



PALEOPATHOLOGY ASSOCIATION 8th Meeting in South America

Scientific Program and
Practical Guide



PAMinSA VIII

SÃO PAULO - BRASIL - 2019

Building Connections - 14th to 16th August



Support :



Paminsa VIII Logo Art Design by Emerson Nobre

Organizing Committee

Veronica Wesolowski

(Museum of Archaeology and Ethnology – University of São Paulo, MAE-USP)

Andre Strauss

(Museum of Archaeology and Ethnology – University of São Paulo, MAE-USP)

Rodrigo Oliveira

(Biosciences Institute - University of São Paulo, IBUSP)

Local Organizing Committee

Marina Di Giusto (MAE – USP)	Maurício Silva (MAE-USP)
Daniel Fidalgo (MAE – USP)	Carla Gibertoni (MAE/USP)
Renato Saad (MAE – USP)	Vanusa Gregório (MAE – USP)
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Scientific Committee

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Ana Luisa Santos (University of Coimbra – Portugal)

Anne Grauer (Loyola University Chicago, USA)

Bernardo Arriaza (University of Tarapaca - Chile)

Della Cook (Indiana University - USA)

Dong Hoon Shin (Seoul National University, South Korea)

Jorge Suby (UNICEN/CONICET)

Karin Wiltschke-Schrotta (National History Museum Vienna, Germany)

Ricardo Guichón (UNICEN/CONICET – Argentina)

Sheila Mendonça de Souza (Oswaldo Cruz Foundation – Brazil)

Cockburn Student Awards Evaluation Committee

Ana Luisa Santos (University – Portugal)

Bernardo Arriaza (University of Tarapaca - Chile)

Della Cook (Indiana University - USA)

Dong Hoon Shin (Seoul National University, South Korea)

Karin Wiltschke-Schrotta (National History Museum Vienna, Germany)

A Few Words of Welcome

After 14 years Paleopathology Association Meeting in South America – PAMinSA returns to Brazil this time to São Paulo City, hosted by São Paulo University. In its 8th edition, this PAMinSA will provide a new opportunity for the construction, reconstruction and renewal of connections between professionals and students from Latin America and other parts of the world, around our common interest: Paleopathology.

Once again, the meeting will bring together professionals and students devoted to the study of past people through their diseases and motivated by the scientific curiosity about the changes followed by the health and disease process through time.

PAMinSA VIII will take place in a very different economic and political scenario, in Brazil as well of other South American countries, from that of two years ago, at the time of our last meeting in Arica - Chile.

Since then the changes have been many and have happened very quickly. In many Latin America's countries, perhaps for the mainly part of them, funding for research and scientific events has shrunk or even disappeared. The ability to keep more expensive types of research has been reduced, students have had difficulty maintaining their studies due to lack of scholarships and the greater need to work concurrently with their training, and the remuneration of researchers and teachers no longer guarantees for many of us the daily tranquility.

These economic and political circumstances, far from being isolated, follow closely, and in some of our countries articulate with, a subtle change in the air regarding the role and place of science in society. Distrust of some people on science and on scientists and teachers seems to be growing, and we are surprised how ideas that we thought surpassed since the late Middle Age, such as the idea that the Earth is flat, make room again.

Two years ago when we took on the task of organizing PAMinSA VIII in Sao Paulo we knew about the hard work involved in the adventure, but we also felt comfortably safe because being part of a State University, located in the richer Brazilian State, that had many secure funding possibilities for promotion of scientific meetings. Nothing like the amazing and fast transforming capacity of life in motion to challenge comfort and transform our certainties!

Little by little, we realized that the previous scenario changes, that economic crisis would prevent many students and professionals from Latin America, and even from other parts of the world, to come. Moreover, we could not be able to have enough, if we have any, budget to funding a big meeting and support in any way students and invited speakers.

Particularly, for all Brazilian researchers dedicated to study the life histories of past individuals and past populations through body remains, this already complicated scenario became darker by the loss of the largest and most important human osteological collection in Brazil. It was destroyed in an extension not yet fully known by the fire that burned the National Museum to the ground in September 2018.

In few hours, the fire burned the bicentenary and most important Brazilian Museum, which was the birthplace of Anthropology, Archaeology and Paleopathology in this country. Almost all Brazilian paleopathologists worked in some point of their careers with its osteological collections, and many of us began ours careers as students in there. All of us are still grieving in some extension. Sometimes it looks likes too much a mourning process for a dear one.

Months of despair and anxiety (at list for me...)! So yes, for a very short time, at the end of 2018 and the begging of 2019, we think about ask for a delay or even cancel the PAMinSA VIII. A flash idea, but I need to confess that it crossed our minds!

Then we began to receive confirmation that guest speakers were somehow willing to come with little or no financial help, that colleagues from various countries would making a great effort to come and bring in the work of their students who unfortunately could not travel to Brazil and Paleopathology Association could help to some extent.

For those Brazilian colleagues who former worked on the skeletal series housed at the Nacional Museum, besides the emotional distress caused by the fire, the loss of the collection had an direct impact over the research. Many colleagues, and particularly those professors in National Museum, lost all their work, students needed to redirect master's monographies and PhD's dissertations, researchers needed to interrupt suddenly their ongoing projects. It seemed obvious that their participation in PAMinSA VIII would be compromised, but some of them confirmed that they came any way just to follow the meeting or even to present what they could save from the ashes, in an amazing example of perseverance.

The colleagues' commitment, from all parts of the world, to come despite the difficulties, made us realize that the decision to maintain our initial plans for PAMinSA VIII happen to be, after all, a form of resistance and the declaration of our resilience capacity in face of this new (world), somehow dark, scenario.

The enthusiasm and commitment of all attendees to generate a learning space on Paleopathology in South America, in a spirit of friendship and warmness, marked all PAMinSAs since the first one. Therefore, the idea of connection as the main guideline to PAMINSA VIII appeared naturally in our minds since the beginning of the planning, so that idea was explicit in the PAMinSA VIII's title that points the direction we would like to take in this meeting:

"Paleopathology: Building connections"

We understand that the establishment, reinforcement and redirection of connections between different themes, approaches, areas of research, methods, theories, professionals and worldviews, produce new ways of understanding reality, ways that are more diverse and more complex.

Back to Brazil after an incredible journey that took us through very beautiful countries, we hope this PAMINSA will allowed a fruitful exchange of knowledge, become a great opportunity to us to learn from which other, and be a great occasion to honorate the Dead, respectfully learning the lessons that they can told us through their bodies.

Maybe this will be one of the smallest PAMinSAs ever, but this is an important declaration of resilience and perseverance to us. So, let go talk about Paleopathology!

In name of the Organizing Committee, I thank you for responding so enthusiastic and generously to our invitation, each of you are very welcomed!

Veronica Wesolowski

SCIENTIFIC PROGRAM

CONDENSED PROGRAM		
14 th August	15 th August	16 th August
8:00 - Registration	8:00 - Registration	8:00 - Registration
9:00 - Opening	9:00 - Conference Kirsten Bos (Max Planck Institute for the Science of Human History, Germany) Ancient pathogen genomics: an emerging tool for paleopathology	9:00 – StraightforW.A.R.D: a Webinar on Ancient Rare Diseases <i>Organizers:</i> Julia Gresky (German Archaeological Institute in Berlin, Germany); Emmanuele Petiti (German Archaeological Institute in Berlin, Germany)
9:20 - Conference Anne Grauer (Loyola University Chicago, USA) Contacts and connections: Migrations and paleopathology	9:50 - Symposium: Paleopathology: What Is There Behind the Borders <i>Organizers:</i> Sheila Mendonça de Souza (ENSP/ Fiocruz, Brazil); Ana Luisa Santos (University of Coimbra, Portugal)	10:40 – Podium Session 2: Living at seashores and riverbanks <i>Chair:</i> Bernardo Arriaza (University of Tarapaca)
10:10 - Symposium: About Paleoparasites: perspectives on research richness <i>Organizers:</i> Alena Mayo Iñiguez (Fiocruz, Brazil); Dong Hoon Shin (Seoul National University, South Korea)		
12:00 Lunch	12:00 - Lunch	12:00 - Lunch
13:30 - Symposium: Food and medicines and their Influence on ancient pathology <i>Organizers:</i> Célia Boyadjean (National Museum/UFRJ, Brazil); Dr. Karl Reinhard (University of Nebraska-Lincoln, USA)	13:30 - Symposium: Much more than bones: Thoughts on ethical, scientific and management issues of Human Remains Collections <i>Organizers:</i> Ricardo Guichón (UNICEN/CONICET, Argentina); Claudia Rodrigues-Carvalho (National Museum/UFRJ, Brazil)	13:30 – Podium Session 2: Living at seashores and riverbanks (cont.)
		14:40 – Podium Session 3: Paleoparasites and Molecules <i>Chair:</i> Alena Mayo Iñiguez (Fiocruz, Brazil)
15:30 - Podium Session 1: A Paleopathology Overview	15:40 - Symposium: Common Parasitological Questions Unique to the Americas <i>Organizers:</i> Karl Reinhard (University of Nebraska-Lincoln, USA); Morgana Camacho (University of Nebraska-Lincoln, USA)	16:55 - Conference Claudia Rojas-Sepúlveda. Aportes de la Bioarqueología a la interpretación de una historia de Colombia (Universidad Nacional de Colombia, Colombia)
		17:40 – Students Awards and final remarks

COMPLETE PROGRAM

14th August - Morning

8:00 – 9:00	Registration
9:00 – 9:15	Opening
9:20 – 10:00	Conference: Contacts and connections: Migrations and paleopathology Anne Grauer (Loyola University Chicago, USA)
10:00 – 10:10	Coffee break
10:10 – 12:00	Symposium: About Paleoparasites: perspectives on research richness <i>Organizers:</i> Alena Mayo Iñiguez (Oswaldo Cruz Foundation, Brazil) Dong Hoon Shin (Seoul National University, South Korea)
<p>10:10: Paleoparasitology and paleogenetic in Brazil: research and education Alena Mayo IÑIGUEZ</p> <p>10:30: Paleoparasitology in Asia from the genetic approaches to the ancient parasites found in Korean mummies of Joseon Dynasty Dong Hoon SHIN, Jong Ha HONG and Min SEO</p> <p>10:50: Paleoparasitology in Europe: Intestinal Parasites at the Late Bronze Age Settlement of Must Farm, UK (9th century BCE) Piers MITCHELL, Marissa L. LEDGER, Elisabeth GRINSHAW, Madison FAIREY, Helen L. WHELTON, Ian D. BULL, Rachel BALLANTYNE and Mark KNIGHTH</p> <p>11:10: Pioneering studies in Portugal Luciana SIANTO and Ana Luisa SANTOS</p> <p>11:30: Paleoparasitology 40th Anniversary: a tribute to Luiz Fernando Ferreira – Fiocruz., Brazil. (vídeo)</p> <p>11:40: Time for questions and discussion</p>	
12:00 – 13:30	Lunch

14th August – Afternoon

13:30 – 15:20	Symposium: Food and medicines and their Influence on ancient pathology <i>Organizers:</i> Célia Boyadjean (National Museum, Brazil) Karl Reinhard (University of Nebraska-Lincoln, USA)
<p>13:30: Role of diet in defining vitamin C deficiency in the Lluta Valley of Chile Karl REINHARD, Skeila D. VINTON and Isabel TEIXEIRA-SANTOS</p> <p>13:50: Dietary diversity revealed in dental calculus from sambaqui Jabuticabeira-II Célia BOYADJIAN, Sabine EGGERS and Rita SCHELL-YBERT</p> <p>14:10: Lessons from forensic science: distribution of inhaled and dietary pollen within homicide victim Marina AMARAL, Nicole WALL and Karl REINHARD</p> <p>14:30: Evidence of medicinal plants from Furna do Estrago prehistoric site, Pernambuco State, Brazil. Isabel TEIXEIRA-SANTOS, Luciana SIANTO, Aduino ARAÚJO (in memoriam), Sergio CHAVES and Karl REINHARD</p> <p>14:50: Archaeoparasitological, historical, and ethnographic data reveal different parasite infection patterns related to diet in ancient Asian societies Dong Hoon SHIN, Min SEO and Sergey SLEPCHENKO</p> <p>15:10: Time for questions and discussion</p>	
13:30 – 15:20	Coffee break
15:30 -18:10	Podium Session 1: A Paleopathology Overview <i>Chair:</i> Rodrigo Elias de Oliveira (University of São Paulo, Brazil)
<p>15:30: La paleodieta en San Pedro de Atacama durante el Período Medio (~400-1000 CE): prosperidad, intercambio y cambio cultural. Mark HÜBBE, Christina TORRES-ROUFF and William PESTLE</p> <p>15:50: La Conquista Inca en el Extremo Norte de Chile: ¿Vía Pacífica o Vía Militar? Vivien STANDEN, Bernardo ARRIAZA and Génesis PÉREZ</p> <p>16:10: Tenetehara: complicating health and contact. Della Collins COOK</p> <p>16:30: Quién era quién en la cultura Chancay? Los resultados del estudio estratigráfico, antropológico y arqueométrico de los fardos Y restos humanos encontrados en los sitios de Cerro Colorado y Macatón.</p>	

Pieter Dennis Van Dalen LUNA and Lukasz MAJCHRZAK

16:50: Prevalence of pathological lesions in the human osteological materials from Iron Age water burial site Levänluhta, Western Finland.

Kati SALO, Kristiina MANNERMAA, Anna WESSMAN and Tina JAKOB

17:10: Salud Y enfermedad de las poblaciones cazadoras-recolectoras en el Centro-Oeste del Chubut: Estado de la cuestión y perspectivas a futuro.

Denise Karla EVANS and Paula Miranda de ZELA

17:30: Warmi Hampicamayoc: las curanderas tatuadas del cementerio Cerro Colorado, Huacho, Perú.

Alfredo J. Altamirano ENCISO and Pieter Dennis Van Dalen LUNA

17:50: Huanthi: A case of congenital syphilis in Tintay, Querobamba, Ayacucho during the Wari period (600-1100 AD).

Alfredo J. Altamirano ENCISO and Ismael Pérez CALDERÓN

Poster session: All day long from 12:00

15th August - Morning

8:00 – 9:00	Registration
9:00 – 9:40	Conference: Ancient pathogen genomics: and emerging tool for paleopathology Kirsten Bos (Max Planck Institute for the Science of Human History, Germany)
9:40 – 9:50	Coffee break
09:50 – 11:50	Symposium: Paleopathology: What Is There Behind the Borders <i>Organizers:</i> Sheila Mendonça de Souza (ENSP/ Fiocruz, Brazil) Ana Luisa Santos (University of Coimbra, Portugal)

09:50: **Either periphery, or center... everything is relative!**

Sheila Mendonça de SOUZA

10: 10: **Portuguese Paleopathology: taking the stock and glancing at the future**

Ana Luisa SANTOS and Carina MARQUES

10:30: **Paleopathology in Greece: current status and future options**

Anna LAGIA and Anastasia PAPATHANASIOU

10:50: **Palaeopathology in South America and Beyond: A Bibliometric Perspective**

Simon MAYS

11:10: Time for questions and discussion

12:00 – 13:30

Lunch

15th August – Afternoon

13:30 – 15:25

Symposium: **Much more than bones: Thoughts on ethical, scientific and management issues of Human Remains Collections**

Organizers: Ricardo Guichón (UNICEN/CONICET, Argentina)

Claudia Rodrigues-Carvalho (National Museum, Brazil)

13:30: **Beyond conflict: connecting different perspectives and contradictions in the construction of ethnographic exhibits.**

Marília Xavier CURY

13:50: **To analyse or to not analyse? This is a question! Challenges to keep the sub-collection of coprolites and paleoparasitological material Luiz Fernando Ferreira as source of studies in Paleoparasitology**

Marcia CHAME

14:10: **Coming back to light: curatorial recovery of old Human Remains Collections**

Veronica WESOLOWSKI

14:30: **Dealing with Human Osteological Collections: questions and reflections before and after the fire at Museu Nacional**

Claudia RODRIGUES-CARVALHO

14:50: **Generate and share information about human bone remains. Prospects and challenges (Generar y compartir información sobre restos óseos humanos. Miradas y desafíos)**

Ricardo GUICHÓN and Manuel D. D'Angelo del CAMPO	
15:10: Time for questions and discussion	
15:30 – 15:40	Coffee break
15:40 -17:40	Symposium: Common Parasitological Questions Unique to the Americas <i>Organizers:</i> Karl Reinhard (University of Nebraska-Lincoln, USA) Morgana Camacho (University of Nebraska-Lincoln, USA)
15:40: Pacific tapeworm infection over time. Isabel TEIXEIRA-SANTOS	
16:00: Louse infestation associated with immigrant populations in southern Peru Elisa Pucu de ARAÚJO and Karl REINHARD	
16:20: Tracing the taphonomic loss of endoparasites in Sambaquis Morgana CAMACHO	
16:40: Porotic hyperostosis related to infection and diet Karl REINHARD and Morgana CAMACHO	
17:00: Discoveries of geohelminths from Northern Mexico and what this shows about parasitism and Mesoamerican influence. Elisa Pucu de ARAÚJO, Daniela LELES, Jessica SMITH, William Darwin HETZEL, Brandon STRAUSS and Karl REINHARD	
17:20: Time for questions and discussion	
Poster session: All day long	

16th August - Morning

8:00 – 9:00	Registration
9:00 – 10:30	90min.StraightforW.A.R.D: a Webinar on Ancient Rare Disease <i>Organizers:</i> Julia Gresky (German Archaeological Institute in Berlin, Germany) Emmanuele Petiti (German Archaeological Institute in Berlin, Germany)
1. Ancient rare diseases: from case studies to challenging marginal topics in palaeopathology	
9:00 - Osteopetrosis: even rarer than expected? Julia GRESKY, German Archaeological Institute, Germany	

	<p>9:15 - Diagnosis of rare diseases in palaeopathology: problems and prospects. Simon MAYS, Historic England, UK</p> <p>2. Leaving the lab behind: re-conceptualising research to re-address outreach</p> <p>9:30 - Rare diseases: a new teaching agenda. Tina JAKOB, Durham University, UK</p> <p>9:45 - The mouth's cradle: social care and medical treatment of orofacial clefts in medieval and modern Iceland. Joe Wallace WALSER III, National Museum of Iceland, Iceland</p> <p>3. Engaged palaeopathology: from ancient to contemporary rare diseases. A contribution to changing our social reality.</p> <p>10:00 - It's rare, take care! Ancient rare diseases between research and outreach, Emmanuele PETITI, German Archaeological Institute, Germany.</p> <p>10:15 - Osteopetrosis, rare but not forgotten. Recent approaches to medical treatment, Polina STEPENSKY, Hadassah Medical Center, Israel</p>
<p>10:30 – 10:40</p>	<p>Coffee break</p>
<p>10:40 – 12:00</p>	<p>Podium Session 2: Living at seashores and riverbanks <i>Chair:</i> Bernardo Arriaza (University of Tarapacá, Chile)</p>
	<p>10:40: Cold-water Diving in the Tropics? External Auditory Exostoses among the Pre-Columbian Inhabitants of Panama Nicole SMITH-GUZMÁN and Richard G. COOKE</p> <p>11:00: Infantile development, physiological stress and survival expectancy in prehistoric fisher-hunter-gatherers from Jabuticabiera II, South Coast of Brazil Luis PEZO-LANFRANCO and José FILIPPINI</p> <p>11:20: Hidroarsenicismo y Mitimaes Bernardo ARRIAZA, Vivien STANDEN and Leonardo FIGUEROA</p> <p>11:40: Intensificación agrícola durante el Periodo Formativo (3000-1 BC) en la costa de los Andes Centrales: evidencia paleodietética Luis PEZO-LANFRANCO, Célia BOYADJIAN and Sabine EGGERS</p>
<p>12:00 – 13:30</p>	<p>Lunch</p>

