Distribuição desigual de elementos químicos na superfície do Esmalte Dentário

Sugestões de leituras

MAIOR DESAFIO DE PESQUISA

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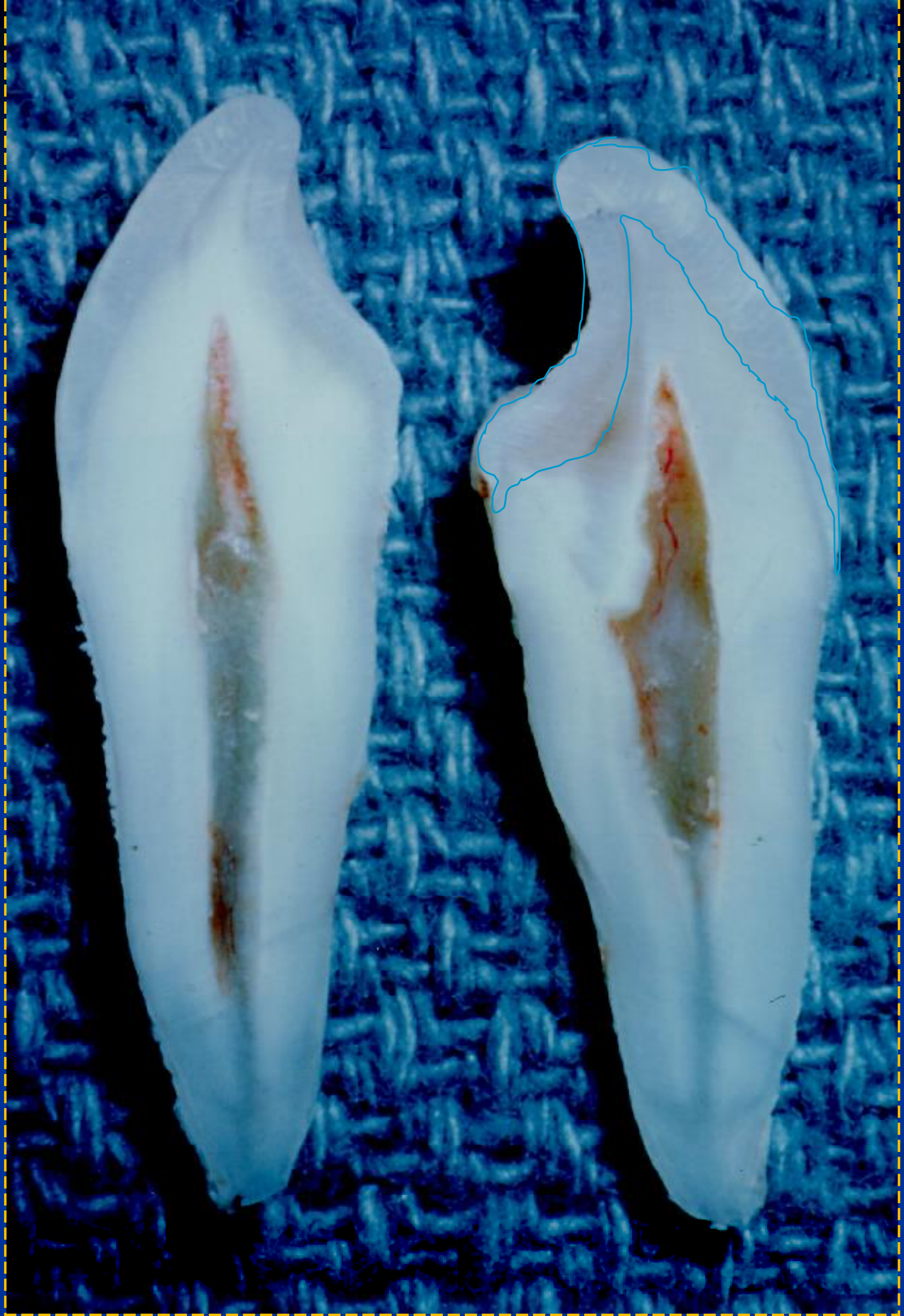


Diferenças entre os tecidos mineralizados OSSO, DENTINA e ESMALTE em % de peso

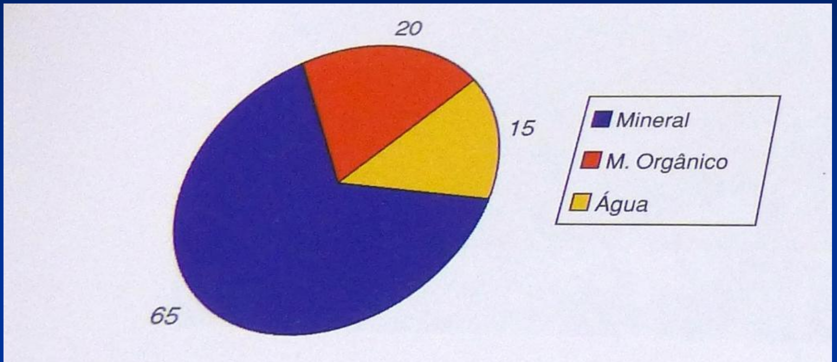
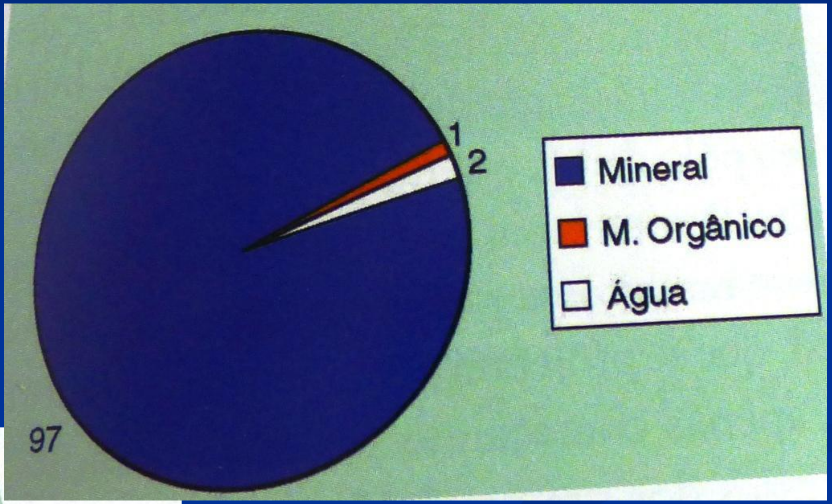


