

PEDIATRIC DENTAL JOURNAL International Journal of
Japanese Society of Pediatric Dentistry
The Japanese Society of Pediatric Dentistry

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ONLINE ISSN : 1880-3997

PRINT ISSN : 0917-2394

Pediatric Dental Journal

Vol. 16 (2006) , No. 1 pp.96-105

[\[PDF \(828K\)\]](#) [\[References\]](#)

Quantitative and qualitative influence on oral hard tissues of neonatal rats born to mothers given methamphetamine during pregnancy

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(Received on October 11, 2005)

(Accepted on January 30, 2006)

Abstract We conducted research as part of a series of studies on the influence on various oral tissues of the offspring of mothers that were given methamphetamine (MA) during pregnancy. The mandibular strength during the growth process of newborn rats from mothers that had received MA was compared with normal newborns. Methamphetamine hydrochloride was continually administered to mother rats (MA group) every day from conception to the day before delivery. Observations of the newborn were made at birth, two, three, four and five weeks. Newborn rats from mothers who had been administered the same amount of physiological saline solution were used as controls. Peripheral quantitative computed tomography (pQCT) was used to measure bone strength to determine bone mineral density and bone structures. A complete determination was made after soft X-ray photography of the mandible. No significant difference was observed in mandibular growth from the menton to the gonion between the MA and the control groups throughout the experimental period. Although no difference was noted in trabecular bone, a significant difference was seen in cortical bone, which tended to become thinner in the MA group. In addition, the cortical bones in the MA group showed lower values for bone mineral density and bone mineral content compared with those in the control group. We concluded that the mandibular strength of neonatal rats of mothers that had received MA was weak, and could break easily compared with normal infants. These results indicate that the problems of female methamphetamine drug users extend to influence on the oral hard tissue formations of their offspring.

Key words Mandible, Methamphetamine, pQCT, Rat

To cite this article:

Naohito Hara, Makiko Hara, Mie Kobayashi, Eiki Kato, Mikio Kato and Mitiharu Daito:
Quantitative and qualitative influence on oral hard tissues of neonatal rats born to mothers
given methamphetamine during pregnancy . *Ped Dent J* **16**: 96-105, 2006 .

JOI JST.JSTAGE/pdj/16.96

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