Tooth development

Rejae Amir
Belarusian State Medical University, Minsk
Tutors – *MD, professor* ***Kabak Sergey Lvovich****, Belarusian State Medical University, Minsk*
PhD, ***Yulia Mikhailovna Melnichenko****, Belarusian State Medical University, Minsk*

Introduction

In the developing embryo ectodermal organs, such as the teeth, arise from their germs through reciprocal epithelial-mesenchymal interactions. Tooth abnormalities are usually the result of disturbances in the "molecular dialogue" between the oral epithelium and the underlying mesenchyme during tooth development, which can result in tooth agenesis with failure of the correct number of teeth.

Aim

Investigation of early stages of tooth morphogenesis and mechanisms of tooth abnormalities described in the literature.

Materials and methods

Histological sections of pig and human jaws were evaluated in this study. We present review of the 34 articles in literature (database MEDLINE via PubMed from inception to 2010) about the roles of genes involved in tooth development and recent advances in tooth regenerative therapy.

Results

In the end of embryonic period (6-8 weeks of human development) the dental lamina thickens (lamina stage). This stage is followed by epithelial thickening (placode stage) at the future location of the tooth and subsequent epithelial budding to the underlying neural crest-derived ecto-mesenchyme. Dental mesenchyme condense around the developing epithelial bud (bud stage). The epithelial and mesenchymal cells in the tooth germ terminally differentiate into ameloblasts, odontoblasts, and dental follicle cells (bell stage,). Ameloblasts and odontoblasts secrete the enamel and dentin matrix, respectively, between the epithelium and mesenchyme, while dental follicle cells differentiate into the periodontal tissues, which include the cementum, periodontal ligaments and alveolar bone (at the beginning of the fetal period).

Conclusion

The embryonic development of dental structures is a complex process guided by specific genetic programs. The gradual identification of the genes responsible for tooth formation could also find remarkable applications in clinical dentistry.