Fig. 3-14: Composição do tecido ósseo em relação ao peso (em %).



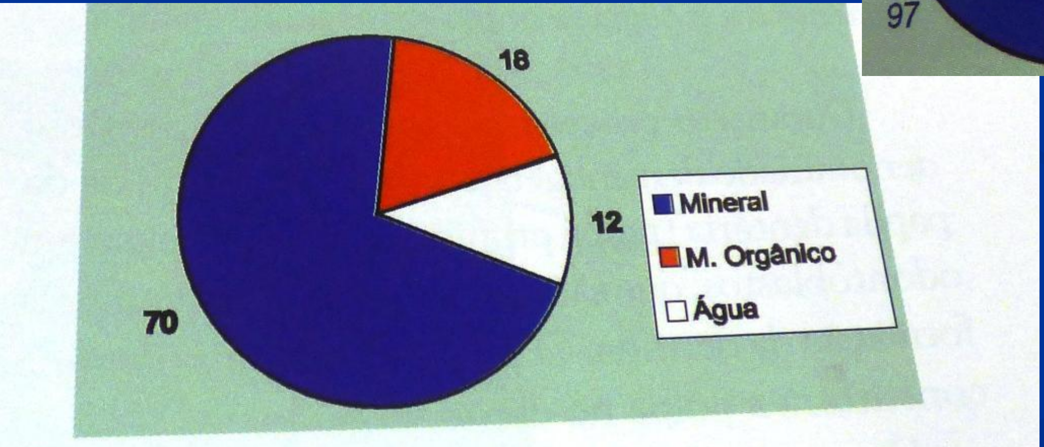


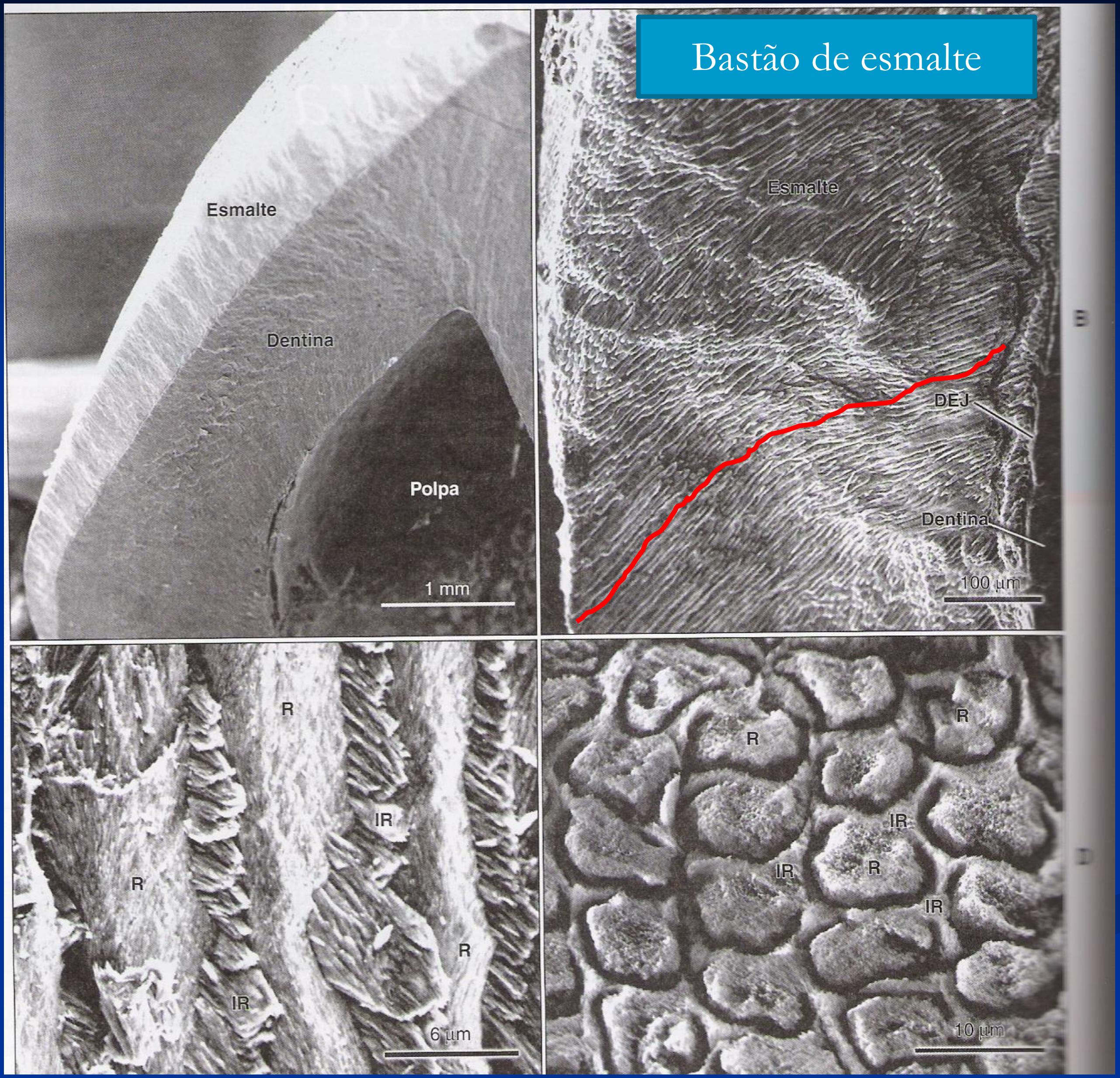
Fig. 7-01: Composição da dentina em relação ao peso (em %).

