An update on tooth agenesis!

Tooth agenesis is one of the dental anomalies which not only looks unfavorable but also has clinical implications with regards to occlusion, bone growth, chewing ability and pronunciation. It has always been a matter of concern for parents and patients themselves. The agenesis of teeth may be syndromic or non-syndromic hypodontia, the latter refers to congenital; absence of few teeth in the absence of any other deformity. The reported anomaly affect six or fewer teeth with a prevalence of 1.6 – 6.9% (excluding third molar); most of the patients having missing permanent premolars and upper later incisors.[1] A meta-analysis included 33 studies from North America, Australia, and Europe found a higher prevalence in Europe (5.5%) and Australia (6.3%) than in North America, most commonly missing teeth were mandibular second premolars and maxillary lateral incisors.[2,3] Both genetic and environmental factors play an important role in etiology of hypodontia, with the former playing a more important role.[1,4] Study found a significant positive correlation between allergy and hypodontia.[5] The etiology of hypo-mineralized first molars is not yet fully understood, but based on the results of this retrospective study, health problems in infancy, especially respiratory diseases, seem to be involved.[6] During the process of tooth development series of genetically controlled successive molecular interactions are involved, alternation in one of their signaling pathways disrupts the normal tooth development leading to hypodontia.[1] There occurs a possibility of health problems disrupted the formation of teeth due to illness associated with fever, malnutrition, illness associated hypoxia or hypocalcemia.[5] Similarly the mutation of genes not only results in hypodontia but has implications on other parts of the body. A study found that a statistical association exists between hypodontia of permanent teeth and this could allow hypodontia to serve as a potential risk marker for epithelial ovarian cancer.[7] The genes responsible for hypodontia have always been of interest to researchers and study shows that it tends to run in families. With advancement in molecular genetics it has now been possible to identify the exact gene and trace the mutation that leads to hypodontia.[8]

References

1. Al-Ani, A.H., et al., Hypodontia: An Update on Its Etiology, Classification, and Clinical Management. BioMed Research International, 2017.

2. Polder, B.J., M.A.V.t. Hof, and F.P.G.M.V.d. Linden, A meta-analysis of the prevalence of dental agenesis of permanent teeth. Community Dentistry and Oral Epidemiology, 2004. 32(3):217-26.

3. Amini, F., V. Rakhshan, and P. Babaei, Prevalence and pattern of hypodontia in the permanent dentition of 3374 Iranian orthodontic patients. Dental Research Journal, 2012. 9(3):245-50.

4. Ely, N.J., M. Sherriff, and M.T. Cobourne, Dental transposition as a disorder of genetic origin European Journal of Orthodontics, 2005. 28(2):145-51.

5. Yamaguchi, T., et al., Allergy as a possible predisposing factor for hypodontia. European Journal of Orthodontics, 2008. 30(6):641-44.

6. Jälevik, B., et al., Etiologic factors influencing the prevalence of demarcated opacities in permanent first molars in a group of Swedish children. European Journal of Oral Sciences, 2001. 109(4):230-34.

7. Chalothorn, L.A., et al., Hypodontia as a risk marker for epithelial ovarian cancer: A case-controlled study. The Journal of the American Dental Association, 2014. 139(2):163-69.

8. Pani, S.C., The genetic basis of tooth agenesis: Basic concepts and genes involved. ournal of Indian Society of Pedodontics and Preventive Dentistry, 2011. 29(2):84-89.

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