

Social Differentiation and Mortuary Rituals at the Xigongqiao Site: Insights into the Dawenkou–Longshan Transition in Southern Shandong

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Abstract:

The Xigongqiao site in Tengzhou is a representative Dawenkou Culture site in eastern China, specifically in southern Shandong Province, yielding abundant mortuary materials. All tombs at the site date to the late middle to late phase of the Dawenkou Culture, essentially belonging to the early Longshan period. This study employs basic research methods to statistically analyze tomb structure, the types of grave goods, and their placement within the tombs, resulting in the identification of three hierarchical tomb grades. The differentiation in tomb hierarchy at Xigongqiao indicates that the site's inhabitants had already developed disparities in private wealth and social status. Concurrently, evidence suggestive of the emergence of mortuary ritual systems is also present within the mortuary context. On one hand, the site inherits the Peiligang Culture's mortuary concept centered on the concept of food and drink, manifested further in the spatial separation of drinking-related and eating-related grave goods. On the other hand, the concept of treating the deceased as if living, which later became widespread and profoundly influential throughout Chinese history, may have already begun to germinate at this site. The mortuary remains at Xigongqiao reflect key social transformations during the Yangshao–Longshan transition, including social differentiation and the emergence of mortuary ritual systems. Future research employing scientific archaeological techniques, such as isotope analysis and residue testing, will be crucial for probing the deeper drivers behind these transformations.

Keywords: Neolithic China; Dawenkou culture; Mortuary practices; Grave goods placement.

1. Introduction

The site Xigongqiao is situated in Tengzhou City, southern Shandong Province, approximately 300 meters southwest of Xigongqiao Village, GuanQiao Town. The site lies within the southwestern piedmont zone of the central-south Shandong mountains, on a river terrace at the confluence of the ancient course of the Xue River and the Xiaowei River. The terrain slopes downward from north to south. The site is roughly elliptical in plan, measuring approximately 250 meters north-south and 200 meters east-west, covering an area of about 50,000 square meters. From October to December 1998, in response to the construction of the Beijing-Fuzhou Expressway, the Shandong Provincial Institute of Cultural Relics and Archaeology conducted survey and salvage excavations at the site. These efforts revealed 48 Dawenkou period tombs and unearthed over 300 artifacts, including pottery, stone tools, and bone objects [1, 2].

The mortuary remains are predominantly from the middle to late Dawenkou period, dating roughly between approximately 5000 BP (Before Present) and 4500 BP. Dawenkou period remains are also abundant in the vicinity of the site. To the south, it adjoins the Xikangliu site, and other prehistoric sites such as Guancun South, Beixin, and Gangshang are distributed nearby. Sites dating to both the Beixin Culture and the Dawenkou Culture periods within this region exhibit a distinct linear distribution pattern along river valleys. This trend is particularly evident in areas where archaeological investigations have been more thorough [3,4].

As the excavation was a salvage operation confined to the area affected by the expressway construction, the 48 tombs uncovered represent only a portion of the entire cemetery. Therefore, additional tombs remain unexcavated. Consistent with the burial patterns observed at most Dawenkou period cemeteries, the 48 tombs exhibit a zonal arrangement. They can be broadly divided into four clusters (A, B, C, D), with an additional four scattered tombs that could not be assigned to any specific cluster[1]. He Deliang proposed that each cluster represents a clan cemetery consisting of individuals with close kinship ties. Furthermore, analysis (e.g., tomb cuts and overlays) indicate that the cemetery was used over a considerable period, rather than all burials occurring simultaneously [5].

2. Mortuary Analysis

This study primarily employs traditional, basic research methods. Integrating the site's chronological context and cultural affiliation, it conducts statistical analyses of the types, quantities, and distributional characteristics of distinctive grave goods within the tombs. Although 48 tombs were uncovered, four tombs (M19, M40, M4, M35) were excluded from statistical analysis due to severe damage. Consequently, the study focuses on the remaining 44 tombs.

All 44 tombs are vertical earthen pit burials. Among these, 20 tombs feature a ledge within the pit. The majority of tombs lacked wooden coffins. Traces of a rectangular wooden coffin were only identified in M38. In some burials, pottery vessels were used as coverings for the head and limbs. Regarding burial posture, single extended supine burial predominates. A small number of flexed burials and double burials also occur. The quantity of grave goods varies significantly among tombs. Tomb M38 contained the highest number, with 55 items, while eight tombs were devoid of any grave goods. Pottery constitutes the primary category of grave goods, followed by stone and bone objects. Among the pottery, mingqi (articles for the dead) predominate. Larger utilitarian vessels were primarily used as coverings, often found broken over the skeletal remains. The main vessel forms include Ding(tripod for cooking meat and cereals), Dou(a high-stemmed shallow saucer with cover on a round base, using for keeping minced meat) , flattened-bottle, bottle , jar, cylindrical cup, and tall-stemmed cup. Isolated instances included offerings of water deer (*Hydropotes inermis*) canines and pig mandibles. Additionally, deliberate tooth ablation was observed among the deceased [1]. This assemblage of mortuary data—characterized by its considerable size, good integrity, and diversity in tomb structure and burial posture—provides a solid foundation for the analyses presented in this study.