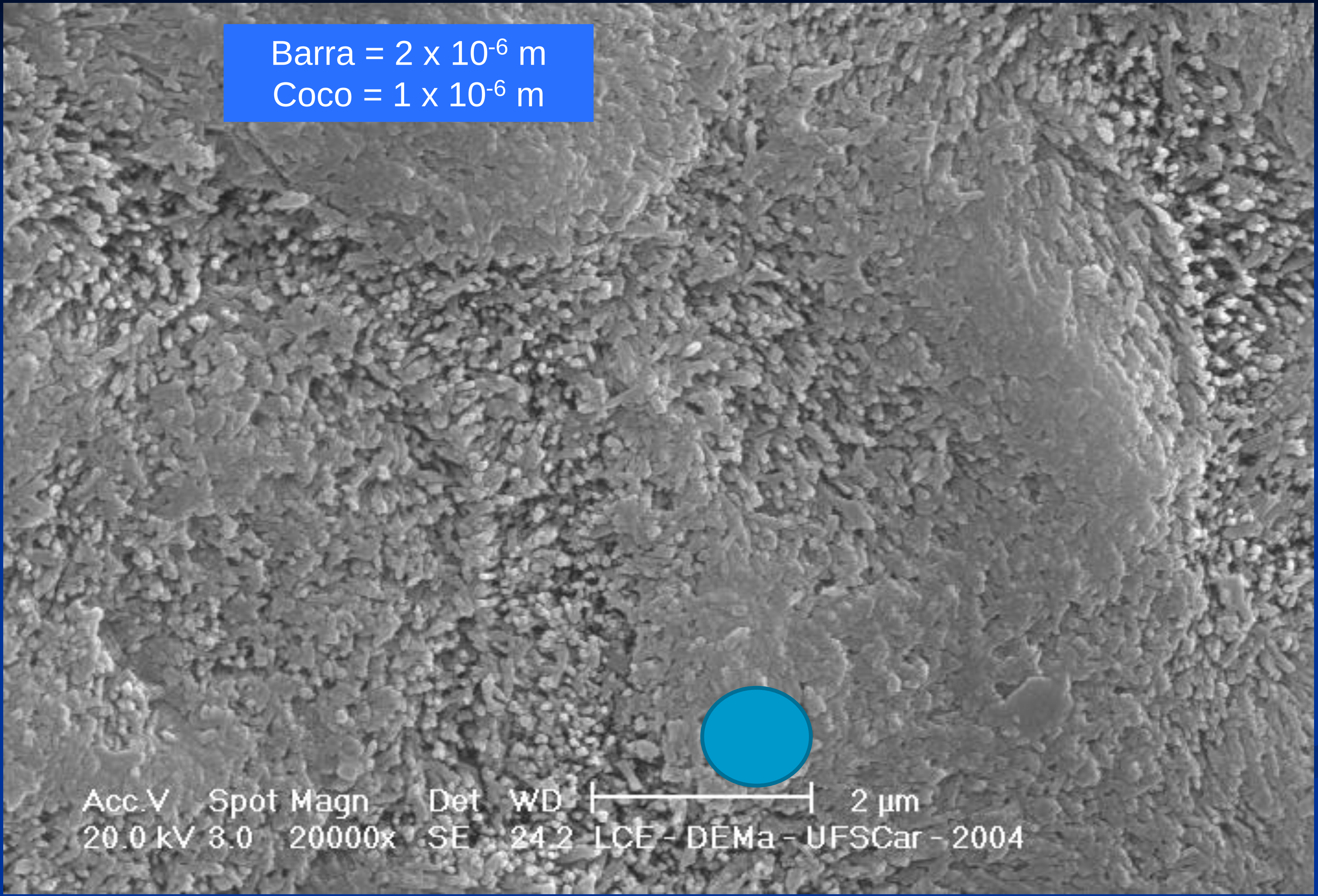
Gerlach RF, Line SRP. Ameloblastos. In: Carvalho & Collares-Buzato: As Células, Manole, 2004. Fotografia: Dr. Paulo Tambasco de Oliveira.

