

# Mesiodistal Gradient of Mandibular Precedence in the Developing Dentition

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In postnatal dental development, there are clear-cut mandibular-maxillary eruption precedences; usually the mandibular incisors tend to precede their maxillary opponents. There is also a mesiodistal gradient of mandibular-maxillary precedence such that maxillary precedence becomes both relatively and absolutely more common in the posterior teeth (H. ISRAEL, A. DAHLBERG, S. M. GARN, and R. KREWESKY, *J Dent Res* 46:456, 1967; and H. ISRAEL, S. M. GARN, and R. F. BENITEZ, *Arch Oral Biol* 13:239-241, 1968). It is not known, however, whether such precedent polymorphisms exist in prenatal dental development and whether they have their origins in the first trimester of existence.

To test this possibility, the relative development of maxillary and mandibular deciduous opponents in a series of 52 human embryos, all below 58 mm in crown-rump length, was examined. The developmental status of each tooth was assessed individually and described by a numerical code; the results were incorporated on standard IBM 80-column punch cards. Then for each pair of opponents, dental development was categorized as (1) mandible

ahead, (2) equal development, or (3) maxilla ahead, depending on the precoded assessments obtained from the IBM 360-67 computer calculations.

Deciduous opponents usually are of comparable development, but there are also clear-cut formation precedences during early fetal life (Table). For the eight deciduous incisors, mandibular precedence is far more common (25%) than maxillary precedence (5%). However, for the eight deciduous molars, mandibular and maxillary precedences are equally common (approximately 10% for each). Furthermore, there is a clear-cut mesiodistal gradient characterized by a shift in relative proportions of mandibular precedence in the incisors to maxillary precedence in the deciduous molars. The departure from simple chance distribution of mandibular and maxillary precedences is highly significant for the deciduous incisors and the canines (using the chi-squared test), as is the difference in distribution of precedences between deciduous incisors as a group and deciduous molars as a group.

Although it cannot be assumed that 8- to 12-week embryos with maxillary or mandibular incisor precedence would exhibit the same sequences in later deciduous or permanent tooth eruption, it is clear that the mandibular-maxillary precedent polymorphisms and the gradients that exist in postnatal dental emergence have close parallels in very early tooth-formation timing.

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Tooth	No. of Sides	Mandible Ahead	Maxilla Ahead	Equal Development	$\chi^2$
$\frac{I}{I}$	104	23	2	79	16.0*
$\frac{I_2}{I_2}$	104	27	7	70	11.8
$\frac{C}{C}$	104	17	8	79	3.2
$\frac{dm1}{dm1}$	104	13	8	83	1.2
$\frac{dm2}{dm2}$	104	9	12	83	0.4

\*  $2 \times 2 \chi^2$ , against chance or 50:50 hypothesis, using Yates' correction.