DOI: https://doi.org/10.53350/pjmhs211592477

ORIGINAL ARTICLE

Developmental Anomalies of Teeth – A cross-sectional study

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ABSTRACT

Background: This study was conducted to find out prevalence of tooth developmental anomalies and tooth agenesis syndrome in patients of Fariyal Dental College Lahore visiting the out-door department during the year 2017.

Objective: The objective of this study was to conduct a retrospective examination of prevalence of developmental tooth anomalies and tooth agenesis syndrome .The relationship of age and gender was also focused.

Methods: All patients of Fariyal Dental College Lahore visiting the out-patient department during the year 2017 were observed and analyzed. The documents scrutinized for this purpose were hospital history charts including patient's biodata, family history and oral examination details.

Results: Out of 160 total cases, 10 cases were of tooth developmental anomalies and 7 cases were of tooth agenesis syndrome were observed.

Conclusion: There are 6% cases of developmental anomalies and 4% cases of tooth agenesis were found. Both findings are quite significant in the given number of patients.

Keywords: Fariyal Dental College, Tooth Developmental Anomalies, Tooth agenesis.

INTRODUCTION

The development of dental structures is thoroughly related to the dentist's ability to properly predicate a thorough treatment plan for many patients. A developmental disturbance is defined as an anomaly as the pathology occurs in the embryonic phase of human life. Hypodontia is an congenital disorder described by developmentally missing teeh characterized by agenesis of one or more teeth (1). During tooth development hypodontia is found to be the most communal congenital anomaly [2,3,4] leading to agenesis of teeth. According to previous studies there is an incidence rate of 2–10% for occurance of hypodontia. This incidence is higher in females as compared to males[5, 6, 7]. Though Tooth agenesis can be related with other diseases or is the consequence of hereditary causes [8,9,10,11,12] but the cause phenomenon of hypodontia is still debatable [13].

Patients with hypodontia face sociopsychological problems and so treatment restoring functional and aesthetic appearance are required on urgent basis[1]. To carry out this management a team involving maxillofacial surgeons, prosthodontists, orthodontists, psychologists and speech pathologists is needed[14,15,16,17,18].

Anodontia is a state to where nope teeth found.[20,21,22,23] Both dentitions can be affected or only teeth of permanent dentition are involved in it. (Dorland's 1998). Literature establishes that 1% (apprx.) of the population agonizes from oligodontia.[24,25,26,27] Graber reported congenital absence of teeth a hereditary phenomenon that passes to each generation by an autosomal dominant pattern.[28-31] . The management of anodontia depends on the number of teeth present in oral cavity of patient. The treatment option for patients with complete anodontia is conventional or implant-supported complete dentures whereas for partial anodontia cases, removable or fixed partial dentures or tooth-supported overdentures using precision or semiprecision attachments are considered[32]

Supernumerary teeth are excessive number of teeth which are normal in morphological respects. Although patients of multiple supernumerary teeth that is not linked to any other systemic disease or syndrome are rare but when present, this occurs near mandibular premolar region [33]. Permanent dentition as compared to primary is more commonly affected dentition for supernumerary teeth. Upper arch is more frequently involved than lower arch[34]
Supernumeraries are classified into four types, on the basis of their locations;

- Mesiodens
- Paramolar
- Distomolar
- Parapremolar

Whereas, on the basis of their position, they are categorized as

- Buccal
- Palatal
- Transverse

Tooth anmolies are categorized acoording to the eruption, structure, number, size and shape of teeth[35,36]. Microdontia (size of teeth are small) and macrodontia (teeth are larger in size) anomalies are associated with the size of teeth. These conditions may be generalized (true or relative) or confined to a single tooth[37]. Associated with pituitary dwarfism, all teeth are smaller than normal known as true microdontia[38]. In relative microdontia there is a role of hereditary factors, the size of the teeth are relatively smaller but the jaw size is gigantic than normal[38].

In pituitary gigantism, true macrodontia exist, while in relative or false macrodontia due to /genetic factors the size of the teeth are normal but the jaw size is small[37,38].

Ceratin anmolies are linked with the shape of dentition, fusion, gemination, taurodontism, dens evaginatus, dens in dente, talon cusp, dilceration, concrescence[39,40].

Fusion and gemination both are closely associated with each other. Fusion occurs due to union of two tooth buds, having two identifiable pulp cavities. Etiology may be herediatory or trauma to the tooth bud. Gemination is a incomplete splitting of single tooth germ, mesiodistally wide tooth, with a single pulp cavity.

METHODOLOGY

The present study was carried at Fariyal Dental College, Lahore during the year 2017. All patients visiting out-patient department of this Institute were included for data collection. The documents scrutinized for this purpose were patient's family history, patient's check up hospital history charts. Previous patients visiting specific departments fortheir respective appointments were excluded from this study. Patients with developmental anomalies and tooth agenesis were counted among all the patients who reported with any dental complain to OPD. Calculation of total number of males and total number of females who had developmental anomalies and tooth agenesis was also performed in the current study. All data was collected and analyzed by using SPSS 13.