O esmalte é o tecido mais denso (2.9), mais duro e mais cristalino

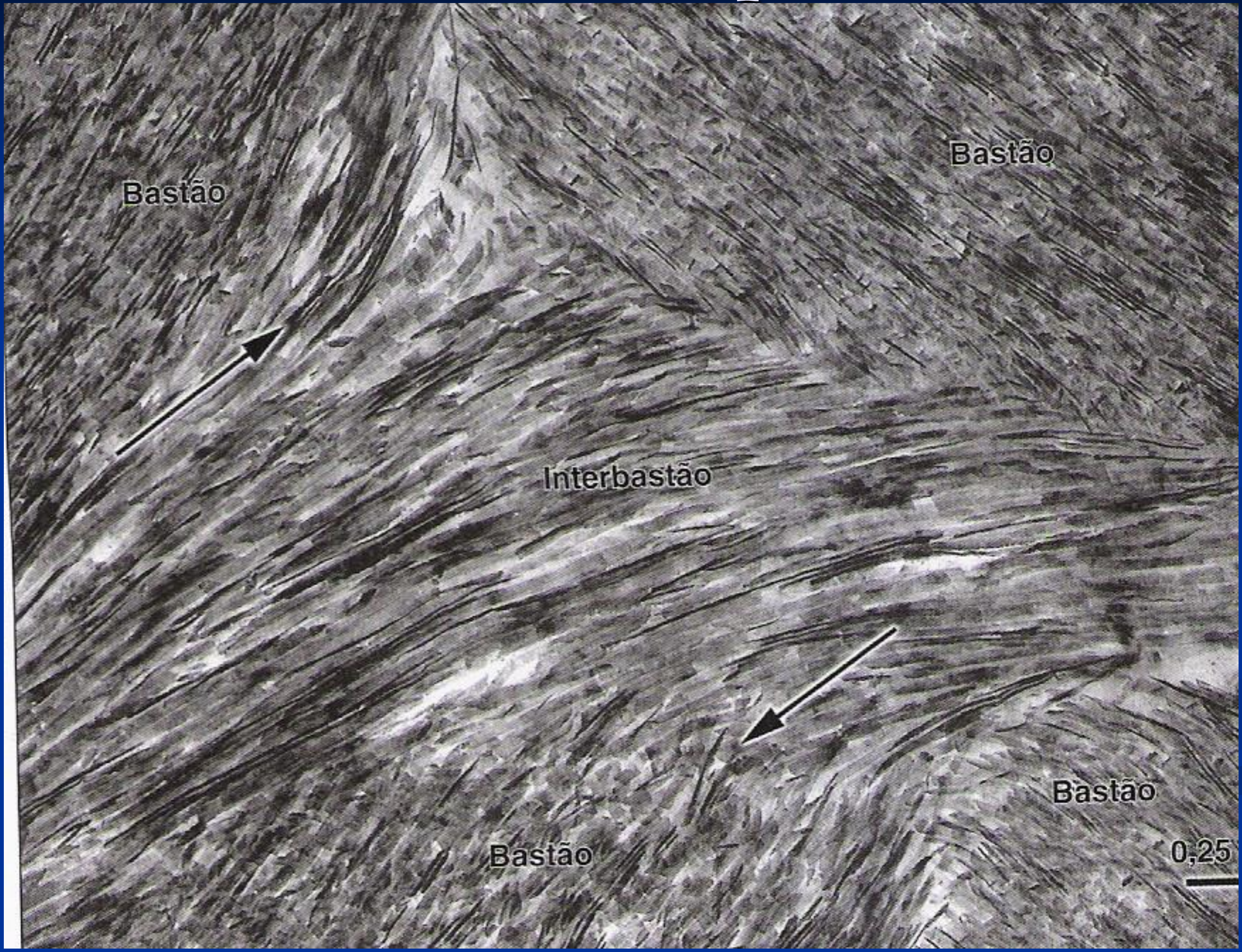
1 mm = 0.001 m
ou 10^{-3}m
100 um = 0.0001 m
ou 10^{-4}m
10 um = 0.00001 m

