

Cosmetic Dentistry: An Overview

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ABSTRACT

Modern day dentistry is much more advanced as it focuses both on the pain, discomfort as well as the increasing demand of the youths towards fashion and trends. To stand out different and do something "out of the box" this generation has found different aesthetic ways to make their smile shinier and recognizable. This article discuss about such fashionable trends both invasive and non-invasive and also about their complications. Some of these are present since many years and are practiced on large scale around the globe. Some are said to have cultural values and some were performed as a rite of ownership. Non-invasive techniques involves tooth gems, twinkles/studs, tooth tattoos, tooth rings and dental grills whereas invasive procedures involves oral piercing in which there are tongue piercing, tongue splitting, lip and cheek piercing and lip surgical procedures in which there are lip reposition, lip reduction and lip augmentation. In non-invasive technique no soft tissue is involved and there is no blood loss either. On the other hand invasive one involves soft tissue and there is loss of blood also. Many advance techniques and materials are developed over the decades to reduce complications but some of complications are very difficult to reduce. Though these are thought to add more bling to the smile, there is nothing as beautiful as natural. As it is said by Ashokha-"Natural beauty remains longer than artificial settings." But as a millennial generation we are also more attracted and fascinated by such things. All the topics are discussed below along with their complications.

Key words: Tooth gems, Twinkles/tooth studs, Tooth tattoos, Tooth rings, Dental grills, Tongue piercing, Tongue splitting, Lip and cheek piercing, Lip reposition, Lip reduction, Lip augmentation.

HOW TO CITE THIS ARTICLE: Namrata Mantri, Bhairavi Kale, Shriya Singi, Akash Sibal, Cosmetic Dentistry: An Overview, J Res Med Dent Sci, 2022, 10 (9): 113-120.

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Received: 23-Jun-2022, Manuscript No. JRMDS-22-50032;

Editor assigned: 27-Jun-2022, Pre QC No. JRMDS-22-50032 (PQ);

Reviewed: 11-Jul-2022, QC No. JRMDS-22-50032;

Revised: 24-Aug-2022, Manuscript No. JRMDS-22-50032 (R);

Published: 02-Sep-2022

INTRODUCTION

Aesthetics has now become a demand for an ever increasing civilization. Most of the time, aesthetic dentistry provides amazing solutions to improve people's appearances, which in turn boosts self-confidence. Earlier dentistry was considered related to pain, fear and discomfort, but as the generation is of millennial's who are more focused towards the looks and appearance to prove their value and status, dentistry also took a turn towards the fashion trends. Today everyone is findings different ways of looking attractive so that they stand out different in the group of thousands. Also now a days everyone is liked to be praised and recognized for setting a different fashion statement. Various treatments, such as body art and cosmetic dental procedures, are becoming increasingly popular. The most appealing aspect of dentistry is its aesthetics. Apart from the usual cosmetic and smile enhancing operations, a few new parts of

dentistry have emerged that may really be described as "out of the box" [1]. To look more fashionable and impactful various surgical and non-surgical procedures are practiced in dentistry also. Non-surgical dental craft includes tooth rings, tooth jewellery, removable tooth jewellery, dental grills, studs, tooth rings, dental tattoo. Tooth jewellery is a type of self-expression that, when done correctly, may give a grin a special confidence boost [2].

The ancient Mayan tribes believed that wearing jade and turquoise inlays in their front teeth would preserve them from death for religious and ritualistic purposes. In some tribes they used to believe that by removing the front teeth will help them to feed the person in the event of a future lock jaw due to tetanus. For linguistic reasons, certain cultures remove specific anterior teeth [3-5]. The extraction of their teeth allows them to talk with their distinctive 'lisp' in their language. To conduct a harder blast at the Indonesian silat weapon (Sumpitan), certain African tribes have their maxillary incisors removed. As a show of sadness and as a baptism, Australian aborigines eliminate their teeth. Some people get their teeth extracted to make spitting more efficient [6]. Body alteration can also be used to attract someone of the opposite gender. Teeth are modified in the intention of

impressing potential mates and are thought to help with reproduction. Women in ancient China used tannin and ferrous acetate to colour their teeth as a sign of fashion and marital status. In Nigeria, before marriage, permanent tattoos are made over the lips and the gingival. Conversely, they can be used to intimidate opponents during a battle. South American Indians in the Amazon valley refine their teeth to make them look pointed and menacing, like a fish of Amazon called "Piranha". African tribes shape their teeth to mimic crocodiles and look ferocious like tigers [7,8]. Pre-Columbian communities in Meso America shaved their teeth with stone tools to worship their solar deity, who was often depicted with filed teeth. Some Indonesian tribes file their teeth to satisfy their soul's desire for beauty and therefore prevent death. In Mesoamerica, pre-Columbian cultures used stone tools to shape their teeth. Filing their teeth, according to some Javanese, Sumatran, and Borneo tribes, functions as a charm, warding off ancestor ghosts and supporting them in the afterlife.

