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REVIEW ARTICLE

Extrinsic stains and management: A new insight

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Abstract

Tooth discoloration is a frequent dental finding associated with clinical and esthetic problems. It differs in etiology, appearance, composition, location and severity. Knowledge of the etiology of tooth staining is of importance to dental surgeons in order to enable a correct diagnosis. The practitioners should also have the basic understanding of the mechanism of stain formation before carrying out any treatment procedures which will facilitate better treatment outcomes. Recently there have been advancements in the various treatment options in this field. This article is a comprehensive review on extrinsic stains and the treatment modalities.

Keywords: Tooth discoloration, esthetic problems, tooth staining, treatment outcomes, extrinsic stains.

Introduction

It is widely recognized that today's youth and appearance oriented culture prizes an attractive smile and white teeth, with sales of whitening products rising dramatically in the past decade. Some of these products are sold as 'over the counter products' and have no professional involvement in their application. The correct diagnosis for the cause of color discoloration is important as, invariably, it has profound effect on treatment outcomes. It would seem reasonable, therefore that dental practitioners have an understanding of the etiology of tooth color discoloration in order to make a diagnosis and enable the appropriate treatment to be carried out (Aryan, 2005). Dental stains differ in etiology, appearance, composition, location, severity and degree of adherence. Attraction of material to the tooth surface plays a critical role in the deposition of extrinsic dental stains. However the mechanism that determines the adhesion strength is not completely understood (Tirth *et al.,* 2009).

Normal variations in tooth color: A basic understanding of the elements of tooth color is important for many aspects in dentistry. Teeth are typically composed of various colors and a gradation of color occurs in an individual tooth from gingival margin to the incisal edge of the tooth. Near the gingival margin, tooth often has a darker appearance because of close approximation of the dentine below the enamel. In most people canine teeth are darker than central and lateral incisors and young people characteristically have lighter teeth, particularly in the primary dentition. Teeth become darker as a physiological age change; this may be partly caused by laying down of secondary dentin, incorporation of extrinsic stains and gradual wear of enamel allowing a greater influence on color of the underlying dentine. Also and tooth wear and gingival recession can directly or indirectly affect tooth color. The science of color is important in dentistry with regard to color perception and description, and can be improved with training.

The viewing conditions are extremely important and variables such as the light source, time of day, surrounding conditions and the angle of tooth viewed affects the apparent tooth color. Light is composed of differing wavelengths and the same tooth viewed under different conditions will exhibit a different color, a phenomenon known as metamerism (Watts and Addy, 2001).

Classification of tooth discoloration

Intrinsic discoloration: Intrinsic discoloration occurs following a change to the structural composition or thickness of the dental hard tissues. The normal color of teeth is determined by the blue, green and pink tints of the enamel and is reinforced by the yellow through the brown shades of dentine beneath. A number of metabolic diseases and systemic factors are known to affect the developing dentition and cause discoloration as a consequence. Local factors such as injury are also recognised.

1. Alkaptonuria.
2. Congenital erythropoietic porphyria.
3. Congenital hyperbilirubinaemia.
4. Amelogenesis imperfect.
5. Dentinogenesis imperfect.
6. Tetracycline staining.
7. Fluorosis.
8. Enamel hypoplasia.
9. Pulpal haemorrhagic products.
10. Root resorption.
11. Ageing.

Extrinsic discoloration: Extrinsic color discoloration is outside the tooth substance and lies on the tooth surface or in the acquired pellicle.

The origin of the stain may be:

1. Metallic.
2. Non-metallic.

Table 1. Types of stains, source, appearance and common sites.