16th August – Afternoon

13:30 – 14:35	Podium Session 2: Living at seashores and riverbanks (continuation) <i>Chair:</i> Bernardo Arriaza (University of Tarapacá, Chile)
13:30: A Survey of bioarchaeological remains from El Paraíso archaeological site, central Peruvian coast Guido LOMBARDI, Dayanna CARBONEL, Anton SAMPLONIUS, Jose SARAVIA and Joaquín NAVÁEZ	
13:50 Tomografía computada para la identificación y diagnóstico de enfermedades en Chinchorro Verónica SILVA-PINTO, Carlos MONTOYA, Catalina MORALES, Mario CASTRO, Jorge FUENTES, Nicolás SHLOTTERBECK and Marcelo GÁLVEZ	
14:30 -15:30	Podium Session 3: Paleoparasites and Molecules <i>Chair:</i> Alena Mayo Iñiguez (Oswaldo Cruz Foundation. Brazil)
14:30: Paleoparasitological and paleogenetic identification of human and animal coprolites from the pre-Columbian archeological site Gruta do Gentio II, Minas Gerais, Brazil Ludmila Lima GURJÃO, Ondemar DIAS JR., Jandira NETO and Alena Mayo IÑIGUEZ	
14:50: Paleogenetic and paleoparasitology analysis of individuals from Jabuticabeira II shell mound (2890±55 e 1805±65 BP), Santa Catarina, Brazil: First records of parasitic infection and human ancestry Lorrayne BRITO, Lucelia GUEDES, Sabine EGGERS and Alena Mayo IÑIGUEZ	
15:20 Diversity of Capillariidae parasites in different archaeological sites from the New and Old World Victor BORBA, Ludmila Lima GURJÃO. Benjamin DUFOUR, José Roberto MACHADO-SILVA Matthieu LE BAILLY and Alena Mayo IÑIGUEZ	
15:40 – 15:50	Coffee break
15:50 - 16:45	Podium Session 3: Paleoparasites and Molecules (continuation) <i>Chair:</i> Alena Mayo Iñiguez (Fiocruz, Brazil)

15:50: : **Paleoparasitological study in the Royal Hospital of Cádiz from XVII - XVIII centuries**

Ramón LÓPEZ Gijón, Darío BERNAL-CASASOLA, Macarena LARA-MEDINA, Alena Mayo IÑIGUEZ, Herminia GIJÓN-BOTELLA

16:10: **Values under the microscope: a cost-benefit analysis in three different ancient DNA reconstruction approaches**

Marcelo PIRES, S. XAVIER, Lucelia GUEDES and Alena Mayo IÑIGUEZ

16:30: **Ancient DNA analysis of head lice remains from Andean mummies, Arica, Chile**

Alena Mayo IÑIGUEZ, Lorrayne BRITO, Vivien STANDEN and Bernardo ARRIAZA

16:55 – 17:40

Conference: **Aportes de la Bioarqueología a la interpretación de una historia de Colombia**

Claudia Rojas-Sepúlveda (Universidad Nacional de Colombia, Colombia)

17:40

Closing remarks and student awards

Poster session: All day long

20:00

Celebration party: cocktail and music

POSTERS - Qualified to Cockburn Student Award

SP01 - Case study: Paleopathological analysis of an infant from Early Holocene Lapa do Santo, Brazil

João Marcus BACURAU, Rodrigo Elias de OLIVEIRA, André STRAUSS, Rui Sérgio Sereni MURRIETA and Cláudio Campi de CASTRO

SP02 - Ancient parasite analysis and zoonotic potencial of *Spirometra* sp in to two related sitres from Pernambuco, Brazil

Adelianna de Castro COSTA, Ana SOLARI, Sergio Francisco Serafim MONTEIRO SILVA, Gabriela MARTIN, Morgana CAMACHO, Antônio Nascimento DUARTE, Joseli Maria Rocha NOGUEIRA, Davi Almada GABRIEL and Shênia Patrícia Corrêa NOVO

SP03 - A possible case of meningitis in a non-adult skeleton from the Mid-Holocene riverine shellmound Moraes (Miracatu, São Paulo, Brazil)

Daniel FIDALGO, Marina Nogueira DI GIUSTO and Veronica WESOLOWSKI

SP04 - Variabilidad transicional em sacros de cazadors-recolectores de Patagonia Austral

Sara PASTOR, Laura MEDIALDEA, Mónica GRJALBA, Manuel CAMPO MARTÍN, Armando GONZÁLEZ Martín, Pamela GARCIA Laborde, Manuel D D'ANGELO del Campo and Ricardo GUICHÓN

SP05 - Paleopathology and paleonutrition of Itacambira mummies.

Bruna RIBEIRO and Sheila Ferraz Mendonça de SOUZA

SP06 - Cribra orbitalia frequency of Sambaquis groups from Saquarema, Rio de Janeiro: A preliminary study

Isabella Gomes Silveira de Sá RIBEIRO, Murilo Quintans Ribeiro BASTOS, Claudia RODRIGUES-CARVALHO and Victor Guida de FREITAS

SP07 - Inferencias en el análisis directo y indirecto del calculo dental

Alejandro ROMERO, Manuel D D'ANGELO del Campo, Pamela GARCIA Laborde and Ricardo GUICHÓN

SP08 - Primera evidencia de uso de dientes em actividad têxtil em Patagonia Austral

Alejandro ROMERO, Manuel D D'ANGELO del Campo, Pamela GARCIA Labord, Luciano O VALENZUELA and Ricardo GUICHÓN

SP09 - Un probable caso de leucemia en un individuo de la época Wari (850-870 d.c) procedente del sitio arqueológico Huaca Pucllana, Lima - Perú: paleopatología y diagnóstico diferencial

Jose Augusto SARAVIDA Yataco and Micaela Álvarez CALME

SP10 - Un caso inusual de lesión suprainiana procedente de un cementerio Chancay (1000-1470 D.C): Implicancias contextuales en el diagnóstico diferencial

Jose Augusto SARAVIDA Yataco and John W. VERANO

POSTERS

P01 - Estudio comparativo de Microscopía Electrónica de Barrido (MEB) entre Lesión Cervical No Cariosa (LCNC) y Surco Inter-Proximal (SIP) en piezas dentales modernas y una precolombina

Anton SAMPLONIUS A.

P02 - A Heart of Stone - Constrictive pericarditis and other calcified tissues from the pathologic-anatomical collection Vienna

Karin WILTSCHE-SCHROTTA, Eduard WINTER and Michelle GAMBLE

P03 - Áreas funerarias y modelaciones corporales y patologías de los atavillos (900 – 1570 d. C.): Andes Centrales Peruanos

Pieter Dennis Van Dalen LUNA

P04 - Primeras evaluaciones de cambios entesiales en los habitantes de la Misión Salesiana “Nuestra Señora de la Candelaria” (Tierra del Fuego, Argentina)

Soledad SALEGA, Pamela GARCIA Laborde; Luciano O VALENZUELA; Josefina B. MOTTI and Ricardo GUICHÓN

P05 - Diseño y evaluación de un protocolo para la extracción simultánea de múltiples proxies en heces: implicancias en investigaciones forenses

Nadia VELÁZQUEZ, Romina PETRIGH, Laura BENVENUTO, Cecilia MARTÍNEZ Tosto, Ivana CAMIOLO, Patricia PALACIO, Martín FUGASSA, Luciano VALENZUELA, Sergio Augusto de Miranda CHAVES, Ricardo A. GUICHÓN and Lidia Susana BURRY

EXTRA ACTIVITIES

14th, 15th and 16th at lunch time [14, 15 y 16 a la hora del almuerzo]

Guided Visits to the Museum of Archaeology and Ethnology exhibits:

[Visitas guiadas a las exposiciones del Museo de Arqueología y Etnología:]

- ✓ Resistance Already! Strengthening and uniting indigenous cultures: Kaingang, Guarani Nhandeva and Terena. [¡Resistencia ya! Fortalecimiento y unión de las culturas indígenas: Kaingang, Guarani Nhandeva y Terena.]

- ✓ Visitable Technical Reserve: The Museum Behind the Scenes. [Reserva técnica visitable: El museo detrás de las escenas]

ABSTRACTS

SYMPOSIUMS

Organized by presentation day and schedule

Wednesday, 14th

(S01) About Paleoparasites: perspectives on research richness

Organizers: Alena Mayo Iñiguez (Oswaldo Cruz Foundation, Brazil); Dong Hoon Shin (Seoul National University, South Korea)

La Paleoparasitología es el estudio de parásitos encontrados en restos humanos, o de otras especies animales, recuperadas de sitios arqueológicos o paleontológicos, o cualquier otra fuente de la cual hayan permanecido preservados. En 2019, conmemoramos los 40 años de la primera publicación con el nombre "Paleoparasitología" en Brasil. Así, promovemos este simposio para la presentación de un panorama actual acerca de avances recientes logrados en Sudamérica y otros continentes. En este simposio se hace también un homenaje al ilustre profesor Luiz Fernando Ferreira, que nos dejó recientemente. Cuatro presentaciones y un video componen este simposio

Paleoparasitology is the study of parasites found in human remains, or other animal species, recovered from archaeological or paleontological sites, or any other source from which they have remained preserved. In 2019, we commemorate the 40 years of the first publication with the name "Paleoparasitology" in Brazil. Thus, we promote this symposium for the presentation of an overview on the recent advances made in South America and other continents. In this symposium there is also a tribute to the illustrious professor Luiz Fernando Ferreira, who left us recently. Four presentations and a video compound this symposium.

Paleoparasitology and paleogenetic in Brazil: research and education

Alena Mayo IÑIGUEZ

LABITRIP, Oswaldo Cruz Institute, Oswaldo Cruz Foundation, Brazil

Paleoparasitology was created with the main objective of exploring the parasitic infections and the relationship with human cultures through the times. Paleoparasitological and paleogenetic findings have changed the previously accepted conceptions about the origin of infectious diseases in South America. The Paleogenetic contributions presented here are related to the improving of methods, techniques and datamining for the recovery of human and animal parasites and or ancient DNA from archaeological remains. We have working on integrating paleoparasitology and other disciplines for a better comprehension of paleoepidemiological sceneries in the past, and in education, for the inclusion of Paleo-parasitology contributions in basic and academic education.

Paleoparasitology in Asia from the genetic approaches to the ancient parasites found in Korean mummies of Joseon Dynasty

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Despite the pioneering paleoparasitologists' achievements, the number of aDNA reports so far is still insufficient to lead to any conclusion about the genetic history of parasites at ancient times. Over the past several years we were able to collect coprolites or other materials from 15th to 18th century Korean mummies in which, by morphological screening, ancient parasite eggs were confirmed to be present. Utilizing the recovered specimens, we have analyzed multiple regions of *Ascaris lumbricoides*, *Trichuris trichiura*, *Paragonimus westermani*, *Clonorchis sinensis* and *Metagonimus yokogawai* aDNA by PCR and cloning/sequencing techniques. We did phylogenetic relationship of each parasite species by the Maximum likelihood (ML) analysis on the consensus sequences we obtained, and the taxa reported to NCBI GenBank. We showed that DNA analysis could be useful for the differential diagnosis of ancient parasite in case that morphological analysis of ancient parasite eggs was indeterminate for species identification. In a series of studies, we could expand the existing gene pool of these 5 species of paleogenetics parasites by sequences obtained from several hundred-year-old Korean mummies.

This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIP) (no. NRF-2017R1D1A1B03030127).

Palaeoparasitology in Europe: Intestinal Parasites at the Late Bronze Age Settlement of Must Farm, in the Fens of East Anglia, UK (9th Century B.C.E.)

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Purpose: Little is known about the types of intestinal parasites that infected people living in prehistoric Britain. The Late Bronze Age archaeological site of Must Farm was a pile-dwelling settlement located in wetland, consisting of stilted timber structures constructed over a slow-moving freshwater channel. Our aim is to improve our knowledge of intestinal infections in the people of prehistoric Britain by investigating the species of parasite that infect the people living at this site.

Methods: At excavation, sediment samples were collected from occupation deposits around the timber structures. Fifteen coprolites were also hand-recovered from the occupation deposits; four

were identified as human and seven as canine, using faecal lipid biomarkers. Digital light microscopy was used to identify preserved helminth eggs in the sediment and coprolites.

Results: Eggs of fish tapeworm (*Diphyllobothrium latum* and *Diphyllobothrium dendriticum*), *Echinostoma* sp., giant kidney worm (*Dioctophyma renale*), probable pig whipworm (*Trichuris suis*), and *Capillaria* sp. were found.

Conclusions: This is the earliest evidence for fish tapeworm, *Echinostoma* worm, *Capillaria* worm, and the giant kidney worm so far identified in Britain. It appears that the wetland environment of the settlement contributed to establishing parasite diversity and put the inhabitants at risk of infection by helminth species spread by eating raw fish, frogs or molluscs that flourish in freshwater aquatic environments. Conversely, the wetland may also have protected them from infection by certain geohelminths such as roundworm, which was common at Bronze Age sites elsewhere.

Pioneering studies in Portugal

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Despite the numerous reports of parasites in European archaeological material, paleoparasitological research in Portugal is very recent. Here we report the results obtained of the analysis of 144 pelvic samples from 11 archaeological regions from Portugal, using microscopic analysis and immunodiagnostic tests.

The most common intestinal helminths were *Ascaris lumbricoides* (large roundworm) and *Trichuris trichiura* (whipworm), species related to population clusters and poor hygiene conditions. Whipworm eggs were identified in two individuals from the S. Julião Church (17th-20th century) in Lisbon. It was also found in an early Modern Age nun's pelvis, buried in the Convent of Jesus in Setúbal. *Ascaris* eggs were identified in one individual from the medieval period from Abrantes Castle, and from two individuals from Sarilhos Grandes. Both parasites were identified in burials from the S. Francisco Church (Vila Franca de Xira, 18th century) and from the Islamic Necropolis of Santarém (8th-12th century), where skeletons were also evaluated for paleopathological lesions related to anemia and metabolic stress.

The first report of *Trichostrongyle* eggs in human remains from Europe was made in two individuals dating from the 16th century in Sarilhos Grandes, near the port of Lisbon. This privileged location may have facilitated the access of this population to products brought from the Americas during the period of the great Portuguese navigations, such as the English potato (*Solanum tuberosum*) which starches were identified in the pelvis of four individuals.

The first record of *Toxocara* sp. eggs in human ancient remains was made in a 18th century Franciscan friar from the Convento do Divino Espírito Santo, city of Loures (Lisbon). The eggs,

probably of *T. cati*, had a concentration equal to 2,766 eggs per gram of sediment, totaling more than 50,000 eggs in the pelvis. The available historical data on life in Portuguese convents reveals the presence of cats as companion animals and as an important ally in the hunting of rats, pests at the time. Although the genus *Toxocara* is one of the most common helminths in dogs and cats worldwide, there are no proven cases of adult worms developing in the intestines of humans, making this case unique.

Giardia lamblia/*Cryptosporidium* spp complex were detected using ELISA tests in four pelvic samples: one from an elderly from Castle of Miranda do Corvo (15th-17th century); one from Castle of Abrantes (15th-16th century); and two from the archaeological city of Mértola. These parasites may cause diarrhea and are transmitted by food and water contaminated by cysts eliminated in the feces of sick people.

For some of the parasites identified, egg concentrations were low when compared to studies published in other countries. This may indicate different cultural habits, knowledge of anthelmintic treatments or yet the action of taphonomic effects that may have destroyed part of the parasitic traces in the soil. Further studies can help to elucidate this issue, in addition to revealing the presence of new parasites and broadening the occurrences of known ones, enriching local paleoparasitological studies and assisting other related scientific areas.

(S02) Food and medicines and their Influence on ancient pathology

Organizers: Célia Boyadjean (National Museum, Brazil) and Karl Reinhard (University of Nebraska-Lincoln, USA)

Diet is the basis for both causation and resolution of pathology. The papers presented in this symposium bring perspectives from dietary analyses of dental calculus and coprolites; trace medicines from microscopic analysis of sacral sediment; show the application of forensic science palynology; and investigate how parasitism might have changed with changes in dietary patterns. These approaches have origin mainly with South American materials and researchers, but also brings interesting data from a study about Asian societies.

Role of diet in defining vitamin C deficiency in the Lluta Valley of Chile.

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Skeletal lesions related to vitamin C deficiency have been documented from skeletons of the Atacama Desert. The dietary basis for the lesions can be seen in coprolite analysis. We undertook analysis of coprolites from the Lluta Valley of northern Chile to evaluate dietary composition. The coprolites were recovered from farmer habitations. These came from Late and Late Intermediate Periods. Starch was the main microscopic dietary component. Most of the starch was from maize. In the Late Intermediate sample, a large proportion of the starch was fermented. This signals the use of chicha. Manioc was of secondary importance. In the Late Period, maize starch declined in abundance and fermented starch was pronouncedly rare. However, starch from oca and potato appeared in small quantities. Notably absent was evidence of fruit. Only one sample contained molle seeds. Fruit skin, possibly from capsicum peppers, was found in 9 (45%) Late Period coprolites. It was found in 4 (31%) Late Intermediate coprolites. Subsequently, we analyzed 15 Late Intermediate mummies from the site of Chiribaya Alta in the Osmore River Valley of southern Peru. This sample showed a greater diversity of foods. Manioc was most common and occurred in 40% of the mummies. Maize was found in 12%. Fruit was more common: 13% with guava, 6% with pepper, and 6% with molle. Thus, there was a relatively wide range of foods eaten in the region. It is noteworthy that the Peruvians sample may represent a higher status compared to the farmers sampled in Chile. This general variability does show that reliance on starch sources with decreased fruit consumption was the source of vitamin C deficiency in some areas. Therefore, future work could focus on the linkage between high starch and scurvy lesions in regions where coprolites and human remains can be recovered.

Dietary diversity revealed in dental calculus from sambaqui Jabuticabeira-II

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The analysis of dental calculus contents can provide interesting insights into different aspects of life, such as diet, habits, behavior, health, and technology, in the past. This line of research is very informative for studies in bioanthropology and bioarchaeology, and its importance has been widely recognized in the last decade. It is a very useful tool in archaeological contexts where information about botanical resources is absent or incomplete, and new excavations are no longer possible. In cases like this, the analysis of dental calculus from osteological collections is one of the very few ways of obtaining direct data about the use of plants by past groups.

In Brazil, the first microbotanical analyses based on dental calculus contents were applied to samples from individuals buried in sambaquis in the early 2000's. These studies were directly supervised by professor Karl J. Reinhard, who was at the forefront of this line of research in the Americas. Here we discuss one of these studies: the analysis of dental calculus from Jabuticabeira-II, one of the monumental sambaquis from the southern coast of Brazil. The research revealed the presence of abundant starch grains, some phytoliths, and diatoms in the samples. Among the plants that could have been eaten, there are wild taxa that might have been collected in the surroundings of the site, as well as domesticated species. The data from the diatom's identification corroborate the use of resources from the lagoon environment nearby the site. The number and distribution of the micro-remains varied considerably among the individuals, suggesting a more diversified diet for some people. However, when the micro-remains assemblages were compared by sex, age, pathologies, and burial characteristics, there were no differences. Damaged starch grains were also noticed, and they can indicate food preparation process (cooking). Finally, the diversity of micro-remains found suggests that the group of Jabuticabeira-II lived in a system of mixed economy, in which fishing and gathering were associated to horticulture, and maybe management of some important species.

Lessons from forensic science: distribution of inhaled and dietary pollen within homicide victim.