Surgical procedures can also be performed in order to increase the aesthetic value. Some are related to piercing such as tongue piercing, lip piercing, cheek piercing and many more. This all comes under oral piercing. Surgeries such as lip reduction, lip repositioning, and lip augmentation are also performed.

LITERATURE REVIEW

Non-surgical procedures

Tooth jewellery: In the battle of Kurukshetra, as described in the Mahabharata Epic, Lord Krishna intended to put Karna's compassion to the question. Krishna, dressed as a Brahmin, asks for gold as a gift, and Karna proves his worth by offering his teeth filled with gold. According to this passage of the epic, dentistry was practiced as early as 2500 BC, when problematic teeth were mended with gold [9].

Tooth gems: These are glass crystals set on a thin aluminium foil. They come in a range of shapes and colours and contribute in the generation of spark. Round and other shape crystals, yellow and white gold tooth jewels, gold numbers and letters, gold tooth jewels with real gemstones, gold facings and many more are available, while colours include ruby, sapphire, diamond, rainbow, emerald, aquamarine, emerald green, sapphire light, pink [10]. Skyce and Sapphire crystals are tooth gems. Skyce crystals (ivoclar vivadent AG, schaan, leichtenstein) are transparent, whereas sapphire crystals are white or blue. Both skyce and sapphire are high-quality tooth gems (Figure 1), but skyce adds glint to every grin [11]. It is a painless technique that can be applied directly to the tooth surface without the need for any preparation. It can be used on a damaged enamel spot or any pigmented area, as well as a mixture of photo polymeric fillings (Figure 2). It is a relatively painless operation taking only 10-15 minutes to complete [12]. It can be removed at any moment or replaced with any other stone because the method does not require drilling

and it can be straightly adhered to the enamel of tooth [13]. Two different diameters are available in these crystal glass stones, they are: 1.8 millimetres and 2.6 millimetre. Rainbow gemstones are the most affordable. They are great for short-term use because they are made economically in mind. Rainbow crystals can be obtainable in ten various hues and two sizes (1.8 mm and 2.5 mm).



Figure 1: Tooth gems on tooth.



Figure 2: Tooth gems on teeth.

Twinkles/tooth studs: Twinkles/tooth studs are designed to be glued to the enamel of tooth, and their distinct backside is comparable to the brackets of orthodontics, allowing them to rest in place for a long time. These are pieces made of 24 carat gold and white gold that come in 50 distinct designs, some of which include diamonds, sapphires, and rubies. The twinkles that are available are: twin dent AB, Uppsala, Sweden. Upper incisal and canine teeth are the most typically used teeth for attachment (Figure 3). Gold, precious stones like diamond, sapphire and ruby are used to make twinkles same as tooth gems it painless, harmless procedure requiring only 10-15 minutes [14].



Figure 3: Twinkles/Tooth stud.

Tooth rings: In this a small hole is drilled near the disto-incisal section of the upper central tooth and the tooth ring is suspended in it. The maxillary central incisors are the most usually utilized desired teeth, and the amount of the hole is determined by the width of the ring chosen. The hole should be polished and prepared in the most efficient manner feasible. Precious stones can also be embedded in this rings (Figure 4). The available overjet should be taken into account while choosing the ring diameter to avoid occlusion interference. The rings can be created to connect the two central incisors or the central incisor to the lateral incisor in some cases [15].



Figure 4: Tooth ring.

