zidove groba ili posude, čime se utječe na položaj kostiju. **Učinak kompresije** ili **učinak ograničenja** (franc. *effet de compression / effet de contraintes*, engl. *compression effect*) nastaje kada su kosti izložene lokaliziranomu pritisku zbog prisutnosti restriktivnoga materijala ili strukture.

Takvi se obrasci ponekad prepoznaju po ponavljajućim obilježjima poput vertikalizacije ključnih kostiju, pri čemu su one orijentirane kranijalno-superiorno umjesto medio-lateralno zbog bočne kompresije.[43] Situacije u kojima element ostaje u nestabilnome položaju zahvaljujući osloncu strukture ili drugoga predmeta nazivaju se **učinak oslonca** ili **učinak graničnika** (franc. *effet d'appui / effet de butée*, engl. *support effect / stopper effect*).

Ostali značajni učinci uključuju **učinak žlijeba** (franc. *effet de gouttière*, engl. *gutter effect*), koji nastaje kada elementi tijekom razgradnje padaju ispod tijela u uzdužnu udubinu u obliku slova V. Taj se učinak često opaža kada se kosti ili drugi ostatci talože u kanalastim depresijama. [44] **Učinak pješčanoga sata** (franc. *effet de sablier*, engl. *hourglass effect*) odnosi se na postupno ispunjavanje unutarnjih praznina (franc. *colmatage progressif*, engl. *progressive in-filling*) unutar groba, kada sediment prodire u prostore nastale razgradnjom mekih tkiva, primjerice u šupljinu prsnoga koša.

39 Duday 1990; Duday 2009.
40 Duday 1990; Duday *et al*. 1990; Castex, Blaizot 2017.
41 Duday 1990; Duday *et al*. 1990.
42 Blaizot 2022.
43 Blaizot 2008
44 Blaizot 2017, 137.

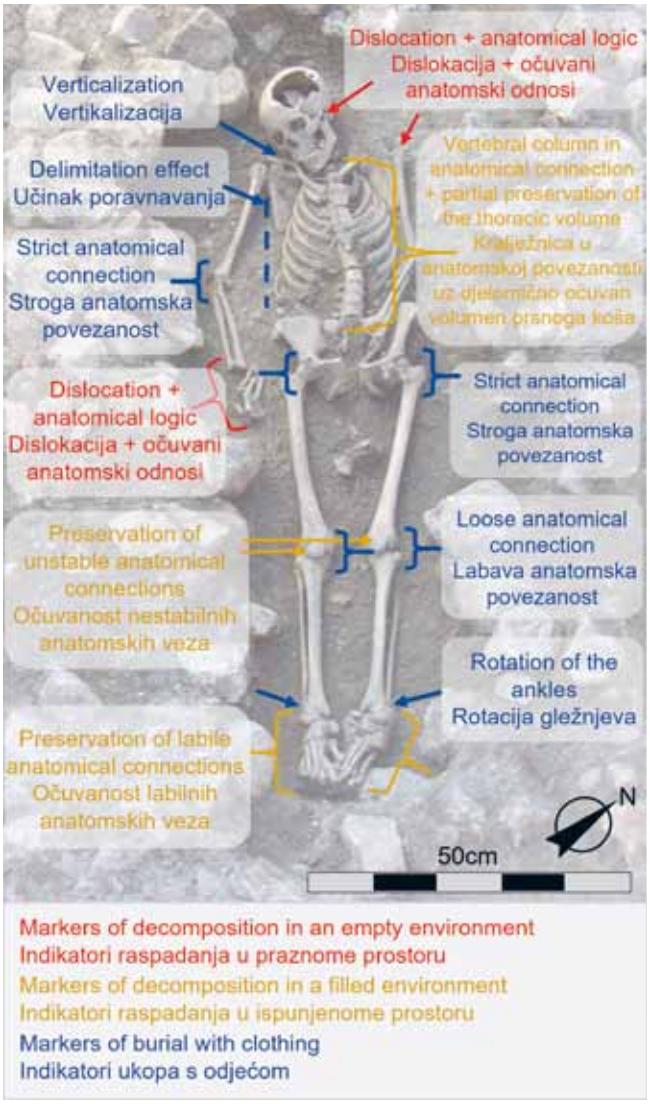


FIGURE 1. Example of archaeothanatological observations, burial 54, excavation of Bruch Saint-Martin , dir. D. Castex and I. Cartron (adapted from a photo by G. Sachau-Carcel).

