Origins of the Mesoamerican ballgame: Earliest ballcourt from the highlands found at Etlatongo, Oaxaca, Mexico

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The ballgame represents one of the most enduring and iconic features of ancient Mesoamerican civilization, yet its origins and evolution remain poorly understood, primarily associated with the Gulf Coast and southern Pacific coastal lowlands. While one early ballcourt dates to 1650 BCE from the Chiapas lowlands, ballcourts have remained undocumented in the Mesoamerican highlands until a millennium later, suggesting less involvement by highland civilizations in the ballgame’s evolution. We provide new data from the southern highlands of Mexico, from the Early Formative period (1500–1000 BCE), that necessitate revising previous paradigms. Along with ballplayer imagery, we recently excavated the earliest highland Mesoamerican ballcourt, dating to 1374 BCE, at the site of Etlatongo, in the Mixtec region of Oaxaca. We conclude that Early Formative highland villagers played an important role in the origins of the formal Mesoamerican ballgame, which later evolved into a crucial component of subsequent states.

INTRODUCTION

The rubber ballgame is one of the most fundamental features of ancient Mesoamerica, a pre-Columbian cultural region encompassing Guatemala, Belize, most of Mexico, and western Honduras and El Salvador (Fig. 1). The presence of more than 2300 probable ballcourts in this region indicates the ballgame’s great importance to ancient Mesoamericans (1). Rich visual, iconographic, and architectural data from the two best-known Mesoamerican civilizations, the Maya and Aztec, emphasize the ritual and political focus of the ballgame, with symbolism that included the regeneration of life and the maintenance of cosmic order. The origin narratives of the Maya, as codified in the Popol Vuh, implicate the ballgame, as part of a contest between heroic mortals and underworld deities, in the creation of the universe (2, 3).

Numerous ballgames (and other athletic contests) existed in Mesoamerica, only some of which involved a hard rubber ball and a masonry court (1, 4). While most Mesoamerican societies had various concurrent games, each (such as the “stickball” game) with their own developmental trajectories, we focus only on one; we use “ballgame” to refer specifically to a formal pan-Mesoamerican sport played with a rubber ball in an architectural ballcourt, players hitting the ball with their hips rather than hands (1, 5). The architectural component of the ballgame corresponds with the development of a more structured version of the game. While many informal and formal games were played within and beyond an architectonic setting, the hipball game has been interpreted as the only version that generally required a formal court and is the version that appears most frequently (6). Basic architectural features shared by all ballcourts, minimally an alley enclosed by two parallel lateral walls or mounds (Fig. 2), suggest a common substratum to at least one variant of the game, the pan-Mesoamerican hipball game, that may have been somewhat standardized, recognized within and between cultural regions, and played at different sociopolitical levels in Mesoamerican states. The great variety in which additional features were appended to these basic architectural elements also expresses local and temporal diversity in practice, reinforcing both the presence of multiple games and the multifunctional nature of ballcourts, which served as loci for community-based rituals, politics, and feasts in addition to athletic contests (7).

Despite the ballgame’s centrality to the many societies that thrived in this region for over 3000 years, its evolution during the Early Formative, the time when most features of Mesoamerica civilization coalesced, remains obscure. We refer to the following “Formative” chronological phases, presented in calibrated or calendar years: the Initial Formative, 1900 to 1500 BCE; the Early Formative, 1500 to 1000 BCE; the Middle Formative, 1000 to 400 BCE; the Late Formative, 400 BCE to 100 CE; and the Terminal Formative, 100 to 300 CE (8, 9).

