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Natal & Neonatal Teeth

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Outline

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- Definitions and nomenclature
- History
- Prevalence
- Etiology
- Clinical presentation and classification
- Histology and ultrastructure
- Complications
- Diagnosis and differential diagnosis
- Management
- Conclusion

Definitions

- **Natal Teeth** are teeth **present in the oral cavity of the infant** *at the time of birth* Massler and Savara, 1950

- **Neonatal teeth** are teeth which **erupt *during the neonatal period*** (from birth to 30 days) Massler and Savara, 1950

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- **Early infancy teeth** are teeth which erupt **within *one to three and a half months* of life** Spouge and Feasby, 1966

- **Precocious Teeth** are teeth which **erupt during the *third to fifth month* of life**

Bodenhoff and Gorlin, 1963

Nomenclature

- Congenital teeth
- Fetal teeth
- Infancy teeth
- Pre-deciduous teeth
- Dentitia praecox
- Dens connatalis
- Precocious dentition

(Zhu and King, 1995; Mayhall, 1967; Kates et al. 1984)

History

- Natal and neonatal teeth have been a **subject of curiosity** and study since the time it was first documented by Titus Livius, in 59 BC

- Gaius Plinius Secundus (the Elder), in 23 BC, believed that a splendid future awaited male infants with natal teeth. In females it was considered a bad sign and that they bring disaster to their community

Diverse superstition

• Africa, India, Poland	monstrous and bearer of misfortune
• China	bad omen for girls
• England	grow up into famous soldiers
• France & Italy	future conquerors of the worlds

(Allwright, 1958; Bodenhoff &Gorlin, 1963; Zhu & King, 1995)

History

SUPERSTITION

Prevalence and Incidence

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- Natal teeth are **three times** more common than neonatal teeth

  Rao and Mathad, 2009

- **95%:** true primary teeth; **5%:** supernumerary teeth

  Kates et al. 1984

- The incidence of natal and neonatal teeth has been investigated in multiple studies :
  - 1:716 to 1:30,000 — Zhu and King, 1995
  - 1:2,000 to 1:3,500 — Chow, 1980

Prevalence and Incidence

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Gender predilection

• F > M	Zhu & King, 1995G; Goncalves et al. 1998
• F : M = 66%: 31%	Anegundi et al. 2002
• F = M	Basavanthappa et al. 2011

Site

• Mandibular incisor region (85%)	Gardina, 1961; Bodenhoff & Gorlin, 1963
• Maxillary incisors (11%)	King and Lee, 1989
• Mandibular canine (3%)	King and Lee, 1989
• Maxillary canine and molar (<1%)	King and Lee, 1989
• Multiple neonatal and natal teeth are rare	Ooshima et al. 1986

Aetiology

- **Unknown**
- **Superficial position of tooth germ** in alveolar bone during development (Cunha et al. 2001)
- **Trauma or infection**
- **Osteoclastic activity** within tooth germ area (bone remodelling) (Goncalves, 1998)
- **Hereditary transmission** of an autosomal dominant gene, with a familial trait in 8–62% of cases (Hyatt, 1965; Zhu & King , 1995)
- Certain **syndrome**s and newborns with orofacial clefts (Motoyama et al. 1967)

Aetiology

- **Maternal-related factors**
  - dietary deficiencies (malnutrition)
  - poor maternal health
  - endocrine disturbances: pyelitis and hypovitaminosis during pregnancy
  - excessive secretion of pituitary, thyroid or gonads

    (Khatib et al. 2005; Vucicevic et al. 2007)
- **Febrile state:** increased body temperature can affect the normal eruption of teeth, e.g. fever, exanthemata

  (Massler & Savara, 1959; Vucicevic et al. 2007)
- **Environmental factors**
  - polychlorinated biphenoyls & bibenzofurans ?