SLIKA 1. Primjer arheotanatoloških opažanja, ukop 54, istraživanje lokaliteta Bruch Saint-Martin , voditelji: D. Castex i I. Cartron (prilagođeno prema fotografiji G. Sachau-Carcel).

3. Example of a study of an individual primary burial

To illustrate the contributions of an archaeothanatological approach, even in cases that may at first glance appear unambiguous, we present below an example from a Merovingian cemetery in southwestern France (Supplement 1, Fig. 1). A conventional approach would interpret this as a primary burial of an individual lying on their back with semi-extended upper limbs and extended lower limbs in a stone-lined pit. However, taphonomic analysis reveals conflicting indicators suggesting both decomposition in a void and a decomposition in a filled space (see full description in Supplement 1). The arguments in favour of a filled space are visible in that the vertebral column remains connected, the costal cage has only slightly collapsed and lost volume, and there are still connections between labile and unstable joints, such as those of the patellae and feet, with the strict connection of the right foot in particular.

On the other hand, several indicators suggest that the body underwent decomposition in an empty space. These include man-

3. Primjer proučavanja pojedinačnoga primarnog ukopa

Kako bismo ilustrirali doprinos arheotanatološkoga pristupa, čak i u slučajevima koji se na prvi pogled čine jednoznačnima, u nastavku donosimo primjer s merovinškoga groblja u jugozapadnoj Francuskoj (prilog 1, sl. 1). Konvencionalni pristup interpretirao bi ovo kao primarni ukop pojedinca koji leži na leđima s polupruženim gornjim udovima i ispruženim donjim udovima u grobnoj jami obloženoj kamenjem. Međutim, tafonomska analiza otkriva kontradiktorne pokazatelje koji sugeriraju i raspadanje u praznome prostoru i raspadanje u ispunjenome prostoru (vidi puni opis u prilogu 1). Argumenti u korist ispunjenoga prostora vidljivi su u kralježnici koja ostaje povezana, rebrima koja su se tek blago srušila i izgubila volumen te u postojanju veza između labavih i nestabilnih zglobova, kao što su koljena i stopala, pri čemu je posebno istaknuta čvrsta povezanost desnoga stopala.

Međutim, nekoliko pokazatelja sugerira da je tijelo prošlo raspadanje u praznome prostoru. To uključuje odvajanje donje čeljusti, dislokaciju lijevoga lakta i pad lijeve proksimalne nadlaktične

dibular disjunction, the dislocation of the left elbow and the fall of the left proximal humerus behind the left scapula, and the dislocation of the wrist and right hand. The right hand, in particular, is a perfect example of decomposition in an empty space: although the anatomical logic is intact, none of the bones remain strictly connected. It is important to note, however, that the fall of the left hand inside the pelvic girdle is not necessarily indicative of decomposition in an empty space, as the void forms during decomposition.

There is no evidence of a wall effect, and the irregular edges of the pit do not allow for the presence of wooden boards, particularly on the right side. The configuration of the void does not appear to have been shaped by a wooden framework or planks. It is therefore likely that the void was maintained by a perishable material supported by the stone-lined edges of the grave.

Particular attention should be paid to certain elements that remained articulated within the void left by decomposition and offer several key insights. The right clavicle is verticalized, and the right elbow is in strict connection, while the wrist and hand are completely dislocated. Moreover, there is visible delineation between the right scapula and the right ribs, even though the upper limb is displaced. Similarly, in the lower limbs, the femurs are strictly connected to the hip bones, but loosely connected to the tibiae, while the tarsal bones, particularly the metatarsals and phalanges, remain strictly connected. These anomalies would suggest that the individual was buried clothed, particularly around the upper body. For the lower body, the presence of trousers and/or socks is indicated by the rotation of the ankles and the positioning of the feet, although it is difficult to conclusively favour one or the other. The possibility that the individual was wearing shoes can be dismissed, given the marked degree of flexion of the forefoot, which is incompatible with an arch support.

The archaeothanatological analysis therefore allows for significant clarification of the funerary arrangement and architecture: the individual was buried clothed, but without footwear, within an initially empty space, likely maintained by a perishable covering supported by the stone-lined edges of the grave. Applying this method across the full funerary assemblage, and integrating archaeothanatological data with biological information (e.g. age at death, sex, health status, DNA analysis, isotopic analysis etc.), offers valuable opportunities for a thorough and nuanced reconstruction of burial practices and offers meaningful insights into the social identities of individuals within the group.