2.1 Tomb Hierarchy

2.1.1 Lowest Tier for Grade 1

Grade 1 comprises tombs lacking both an erchentai and grave goods. Six tombs belong to this grade (M20, M27, M22, M30, M29, M44), distributed across Clusters A, B, D, and among the scattered tombs. A typical tomb(M22)of Grade 1 is illustrated in Figure 1.

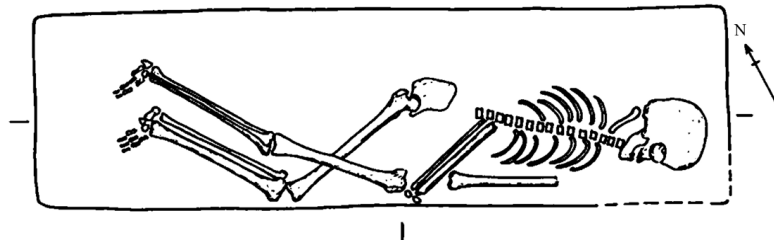


Fig. 1 Plan of Grade 1 Tomb M22

Tombs of this grade exhibit the lowest specifications among the three tiers. Their average length, width, and depth are minimal, barely sufficient to accommodate the interment of the deceased. Furthermore, flexed burial posture is a distinctive characteristic exclusive to this grade. Statistical analysis shows that among the seven individuals interred in these six tombs, four were buried in a flexed position (frequency: 4/7). Crucially, flexed burials at the Xigongqiao site occur only within this tomb grade. Considering the combination of features—simple tomb structure, absence of grave goods, low specifications, and distinctive (flexed) burial posture—the occupants of Grade 1 tombs likely represent individuals with the least wealth and the lowest social status within the community.

2.1.2 Middle Tier for Grade 2

Grade 2 comprises tombs containing grave goods but lacking a ledge. Eighteen tombs belong to this grade, distributed across all clusters except D.

Tombs of this grade contain between 1 and 7 grave goods. Their average length (1.9m), width (0.55m), and depth (1.07m) fall between those of Grades 1 and 3. A burial practice distinctive to this grade is the placement of shattered pottery vessels as coverings over the head, face, and torso of the deceased. Statistical analysis indicates that this practice occurred in 8 out of the 18 tombs (frequency: 8/18) and was exclusive to Grade 2. All burials in this grade are extended supine, possibly resulting from treatments aimed at securing the feet together or similar practices. Tomb M13, shown in Figure 2, exemplifies the characteristics of this grade.

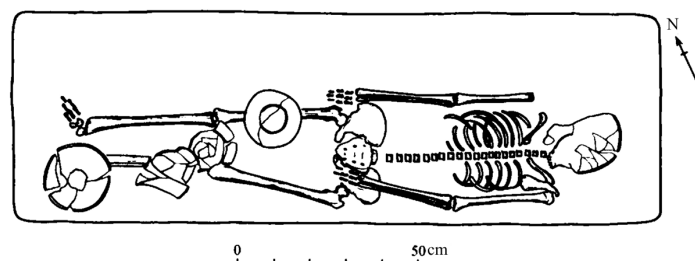


Fig. 2 Plan of Grade 2 Tomb M13

The presence of grave goods and this intentional burial practice suggest that the occupants of Grade 2 tombs possessed a certain degree of social status and wealth, and that their funerary rites involved planned procedures.

2.1.3 Grade 3 (Highest Tier)

Grade 3 comprises tombs featuring a ledge. Twenty tombs belong to this grade, distributed across all clusters. Four tombs in Cluster D have a ledge constructed of rammed earth, while the others have ledges cut into undisturbed soil. This grade has the highest average number of grave goods (approx. 12 items) and the largest average dimensions: length (2.1m), width (0.77m), and depth (0.92m).