RESULTS AND DISCUSSION

Out of 160 total cases observed, 10 cases were of tooth developmental anomalies and 7 cases were of tooth agenesis syndrome as in Table No.1and Table No. 2. Male & female ratio was found as that all tooth developmental anomalies were found in only males (40) and tooth agenesis syndrome was found in only females as in Table No. 3 and Table No. 4 due to some hereditary anomalies and environmental & dietary factors which requires an another comprehensive study. Dental anomalies and their treatment modalities / planning in orthodontic(41)

Table No.1

Total Patients during 2017	Tooth Developmental Anomalies	Percentage (%)
160	10	6

Table No.2

Total Patients during 2017	Tooth Agenesis syndrome	Percentage (%)
160	7	4

Table No.3

Sex	Tooth Developmental Anomalies out of 160 patients during 2017	Percentage (%)
Male	10	100
Female	0	0
Total	10	100

Table No.4

Sex	Tooth Agenesis syndrome out of 160 patients during 2017	Percentage (%)
Male	0	0
Female	7	100
Total	7	100

CONCLUSIONS & RECOMMENDATIONS

Out of 160 total cases observed, 10 cases were of tooth developmental anomalies and 7 cases were of tooth agenesis syndrome as in Table No.1and Table No. 2. Male & female ratio was found as that all tooth developmental anomalies were found in only males and tooth agenesis syndrome was found in only females as in Table No. 3 and Table No. 4 due to some hereditary anomalies and environmental & dietary factors which requires an another comprehensive study.

Following recommendations were suggested:

1. Need for massive improvement of diets.
2. Impediment of environmental hazards.
3. Another comprehensive study for detection of hereditary anomalies and factors.

Supernumerary teeth (more common in males), hypodontia (more common in females), and impacted maxillary canine were the most frequently occurring anomalies.

REFERENCES

1. Bloch-Zupan, Agnes (2013). Dento / Oro / Craniofacial Anomalies and Genetics. Amsterdam. pp. 9–74.
2. Nunn, J.H.; Carter, N.E.; Gillgrass, T.J.; Hobson, R.S.; Jepson, N.J.; Meechan, J.G.; Nohl, F.S. The interdisciplinary management of hypodontia: Background and role of paediatric dentistry. *Br. Dent. J.* 2003, *194*, 245–251.
3. Tan, S.P.; van Wijk, A.J.; Prahl-Andersen, B. Severe hypodontia: Identifying patterns of human tooth agenesis. *Eur. J. Orthod.* 2011, *33*, 150–154.
4. Vastardis, H.; Karimbux, N.; Guthua, S.W.; Seidman, J.G.; Seidman, C.E. A human MSX1 homeodomain missense mutation causes selective tooth agenesis. *Nat. Genet.* 1996, *13*, 417–421.
5. Terheyden, H.; Wusthoff, F. Occlusal rehabilitation in patients with congenitally missing teeth-dental implants, conventional prosthetics, tooth autotransplants, and preservation of deciduous teeth-a systematic review. *Int. J. Implant Dent.* 2015, *1*, 30.
6. Polder, B.J.; Van't Hof, M.A.; Van der Linden, F.P.; Kuijpers-Jagtman, A.M. A meta-analysis of the prevalence of dental agenesis of permanent teeth. *Community Dent. Oral Epidemiol.* 2004, *32*, 217–226.
7. Gracco, A.L.; Zanatta, S.; Valvecchi, F.F.; Bignotti, D.; Perri, A.; Baciliero, F. Prevalence of dental agenesis in a sample of Italian orthodontic patients: An epidemiological study. *Prog. Orthod.* 2017, *18*, 33.
8. Ranta, R.; Stegars, T.; Rintala, A.E. Correlations of hypodontia in children with isolated cleft palate. *Cleft Palate J.* 1983, *20*, 163–165.
9. Boehn, A. Dental Anomalies in Harelip and Cleft Palate. *Acta Odontol. Scand.* 1963, *21* (Suppl. S38), 31–109.
10. Prager, T.M.; Finke, C.; Miethke, R.R. Dental findings in patients with ectodermal dysplasia. *J. Orofac. Orthop.* 2006, *67*, 347–355.
11. Kumasaka, S.; Miyagi, A.; Sakai, N.; Shindo, J.; Kashima, I. Oligodontia: A radiographic comparison of subjects with Down syndrome and normal subjects. *Spec. Care Dent.* 1997, *17*, 137–141.
12. Kolenc-Fuse, F.J. Tooth agenesis: In search of mutations behind failed dental development. *Med. Oral Patol. Oral Cir. Bucal* 2004, *9*, 385–395.
13. Hourfar, J.; Lux, C.J.; Ludwig, B. Kieferorthopädische Therapieoptionen von Nichtanlagen permanenter Zähne. *Zahnmed. up2date* 2014, *8*, 167–188.