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The analysis of microfossils from within mummified human remains has long been used for dietary and environmental reconstruction. Generally, archaeological analysis is focused on the intestinal tract for dried corporeal remains. Medicolegal death investigation within the controlled setting of a morgue provides for structured situation for sampling mummified bodies. Control samples from the crime scene enhance control. Combined with the facilities of a forensic palynology lab, precise sampling can be achieved with anatomical knowledge of pollen source samples. Pollen analysis was applied to a mummified homicide victim in Nebraska, USA. Control

samples from outside of the corpse provide an idea of the normal ambient pollen of the crime scene. From inside of the decedent, samples from the sacrum well as a section of intestine were analysed. Another internal control sample of powder was recovered from the area inferior to the diaphragm. Finally, pollen was washed from the victim's hair. The intestine was rehydrated and microfossils were recovered from the inside of the section. The control samples were dominated by wind pollinated, environmental pollen types, as ragweed (*Ambrosia* type and related genera), goosefoot/pigweed (*Chenopodium/Amaranthus*), maize (*Zea mays*) and grass (*Poaceae*), among others. The internal intestine sample was dominated by dietary pollen types as Brassica type (broccoli and related plants). The sacrum sample was also dominated by dietary pollen types, as Brassica type and cactus (*Platyopuntia*), with some environmental pollen types. The pollen from the diaphragm was dominated by diverse air-borne pollen types. The intestinal section method, proven important in archaeological investigations of mummies, can be directly transferred to forensic investigations. In this case pollen from the diaphragm was inhaled around the time of death and contrasts with the dietary remains. Thus, a single body contains inhaled pollen from air and ingested pollen from food.

Evidence of medicinal plants from Furna do Estrago prehistoric site, Pernambuco State, Brazil

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Analysis of sediments from the pelvic girdles of burials has long been recognized as a source of data about diet and infection. In addition, the recovery and identification of pollen grains that originated from plants with medicinal properties contributes to our understanding of paleonutrition, paleoepidemiology and paleopharmacology. In the past, this approach was refined for the archaeological sites of Boqueirão da Pedra Furada, in Piauí, northeast Brazil. When coprolites preserve in burials, there is an ideal opportunity to look at the nexus of infection and treatment. Such was the situation encountered at the site of Furna do Estrago, located at Brejo da Madre de Deus, Pernambuco State, Brazil. We analyzed burials with associated coprolites to understand key aspects of cultural adaption to infection through the innovation of therapeutic plant remedies.

In the present study, pollen grains were recovered from 6 human coprolites associated with five skeletons from Furna do Estrago. The remains are dated between 1730 +/- 50 (BETA 145954) and 1,610 +/- 70 (BETA 145955) years BP (before present). Previously, researchers showed that the local population was infected with parasites. This is a follow-up study to assess whether or not the population used medicinal plants to treat the symptoms of infection. Pollen grains from anthelmintic plants and other medicinal and analgesic properties were found in all samples and at high concentrations. These included *Stryphnodendron barbatiman*, *Fevillea trilobata*, and species of the genera *Sebastiania*, *Syagrus* and *Pisonia*. This demonstrates that plants with medicinal properties were part of the adaptation strategy of this population. The data show that

Brazilian indigenous people have an ancient recognition of medicinal active plants. In ancient times the human-parasite interaction gave rise to the discovery of medicinal plants.

Archaeoparasitological, historical, and ethnographic data reveal different parasite infection patterns according to diet in ancient Asian societies.

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In order to demonstrate that the mankind's parasitism might have changed dramatically when the dietary patterns changed along the history, we compared the archaeoparasitological results from ancient sites related to people living under distinct lifestyles in the Asian continent. We predicted what kind of difference in parasitism occurred in the historical Asian societies by archaeoparasitological reports available so far. In brief, hunter-gatherer's parasite infection pattern was obtained from the data of West Siberian historic native people. South Korean data are those of agriculturalists and was obtained from mummies of Joseon Dynasty (1392-1910 CE). We also estimate the parasite infection of ancient peoples living under a freshwater fish diet as staple food based on reports from Southeast Asia. Throughout history, each society may have experienced remarkable shifts in parasite infection pattern in accordance with social changes. We showed the existence of a possible difference in archaeoparasitological pattern between hunter-gatherer, freshwater fishers, and agriculturalist's societies, through time, in Asia. Regardless of temporal or spatial differences, various parasite infection patterns may have occurred in different societies with distinct dietary habit in history.

(S03) Paleopathology: What Is There Behind the Borders

*Organizers: Sheila Mendonça de Souza (National School of Public Health, Oswaldo Cruz Foundation, Brazil)
and Ana Luisa Santos (CIAS – Research Center for Anthropology and Health, Department of Life Sciences,
University of Coimbra)*

Science is not neutral, as it depends on when, where, and who does the research. Internationally, the state of the art, ethical and juridical norms, sociocultural context, and the historical background that have influenced what and how we do paleopathology and forensic anthropology studies have been widely discussed. Through a literature review, it becomes clear that different axis of inequality can lead to an unbalanced production of knowledge and its diffusion, and it prompts difficulties in the creation of large-scale collaborative scientific networks.

Bearing in mind these problems, and with the aim to share them with our colleagues working in the fields of paleopathology and forensic anthropology, the goal of this symposium is to produce a body of knowledge on the diverse geographic and sociocultural spaces where this research is produced. We expect to focus on the Mediterranean region and the American continent. We hope to discuss the state of the art in different countries and to exchange experiences and ideas about the barriers, challenges, and stimuli, inside and outside the principal academic centers. What is the contribution of the scientific exchanges between distant partners for our academic trajectories and scientific production? How do the relationships that have historically been established between academies, the choices regarding the publishing industry, and academic careers influence the development of the discipline?

Reflecting on these trajectories and scenarios is a necessary contribution to the epistemology of paleopathology which seems particularly relevant during unstable times, like the ones we are living today in some parts of the world.

Either periphery, or center... everything is relative!

Sheila Mendonça de SOUZA
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Brazil had a few opportunities to be in a central world position in Science, as many other Nations which historical, cultural and economic conditions arrested scientific development to a slow compass. In spite of creativity and potential for innovation, many scientific fields remained dependent from other countries. Important discoveries have low impact on knowledge, research is discontinuos and poorly diffused. In the last decades, we observed a more ex-pressive participation in the international meeting, scientific production increased, and paleopathology was improved.

On the other side, palaeopathology companions in Brazil, biomedical specialties, were often more affluent areas, pushing forward to progress helping paleopathology to jump its gaps. Reviewing some of our fundamental contributions we can confirm some of our more prominent advances and how did they were shared with other countries.

At the beginning of the 19th century, before systematic investigations could be done in Brazil, a Danish paleontologist named Peter Willelm Lund, first brought to discussion trauma and pathological conditions in the skulls of Lagoa Santa man, motivating the eminent father of Pathological Anatomy, Rudolph Virchow, to discuss his findings. In the middle of the 20th century, Ernesto de Mello Sales Cunha, professor of Dental Pathology in Rio de Janeiro, first published papers about dental pathologies in Brazilian historic and Prehistoric samples. His discussion about the absence/slow rates of caries in coastal populations still motivate investigations.

In the same period, Luiz Fernando Ferreira, a professor of parasitology of helminths in Fiocruz, founded a group that turned attention to coprolites and mummies, pioneering paleoparasitology and promo-ing that field in Brazil. His investigations and expertise motivated similar development in other countries. Some more contributions were done in recent times, reaching colleagues in far distant places.

A synthesis of the progress of paleopathology in Brazil is presented here, Periphery or Center? Does not mind. Everything is relative. Ingenious minds, hard work, serendipity, and good companions make the difference. Be in contact, exchanging new questions, answers, insights. Keep communication channels wide opened to be in contact. What is beyond our borders? Either center, or periphery... Come to the PPA meetings, keep talking!

Portuguese Paleopathology: taking the stock and glancing at the future

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Portuguese anthropology emerged as a scientific discipline in the 19th century. In the following decades, the weight of paleopathological studies was residual; however, this situation shifted in the 1990's with an expansion of the discipline. This work intends to interpret the recent course that Portuguese paleopathology (PPp) has taken, as academic and research endeavors, whilst pondering on its future.

As fundamental pillars of the PPp's were considered:

i) the identified skeletal and skull collections, amassed since the 19th century; ii) the formal teaching of paleo-pathology, within the anthropology program, at University of Coimbra; iii) national legislation (Regulation of Archaeological Works in 1999) that requires an anthropologist's participation in the excavation of human skeletal remains; iv) promotion of scientific meetings,

e.g. European PPA (2002) and Jornadas Portuguesas de Paleopatologia, biennial editions since 2008; v) funding by the Portuguese public research agency-FCT.

At the present time, nearly two dozen PhD researchers conduct paleopathological studies together with many more master and doctoral students at the Universities of Coimbra, Lisbon (Nova and ISCSP), and Évora. The high standards of the Portuguese research contributed, for example, to the participation in inter-national and national projects, solidified the scientific network, and the authorship in reference literature in the field. PPA strengthened studies in paleoepidemiology, paleogenetic, and contributed to technical and methodological advances. Since the 1990s a large volume of data was produced which led to a good scientific position in the contemporaneity.

Now is the perfect time to consider: What do we want the future to be? Points of reflection include: the discipline's theoretical models and orientation, the ethical challenges of technological advances, expansion of the international scientific network, how to move past a diagnostic oriented praxis to a broader and societal reconstruction of the past, and how to develop community outreach programs and thematic exhibitions. Hopefully, this glance at the future will guide the Portuguese paleopathology to strengthen our contribution to the discipline.

Paleopathology in Greece: current status and future options

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Systematic studies in paleopathology in Greece began with the work of J.L. Angel shortly before the middle of the 20th century. Angel approached past human lives searching for correlations between health and the natural and cultural environments. Most renowned is his work on the link between thalassemia and malaria in the eastern Mediterranean and his observations remain to date integral to paleopathology. His contemporaries and predecessors, including the renowned pathologist Rudolf Virchow, invested only minimally on paleopathology.

Most scholars working in Greece at the turn of the 20th century focused on population affiliations instead on health conditions and Paleopathology, as a distinct research field, actually never developed in Greece, although in recent decades systematic analyses of non-specific stress indicators comprise a fundamental component of almost all bioarchaeological investigations. The study of disease per se has been more a sideline to general bioarchaeology. Notable has been the foundation of the modern reference human skeletal collection of the University of Athens with a multitude of conditions invaluable to the understanding of forensic and archaeological contexts.

The application of molecular techniques promises to open a more concrete avenue to the study of disease. At the same time, it raises important ethical questions on the interpretation of finds. Current areas of investigation published in international journals and archaeological monographs include trauma, anemias, scurvy, congenital conditions, infectious diseases and cancers.

Publications in Greek are scarce and concern for the most part archaeological journals published by the Ministry of Culture and proceedings of regional conferences in which paleopathology is integrated into contextually sensitive bio-archaeological analyses. In the past three decades many scholars have sought education in English speaking countries adopting a broader bioarchaeological perspective. The principal language of communication of scientific data has been English which is minimally perceived as a barrier in academic environments. Nevertheless, there is a void of publications in Greek in terms of approaching the public expressing keen interest to all mentions of past life ways.

Besides the study of human skeletal remains, paleopathology in Greece and the Eastern Mediterranean is approached through the study of parasites in latrines and the soil. To integrate paleopathology in the curricula of university departments where anthropology is taught is an imperative need. The material and human capital in this regard are not scarce.

Palaeopathology in South America and Beyond: A Bibliometric Perspective

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Purpose

Bibliometric analysis (the quantification of publications) has previously indicated differences in emphasis in palaeopathology between some European and North American countries (Mays, 2010). The current study aims to broaden this work by investigating how published output in palaeopathology from South America fits into this pattern.

Methods

A database of 2500 publications in osteo-archaeology was assembled by examining papers published in nine internationally distributed journals. The publications examined date from 2006-2018. For each publication, the subject matter (palaeopathology, normal skeletal morphology, etc) and type of paper (case study, population study, etc) was identified, and the paper was ascribed to country on the basis of the affiliation of the lead author. This methodology is as previously described (Mays, 2010).

Results

The proportion of total publications in osteoarchaeology emanating from South America that were devoted to palaeopathology (31%) was less than in Europe (42%) and North America (38%). By contrast a greater proportion of published papers from South America concentrate on morphological biodistance studies.

Looking specifically at palaeopathology, work in Europe continues to be dominated by case studies. The ratio of case study publications to population study publications is 1.8:1 among European-based authors. This ratio is markedly lower in South America (0.45:1) where population-based analyses rather than case reports predominate. North American publications

fall between these two (ratio of case reports: population studies among North American publications is 0.72).

Breaking down the data by year of publication shows that the proportion of publications comprising case reports has been static among authors working in South America and North America over the period studied. By contrast, despite consensus that we should, as a discipline, be moving away from case reports toward population-based work that enables hypothesis testing, the proportion of case studies is actually increasing among European-based workers. These broad patterns may be related to differing academic traditions and differences in the way in which the discipline is funded and structured in different regions of the world.

Conclusions

The character of published output in palaeopathology from South America is distinct from that characterizing authors based in Europe or North America. This indicates that, as well as being ethically desirable, increasing the diversity of PPA membership beyond the traditional heartlands of Europe and North America is beneficial by increasing the diversity of approaches to the discipline.

Future work using this large database will look in more detail at these broad patterns, as well as investigating publication patterns in palaeopathology in other parts of the globe.

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(S04) Much more than bones: Thoughts on ethical, scientific and management issues of Human Remains Collections

Organizers: Ricardo Guichón (UNICEN/CONICET, Argentina) and Claudia Rodrigues-Carvalho (National Museum/UFRJ, Brazil)

Especialmente en países de Sudamérica y el Caribe los vertiginosos cambios en los modos de percibir las problemáticas locales, las discontinuidades en las gestiones en ciencia, y la emergencia de nuevos actores y sectores ponen en tensión tanto las agendas de trabajo como los modos de generación de conocimiento a todos los niveles. ¿Cómo afrontar tremendos desafíos?

En cada lugar y considerando el amplio abanico de singularidades y entramados históricos que distinguen modos de llevar adelante actividades este simposio es una invitación a repensar creativamente tanto nuestras prácticas de gestión de colecciones osteológicas sensibles y otras de interés paleopatológico y forense; como los tratamientos curatoriales en especial aquellos que hagan foco en estrategias sustentables, que consideren aspectos éticos y que potencien la consideración de la mira de otros actores sociales.

En muchos casos la gestión de colecciones, reservorios, registros identitarios y cuerpos muertos traen aparejados acuerdos dinámicos entre actores, instituciones y comunidades en diferentes escenarios del mundo. Los diálogos, así como los no diálogos entre personas que vienen de diferentes trayectorias y producciones de sentidos (disciplinares, no disciplinares, miembros de comunidades originarias/ científicas/ organismos de gestión/ religiosas) están atravesadas por lo que podrían considerarse conflictos sociales complejos. En estos contextos las dinámicas y tradiciones institucionales (Museos, Universidades, Centros de Investigación) y de cada comunidad de actores suelen tener dificultades al momento de generar alternativas innovadoras y de articulación. Por supuesto la historia de muchas de las colecciones es centenaria o tienen décadas, conceptos cambian y nuevos desafíos deben ser conciliados.

Nos interesa en este simposio también generar un espacio de diagnóstico e intercambio de experiencias vinculadas a la creación, gestión y uso de colecciones de restos humanos actuales documentadas que articulan necesidades dentro del ámbito forense y como de la paleopatología, teniéndose en cuenta incluso los permisos, consentimientos y otras cuestiones. En esta misma línea las colecciones vinculadas a investigaciones paleoparasitológicas también resultan altamente relevantes.

Haciendo foco en otros aspectos entendemos que los modos de generación de conocimientos y dentro de estos las formas de compartir datos constituyen procesos dinámicos y no lineales donde su abordaje puede realizarse desde variadas perspectivas y dimensiones de análisis. Es así como a lo largo del tiempo diferentes formas de compartir datos pueden ser consideradas como medios para optimizar las actividades académicas. A partir de la modernidad y dentro de los procesos coloniales la obtención y circulación tanto de restos humanos como determinado tipo de información sobre ellos implicó situaciones donde vínculos asimétricos de poder estuvieron presentes.

En estos contextos es posible que los intereses de las ciencias, respecto a obtener un determinado tipo de información sobre restos humanos, pueda entrar en conflictos con otros intereses, sentires y cosmovisiones de comunidades. Queremos invitar a reflexionar también sobre esta problemática desde diferentes lugares que no necesariamente deban ser incompatibles o generar planteos dicotómicos. Los modos (por llamarlos de alguna forma) occidentales de generación de conocimiento produjeron y producen interesantes resultados (el avance de las ciencias) pero al mismo tiempo (como toda percepción) iluminan algunos aspectos e invisibilizan otros (puntos ciegos). En síntesis, la invitación también es a poner en tensión los planteos esencialistas y focalizados en sistemas cerrados.

[EN] Especially in countries of South America and the Caribbean, the vertiginous changes in the ways of perceiving local problems, the discontinuities in the management of science, and the emergence of new actors and sectors put stress on both work agendas and ways of generating knowledge at all levels. How to face these tremendous challenges?

Considering the wide range of singularities and historical frameworks that distinguish many ways of carrying out activities, this symposium is an invitation to rethink creatively our management of sensitive osteological collections, and others of paleopathological and forensic interest ; and also our curatorial practices, especially those that focus on sustainable strategies, that consider ethical aspects and enhance the consideration of other social actors.

In many cases, the management of collections, reservoirs, identity records and dead bodies bring dynamic agreements between actors, institutions and communities in different scenarios of the world. The dialogues, as well as the non-dialogues, between people who come from different trajectories and productions of senses (disciplinary, non-disciplinary, members of indigenous or traditional communities / scientific communities / management organizations / religions ones) are crossed by what could be considered complex social conflicts. In these contexts, the Institutional dynamics and traditions (Museums, Universities, Research Centers) as well these of each community of actors, often have difficulties to generating innovative alternatives and articulations. Of course, the history of many of the collections is centuries-old, or at least decades, so concepts change, and new challenges must be reconciled.

We are interested that this symposium is also a space for diagnosis and exchange of experiences related to the creation, management and use of collections of modern documented human remains that articulate needs within the forensic field and the paleopathological one, considering permits, consents and other issues. Along these same lines, collections linked to paleoparasitological research are also highly relevant.

Focusing on other aspects, we understand that the ways of generating knowledge, and the ways of sharing data, constitute a dynamic and non-linear processes and can be approached from various perspectives and analysis' dimensions. Thus, over time, different ways of sharing data can be considered as means to optimize academic activities. In the modernity, and within the colonial processes, the obtention and circulation of both human remains and certain type of information about them implied situations where asymmetric power relationship were present. In these contexts, it is possible that the scientific interests, regarding the obtention of a certain type of information on human remains may conflict with other interests, feelings and worldviews of the communities. So, this symposium is also an invitation to think about this problem from different places and points-of-view that do not necessarily have to be incompatible or generate dichotomous demands. The occidental ways (to call them somehow) of knowledge generation

produced and keeping producing interesting results (the advance of science) but at the same time (like all perception) illuminate some aspects and make others invisible (blind spots). In short, our invitation is also to question the essentialist and focused approaches in closed systems. [Translated by V. Wesolowski].

Challenges to keep the sub-collection of coprolites and paleoparasitological material Luiz Fernando Ferreira as source of studies in Paleoparasitology

Marcia CHAME

Oswaldo Cruz Foundation, Brazil

The advancement of the Paleoparasitology field in Brazil and in the world over the last 40 years was remarkable and the demand for materials for analysis grew. The raising of molecular methods improved even more the research putting extra pressure over the study collections.

The research conduct over any kind of institutionalized or musealized collection is always a compromise solution between conservation/ preservation needs and research needs. These needs are frequently opposed or at list divergent, which bring some dose of conflict to the interactions established among researchers, house institutions and curators or collection managers. Scientific collections institutionally recognized have not only the mission of provide material for development of scientific new knowledge in present but also the mission to be a reservoir of biodiversity allowing new research in future as well the scientific confrontation and test of previous results, and yet the mission to preserve unrecoverable testimonies of its time, space and history. In order to fulfill these missions in a balanced way standards and curatorial rules must be observed under modern ethical aspects and national and institutional legislation.

The “Paleoparasitological and Recent Animal’s Faecal Collection” of the Oswaldo Cruz Foundation comprises the “Luiz Fernando Ferreira Collection of Coprolites and Paleoparasitological Material”, which was started in 1979 and, at the age of 40th, includes today more than 3,000 items, most of which are coprolites. The Luiz Fernando Ferreira Collection was institutionally recognized in February 2019 and since 1979 had already provided material for many studies and discoveries well documented and published. This presentation aims to conduct a reflection on the defies, ethical and scientific issues and conflicts that arouse from distinct interests over this type of collection and the difficulties and limits to keep, manage and research such collections through our experience with the Luiz Fernando Ferreira Collection.