Conclusion

This paper provides a brief overview of the development of archaeothanatology as a distinct discipline and research approach, and outlines its fundamental principles. It also highlights key steps in fieldwork, proposes a translation of the terminology into Croatian, and presents the practical application and advantages of this approach through a case study. The aim was to emphasize the importance of detailed field observations, to foster collaboration and dialogue on funerary practices within both the Croatian and international archaeo-anthropological communities, and to promote an inclusive and interdisciplinary ap-

kosti iza lijeve lopatice te dislokaciju zgloba šake i desne ruke. Desna je ruka posebno dobar primjer raspadanja u praznome prostoru: iako je anatomska logika očuvana, nijedna kost nije strogo povezana. Važno je, međutim, napomenuti da pad lijeve ruke unutar zdjeličnoga pojasa ne mora nužno upućivati na raspadanje u praznome prostoru, jer se prazan prostor formira tijekom raspadanja.

Nema dokaza o učinku stijenke, a nepravilni rubovi jame ne dopuštaju prisutnost drvenih dasaka, osobito s desne strane. Konfiguracija praznoga prostora ne čini se oblikovanom drvenim okvirom ili daskama. Stoga je vjerojatno da je prazan prostor održavao propadljivi materijal oslonjen na kamene rubove groba.

Posebnu pozornost trebalo bi posvetiti određenim elementima koji su ostali artikulirani unutar praznoga prostora nastaloga raspadanjem, jer pružaju nekoliko ključnih uvida. Desna je ključna kost vertikalizirana, a desni je lakat u strogoj povezanosti, dok su zglob šake i šaka potpuno dislocirani. Nadalje, vidljivo je jasno razgraničenje između desne lopatice i desnih rebara, iako je gornji ud pomaknut. Slično tomu, na donjim udovima bedrene su kosti strogo povezane s kukovima, ali labavo povezane s goljeničnim kostima, dok su kosti stopala, kosti donožja i članci strogo povezani. Te anomalije sugeriraju da je pojedinac ukopan odjeven, osobito u gornjem dijelu tijela. Na donjem dijelu tijela rotacija gležnjeva i položaj stopala sugeriraju prisutnost hlača i/ili čarapa, premda je teško jasno razlikovati te dvije mogućnosti. Mogućnost nošenja obuće može se isključiti zbog izraženoga stupnja fleksije prednjega dijela stopala, nespojivoga s potporom svodu stopala.

Arheotanatološka analiza stoga omogućuje preciznije tumačenje pogrebnoga rasporeda i grobne arhitekture: pokojnik je pokopan odjeven, ali bez obuće, u inicijalno praznome prostoru, koji je vjerojatno bio osiguran raspadljivim pokrovom oslonjenim na kamenom obložene rubove groba. Primjena te metode na cjelokupni pogrebni skup, u kombinaciji s biološkim podatcima (npr. dobi u trenutku smrti, spolom, zdravstvenim stanjem, DNK analizama, analizama stabilnih izotopa itd.), omogućuje temeljitu i nijansiranu rekonstrukciju pogrebnih praksi te pruža dublji uvid u društvene identitete pojedinaca unutar zajednice.

Zaključak

Ovaj rad donosi kratak pregled razvoja arheotanatologije kao zasebne discipline i istraživačkoga pristupa te objašnjava njezine temeljne postavke. Također se ističu ključni koraci terenskoga rada, predlaže prijevod strukovnoga nazivlja na hrvatski jezik te se na primjeru studije slučaja prikazuju praktična primjena i prednosti ovoga pristupa. Cilj je bio naglasiti važnost detaljnih terenskih opažanja, potaknuti suradnju i dijalog o pogrebnim praksama unutar hrvatske i međunarodne arheoantropološke zajednice te promicati uključiv i interdisciplinaran pristup razumijevanju pogrebnih fenomena. Predloženi prijevod zamišljen je

proach to understanding funerary phenomena. The translation is intended as a preliminary proposal, open to discussion and further refinement through dialogue on diverse funerary practices and the application of archaeothanatological methods in both planned and rescue archaeology contexts.

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SUPPLEMENT 1. Location of the site of Bruch in south-western France (photo by ©E. Gaba, source: Wikimedia Commons).