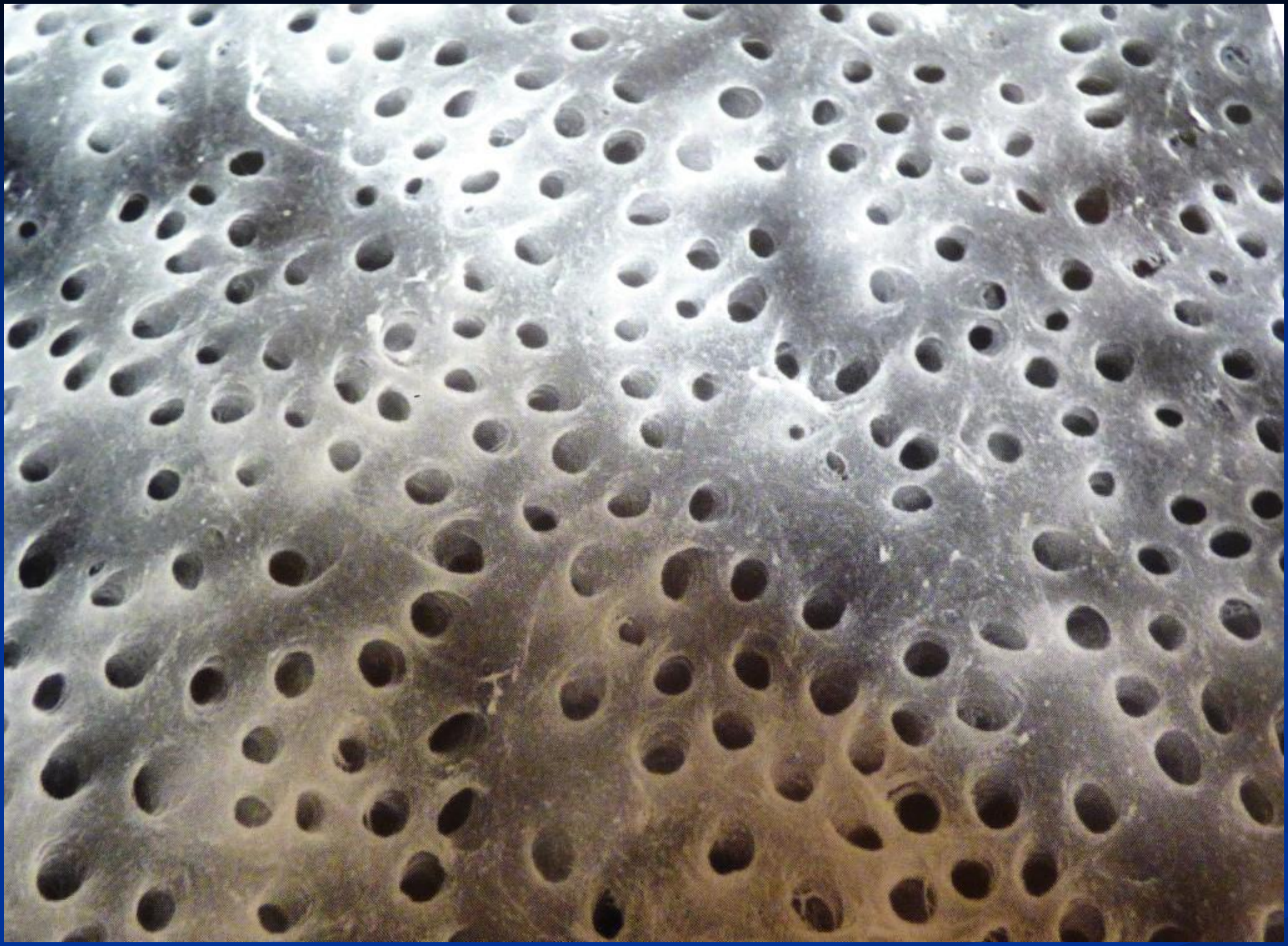
1 um = 0.000001 m
ou 10^{-6}m




Barra = 2 x 10-6 m
Coco = 1 x 10-6 m
Acc.V Spot Magn Det WD 2 µm
20.0 kV 3.0 20000x SE 24.2 LCE - DEMa - UFSCar - 2004