Types of stains	Source and predisposing factors	Appearance on the tooth surface	Common sites
Brown stain	The color is due to tannin. Intake of coffee and tea. Causes-insufficient brushing. Inadequate cleansing action of dentifrice. Chromogenic bacteria.	Thin, translucent, acquired bacteria free pigment pellicle.	(1) Buccal surface of maxillary molars. (2) Lingual surface of mandibular incisors.
Black stain	(1) Coal tar combustion products due to smoking. (2) Penetration of pits and fissures, enamel and dentine by tobacco juices. Iron containing oral solutions. Exposure to iron, manganese, silver.	These are tenacious dark brown or black with brown discoloration.	(1)Involves all the teeth. (2) Common on pits and fissures.
Black stain	More common in woman, may occur in excellent oral hygiene. High tendency for recurrence: (1) Associated with low incidence of caries in children. (2) Chromogenic bacteria-e.g. Gram positive rods-Actimomyces species *Bacteriodes melaninogenicus*. Iron containing oral solutions.	This is a thin black line, firmly attached on tooth surface.	(1) Near the gingival margin of facial and lingual surface of a tooth. (2) Diffuse patch on the proximal surface may be seen.
Orange stain	Chromogenic bacteria *Serratia marcescens, Flavobactraium lutescens*. Exposure to chromic acid fumes in factory workers (Manuel *et al.,* 2010).		Both facial and lingual surface of anterior teeth.
Green stain	Children are frequently affected due to inadequate daily plaque removal, chromogenic bacterial deposits or decomposed hemoglobin. (i)Fluorescent bacteria- Penicillium. (ii)Fungi-Aspergillus. (iii) Associated with children with T. B. or cervical lymph node. 3) Copper salts in mouth rinse (Manuel *et al.,* 2010). 4) Exposure to copper and nickel in the environment in factory workers (Manuel *et al.,* 2010).	These are green or greenish yellow stains of considerable thickness. This type of stain is considered as stained remnants of enamel cuticles.	Facial surface of maxillary anterior teeth.
Metallic stain	This type of stain is caused by metals and metallic salts. Metals are penetrated into tooth substances and produces permanent decolonization or they bind with pellicle and produce surface stain. *Source of metals:* (I) Introduction of metals into oral cavity. (II) Metal containing dust inhalation by worker. (III)Oral administration of drugs.	Some metals that cause's stains: Copper dust-Green stain Iron dust-Brown stain Magnesium-Black stain Silver- Black stain Iodine- Black stain Nickel- Green stain. Metal penetrating into tooth substance causes permanent discoloration where as that bind with pellicle causes surface stain (Manuel *et al.,* 2010).	Generalised appearance on all the teeth.
Yellowish brown stains	Chlorhexidine has affinity for sulfate and acidic groups such as those found in pellicle, plaque constituents, carious lesion and bacterial cell wall. So it is retained into oral cavity and stained oral tissues (Manuel *et al.,* 2010).	Yellowish brown to brownish. The stains are not permanent in nature. It can be removed with proper brushing with dentifrice.	(i)Cervical and interproximal area of the teeth. (ii) Plaque and other restorations. (iii) Dorsum of tongue.
Yellow	Essential oil and phenolic mouth rinse (Manuel *et al.,* 2010).		
Golden brown stains	Due to use of stannous fluoride (Mosby's Dental Dictionary, 2008).		
Violet to black	Presence of potassium permanganate in the mouth rinses (Manuel *et al.,* 2010).		
Red-black	Use of betel leaves and nuts commonly seen in adults and children in the Eastern Hemisphere, where betel leaves and nuts are used as stimulants (Mosby's Dental Dictionary, 2008).	Thick, hard, dark brown or black extrinsic stain left on the teeth after chewing the leaves of the betel palm (Mosby's Dental Dictionary, 2008).	Facial, lingual and occlusal surfaces of both anterior and posterior teeth.

Internalised discoloration: Internalised discoloration is the incorporation of extrinsic stain within the tooth substance following dental development. It occurs in enamel defects and in the porous surface of exposed dentine. The routes by which pigments may become internalised are:

1. Developmental defects.
2. Acquired defects.
    a) Tooth wear and gingival recession.
    b) Dental caries.
    c) Restorative materials (Manuel *et al.,* 2010).

Extrinsic tooth discoloration: The causes of extrinsic staining can be divided into two categories;

a) *Direct extrinsic tooth staining:* Those compounds which are incorporated into the pellicle and produce a stain as a result of their basic color.
b) *Indirect extrinsic tooth staining:* Those which lead to staining caused by chemical interaction at the tooth surface.

Direct extrinsic tooth staining has a multi-factorial aetiology with chromogens derived from dietary sources or habitually placed in the mouth (Fig. 1). These organic chromogens are taken up by the pellicle and the color imparted is determined by the natural color of the chromogen. Tobacco smoking and chewing are known to cause staining, as are particular beverages such as tea and coffee (Fig. 2 and 3). The color seen on the tooth is thought to be derived from polyphenolic compounds which provide the color in food (Pearson, 1976). Indirect extrinsic tooth staining is associated with cationic antiseptics and metal salts. The agent is without color or a different color from the stain produced on the tooth surface. Interest in the mechanisms of extrinsic tooth staining was rekindled in 1971 with the observation by Flotra *et al*. (1971) that tooth staining increases with the use of chlorhexidine (Fig. 4).

