Nance–Horan Syndrome: A Rare Case Report

Abstract

Dentofacial anomalies may guide us to the diagnosis of many congenital and hereditary syndromes. A 9-year-old boy was diagnosed with Nance–Horan syndrome. This syndrome is an extremely rare X-linked genetic disorder which is entirely expressed in males with semi-dominant transmission which results from mutations occurring in male gametes. It is characterized by facial dysmorphism such as long face, prominent nose and mandibular prognathism, ocular abnormalities such as congenital cataract, microcornea, microphthalmia and strabismus, and dental anomalies including mulberry molars and screwdriver-shaped incisors. Heterozygous females inherit this disease and also suffer from this syndrome but in a milder form. Approximately one-third of the affected males show signs of developmental delay and intellectual abnormalities. This syndrome is very rare and the incidence of the disease has not been established so far. The present article describes the clinical and radiological features and the genetic implications of this syndrome.

Keywords: *Cataract–dental syndrome, Nance–Horan syndrome, X-linked syndrome*

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Introduction

Nance–Horan syndrome (NHS) is an extremely rare X-linked genetic disorder which fully expresses in males and may be evident at birth (OMIM 302350). This syndrome is also known as cataract–dental syndrome or mesiodens–cataract syndrome.[1,2] NHS is inherited in a co-dominant fashion with heterozygous females often manifesting similar but milder features than affected males.[3,4] It is characterized by facial dysmorphism; abnormalities of eyes and teeth. Facial dysmorphic features include long face, prominent nose and nasal bridge, mandibular prognathism, and large ears with anteverted pinnae and increased folds.[1-6] Eye abnormalities include bilateral congenital cataract (100%), microcornea (96%), and microphthalmia. In 93% of the cases, ocular abnormality causes severe nystagmus (93%) and sometimes strabismus (43%).[1-7] In 89% of cases, ocular impairment requires surgery. Postsurgical complications are common and include glaucoma, retinal detachment, corneal lesions, and even eyeball atrophy, and visual prognosis remains poor.[6]

Dental abnormalities have high diagnostic value and involve both primary and permanent dentition in 100% of cases. They are characteristic and specific of NHS, either by their type or by their aggregation in the same individual. Molars are rounded, globular, and look like lotus flower. Presence of central supernumerary cusp gives them the appearance of mulberry molars. Tapering, screwdriver-shaped incisors look similar to Hutchinson's incisors. Supernumeraries had been reported in 65% of cases. Retained deciduous teeth and pulp chamber anomalies such as taurodontism, large and wide coronal and radicular pulp, abnormal calcifications in pulp, and pulp stones are commonly found in NHS.[1-6] Approximately 30% of affected males also suffer from developmental delay and/or mental retardation, but affected females do not suffer from intellectual impairment.[1-8] The gene encoding NHS has been located at 3.5-cm interval on the distal short arm of the X chromosome between Xp22.31 and Xp22.13.[9,10] This condition has semi-dominant transmission which results from truncated mutations occurring in NHS genes of male gametes.[11,12] The pathogenesis is unknown and is diagnosed by history, clinical and radiological features only.[6,7,9-12]

Case Report

A 9-year-old boy reported for dental treatment of broken upper incisors of

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2 weeks' duration. Medical history revealed surgical enucleation of bilateral congenital cataract and replacement with intraocular lens implants. The patient was under regular follow-up with ophthalmologist for the treatment of glaucoma. Family history was noncontributing.