    (Yamaguchi et al. 1971; Gladen et al. 1990)

Clinical Presentation

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- Usually **small and conical**
- **May resemble** normal primary teeth in **size & shape**
- Usually have **an immature appearance** with poorly-developed, hypoplastic enamel and dentine
- Usually **occurs in pair**

(Zhu & King, 1995; Galassi et al. 2004; Ziai et al. 2005)

Clinical Presentation

- **May be attached to the mucosa** and are occasionally covered by a pad of soft tissue
- **Absent or poor root development**
- Mostly **mobile**

(Zhu & King, 1995; Galassi et al. 2004; Ziai et al. 2005)

Classification - Spoug & Feasby 1966

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A mature natal or neonatal tooth

- a tooth **which is nearly or fully developed**
- relatively **good prognosis** for maintenance

The immature natal or neonatal tooth

- a tooth **with incomplete or substandard** structure
- implies a **poor prognosis**

Classification - Hebling et al. 1997

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The appearance of each natal tooth in the oral cavity can be classified into four categories given as follows, as the teeth emerge in the oral cavity:

1. Shell-shaped crown

- poorly fixed to the alveolus by the gingival tissue
- absence of a root

2. Solid crown

- poorly fixed to the alveolus by the gingival tissue
- little or no root

Classification - Hebling et al. 1997

3. Eruption of the incisal margin of the crown through the gingival tissue

4. Edema of the gingival tissue with an unerupted palpable tooth

Histology

Enamel (Ndiokwelu et al. 2004, To 1992)

- thin layer of enamel or absence of the enamel
- enamel hypoplasia/hypomineralisation

Dentin (Massler & Savara, 1950; Zhu & King, 1996; Uzamis et al. 1999; Leung & Robson, 2006)

- interglobular dentin in the coronal region
- **irregular dentin** and cell inclusions in the cervical region
- **atypical dentin** (due to the response to irritant stimulus from oral cavity)

(Baumgart & Lussi, 2006)

Histology

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Dentino-enamal junction: not scalloped

Cementum

- lack of cementum and Hertwig's sheath
- acellular cementum in some cases (**thinner than normal**)

Pulp canal and pulp chamber (Howkins 1932, Massler & Savara 1950, Hals, 1957, Clergeau-Guerithault, 1991, Friend et al. 1991)

- **larger** than normal
- **vascularised pulps** along with few inflammatory cells

Roots (Massler & Savara, 1950, Allwright 1958, Leung & Robson 2006)

- **lack of root formation** (despite the tooth is erupted in the oral cavity)

Structural Characteristics

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- **Enamel** of the teeth exhibited hypoplastic, depressed areas, and the incisal edge of natal tooth lacked enamel (Jasmin & Clergeau-Guerithault, 1991)
- **Thickness of enamel** was around 280 microns compared to up to 1200 microns in normal teeth (Uzamis et al.1999)
- **Enamel has normal prism structure and mineralization** (prism structure can be absent in the cervical part of the enamel)
- Cervical and apical **dentin** is tubular
- In developing teeth, the **dentin** in these regions changed to an irregularly formed hard tissue of osteodentin character (in which enclosed cells could be observed) (Masatomi et al. 1991)

Complications

- Dysplastic enamel
- Mobility - potential risk of aspiration
- Difficulty suckling - interfere with feeding
- Traumatic injury to the baby's tongue and/or to the maternal breast
- Riga-Fede disease

Complications

Poor quality enamel

- increased risk of caries
- chipping and attrition
- periapical abscesses

(Allwright, 1958)

Periapical radiolucencies

(Kates et al. 1984)

Mobility

- "[Natal] teeth are **loose and moveable** in the early stages and there is a constant danger of the teeth becoming detached and either swallowed or aspirated, especially during nursing"

  (Brauer et al 1947 as cited by Massler & Savara 1950)

- **No reports of inhalation** of an exfoliated natal tooth

  (Gardiner 1961)

- *"Inhalation of one of these teeth has never been reported in the literature and the danger is probably more imaginary than real"*