Three types of data indicate the presence, or at least knowledge, of the game: ballplayer imagery, paraphernalia (equipment and costume elements), and architectural ballcourts, the most compelling evidence of actually playing the game. The lowlands have long been favored as the place of origin and primary evolution of the ballgame, an interpretation originally based on the association of the best-known source of rubber, Castilla elastica, with the plains of the Gulf and southern Pacific coasts (10). The rubber tree’s range has also been reported, however, as extending north up the Pacific coast as far as the Mexican state of Sinaloa (11). Chemical analysis of several archaeologically recovered Aztec rubber balls indicates C. elastica as the source (11). In addition to imagery, archaeological research during the past three decades in the lowlands has reinforced lowland priority in the ballgame, with early examples of rubber balls from the Gulf Coast and an actual ballcourt along the Pacific coast extending the ballgame’s origins to the final portion of the Initial Formative (10, 12). These discoveries, and the lack of documented ballcourts in the highlands until a millennium after the earliest known lowland court, would seem to support a primarily lowland origin and development of the ballgame. On the basis of our recent discovery of the earliest highland ballcourt in Oaxaca, Mexico, we argue that both...
lowland and highland societies contributed to the evolution of the Mesoamerican ballgame, an institution that profoundly affected the ritual and politics of subsequent states for two millennia.

**Ballgames and ballcourts in early Mesoamerica**
The ballgame became a pan-Mesoamerican phenomenon, a critical aspect of statecraft, religion, and cosmology, during the Late to Terminal Formative (8, 13), reflected by the abundance of all three types of data. Before the Late Formative, however, ballgame evidence remains scattered and inconsistent. Ballgame imagery is the primary type of evidence found in the Early Formative, a time of emergent sociopolitical complexity and increased interregional interaction throughout Mesoamerica that encompasses the apogee of the Gulf Coast Olmec at San Lorenzo, Veracruz from 1400 to 1000 BCE, a span of time referred to as the "Early Horizon" (14–16). Interaction between the Olmec and other Early Horizon societies varied regionally, and its impact remains highly contested (14). Recent research, however, at San Lorenzo indicates that it was the first urban center in Mesoamerica (15), at a different scale of sociopolitical complexity than its contemporaries. The confluence of both ballplayer imagery

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**Fig. 1. Location of Etlatongo in Mesoamerica and the setting of its ballcourt.** (A) Map of central to southern Mesoamerica, showing location of Etlatongo in the Mixteca Alta and other sites referenced in text; dashed lines indicate cultural/geographic regions. (B) Aerial view of the ballcourt on Mound 1-1 (colored blue) in relation to domestic space in Operations G and I (purple) to the north. Base image: Google Earth.

**Fig. 2. Early ballcourts in Mesoamerica.** Comparison of early ballcourt cross sections (to scale), with earliest on top, with plan views (not to scale) from Paso de la Amada and La Laguna [redrawn from (28, 33)].
at San Lorenzo and rubber balls at a ceremonial site in its realm have implicated the Olmec in the origin of the Mesoamerican ballgame, despite the absence of a formal ballcourt. Our recent discovery in the highlands, however, challenges a primarily Gulf origin, suggesting a broader web of regional players in the formalization of the ballgame.

Early Formative ballgame imagery primarily occurs as small, solid ceramic ballplayer figurines, which, during the Early Horizon, exhibit regional differences, albeit not mutually exclusive, in costume, gear, and paraphernalia (16). More frequent at San Lorenzo than neighboring sites, "Olmec-style" ballplayer figurines are generally tripod based of a support in back that enables them to stand; similar figurines also appear at distant sites such as Canton Corralito in coastal Chiapas, where substantial interaction with San Lorenzo has been documented (17). Olmec-style ballplayer figurines from these sites share similar costumes: wide, thick padded belts or yokes, loincloths, and usually round pendants or pectorals. These costume elements depicted on Early Horizon figurines become central accoutrements to successive depictions of Mesoamerican ballplayers. In contrast, many contemporaneous highland ballplayer figurines wear divergent costume elements that appear to resonate less in later visual depictions of ballplayers; these costumes and gear may represent sports that differ from our focus, the Mesoamerican hipball game. Figurines from Central Mexican sites such as Tlatilco often wear suspender-like vertical or crossed bands that support either thin belts or distinct, elaborate yokes (16); unfortunately, most of these figurines come from undocumented and/or illicit excavations, limiting their interpretive potential and raising basic issues of authenticity. In contrast, the minimally clothed West Mexican figurines that formed a scene from a shaft tomb excavated at El Opeño, Michoacán lack belts or yokes, but some wear padding on one leg and hold staffs or bats, possibly to play a stickball game (18–20).

