

University of Montana

ScholarWorks at University of Montana

UM Graduate Student Research Conference (GradCon)

Feb 24th, 5:00 PM - 6:00 PM

Children of Casas Grandes: A Molecular Examination of Subadults at Convento and Paquimé

Lacy J. Hazelwood
lh164439@umconnect.umt.edu

Holli K. McDonald
holli.mcdonald@umontana.edu

Follow this and additional works at: <https://scholarworks.umt.edu/gsrc>

Let us know how access to this document benefits you.

Hazelwood, Lacy J. and McDonald, Holli K., "Children of Casas Grandes: A Molecular Examination of Subadults at Convento and Paquimé" (2023). *UM Graduate Student Research Conference (GradCon)*. 1. <https://scholarworks.umt.edu/gsrc/2023/posters/1>

This Poster Presentation is brought to you for free and open access by ScholarWorks at University of Montana. It has been accepted for inclusion in UM Graduate Student Research Conference (GradCon) by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.

Children of Casas Grandes: A Molecular Examination of Subadults at Convento and Paquimé



Lacy Hazelwood, MA & Holli McDonald, MA
Department of Anthropology, University of Montana

Introduction

Bioarchaeological research has played a significant role in understanding the **Casas Grandes region in Chihuahua, Mexico**. Excavations at the prehistoric sites of Convento and Paquimé recovered at least 652 burials dating to AD 700-1450, providing a robust skeletal population for investigations, including research on population demographics, patterns of violence, and social stratification. While there is extensive literature on these individuals, **research focusing solely on subadults (individuals >18 years of age) is nonexistent**. Although children actively participated in the creation of the archaeological record, they are traditionally neglected in archaeological interpretations due to challenges in reconstructing their identities using standard skeletal methods. This renders subadults invisible and largely underrepresented in archaeological research compared to their adult counterparts. Therefore, this study **employs genetic and isotopic analyses on subadult remains from both Convento and Paquimé** to provide estimations of biological sex and migration status.



Figure 1. Geographic area of interest.

Subadults of Casas Grandes

- Comprise ~40% of burial population (Di Peso et al. 1974).
 - Convento: 32 of 76 burials previously identified as subadults.
 - Paquimé: 225 of 576 burials previously identified as subadults.
- **No subadult-specific studies have been conducted in the Casas Grandes region.**
- **Subadults are largely underrepresented** due to limited preservation of remains and lack of reliable methods for skeletal analysis.

Objectives

- To characterize subadults within the Casas Grandes skeletal assemblage by providing biological profiles using molecular methods:
 - Migrant status via stable isotopic analysis
 - Biological sex determinations via DNA analysis
- Permission for this work has been granted by the Instituto Nacional de Antropología e Historia (INAH) of Mexico.

Materials and Methods

26 subadults (>18 years) from Convento (n = 6) and Paquimé (n =20).

Drilling & DNA Extraction

- Collected ~0.3 g of bone dust was recovered through drilling into the petrous bones or teeth, followed by DNA extraction.

Migrant Status by Stable Isotope Analysis

- Strontium ($^{87}\text{Sr}/^{86}\text{Sr}$) isotopic analysis performed at the University of Utah ICP-MS Metals and Strontium Isotope Facility.
- Tooth samples represent geographic origins while bone samples represent residence at time of death.
- Resulting isotopic data compared to $^{87}\text{Sr}/^{86}\text{Sr}$ data for the Casas Grandes region (Offenbecker 2018) to determine migrant status.

Biological Sex Determination by TriXY

- Real-Time PCR:
 - Targeted amplification of specific regions on sex chromosomes (X44, Y44, and Y47) using real-time PCR (Madel et al. 2016). To reduce false identifications, all amplifications were run in duplicates with positive controls of known sex.
- High Resolution Melting Analysis:
 - PCR products were subjected to HRM analysis for sex determination based on differences in melting temperatures of the targeted regions.
 - Agilent AriaMx Software version 1.71 used to generate melting curve profiles obtained from individuals showing a clear difference in shape between sexes.

