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THE FINDING OF HOOKWORM EGGS IN HUMAN COPROLITES FROM $7,230 \pm 80$
YEARS BP, FROM PIAUÍ, BRAZIL

Luiz Fernando Ferreira

Adauto Araújo

Ulisses Confalonieri

Marcia Chame and

Benjamim Martins Ribeiro-Filho

Escola Nacional de Saúde Pública
Fundação Oswaldo Cruz
Rua Leopoldo Bulhões, 1480 - 6º andar
Manguinhos, RJ
Rio de Janeiro - CEP 21041
Brasil

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Finding of Hookw. eggs in human copr.

RESUMO

ENCONTRO DE OVOS DE ANCILOSTOMÍDEOS EM COPRÓLITOS HUMANOS DATADOS DE 7.230 \pm 80 ANOS, PIAUÍ, BRASIL.

O encontro de ovos de ancilostomídeos em coprólitos humanos datados de 7.200 anos, coletados no sítio arqueológico do Boqueirão do Sítio da Pedra Furada, no sudeste do estado do Piauí, possibilitou a discussão sobre a origem dessa infecção no continente americano.

Como as migrações pré-históricas, que seguiram o caminho pela ponte de Bering, da Ásia para a América não teriam permitido a manutenção da infecção por ancilostomídeos em virtude das condições climáticas, o dado paleoparasitológico é um fator indicativo de que populações migrantes chegaram à América por rotas transoceânicas.

SUMMARY

The finding of hookworm eggs in human coprolites dated from 7,200 years, collected at the archaeological site of Boqueirão do Sítio da Pedra Furada, in the Southeast of Piauí State, arise the discussion about the origin of this infection in the American continent.

Since the prehistoric migrations that followed the Bering Landbridge, from Asia to America, would not allow the maintenance of hookworm infection due to climate conditions, the paleoparasitologic data is indicative that migrant populations arrived in America by transoceanic routes.

INTRODUCTION

The finding of ancylostomid larva and eggs in human coprolites dated from precolumbian times showed that ancylostomiasis existed among the ancient indians in Central Brazil (FERREIRA et al. 1980; 1983).

This paper refers to the finding of the same parasite in human coprolites, collected in an occupational layer dated from 7,230 \pm 80 years BP (Before Present), from an archaeological site in Northeastern Brazil.

This is the oldest dating in South America associated with human parasites, specially with hookworms and, to the present knowledge, it is considerably older than the transpacific contacts of Asiatic migrants (MEGGERS and EVANS, 1966), regarded as responsible for the introduction of the parasite in the continent (FERREIRA et al., 1980; 1983; ARAÚJO et al., 1981).

MATERIALS AND METHODS

The coprolites analysed were collected by the staff of the French-Brazilian Mission, headed by Dr. Niède Guidon, in the archaeological site of Boqueirão do sítio da Pedra Furada, situated in the National Park of Serra da Capivara, in the Southeast of Piauí State. The region is known by the numerous archaeological sites, and is located between 08^o:00' to 10^o:00' S and 41^o:00' to 42^o:30' W, in a semi-arid zone. The rain period extends from November to April and the vegetation is typical of the caatinga, characterizing the dry climate (GUIDON, 1984).

The archaeological site consists of a rock-shelter, the Toca do Boqueirão do Sítio da Pedra Furada, with rock paintings. The occupational layers showed lithical artefacts, human bones, little animal bones and remains of hearths, from which the radiocarbon dates were obtained. These showed that the final occupational stage occurred at 6,160 \pm 130 years BP (GIF = Centre des Faibles Radioactivités, Gif-sur-Yvette, France - 5863) and the early stages showed 32,160 \pm 100 years BP (GIF 6653), the oldest dating for an archaeological site in Brazil (GUIDON and DELIBRIAS, 1986).

The layer from which we received the coprolites dated from 7,320 \pm 80 years BP (GIF 7242) and the sample consisted of 17 specimens, 10 of which of cylindrical shape measuring from 5 to 10 cm in length by 3 to 4 cm in width, and had a brown colour (FIG. 1). The

The material was rehydrated in the trissodium phosphate solution for 72 hours (CALLEN and CAMERON, 1960), and submitted to the spontaneous sedimentation method in conical glass jars (LUTZ, 1951). Slides were then prepared for microscopical analysis. The remaining of the sediment was preserved in formol-acetic solution.

RESULTS

After 72 hours of rehydration, the cylindrical coprolite turned the solution to a brown opaque colour while in 3 fragments the solution was brownish-yellow and translucent.

Microscopic analysis of the coprolites revealed the presence of ellipsoid eggs with thin shell, measuring $57.31 \times 39.31 \mu$ ($\bar{X} \pm 10$) (FIG. 2), as well as 3 larval stages being the 3rd a sheated larva. The first larval stage was the most abundant and could be found inside and outside the eggs (FIG. 3).

DISCUSSION

The coprolites were identified as of human origin by their shape and size, the colour of the rehydrating solution and also by their contents which included plant remains and charcoal particles besides the helminth eggs corresponding in shape and size to the human hookworms.

A survey of the recent mammalian fauna of the region and a study of the morphological aspects of their faeces, both fresh and experimentally desiccated, showed also that none of the wild animals can produce faeces that could be taken as human.

It is not possible yet to say which parasite species was found, whether Necator americanus or Ancylostoma duodenale, but the size of the eggs are within the range of those of A. duodenale. It had to be noted that only this species can be found in dry climate (SCHAD et al., 1973), and in fact is the only hookworm found at the local population today.

The presence of hookworm infection among South American Indians in pre-Columbian times was explained by transpacific contact of Asiatic populations (FERREIRA et al., 1983; ARAÚJO et al., 1981; NOZAI, 1985; HORNE, 1985), since the cold migration route by the Bering Landbridge would not allow the larva to evolve in the soil. However the oldest known dating for these contacts is 5,200 years BP (MEGGERS and EVANS, 1966).

The finding of hookworm eggs in human coprolites from

data indicates that probably the research in archaeological sites in the South American Pacific coast will demonstrate a greater antiquity of navigation in prehistoric Asiatic populations.

Another possibility is the transatlantic migrations of south-European or north-African populations since these people lived in the geographic region of dispersion of A. duodenale (MANTER 1967)

We can conclude by saying that paleoparasitological research indicates that prehistoric transoceanic contacts with the New World did take place in older times than is presently known.

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