Classification of extrinsic tooth staining

Extrinsic tooth discoloration has usually been classified according to its origin, whether metallic or non-metallic (Gorlin and Goldman, 1971).

Non-metallic stains: The non-metallic extrinsic stains are adsorbed onto tooth surface deposits such as plaque or the acquired pellicle. The possible aetiological agents include dietary components, beverages, tobacco, mouthrinses and other medicaments. Chromogenic bacteria have been cited in children (Fig. 5 and 6). Particular colors of staining are said to be associated with certain mouths, for instance, green and orange in children with poor oral hygiene and black/brown stains in children with good oral hygiene and low caries experience (Theilade *et al.,* 1973). Conclusive evidence for the chromogenic bacterial mechanism has not been forthcoming. The most convincing evidence for the extrinsic method of tooth staining comes from the differing amount of stain found in a smokers and non-smokers (Ness *et al.,* 1977).

Fig. 1. Stains due to betel nut.

Fig. 2. Smoking stains.

Fig. 3. Tobacco stains.

Fig. 4. Chlorhexidine stains.

Metallic stains: Extrinsic staining of teeth may be associated with occupational exposure to metallic salts and with a number of medicines containing metal salts (Addy and Roberts 1981). The characteristic black staining of teeth in people using iron supplements and iron factory workers is well documented (Nordbo *et al.,* 1982). In a study conducted on school going students of black stain scraping was taken from 5 students and it was subjected to analysis for trace elements. Trace elements analysis was done by (ICP) Inductively Coupled Photo spectrometry. Out of 5 scrapings, 3 showed presence of ferrous ions of about 2.56%, calcium ions 17.15% and magnesium ions 0.72%, while the remaining 2 samples showed calcium 14.86%, magnesium ions 0.82% and no presence of ferrous ions (Tirth *et al.,* 2009). Copper causes a green stain in mouthrinses containing copper salts (Waerhag *et al.,* 1984) and in workers in contact with the metal in industries (Dayan *et al.,* 1983) (Table 1).

A number of 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, and stannous fluoride causes a golden brown discoloration (Ellingsen *et al.,* 1982). It was previously thought that the mechanism of stain production was related to the production of the sulphide salt of the particular metal involved (Moran *et al.,* 1991). This is perhaps not surprising since the extrinsic stain coincided with the color of the sulphide of the metal concerned. However, those proposing the hypothesis appeared not to consider the complexity of the chemical process necessary to produce a metal sulphide. As mentioned earlier the interest aroused by the staining noted with use of chlorhexidine mouth rinse has prompted renewed interest in the mechanism of stain formation. For this reason most of the research into stain formation has been carried out on chlorhexidine, although there are other antiseptics which cause staining to a lesser extent and the mechanism proposed could be applicable to staining found with polyvalent metals. The characteristic staining of the tongue and teeth noted by Flotra and co-workers in 1971 is not peculiar to chlorhexidine, it has been reported in other cationic antiseptics, the essential oil/phenolic mouth rinse 'Listerine' and following prolonged use of delmopinol mouthrinses (Claydon *et al.,* 1996). There is great individual variation in the degree of staining from person to person, this makes explanation more difficult as it may be caused by intrinsic factors, differences in extrinsic factors or both. No longer accepted theories of stain formation with chlorhexidine include breakdown of chlorhexidine in the oral cavity to form parachloroaniline (Gjermo *et al.,* 1973) and also that chlorhexidine may reduce bacterial activity such that partly metabolised sugars were broken down and then degraded overtime to produce brown-colored compounds (Davies *et al.,* 1970). Most recent debate has centered around three possible mechanisms.

Fig. 5. Orange stains due to chromogenic bacteria.

Fig. 6. Black stains due to chromogenic bacteria.

Non-enzymatic browning reactions: Berk (1976) suggested that the protein and carbohydrate in the acquired pellicle could undergo a series of condensation and polymerisation reactions leading to colordiscoloration of the acquired pellicle. Chlorhexidine may accelerate formation of the acquired pellicle and also catalyze steps in the Maillard reaction (Yates *et al.,* 1993). Observation of furfurals, intermediate products in Maillard reactions, in brown-discolored pellicle has lent support to the theory (Nordbo, 1977), but the evidence is inconclusive (Eriksen *et al.,* 1985). Moreover, these authors did not consider at all the same staining phenomenon observed with the numerous other antiseptics.

