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Tooth Discoloration in Children- Review Article

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Abstract

Tooth discoloration in children is a common dental concern where a child's tooth or teeth lose their natural white hue, turning creamy ivory, yellow, brown, or gray. Change in tooth color indicates a problem. However, rest assured that not all tooth or teeth color changes indicate a problem. Yet, knowing about tooth discoloration in detail can end the parent's apprehensions and help us to stay informed about the various reasons for a child's tooth or teeth to change color. This review article throws light on the possible causes of tooth discoloration, its treatment, and effective prevention.

Keywords: Tooth Discoloration, Fluoride, Genetic factors.

Introduction

Tooth discoloration varies with etiology, appearance, localization, severity and adherence to the tooth structure.



Figure 1

Tooth Discoloration

Tooth discoloration is defined as "any change in the hue, colour, translucency of a tooth due to any cause restorative filling materials, drugs, pulpal necrosis, haemorrhage may be responsible.

Seven Reasons Behind Tooth Discoloration In Children

Fluoride Consumption

Fluoride is an essential mineral that helps reduce tooth decay and can strengthen tooth enamel. It's a natural

ingredient in a variety of foods and drinks, including the water supply. However, it's possible for infants and young children to receive too much fluoride.

If we frequently mix powdered or liquid baby formula with fluoridated water, it's possible for the child to develop fluorosis. This condition occurs due to overexposure to fluoride, and we might notice white lines, streaks, or brown spots on child's teeth.

Not Brushing Properly

Inadequate brushing habits are a common cause of tooth discoloration and stains in children. If a child doesn't properly care for their baby teeth, plaque bacteria can quickly accumulate, leading to stains and discoloration. Plaque can adhere to stains from foods and drinks, and it can quickly develop into a hardened deposit called plaque, which is typically brown or yellow in color.

Taking Certain Medications

Medications or supplements containing iron can cause dark stains to develop on a child's teeth. Antibiotics and antihistamines can also discolor child's teeth, leading to yellow or gray stains. Mothers who take antibiotics during pregnancy or while breastfeeding, particularly tetracycline, can increase their child's risk of having discolored or stained teeth.

Tooth Injury

If a child sustains a tooth injury, blood vessels within the center of the tooth can rupture. This can make the child's teeth appear black, gray, yellow, or brown in color. A tooth that suddenly appears much darker in comparison to the surrounding teeth can indicate tooth trauma or injury.

Medical Conditions or Illness

If a child was born with a condition called hyperbilirubinemia, a medical condition that develops when bilirubin levels in the blood are too high, they may have teeth that appear green or yellow in color. And,

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although rare in children, stained teeth can also be a sign of jaundice.

Thin Enamel

Genetic factors that negatively affect the development of tooth enamel are another cause of tooth discoloration in children. This can lead to tooth enamel that is weaker or thinner than normal, which may expose the dentin layer underneath. As a result, the child's teeth may appear yellow in color.

Diet

Child's diet can also contribute to tooth staining. If the child drinks a lot of acidic beverages or frequently consumes foods and drinks high in sugar, such as soda, popsicles, and juices, they're at a greater risk of developing tooth stains. Acidic drinks and foods can gradually wear away tooth enamel. This can result in dull, discolored teeth that appear yellow or gray. Sugary foods and drinks can also increase the child's risk of developing tooth decay, which can cause teeth to appear brown or dark in color.

Classification of Tooth Discoloration¹:

Most commonly followed classification which was given by (Dayan et al 1983, Hayes et al 1989)-Based on location of discoloration,

Extrinsic Stains	Intrinsic Stains		
These are located on the	These are located on		
outer surface of the teeth.	internal surfaces of the		
	teeth.		
These are common and it	It may be result of		
may be result of various	various causes,		
causes,	• Hereditary		
• Poor oral hygiene	disorders		
• Existing restoration	• Medications		
Gingival bleeding	• Excess fluoride		
• Plaque and calculus	o High fever		
	associated with		

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	accumulation		early childhood
•	Eating habits(Eg: Tea,		illness, other types
	Coffee stains, etc)		of trauma
•	Tobacco chewing habit	0	Staining may be
•	Chromogenic bacteria		located in enamel
•	Mouthwashes		and dentin
	(Eg:chlorhexidine)		

Based on owing to patient – or dentist – related causes (Ingle),



Based on surface area or number of teeth involved,

Localised	Generalised	
Non-vital tooth	Tetracycline	
Amalgam blues	Fluorosis	
• Turner's hypolplasia	• Tobacco stains, Tea	
• Localised area of dys-	and Coffee stains	
mineraslization	• Ageing, generalised	
	yellowish	
	discoloration	

Extrinsic Stains

Extrinsic stains are caused by agents which are deposited in enamel defects or become attached to the enamel without bringing out a change in its surfaces.



Figure 2

Bacterial Staining

Green \ **Orange Stains:** They are usually in cervical and gingival areas of tooth. They are more common in mouth breathers and young persons. They occur more readily on the labial surface of the maxillary anterior teeth.



Figure 3

Black Stains

The stain may be seen as a line following the gingival contour or it may be apparent in a more generalised pattern on the clinical crown. If it is collects in pitted areas, it is difficult to remove. Black staining can also be caused by iron supplements.



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Figure 4

Yellow Stains

Yellow stains are usually caused by beverages\foods, due to bile pigments from gingival crevicular fluid.