Until recently, Oaxaca has contributed limited Early Horizon ballgame imagery: One ballplayer figure torso from a previous project at Etlatongo and one tripod figurine from San José Mogote, in the Valley of Oaxaca, exhibit Olmec-style costumes, while one San José Mogote figurine wears a costume more similar to those from Central Mexico (16).

Beyond small ceramic figurines, Early Horizon ballplayer-related imagery appears on monumental stone sculpture only at San Lorenzo. Monument 34 from that site depicts a half-kneeling male figure with a thick protective belt and loincloth, trunks, and pectoral; perishable arms, possibly of wood, could have been manipulated to possibly signal aspects of play (21). Found north of San Lorenzo’s plateau, Tenochtitlán Monument 1 depicts a figure, interpreted as a ballplayer and wearing a thick protective belt and a probable mirror pectoral, positioned atop a captive, indicating an early association between the ballgame and human sacrifice (22, 23). In addition, some scholars interpret the multi-ton Olmec colossal heads at San Lorenzo and later Olmec sites as ballplayer related because of their headgear (6, 12, 21), although this visual observation has never been corroborated archaeologically. Possible Early Horizon examples of ballplayer imagery in wood also come from San Lorenzo’s realm (see below).

Paraphernalia and equipment discovered on the Gulf Coast extends the ballgame’s material record back to 1600 BCE. Ranging in diameter from 8 to 30 cm, 19 rubber balls emerged from an ancient spring at El Manati, located just southeast of San Lorenzo (12). The great variety in size of the rubber balls indicates a variety of functions. While some may have been offerings, burned as incense at this ritual site, others potentially saw action in ballgames, with their different sizes reflecting different types of games. Six of the balls date to the late Initial Formative, and rubber balls continued as offerings at this ritual site during the Early Horizon apogee of San Lorenzo, along with wooden Olmec-style busts, three of which had perishable pectorals, interpreted as representing the kind of mirrors worn by some San Lorenzo ballplayers (12, 23). The excavators found fragments of wooden shafts adjacent to some of the bats, which they interpret as batons or staffs of power and possibly used for hitting the smaller rubber balls from El Manati, but only at the start of a potential game as the staffs would have been too fragile for sustained use (12). Although less convincing as ballgame paraphernalia than rubber balls, miniature stone yokes or “yuguitos,” probably worn on the hand to either protect it and/or hit the ball, have been found at scattered Early Formative highland sites, including San José Mogote (24) and El Opeño (18).

While an architectural ballcourt provides the most compelling evidence for the ballgame, any level surface could serve as a playing field for various sports. The Aztecs played games both in open fields and in masonry courts, which were primarily restricted to large centers, indicating a hierarchy in the setting of games and associated architecture (5). Athletic activities and/or dancing have been proposed in flat open spaces as far back as before 7000 BCE, based on two parallel rows of boulders at Gheo-Shih in the Valley of Oaxaca (25, 26). Located close to modern ground surface, questions remain about this space, which is also interpreted as a street or empty space between houses (26). Many features of the Mesoamerican ballgame first developed in less structured contexts. Associated with both more consistent and widely shared rules and increasing sociopolitical complexity, formal ballcourts both reinforced leaders’ authority while integrating communities (6). As opposed to games played in open fields, formal ballcourts also impose more restrictions on viewership (27). Thus, discovering the origins of the ballcourt underlies understanding the ballgame’s evolution as a crucial sociopolitical institution of later Mesoamerican states.