The formation of the pigmented sulphides of iron and tin: this theory suggests that chlorhexidine denatures the acquired pellicle to expose sulphur radicals. The exposed radicals would then be able to react with the metal ions to form the metal sulphide. Warner and coworkers have shown increased levels of iron in chlorhexidine treated individuals compared with water controls, no evidence was shown for tin (Warner *et al.,* 1993). They then went on to conclude that the chromophore was not a sulphide, but a sulphur containing organic compound and metal ion complex and that chlorhexidine promoted the deposition of sulphate proteins. However, somewhat anomalously although the amount of stain and iron levels were increased.

Management of stains

Proper diet and habits: Extrinsic staining caused by foods, beverages, or habits (eg, smoking, chewing tobacco, coffee and tea) is treated with a thorough dental prophylaxis and cessation of dietary or other contributory habits to prevent further staining (Azer *et al.,* 2011).

Tooth brushing: Effective tooth brushing twice a day with a dentifrice helps to prevent extrinsic staining. Most dentifrices contain an abrasive, a detergent, and an anti-tartar agent. In addition, some dentifrices now contain tooth-whitening agents.

Over-the-counter products: Three types of whitening toothpastes are manufactured. The first type, based on use of an abrasive to remove extrinsic stains, has been available for many years (Haywood and Robinson, 1997; Council on Scientific Affairs, 1997). All toothpastes, however, contain some abrasives and are capable of potentially removing stains whether they are labeled "whitening" or not. Toothpastes with a high content of abrasives should not be recommended for daily use. Secondly, the newer whitening toothpastes contain a bleaching agent, such as peroxide, but the Council on Scientific Affairs of the American Dental Association (ADA) does not recommend them for long term use (Hosoya and Johnston, 1989). Lastly, cosmetic toothpastes, containing titanium dioxide, cover extrinsic stains like paint covers a wall and do not change the internal tooth color (Haywood and Robinson, 1997).

Professional tooth cleaning: Some extrinsic stains may be removed with ultrasonic cleaning, rotary polishing with an abrasive prophylactic paste, or air-jet polishing with an abrasive powder (Weaks *et al.,* 1984). However, these modalities can lead to enamel removal; therefore, their repeated use is undesirable (Croll, 1977).

Ultrasonic and sonic scaling: Ultrasonic and sonic scalers are referred to as power-driven scalers. The small, quick vibrations in combination with a water flow give us a whole new level of effectiveness in removal of deposits on the tooth surface. The benefits of ultrasonic scaling include increased efficiency of calculus removal and less need for hand scaling. High vibrational energy generated in the oscillation generator is conducted to the scaler tip, causing vibrations with frequencies in the range of 25,000–42,000 Hz. The amplitude ranges from 10 to 100 µm. Micro-vibration crushes and removes calculus under cooling water. Ultrasonic and sonic scalers vary in their efficiency in removing calculus from the tooth surfaces. Sonic scalers are air-turbine units that operate at low frequencies ranging between 3000 and 8000 cycles per sec (Cps). Tip movement and the effect of root surfaces can vary significantly depending on the shape of the tip and type of the sonic scaler. In general, tip movement is orbital. Sonic scalers provide a simple and inexpensive mechanism. Sonic scalers have a high intensity noise level because of the release of air pressure needed for movement of the tip of the sonic hand-piece (American Academy of Pediatric Dentistry, 2000).

Selective polishing: Selective polishing involves polishing only the areas of stains. In this procedure, the dental auxiliary can select specific teeth to be polished using a prophylactic angle and rubber cup with a fine paste, and can brush the remaining teeth with a toothbrush to remove bacterial biofilm on tooth surfaces. According to the American Academy of Periodontology (2000) and other sources (Mellberg, 1979), polishing for approximately 30 sec with a prophylactic paste containing pumice can remove between 0.6 µm and 4 µm of the outer enamel. The outer surface of the enamel contains a natural component of fluoride, with the highest amount of fluoride concentrated on its surface. When using a prophylactic angle with a prophylactic cup on this enamel-rich surface, the dental assistant may not only remove the fluoride layer, but also introduce a rough surface and/or scratches on the tooth surface, which can contribute to the further harboring of bacteria on these surfaces.