Extraoral examination revealed features of facial dysmorphism, anteverted pinnae with increased fold in both ears, and ocular abnormalities [Figure 1]. Intraoral examination revealed mixed dentition, poor oral hygiene with Simplified Oral Hygiene Index score of 3.2, and class III skeletal and molar relationship with bilateral posterior cross bite and anterior open bite [Figure 2]. The patient had decayed, missing, and filled teeth and deft scores of 3 and 12. 11 and 21 had uncomplicated crown fracture (Ellis Class II) and were clinically asymptomatic [Figure 2]. 55, 64, 65, 75, 74, 84, and 85 were grossly decayed. All the first permanent molars had one central extra cusp and all cusps were rounded with shortened cuspal height resembling mulberry molars. Central supernumerary cusp in 46 and 36 was seen destroyed by occlusal dental caries. Axial surfaces of the crowns of permanent and primary molars were observed converging toward the occlusal surface making the occlusal table narrow and look like lotus flower [Figures 2 and 3]. Tapering, screwdriver-shaped incisor teeth with notched incisal edge gave them an appearance of Hutchinson's incisor. Panoramic radiograph revealed features of pulpal anomalies and taurodontism. It also revealed abnormal crown morphology of unerupted second permanent molars and premolars with tapered proximal surface [Figure 4]. Findings of intraoral periapical radiograph and vitality test of 11 and 21 were within normal limits.

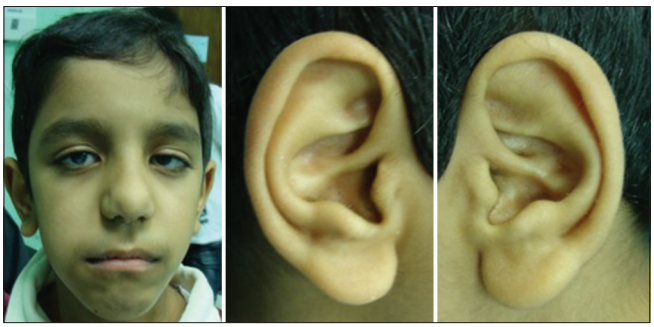

Figure 1 : Extraoral photograph showing facial dysmorphism and increased folds in ears

Blood serological investigation to rule out congenital syphilis was negative. Evaluation of intelligence quotient (IQ) (Stanford-Binet Intelligence Scale Fourth Edition 1986c) showed signs of mild intellectual impairment with an IQ score of 70. Based on the history of ocular findings and treatments, dental findings, facial dysmorphism, and radiological findings, a diagnosis of NHS was made.

The management of patients with NHS is directed mainly toward the specific problems present in the patients. A team of pedodontists, orthodontists, and maxillofacial surgeons was consulted to formulate an appropriate treatment plan. The treatment plan was divided into short- and long-term. Under short-term treatment plan, meticulous preventive treatments including preventive resin restorations were given in 36 and 46 and the patient was professionally monitored regularly to reinforce preventive treatments. Root canal therapy was done in 75 and stainless steel crown was given on 64, 75, 74, and 84. 55, 65, and 85 were extracted, and band and loop space maintainer was given on 16 and 46 [Figure 5]. Fractured 11 and 21 were restored with light-cured composite resin. The long-term treatment included orthognathic surgery along with fixed orthodontic treatment after growth and development of patient is complete.

Discussion

NHS was first described simultaneously by Nance *et al*. and Horan *et al*. in 1974 in two separate studies.[1,2] The dentition was evaluated for the first time by Seow *et al.* in 1985.[5] The history, clinical and radiological findings of this case were consistent with other case reports of NHS.[1-7] The patient's medical history revealed bilateral congenital cataract which was treated with intraocular lens implant. In this case, ocular abnormality caused severe visual impairment, for example, nystagmus and strabismus as observed in other studies.[1-7] Postsurgical complication resulted into glaucoma which was being managed by ophthalmologists. Facial dysmorphism and dental abnormalities are constant features of NHS and they were also observed in this patient.[1-7]

The findings of Hutchinson's incisors and mulberry molars as features of congenital syphilis were observed in this case. However, absence of general features and negative serological report ruled out congenital syphilis.[6,11] The pulp chamber anomaly such as taurodontism, large pulp