Beyond their larger size and greater quantity of grave goods, these tombs exhibit distinctive features in artifact types, combinations, and placement. Firstly, regarding vessel types and combinations, Ding, Dou, flattened bottles, and cups finds are ubiquitous in Grade 3 tombs. Statistical

analysis reveals that Ding, Dou, and flattened bottle appear in 90% of these tombs, while cylindrical cups appear in 80%. Comparing finds from refuse pits at Xigongqiao, Ding were the most common vessel type in pits and are also relatively frequent in Grades 1 and 2 tombs. This suggests they were widely used vessels in society, not exclusive to high status. In contrast, Dou and flattened bottle show markedly higher frequencies in Grade 3 tombs (90%) compared to other tombs (12.5%), indicating they were likely markers of higher social rank. The flattened bottle is particularly significant. The data demonstrates that of the 21 tombs site-wide yielding a flattened-bottle, every tomb contained only one such vessel. For example, despite containing 55 pottery vessels, M38 (Figure 3) yielded only one flattened-bottle. This strongly suggests that the flattened bottle itself, or its contents, held special significance in the funerary rites, serving as a key identifier of the occupant's status during life.

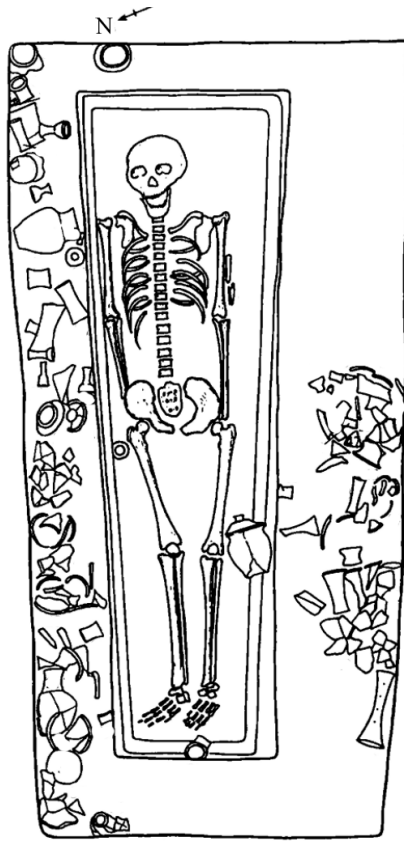


Fig. 3 Plan of Grade 3 Tomb M38

Table 1. Frequency of Artifact Placement Below the Ledge in Grade 3 Tombs

Vessel Type	Ding	Dou	Zun	Weng	Gui
Frequency(%)	5.56	0	0	0	0
Vessel Type	Cylindrical Cup	Tall-stemmed Cup	Flattened-bottle	Bottle	Jar
Frequency(%)	43.75	55.56	28.57	38.89	23.08

The area below the ledge is physically closer to the deceased. This spatial arrangement may reflect greater emphasis placed on cups, bottles, and similar liquid containers, or on their contents, within the mortuary customs. This interpretation is supported by the unique pattern observed with the flattened bottle.

Furthermore, mortuary practices reflect not only the deceased's wishes, but also ritual behaviors shaped by societal beliefs. Therefore, the distinction between ledge and pit placement might represent a spatial separation of the "deceased's personal possessions" (intended for their use) and the "ritual offerings of the living." The area below the ledge (and inside the coffin in tombs like M38), being closer to the body, likely served as the space for items belonging to the deceased or signifying their identity. The area on the ledge, conversely, functioned as a ritual space

Secondly, the placement of artifacts shows a clear distinction between items positioned on the ledge and those placed below it within the central pit. As indicated by the frequency data (referenced in Table 1), Ding, Dou, Zun (a breaker-shaped rectangular vessel), Weng (urn), and Gui (pitcher) are found almost exclusively on the ledge. Vessel types with a higher-than-average frequency (mean=21.74%) of placement below the ledge include cylindrical cups, tall-stemmed cups, bottle, Flattened-bottle, and jar. Additionally, the few small cups and pottery Gu (beaker) found were all located below the ledge. While tripods and stemmed dishes (food-related vessels) are common in tombs with ledges, they are almost always placed on the ledge. Conversely, vessels placed below the ledge are predominantly types associated with holding liquids.

during the burial ceremony, used for placing sacrificial offerings and conducting rites.

In summary, the complex tomb structure, larger dimensions, greater quantity of grave goods, prevalence of diagnostic vessel types, and organized placement patterns in Grade 3 tombs collectively indicate that their occupants, or those who presided over their funerals, held significantly higher wealth and social status within the community.