  (Spouge & Feasby 1966)

Difficulty Feeding

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- Presence of natal teeth may cause discomfort for the mother when the infant is suckling
  - interfere with feeding
  - ulceration
  - laceration

(Bodenhoff & Gorlin 1963, Massler & Savara 1950)

- Children with normal primary teeth have often been nursed up to 2-3 years of age without complication

(Massler & Savara 1950)

Riga-Fedes Syndrome

- **Benign ulceration of the ventral surface of the tongue** of lingual frenum caused by **repetitive trauma from the sharp incisal edges of teeth** (Choi et al. 2009, Bodenhoff & Gorlin ,1963)
- In infants, the tongue rests between the alveolar processes, causing the ventral surface of the tongue to rest against the incisal edges of natal teeth (Massler & Savara 1950)
- Discomfort, refusal to feed

(Massler & Savara 1950)

Sublingual ulceration of a 27 day old male resulting from natal teeth

(Patil and Dixit 2013)

Systemic Conditions

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- Cleft lip, Palate and cyclopia (Boyd & Miles 1951, de Almeida & Gomide 1996)
- Ellis-Van Creveld (Chondroectodermal Dysplasia) (Weiss, 1955)
- Pachyonychia Congenital (Jadassohn-Lewandowsky) (Bodenhoff & Gorlin 1963, Leung 1986)
- Hallermann-Streiff (Oculomandibulodyscephaly with Hypotrichosis) (Robotta & Schafer, 2011)
- Steatocystoma Multiplex (McDonald & Reed 1976, King & Lee 1987)
- Pierre-Robin
- Pallister-Hall
- Short Rib-Polydactyly (type II)
- Wiedemann-Rautenstrauch (Neonatal Progeria)
- Pfeiffer, Ectodermal Dysplasia, Craniofacial Dysostosis
- Rubinstein-Taybi
- Sotos
- Adrenogenital
- Epidermolysis-Bullosa Simplex including Van der Woude
- Down's Syndrome (Ndiokwelu et al. 2004)
- Walker-Warburg Syndromes (Venkatesh and Adhisivam, 2011)

Diagnosis

- History
- Clinical examination
- Radiograph ?

Differential Diagnosis

- Supernumerary teeth (Zhu & King, 1995)
- Bohn's nodules (Leung and Robson, 2006)
- Dental lamina cysts (gingival cyst of newborn) (Leung and Robson, 2006)
- Inclusion cysts (Kumar et al. 2008)
  - Congenital epulis
  - Odontogenic hamartomas
- Lymphangiooma of the alveolus

(Leung, 1986; Leung and Robson, 2006)

Bohn's nodules

Congenital epuli

Eruption cyst

Radiographs

What can you see?

When does calcification of primary incisors begin?

When does calcification of permanent incisors begin?

Radiographs

- A **radiographic verification** of the relationship between a natal and/or neonatal tooth and **adjacent structures, nearby teeth, and the presence or absence of a germ** in the primary tooth area
- Differentiate the **premature eruption of a primary tooth from a supernumerary tooth**
- Provides **information about root development**
- Shows tooth's relationship to underlying structures

(Massler & Savara 1950; Leung, 1986; Almeida al 1997; Cunha et al. 2001)

Radiographs

- ALARA principle…
- Diagnostic quality of radiograph
- Risk / benefit

Management

The treatment planning of these natal or neonatal teeth depends on various factors including:

- **degree of mobility**
- if the tooth is **supernumerary or is part of the normal dentition**
- **inconvenience during suckling**
- problems associated with breastfeeding

- If the erupted tooth is diagnosed as a tooth of the **normal dentition** - **maintenance of these teeth in the mouth is the first treatment option**

(Chow, 1980, Roberts, 1992)

Management

No treatment

- if the tooth is **asymptomatic**
- breastfeeding is not impaired

(Boyd and Miles, 1951)

