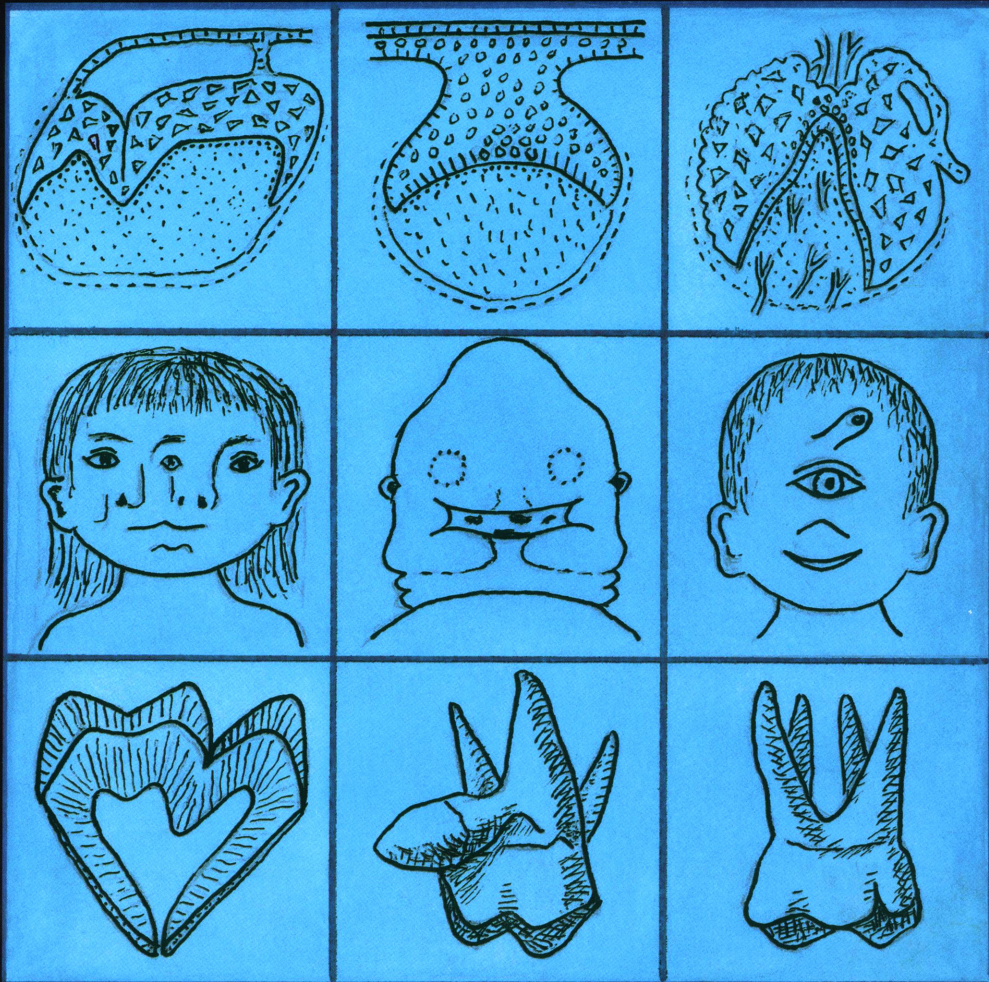


EMBRYOLOGY OF THE MOUTH AND RELATED STRUCTURES

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Experimental Production of Malformed Teeth

Three experimental procedures have been reported which bring about tooth anomalies. These are X-ray irradiation of pregnant mice, hypervitaminosis A in pregnant rats, and trypan blue venous injections into pregnant mice (Ritter 1962, Kundsén 1965-66). However, the experiments of producing malformed teeth by transplantation of the surgically operated tooth-buds make slow progress. The experimental production of fused teeth and supernumerary teeth by implantation of surgically operated tooth-buds was undertaken in the author's laboratory. The surgically wounded flanks of two bell-stage molar buds before mineralization are joined together and explanted in the subcutaneous space behind the ear or in the pouch of a young hamster, which results in fused molars (Figs. 172.1, 172.2). Root-fused teeth may be produced by creating a wound in corresponding regions in the flank of the root sheath of two tooth buds and bringing the wounds in apposition to each other.

