

# Tooth Discoloration-A Review

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**Abstract:** Tooth colour has esthetic importance since it is visible during speech and smile. It plays a major role in overall smile of an individual. This review discusses the various causes of tooth discoloration.

**Keywords:** Tooth discoloration, extrinsic stain, intrinsic stain

## 1. Introduction

Tooth color is dependent on the reflectance and absorbance properties of the tooth, which are influenced by the structures of the tooth (enamel, dentin, pulp). Any changes that effect these structures before or after eruption will result in tooth color change and hence tooth discoloration [1].

## 2. Etiology

Tooth discoloration can be divided into two main groups: intrinsic stains and extrinsic stains. Intrinsic stains could be due to metabolic, inherited, iatrogenic, traumatic, idiopathic, or ageing causes. Metabolic disorders such as alkaptonuria and congenital erythropoietic porphyria may cause tooth discoloration. Alkaptonuria is an inborn error of metabolism that results in a brown discoloration of the permanent dentition [2], whereas congenital erythropoietic porphyria gives a red purple–brown discoloration of teeth [3].

## 3. Intrinsic stains

Amelogenesis imperfecta and Dentinogenesis imperfecta are examples of inherited causes of tooth discoloration. Amelogenesis imperfecta is presented in different forms; teeth in the mild form are yellowish to brown with thin, hypoplastic enamel. The darker the tooth, the more severe the hypomineralization of the enamel. Dentinogenesis imperfecta is characterized by opalescent primary teeth; this condition affects primary teeth more than permanent teeth. Teeth are grey to purple–blue in color or opalescence [4]. Iatrogenic causes of tooth-discoloration include tetracycline drugs that are administered systematically either by taking the drug or through mothers breastfeeding their children. The severity of the stain is dependent on the age of the person, amount of drug intake, and exposure time. Teeth generally look worse immediately after eruption, and discoloration tends to lessen after that due to photo-oxidation (exposure to light). These teeth exhibit a yellow or brown–grey discoloration [5]. Another cause of discoloration is fluorosis, which may be due to the natural occurrence of fluoride in water, toothpaste, or tablets. Teeth are characterized by a chalky, white enamel or dark brown color, depending on the severity [6]. One of the most common causes of intrinsic tooth discoloration is trauma, which is believed to be due to accumulation of hemoglobin molecules in the traumatized tooth. Enamel hypoplasia is another cause of intrinsic staining that is believed to be due to disturbance to the tooth germ following trauma [7]. Molar incisor hypomineralization is a condition of unknown etiology that affects 1st molars and incisors. Teeth are characterized by enamel loss and discolorations

that may vary from white, yellow or brown areas [8]. Color changes associated with aging could be due to thinning of enamel and thickening of the deposition of dentin as teeth age and become darker and more yellow [9].

## 4. Extrinsic stains

Extrinsic tooth discoloration is another major category of tooth discoloration. This type is more manageable than intrinsic tooth discoloration and commonly occurs with age, where it is more prevalent in men than women [10]. Dietary components, beverages, tobacco and mouth rinses causes non-metallic stains, which are adsorbed onto the tooth surface deposits such as plaque. In children with poor oral hygiene, primary teeth may present with green and yellowish-orange stains mainly caused by bacteria in bacterial plaque. These types of stains are usually found on the buccal surface of teeth. Other stains due to bacteria are the dark brown to black discolorations found on the cervical portion of primary teeth; in this case, patients exhibit a low caries rate with fair oral hygiene [11]. Metallic stains most commonly occur with exposure to metallic salts [12], and may be manifested as a black stain caused by iron supplements. Green stain is caused by mouth rinses containing copper [13]. Other metals have associated colors such as potassium permanganate producing a violet to black color when used in mouth rinses; silver nitrate salt used in dentistry causes a grey color [14]. Moreover, stannous fluoride causes golden brown discoloration. It is believed that that the mechanism of the metallic stain process is due to the production of sulphide salt of the specific metal involved. In fact, the extrinsic stain coincides with the color of the sulphide of the metal concerned. However, strong evidence for the chemical process necessary to produce the metal sulphide is lacking [15]. Brown stains are a very common type of stain that is bacteria free; these stains are usually due to a thin pigmented pellicle which is found most commonly on the buccal surface of maxillary molars and the lingual surfaces of lower anterior teeth. This type of stain is believed to be caused by the deposition of tannin found in chromatic beverages and is generally associated with poor oral hygiene and improper brushing [16]. Tobacco stains usually mask the gingival portion of the tooth and mainly occupy enamel defects. They manifest as a dark brown/ black discoloration, mainly caused by deposition of the coal tar with the possibility of enamel penetration [17]. This stain does not entirely depend on the amount of tobacco consumed, but rather the amount of preexisting coating and roughened enamel that will eventually allow tobacco products to adhere [18]. Green stains frequently occur in children, affecting boys more than

girls, and appears as a thick band on the buccal surface of maxillary anterior teeth in the gingival third. Some believe it is a remnant of the primary enamel cuticle. Others suggest it could be due to fluorescent bacteria and fungi. Photo-activation is essential for this type of bacteria which explains their presence on maxillary anterior teeth [16]. Orange stains are the least common type of stain. They occur on the labial surface of the upper and lower anterior teeth, mainly caused by bacteria such as *Serratia marcescens* and *Flavobacterium lutescens* and are usually associated with poor oral hygiene [17].

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