Discovered in the coastal lowlands of southern Chiapas, the earliest formal ballcourt was built around 1650 BCE at Paso de la Amada, a regional ceremonial center with a core of public space largely abandoned before the Early Horizon (6, 10, 28). Located at a right angle to one of several mounds interpreted as platforms for the residences of lineage leaders, the ballcourt appears to be the center’s only nonresidential structure; its long axis is 39° east of true north (10). Excavations exposed nearly 10% of the ballcourt, composed of two narrow, parallel lateral mounds, averaging 75.9 m in length, defining a 6.8-m-wide alley or playing field with low benches extending from the lateral mounds to the alley (Fig. 2). The ballcourt was open at both ends and made of compacted earth, not stone, and estimated to have been about 3 m high with a total width of 21.5 m (10, 28). Later, ballcourt renovations expanded it to over twice its original volume. No ballplayer figurines or other ballgame-related imagery or paraphernalia came from Paso de la Amada (10).

Great temporal discontinuity (nearly 800 years) exists between the Paso de la Amada court and subsequent Chiapas ballcourts, documented from the Middle Formative in the Grijalva River area (29). In the Gulf lowlands, the earliest confirmed court dates to after the Terminal Formative (30). Despite extensive excavations at the major Gulf Olmec sites of San Lorenzo and La Venta, formal ballcourts have proven elusive. Middle Formative earthen architecture
at both sites, the Palangana at San Lorenzo and Complex A at La Venta (23, 31), remain problematic and have not been widely accepted as ballcourts (30). Thus, no unbroken sequence of lowland architectural data links the isolated Paso de la Amada ballcourt with the origin of the formal Mesoamerican ballgame. The ballgame’s evolution is much more complicated and multiregional, as shown by the recent discovery of small, Middle Formative ballcourts in the lowlands of northwest Yucatan, but in this case, without any Early Formative antecedents (32).

In contrast to the lowlands, the first highland ballcourts date to over a millennium after the Paso de la Amada court. The first securely dated full-sized ballcourts, from the end of the Middle Formative (600 to 500 BCE), occur at the central Mexican highland sites of Capulac Concepción and La Laguna (33). While exhibiting different orientations, both courts have similar sizes and shapes: lateral mounds terminate in closed “end zones,” giving the court, in plan view, the I shape so typical of later ballcourts throughout Mesoamerica (Fig. 2). In Oaxaca, I-shaped ballcourts, interpreted as boundary and defensive mechanisms associated with a state game center at the Zapotec urban center of Monte Albán, first appeared in the final portion of the Late Formative (13, 34). One possible earlier architectural invocation of the ballgame exists in the highlands as a miniature or symbolic ballcourt, composed of two low platforms, only 7 m long, forming a flat open space or alley between them, in a sunken patio at Middle Formative Teopantecuanitlán, Guerrero (35).

RESULTS
We challenge the lowland paradigm by providing evidence that the earliest highland ballcourt dates to the Early Formative, nearly a millennium earlier than any previous highland architectural data and just over two centuries after the Paso de la Amada court. We contribute two types of ballgame data recently excavated at Etlatongo: remains of two formal superimposed architectural ballcourts and associated ballplayer ceramic figurines. Stratigraphy, ceramic artifacts, and an assay of 11 carbon samples support the dating of the ballcourt (see Materials and Methods below, table S1, and fig. S1).

Early Formative Etlatongo and its ballcourts
Located in the Nochixtlán Valley of the Mixteca Alta, Oaxaca, the site of Etlatongo (36–38) was the focus of substantial excavations from 2015 to 2017 by the Formative Etlatongo Project (FEP). Lacking any primary evidence of an occupation earlier in the Early Formative, Etlatongo became a 26-ha Early Horizon regional center, with at least one area of public space (Mound 1-1) and several areas of probable higher-status domestic occupations to its north and east (Operations G and I, Fig. 1). During the Early Horizon, Etlatongo villagers engaged in substantial interregional interaction, in both raw materials, such as obsidian and shell, and ceramic vessels and figurines, some of which exhibit style and complex iconography associated with the Gulf Olmec. Chemical testing of pottery demonstrated that some vessels previously excavated at Etlatongo were imported from San Lorenzo (39). Etlatongo appears to have been similar in size and sociopolitical complexity as the contemporaneous ranked society at San José Mogote, with its 2.0-ha core of public space consisting of earlier rectangular structures atop small platforms and two large adobe and stone platforms that probably supported temples made of perishable materials (25).