Transplantation of the intact, removed, molar tooth-bud brings about a molar with elongated roots. In the experiment designed for effects of vitamins or hormones on to the tooth development by using rats with such tooth-bud grafts, administration of a small amount of vitamin A or parathormone may bring about a much better result.

Transplantation of a group of several lengthwise sectioned pieces of a tooth-bud with no mineralization may bring about a compound odontoma. In more than six lengthwise sectioned pieces of a molar-bud just before mineralization, epithelial fusion tends to be partial in each piece. As a result, malformed teeth may develop. Therefore, in this experiment the tooth-bud of a very early stage of development is desirable, but it is extremely difficult to manipulate such a small tooth-bud.

Experimental Production of Pulp Stones

The 5-day cultivation at 36°C of a removed dental papilla followed by 3-day cultivation at 40°C results in false pulp stones (Gerstner 1973). In the author's laboratory the multiple pulp stones were found to be formed in the molar tooth of a young rat whose blood pH was maintained at 7.2 for two months. The incidence of pulp stones in the experimental group is 60/268 teeth (22.3%), whereas that in the control group is 18/270 teeth (6.6%). In this experiment not only the false pulp stones, but also genuine pulp stones are found (Fig. 173).

Congenital Fistula of the Lip

Congenital fistula of the lip in general appears bilaterally in the lower lip. Sometimes it appears at the border of the nasomedial process and the maxillary process, but rarely at the median part of the upper lip. In most of the cases the duct of the mucous glands is opened in the wall of the fistula. The incidence of bilateral fistulae of the upper lip may be related to the epithelial remnants derived from the epithelial wall between the nasomedial process and the maxillary process. In the lower lip, however, the fistulae appear, in general, bilaterally rather than at the median part of the lip.

Careful observation on the lip anlage of 32 to 37-day human embryos reveals that the lip anlage consists of four growth centers. In the 32-day embryo the borders of these growth centers in the lower lip are recognized as a median groove and lateral