Coming back to light: curatorial recovery of old Human Remains Collections

Veronica WESOLOWSKI

Museum of Archaeology and Ethnology, University of São Paulo, Brazil

Most human osteological collections count their formation time in decades, many of them are even centuries old, and were produced from various theoretical and methodological perspectives, including some we wish we could forget.

In the case of Brazil, some of these collections, over time, have been exhaustively requested for research and have accumulated studies from many perspectives, at the same time others have never been studied or even satisfactorily described since they were excavated. Both are frequently under-documented in contextual terms. Apart from some curators directly involved with the collections, it is common that the actual conditions of their formation are little known by current museums researchers and staff.

In general, two factors influence whether a skeletal series of archaeological origin is more or less requested for research in Brazil: the first is the number of individuals that integrate it, the second the preservation conditions and the integrity of the skeletons. Good contextualization and archaeological documentation, as incredible as it may seem, are not always a criterion of choice for requests.

While cured osteological collections are much in demand and accumulate conservation problems due to over-manipulation, those that have not been satisfactorily cured (if cured at all!) and are therefore under-requested, accumulate conservation problems exactly because they remain in conditions that make their study unfeasible. This scenario creates a vicious circle in which both also suffer from a lack of sufficient specialized technical staff to ensure continued preventive conservation actions.

Much has been said and discussed, for some time now, about ethical aspects involved in research with human remains of archaeological origin; there are many dissonances, but also consonances, between multiple actors and places of speech. Undoubtedly, the issues surrounding the rights to the bodies of their ancestors of those who maintain biological or cultural ties of descent and the research privileges of scientists have taken largely the discussion and it is understandable to be so. However, in this presentation, I would like to step back from these issues for a moment and invite to a discussion on aspects of what I will call an "ethic of care" in relation to these osteological collections with regard to our responsibility to ensure curatorial action that focus on the respectful and dignified treatment of human body remains. My point is that the purpose of the curatorial process in these collections should not be strictly to ensure that archaeological heritage is well preserved, somehow available and suitable for research. It is also to ensure that the humanity inherent to these remains is taken into account on a daily basis, whether through collaborative conservation actions, by reviewing storage and handling procedures or even by blocking some research actions. In this sense, a curatorial procedure based on this "ethic of care" could be operationalized by investing time and human and financial resources not only in research but also in conservation, not prioritizing research over conservation, changing practices such as separating funerary goods from human remains, identifying sensitive collections, etc.

Except for a few exceptions, this discussion is still distant from the daily life of the many Brazilian institutions that houses human osteological collections but not necessarily specially trained bioarchaeologists or technicians to care and deal with them.

Dealing with Human Osteological Collections: questions and reflections before and after the fire at Museu Nacional

Claudia RODRIGUES-CARVALHO

National Museum, Federal University of Rio de Janeiro, Brazil

Ethical aspects regarding human remains collections and research are still a developing issue in many Brazilian institutions. Besides the intense indigenous depopulation after the arrival of European groups in this country, the colonization project had an implicit activity in the dissolution of locals' identities.

This project spread through all the colonized world and is responsible for the contemporary dichotomies among what is been called the "general society" and many traditional groups. This identity dissolution goes far more than a world of contemporary "us" and "them". It also affects the ways we see our past. Without established ties with our indigenous roots (which indeed exists but are seldom perceived), our past is always in a complex consciousness conflict.

Decolonizing and multivocality movements are getting space and claiming for new directions for managing the questions linked to heritage, sacred objects and manipulation (study, storage, sample collecting, etc.) of human remains. Immersed in these new ways of thinking I was in the comfortable position of a progressive fellow open to discuss and listen to any kind of claims regarding the collection of the human remains under my responsibility: the collection held in a National museum, built over the last 200 years and under different contexts trough time (with some stories not so nice to be told). This collection was heavily affected by the September 2 fire in 2018 and the extent of loss is yet to be determined. Through the efforts of reconstruction issues regarding methods for identification of burnt and mixed bones, the possibility of disposal of unidentified ones, and more, the expectation of constructing a new collection, are in the minds of the curator team.

Is in our hands the decision to begin a new collection. How can we do it without following the (many times wrong) steps of our predecessors is now the theme pervading all reflections. Although none of our ideals had changed after the fire, it leads to an unexpected situation: we'll have to find how much decolonized we are and how much of that insidious project are still living in us. In this sense, we intend to discuss the tensions between local versus national collections and teaching, research and exhibition uses and issues regarding human remains or their images.

Generate and share information about human bone remains. Prospects and challenges (Generar y compartir información sobre restos óseos humanos. Miradas y desafíos)

Ricardo GUICHÓN (1, 2) and Manuel D. D'Angelo del CAMPO (1,3)

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(3) Laboratorio de Poblaciones de Pasado (LAAP), Universidad Autónoma de Madrid (UAM), España.

La presencia de restos humanos en diferentes escenarios: arqueología, forenses, estudios de impacto, movimientos de tierra, reclamos y restituciones son procesos complejos atravesados por diversidad de perspectivas y actores sociales. El objetivo de esta presentación es proponer un espacio de reflexión sobre la generación y los modos de intercambio de conocimiento vinculados a los restos óseos humanos. La obtención y circulación de restos esqueléticos humanos, así como determinado tipo de información sobre estos, implica situaciones donde a lo largo de la historia se aprecian vínculos asimétricos de poder.

Los intereses de las diversas áreas del conocimiento en obtener un determinado tipo de información a partir de los restos óseos pueden entrar en conflicto con otras cosmovisiones. Por otro lado, los sistemas científicos evolucionan, así como los canales en que se comparten los conocimientos; esta situación, abre un abanico de nuevas posibilidades.

Se revisarán algunas ideas sobre que son los datos, la información, la comunicación y las producciones de sentidos; así como argumentos positivos y negativos acerca del libre intercambio de estos ("data sharing").

No es un análisis exhaustivo, no se buscan respuestas dicotómicas (bueno o malo). En concreto, el data sharing puede implicar cambios manteniendo la organización de la variedad de expresiones que tienen los sistemas científicos, pero también puede acompañar nuevos modos de producción de conocimiento. Recuperamos la integración y utilización de los antagonismos en las formas organizacionales (sistemas complejos abiertos) para interpretar los sistemas científicos y alentando la posibilidad de nuevos y diversos escenarios cogestionados.

(S05) Common Parasitological Questions Unique to the Americas

Organizers: Karl Reinhard (University of Nebraska-Lincoln, USA) and Morgana Camacho (University of Nebraska-Lincoln, USA)

Archaeological analysis of parasitism is unique in the Americas due to the presence of mummies and coprolites. These provide sources of information that can address paleopathological questions unique to the Americas such as the causation of porotic hyperostosis. Also, some disease agents, such as *Trypanosoma cruzi* are exclusively American. Others such as *Adenocephalus pacificus* are uniquely South American. The theme of this symposium relates to parasitological analyses that address specific questions for the Americas such as the source and spread of endemic American parasites and their role in defining gross pathology.

Pacific tapeworm infection over time

Isabel TEIXEIRA-SANTOS
University of Nebraska-Lincoln, USA

To understand the continuum of infection, one must consider the study of parasites in archaeological contexts. Quantitative methods are commonly applied in modern parasitology and prevalence, intensity of infection and parasite distribution are foci in research of human parasitism. Parasites are found to be “overdispersed” among host populations, with the majority of parasites concentrated in a minority of hosts. Quantitative analyses have been performed in studies of ancient parasites since the end of the 20th century. Through these studies, Paleoepidemiology could be defined and emergence and reemergence of infection could be discerned. There is a global reemergence of diphyllobothriasis due to *Adenocephalus pacificus* infection in modern populations. Ancient populations from Southern Peru and Northern Chile were found to be parasitized by *A. pacificus* in sufficient concentrations to provide epidemiological and archaeological information. Are paleoepidemiological data of *A. pacificus* infection in ancient populations comparable to epidemiological data from modern populations?

This study aimed to investigate prevalence, intensity of infection and parasite distribution in sites from three ancient societies: Chinchorro (5434 – 2700 BP), Chiribaya (1000 – 538 BP) and Inka (539 – 483 BP). Samples from four sites of the Chinchorro culture (MO 1, MO 1-6, Chacarilla, Camerones Norte) were analyzed from Chile. From southern Peru, three Chiribaya sites were studied (Chiribaya Baja, Chiribaya Alta, San Geronimo). From northern Chile, Mitas Chiribaya coprolites from the Lluta Valley were analyzed as well as Inka samples from the same valley. The samples were weighed and rehydrated in 0.5% trisodium phosphate solution during 48h. Lycopodium tablets were added according to the weight of each sample. A magnetic stirrer was used to disaggregate the samples, which were later screened through a 250µm mesh. Microscopic remains were concentrated by centrifugation and slides were prepared. A minimum of 50 spores were quantified along with the parasite eggs. Parasitological parameters were calculated, a two-tailed T-test was performed to compare egg concentrations and parasite distribution was

obtained by comparing parasite abundance and concentration. Prevalences found were: 38% from Chinchorro site MO 1-6, 69% from Chiribaya Baja, 20% from San Geronimo, 4% from Chiribaya Alta and 4% from Inka period. The T-test ($p < 0.05$) between Chinchorro and Chiribaya demonstrated egg concentrations to be statistically different. Parasites were found to be “overdispersed” between all study sites and both contexts. There was a decline of infection through time. In addition, there are differences in prevalences when comparing sites from the same culture, which can be attributed either to dietary patterns or to taphonomy.

Ancient and modern data can be comparable. We are approaching a fusion of past and present in parasitology that will expand our perspectives on transmission among peoples of diverse cultural backgrounds and time periods.

Louse infestation associated with immigrant populations in southern Peru

Elisa Pucu de ARAÚJO (1) and Karl REINHARD (2)

(1) Federal Fluminense University, Brazil

(2) University of Nebraska-Lincoln, USA

Recent studies, especially of louse ectoparasites from mummies, developed especially robust data sets that allow a true epidemiological approach to the prehistory of louse parasitism. One epidemiological principle is the negative binomial of overdispersion. This refers to the fact that in a host population, parasites are aggregated in a few individuals. This paper is an attempt to test whether or not overdispersion can be documented through archaeological study of lice and then related to environment and status. Once this pattern is established in archaeological host populations, then we propose that parasitological data from archaeological sites can be used in the same epidemiological manner as modern parasite data. Therefore, the analysis of archaeological patterns will reveal the states of infestation in past populations with unique lifestyles, not seen in modern peoples.

The coastal valley of Moquegua, Peru is deep with a narrow arable flood plain. Today the river runs only a few days each year. Evidence from archaeology indicates that the river flowed year-round. The coastal Valley was occupied by agriculturalists that developed their own advanced culture known as the Chiribaya. They were established by 950AD and persisted until after 1350AD. The Chiribaya economy was based on a subsistence of fishing, agriculture and herding. The Tiwinaku civilization collapse caused a dispersal of people into regions well beyond Lake Titicaca. Some of these settled in the coastal valley near Chiribaya towns. These Tiwinaku people were a marked, lower-status minority surrounded by the Chiribaya majority. These low status immigrants are known archaeologically as the Ilo-Tumilaca/Cabuza.

The availability of louse data from Moquegua Valley mummies allows us to detail the paleoepidemiology of lice in these stratified cultures. The mummies come from three sites, two of which are in the coastal valley and one of which is in the middle valley. The two sites from the coastal valley represent economic extremes. The first is a high-status administrative center known as Chiribaya Alta. The second is Algodonal, a small hamlet of Ilo-Tumilaca/Cabuza immigrants of the lowest status.

Overdispersion was evident in all samples, with an aggregation of a majority of louse nits/eggs on a minority of hosts. Sample size was 32 for Algodonal and 63 for Chiribaya Alta. The total prevalence was 40.6% of Algodonal and 39.1% from Chiribaya Alta. However, a difference in intensity was found. Infected individuals at Algodonal, was 67.23 nits/eggs per sampling unit of 2 x 2 cm. For Chiribaya Alta, mean intensity was 18.08.

We were able to demonstrate louse overdispersion in this study. We were able to demonstrate significant differences in measure of infestation intensity. We believe that the study of lice has the greatest potential for providing real epidemiological data regarding past populations, when large numbers of mummies are examined. Therefore, we encourage researchers to collect data to develop a significant data base concerning lice in prehistory.

Tracing the taphonomic loss of endoparasites in Sambaquis

Morgana CAMACHO

National School of Public Health, Oswaldo Cruz Foundation, Brazil

Since the beginning of paleoparasitology in Brazil until 2010, 121 sediment samples from different sambaquis were analyzed. However, no parasite remains were found. After 2010, a few parasite eggs were observed in samples from archaeological profiles and sediments from the pelvic girdles of skeletons. However, these findings were poorly preserved. Only a few eggs were found and mostly were from non-human parasites. Sambaquis are located next to waterbodies and are distributed along most of the Brazilian coast, where rain is constant.

Considering these facts, it was hypothesized that water percolation was probably the major taphonomic factor that interfered in the paleoparasitological analyses. In order to test if water percolation could have influenced the rarity of parasite findings in sambaquis, we performed an experiment to evaluate if vertical water percolation could contribute to the disappearance of *Ascaris lumbricoides* eggs. Three columns of undisturbed sediment derived from archaeological profiles with different sedimentary constitutions (sandy, sandy-clayey, clayey) from Sernambetiba sambaqui, Guapimirim, Rio de Janeiro, were collected with aluminum tubes and stratigraphically documented. The tubes were vertically attached to a lab wall and a million *A. lumbricoides* eggs were introduced in each tube. Distilled water was poured two days a week during 45 days. Collection recipients were placed under the tubes in order to evaluate if eggs were being carried with water through the tubes. After the 45-day period of experiment, the tubes were opened and the profiles' layers were collected according by stratigraphy. Twenty grams of sediment of each layer were rehydrated in 0.5% trisodium phosphate solution during 24h and then submitted to the spontaneous sedimentation technique. Microscopic slides were prepared and analyzed by light microscope with 100x and 400x magnification. No *A. lumbricoides* eggs or of any other helminth were found in the analyses of the water collected by the recipients during the experiment. However, active free-living nematode larvae and protozoa could be observed. The analyses of the sediments from the tubes demonstrated that the vast majority of eggs had disappeared, and the remaining eggs were retained in the surface of the tubes. In the sandy tube, only 34 eggs were found, in the sandy-clayey tube, only 16 eggs and in the clayey tube, only 31 eggs. In this experiment, it was not possible to verify the influence of water percolation in the

disappearance of *A. lumbricoides* eggs. Instead, a rapid destruction of the eggs was noticed indicating that there are taphonomic factors other than water percolation acting in the degradation of the eggs. The active free-living nematodes and protozoa as well as other microorganisms could have predated the eggs. In general, hunter-gatherer populations are known to have low parasite prevalences and in some cases no parasite findings. However, in the case of sambaquis the poor conditions of preservation strongly contributed to the paucity of findings and may suggest that instead of an absence of infection, there are several taphonomic factors that degraded the parasitological findings, which lead to the impossibility to evaluate parasite infections in sambaqui populations.

Porotic hyperostosis related to infection and diet

Karl REINHARD (1) and Morgana CAMACHO (1)

(1) University of Nebraska-Lincoln, USA

Porotic hyperostosis is a common prehistoric bone lesion diagnosed mostly in infants. In the past, it was correlated to iron deficiency anemia due to nutritional deficiency and intense parasitism related to crowding, poor sanitation and cultural practices. In 2009, Walker and colleagues reappraised the iron deficiency anemia hypothesis and suggested that megaloblastic anemia, due to chronic deficiency of vitamins B9 and B12, was the actual cause of these lesions in Native American populations. The authors point out that intense infection with intestinal parasites and a diet dependent on maize consumption were probably related to the absence of these vitamins in Ancestral Pueblo populations. Paleopathological studies demonstrated that these populations exhibit high rates of these lesions. Was the Walker and colleagues (2009) hypothesis valid for Ancestral Puebloans?

In order to investigate if the epidemiological scenario suggested by Walker and colleagues (2009) we evaluated the possible existence of intense parasite infection and maize dependent diet in three Ancestral Pueblo sites with different occupation periods. We applied quantification methods to evaluate dietary components and parasite infection burden in Ancestral Pueblo populations from Turkey Pen Cave (0-100 Anno Domini-AD), Salmon Ruins (1088-1250 AD) and two latrines from Aztec Ruins (1110-1275 AD), rooms 219 and 225. A total of 123 coprolites were weighed, rehydrated and, along with Lycopodium tablets, and sedimented in 250µm mesh in order to concentrate parasite remains. The dietary analysis was performed by applying the acetolysis method. *Enterobius vermicularis* was the only parasite recovered and prevalences were the highest found in archaeological sites. Four different diets are evident at the sites; 1) bean leaves, squash, wild tomatillos and pollen; 2) maize, wild seed and pine nuts; 3) wild grasses and maize and 4) fermented maize, pine nuts and wild seeds and grasses. In Turkey Pen Cave and Aztec Ruins, spores of *Ustilago maydis*, a fungus that parasitizes maize, was found to be representative and indicates intentional consumption by the members of these populations. Previous study points that this fungus was an important source of vitamin B9 and essential amino acids.

Despite this, there is still the absence or low intake of vitamin B12. Intense pinworm infection is related to vitamin B12 depletion in modern populations. Cultural factors such as the amount of

time spent in ritual constructions (kivas) facilitated pinworm transmission through the air and contributed to spread the infection. In addition, the use of cradleboards to immobilize infants probably contributed to autoinfection, increasing the intensity of infection in individuals of this age. Our results indicate that cultural, nutritional and health aspects probably contributed to a chronic deficiency in vitamin B12, confirming that the depletion of this nutrient was present, thus pointing that the pathoecological factors related to the megaloblastic anemia by Walker and colleagues (2009) were present in the studied populations.

Discoveries of geohelminths from Northern Mexico and what this shows about parasitism and Mesoamerican influence

Elisa Pucu de ARAÚJO (1), Daniela LELES (1), Jessica SMITH (2), William Darwin HETZEL (2),
Brandon STRAUSS (2) and Karl REINHARD (2)
(1) *Federal Fluminense University, Brazil*
(2) *University of Nebraska-Lincoln, USA*

Previous studies comparing data from burials and mummies from Europe and Americas have shown a higher prevalence of *Ascaris* and *Trichuris trichiura* in Europe and a near absence in the Americas. Low prevalence could be due to the presence of anti-helminthic therapies and lower population densities in the Americas. Also, the use of fecal fertilization in Europe spread infection.

In this study, sediment of 7 burials (numbers 1, 3, 4, 5, 6a, 6b and 8) are analyzed from La Cueva de Los Muertos Chiquitos, Mexico (600 A. D.) for the presence of parasites. Samples were weighed, subsampled (maximum of 5.0 grams), and rehydrated for 48 hours in 0.5% trisodium phosphate. For every gram of sediment, a *Lycopodium* tablet (containing $12,500 \pm 400$ *Lycopodium* spores), was added in order to calculate microfossil concentrations. Samples were treated with heavy-density zinc bromide solution, with gravity of 1.9 with 2% hydrochloric acid. Microscope preparations from light fractions were analyzed for the presence of parasites. We found *A. lumbricoides* in burials 5 and 6a, *T. trichiura* in burials 5, 6a and 6b, and *Toxocara* sp in burials 5, 6a, and 8. The highest concentration for *A. lumbricoides* was in sample 6a with 18,840 eggs/gram; *T. trichiura* 2,398 in burial 5; and *Toxocara* sp. 1,630 in burial 6a.