The FEP explored the public space centered on Mound 1-1, heavily damaged in ancient, historic, and modern times. Rather than a pub-

lic core containing several types of structures, such as at contemporaneous San José Mogote, our research revealed something else entirely: Two superimposed Early Horizon ballcourts were the focus of this public space at Etlatongo (Figs. 3 and 4).

Villagers selected Mound 1-1, naturally elevated in the landscape, early in Etlatongo’s occupation as the locus of public architecture, with no evidence of prior (or contemporaneous) domestic space. Landscape transformation began with Structure 1-1, a platform created by exposing and modifying bedrock. Covered by subsequent constructions and only well documented in the southeast, this platform extended about 7 m from east to west and, at minimum, 25 m long (its north/south limits were not encountered); several postholes atop it evince a perishable superstructure. The long, narrow shape of Structure 1-1 and the modification of bedrock that probably extended to the prepared floor (Floor A) or alley for the first ballcourt (Structure 1-2; see below) suggest that this may be the east wall of an earlier ballcourt or some other structure that ultimately served as a model for the Etlatongo ballcourt, already exhibiting its orientation.

Structure 1-2 is the earlier of the two ballcourts. Symmetrical in profile and made from compacted earth, modified bedrock, and coarse, unmodified stones, Structure 1-2 has an orientation of approximately 13° west of true north, similar to the 8° west of true north for some contemporaneous public architecture at San José Mogote (13, 23). A well-defined white surface (Floor A), made of bedrock and probably painted red (or at least on the edges, where paint remained), formed the alley, 6 m wide and extremely level. Benches or banquettes frame the alley on either side and abut steep walls that rise for 0.80 m above it. Formed of compacted clay and crushed reddish bedrock, and covered by one row of stones, these low banquettes have a maximum height of 0.20 m and are 2 m wide (Fig. 5). The FEP exposed Structure 1-2’s northern boundary, formed by modified bedrock supplemented by a masonry wall at depressions in the bedrock; the southern edge would have been located on a highly damaged portion of the mound. The parallel mounds defining the court extended between 46 and 52 m in length. The western mound, composed mostly of bedrock, contrasts in construction techniques with the more fully exposed eastern mound, which is 7.5 m wide. Incorporating Structure 1-1 in its construction, Structure 1-2’s eastern mound exhibits a wall along the alley made of coarse stones in a matrix of rammed earth, which also covered the stones, forming a façade that exhibited traces of the maroon color of the bedrock used in this material. Assuming that the west mound is fully symmetrical to the east mound, we project the total size of Structure 1-2 as between a minimum of 25 m wide by 46 m long (an area of 1150 m²) and a maximum of 52 (1300 m²). As preserved, Structure 1-2 has a height of 1.10 m. The earliest radiocarbon sample, recovered from the remodeling of Structure 1-1 during its incorporation into the eastern mound of Structure 1-2, dates our first ballcourt to the second half of the 14th century BCE: 2σ range 1443 to 1305 BCE, with a midpoint of 1374 BCE (see table S1 for all radiocarbon data and Fig. 4 for the excavation locations of all radiocarbon samples).

Placed atop Structure 1-2 and separated from it by 0.20 m of fill between alleys (from which originate radiocarbon samples #3, #5, and #6), the second Early Horizon ballcourt, Structure 1-3, exhibits the same orientation and length as its predecessor but also presents architectonically different structures. Structure 1-3 is much wider because of extensive additions to both lateral mounds. While its eastern edge was not well preserved, we project the more fully exposed eastern mound as 17 m wide, for a ballcourt size range between 40 m by
46 m and 40 m by 52 m (1817 to 2054 m²). Two radiocarbon samples (#2 and #4) come from the fill of the eastern mound (see table S1). Structure 1-3’s profile differs greatly from that of Structure 1-2. Rather than banquettes, Structure 1-3 displays a steep wall or step adjacent to the alley with an additional step to the highest part of the lateral mounds (Fig. 5). The one asymmetry of Structure 1-3 is the highest part of the eastern mound rises 2 m above the alley and exhibits postholes indicative of a perishable superstructure, Structure 1-4. In contrast, the less fully explored west mound is 0.70 m shorter, with no evidence of a structure atop it. The thin (~1 cm) alley floor was formed from modified bedrock and remodeled at least 10 times, with each subsequent surface alternating in color between white, cream, and red. Like Structure 1-2, the walls of Structure 1-3 were made of rows of small, coarse stones in a matrix of compacted earth, which also covered the stones.