PRILOG 1. Položaj lokaliteta Bruch u jugozapadnoj Francuskoj (snimio ©E. Gaba, izvor: Wikimedia Commons).

Supplement 1: Example of archaeothanatological description, grave 54 at Bruch Saint-Martin, France.

Context: This example comes from a Merovingian cemetery (6th – 8th centuries CE) in Southwest France (Lot-et-Garonne), in the town of Bruch, located on the western bank of the River Garonne (Supplement 1). The planned excavation was led by D. Castex (CNRS, UMR 5199 PACEA, Bordeaux) and I. Cartron (University of Bordeaux-Montaigne, UMR 5607 Ausonius) between 2011 and 2014. The site was initially occupied by a villa during the Late Gallo-Roman period, the walls of which were later reused to enclose a funerary space in the Early Middle Ages. Approximately fifty graves on a surface of 250 m² were discovered in a rocky detrital layer prior to the interruption of the archaeological excavations, which ended before the site could be fully explored.[45]

Prilog 1: Primjer arheotanatskoga opisa, grob 54 na lokalitetu Bruch Saint-Martin, Francuska.

Kontekst: Ovaj primjer potječe iz merovinškoga groblja (6. – 8. stoljeće) na jugozapadu Francuske (Lot-et-Garonne), u gradu Bruch, smještenome na zapadnoj obali rijeke Garonne (prilog 1). Sustavna iskopavanja vodili su D. Castex (CNRS, UMR 5199 PACEA, Bordeaux) i I. Cartron (Sveučilište Bordeaux-Montaigne, UMR 5607 Ausonius) između 2011. i 2014. godine. Na lokalitetu se prvotno nalazila vila iz kasnoga galorimskog razdoblja, čiji su zidovi u ranome srednjem vijeku ponovno korišteni za ograđivanje pogrebnoga prostora. Na površini od 250 m², u stjenovitoj detritalnoj podlozi, otkriveno je oko pedeset grobova prije nego što su arheološka istraživanja prekinuta. Budući da istraživanja nisu dovršena, lokalitet nije u potpunosti istražen [45]

45 Cartron, Castex 2018, 209–224.

45 Cartron, Castex 2018, 209–224.

The example presented is grave 54, belonging to a single individual in primary deposit, laid on their back with the upper limbs slightly flexed and the lower limbs in extension (Fig. 1, Supplement 2). The majority of joints are in strict connection, and the skeleton is fully represented. The trauma to the skull is post-mortem and happened during the discovery of the burial ground with a mechanical digger.

Prikazani primjer odnosi se na grob 54, u kojem se nalazio jedan pojedinac u primarnome ukopu, položen na leđa s gornjim udovima blago savijenima i donjim udovima u ekstenziji (sl. 1, prilog 2). Većina zglobova nalazi se u strogoj anatomskoj povezanosti, a kostur je potpuno očuvan. Trauma na lubanji nastala je postmortalno tijekom otkrivanja groblja mehaničkim iskopavanjem.



SUPPLEMENT 2. Burial 54, excavation of Bruch Saint-Martin, dir. D. Casteux and I. Cartron (photo by G. Sachau-Carcel).

PRILOG 2. Ukop 54, istraživanje lokaliteta Bruch Saint-Martin , voditelji: D. Casteux and I. Cartron (snimila G. Sachau-Carcel).

Description of the skeletal elements

The skull is visible from the right superolateral aspect. The mandible appears in right superolateral view, inferiorly to the maxilla. The left temporomandibular joint is disconnected, and the condyle has emerged from the mandibular fossa.

The cervical vertebrae described during the removal of the spinal column are in strict connection from the first to the fourth, and in loose connection for the last three cervical vertebrae, which appear anteriorly with a superior component. The cervical spine deviates to the right, consistent with the position of the skull. The first thoracic vertebra (TV1) is loosely connected to the second. TV2 to TV8 are in strict connection and appear in anterior view. TV8 is disconnected from TV9. The thoric vertebrae 9 to 12 are strictly connected to each other, while TV12 and the first sacral vertebra (LV1) are disconnected. The segment from T9 to T12 exhibits a slight angulation towards the right-hand side. Lumbar vertebrae 1 to 5 are in strict anatomical connection with each other and the sacrum.