Benefits: Minimises irreversible loss of enamel. Prevents damage to the restorative surfaces requires less time. More time can be spent for patient education.

Prophylactic paste: Prophylactic pastes contain abrasive, water, humectants, binder, sweetener, flavoring and coloring agents. Prophylaxis polishing agents are available in two basic forms: dry powders, also referred to as flours that must be mixed with a liquid (water, fluoride, or mouth rinse) and commercially prepared polishing pastes that are available in bulk or individual unit doses. Dry powders or flours are not graded according to grit, rather they are graded in order of increasing fineness: F, FF, and FFF. Powders or flours with no wetting agent represent the greatest quantity of abrasives that can be applied per unit of time and they create excessive heat. Therefore, the use of dry abrasives or powder on a dry polishing cup is contraindicated due to the potential for thermal injury to natural teeth. The grit of commercially prepared polishing pastes is graded from fine to coarse, based on a standard sieve through which the particles pass (Wilkins, 2009). The types of abrasive particles used in polishing pastes vary among the commercial varieties and from one grit size to another, yet there is no industry standard to define what these terms mean or what size the abrasive particle must be. The types of abrasive particles used in commercial prophylaxis polishing pastes include flour of pumice, aluminum oxide, silicon carbide, aluminum silicate, silicon dioxide, carbide compounds, garnet, feldspar, zirconium silicate, zirconium oxide, boron, and calcium carbonate (Wilkins, 2009).

Others include emery, perlite, and silica. Commercially prepared prophylaxis polishing pastes combine abrasives with a binder, humectants, coloring agent, preservatives, and flavoring agents. Manufacturers generally do not disclose the amount of ingredients in their polishing pastes because the information is proprietary. However, it is general knowledge that pumice and glycerin are the most commonly used ingredients in commercially prepared polishing pastes. Some commercially prepared polishing pastes contain fluoride. Fluoride in prophylaxis polishing pastes is not a replacement for a fluoride treatment (Wilkins, 2009).

Unfortunately, many dental hygienists use whatever type of polishing paste is available on every patient, regardless of the grit size. Even worse is the fact that some dental hygienists subscribe to the "coarse grit theory." The premise for this ill-advised idea is that the use of the coarsest polishing paste available will remove the heaviest amounts of stain as well as the lightest amounts, thus saving time. Providers who polish in this fashion ignore the professionally recommended method of using the polishing grits in a progression of coarse, medium, and fine applications, which is supported by well-established science and is applied not only in health care but in mechanical polishing procedures in a variety of industries. In an ideal setting the progression from coarse to fine paste is best. In clinical practice, if a dental hygienist is using medium grit paste it is best to follow with fine grit. Coarse grit polishing pastes can produce hypersensitivity, rough tooth surfaces, pastes are only needed in situations of heavy stain.

Proof of the widespread use of the "coarse pumice theory" lies in the published sales of coarse grit as the leading selling brand of polishing paste; 80% of polishing paste sales are in coarse grit and 10% are in medium grit. Coarse grit polishing pastes may remove and accelerate staining and the retention of dental plaque and calculus.

Port polisher: Port polisher consisting of orangewood points is helpful in situations when aerosol should not be produced, in abraded cervical areas, or when electricity is not available. However slowness of the procedure and amount of hand strength for instrumentation are its drawback. Although highly abrasive in nature, polishing or finishing strips present an option for inter-proximal areas or line angles but should be cautiously used to avoid cutting of soft tissues.

New options and available evidence

For many years, the most notable advancement in traditional polishing was the introduction of prophy pastes in unit-dose cups. Since then, new formulations of commercial polishing pastes have been added to the polishing armamentarium. For more than a decade, commercial polishing pastes that contain perlite as an abrasive ingredient have been available.