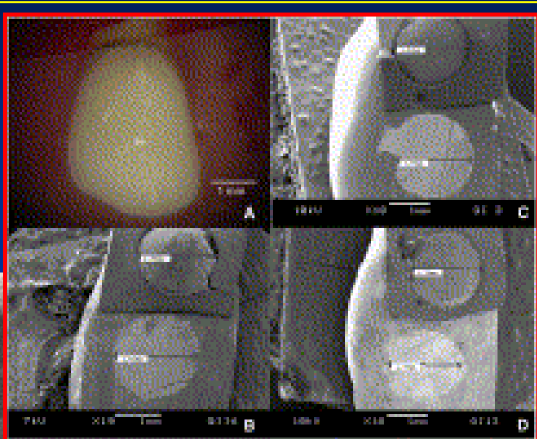
Cristais de Hidroxiapatita

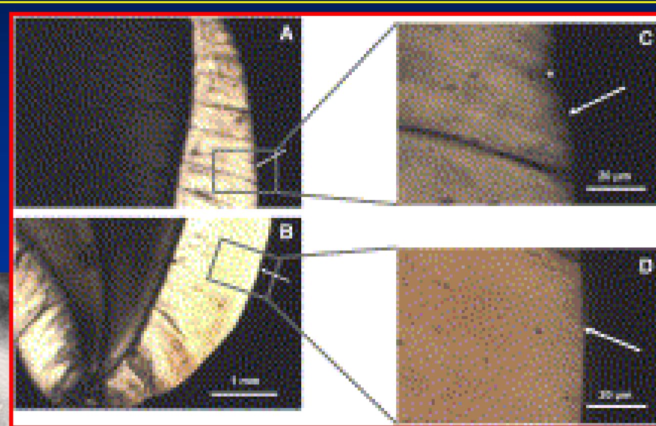




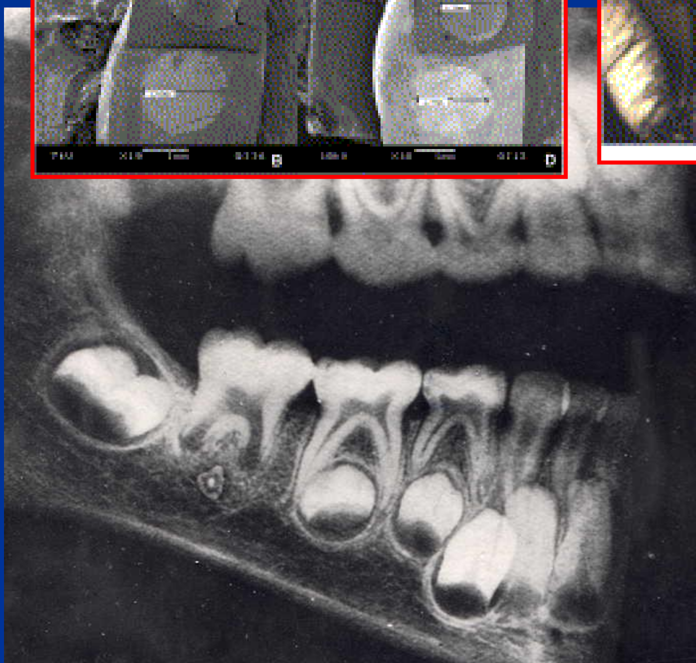
Túbulos dentinários

Fizemos testes de esmalte na superfície de dentes de leite





In vitro



UIC Film Series courtesy Department of Oral Biology, UIC College of Dentistry:
http://www.uic.edu/classes/orla/orla312/sequence_and_timing_in_dental_development.htm

e...in vivo

Vídeo da biópsia

Tabela 2 - Concentração de chumbo no esmalte de acordo com a região em dentes decíduos de pré-escolares e presença ou ausência de cárie. Piracicaba, 2001.

Concentrações de Pb (µg/g)	Região			
	Industrial (N=132)		Não industrial (N=197)	
	Presença	Ausência	Presença	Ausência
>140*	36 (27,3%)[a]	44 (33,4%)	48 (24,4%)[a]	36 (18,3%)
≤140	24 (18,1%)[a]	28 (21,2%)	46 (23,3%)[a/b]	67 (34,0%)
Total	60	72	94	103
>220**	22 (16,7%)[a]	30 (22,8%)	35 (17,8%)[a]	22 (11,2%)
≤220	38 (28,7%)[a]	42 (31,8%)	59 (29,9%)[a/b]	81 (41,1%)
Total	60	72	94	103

Valores seguidos por letras distintas, na coluna, indicam que não há diferença estatisticamente significativa pelo teste de qui-quadrado ($p<0,05$).
*Valor da mediana das concentrações de Pb
**Valor da média das concentrações de Pb

Gomes et al., Sci Total Environ 320(1):25-35, 2004.
doi: 10.1016/j.scitotenv.2003.08.013.
In vivo studies on lead content of deciduous teeth superficial enamel of preschool children