- Application of a corticosteroid in orabase (such as kenalog) can aid in relieving the symptoms of the ulcer

(Slayton, 2000; Choi et al. 2009)

Management

Grinding

Smoothing of the tooth by grinding should be carried out if tooth is causing

- Mild subgingival ulceration or mild discomfort to the mother
- Trauma to the infant's tongue

Finishing burs, sandpaper disc, soflex disc can be used for smoothing

(Allwright 1958, Choi et al 2009, Slayton 2000)

*Intra oral p*hotograph of 2-month-old girl with tongue ulcer lesion caused by neonatal tooth

Intraoral photograph of the same infant, 1 month after grinding the sharp incisor edge. The lesion was resolved

Choi et al. 2009

Management

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Coverage

- Placed something over the tooth in order to reduce the trauma to the tongue and nipple
- Options are:
  - a smooth rounded composite dome restoration (Goho, 1996; Choi et al. 2009)
  - a breast feeding splint (Bjuggren, 1973)
  - stomahesive wafers (Buchannan & Jenkins, 1997)

Management

Coverage - Composite build-up

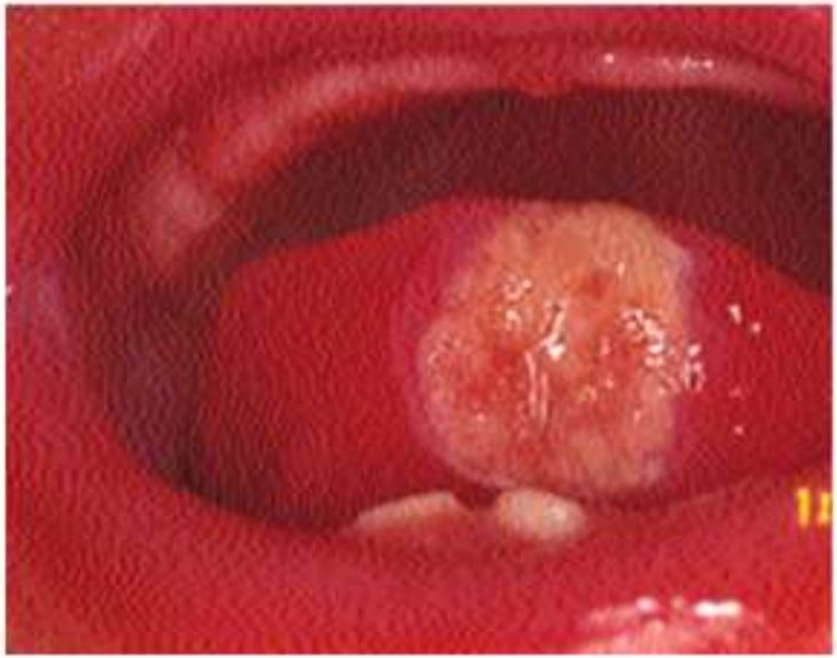
Initial photograph of 8 month old boy with a sublingual ulcer caused by primary lower anterior teeth

Final photograph 2 months after a resin composite build up was placed on the teeth

Choi et al 2009

Management

Coverage -Stomahesive Wafer



Partially erupted neonatal deciduous lower central incisors with associated ulcer on the ventral surface of the tongue

Stomahesive Wafer placed over neonatal deciduous lower central incisors protecting tongue from further trauma

Buchanan and Jenkins, 1997

Management

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Extraction - Indications

- Extraction is not contraindicated for any other clinical reasons (Mhaske et al. 2013)
- If the tooth is confirmed **supernumerary** through radiographs (Mhaske et al. 2013)
- **Excessive mobility**: risk of spontaneous exfoliation and consequent aspiration (Allwright, 1958; Kates et al. 1984)
- The tooth is **unsuitable to retain** due to severe dysplasia (Coho, 1996)
- The tooth **developed an abscess or pulpal hyperplasia** (Coho, 1996)
- Tooth **interfering with the pre-surgical orthopaedic or surgical phase** of oral cleft management (Ziai et al. 2005)
- **Severe sublingual ulceration** which is seriously interfering with feeding and the **child is severely malnourished or dehydrated** (Allwright, 1958; Slayton, 2000; Choi et al. 2009)

Management

13-day-old female infant with neonatal teeth.