2.2 Mortuary Concepts

Grave goods in the site's tombs consist predominantly of mingqi (ritual objects exclusively for the dead), indicating their symbolic nature. Mortuary practices, as societal rituals, reflect not only the lifetime social status of specific groups but also their funerary beliefs and concepts of death. These practices represent ritual behaviors shaped

by contemporary social ideologies. Higher-status tombs received greater ceremonial care and possessed sufficient material resources to manifest these concepts. Consequently, Grade 3 tombs exhibit distinctive phenomena. These distinctive features enable speculation regarding the mortuary concepts of that society.

2.2.1 Food-and-Drink-Centered Mortuary Practices and Their Spatial Separation -Inheritance and Development of Mortuary Customs

Among the 20 Grade 3 tombs at the site, three were excluded from analysis due to severe damage or having only one or two pottery grave goods. Statistical analysis of the remaining 17 tombs shows that ten tombs (approximately 58.8%) exhibited a spatial separation between drinking-related vessels and eating-related vessels.

Mortuary practices at Xigongqiao demonstrate a clear focus on food and drink as represented by dedicated pottery vessels. This characteristic closely resembles funerary rites observed in the Peiligang Culture. Zhang Chi's research indicates that Peiligang burials are similarly centered on food and drink, with core grave goods comprising eating-related vessels (represented by milling stones, milling rods, pottery jars, and tripod bowls) and drinking-related vessels (represented by bottles [6]). Particularly noteworthy is the parallel uniqueness: both the bottle in the Peiligang Culture and the flattened bottle at Xigongqiao appear as single specimens per tomb. Statistical data reveals that the occurrence rate of pottery bottles (bottle or flattened) reached 90% in both the Peiligang and Jiahu cemeteries, as well as in the Grade 3 tombs at Xigongqiao, indicating a certain degree of prevalence. This suggests that the Xigongqiao population, or at least its higher-status segment, inherited elements of mortuary customs and cultural practices from the Peiligang Culture. Beyond the spatial separation of food and drink vessels, the placement orientation of grave goods at Xigongqiao reveals another significant pattern. This arrangement may reflect the distinction proposed earlier between the personal possessions of the deceased and the ritual offerings of the living. Statistical analysis of Grade 3 tombs shows that Ding and Dou were placed on the ledge in only 10% and 0% of cases respectively. Conversely, drinking-relat-

ed vessels frequently occur below the ledge. In the only tomb with a coffin (M38), artifacts placed inside the coffin comprised one pottery jar, one cylindrical cup, one stone ring, one stone spade, and one bone hairpin. The space below the ledge and inside the coffin represents areas closest to the deceased. Items placed here likely hold a stronger connection to the individual, potentially serving as personal belongings used during life or as personal markers of individual identity and status. Therefore, drinking-related vessels commonly placed below the ledge may represent objects used by the deceased in life. Other distinctive vessel types, such as flattened-bottles and tall-stemmed cups, likely functioned as indicators of social status. Conversely, the area on the ledge, where eating-related vessels were predominantly placed, likely served as a ritual space for the living to conduct sacrifices and present offerings during the burial ceremony. Pig mandibles found in some tombs (e.g., M26, M28) were typically located near pottery Dou and Ding vessels. This spatial association suggests they functioned as sacrificial offerings within the mortuary rites. As the space for mortuary rituals performed by the living, the area on the ledge may also reflect, to some extent, the wealth and social standing of the ritual officiants.

2.2.2 Grave Goods Placement on the Right: Emergence of the Concept of Treating the Dead as if Living

Statistical analysis of the 44 documented tombs reveals a predominant placement of grave goods on the right side of the deceased. Where goods occurred on both sides, the right side typically contained more items. Only five tombs (M7, M11, M15, M34, M3) exhibited more grave goods on the left side. Critically, all five lack a ledge (characteristic of Grade 2 tombs). The data indicate that 88.6% of tombs prioritized right-side placement. Among ten tombs with grave goods near the head, eight placed them to the right of the skull, one above the skull, and only M7 to the left. Tomb M42, illustrated in Figure 4, exhibits a pronounced right-side placement of grave goods. A row of tall-stemmed cups was arranged on the right side of the occupant's body, and other pottery vessels, such as Ding and Dou, were also positioned on the right side of the ledge.

