

ABSTRACT

In humans, the deciduous dentition develops from the U-shaped dental lamina running along the upper or lower jaw arch. It is assumed that the vestibular lamina is located externally and parallel to the dental lamina and gives rise to the oral vestibule. We investigated the early development of the dentition and the oral vestibule from embryonic week 6 to 9 by using serial frontal histological sections and computer-aided 3D reconstructions.

The thickened dental epithelium originated separately on the medial nasal, maxillary and mandibular outgrowths before their fusion. After complete fusion, the dental epithelium formed a continuous mound in 3D reconstructions, giving rise to single tooth primordia. Externally to the dental mound, we regularly observed epithelial structures on frontal sections, protruding into the mesenchyme. Without correlation with 3D reconstructions, these structures could be considered as forming a continuous U-shaped vestibular lamina. However, 3D reconstructions did not show any continuous vestibular lamina.

At the earlier fusion site of the dental epithelia of the upper jaw, the lateral deciduous incisor started to develop, comprising material from both: medial nasal and maxillary outgrowths.

We can conclude that the continuous vestibular lamina does not exist. The vestibular epithelium forms a number of distinct epithelial structures (bulges and ridges) that occur transiently in the vestibular epithelium. The dental and vestibular epithelia are parallel-segmented along the mesio-distal axis. They interact repeatedly along the mesio-distal (antero-posterior) jaw axes.

The upper deciduous lateral incisor takes its origin from two facial outgrowths (medial nasal and maxillary outgrowths). This could explain the developmental vulnerability of the upper lateral incisor.