Supplement 2

The shoulder girdle is disconnected, but in anatomical logic. The right clavicle appears in superior view, slightly verticalized, lying on the second right rib. The left clavicle is loosely connected to the left scapula and appears in its anterior aspect. The two clavicles are disconnected from the manubrium, which appears in anterior view with a right component. The manubrium is connected to the sternum, which is in anterior view with a slight right lateral component, and has also slipped towards the left ribs. The body of the sternum is fused to the xyphoid process. The distal parts of the left ribs lie anteriorly to the sternum (ribs 5 to 7). The right scapula is visible from the anterolateral side and is partially flattened. The left scapula appears in its anterior aspect.

The first and second ribs appear in superior view and are disconnected from the thoracic vertebrae. The thoracic cage has preserved part of its original volume, with the ribs having collapsed inferiorly and appearing in superoanterior view. On the right side, the heads of ribs 8, 9 and 10 are disconnected from the thoracic vertebrae and rise along the vertebral body. The last ribs (11 and 12) are slightly open and appear in endo-superior view. The bodies of the ribs are superimposed at the same angle and openness and are aligned with the right scapula. The left ribs have collapsed forwards in superior view for the 3rd rib and in superoanterior view for ribs 4 to 10. Ribs 11 and 12 are open and endo-superior, against the left ulna. Ribs 5 to 7 are in front of the sternum, extending beyond the median axis of the body. This position shows the effect of the pressure exerted on these ribs during decomposition. The ribs cannot open or collapse laterally, so they have moved into the space freed up by the abdomen, anteriorly to the spine.

Opis skeletnih elemenata

Lubanja je vidljiva iz desnoga superolateralnog aspekta. Donja čeljust nalazi se inferiorno u odnosu na gornju čeljust, u desnome superolateralnom položaju. Lijevi je čeljusni zglob dislociran, a kondil je izašao iz donjočeljusne jame.

Vratni kralješci, opisani tijekom uklanjanja kralježnice, nalaze se u strogoj anatomskoj povezanosti od prvoga do četvrtoga, dok su posljednja tri vratna kralješka u nestabilnoj anatomskoj povezanosti i pomaknuta anteriorno sa superiornom komponentom. Vratni dio kralježnice odstupa udesno, u skladu s položajem lubanje. Prvi prsni kralježak (Th1) u nestabilnoj je povezanosti s drugim. Kralješci Th2 do Th8 nalaze se u strogoj anatomskoj povezanosti i vidljivi su u anteriornome pogledu. Th8 je dislociran u odnosu na Th9. Prsni kralješci Th9 do Th12 međusobno su u strogoj anatomskoj povezanosti, dok su Th12 i prvi križni kralježak (S1) dislocirani. Segment od Th9 do Th12 pokazuje blagu angulaciju prema desnoj lateralnoj strani. Slabinski kralješci L1 do L5 nalaze se u strogoj anatomskoj povezanosti međusobno i s križnom kosti.

Prilog 2

Rameni je obruč dislociran, ali u skladu s anatomskim odnosima. Desna ključna kost vidljiva je u superiornome pogledu, blago vertikalizirana, položena na drugo desno rebro. Lijeva ključna kost u nestabilnoj je anatomskoj povezanosti s lijevom lopaticom i vidljiva je na njezinu anteriornom aspektu. Obje ključne kosti dislocirane su u odnosu na držak prsne kosti, koji je vidljiv u anteriornome pogledu i pomaknut ulijevo. Držak prsne kosti povezan je s trupom prsne kosti, koja je vidljiva u anteriornome pogledu s blagom desnom lateralnom komponentom te je također pomaknuta prema lijevim rebrima. Tijelo prsne kosti sraslo je s vrškom prsne kosti. Distalni dijelovi rebara (5–7) nalaze se anteriorno u odnosu na prsnu kost. Desna lopatica vidljiva je iz anterolateralnoga aspekta i djelomično je spljoštena. Lijeva lopatica vidljiva je na svome anteriornom aspektu.