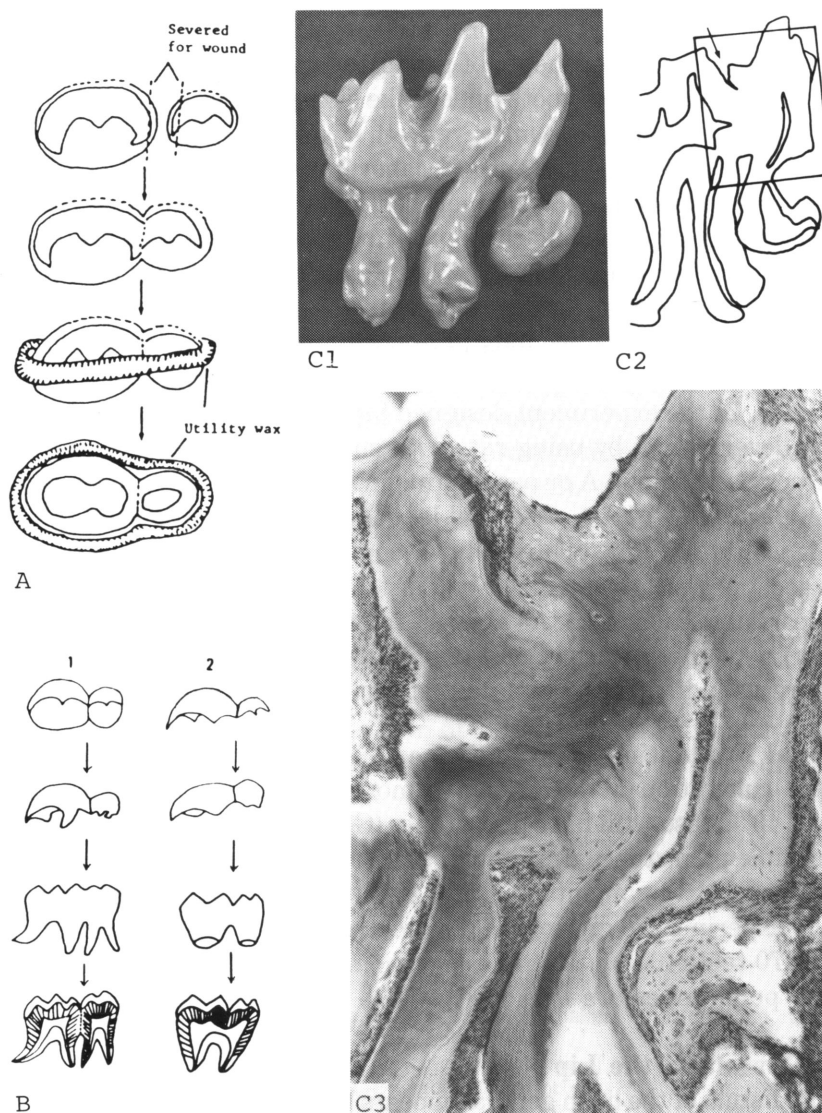


Fig. 172.1

A. Diagram indicating a method of tooth fusion by hamster tooth-bud grafts. Two molar buds with a knife-created wound are made to contact each other at the flank. They are entrapped with looped utility wax, and then transplanted.

B. Variant wounds of the molar buds result in variant malformed fused molar teeth.

C. Wax reconstruction model (C₁) and a decalcified H-E stained section (C₂, C₃) of the fused molar teeth by hamster tooth-bud grafts (Dr. M. Koizumi's sample).