Previous studies of the archaeology of this site showed that the population that inhabited the region was the Loma San Gabriel. The population subsisted on agriculture and hunting/ gathering, with a diet mostly based on agave, maize, squash, beans, and mammals/fish. The presence of geohelminths indicate that the population was parasitized by *A. lumbricoides* and *T. trichiura*. The presence of *Toxocara* eggs shows that dogs were also present in the site. Previous analysis of coprolites from a different context have found the presence of *T. trichiura* and other parasite species, but not *A. lumbricoides* or *Toxocara* sp. These findings indicate that possibly there were two distinct populations represented in different strata. An earlier stratum contains *A. lumbricoides*, *T. trichiura* and *Toxocara* eggs. A later stratum had no *A. lumbricoides* or *Toxocara* sp. *Toxascaris* and other three other dog parasites were found in the later stratum. In both strata, analysis shows that dogs were on the site, which could be a risk of toxocariasis for the earlier population.

In this study we highlight the occurrence of intestinal parasites that are not common in the prehistoric New World: *A. lumbricoides* and *Toxocara* sp. Possibly, the absence of these parasites in other archaeological sites could not only be due to lifestyle but also to the preservation of the sites. Previous studies have diagnosed *Ascaris* DNA in archaeological samples from the New World. We corroborated this finding with physical evidence of eggs. This shows that this parasite occurred in high concentrations in suitable environments. Concentrations of parasite eggs show that the population probably experienced toxocariasis, *Trichuris* and *Ascaris* infection resulting in health disorders having an impact in their lifestyle.

PODIUM PRESENTATIONS

Organized by presentation day and schedule

Wednesday, 14th

(PS01) A Paleopathology Overview

Chair: Rodrigo Elias de Oliveira (São Paulo University)

Tenetehara: complicating health and contact.

Della Collins COOK
Indiana University, USA

Guedes and colleagues' recent article on tuberculosis in the Tenetehara-Guajajara collection at the National Museum in Rio de Janeiro (2018) documents a vanishing resource: skeletal collections that provide a paleopathology of the experience of indigenous groups in contact with the larger society. Their demonstration that tuberculosis—both human and bovine—was rampant in this group, even in those with limited osteological evidence for TB, is particularly valuable. That contact included physical trauma also well-demonstrated.

There is more to be said about the negative consequences of contact in this group. The lumbar spine of SABMN00704, a young adult male, presents a particularly interesting lesion. TB is a possibility, even when ancient DNA fails to confirm the diagnosis. However, trauma, enthesiopathy, Scheuermann disease, brucellosis, and other infectious diseases should be part of the differential diagnosis. Additional detail about the life and death of this young man enriches our understanding of his society.

Guedes, Lucelia et al. (2018) Tuberculosis in post-contact Native Americans of Brazil: paleopathological and paleogenetic evidence from the Tenetehara—Guajajara. *Plos ONE* 13(9): e202394.

La Conquista Inca en el Extremo Norte de Chile: ¿Vía Pacífica o Vía Militar?

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El Imperio Inca el más grande y expansivo de América conquistó y anexó bajo su dominio y control político todos los territorios a lo largo de la Cordillera de los Andes, tanto de la vertiente occidental como oriental; y se extendió desde Colombia por el norte hasta el río Cachapoal en el centro sur de Chile. Su presencia en el extremo norte de Chile se constata por sus abundantes restos culturales (cerámica, tejidos, metalurgia, etc.) y arquitectónicos (aldeas, tambos, silos de almacenaje, caminos, etc.). Bajo esta perspectiva nos preguntamos si la conquista del actual

territorio de la costa del extremo norte de Chile habría sido de carácter Pacífico o en contraste se habría empleado la fuerza militar, como sí sucedió en otros lugares de los Andes donde los Incas conquistaron territorios por la fuerza (ej. Los Chankas en la sierra central de Lima). Para contestar esta pregunta se empleó una perspectiva bioarqueológica y se estudiaron los traumas craneanos para la búsqueda de huellas de violencia intencional que reflejen combates o peleas intergrupales.

Metodos: Se estudiaron cuatro colecciones bioarqueológicas procedentes del valle de Lluta (LLuta-54, n=30), costa de Arica (Playa Miller 4, n=47) y costa de Camarones (Cam-8, n=16 y Cam-9, n=29) correspondientes a los Periodos Intermedio Tardío y Tardío, para la búsqueda de traumas craneanos (fracturas sanadas en depresión en la bóveda, presencia de puntas de proyectil impactadas, fracturas faciales). El rango etario de la muestra incluyó individuos entre los 17 años hasta sobre 50 años de edad.

Resultados: Los resultados muestran que los niveles de violencia durante los Periodos Intermedio Tardío y Tardío fueron relativamente bajos en las cuatro colecciones estudiadas. Los porcentajes fluctúan entre el 5% - 10 % de los individuos afectados. Aunque los hombres están levemente más afectados, estas diferencias no fueron significativas. Los traumas en general no fueron severos (fracturas nasales y leves fracturas en depresión en la bóveda). No se registró ningún trauma letal.

Conclusión: Debido a los bajos índices de violencia interpersonal que fueron encontrados en el estudio de los cráneos de los Periodos Tardíos de Arica y Camarones concluimos que estos territorios fueron conquistado por la vía pacífica. Funcionarios incaicos (militares, diplomáticos, entre otros) encargados de anexar estos territorios al imperio, debieron llegar a acuerdos políticos con los caciques locales para mantener la armonía social en esta región. Esta evidencia es concordante con los datos etnohistóricos y arqueológicos que sugieren una multiétnicidad de grupos conviviendo en la región.

La paleodieta en San Pedro de Atacama durante el Período Medio (~400-1000 CE): prosperidad, intercambio y cambio cultural.

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El Período Medio en el Desierto de Atacama, norte de Chile, (~400-1000 CE) es considerado un período de paz y prosperidad, asociado a un aumento poblacional y la intensificación de las interacciones interregionales. Dentro de este desierto se ubica San Pedro de Atacama, que consiste de una serie de pequeños oasis a 2.450 msnm. Al comienzo del Período Medio, los oasis presentan evidencia de asentamientos permanentes habitados por pastores de camélidos que practicaban la agricultura en pequeña escala. Se ha argumentado que este período muestra la evidencia más temprana de producción de excedentes, un fenómeno que facilitó el creciente

comercio de caravanas. Esto se ve reforzado por la incipiente especialización artesanal, que se evidencia en las nuevas prácticas metalúrgicas y en el crecimiento de las prácticas agrícolas. La expansión demográfica, el aumento notable en la cantidad y calidad de los bienes funerarios, y una red sustancial de interacción interregional demuestran la creciente prominencia y prosperidad de los oasis en este momento. En conjunto, estos factores, en combinación con cambios sociales y con el desarrollo de la desigualdad formalizada, influenciaron el acceso a recursos y la dieta de los antiguos habitantes de los oasis Atacameños. Para caracterizar estas diferencias en las dietas, hemos analizados isótopos estables de carbono y nitrógeno de 276 individuos de 13 cementerios de este período. Los resultados indican mucha variabilidad en todos los sistemas isotópicos (con rangos de aproximadamente 9 por mil) y una compleja variabilidad de la dieta, influenciada por múltiples ejes bioculturales, incluyendo el género, la foraneidad de los individuos, y las diferencias entre cementerios. Por ejemplo, hemos visto que la foraneidad en algunos casos se relaciona a un consumo más alto de plantas C4. Por otra parte, a pesar de que el género se manifiesta de forma diferenciada en los ajuares, no lo hace de forma generalizada en la dieta, variando entre cementerios. Aquí exploramos aspectos de la interrelación de algunos elementos del estilo de vida, las identidades sociales y la salud de estos individuos y sus patrones de alimentación para detallar la complejidad del Período Medio.

Quién era quién en la cultura Chancay? Los resultados del estudio estratigráfico, antropológico y arqueométrico de los fardos Y restos humanos encontrados en los sitios de Cerro Colorado y Macatón.

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Durante las excavaciones realizadas en los cementerios de la cultura Chancay, en los valles de Huaura y Chancay, encontramos más de 250 fardos, los cuales podemos estimar como elaborados o “ricos”. Eso quiere decir que los cadáveres se ubicaban envueltos tanto con varios textiles ejecutados y decorados en técnicas diferentes, como también con símbolos de poder. Entre los textiles se puede mencionar las gasas, las redecillas y los tapices decorados con figuras antropomorfas o zoomorfas, algunos de ellos con clara referencia a la iconografía norteña de Chimú y Lambayeque. Además, se encuentran también los adornos de la cabeza como hondas y vinchas decoradas, láminas de metal colocadas sobre el rostro; finalmente también los tocados en forma de media luna elaborados de cobre o plata. Se encontró también unos tupus y brazaletes de cobre y plata. Más que eso, los estudios arqueométricos ejecutados en laboratorios químicos informan que al menos algunas personas fueron embalsamadas y pintadas con el cinabrio, el mineral sagrado en los Andes prehispánicos.

A primera vista, podríamos decir entonces, que tenemos que ver con los miembros de una élite. Sin embargo, los análisis antropológicos no dejaron ninguna duda que todas esas personas ejecutaban un trabajo físico forzado a lo largo de su vida. Lesiones por la enfermedad degenerativa de las articulaciones, osteoartritis bien pronunciada en las vértebras y en las rodillas, en algunos casos exostosis en los conductos auditivos y otros cambios degenerativos informan de

que los muertos encontrados en los fardos “ricos” de hecho eran trabajadores que realizaban intensos trabajos físicos: posiblemente las tejedoras (pero también tejedores) y los pescadores o pescadoras, en algunos casos también guerreros. La datación radiocarbónica ejecutada para los 30 contextos funerarios del sitio Cerro Colorado en Huaura nos informa que los fardos mejor elaborados fueron creados entre las últimas décadas del siglo XIII y las primeras del siglo XV. Todo eso significa, que en los últimos doscientos años antes del Tawantinsuyu, alguna gente quien pasó su vida trabajando físicamente, tuvo acceso a los bienes teóricamente restringidos a las personas del status alto. Todo eso nos hace repensar la situación sociopolítica en la región del Norte Chico en los últimos siglos del Periodo Intermedio Tardío y además preguntar, que significaba “ser de elite”, “ser artesano” y “ser pescador” en la Cultura Chancay.

Prevalence of pathological lesions in the human osteological materials from Iron Age water burial site Levänluhta, Western Finland.

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The Iron Age site Levänluhta is situated in the Isokyrö municipality, western Finland (5th to 8th centuries AD). A major bioarchaeological study of the site was carried out in 1993 (Formisto 1993). The minimum number of individuals is 98 of which 62 are adults and 36 are subadults (Formisto 1993). In this paper we present the main results of the paleopathological study and the true prevalence rates of various pathological conditions.

Ante mortem tooth loss (AMTL), dental calculus and especially dental caries prevalence was lower than in later periods in Finland. The prevalence of periapical lesions in the lower molars, however, were slightly higher in Levänluhta than in later periods. This may be explained by advanced dental wear or trauma. The alveolar-CEJ distance was also lower although teeth in general had more wear. This speaks for diet change (increase in carbohydrates and softer foods) in the later Iron Age, medieval and early post-medieval periods in Finland. For dental caries, however, even the existence of the pathogens causing dental decay in the whole material can be questioned, since lesions are so few and some of them are not typical caries lesions and could be taphonomic or developmental defects of the dental enamel.

Most striking feature in the paleopathological state of the Levänluhta people is that joint lesions are found more than usual in bioarchaeological studies. Especially the knee and ankle joints are affected more than usual. Most of the joint lesions resemble osteochondritis dissecans, but its prevalence exceeds the normal crude prevalence rate of osteochondritis (0-5%) by far.

Trauma prevalence is similar to other bioarchaeological studies. Periostitis and localized infections neither did reveal anything surprising. *Cribra orbitalia*, especially in subadult skulls, seems to be slightly lower than the later periods in Finland.

Schmorl's nodes, spondylolysis, enamel hypoplasia, osteoma and localized osteophytic lesions prevalence rates were similar to those reported in previous bioarchaeological studies. Partial sacralization of the left side was observed in three individuals.

Formisto, T. 1993: An Osteological Analysis of Human and Animal Bones from Levänluhta, Vammalan kirjapaino oy, Vammala

Salud Y enfermedad de las poblaciones cazadoras-recolectoras en el Centro-Oeste del Chubut: Estado de la cuestión y perspectivas a futuro

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El objetivo de este trabajo es presentar una síntesis de los estudios paleopatológicos realizados en restos humanos procedentes del Centro-Oeste de la provincia de Chubut, República Argentina. Estos estudios se realizaron en el marco de un proyecto iniciado en el año 2009 cuyo propósito era evaluar el potencial arqueológico de un área donde, hasta ese entonces, no se habían realizado investigaciones arqueológicas sistemáticas.

A partir de distintas campañas arqueológicas se recuperaron restos óseos y dentales en dos sitios localizados cerca de Río Pico (Acevedo 1 y Solís sepultura) y uno en las cercanías de la localidad José de San Martín, valle del Genoa (Fabiana Elizabeth). En ambos casos, no se detectaron indicios de estructuras. A partir de un nuevo proyecto que busca vincular el registro arqueológico con el registro bioarqueológico registrado en esa misma área y de zonas vecinas, se realizaron nuevas excavaciones en el valle del Genoa que permitieron ampliar la muestra. Adicionalmente, se incluyeron muestras procedentes de colecciones bioarqueológicas albergadas en museos, instituciones estatales y privadas. En este trabajo se presentan los avances obtenidos a diez años de haber comenzado las investigaciones en la zona.

Los análisis realizados sobre el total de las muestras óseas y dentales recuperadas consistieron, en primer lugar, en establecer la estructura de estas muestras a través de la determinación del sexo y la estimación de la edad y del número mínimo de individuos. Además, se cuantificó la frecuencia, los tipos y la distribución de la deformación craneana en la muestra. En segundo lugar, se consideró el estudio de los siguientes indicadores de salud: de estrés metabólico-sistémico (hipoplasia del esmalte dental, hiperostosis porótica, *cribra orbitalia*), procesos infecciosos, de estrés mecánico o funcional (osteoartritis, traumas y desgaste de las piezas dentales), de salud bucal (caries, presencia de cálculos, retracción alveolar, lesiones periapicales y pérdida dental antemortem) y patologías de carácter congénito

La información generada permitió plantear que, si bien las expectativas apuntaban al registro de la presencia humana en el área a partir del Holoceno tardío, la recuperación de los restos

humanos en el sitio Fabiana Elizabeth llevó a replantear la profundidad temporal de la ocupación humana en la región, extendiéndola hasta el Holoceno medio. En este trabajo se presentarán los resultados obtenidos a partir del análisis de los indicadores de salud mencionados y se discutirá la integración de estos datos en la bioarqueología regional.

Warmi Hampicamayoc: las curanderas tatuadas del cementerio Cerro Colorado, Huacho, Perú

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Excavaciones arqueológicas realizadas en el cementerio de Cerro Colorado, valle de Huaura, Huacho, entre 2014-15, hoy ocupado por un asentamiento humano denominado Los Pinos, ex Fujimori, dirigidos por Pieter van Dalen Luna, han permitido recuperar cerca de 1,265 individuos, correspondientes a la primera etapa de las excavaciones, de los cuales, 18 adultos exhiben tatuajes (1.42%). De esta muestra 12 son femeninos (67%) y 6 masculinos (33%). El análisis del ajuar, sus patologías y lesiones traumáticas de individuos tatuados permitió definir que estaban relacionados con actividades curanderiles. Eran básicamente agricultores. Dos hipótesis serán discutidas aquí, una concerniente a que los individuos que portan tatuajes serían la élite gobernante de la compleja sociedad Chancay y, otra, que serían curanderos agricultores y que estos motivos representarían las fuerzas de la tierra, aire, agua y fuego. Se concluye que el uso del tatuaje entre los antiguos hombres del valle de Huaura, durante el periodo Intermedio Tardío y Horizonte Tardío (1200-1532 d.C.) ha tenido un profundo significado religioso concerniente al wakanismo.

[EN:] Archaeological excavations at Cerro Colorado cemetery, Huaura valley, Huacho, between 2014-15, today occupied by a human settlement called Los Pinos, exFujimori, directed by Pieter van Dalen Luna of San Marcos University, have permitted to obtain near to 1,265 individuals, with 18 adults show tattoos (1.42%). Yet, 12 are females (66.66%) and 6 males (33.33%). The analysis of grave goods, its pathologies and traumatic lesions of tattoo individuals permitted define that were relationship with cure activities. Two hypothesis will be discuss here, one concern to several tattoo motives would represent to ethnic groups of complex society Chancay and two, would be cured individuals and those motives represent the strong of earth (mountains and hills), air, water and fire. We conclude that the tattoo used in ancient peoples of Huaura valley, that lived during Late Intermediate Period and Late Horizon (1200-1532 a.D.) have had a deepest significant symbolic and cognitive.

Huanthi: A case of congenital syphilis in Tintay, Querobamba, Ayacucho during the Wari period (600-1100 AD)

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Damos cuenta del registro del cráneo C3 de una adolescente que vivió como parte de los asentamientos poblados establecidos en Tintay. El cráneo, procedente de un contexto funerario disturbado, presenta huellas de haber sufrido de sífilis congénita, y por los restos de tejidos expuestos, así como la forma y construcción de la cámara funeraria corresponde a la época Wari (600-1100 d.C.). Se trata del primer caso registrado en la literatura arqueológica peruana de esta patología. Además, exhibe modelación cefálica del tipo circular con leve elevación bregmática.

La sífilis congénita es causada por una bacteria en forma de espiroqueta denominada *Treponema pallidum* y se transmite de la madre infectada al feto. Esta enfermedad causa distintas alteraciones sistémicas, dependiendo en qué fase de la sífilis se infecta el bebé. El incremento de casos a nivel mundial hace necesario el estudio de su epidemiología y que se implementen programas de salud que atiendan a la población embarazada, con seguimiento por medio del control prenatal. Se estima que 1.5% de las mujeres embarazadas a nivel mundial la padecen. Las alteraciones dentales tienen su etiología en la inflamación provocada por la espiroqueta al momento de la amelogénesis; los signos dentales característicos de la sífilis congénita son los incisivos de Hutchinson, molares de mora y, en menor medida, los caninos de Fournier.

[EN:] We give an account of the skull C3 record of a teenager who lived as part of the settlements settled in Tintay. The skull, from a disturbed funerary context, shows traces of having suffered from the disease congenital syphilis, and the remains of exposed tissues, as well as the shape and construction of the burial chamber corresponds to the Wari era (600-1100 AD) . It is the first case recorded in Peruvian archeology. In addition, it exhibits cephalic modeling of the circular type with slight bregmatic elevation.

Congenital syphilis is caused by a bacterium in the form of a spirochete called *Treponema pallidum* and is transmitted from the infected mother to the fetus. This disease causes different systemic alterations, depending on which phase of syphilis the baby is infected. The increase of cases worldwide makes it necessary to study its epidemiology and to implement health programs that attend to the pregnant population, with follow-up through prenatal control. It is estimated that 1.5% of pregnant women worldwide suffer from it. Dental alterations have their etiology in the inflammation caused by the spirochete at the time of amelogenesis; The characteristic dental signs of congenital syphilis are Hutchinson's incisors, molars of mora and, to a lesser extent, the canines of Fournier.

(PS02) Living at seashores and riverbanks

Chair: Bernardo Arriaza (University of Tarapaca)

Cold-water Diving in the Tropics? External Auditory Exostoses among the Pre-Columbian Inhabitants of Panama

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The appearance of external auditory exostoses archaeologically has been attributed to aquatic activities in middle latitudes. However, recent clinical research implicates low sea surface temperatures, especially below a threshold of 19°C, as a stronger predictor of ear exostosis development than latitude. Here, we examine the frequency of external auditory exostoses in human remains from nine pre-Columbian archaeological sites in Panama, representing individuals from a warm, tropical region. External auditory exostoses were recorded as present when an abnormal bony growth was observed macroscopically within the ear canal. The presence of exostoses was compared by right and left side, geographical region, sex, and degree of stenosis. Within a total sample of 125 adult individuals, exostoses were observed in seven males and one female. All individuals affected by this pathology were recovered from sites along the Gulf of Panama – a region characterized by intense cold water upwelling in the dry season. The results of this study suggest that external auditory exostoses affected individuals involved in habitual aquatic activities in the cold, upwelled waters of the Gulf of Panama. These activities appear to be almost exclusively dominated by male individuals. Ethnohistorical and archaeological records point to marine shell resource acquisition by deep-water diving as the activity driving exostosis development in pre-Columbian Panama.