14. Breeze, J.; Dover, M.; Williams, R. Contemporary surgical management of hypodontia. *Br. J. Oral Maxillofac. Surg.* 2017, *55*, 454–460.
15. Durey, K.; Carter, L.; Chan, M. The management of severe hypodontia. Part 2: Bone augmentation and the provision of implant supported prostheses. *Br. Dent. J.* 2014, *216*, 63.
16. Borzabadi-Farahani, A. Orthodontic considerations in restorative management of hypodontia patients with endosseous implants. *J. Oral Implantol.* 2012, *38*, 779–791.
17. Filius, M.; Cune, M.; Raghoebar, G.; Vissink, A.; Visser, A. Prosthetic treatment outcome in patients with severe hypodontia: A systematic review. *J. Oral Rehabil.* 2016, *43*, 373–387.
18. Burns, B.; Grieg, V.; Bissell, V.; Savarrio, L. A review of implant provision for hypodontia patients within a Scottish referral centre. *Br. Dent. J.* 2017, *223*, 96.
19. Fekonja A (October 2005). "Hypodontia in orthodontically treated children".European Journal of Orthodontics. 27 (5): 457–60. doi:10.1093/ejo/cji027.PMID 16043466.
20. Wong, S. W. et al. A novel non-stop mutation in MSX1 causing autosomal dominant non-syndromic oligodontia. *Mutagenesis* 29, 319–323 (2014).
21. Wang, J. et al. DNA methylation is critical for tooth agenesis: implications for sporadic non-syndromic anodontia and hypodontia. *Sci. Rep.* 6, 19162 (2016).
22. Polder, B. J., Van't Hof, M. A., Van der Linden, F. P. & Kuijpers-Jagtman, A. M. A meta-analysis of the prevalence of dental agenesis of permanent teeth. *Community Dent. Oral Epidemiol.* 32, 217–226 (2004).
23. Ye, X. & Attaie, A. B. Genetic basis of nonsyndromic and syndromic tooth agenesis. *J. Pediatr. Genet.* 5, 198–208 (2016).
24. Rolling, S. & Poulsen, S. Oligodontia in Danish schoolchildren. *Acta Odontol. Scand.* 59, 111–112 (2001).
25. Ma, T. et al. A novel mutation of MSX1 inherited from maternal mosaicism causes a severely affected child with nonsyndromic oligodontia. *Ann. Hum. Genet.* 84, 97–101 (2020).
26. Shafer, et al: A textbook of Oral Pathology, › 3rd Edition • (pages 37-69)
27. Hickey AJ, Vergo TJ Jr. Prosthetic treatments for patients with ectodermal dysplasia. J Prosthet Dent 2001;86:364-8.
28. Jorgenson RJ Clinician's view of hypodontia. J Am Dent Assoc 1980;101:283-6.
29. Rajendran R Diseases of skin. In: Rajendran R, Sivapathasundaram B. editors. Shafer's Textbook of Oral Pathology. 5th ed. Elsevier; 2006. p. 1099-162.
30. Graber LW Congenital absence of teeth: A review with emphasis on inheritance patterns. J Am Dent Assoc 1978;96:266-75.
31. Agarwal SK, Madan R, Praveen G, Tandon R Prosthodontic rehabilitation of a patient with true partial anodontia—a case report. J Indian Prosthodont Soc 2010;10:75-7.
32. Neville, et al: Oral and Maxillofacial Pathology › 3rd Edition • (pages 77-
33. Scheiner MA, Sampson WJ. Supernumerary teeth: a review of the literature and four case reports. Aust Dent J 1997; 42(3):160-5. https://doi.org/10.1111/j.1834-7819.1997.tb00114.x [Links]
34. Ata-Ali F, Ata-Ali J, Peñarrocha-Oltra D, Peñarrocha-Diago M. Prevalence, etiology, diagnosis, treatment and complications of supernumerary teeth. J Clin Exp Dent 2014; 6(4):e414-418. https://doi.org/10.4317/jced.51499 [Links]
35. Attia S, Schaaf H, El Khassawna T, Malhan D, Mausbach K, Howaldt H-P, et al. Oral rehabilitation of hypodontia patients using an endosseous dental implant: functional and aesthetic results. Journal of clinical medicine. 2019;8(10):1687.
36. Zheng J, Yu M, Liu H, Cai T, Feng H, Liu Y, et al. Novel MSX1 variants identified in families with nonsyndromic oligodontia. International journal of oral science. 2021;13(1):1-10.
37. Jadhav S, Sahu K, Khan M, Khan SSMN, Singh N, Agarwal A. Partial anodontia with macroglossia: An esthetic and functional challenge for a prosthodontist. International Journal of Oral Care and Research. 2020;8(3):60.
38. Arandi NZ, Abu-Ali A, Mustafa S. Supernumerary teeth: A retrospective cross-sectional study from Palestine. Pesquisa Brasileira em Odontopediatria e Clínica Integrada. 2020;20.