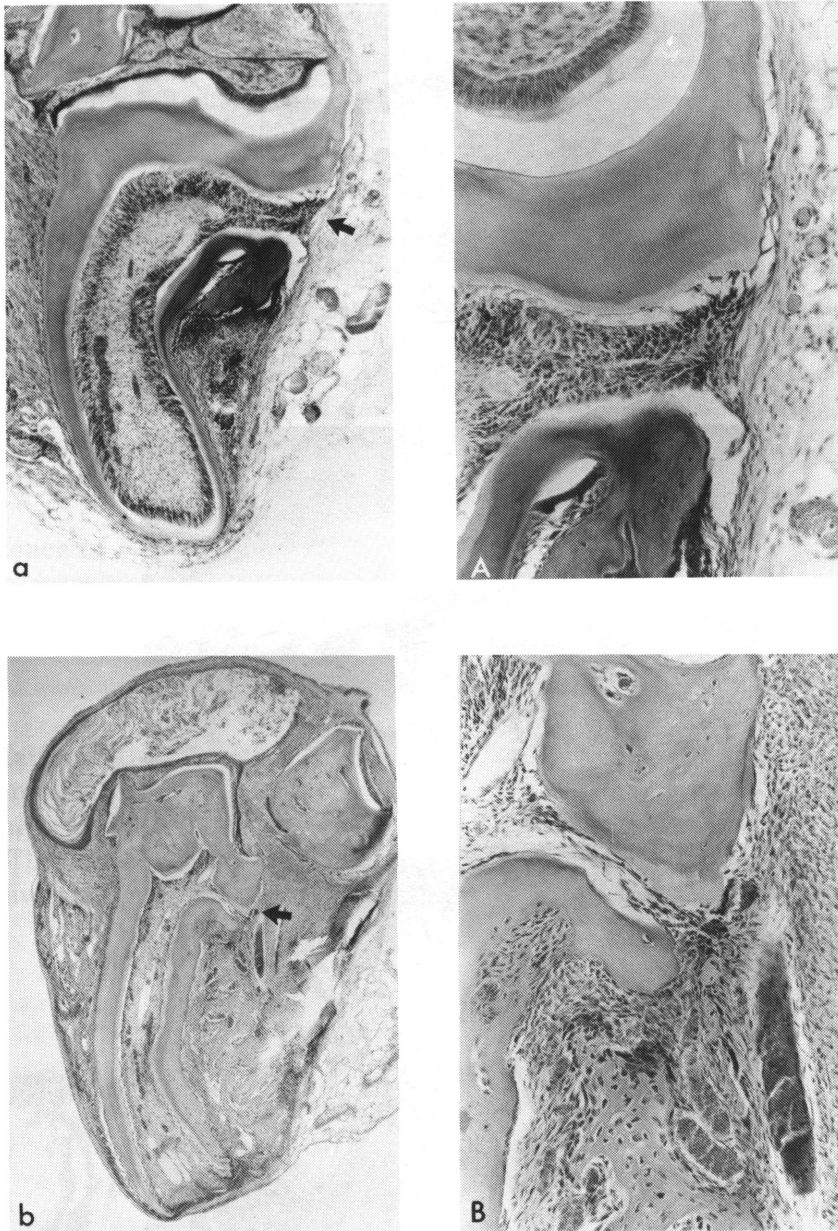


Fig. 172.2 Sections of hamster molar teeth developed from halved molar bud grafts (Dr. M. Koizumi's sample)

Each of the halved molar bud grafts develops into a whole tooth. In both of the teeth the wounded flank of the bud is not closed completely, which is appeared as a slit-like opening in each of the sections (arrow).

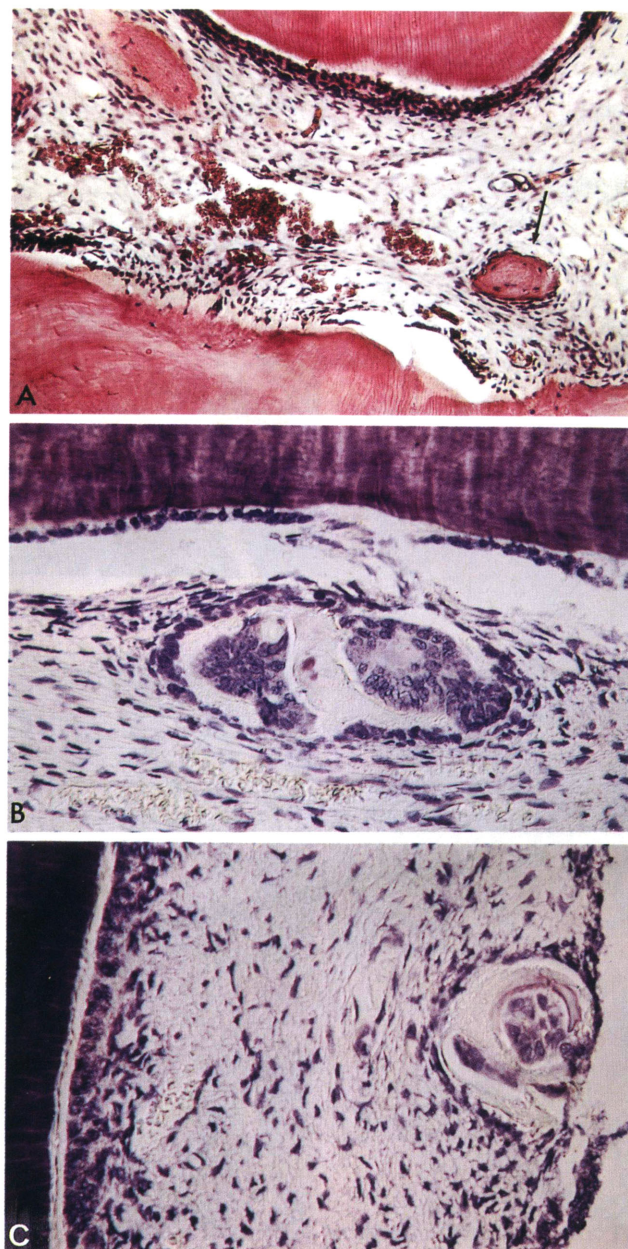


Fig. 173 Experimentally produced pulp stones in rats with blood pH 7.2 (Dr. T. Tanaka's sample)
A. False pulp stones produced in the coronal pulp.
B,C. Genuine pulp stones produced in the radicular pulp. Odontoblasts surround the pulp stone of B, whereas epithelial cells (Malassez's epithelial rest) form the core of that of C.