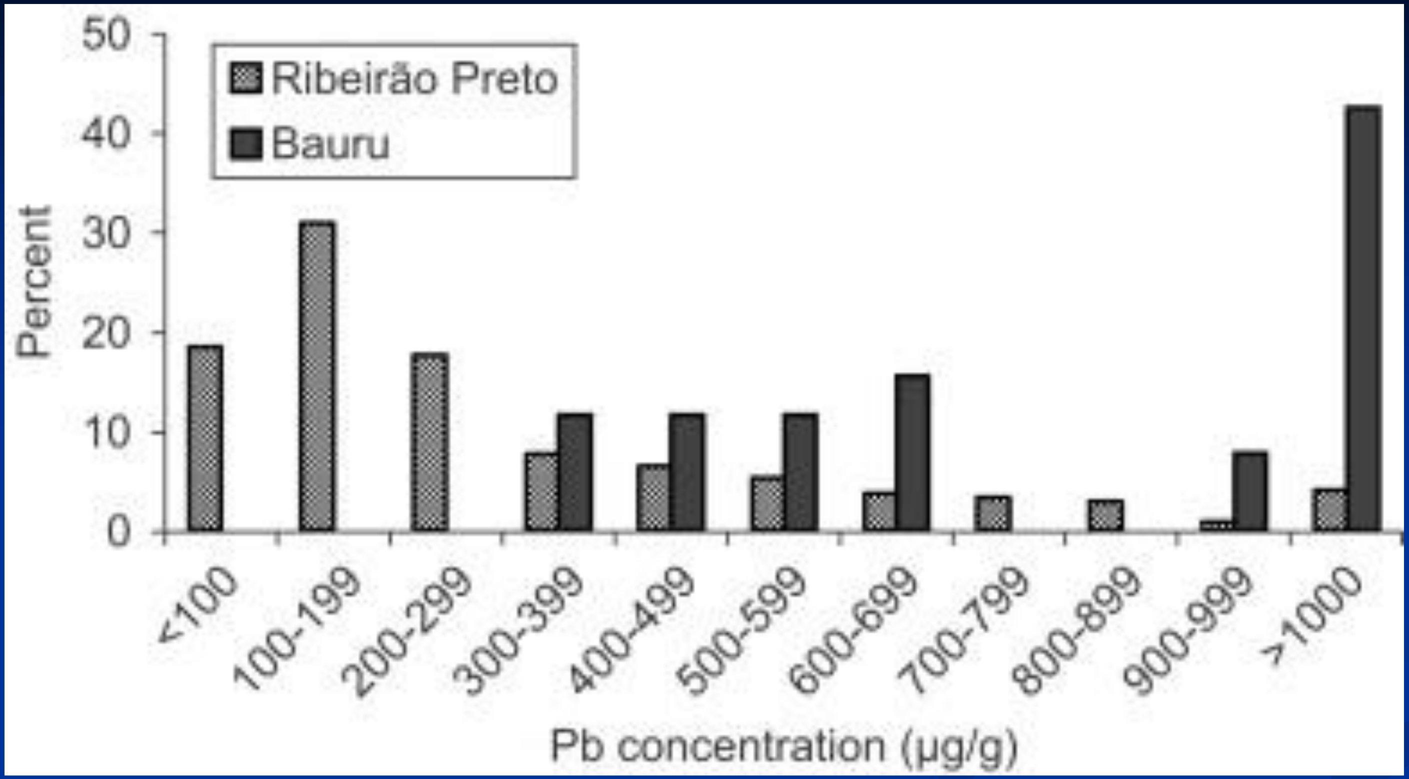


Fig. 1. Distribution of children according to lead concentration in surface deciduous enamel in population from Ribeirão Preto and Bauru, São Paulo State, Brazil (2004).

Lead contents in the surface **enamel** of deciduous teeth sampled in vivo from children in uncontaminated and in lead-contaminated areas.**Costa de Almeida GR**, Pereira Saraiva Mda C, Barbosa F Jr, Krug FJ, Cury JA, Rosário de Sousa Mda L, Rabelo Buzalaf MA, **Gerlach RF.**Environ Res. 2007 Jul;104(3):337-45. doi: 10.1016/j.envres.2007.03.007.

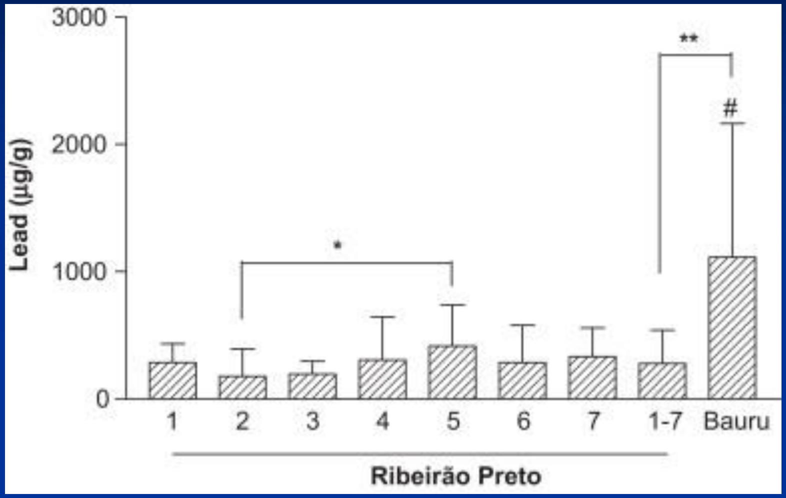


Fig. 1. Lead content (µg/g) in subsurface enamel in children from each Kindergarten of Ribeirão Preto (*n*=186) and Bauru (*n*=20), State of São Paulo, Brazil (2004). #*p*<0.001 vs. all groups from Ribeirão Preto; **p*<0.01; ***p*<0.0001.

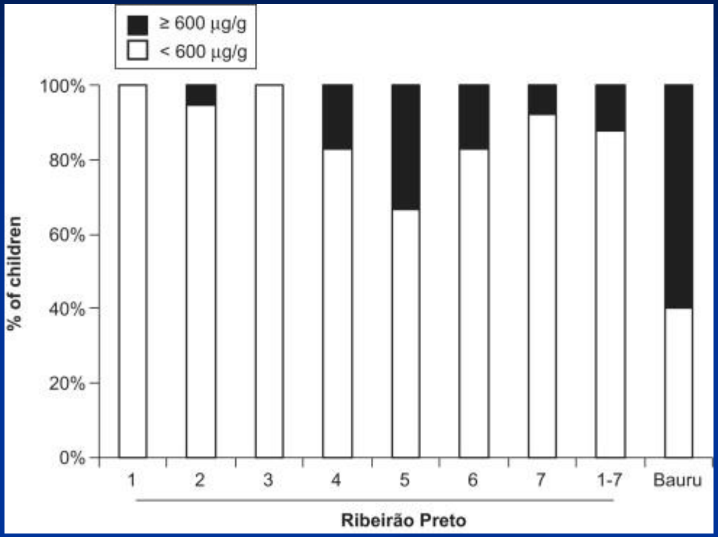
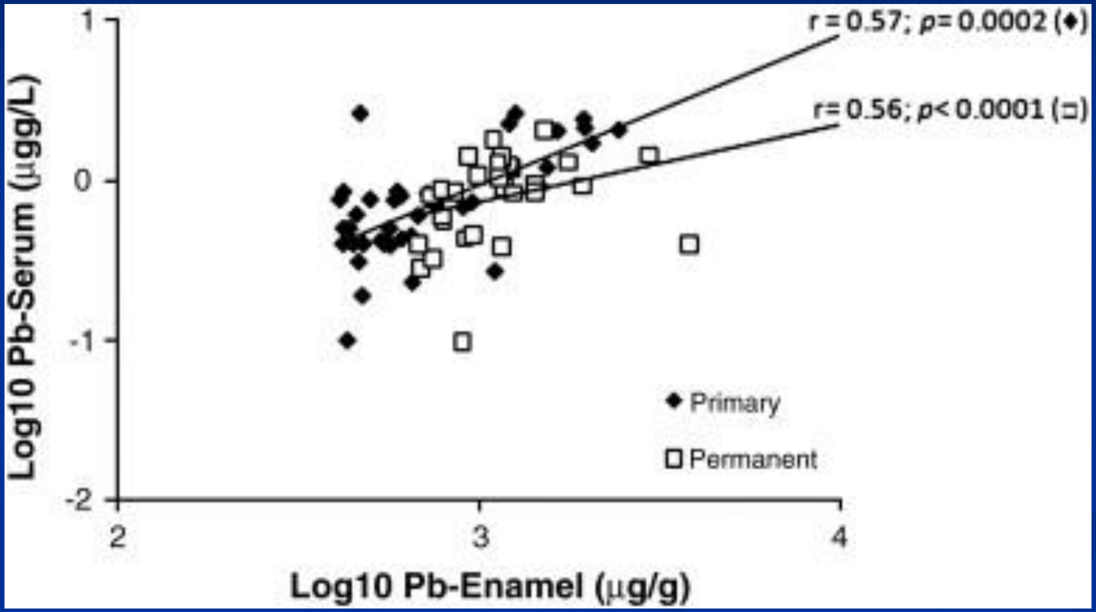