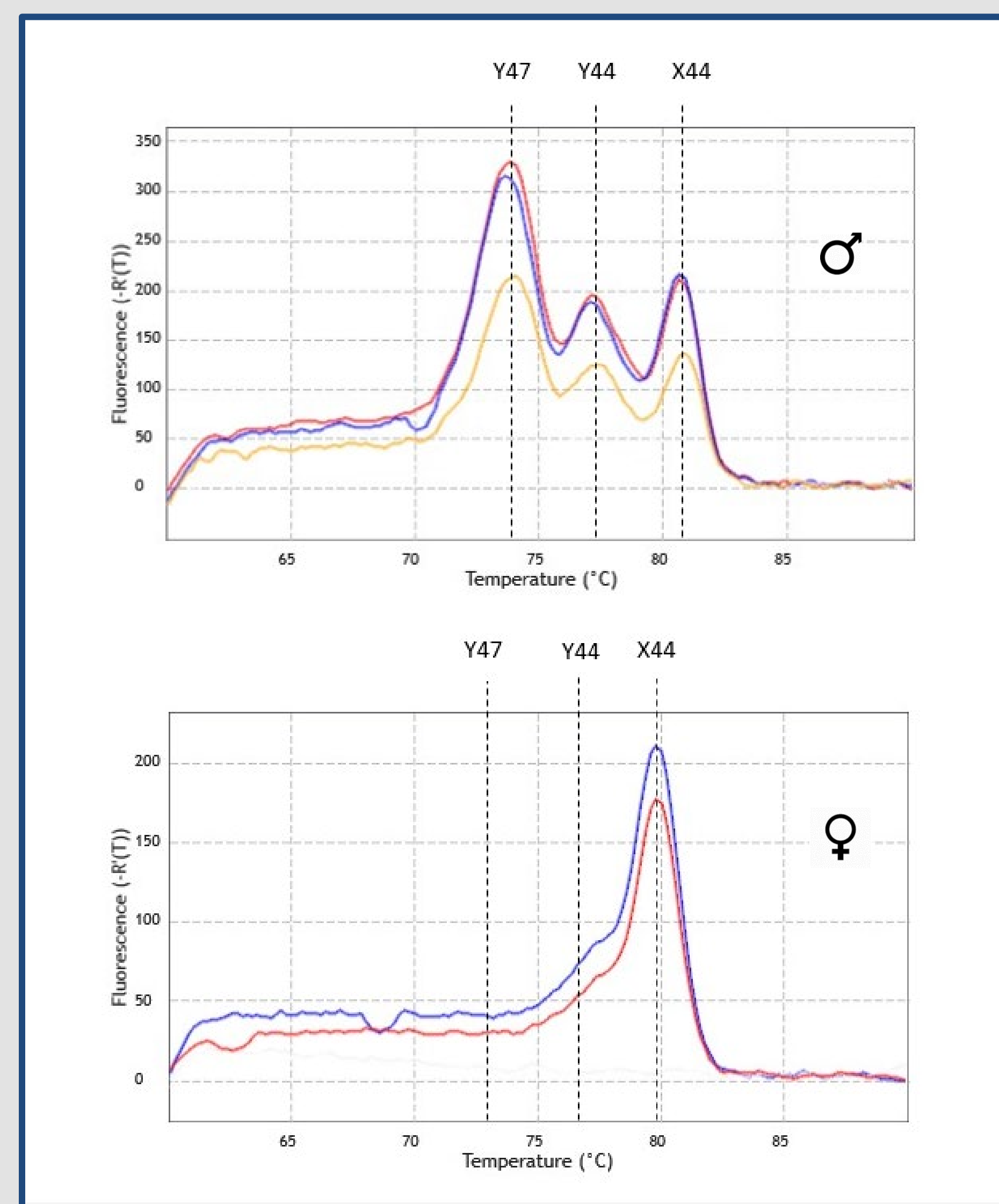


Figure 2. Melting temperature curve profiles produced by male and female samples in HRM analysis.

Results

SAMPLE	AGE	SEX	$^{87}\text{Sr}/^{86}\text{Sr}$
19A-1	Adol. 13-17	Male	-
CO-11	Infant	Female	0.70729
CO-25	Child 2-5	-	0.70736
CO-37	Juvenile 6-12	Male	0.70714
CO-44	Child 2-5	Male	0.70731
CO-47	Infant	Female	0.70736
CO-55	Adol. >18	Female	0.70737
21-6	Infant	Female	0.70728
22-6	Infant 15-18 mo	Female	0.70725
23B-6	Child 2-5	Female	0.70723
31B-6	Adol. 13-17	Female	0.70755
48-6	Adol. 13-17	Male	0.70793
16-8	Child 2-5	Female	0.70722
23-8	Child 3-5	Male	-
24-8	Infant 9 mo	Male	0.70726
52-11	Adol. 13-14	Female	0.70729
6B-12	Child 2-5	Male	0.70729
36-13	Child 4-5	Male	0.70726
44J-13	Adol. 13-15	Female	-
48B-13	Child 5	-	0.70716
56-13	Adol. 13-17	-	0.70667
74-13	Child 2-4	Female	-
8-14	Juvenile 8	Male	-
23-14	Adol. 13-17	Female	-
24-14	Adol. 13	Female	-
46-14	Infant	Male	0.70729

Molecular sex estimations were assigned for 23/26 individuals.

- Males: n = 10
- Females: n = 13

Migrant status was assigned for 21/26 individuals, all of which were determined to be **local** to the region.

Conclusions

Preliminary results indicate molecular methods of identity reconstruction are successful for subadult individuals at Casas Grandes who cannot be identified osteologically. This research provides a greater working knowledge of the region – **We cannot fully understand a culture and its people without considering all members of society.**

Ongoing research is focused on completing molecular methods of identity reconstruction for the remaining subadults in the Casas Grandes skeletal assemblage. Results will provide a more comprehensive understanding of the prehistoric peoples that resided in the Casas Grandes region.

Special thanks to Dr. Meradeth Snow, the Instituto Nacional de Antropología e Historia (INAH) of Mexico, and the University of Utah for providing additional resources.

References

- Di Peso, Charles Corradino, John B. Rinaldo, and Gloria J. Fenner. 1974. *Casas Grandes: A Fallen Trading Center of the Gran Chichimeca, Vol. 8: Bone, Perishables, Commerce, Subsistence, and Burials*. Vol. 8. 8 vols. American Foundation. Flagstaff: Northland Press.
- Madel, Maria-Bernadette, Harald Niederstätter, and Walther Parson. 2016. "TriXY—Homogeneous Genetic Sexing of Highly Degraded Forensic Samples Including Hair Shafts." *Forensic Science International: Genetics* 25: 166–74.
- Offenbecker, Adrienne M. 2018. "Geographic Origins, Status, and Identity at Paquimé, Northwest Chihuahua, Mexico." *Arts*.