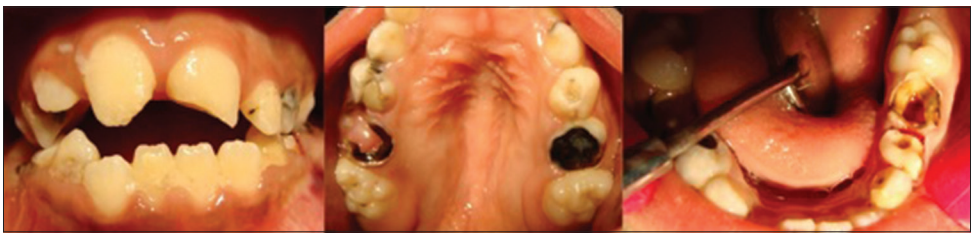

Figure 2: Intraoral photographs showing Hutchinson incisors and mulberry molars

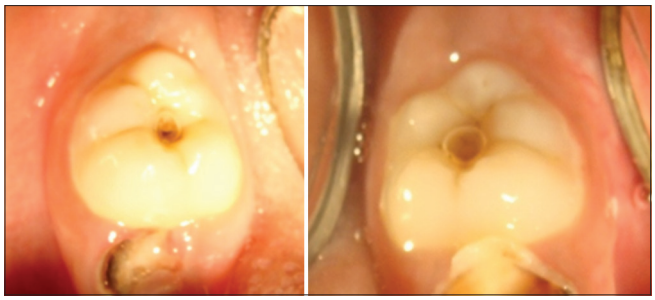

Figure 3: Intraoral photographs – lotus-shaped lower molars

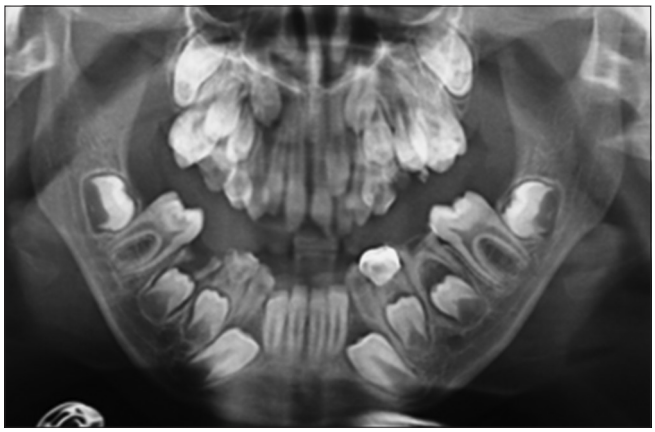

Figure 4: Panoramic radiograph showing crown morphology and pulp chamber anomalies

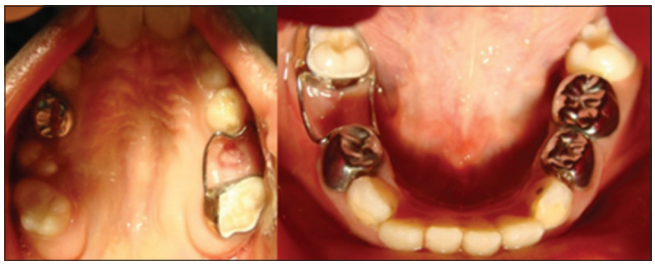

Figure 5: Postoperative intraoral photographs

chambers, and wide radicular pulp in teeth has a high incidence of occurrence in NHS and similar findings were also observed in this case.[1-7]

The diagnosis of NHS has important genetic implications for future offspring because 30% of affected males suffer with intellectual disability in which 80% of individuals have mild disability. However, in few individuals, mental retardation is profound with autistic features.[6,8] This patient had mild intellectual disability which is evident from his IQ score. Early prenatal diagnosis can be achieved in cases of at-risk families with multidisciplinary approach including clinical and molecular geneticists, ophthalmologists and ultrsonologists.[6,13]

Conclusion

This case demonstrates the role of oral health-care professionals for increased awareness of many congenital and hereditary syndromes with dentofacial anomalies for early diagnosis and management. Dentofacial features are often the most obvious sign of an underlying syndrome, and this may have important implications for the health of patients and their potential future offspring. Treatment requires the coordinated efforts of a team of specialists, such as pediatricians, ophthalmologists, pedodontists, orthodontists, maxillofacial surgeons, and other health-care professionals. Genetic counseling can be of great help for affected individuals, at-risk females, and their families. Ocular and intellectual impairment requires education in special schools for visually and intellectually impaired children.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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