Probable large-scale steps or terracing along the exterior sides of the long, lateral mounds reinforced the restricted nature in terms of viewship involving formal ballcourts (27); these terraces share the ballcourts’ orientation. Only excavated along the eastern mound, we exposed three stepped platforms or terraces that began with Structure 1-2 and expanded in size with Structure 1-3. Raised about 0.50 m from the previous step, there was at least 1 m of horizontal distance between steps. The stepped platforms served as both retaining walls of the ballcourt platforms and further added to its volume and monumentality (although these terraces are not included in the ballcourts’ size estimates above). Access to the court’s alley may have

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**Fig. 3. Comparative cross sections of Etlatongo ballcourts.** Combining the best-preserved profiles, the cross sections show architectonic differences as well as the limited vertical space between the alleys of Structure (Str.) 1-2 and Str. 1-3 (looking north).

**Fig. 4. Plan views of Etlatongo ballcourts.** The plan views show the expansion from the earliest ballcourt, Str. 1-2, to the second, Str. 1-3. Str. 1-4 is located atop Str. 1-3’s eastern mound. White squares represent excavation units; numbers 1 to 11 show locations of radiocarbon samples (see table S1).
come from the northern and southern sides, which we interpret as open (at the same elevation as the alley) on the basis of what the FEP excavated of the northern boundary. The long mounds flanking the ballcourt to the east and west served as platforms that would have provided the primary space for viewership. This defined and restricted space from which to watch games and other activities within the court could have been potentially even more exclusive with the superstructure (Structure 1-4) atop Structure 1-3’s eastern mound.

The tight clustering of dates associated with the ballcourts’ construction and use indicates an active life of about 175 years (table S1 and fig. S1). A termination event, dated between 1174 and 1102 BCE (or a 2σ date range of 1261 to 1016 BCE) based on five radiocarbon samples (#7 to #11), marked the end of Structure 1-3’s use, with deposits evincing burning, ranging from 0.40 to 1.0 m in depth, placed over its alley and walls. Perhaps consumed in commensal rituals, much of the cultural materials appeared to be spent ritual paraphernalia, including frequent Olmec-style pottery and figurine fragments, abundant animal remains, charred plant remains, shell, and scattered human bones (especially infants). We found ballplayer figurine fragments associated with these deposits (Fig. 6), with a minimum number of individuals of 14 recovered in the first (2015) and shortest field season alone. All wear a yoke or thick belt, with a loincloth below it and sometimes a pectoral above, similar to the Olmec-style costumes noted above (16). Created as tripods, many of these figurines served as whistles, adding a sonorous dimension to their deployment. The termination event also included the partial destruction and dismantling of some architectural elements of Structure 1-3, as well as the excavation of pits into the ballcourt, perhaps for extracting consecrated soil used in the creation of a subsequent ballcourt, or other public space, elsewhere on the site. Once covered by
the termination event, the ballcourt area received burials for several hundred years. The memory of this important space endured longer than its actual utilization.

DISCUSSION
The ballcourts represent the first large-scale modification of the natural landscape at Etlatongo. While the poorly documented Structure 1-1 may represent a precedent, Structure 1-2’s creators had a template in mind, as they constructed this first ballcourt as one event, representing substantial labor and planning. The first Etlatongo ballcourt has a plan view roughly similar to the Paso de la Amada court, although its orientation is more similar to those of contemporaneous public architecture at the closest regional center, San José Mogote (10, 25). The second ballcourt, Structure 1-3, shows a substantial change in layout, with the removal of banquettes and the greater height and volume of the sloping lateral mounds; these changes may reflect variations in the game. The ballcourts endured for only six or seven generations, with the first court used longer than the second ballcourt.