Tooth tattoo: It is also referred to as dental tattoo which is actually a misnomer as 'Tattoo' is made by piercing the skin making pigment marks. But in case of tooth tattoo the needle touches the enamel only. Tooth tattoos are personalized graphics that are applied on dental crown before they are sealed and placed on tooth/teeth. Tooth tattoos come in a variety of styles, colours, and designs and can be put on any tooth (Figure 5). The interested group ranges from 14-35 years [11]. Celebrities, flowers, religion, loyalty to a person or subject, and animals are just few of the tattoo categories that are employed as dental tattoos. Temporary tattoos can also be applied; these are usually developed in the form of stencils that are attached to the teeth. It only takes 15-20 minutes to apply a temporary tattoo (Figure 6). It is an indirect method that necessitates tooth reduction in order to place the crown. Dental tattoos were born as a result of modern dentistry. Dental tattoos became popular a decade ago, when hip hop performers and rappers began wearing them in their music videos [16].



Figure 5: Tooth tattoo intraorally.



Figure 6: Tooth tattoo on cast.

Dental grills: They have a bit more bling than the various tooth stones. American rappers and hip-hop stars are the biggest fans of grills. It is something we have probably seen on television or in publications with a tooth accessory like this (Figure 7). They are usually made of metal, like gold, and can also hold valuable stones like diamonds. They typically cover the whole front area of the dentition, although the material, location, and design are all distinctive to an individual. It is a style for some, despite the fact that it is a striking addition to the smile (Figure 8).



Figure 7: Dental grill.



Figure 8: Dental grill on cast.

Complications of non-surgical procedures

- Dentinal Sensitivity
- Act as a plaque retentive factor
- Aspiration of jewel
- Allergy
- Injury to adjacent teeth
- Injury to adjacent mucosa
- Enamel wear or abrasion
- Halitosis
- Oral infection
- Entrapment of food and debris in between tooth and grills
- Cavities

Surgical

Oral piercing: Oral tissue piercing other than hard tissue is an invasive type of oral jewellery in which numerous places are pierced to the individual's preference. The most common sites are the tongue, upper lip if done on left side then called Monroe piercing, and if on right side then madonna piercing, on lower lip it is called labret piercing on cheeks it is called dimple piercing, on philtrum called medusa piercing, smiley piercing if done on maxillary labial frenum, frowny piercing if done on mandibular labial frenum, on mandibular lingual frenum it becomes web piercing, on nose it is called rhino piercing and uvula piercing. Studs, barbells, and rings are among the different pieces of jewellery worn. Surgical gold, niobium, stainless steel or titanium is the recommended material

Tongue piercing: The Mayans, approximately 700 BC, and subsequently the civilization of Central America called Aztec, considered tongue piercing as a profoundly sacred procedure performed only for pandits and kings. When the Spanish colonizers arrived on the American continent in 1521, they wiped off both the Aztecs and their practice of tongue piercing [17]. In this piercing, a barbell shaped component of jewellery is frequently placed across the width of the tongue at the midline in the frontal 1/3rd using a needle. To accommodate post-piercing edema, a temporary appliance, larger in length than the jewellery which will be originally placed, is initially inserted. The free end of the barbell is then

placed ventral-dorsally into the pierced part (Figure 9). Between the intermaxillary anterior teeth, the dentist grasps the open end of the jewellery and screws the ball onto the stem (Figure 10). The twinkles present on the lingual surface of the dorsolateral end can also be used to insert the barbell laterally. Healing takes 4 to 6 weeks in the absence of complication.



Figure 9: Different positions of Tongue piercing.



Figure 10: Tongue piercing.

Tongue splitting: Some people believe tongue splitting as a sort of body art. The procedure splits a tongue of a person in half, giving them a "forked" appearance. Laypeople split languages using a variety of rudimentary procedures. Without anesthetic, a knife and cauterizing pen, for example, could be used, or a fishing line could be passed through the punctured tongue and pushed forward, severing the front part. Individual pulls the two tongue segments away on a frequent basis to keep the split from "healing" back together (Figure 11). Additional surgery to correct the "split" may be required once the wound has healed.



Figure 11: Tongue split.

Lip and cheek piercing: People are using their hands on piercing since ages and is still practiced across the globe. Wooden plugs are placed in the lips of women by their husband of the African tribe named Makololo as a symbol of possession, and it is viewed as a mark of great beauty by the tribe's members. The position of the jewellery in a cheek or lip piercing is generally decided by aesthetics (Figure 12), with consideration for where the piercing will be placed inside the mouth. Once the site has been chosen, a corkscrew is repeatedly placed in the oral cavity to support the tissue as it is penetrated using a needle (Figure 13). The needle goes through the tissue and into the cork backing. The disc is then screwed into place, and the needle is restored with the labret stud. And the time taken by the body to heal is from weeks to months [17].