Postoperative haemostasis achieved

Khandelwal et al. 2013

Extracted natal teeth with no root development

Management

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Extraction – Precautions

If the treatment option is extraction only, certain precautions should be taken :

- Considering the **general health condition of the infant** prior to extraction
- **Avoiding extraction up to the 10th day** of life to prevent hemorrhage **?**
- Assessing the need to **administer vitamin K before extraction** (0.5-1.0 mg IM)
- **Avoiding unnecessary injury** to the gingiva
- **Socket should be curetted following extraction** to prevent continued development of the cells of the dental papilla

(Leung & Robson 2006, Zhu & King 1996)

- Being **alert to the risk of aspiration** during removal

Management

Extraction – complication

- **Potential increased risk of space loss** following extraction

- **Gardiner, 1961** reported 9 cases with space loss following extraction of natal teeth, however the space was regained when the permanent teeth erupted

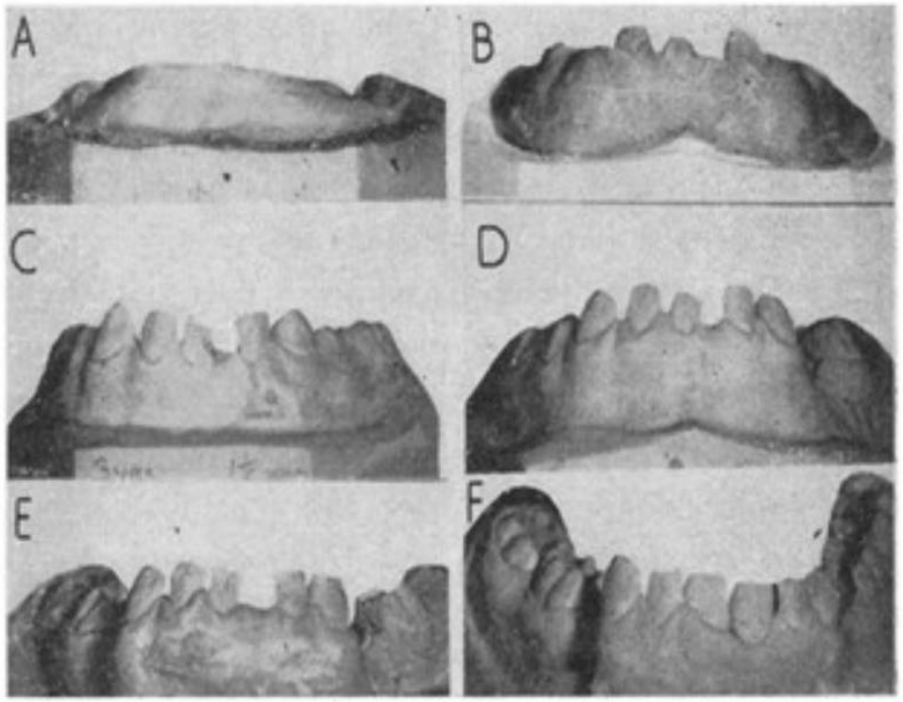

Fig 2 *Models showing the closing of incisal space (measured between $\overline{B|}$ and $|\overline{B)}$ following the loss of $|\overline{A}$ and also the opening of this space at 5 years.* A, *aged 4 months – 0 mm;* B, *aged 1½ years – 9 mm;* C, *aged 3 years – 7 mm;* D, *aged 5¼ years – 7·5 mm;* E, *aged 6½ years – 8 mm;* F, *aged 7½ years – 12 mm*

Gardiner, 1961