Prvo i drugo rebro vidljivi su u superiornome pogledu i dislocirani su u odnosu na prsne kralješke. Prsni koš djelomično je očuvao svoj izvorni volumen, pri čemu su se rebra urušila inferiorno te su vidljiva u superoanteriornome pogledu. Glave desnoga 8., 9. i 10. rebra dislocirane su od prsnih kralježaka i uzdižu se uz tijela kralježaka. Posljednja rebra (11. i 12.) blago su otvorena i vidljiva u endosuperiornome pogledu. Tijela rebara preklapaju se pod istim kutom i otvorenošću te su poravnata s desnom lopaticom. Lijeva su se rebra urušila anteriorno: treće rebro vidljivo je u superiornome pogledu, a rebra 4. – 10. u superoanteriornome pogledu. Rebra 11. i 12.otvorena su i u endosuperiornome položaju, uz lijevu lakatnu kost. Rebra 5. – 7. nalaze se anteriorno u odnosu na prsnu kost iprelaze središnju os tijela. Taj položaj odražava učinak pritiska koji je djelovao na ta rebra tijekom raspadanja. Budući da se rebra nisu mogla otvoriti niti urušiti lateralno, pomaknula su se u prostor oslobođen raspadom trbušne šupljine, anteriorno u odnosu na kralježnicu.

The right upper limb is semi-flexed and displaced laterally from the trunk. The right humerus is in anterolateral view, disconnected from the scapula, with the humeral head having descended into the glenoid cavity. The right elbow is strictly connected. The right radius appears the right radius and right ulna appear in anterolateral aspect. The distal articulation of these two right bones is loose. The right carpus is disconnected. The right metacarpals and phalanges are in anatomical logic but not connected, with the various aspects suggesting a pronated position of the right hand, dorsally, with the first ray below rays 3, 4 and 5. The left upper limb is also semi-flexed. The left humerus is completely disconnected from the scapula and has fallen behind the glenoid cavity. It appears in its anterior aspect. The left elbow is completely disconnected. The left radius has passed anteriorly to the left ulna and appears in posterior view, with the ulnar head raised above the distal part of the humerus. The left ulna appears posteriorly, behind the left radius and in front of the left hip bone. The left radius and ulna are disconnected. The carpus and left hand have collapsed into the pelvic girdle, as evidenced by the capitate in lateral view into the sacrum. The third metacarpal is in continuity with the ulna, a relationship that is anatomically incongruent.

The proximal phalanges appear on their superior or proximal surface, in a bundle through the obturated foramen of the left coxal bone. A proximal phalanx is located inferiorly to the hand, between the two femurs. The pelvic girdle is semi-open, the right coxal bone is slightly flattened, with an opening of the symphysis pubis, while the left coxal bone is in strict connection with the sacrum. The right coxal bone appears in its anteromedial aspect, while the left coxal bone is seen anteriorly. The lower limbs are in extension, with the knees and ankles close together and the feet together.

The right femur, visible from the anterior view, is in strict connection with the right coxal bone, the right knee joint is loosely connected, and the patella is slightly displaced inferiorly but remains balanced on the femur. The right tibia is seen antero-medially, in strict connection with the talus and fibula proximally and distally. The various right tarsal bones are in strict connection with each other and with the metatarsals. The right foot has lateral eversion of the posterior tarsus and medial eversion from the metacarpals. All the right metatarsals and phalanges are in strict connection. The left femur is seen anteriorly and in strict connection with the patella and loose connection with the tibia. The left tibia is seen antero-medially and is in strict connection with the fibula. The left talus is disconnected from the left tibia and disconnected from the navicular; it is visible from its superoanterior face. The aspects of the right and left tibia do not allow maintenance of a strict connection with the femurs.

The medial and anterior sides of the cuneiforms are visible, and the position of the metatarsals are anatomically consistent with the cuneiforms, even if they are superimposed on the 3rd in front of the 4th. The posterior tarsus is everted laterally, whereas the anterior tarsus, metatarsals and phalanges are drawn medially. The left first metatarsal has fallen forwards towards the right foot. The right proximal phalanx of ray 1 lies anterior to the left proximal phalanx of ray 3. The feet exhibit lateral delimitation