Infantile development, physiological stress and survival expectancy in prehistoric fisher-hunter-gatherers from Jabuticabiera II, South Coast of Brazil

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In this study, we address the issues of infantile growth, morbidity and life expectancy in fisher-hunter-gatherers of the sambaqui Jabuticabeira II (1214–830 cal B.C. - 118–413 cal A.D.), from the south coast of Brazil. We test the underlying causes of heterogeneity in frailty and selective mortality in a population that inhabits a plentiful environment in sedentary settlements. Our aim was to examine how stress factors relate among each other and modulate development and survival. Estimated stature by measuring long bones, physiological stress markers, isotopic markers of weaning habits and age of death, allowed a detailed reconstruction of “life-history” of 41 individuals (23 adults and 18 subadults). Against expectations for a population living in a

resourceful environment, the results show adult individuals of short stature that suffered subadult morbidity, mostly during the end of weaning or post-weaning ages; and subadult individuals with stunting that suffered physiological stress associated with anemia and possibly related to mortality causes. The “survivors” experienced recurrent periods of morbidity during subadult and adult stages of life, more likely associated to the parasite burden of the ecosystem and mal absorption syndromes, than to undernourishment. A relationship between early-stress suffering and premature or delayed death was not demonstrated in our sample. Our data is compatible with a “intermittent penalty of low lethality” model, which shows individuals living through recurrent conditions of severe stress during the subadult and adult life that, despite environmental insults, survive to the reproductive age.

Hidroarsenicismo y Mitimaes

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El Imperio Inca ocupó una variedad de territorios, desde zonas selváticas hasta la costa del Desierto de Atacama. Para mantener los espacios conquistados movilizó diversos tipos de poblaciones tanto para la construcción de tambos, caminos, administración y producción de bienes, como para el control militar. Así muchas poblaciones (mitimaes) fueron relocalizadas en ambientes distantes y distintos de su entorno cotidiano, tuvieron que adaptarse a su nuevo entorno. Seguramente algunas sufrieron las consecuencias de dejar atrás su hábitat natural y enfrentarse a ambientes que contienen contaminantes naturales altamente tóxicos para el ser humano como, por ejemplo, el arsénico (As) que se acumula en los tejidos y causa daños sistémicos ¿Podemos entonces a través de la bioarqueología y análisis de contaminantes naturales acercarnos a debatir la problemática de relocalización de poblaciones?

En la prehistoria del norte de Chile se ha postulado la coexistencia de grupos multiétnicos ocupando diferentes pisos ecológicos durante el periodo Intermedio Tardío y Tardío para proveerse de recursos complementarios. Algunos sitios del norte de Chile como Chaca 5, AZ15 y Camarones 9 han sido asociados a grupos de colonias altiplánicas asentadas en los valles bajos del norte de Chile, esto basado en el análisis de los restos culturales presentes.

Métodos: En este trabajo presentamos una revisión de los datos arqueoquímicos de momias asociadas al sitio Camarones 9 en conjunto con nuevos análisis. Este sitio corresponde a un cementerio del Periodo Inca y de contacto Hispánico y está ubicado a unos 100 km al sur de la ciudad de Arica en la Quebrada de Camarones. En dicho sitio se localizaron 41 tumbas de ambos sexos con un patrón funerario en fosas y entierros individuales. La materialidad arqueológica del sitio sugiere una economía de pesca y agricultura. Diversos tejidos de estas momias (riñones, hígado, etc. Obtenidos de los bancos de muestras) fueron analizados utilizando espectrometría de absorción atómica para cuantificar los niveles de As presente en los tejidos corporales.

Resultados: La gran mayoría de las momias presentan altísimos niveles de As en diversos órganos, lo cual sugiere un envenenamiento crónico producto de la ingesta de agua naturalmente contaminada. Esto contrasta con otras momias de la región que no presentan el mismo nivel de contaminación. Además, cabe señalar que las aguas de Camarones, de donde proviene el sitio en estudio, contienen una concentración promedio de As de 1000 µg/L, 100 veces más que la norma recomendada por la OMS y es la más elevada de la región.

Conclusión: Nuestra propuesta bioarqueológica es concordante con lo señalado por autores como Muñoz, Horta y otros, quienes a partir de la cultura material postulan la existencia de poblaciones Inca asentadas en ambientes costeros en el norte de Chile. Las altas concentraciones de As encontradas en diversos tejidos humanos de las momias de Camarones 9 indican que corresponde a una población que no estaba adaptada a vivir en ambientes arsenicales. Concluimos que este sitio representa una población de mitimaes, procedente de ambientes menos contaminados y que fue relocalizada por el Inca al norte de Chile.

Intensificación agrícola durante el Periodo Formativo (3000-1 BC) en la costa de los Andes Centrales: evidencia paleodietética

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From a comparative bioarcheological perspective, this revision raises the problem of changes in subsistence patterns and agriculture intensification and their implications for social complexity in the Central Andes during the Formative Period (~3000-1 BC). We analyzed stable isotopes and other paleodietary and archaeological data from several prehistoric Andean populations to identify chronological changes in diet. The available bioarcheological evidence suggests that carbohydrate-driven diets are notably old in this area, including marine sites, supporting the idea that the process of complexification occurred under an agricultural economic basis. Theocratic societies thrived from the 3rd and 2nd millennia based on the cultivation of tubers, legumes, fruit trees and maize (less than 15%) by employing agricultural techniques adapted to the aridity in the valleys of the Pacific basin. Between 500–1 BC, concomitant with the raise of secular governments, the diet of people in the costal Andes dramatically changed, and maize became the main regional subsistence crop.

A Survey of bioarchaeological remains from El Paraíso archaeological site, central Peruvian coast

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Over the last five years, the El Paraíso Archaeological Project has found some important human and non-human remains, mostly associated to monumental structures dating back from the Late Archaic and Initial Periods (~5.000 – 3.000 B.P.), though the site also comprises some later intrusive contexts. Both periods are puzzling to local archaeology, because formal cemeteries or any other areas devoted to hold the deceased exclusively are still lacking. This fact comes in sharp contrast to the apparent urban development this part of the world underwent, back then, for over a thousand years. Therefore, any bioarchaeological finds from that period become of particular interest.

Objective: The purpose of this study was to diagnose the state of conservation of all scarce human remains found to date, as well as to document all bioarchaeological information from the direct inspection of all individuals. The set includes the skeletal remains of, at least, ten individuals of different ages, antiquity, and degrees of preservation; as well as some interesting animal and vegetable finds.

Results: The highlights of our observations include the following:

- a) Severe salt infiltration of some skeletal remains.
- b) Cutmarks on three femora.
- c) A sanpedro cactus 'mummy'.

Conclusions

- a) The differential salt infiltration depends on the skeletal remains' distribution at the site. Older bones seem more affected, as they might have been subject to more saltwater - contaminated water table rises following tsunami events.
- b) The type of cutmarks recorded represent an isolated find not only at the site, but also for the region. Given the secondary nature of their burial, among alternative explanations, we favor their being made as part of a body processing procedure, which included defleshing.
- c) Sanpedro cactus is a well-known character of Andean religion, with clear representations in iconography across all periods and horizons. The discovery of this naturally dehydrated cactus in an intact ritual context is a first for Andean archaeology.

Both the site and these findings deserve to be studied in further detail. Overall, the results of this survey provide useful insights towards a better understanding of life and death in the Peruvian Desert at the dawn of the Andean Civilization.

Tomografía computada para la identificación y diagnóstico de enfermedades en Chinchorro

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Los Chinchorro fueron una sociedad de cazadores, recolectores y pescadores que habitaron alrededor de pequeños ríos, quebradas y aguadas entre las costas del sur de Perú y el extremo norte de Chile desde el 7.600 al 3.660 A.P. Se caracterizaron por una adaptación temprana a ambientes costeros y desérticos, y por el desarrollo de tecnologías especializadas en la explotación marina. Destacan sus prácticas mortuorias que nos hablan de una compleja cosmovisión en torno a muerte y que hasta el momento, son las evidencias más antiguas de momificación artificial en el mundo (7570 AP).

Como parte del tratamiento mortuario, los Chinchorro retiraban la piel, órganos y musculatura, manteniendo solo el esqueleto como estructura interna del cuerpo. Para unir el esqueleto y devolverle el volumen al cuerpo, los tejidos blandos eran reemplazados por otros materiales como fibras vegetales, arcillas, emplastos y tejidos animales. Esto genera, a diferencia de las momias naturales, que los cuerpos Chinchorro no puedan ser analizados por visualización directa del esqueleto o por radiografías convencionales. Lo que dificulta la identificación y diagnóstico de enfermedades.

Metodológicamente y considerando las limitantes antes mencionadas, se aplicó tomografía computada (TC) para el análisis de los cuerpos Chinchorro. La TC es un procedimiento computarizado que proyecta un haz angosto de rayos X hacia el cuerpo utilizando una fuente motorizada de rayos X, que gira rápidamente alrededor de él. A partir de las imágenes obtenidas por TC se realiza el procesamiento de éstas mediante algoritmos capaces de separar los diferentes componentes del objeto escaneado. Posteriormente, se generan los modelos 3D, también con el uso de algoritmos de aplicaciones o software que presenten esta modalidad. Estos modelos se pueden manipular digitalmente y se le pueden realizar todas las modificaciones que sean necesarias, a diferencia de los objetos reales.

Se identificaron patologías articulares, infecciosas, metabólicas, traumáticas, congénitas y alteraciones asociadas al modo de vida. Niños e infantes presentan escasa presencia de enfermedades identificables en el esqueleto, destacando las enfermedades metabólicas y congénitas. Los adultos desarrollan tempranamente y en alta frecuencia enfermedades articulares, en especial en la columna vertebral. Enfermedades infecciosas y traumas se observan en menor frecuencia; la exostosis auditiva externa, asociada a actividades de buceo se observa en ambos sexos, con una mayor frecuencia en masculinos. La tomografía computada ha demostrado ser un eficiente método de identificación de enfermedades esqueléticas, sobretodo en casos donde es imposible o complejo visualizar directamente el esqueleto.

(PS03) Paleoparasites and Molecules

Chair: Alena Mayo Iñiguez (Oswaldo Cruz Foundation, Brazil)

Paleoparasitological and paleogenetic identification of human and animal coprolites from the pre-Columbian archeological site Gruta do Gentio II, Minas Gerais, Brazil

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Paleoparasitological studies are focused on finding parasites in archaeological or paleontological materials and has as the principal objective the understanding about the origin and evolution of parasitic infections. Paleogenetic studies identify ancient DNA (aDNA) in order to providing genetic information of parasites, but also, host, diet and environment. Paleoparasitological and Paleogenetic studies in ancient population contributes with genetic information about human peopling around the world, along with the presence of parasites that accompanied those migrations. The archaeological site Gruta do Gentio II (GGII) located in southeast of Brazil, is dated from 12.000 to 410 A.P. with two periods of subsistence, hunter-gathering (12.000 to 7.295 A.P.), and horticulturist (3.490 a 410 A.P.). The excavations showed human burials, food remains, as corn and manioc, cultural artefacts, as pottery, and ornaments associated to the human burials. Additionally, coprolites (desiccated or fossilized feces) were found distributed in stratigraphic layers of 16 sectors. The principal objective of this study was to identify parasites composition and animal or human origin of coprolites found. The samples were analyzed for the identification of gastrointestinal parasites through rehydration, spontaneous sedimentation and light microscopy. The determination of human or animal origin was conducted by paleogenetic analysis through barcoding DNA approach. The paleoparasitological analyses showed the presence of 5 parasite taxa of Capillariidae, Trichostrongylus sp., Ancylostomatidae, Echinostoma sp. and Spirometra sp. The paleogenetic result allowed the identification of a diverse animal coprolites, as jaguar (*Panthera onca*), ocelot "*Leopardus pardalis*", white-ear opossum "*Didelphis albiventris*" and cuaca "*Philander opossum*", as well as human molecular sequences. Diagrams integrating paleoparasitological and paleogenetic data with archeological context suggest a wide animal and human interaction inside GGII, both spatial and temporally. Human and animal coprolites were identified belonged to both hunter-gathering and horticultural horizons and in a number of sectors associated, mainly to the fireplace and next to the entry of the archaeological site. The study revealed a richness of 5 different parasite species that can infect both humans and animals, making possible the sharing of parasites between those hosts. The identification of coprolite origin and parasites, applied to the archaeological context, allowed to propose a paleoecological scenario of parasitic infection in pre-Columbian times from Brazil.

Paleogenetic and paleoparasitology analysis of individuals from Jabuticabeira II shell mound (2890±55 e 1805±65 BP), Santa Catarina, Brazil: First records of parasitic infection and human ancestry

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Studies on infectious diseases that affected human in the past, are based on paleoparasitological and paleogenetic assays. Paleogenetic analysis is a relevant approach to diagnose parasitic infections in shell mound individuals, since morphoscopic diagnosis of disease in human bone can be inconclusive. The paleoparasitological approach allows the identification of parasitic structures and micro-traces present in archaeological and paleontological material. In this study, paleogenetic and paleoparasitological assays were performed in 10 individuals from the Jabuticabeira II (JII) shell mound, Santa Catarina (2,890 ± 55 to 1,805 ± 65 years BP), Southern Brazil. The study focused on the determination of matrilineal human haplotype ancestry, intestinal parasite infections, as well as, the of micro-traces from abdominal sediments. Bone samples, sediments from the sacral region and environmental controls were studied. Polymerase Chain Reaction (PCR) and nucleotide sequencing techniques were used to amplify specific regions of ancient DNA (aDNA). The matrilineal human ancestry was determined by amplification of the fragment of the HVS-I region (mtDNA) and for the *Ascaris* sp. diagnosis 4 molecular targets were used: 18S rDNA, *cox1*, *nad1* and *cytb* genes. The paleoparasitological analysis returned no parasitic structures, possibly due to taphonomy factors. However, a pollen grain of the genus *Podocarpus*, present in coniferous trees, was recovered in one individual. From the eight species of *Podocarpus* identified in Brazil, two belong to the Southern region: *Podocarpus lambertti* and *P. sellowi*. Since coniferous can be found only in mountainous regions, we suggest a possible migration of at least one JII individual between this area and the coast. Human aDNA sequences retrieved were compared with the GenBank database. The mtDNA HVS-1 target was amplified in 1 individual, and showed 100% of genetic identity and sequence coverage with Amerindian sequences, haplotype A. It was further possible to detect *Ascaris* sp. infection in one individual, using *nad1* molecular target. The nucleotide sequence analysis demonstrated 100% of genetic identity and sequence coverage with contemporary haplotypes of *Ascaris* sp. parasite. The polymorphisms pattern revealed that *Ascaris* sp. JII haplotype identified in the present study is identical to haplotypes found in human and swine hosts in Brazil and China, including the most prevalent haplotype worldwide. The results obtained herein show that the study of parasite aDNA as well as micro remains from human is a fruitful research avenue in archaeological sites of poor preservation. Considering taphonomic factors and the thousands of individuals that were buried in JII shell mound, is likely that the prevalence of *Ascaris* sp. infection was higher when this site was active.

Paleoparasitological study in the Royal Hospital of Cádiz from XVII - XVIII centuries

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Los materiales arqueológicos, de finales del s. XVII/inicios del s. XVIII corresponden a vasos desechables, destinados al muestreo analítico individual son desechados por el carácter contaminante de dichas muestras, procedentes de las actividades del Hospital Real de Cádiz. En este momento, Cádiz era el epicentro del comercio marítimo español. Con este trabajo buscamos conocer las infecciones paleoparasitológicas presentes en la sociedad española, así como de la población procedente de las colonias entre los siglos XVII y XVIII. Se trata del primer estudio paleoparasitológico llevado a cabo en España con muestras de esta cronología.

Se recuperaron un total de 400 fragmentos de vasos de cerámica común, con pie destacado, que se corresponden con más de un centenar de individuos. Para dicho estudio las muestras fueron procesadas en el Departamento de Parasitología de la Universidad de Granada.

El análisis Paleoparasitológico se realizó en 40 de ellos. Se hidrataron 2 gr. de cada muestra en tubo de ensayo con fosfato trisódico al 0.5%, permaneciendo a 4°C durante 72 horas (Callen y Cameron, 1960) y sometidas a sedimentación espontánea (Lutz, 1979). La visualización fue realizada mediante microscopía óptica a 10x y 40x, midiendo y fotografiando los hallazgos.

Los resultados paleoparasitológicos han mostrado la presencia de formas parasitarias en distintos estadios (quísticos y de dispersión). Se han encontrado *Ascaris*, *Strongyloides stercoralis* y *Paragonimus westermani*.

Estos resultados nos muestran trastornos broncopulmonares, pudiendo ser motivo para su hospitalización.

Diversity of Capillariidae parasites in different archaeological sites from the New and Old World

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Capillariid eggs are reported in archaeological material in both the New and the Old World, mainly in Europe and South America. It has been found in a variety of samples, as coprolites, sediments

from latrines, pits or burials. More than 300 species have been described in all vertebrate taxa (fish, amphibians, reptiles, birds and mammals), including humans, which makes a much-diversified group in morphology. The main proposal of this work is to provide information of capillariid egg diversity in archaeological sites from the New and the Old World. A total of 39 samples of 7 archeological sites from Europe, deposited in the Paleoparasitological collection of the University of Bourgogne Franche-Comté, Besançon, France, were analyzed. In addition, were studied 80 coprolites from the pre-Columbian archaeological site Gruta do Gentio II, Brazil, deposited in the Paleogenetic Laboratory of Instituto Oswaldo Cruz (IOC/FIOCRUZ). Samples were treated following the protocols established in each laboratory and then analyzed under light microscopy. In all samples the rehydration technique proposed by Callen and Cameron were used. In European samples, a sieving process with 4 different sizes of meshes was applied, while in Brazilian samples the sedimentation technique, proposed by Lutz, was done. Capillariid eggs found were characterized by measures of length, width, plugs and eggshell thickness, and statistical analysis of morphometric dataset was made. As results, 12 samples from Europe and 2 from Brazil were positive for capillariids, showing 13 different morphotypes in a total of 27 eggs. As European samples were mainly collected from latrines and pits, it was difficult to determine parasite hosts, and consequently, species identification was impaired. In contrast, with the information of the hosts of Brazilian coprolites, the discussion on egg identification was facilitated. The 2 hierarchical trees were generated for each eggshell ornamentation type (punctuated and reticulated type II), showed clustering that enable identification. Species as *Eucoleus gastricus*, *Capillaria venusta*, *Aonchotheca myoxinitelae* and *Eucoleus bohemi*, showed low statistical distances with some of archaeological samples. However, the possibility of a pseudo-parasitism makes the capillariid findings harder to interpret. The study provides new data for capillariid identification and for a better understanding of the relationship between parasites and human or animal hosts in the past.