While there are no contemporaneous highland courts for comparison, similarities in shape but variations in orientation noted above with the Paso de la Amada court indicate a very early origin for both the formal template of the court and the regional variations in architectural details exhibited by ballcourts of later Mesoamerican civilizations. Paso de la Amada lacks ballplayer figurines contemporaneous with the court and predates evidence of the playing of the game itself in terms of paraphernalia and equipment. In contrast, the Etlatongo villagers fully participated in an Early Horizon focus on ballplayer imagery, with a series of ballplayer figurines evincing formal characteristics and costume elements that relate them to ballplayer imagery from throughout Mesoamerica, especially Olmec-style ceramic tripod figurines and monumental sculpture from San Lorenzo (16, 21). Despite the more extensive excavations at San José Mogote, such ballplayer imagery is nearly lacking, as is any evidence of a ballcourt at this time. The combination of ballcourts and ballplayer figurines indicates a much deeper entanglement at Etlatongo with the ballgame, interregional interaction, and associated societal transformations. The commitment to the ballgame involved not only the labor of building two courts but also the adoption of potentially exotic imagery and foreign materials—the rubber balls used at Etlatongo would have been imported. The Olmec may have played an important role in the creation of enduring aesthetic tropes for ballplayer imagery and ballgame cosmology (23), and the lowlands undoubtedly contributed rubber. The presence, however, of both an earlier ballcourt (Paso de la Amada) and Early Horizon highland courts (Etlatongo) contemporaneous to the apogee of San Lorenzo, for which no architectural court has yet been found, underscores greater heterogeneity in the development of the formal ballcourt and ballgame played within it, with contributions from both the highlands and lowlands. While the Olmec may have played an important role in many aspects of the Mesoamerican ballgame’s evolution, the creation of the formal ballcourt appears to have taken place outside of the Gulf Coast.

Built during a time of emerging sociopolitical complexity throughout Mesoamerica, the Etlatongo ballcourts are implicated in these changes. Building the ballcourts and staging athletic contests and associated activities would have engaged and integrated elements of the community but may also have privileged roles of nascent leaders in organizing ballcourt-related activities, many of which they conducted in a space that restricted viewing and perhaps full participation of the community at large. The probable terracing of the slopes parallel to the courts’ axis further materialized its separation from the rest of the village. Unlike the Paso de la Amada court, the Etlatongo ballcourts were not associated with residential architecture; the large mound comprising it was a unique locus of public space and activities during the Early Horizon. Nor were the courts part of a larger core of public architecture similar to that at San José Mogote. The ballcourts stood apart from quotidian spaces, perhaps perceived of as a sacred mountain on the village’s southern boundary. Even after this space was ritually terminated, and perhaps a ballcourt built elsewhere at Etlatongo, it retained great significance, serving as a locus for select burials, some of which exhibit elaborate Middle Formative offerings, for generations after the last game had been played. Nearly a millennium later, this entire mound served as a platform for additional, and now destroyed, public space.