Figure 5

Brown Stains

Brown stains in arrested caries are usually caused by Chromogenic bacteria(Actinomyces, Prevotella melaninogenic, Prevotella intermedia, Prevotella nigrescens, P.gingivalis). Discolouration is due to subsurface decalcification with intact surface.



Figure 6

Mouthwash (Chlorhexidine)

Usage of chlorhexidine mouthwash sometimes causes yellowish brown to brownish stain.





Restorative Materials

Amalgam Staining: Leakage of old amalgam restoration causes discolouration around the restoration. It mostly occurs in younger patients who have open dentinal tubules. Large class II proximal restoration of posterior teeth and deep lingual metallic restoration on anterior incisors significantly stain the underlying dentin and produce grevish discolouration.



Figure 8

Intrinsic Stains

An intrinsic tooth stain is staining below the surface of the tooth. It occurs when stain causing particles pass through the exterior of the tooth and accumulate within the tooth enamel.



Figure 9

Dentinogenesis Imperfecta

It is an inherited disorder of dentin. Dental manifestations are bluish brown discolouration or opalescence, pulpal obliteration, relatively bulbous crowns, short narrow roots.

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Figure 10

Amelogenesis Imperfecta²

It can be classified into,

- o Hypoplastic A.I
- o Hypomineralized A.I
- Hypocalcified A.I
- > Enamel may be rough, smooth, or randomly pitted.
- Enamel is thin and yellow to brown in colour.



Figure 11

Turner's Hypoplasia

It is a developmental defect characterised by yellow brown\white stains. Enamel defects seen in permanent teeth are caused by periapical inflammatory disease of the overlying deciduous tooth. The altered tooth is called Turner's tooth.



Figure 12 Hyperbilirubinemia

It is a condition in which there is a increased bilirubin in blood, causing green – blue stains. It is seen in children with end stage liver disease and premature infants. Common disorders that cause this intrinsic staining are erythroblastosis fetalis and biliary atresia.

Erythroblastosis Fetalis

It leads to Rh-incompatibility, causes anaemia and jaundice due to red cell destruction which in turn leads to hyperbilirubinemia.



Figure 13

Fluorosis

The mildest form of fluorosis is manifest as hypomineralization of the enamel, leading to opacities. The opacities range from tiny white flecks to confluent opacities throughout the enamel, making the crown totally lacking in translucency. Usually only permanent dentition is affected.³

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Figure 14 Medications Tetracycline

- Discolouration is noticed in children who have received tetracycline therapy during the period of calcification of primary or permanent teeth.
- Tetracycline chelate calcium salts and so incorporated into bones and teeth during calcification.
- Tetracycline adm. during pregnancy can be transferred through the placenta and cause discolouration.



Figure 15

Treatment Options

- Scaling
- Micro-abrasion
- Macro-abrasion
- Veneers
- Ceramic crowns
- Bleaching

Micro abrasion

Micro-abrasion technique involves the physical removal of tooth structure and does not remove stains or defects through any bleaching phenomena. Fluorosis stains can also be removed by microabrasion, if the discoloration is within the 0.2-0.3mm removal depth limit. Treated area are polished with a fluoride containing paste to restore surface lustre and enhance re-mineralization.

Macroabrasion

Macro-abrasion is an alternative for removal of localized superficial white spots and other surface stains or defects. It uses a 12-fluted composite finishing bur or a fine grit finishing diamond in a high-speed handpiece to remove the defect. Air- water spray is recommended as coolant and also to maintain the tooth in hydrated state to facilitate assessment of defect removal.



Figure 16

Veneers

It is a layer of tooth-coloured material that is applied to a tooth surface to restore localized or generalised defects

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and intrinsic discolorations. Common indications – Facial surfaces that are malformed, Discoloured, Abraded or Eroded or Faulty restorations. Several factors should be evaluated before pursuing full veneers as treatment options – For examples: Patient's age, Occlusion, Tissue health, Position and Alignment of teeth and oral hygiene.

Based on material, it can be classified as-Composite, Porcelain, Ceramic materials.



Figure 17 Bleaching

The lightening of the colour of a tooth through the application of a chemical agent to oxidize the organic pigmentation in the tooth is referred to as bleaching. Bleaching will lighten teeth and the degree of lightening varies with the individual. Teeth that tend to be yellow in colour are the easiest to lighten and give the best results. Darker teeth may need more time to lighten but virtually all cases involving bleaching can have positive results. Whitening offers a conservative, simplified, economical approach to changing the colour of teeth. As a result, tooth whitening has become one of dentistry's most popular esthetic treatments.

Bleaching Agents

The most commonly used peroxide compounds,

- Hydrogen Peroxide
- Sodium Perborate

- Carbamide Peroxide
- Hydrogen Peroxide and Carbamide Peroxide (Extra-coronal)
- Sodium Perborate (Intra-coronal)

Conclusion

Unlike olden days, dentistry in this era has various options to treat discoloured teeth. Today dental markets are full of various teeth whitening products. But which procedure or technique is suitable to treat which type of discolouration that is a big responsibility on dentist's shoulder. Therefore proper evaluation of discoloured teeth and then selecting appropriate option to treat it plays a key role in success of treatment. To conclude, for a desired and favourable outcome a thorough knowledge of etiology, treatment options, products and its properties is supreme demand.

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