Desni je gornji ud polusavijen i lateralno pomaknut u odnosu na trup. Desna nadlaktična kost vidljiva je u anterolateralnome pogledu, dislocirana u odnosu na lopaticu, pri čemu je glava nadlaktične kosti spuštena u plitku zglobnu šupljinu lopatice. Desni lakat nalazi se u strogoj anatomskoj povezanosti. Desna palčana i lakatna kost vidljive su u anterolateralnome pogledu. Distalna artikulacija tih dviju kostiju u nestabilnoj je povezanosti. Kosti su desnoga zapešća dislocirane. Kosti pešća i članci desne ruke nalaze se u skladu s anatomskim odnosima, ali nisu u povezanosti; njihovi položaji upućuju na pronirani položaj šake, dorzalno, pri čemu je prvi snop smješten ispod snopova 3, 4 i 5. Lijevi gornji ud također je polusavijen. Lijeva nadlkatična kost potpuno je dislocirana u odnosu na lopaticu te je pomaknuta posteriorno od plitke zglobne šupljine lopatice. Vidljiva je u anteriornome pogledu. Lijevi lakat potpuno je dislociran. Lijeva palčana kost pomaknuta je anteriorno u odnosu na lijevu lakatnu kost i vidljiva je u posteriornome pogledu, pri čemu je glava lakatne kosti uzdignuta iznad distalnoga dijela nadlaktične kosti. Lijeva lakatna kost vidljiva je posteriorno, iza lijeve palčane kosti i ispred lijeve zdjelične kosti. Lijeva su palčana kost i lakatna kostdislocirane. Zapešće i lijeva šaka urušili su se u zdjelični obruč, što potvrđuje položaj glavičaste kosti vidljive u lateralnome pogledu u području križne kosti. Treća metakarpalna kost nalazi se u kontinuitetu s lakatnom kosti, što ukazuje na anatomski nepodudaran odnos.

Proksimalni članci prstiju vidljivi su na svojoj superiornoj, odnosno proksimalnoj strani, grupirani u snopu unutar opturacijskoga otvora lijeve zdjelične kosti. Jedan proksimalni članak prsta nalazi se inferiorno u odnosu na šaku, između obje bedrene kosti. Zdjelični je obruč poluotvoren; desna zdjelična kost blago je spljoštena, uz razmak simfize preponskih kostiju, dok je lijeva zdjelična kost u strogoj anatomskoj povezanosti s križnom kosti. Desna zdjelična kost vidljiva je na svome anteromedijalnom pogledu, dok je lijeva zdjelična kost vidljiva anteriorno. Donji udovi nalaze se u ekstenziji, s koljenima i gležnjevima blizu jedan drugomu te priljubljenim stopalima.

Desna bedrena kost, vidljiva u anteriornome pogledu, nalazi se u strogoj anatomskoj povezanosti s desnom zdjeličnom kosti. Desni koljeni zglob u nestabilnoj je povezanosti, a iver je blago pomaknut inferiorno, ali i dalje uravnoteženo leži na bedrenoj kosti. Desna goljenična kost vidljiva je u anteromedijalnome pogledu i u strogoj je anatomskoj povezanosti sa skočnom i lisnom kosti, proksimalno i distalno. Kosti nožja desnoga stopala nalaze se u strogoj anatomskoj povezanosti međusobno i s kostima donožja. Desno stopalo pokazuje lateralnu everziju (izvrtanje prema van) stražnje kosti nožja i medijalnu everzijuu području kostiju donožja. Sve kosti donožja i članci desnoga stopala nalaze se u strogoj anatomskoj povezanosti.

Lijeva bedrena kost vidljiva je u anteriornome pogledu i u strogoj anatomskoj povezanosti s iverom, dok je s goljeničnom kosti u nestabilnoj povezanosti. Lijeva goljenična kost vidljiva je u anteromedijalnome pogledu i u strogoj je anatomskoj povezanosti s lisnom kosti. Lijeva gležanjska kost dislocirana je u odnosu na lijevu goljeničnu kost i čunastu kost stopala i vidljiva je sa svoje superoanteriorne strane. Položaji desne i lijeve goljenične kosti ne omogućuju održavanje stroge anatomske povezanosti s bedrenim kostima.

and compression effects from the anterior tarsus to the intermediate phalanges, resulting from flexion of the feet, like a dancer's pointe position.

Vidljive su medijalne i anteriorne strane klinastih kostiju stopala, a položaj kostiju donožja u skladu je s anatomskim odnosima s klinastim kostima, iako su djelomično superponirane, pri čemu se treća nalazi anteriorno u odnosu na četvrtu. Stražnje kosti nožja pokazuje lateralnu everziju, dok su prednje kosti nožja, kostidonožja i članci pomaknuti medijalno. Lijeva prva kost donožja pomaknuta je anteriorno prema desnome stopalu. Desni proksimalni članak prvoga snopa nalazi se anteriorno u odnosu na lijevi proksimalni članak trećega snopa. Stopala pokazuju učinke lateralne delimitacije i kompresije od prednjega dijela nožja do srednjih članaka, kao posljedicu fleksije stopala, nalik baletnomu položaju na prstima (*en pointe*).

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