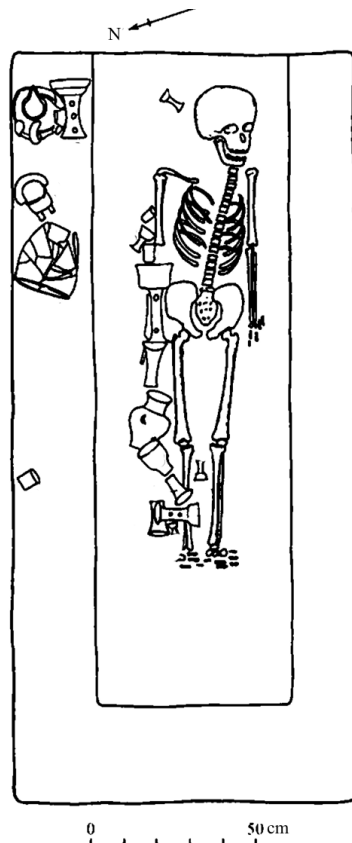


Fig. 4 Plan of M42

This pattern reflects intentional organization and preference for differentiating left and right sides. The predominance of right-hand dominance in humans likely motivated this practice, facilitating imagined use by the deceased. While left-handedness could explain the five exceptions, their exclusive occurrence in Grade 2 tombs (intermediate status) suggests alternative factors: less stringent adherence to mortuary norms during burial.

If correct, right-side placement as a facilitation for the deceased implies the emergence of the concept “treating the dead as if living”. The partial adoption rate (88.6%) further indicates this concept was nascent rather than institutionalized.

3. Discussion

The preceding analysis has examined the roles of beverages and food in the mortuary context of this site. The discovery of pig mandibles adjacent to pottery Ding and Dou confirms that food-related vessels contained sacrificial offerings, specifically pork or bone. In contrast, the function of beverage-related vessels remains ambiguous. As noted, drinking vessels, particularly the flattened bottle exhibiting uniqueness (one per tomb) and high prevalence (90% in elite tombs) were predominantly placed near the

deceased. This pattern suggests these vessels or their contents served as critical markers of status identity. Given evidence of fermented beverages at Jiahu (Peiligang period) and Liangchengzhen (Longshan period), flattened bottles at Xigongqiao potentially contained alcoholic liquids [7, 8].

Residue analysis of flattened-bottle pottery could test this hypothesis. Detection of biomarkers (e.g., tartaric, oxalic, or syringic acids) or microfossils/phytoliths from yeast would support the presence of fermented beverages [9, 10, 11]. Confirmation of alcohol would indicate surplus grain production for fermentation and elucidate wine’s role in Neolithic mortuary rites.

Furthermore, tombs demonstrate clear wealth disparities and status-linked burial customs, exemplified by flexed burials in Grade 1 tombs and pottery coverings in Grade 2. The underlying drivers of this differentiation require clarification. Possible explanations include differential wealth accumulation or distinct kinship groups. Preliminary stable isotope dietary analysis of human remains indicates divergent subsistence: some individuals consumed primarily C3 plants (e.g., rice), while others relied on C4 plants (e.g., millet) [12]. However, contamination limited analysis to eight individuals, with no data from flexed burials. This gap permits the hypothesis that flexed burial practitioners were migrants with distinct traditions. Studies also indicate that populations in this region primarily subsisted on millet during the Peiligang period, while rice cultivation and consumption began in the Longshan period. The presence of both rice-dominant and millet-dominant populations at this site suggests it likely represents a transitional phase in this shift. Investigating the origins and dietary habits of the individuals buried at Xigongqiao can significantly contribute to clarifying the specific processes underlying this change [13]. Future research should employ ancient DNA analysis, paleo proteomics, expanded isotopic dietary studies, and strontium isotope tracing to clarify kinship relationships, population origins, and social organization [14, 15].

4. Conclusion

The Xigongqiao site represents a transitional phase from the late Dawenkou to early Longshan period. Analysis of tomb structures and grave goods reveals key social transformations characteristic of this era. First, the cemetery exhibits pronounced social differentiation. Tombs are stratified into three grades (Grades 1-3) based on dimensions, structural complexity, and grave goods assemblages. Grade 3 tombs demonstrate significantly greater wealth and status through larger sizes, ledges, and richer offerings. Second, incipient mortuary ritual systems emerge.

The spatial separation of food-related vessels on ledges from beverage-related vessels (e.g., flattened-bottles, cups) below reflects both inheritance of Peiligang food/drink-centered traditions and innovative ritual spatialization. This division likely distinguishes personal belongings of the deceased from communal sacrificial offerings. Third, early conceptual developments are evident. The predominant placement of grave goods on the right side of the deceased—observed in 88.6% of tombs—suggests the emergence of the concept treating the dead as if living, though not yet uniformly practiced. Future applications of residue analysis (for flattened-bottle contents), ancient DNA, paleo proteomics, and isotopic tracing will clarify kinship structures, population origins, and the deeper drivers of social change—particularly regarding flexed burial practitioners and subsistence strategies. These approaches promise transformative insights into this critical Yangshao-Longshan transition period.

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