Prophy pastes containing perlite make claims that the abrasive particles break down and become less abrasive under pressure. Scientific evidence supports the fact that the abrasive agents in these products do break down under load (pressure). However, scientific evidence supports the fact that most abrasives in polishing pastes break down under pressure. Amorphous calcium phosphate (ACP) products that include a polishing paste claim to remineralize enamel subsurface carious lesions. These products are missing a body of research in vivo. The current research exists only *in vitro*. Three scientific questions need to be addressed: Is it possible to burnish an ingredient such as ACP into enamel with a polishing product that is abrasive and meant to remove stain? What are the true benefits of ACP or similar products such as casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) over the known remineralization properties of fluoride? Why has fluoride been added to some of these ACP and CPP-ACP products? Polishing paste with calcium sodium phosphosilicate is a new development. Calcium sodium phosphosilicate is a bioactive glass that releases calcium and phosphorus ions rapidly and is currently being incorporated into other dental products. Scientific clinical research is not available to support the claim that this product immediately relieves dentinal hypersensitivity. Some *in vitro* studies of ACP, CPP-ACP, and calcium sodium phosphosilicate-containing products do indicate clinical promise; however, the lack of in vivo research to date is the matter of concern. It will be a leap forward if the additives to polishing pastes can remineralize carious lesions and immediately relieve hypersensitivity on a long-term basis.

There is no doubt that polishing pastes are going through a period of renewal as manufacturers are looking for ways to add remarkably active ingredients to such an inexpensive and easy delivery system. It is challenging, however, for manufacturers to add these novel ingredients while retaining the expected performance of polishing pastes. Hopefully, the future will bring about this much-needed research and the introduction of new products (Litkowski *et al.,* 1997).

Air jet polishing: Air polishing was first introduced to the dental community in the late 1970s as a mechanism to quickly and easily remove extrinsic stain and soft deposits. It also helps minimize hand, wrist, neck and eye fatigue like a cavitron tip, by helping to remove stain quicker than scaling and polishing the conventional way. Air polishing uses a water soluble sodium bicarbonate mixture to help in the removal of stain and plaque during a routine hygiene appointment. Air polishing is great to help in the removal of stain due to smoking, coffee, tea, chlorhexidene and other extrinsic factors. Aluminum trihydroxide is an alternative solution to the sodium bicarbonate for patients, they are sodium restricted and have heavily stained enamel. Avoid use on dentin, cementum and restorative resins.

Use of the air polisher for stain removal involves three steps: patient selection and preparation, clinician preparation, and the actual clinical technique. Air polishing should follow a careful review of the patient's medical and dental history, and a thorough examination of the oral hard and soft tissues. Indications and contraindications, effects on hard tissues, restorations, safety, and alternative uses should be reviewed prior to treatment planning the use of the air polisher. Preparation of the patient should include an explanation of the procedure, removal of contact lenses, an anti-microbial rinse, application of a lubricant to the lips, placement of safety glasses or a drape over the nose and eyes, and placement of a plastic or disposable drape over the patient's clothing. Operators should use universal precautions, including protective apparel, a face shield or safety glasses with side shields, gloves, and a well-fitting mask with high-filtration capabilities. The actual air polishing technique includes proper patient and operator positioning for adequate access and direct vision, use of high-speed suction if an assistant is available, or use of the saliva ejector and aerosol-reduction device when working alone. The suction orifice of the saliva ejector should be as close as possible to the tip. It also may enhance patient comfort if moistened 2x2 gauze square is placed over the tongue or lip in the area being polished. Rapid, sweeping strokes are recommended, with the tip directed at a 60° angle to the tooth for anterior teeth, 80° for posterior teeth, and a 90° for occlusals. Cupping the lip with the forefinger and thumb allow the water to pool in the vestibule for easier evacuation and minimal aerosol dispersion. Polishing two to three teeth at a time by fully depressing the foot pedal, then rinsing the teeth and tongue by pressing the foot pedal half way increases efficiency and minimizes the saline taste. A systematic approach to polishing all teeth will increase efficiency. Polishing for five seconds or less per tooth is usually adequate to remove most of the stains.

Conclusion

Tooth discoloration is a frequent dental findings associated with clinical and esthetic problems. It differs in etiology, appearance, composition, location and severity. Knowledge of the etiology of tooth staining is of importance to dental surgeons in order to enable a correct diagnosis to be made when examining a discolored dentition and allows the dental practitioner to explain to the patient the exact nature of the condition. In some instances, the mechanism of staining may have an effect on the outcome of treatment and influence the treatment options the dentist will be able to offer to patients. Dental auxiliaries must use good judgment when considering coronal polishing and practice preventive procedures as the standard of care, which means that treatment must be individualized. Patients may not be aware of the effects of rubber-cup polishing on the enamel, so it is the job of the dental assistant to educate patients on the philosophy of polishing based solely on need.

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