Values under the microscope: a cost-benefit analysis in three different ancient DNA reconstruction approaches

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The detection of ancient DNA (aDNA) in archaeological samples is a challenge, mostly due to the taphonomic process to which it is exposed, leaving the samples highly decayed and fragmented. Methods of aDNA reconstruction/amplification like Reconstructive Polymerization (PR) or Multiple Displacement Amplification (MDA) utilized in Whole Genome Amplification (WGA) commercial kits are applied in paleogenetic studies with the main goal of reconstructing and increasing the aDNA concentration before any molecular diagnosis. This research aimed to analyze/compare the efficiency of the aDNA reconstruction, time-consuming of execution and investment needed to complete each of the three methods. Thirty dental samples from the archaeological site Malhada (4020 to 710 BP), Cabo Frio district, RJ, were submitted to aDNA extraction with QIAmp DNA Investigator (Qiagen®), preceded by aDNA quantification in an Nanodrop ND-1000 UV-Vis Spectrophotometer (Thermo Fisher Scientific®). As the efficiency test,

the commercial kits GE Illustra GenomiPhi V2 DNA Amplification Kit® (WGA1) and QIAGEN REPLIG® (WGA2) were utilized following the instructions of manufacturer. The statistical comparison was made with two methods, variance analysis (ANOVA) and t-test on Excel (version), with alpha level $\alpha = 0.05$. The study verified the time-consuming to perform the methods by a medium-experienced molecular biology operator (conclusion time test) and the price of kits (investment analysis). Results showed significant increment in aDNA concentration when comparing all methods were applied, thus proving its effectiveness. It was also observed that PR is not only the method with the lowest cost with US\$1.33 by reaction, but also has the lowest time-consuming 1h40'. When comparing aDNA concentrations between PR method with WGA2, PR shows statistical difference ($p=3.91-5$) and has also a price almost 5X lower than the aforementioned commercial kit. When PR is compared to WGA1, although the in-house method's cost is 4x cheaper, WGA1 shows statistical difference ($p=1.63-3$) and, therefore, the best efficiency in aDNA reconstruction among the analyzed methods. Bearing in mind the cost-benefit analysis, PR can replace the WGA2 kit, as is cheaper and produce higher values of aDNA reconstruction. This study concludes that PR offers a possibility of reconstruction and subsequent aDNA analysis on a large number of samples, as well as accessible prices, which can help to increase access to molecular information in archaeological, paleogenetic and paleoepidemiological studies.

Ancient DNA analysis of head lice remains from Andean mummies, Arica, Chile

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Human head lice are ancient parasites of phylogenetic origin, inherited from pre-hominids. The occurrence of pre-Columbian pediculosis in the Andean region of the Atacama Desert have been wide studied. However, the ancient genotypes that circulated in the region have been little explored. In this study we investigated through paleogenetic assays head lice from human remains of a wide chronology from Arica, Atacama Desert, Chile.

Head lice or nits/eggs were collected in 8 burials from in 6 Andean archaeological sites: Quiani-7: Tomb 9, TR-40A: Tomb 10, AZ-71: Tomb 127, AZ-6: Tomb 36, AZ-140: Tomb 105 and Tomb 75, CAM-9: Tomb 38A and Tomb 29. The archaeological sites belonged to different chronological periods: Archaic, Formative, Middle Horizon, Intermediate and Late. Molecular paleoparasitological analyses were conducted at Paleogenetic Lab/LABTRIP/IOC/Fiocruz, Rio de Janeiro, Brazil, a facility restricted for handling ancient remains. Ten samples contained 2 head lice or 2-3 nits/eggs were separated according to the chronology of archaeological materials. Ancient DNA (aDNA) was extracted using Dneasy® Plant Mini Kit (Qiagen). Polymerase Chain Reaction (PCR) and nucleotide sequencing techniques were applied in order to identify aDNA of lice with 3 molecular targets from 12S rDNA, and cytb genes. The molecular target mtDNA HVS-1 was applied for defining matrilineal human ancestry. aDNA sequences were edited and compared to Genbank database.

The results showed PCR amplifications for the 3 targets and a cytb fragment with 100% of sequence coverage and 99.71% of maximum identity with *Pediculus humanus capitis* sequences available in the Genbank (MK248879). The head lice haplotype characterized was collected in Tomb 10, TR-40A archaeological site from the Formative period. Preliminary, the *P. humanus* haplotype identified here was not previously observed.

POSTERS

Organized in Alphanumeric Order by First Author Name

[SP] Student's poster
[P] Professional's Poster

SP01 - Case study: Paleopathological analysis of an infant from Early Holocene Lapa do Santo, Brazil

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The analysis of human remains allows us to gather a large amount of data, such as sex, age, cause of death, pathologies and traumas. These individual stories are fundamental in order to understand health and lifestyle in ancient populations. In this study, using data collected from macroscopic osteological analysis, CT Scan and X-ray images, we present a brief osteobiography describing the burial XXVIII from Lapa do Santo. Lapa do Santo is an archaeological site located in the heart of Minas Gerais state (Southeast Brazil), this site contains a large number of well-preserved individuals from Early Holocene and an important collection of bone and lithic artefacts. Burial XXVIII was excavated in 2012 and it contains one infant. The stage of dental eruption suggests that this subadult had between 1.5 and 2 years old at the time of death, sex could not be inferred due to the age of this child. His right leg's femur and tibia present a severe periostitis and there is also some marks of calcification in his right fibula, indicating a probable fracture in healed diaphysis. We believe that burial XXVIII probably suffered some kind of accidental trauma, resulting in a fracture on the right fibula, this injury could create conditions to facilitate the appearance of periostitis. Due to the severity of these infections, it's worsening could've led to the child's early death.

SP02 - Ancient parasite analysis and zoonotic potencial of Spirometra sp in two related sites from Pernambuco, Brazil

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Pathoecology studies the environmental and cultural factors that contribute to the maintenance of infections or diseases in populations. Concerning parasites, since it requires the evaluation of these factors based on the presence and lifecycle of these organisms, it is possible to apply this concept in ancient populations' contexts, in order to understand the parasite-host dynamic or even the health consequences faced by them. This study aimed to apply the pathoecology concept in Pedra do Tubarão and Cemitério do Caboclo archaeological sites. Six coprolite samples were analyzed and one was positive for *Spirometra* sp. eggs. *Spirometra* is a cestode, which has copepods as the first intermediate host; amphibians, reptiles, birds and mammals as the second intermediate hosts and felines and canines as definitive hosts. Humans can be infected by ingesting the first or second intermediate hosts and develop sparganosis, which can cause health consequences depending on the location of the spargana. The presence of this parasite, of a water fountain near the site, where the first intermediate host can live and the findings of the bones of some of the second intermediate hosts in these sites, suggesting dietary purposes, indicate that probably this infection was present in this population.

SP03 - A possible case of meningitis in a non-adult skeleton from the Mid-Holocene riverine shellmound Moraes (Miracatu, São Paulo, Brazil)

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Endocranial lesions have been reported in several non-adult skeletons from different times and geographic origins. Often, they have been used to shed light on the living conditions of past human populations. In this study we report a 13-14-year-old individual from the riverine shellmound Moraes (Miracatu, São Paulo, Brazil), a site dated to ~5.000 B.P. (non-calibrated). This individual displays signs of premature sagittal synostosis, *cribra orbitalia* on the left orbital roof, endocranial porotic lesions on the frontal and parietal bones (mostly centered along the obliterated sagittal suture, with some signs of bone remodeling), and short root anomalies (crown-root ratio ≤ 1.1) on the recovered upper incisors and upper canine. The post cranium remains from this individual appear normal.

Differential diagnosis includes: nonspecific meningitis, tuberculous meningitis, meningioma, scurvy, rickets, congenital syphilis, and iron deficiency anemia. The lack of porotic hyperostosis and radiating spicules in the outer table of the skull turns the possibility of meningioma unlikely. Tuberculous meningitis may exhibit the same form of lesions, but these are usually focused at the endocranial surface of the base, lateral walls of the skull, and occipital bone, which is not the case in this individual. The lack of periosteal reaction in the maxilla, mandible, and post-cranial remains excludes scurvy, and the lack of bone deformations, stress fractures or porotic lesions in the post-cranial skeleton excludes rickets. In the case of meningeal reactions related to syphilis, the endocranial lesions are more commonly positioned at the base of the skull, which is not this case. Also, although there are noteworthy dental defects, this individual does not exhibit Hutchinson's teeth. The presence of *cribra orbitalia* is consistent with iron deficiency anemia,

however, there are no signs of porotic hyperostosis on the outer table to further reinforce this diagnosis.

Nonspecific meningitis is usually an acute inflammatory reaction of the meninges, which is usually caused by bacterial infection. However, several cases of meningeal reactions belong to a mix of hemorrhagic and inflammatory elements. Therefore, a hemorrhagic etiology cannot be refuted without future microscopic analysis. An otic origin for the infection must be taken with uncertainty, remembering that there are no endocranial lesions on the recovered left temporal bone.

Acute cases of meningitis are well known in the literature. But in this case, the evidence of bone remodeling suggests perhaps a more chronic nature. Meningitis causes endocranial lesions on parietal, frontal, and occipital bones, usually following areas of venous drainage. However, the relation between sagittal synostosis and endocranial lesions following the sagittal suture, in this case, is still unclear. This study suggests a possible case of meningitis as a differential diagnosis, and supports the idea of previous authors that possible meningeal diseases are being underestimated in archaeological samples.

P03 - Áreas funerarias y modelaciones corporales y patologías de los atavillos (900 – 1570 d. C.): Andes Centrales Peruanos

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La nación Atavillos se desarrolló en gran parte de la cuenca alta del río Chancay-Huaral en el periodo Intermedio Tardío, siendo conquistados militarmente por el Tawantinsuyu y anexados como una provincia Inca del Chinchaysuyu hacia 1450 d.C. Los pueblos Atavillos se caracterizan por estar emplazados en la cima de los cerros de mayor elevación que circundan el valle. Entre los principales pueblos o marcas atavillanas tenemos: Purunmarca, Ninash, Araro, Chupaqa, Rupac, Marca Piche, Arcotal, Auquihuilca, Gallum, Carihuaín, Culle, Chupas, Cachirmarca, Huampón, Quishuar, Puchune, Rancocha, Chamanhuampo, Sacuantacuna, Chaclamarca, Maranhuaşi, Sinsanchacra, Yaros, San Cristóbal, Curcos, Chiprac, Añay, entre muchos otros.

La arquitectura atavillana está conformada por dos conjuntos principales: el edificio tipo Kullpi, de planta cuadrangular, de hasta siete metros de altitud, edificado íntegramente a base de piedras canteadas unidas con argamasa, con una cámara principal ovalada a la cual se accede del exterior mediante un pequeño vano, y desde esta cámara principal se accede por pequeños vanos a diversas cámaras secundarias dispuestas a su alrededor. En estas cámaras secundarias se puede encontrar productos agrícolas, áreas de cocina y contextos funerarios; es decir evidencian una convivencia entre lo doméstico y lo funerario dentro del mismo espacio. El segundo tipo arquitectónico es la chullpa, de planta cuadrangular o rectangular, también edificado con piedras canteadas y argamasa, de hasta 2 metros de elevación y de función únicamente funeraria. En algunos casos se puede apreciar chulpas que se encuentran adosadas en la parte externa del Kullpi.

Las chulpas se podían edificar al interior de los más de 80 pueblos que conformaban a la nación Atavillos, o en el exterior en grupos de 5 a 10 o aislados, en medio de los farallones rocosos de los

contrafuertes cordilleranos que se elevan bruscamente desde el cauce de los ríos. En los últimos años el proyecto Arqueológico Chancay-Huaral-Atavillos (PACHA), ha desarrollado por primera vez, investigaciones en cuatro sitios arqueológicos Atavillos: Purunmarca (2014), Rupac (2015), Marca Piche (2015, 2017) y Araro (2015), desarrollados con el auspicio de la Universidad Nacional Mayor de San Marcos, la Comunidad Campesina de San José de Baños, la Comunidad Campesina de San Miguel de Vichaycocha y la Municipalidad Distrital de Santa Cruz de Andamarca. Las excavaciones desarrolladas en estos sitios ha permitido intervenir en áreas domésticas, administrativas y funerarias atavillanas, tanto de su periodo independiente (antes de 1450 d.C.), como bajo la dominación del Tawantinsuyu (entre 1450 y 1533 d.C.) y bajo la dominación hispana (1533 – 1570 d.C.).

Muchos de los contextos funerarios recuperados se encontraban con el individuo disturbado en periodos arqueológicos, lo que indica que luego de depositado el individuo al interior de la estructura funeraria, era retirado para que participe en ceremonias rituales de culto a los ancestros, siendo luego colocado nuevamente en su estructura; por ello la disposición de numerosas ofrendas como las conopas (illas) que están acompañando al individuo al interior de la estructura funeraria. Existe en territorio Atavillos, dos tipos de modelaciones cefálicas del tipo Atavillos: uno de forma vértico-bregmático y otro semi-alargado horizontal, ambos son de origen serrano propios de la zona. El tipo semi-alargado horizontal es más común en los asentamientos de la cuenca alta del río Chancay como en Purunmarca (Hanan Atavillos), en cambio, el tipo vértico-bregmático es más común en los asentamientos de menor altitud como Rupac (Hurin Atavillos).

Los intensos enfrentamientos rituales entre hombres y mujeres con estas modelaciones cefálicas producían muertes de los combatientes, los cuales eran héroes de guerra y depositados solemnemente en Purunmarca, como un gran santuario de los “abuelos” que sacrificaron sus vidas para los dioses andinos de los apus, la perpetuidad del agua y la pachamama. A través de las asociaciones estratigráficas y los cráneos modelados podemos plantear hipotéticamente tres fases culturales de los Atavillos: temprano, medio y tardío. En la fase Temprana que corresponde a fines del Horizonte Medio, cuando se inician la llegada de poblaciones con el tipo vértico-bregmático, tal vez procedente de Pasco y la sierra central, que se caracterizan por una pronunciada y elevada área bregmática, tratando de causar temor a sus adversarios en las batallas, esto probablemente estaría ocurriendo entre 700-1100 d.C.

Durante la fase Media que corresponde al período Intermedio Tardío (1100-1460 d.C.) surge el tipo semi-horizontal asociado con la tradicional vértico-bregmático, ambas formas conviven en forma de guerras o batallas interpersonales a fin de controlar y dominar las tierras de pastoreo y caza. Este tipo caracterizaría a los Atavillos y se difunde en las zonas durante este período, teniendo fuerte interrelación socioeconómica con los Chancay. Durante la fase Tardía u Horizonte Tardío (1460-1535 d.C.), que corresponde a la ocupación Tawantinsuyu en la zona, se interrelacionó con el resto del imperio mediante el Qhapaq ñan, los Atavillos pasan a ser dominado por los cusqueños, los cuales respetaron la vieja ideología de las modelaciones cefálicas, a los apus locales y el culto a la illa. Esperamos contrastar este modelo con futuras investigaciones bioculturales en la cuenca alta del río Chancay

Los fuertes desgastes dentarios, pérdidas de premolares y primeros molares, y la presencia de raigones expuestos y caries dentarias indican que estos grupos humanos sufrían problemas odontológicos y para calmar los dolores intensos se consumía la hoja sagrada de la coca, la cual llegaba del valle medio del río Chancay. La lesión de osteomielitis confirma las luchas interpersonales produciéndose traumatismos. Las entesopatias de brazos y antebrazos indican la robustez de los individuos, cargando peso o luchando contra otras poblaciones vecinas usando

hondas o huaracas. Asimismo, la hipervascularización de las tibias, rodillas, fémures y pelvis apuntan que estos hombres atavillos realizaban intensas caminatas por las quebradas y valles interandinos. La alta incidencia de osteofitosis y espondilólisis de las vértebras lumbares señalan que estos hombres cargaban pesos mayores de 40-50 kilos cuando se desplazaban a gran distancia con sus recuas de camélidos o durante la actividad cinegética de cérvidos, guanacos y vicuñas. Las constantes luchas por el control del agua y tierras entre los Atavillos, divididos en altos y bajos en el Tawantinsuyo, eran protegidos por sus apus tutelares como el de Antajirca, Quirupalca, Chiwiria y el Cerro Chuquimango.

Las evidencias arqueológicas en general demuestran que las sociedades altoandinas del Intermedio Tardío fueron sociedades altamente violentas, tanto en cuanto al enfrentamiento con sociedades vecinas por el control de tierras, recursos y agua; como por enfrentamientos con otros miembros de su misma sociedad; situación relacionada con la ausencia de productos por los cambios climáticos radicales y la escasez de tecnología material. Una constante en la violencia social identificada en el sitio de Purunmarca es la realizada contra niños y neonatos, en su mayoría relacionados con sacrificios a personas o divinidades. Los diversos entierros de niños y bebés asociados a los osarios y contextos funerarios indican que hubo una elevada mortalidad debido a factores sociobiológicos, relacionados a los psicopompos y a “alimentos” espiritual de los héroes culturales para su regeneración y volver a nacer. Estos sacrificios eran solemnes en la zona y conmemoraban a los grandes héroes regionales (culto a los ancestros).

Por su parte, entre jóvenes y adultos se ha identificado evidencias de múltiples traumatismos, algunos de ellos causaron la muerte de los individuos, al parecer durante peleas interpersonales. Existen cráneos con evidencias de fracturas perimortem. De igual manera se observan huesos de extremidades superiores e inferiores con evidencias de fracturas, en especial la de Perry, muchas con evidencia de mejora y soldadura de hueso. Se ha identificado deformaciones óseas por fractura y golpes en clavículas. Se identificó traumas en rodillas, sean por golpes y por grandes trajines físicos. Un cráneo presenta meningocele por golpe cerca de la nariz. De igual manera se observa traumas dentales.

SP04 - Variabilidad transicional em sacros de cazadors-recolectores de Patagonia Austral

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Las alteraciones en el número de vertebras del sacro son relativamente frecuentes, siendo habitual encontrar individuos con cuatro, cinco, seis o siete elementos sacrales. Estas variaciones son más habituales en el extremo caudal y presentan patrones de variación transicional diferentes entre poblaciones. A pesar de considerarse una alteración de índole congénita, consecuencia de disimilitudes en el número de somitas durante el proceso embrionario, su etiología no está clara; apuntando también a la influencia de factores ambientales. En este caso, se analizaron 48 sacros de cazadores-recolectores adultos de ambos sexos procedentes de Patagonia Austral, con una

datación que abarca desde el Holoceno Medio (pre-contacto) hasta principios del siglo XX (post-contacto, dentro y fuera de la Misión Salesiana “Nuestra Señora de La Candelaria). El estudio se llevó a cabo en los sujetos que presentaron el sacro completo. El 70,8% de los individuos (n=34) presentaron 5 vértebras, el 22,9% (n=11) 6 elementos y el 6,3% (n=7) 7. Los individuos que habitaron en la Misión Salesiana mostraron menor prevalencia de sacros con 5 vértebras (54,6%), con respecto a los individuos pre-contacto (70%) y post-contacto (75%) que habitaron fuera de la misión. La región que mostró una menor prevalencia de sacros sin alteraciones numéricas fue el norte de la isla grande de Tierra del Fuego (64%), seguida por el Canal de Beagle (73,3%) y la muestra del Continente (83,3%). No se reportaron diferencias significativas en la prevalencia de sacros con 5 vértebras con respecto al sexo y la edad entre adultos maduros (69,6%) y jóvenes (66,7%), ni entre hombres (69%) y mujeres (66,7%). Las variaciones en el número de vértebras exhibieron notables disparidades entre poblaciones. Los resultados observados en la muestra de Patagonia Austral se asemejaron a los ya reportados en muestras de Inuit, pudiendo estar implicado el factor ambiental en dicha similitud. Observación que está en consonancia con otras semejanzas apreciadas entre ambos grupos en aspectos morfológicos, metabólicos, prevalencia de patologías, estatura, proporciones corporales y robustez. Sin embargo, el escaso conocimiento sobre el origen de la variabilidad transicional del sacro que requiere profundidad en el estudio de la causalidad ambiental. Por último, se ha de señalar que la prevalencia de sacros con 5 vértebras observada en la Misión Salesiana es la más baja que se ha registrado hasta el momento en el mundo. Esta nueva característica se suma a otras diferencias observadas en signos patológicos y nutricionales que muestran estos sujetos con respecto a sus coetáneos encontrados fuera de la misión y aquellos anteriores al contacto con los europeos. Los resultados acá obtenidos acercan singularidades y tendencias que esperamos inviten a seguir explorando hipótesis alternativas.