Fig. 2. Percentages of children distributed according to lead values ⩾600 or <600 µg/g in biopsies deeper than 3.18 µm in Kindergartens of Ribeirão Preto (*n*=186) and Bauru (*n*=20), State of São Paulo, Brazil (2004).

de Almeida GR, de Souza Guerra C, Tanus-Santos JE, Barbosa F Jr, **Gerlach RF**.
A plateau detected in **lead** accumulation in subsurface deciduous **enamel** from individuals exposed to **lead** may be useful to identify children and regions exposed to higher levels of **lead.**
Environ Res. 2008 Jun;107(2):264-70. doi: 10.1016/j.envres.2008.01.002



Costa de Almeida GR, de Sousa Guerra C, de Angelo Souza Leite G, Antonio RC, Barbosa F Jr, Tanus-Santos JE, **Gerlach RF.** Lead contents in the surface **enamel** of primary and permanent teeth, whole blood, serum, and saliva of 6- to 8-year-old children. Sci Total Environ. 2011 Apr 15;409(10):1799-805. doi: 10.1016/j.scitotenv.2011.01.004. Epub 2011

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Lead concentrations in whole blood, serum, saliva and house dust in samples collected at two time points (12 months apart) in Santo Amaro, BA, Brazil

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ABSTRACT

Whole Blood Lead Level (BLL) is the main marker used to verify lead contamination. The present study explores how BLL is associated with lead concentrations in serum, saliva and house dust. Samples were collected twice from Santo Amaro, BA, Brazil, a region that was contaminated by a lead smelter in the past; a time interval of 12 months was allowed between the two collections. It is noteworthy that the following measures have recently been taken to diminish exposure of the population to lead: streets have been paved with asphalt, and educational campaigns have been launched to reduce exposure to contaminated dust.

Results: Compared with the first time point, all the samples collected at the second time point contained lower lead concentration ($p < 0.05$), which suggested that the adopted measures effectively reduced exposure of the population to lead present in contaminated soil and dust. Statistically significant correlations only existed between lead in blood collected in the first year and lead in blood collected in the second year (Spearman's $r = 0.55$; $p < 0.0001$; $n = 62$), and lead in house dust collected in the first year and lead in house dust collected in the second year (Spearman's $r = 0.5$; $p < 0.0001$; $n = 59$).

Conclusions: Results support the validity of lead determination in blood and in house dust to assess lead exposure over time. However, lead in blood and lead in dust did not correlate with lead in serum or lead in saliva.

1. Introduction

Lead is a well-known toxic metal that is usually associated with the enormous burden of social, financial, and medical/psychological issues faced by the population living in areas where it is or was smelted (Warren, 2000; Denworth, 2009; Markowitz and

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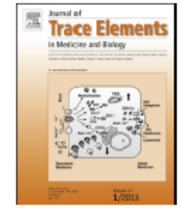

BIOINORGANIC CHEMISTRY

Anatomical variations in primary teeth microelements with known differences in lead content by micro-Synchrotron Radiation X-Ray Fluorescence (μ-SRXRF) – A preliminary study

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ABSTRACT

Shed teeth have been proposed as trace element biomarkers. This study determined variations in the spatial distribution of Ca, K, Zn, Pb, Mn, Cu, and Sr in four anatomical locations: superficial enamel (SE, 0–10 μm), subsuperficial enamel (SSE, 10–30 μm), primary dentin (PD), and secondary dentin (SD). Five primary incisors were analyzed by micro Synchrotron Radiation X-Ray Fluorescence (μ-SRXRF). Two teeth had low concentrations of lead in the SE (<250 μg/g), while three contained very high lead concentrations in the SE (>2000 μg/g). Teeth were sliced, and five spot measurements (20 μm beam diameter) were accomplished in each location. The data are shown as absolute values and as the ratio between the different elements and Ca. The distribution of K was close to that of Ca. Zn was the third most abundant element, with the highest levels being found in the SE and SD and low levels detected in the PD. Increasing Sr levels were found progressing from the enamel to the dentin, with the highest levels being found in the SD, a distribution that was unique. Pb, Mn, and Cu exhibited a similar trend, with higher signals for these elements detected in the SE. This study provides preliminary data on the heterogeneous distribution of different elements in the tooth, highlighting the importance of the first 10 μm of the SE for determination

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Obrigada !