CONCLUSION
The Etlatongo ballcourts are the earliest known from highland Mesoamerica; the first court, constructed between 1443 and 1305 BCE (with 1374 BCE as the midpoint), is 800 years older than are those from the central Mexican highlands and over 1000 years earlier than any other ballcourt in Oaxaca (33, 34). Rather than early ballgame evidence being primarily associated with the lowlands, our results show that highland villagers participated in ballgames marked by formal ballcourts during the Early Formative and were important players in its origins and evolution, with architectural modifications from the earliest to later of the two Etlatongo ballcourts perhaps associated with changes in the game. The construction of an architectural ballcourt represents both more formalized rules for the game and more complex social and regional interactions (10). The first highland ballcourt emerged during the Early Horizon, a time of increasing sociopolitical complexity and interregional interaction. We argue that ballcourts provided an important venue that promoted increasing differentiation of leaders and promoted interaction between polities of different regions. Other highland villages may have been familiar with the ballgame but lacked a formal ballcourt, perhaps confined at this time to regional centers such as Etlatongo. Ballgame imagery materialized the increasing interaction among nascent leaders, some of whom at Etlatongo were depicted as Olmec-style ballplayers; the association between elites and ballplayer imagery and regalia is well documented in later Mesoamerican civilizations, such as the Maya (2). The origin of at least some ballplayer imagery at Etlatongo may have had a Gulf Olmec inspiration; the lack of a ballcourt at San Lorenzo earlier or contemporaneous to those at Etlatongo suggests, however, that the Olmec did not have a primary role in the plan of the actual ballcourt. The ballcourt plan first materialized at Paso de la Amada, while the architecture of the two Early Horizon ballcourts at Etlatongo display substantial change and local innovation, suggesting both highland and lowland roles in the evolution of the pan-Mesoamerican ballgame.

Similar to the Paso de la Amada ballcourt, the Etlatongo ballcourt is unique to its contemporaneous region, with nearly a millennium separating these early courts from the next ballcourt documented in their respective regions. As ballcourts in later Mesoamerican societies generally formed part of a greater network of courts (6), we anticipate that the discovery of other contemporaneous ballcourts in the
highlands will further enrich our understanding of the Etlatongo courts and their larger Mesoamerican context.

**MATERIALS AND METHODS**

First identified by a regional surface survey, the site of Etlatongo was subjected to limited archaeological testing in 1980 and was systematically surveyed, mapped, and archaeologically explored in 1992 (36–38). From 2015 to 2017, the FEP conducted 9 months of large-scale excavations on the ballcourts located in Mound 1-1. Excavations, placed at strategic points to document architecture, were primarily through stratigraphic layers, subdivided into 10-cm arbitrary levels. Because of substantial damage inflicted on the architecture by later intrusive pits, we present a composite cross section of the ballcourts (Fig. 3) from undamaged sections. Historic construction activities and recent terracing destroyed much of the southern portion of Mound 1-1, precluding the discovery of the ballcourts’ southern boundary. Because of the ambiguity of the exact southern boundary, we calculate the FEP excavated between 10.8 and 12.2% of the earliest ballcourt (Structure 1-2) and between 8.76 and 9.90% of Structure 1-3, similar to the amount exposed of the Paso de la Amada ballcourt (28).

All ceramic artifacts associated with the ballcourt and the termination event atop it are stylistically associated with the Early Horizon in regional ceramic chronologies. In addition to the stratigraphy and analysis of the associated ceramics, we base the dating of the ballcourts on an assay of 11 carbon samples, all of which were charred wood samples, analyzed using accelerator mass spectrometry (AMS). These 11 samples span the entire time from the construction of the Structure 1-2, the first ballcourt (sample #1), the construction of Structure 1-3, the second ballcourt (samples #2 to #6), and the termination event that sealed the abandonment of the second ballcourt (samples #7 to #11). This sequence of dates make the Etlatongo ballcourts the most fully dated early ballcourts in Mesoamerica, compared with two dates reported each for the courts at Paso de la Amada (10) and La Laguna (33). We present individual Etlatongo dates as a simple midpoint between a calibrated range at the 95.4% probability level. Table S1 contains the relevant Etlatongo radiocarbon data, all of which were analyzed at the University of Arizona AMS Laboratory and were calibrated using OxCal 4.2 (40) and IntCal13 (41) programs; fig. S1 presents the dates as a probability distribution plot model.

**SUPPLEMENTARY MATERIALS**

Supplementary material for this article is available at http://advances.sciencemag.org/cgi/content/full/6/11/eaay6964/DC1

Table S1. Radiocarbon dates associated with Etlatongo’s ballcourts, calibrated with OxCal 4.2/IntCal13.

Fig. S1. Probability distribution plot model of the calibrated dates of Etlatongo’s ballcourts sorted by construction and termination episodes.

**REFERENCES AND NOTES**

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