SP05 - Paleopathology and paleonutrition of Itacambira mummies

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In the fifties some apparently natural mummified human remains were found at St Antonio de Itacambira church, Minas Gerais State, Brazil (18th-19th). Itacambira village emerged during the diamond's mining period. Well preserved, the mummies had parasitic evidences (1,2), confirming conditions such as trichuriasis (eggs/adults in mummified gut), that could be causing Maculo, a specially severe form of the infestation. Paleogenetic studies confirmed the presence of *Leishmania tarentolae* (4) in the same individual. Itacambira is located in a semi-arid inland territory, in one of the poorest regions of Brazil, known as Jequitinhonha valley. Hard climatic conditions and severe economic history contributed to a challenging lifestyle. Puparia of *Megaselia scalaris* was found in the mummified corpses (3) suggesting special taphonomic conditions to be cleared.

The investigation of pathological signs in the remains is in progress, some abnormalities are present in the different human remains and more information about their historical context, their bioarchaeology and taphonomy is being collected since 2018. Paleopathology is focusing infectious diseases and nutritional aspects of those individuals. Despite the small number of

remains (6 individuals), the scarcity of information about the historical period in the region underlines the interest of this project. The remains are now curated in the scientific collection of coprolites and other archaeological evidences used for the study of disease (CPFERA) in the Laboratory of Paleoparasitology of National School of Public Health, Fiocruz. Some of the questions for this project are the following: Who were those people? Which mummification facts involved in the preservation of their bodies? Are there other signs of pathologic conditions in the mummies and bones? Which are the possible infectious diseases causing them? Which are the significant taphonomic evidences in the corpses? These, among other questions, are under investigation.

Besides detailed documentation of the remains, samples for different analysis including isotopic studies will be collected. Macroscopic as well as digital microscopic examination of the surfaces and insides, besides tomography and histology, are planned. Comparative morphology, considering variations in form, colour, size, texture and other parameters for normal anatomy are helping to select areas to exam in details. Lesions suggestive of trauma and degeneration are identified in the mummified tissues and bones already. The authors here present the first results of this project and some initial hypothesis about the Itacambira remains.

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SP06 - Cribra orbitalia frequency of Sambaquis groups from Saquarema, Rio de Janeiro: A preliminary study

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Sambaquis are archaeological sites composed mainly by mollusk shells and fish bones, that were built by hunter-gatherers pre-Columbian groups, often associated as burial grounds in south and southeast Brazil. The present study aims to analyze cribra orbitalia in skeletal remains excavated from three sambaquis of the coastal municipality of Saquarema, located 100 km from the city of Rio de Janeiro, in Brazil.

The three sites were excavated during the 1980's and 90's, presenting occupations dated from: 5.400 to 3.400 years cal B.P. on Sambaqui da Beirada, 4.700 to 3.100 cal B.P. on Sambaqui do Moa and from 3.600 to 2.300 cal B.P. on Sambaqui de Saquarema.

Cribriform orbitalia is characterized as porotic lesions present in the orbital region of the skull, caused by sequential reabsorption in the bone tissue due to the necessity of red blood cell production that are commonly associated with anemic diagnostics. Identifying its frequency in ancient populations contributes with the reconstruction of lifestyles of ancient groups, since it is linked to food deprivation and/or another conditions, such as diseases and pregnancy.

This study was based on identifying the lesions, aiming to gather data regarding the frequency of cribriform orbitalia. Orbitals and orbital fragments were both taken into consideration. Healed lesions were also considered in this study. The results suggest differences in the frequency between the studied sites, where the individuals analyzed from Sambaqui da Beirada shown a higher occurrence of cribriform orbitalia when compared to the ones from Sambaqui do Moa and Saquarema. Such evidences suggest changes in the health of these populations through the occupation time in the region and can be associated with a dietary pattern change, since previous studies indicate differences in dental wear between Beirada and Moa .

SP07 - Inferencias en el análisis directo y indirecto del calculo dental

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La presencia de cálculo dental es común en poblaciones arqueológicas derivado de mala higiene buco-dental e ingesta de carbohidratos. Actualmente es una importante fuente para recuperar microbiomas orales y ADN antiguo. No obstante, su preservación y registro es un aspecto poco desarrollado. Realizamos un análisis inter-observador en la presencia de cálculo in situ y sobre réplicas dentales con el objetivo de validar su cuantificación de forma directa e indirecta. Se seleccionaron individuos adultos y subadultos de la Misión Salesiana "Nuestra Señora de La Candelaria" (Río Grande, Tierra del Fuego, Argentina). La presencia de cálculo fue registrada sobre 379 dientes anteriores y postcaninos, tanto de visu (metodología directa) como mediante réplicas de poliuretano (metodología indirecta) procesadas de moldes en polivinilsiloxano. El cálculo se registró de manera directa en 101 (26,64%) dientes y en 41 (10,81%) de modo indirecto. Un 5,54% de casos positivos coinciden entre métodos y una concordancia en ausencia de cálculo del 64,15%. Ambas observaciones registran ≈90% (88,1% directamente y 95,1% indirectamente) de cálculo en dentición postcanina. Nuestros resultados infieren analizar in situ el cálculo dental para

una precisa observación. No obstante, similares tendencias sugieren un alto grado de preservación y representatividad derivado de réplicas dentales.

SP08 - Primera evidencia de uso de dientes em actividad têxtil em Patagonia Austral

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Estudios etnográficos describen la existencia del uso de la dentición como tercera mano entre las poblaciones que habitaron Patagonia Austral. Sin embargo, son escasas las evidencias documentadas y su asociación a actividades culturales concretas. En el cementerio de la Misión Salesiana "Nuestra Señora La Candelaria" se recuperaron 33 individuos Selk'nam de ambos sexos y edades comprendidas entre pocos meses y 60 años. Uno de los individuos (C 10-11) de sexo femenino y edad ≈ 10 años presenta en incisivos centrales (I1) y laterales (I2) de ambas arcadas evidencias de desgaste en forma de surcos en V compatible con actividad cultural. Los valores de isótopos estables obtenidos en dentina ($\delta^{15}\text{N}$: 11,9 y $\delta^{13}\text{C}$: -19,1) y esmalte ($\delta^{13}\text{C}$: -15,9) indican que su dieta tendría una alta proporción de hidratos de carbono y baja proporción de proteína animal, en comparación con muestras pre-contacto, pero similar a otros individuos de la Misión. Los análisis macro y microscópico confirman una etiología no-alimentaria del desgaste, descartando un origen traumático o post-mortem. La simetría morfológica es compatible con una abrasión repetida, probablemente por la manipulación de fibras para producción textil. Los documentos históricos y fotografías de la Misión generan evidencias que acompañan esta hipótesis. Este hallazgo proporciona la primera evidencia del uso de los dientes vinculada a actividades culturales durante el periodo post-contacto en Patagonia Austral así como una agenda de trabajo futura.

P01 - Estudio comparativo de Microscopía Electrónica de Barrido (MEB) entre Lesión Cervical No Cariosa (LCNC) y Surco Inter-Proximal (SIP) en piezas dentales modernas y una precolombina

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A la observación simple, puede hallarse lesiones no cariosas sui generis en el cérvix dental. Al comparar la literatura odontológica y la antropológica dental, se señala etiologías disímiles, pero contradictoriamente, con características morfológicas clínicas (visuales) semejantes, a un tipo de lesión (LCNC y SIP respectivamente). El consenso odontológico, sugiere que la etiología es por

rompimiento microestructural por flexión dental, ante cargas funcionales y parafuncionales. En la literatura antropológica, se insiste en una etiología antropogénica friccional por palillos dentales higiénicos.

La muestra de estudio consistió en cinco piezas dentales con LCNC (Grupo 1), obtenidas de una consulta odontológica moderna (incisivo inferior, premolares y molares superiores), y una premolar (Grupo 2) proveniente de un rescate arqueológico en el campus de la UNMSM, Lima, Perú. Este contexto (#311), constó de siete piezas dentales sueltas, de un mismo individuo de la Cultura Ychsma, Horizonte Medio e Intermedio Tardío, 900 – 1450 AD.

Las seis piezas dentales estudiadas fueron deshidratadas por gradiente de alcohol, desde 40% hasta alcohol absoluto, por periodos de ocho minutos. Luego se fijaron en una base de fibra de carbono. Se observó al MEB (INSPECT S50) a alto vacío, en diversos aumentos.

En el Grupo 1, a nivel microestructural se evidenció algunas estrías por fricción. El borde adamantino de las lesiones tendió a ser agudo, con áreas de microrompimiento de los prismas, a manera de bisel. En las molares y premolares se halló en el esmalte, múltiples microfisuras perpendiculares al borde de la lesión. El incisivo lateral mostró características notoriamente diferentes al resto del grupo: lesión amplia por lingual, superficie brillante y pulida de bordes romos, que sugiere acción corrosiva por ácidos no bacterianos.

La pieza dental del Grupo precolombino tiene una lesión mesio-vestibular de aproximadamente 4 x 2mm. No se evidenció estriado por fricción. El esmalte de la región entre la lesión y la corona, mostró un patrón corrugado por probable efecto biofísico por deformación. El borde de la lesión es romo y la superficie interna de la lesión es anfractuosa, quizá por efecto tafonómico.

Las características entre ambos grupos muestran gran similitud en su macromorfología, pero las divergencias fueron amplias a nivel microestructural. La información hallada confirma un efecto biofísico y biocorrosivo en las LCNC (microrompimiento por flexión dental y ácidos no bacterianos), compatible con el consenso actual en odontología. No se confirma una acción antropogénica (fricción por palillos dentales o acción pseudo terapéutica) en el SIP estudiado. Se sugiere, que ambos tipos de lesiones tendrían una misma etiología bio-físico-química.

P04 - Primeras evaluaciones de cambios entesiales en los habitantes de la Misión Salesiana “Nuestra Señora de la Candelaria” (Tierra del Fuego, Argentina)

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A partir del siglo XVI con la llegada de los europeos a Patagonia Austral se inicia un proceso de cambios en las poblaciones nativas. Este proceso se intensifica desde el XIX generando lo que hemos denominado un escenario de doble colonialidad. Es así como la presencia de poblaciones

migrantes europeas y mestizas provenientes de otras regiones modificaron la diversidad biológica humana en la región. En el norte de la Isla Grande de Tierra del Fuego el cementerio de la antigua Misión Salesiana “Nuestra Señora de la Candelaria” (1893 y 1946) constituye un lugar privilegiado para evaluar algunos de los cambios en las formas de vida que sugieren fuentes documentales disponibles. En el marco de los proyectos en curso se presentan los primeros resultados del análisis de los sitios de inserción muscular (entesis). Nuestro interés es comenzar a caracterizar las actividades habituales llevadas a cabo por personas que habitaban la Misión. La muestra está compuesta por 15 individuos adultos jóvenes y medios (9 hombres y 6 mujeres) que fueron excavados entre 2007 y 2009. Estudios de ADNmt previos sugieren que 13 individuos presentan haplogrupos compatibles con los esperados para nativos americanos y dos con un origen europeo. Por otra parte análisis de isótopos estables disponibles para cada uno de ellos ayudan a interpretar aspectos vinculados con la dieta y la movilidad. Los cambios entesiales fueron registrados con el Nuevo método Coimbra, teniendo en cuenta 11 entesis fibrocartilaginosas de las extremidades superiores e inferiores. La asimetría bilateral se evaluó mediante una prueba de rango con signo de Wilcoxon, mientras que la prueba exacta de Fisher se aplicó para buscar diferencias significativas con respecto al sexo y la edad de las personas. Los resultados sugieren que a) no hay asimetrías bilaterales en la expresión de los cambios entesiales, b) no hay diferencias significativas según el sexo, y c) solo tres entesis mostraron una diferencia significativa entre los individuos adultos medios en comparación con sus contrapartes más jóvenes. En principio las diferentes labores realizadas durante un tiempo relativamente corto en la Misión, junto con una mayor mortalidad (debido a la propagación de enfermedades infecciosas) podrían haber evitado un desarrollo más evidente de los cambios en las inserciones musculares de estos individuos. Cabe señalar que un estudio previo de cambios patológicos en la columna vertebral sugiere un aumento del estrés para las poblaciones posteriores al contacto. Los pasos futuros se orientarán al estudio de cambios entesiales entre poblaciones nativas previas al contacto para establecer comparaciones válidas.

SP09 - Un probable caso de leucemia en un individuo de la época Wari (850-870 d.c) procedente del sitio arqueológico Huaca Pucllana, Lima - Perú: paleopatología y diagnóstico diferencial

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Se presenta un probable caso de leucemia en un esqueleto adulto femenino exhumado de una ocupación funeraria de la época Wari (RC14 850 - 870 D.C) ubicada en la cima de la Gran Pirámide del Centro Ceremonial Pucllana, en Lima, Perú. El ajuar funerario de esta mujer nos indica su posible adscripción como tejedora.

Las lesiones líticas fueron los principales cambios esqueléticos macroscópicos registrados: agujeros focales (1-3mm), expansión de forámenes vasculares y reabsorción cortical que afectaron huesos craneales, vértebras, costillas, escápulas, coxales y los extremos proximales del

fémur y húmero. Estos cambios óseos no presentaron evidencia de reacción blástica marginal y evitaron afectar las superficies articulares.

El patrón de localización de las lesiones sugiere una etiología asociada a la alteración de las funciones hematopoyéticas del sistema esquelético. El diagnóstico diferencial incluyó talasemia, mieloma múltiple, carcinoma metastásico (osteolítico) y leucemia aguda. Las características macroscópicas de las alteraciones, el patrón de distribución y ubicación nos sugieren un diagnóstico diferencial altamente consistente con leucemia aguda. Cabe destacar que, hasta la actualidad, se trataría del primer caso de leucemia aguda descrito en un esqueleto adulto en un contexto arqueológico sudamericano.

SP10 - Un caso inusual de lesión suprainiana procedente de un cementerio Chancay (1000-1470 D.C): Implicancias contextuales en el diagnóstico diferencial

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El uso de cradleboards o aparatos deformadores en infantes precolombinos generaron remodelaciones craneales, tales como las conocemos por el registro arqueológico. No obstante, estas no fueron las únicas alteraciones producidas: en algunos casos la fricción causada por dichos artefactos provocaron necrosis isquémica y/o inflamación, siendo la región suprainiana mayormente afectada. Dicha alteración, conocida como lesión suprainiana, típicamente se manifiesta durante la infancia como porosidad focalizada; mientras que en los adultos la cicatriz de dicha lesión se presenta como una suave depresión.

Reportamos el caso de un infante procedente de un cementerio precolombino Chancay (1000-1470 D.C), costa central de Perú, que presenta un defecto craneal remodelado (19x21mm) ubicado en la región suprainiana. La especificidad en la ubicación de la lesión, el hallazgo de casos típicos de lesión suprainiana asociados a remodelación craneal en el mismo cementerio de procedencia de este caso, así como los numerosos reportes en la costa central (especialmente del valle de Chancay) apoya la hipótesis de una manifestación inusual de lesión suprainiana.

A pesar que el diagnóstico diferencial en un defecto óseo remodelado suele ser una tarea difícil, la adopción de un enfoque hipotético-deductivo que considera las circunstancias contextuales nos permite ponderar diferencialmente las alternativas diagnósticas.

P05 - Diseño y evaluación de un protocolo para la extracción simultánea de múltiples proxies en heces: implicancias en investigaciones forenses

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Estudios sobre restos de heces halladas en escenarios forenses han mostrado la potencialidad del análisis interdisciplinario en el esclarecimiento de casos. Estos estudios no poseen diferencias sustanciales con el análisis simultáneo de múltiples proxies de coprolitos (ADN, fragmentos vegetales, isótopos estables de carbono y nitrógeno, polen, silicofitolitos y restos parasitarios). La metodología para el análisis de coprolitos consiste en: 1. eliminación del córtex y división en submuestras para extracción multiproxy; 2. defloculación y extracción con sustancias químicas; 3. concentración y observación microscópica. Este procedimiento, muchas veces, produce pérdida de muestra impidiendo la cuantificación. Con el objetivo de sumar más líneas de evidencia, se diseñó y optimizó un protocolo de procesamiento de extracción conjunta de diferentes proxies a partir de una muestra mínima de heces que resultaría aplicable para el esclarecimiento de casos en escenarios forenses. Se procesaron heces de Lama guanicoe (Familia Camelidae) recolectadas en el noroeste de Santa Cruz, Argentina (47°00'S; 72°15'O). Las siguientes consideraciones se tuvieron en cuenta: la fisiología digestiva de L. guanicoe, n° de heces para procesar, composición y tiempo necesario de rehidratación de las heces, unificación de metodologías, representatividad y distribución de cada proxy, propiedades físico-químicas de los proxies, compatibilidades de las diferentes soluciones utilizadas, evaluación de pérdida de diferentes proxies en cada paso, índices de refracción de cada proxy para su observación microscópica.

El protocolo multiproxy consensuado consistió en: 1. registro del peso de las heces, caracterización morfométrica y organoléptica, 2. separación y almacenamiento del córtex, 3. división en dos secciones, una para la determinación del origen por ADN, y otra para el análisis de fragmentos vegetales, isótopos estables de C y N, polen, silicofitolitos y restos parasitarios, 4. registro del peso de ambas secciones, 5. adición de tableta de esporas de *Lycopodium clavatum* y rehidratación con fosfato trisódico acuoso 0.5% a 4°C por 5 días, 6. agitación, 7. filtración utilizando malla de 250 µm, 8. recuperación de los restos retenidos en la malla mediante lavados con PBS 1X para el análisis microhistológico, de silicofitolitos e isótopos de C y N, 9. centrifugación a 1500 rpm por 10 min, 10. realización de preparados con aceite de inmersión para la observación microscópica de silicofitolitos y restos parasitarios, 11. extracción polínica mediante acetólisis, 12. realización de preparados semipermanentes.

Se confirmó origen zoológico de las heces y se determinó presencia de ADN necesario para el análisis. Se almacenó la muestra para el análisis de isótopos estables. Se reconocieron fragmentos

vegetales a nivel específico de Poaceae, Juncaceae y Apiaceae. Se identificaron silicofitolitos de Poaceae (Pooideae y Stipoideae) y especies dicotiledóneas. Se observaron tipos polínicos arbóreos (Nothofagus), arbustivos (Empetrum y Mulinum) y herbáceos (Caryophyllaceae y Poaceae). Por último, se registraron huevos de nematodos Capilláridos. El análisis permitió sustentar la identificación del origen zoológico por ADN, determinar items de dieta a diferente resolución taxonómica, inferir el rango de acción y registrar parasitosis en guanacos. Este protocolo multiproxy podría ser considerado para la definición del contexto forense y sumar evidencias para la resolución de casos judiciales.

P02 - A Heart of Stone - Constrictive pericarditis and other calcified tissues from the pathologic-anatomical collection Vienna

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Calcifications of the cardiovascular system are frequently seen in clinical cases. Today, atherosclerotic cardiovascular disease (ACD) is a leading cause of mortality worldwide (Barquera et al. 2015). The pathologic-anatomical collection in Vienna, now housed in the Fools' Tower (Narrenturm), is a perfect starting point to compare rare calcified human tissue finds (Binder & Roberts 2014), from archaeological contexts with documented pathological body parts from hospitals. Six cases from the pathologic-anatomical collection will be presented showing selected calcifications connected to the cardiovascular system. We have focussed our descriptions on the calcifications, in the hope that it will raise the awareness of unusual calcifications in the human body. Even if the calcifications themselves were not lethal, some restrictions to normal body function would have affected the individual during life. In general, atherosclerotic calcifications are only a few millimetres thick or less, they are convex-concave plaques with a stratified structure, and a pale-yellow to brown colour (Biehler et al. 2019). Our case study specimens reflect this description clearly. There are three key points from these six cases which we hope will aid with identification in the field: a) the calcifications tend to be white or cream in colour and quite thin; b) both location within the skeleton and possibly general shape of the calcification can be used to help identify the nature of the calcification; c) while irregular in shape and size, they are visibly identifiable based on context and consistency of the material. This poster aims to encourage the careful identification of unusual calcifications from archaeological contexts, and to support the use of comparative pathologic-anatomical collections, such as that in Vienna/Austria.

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