Figure 12: Lip-piercing.



Figure 13: Cheek piercing.

Complications of surgical procedures

Oral piercing during procedure:

- Bleeding
- Hemorrhages
- Primary post-operative complications
- Swelling
- Edema
- Infection
- Allergic reactions
- Localized and systemic infections
- Increased salivary flow
- Ludwig's Angina
- Thrombophlebitis

Secondary post-operative complications:

- Mucosal Injury and Tissue Alteration
- Damage to Periodontium
- Dental Trauma
- Aspiration and Ingestion of jewellery
- Problems during Medical/Dental procedures
- Generation of galvanic current

Lip surgical procedures

A grin is a nonverbal communication tool that involves the interplay of the teeth, lip framework, and gingival scaffold (Garber and Salama). A medium smile line with low Gingival Display (GD) is considered the most appealing in the western world. A "gummy smile" is a condition that occurs when an excessive amount of gingiva is seen while smiling, and it is widespread in the general population. A gummy smile was discovered in 7% of males and 14% of women in a sample of approximately 450 persons aged 20 to 30 years smile.

The aesthetic smile: The three primary components which are essential for aesthetic smile are (Figure 14):

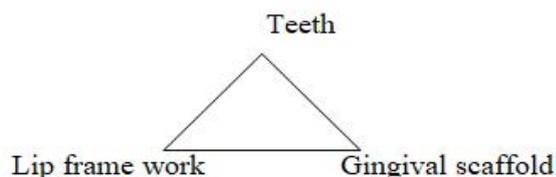


Figure 14: The three primary components which are essential for aesthetic smile.

The teeth: The dentist considers the colour, position, size, and geometry or silhouette of the teeth all as an important aspects for an aesthetic smile. The clinical crown lengths of the upper central incisors and cuspids should be consistent in theory, with the lateral incisors being shorter. With the bicuspid teeth, which may be evident at the corners of the buccal vestibules, this relationship between the tooth lengths should continue posteriorly to produce a seamless front to back progression. The position of the incisal edge of the central incisors should be set as the defining determinant, employing phonetic prompts, in order to achieve perfect anterior aesthetics. Other tooth length metrics should match the central incisors' length. At the lateral incisors, about 1-2 mm of gingiva should be visible (McGuire). So that there is no mismatch between the contralateral like tooth kinds, there should be left and right side symmetry (Brisman). Each tooth has its own incisal gingival and mesiodistal widths, which work together to create a cosmetically appealing maxillary anterior unit. In most cases, a 10:8 ratio is ideal (Ash).

The lip: The lips define the aesthetic zone while also forming the frame of a grin. Lip lines are categorised as mild, medium or high (Goldstein).

- Normal low lip line shows only a piece of the teeth underneath the upper lip's inferior border.
- High lip line has a wide range of gingiva stretching from the upper lip's lower border to the free gingival edge.
- In Western cultures, the medium lip line is seen as the most attractive. A notional exposure of 1-3 mm of gingiva from the apical extent of the free gingival edge to the inferior border of the upper lip is exposed when the patient smiles.
- Tjan et al. found that 20.5% of the population had a low lip line, 69% had a medium lip line, and 10.5% had a high lip line. Peck et al. discovered a link between gender and smile style, with females (2:1) preferring gummy smiles and males preferring low lip lines (2.5:1)

The gingival scaffold: The primary goal of periodontal therapy is to re-establish the function and structure of the attachment system. From an aesthetic standpoint, this isn't done nearly enough. An uneven gingival arrangement, even if healthy, may strike a discordant note, necessitating restoration of harmony and continuance of the free gingival border. As a result, the entire tooth, as well as the interdental gingival tissue and the free gingiva border around the tooth's cervical area, is exposed.

The contour progression from the incisors to the canines should be parabolic, with heights of contours (Gingival Zenith) distally to the midline for the central incisors and cuspids and at the midline for the laterals.

The Gingival Aesthetic Line (GAL) is a classification that is used to provide a nice gingival level transition between the maxillary anterior teeth. A GAL is a line that connects the tangents of the zeniths of the central incisor and canine FGMs. The GAL angle is the angle created when this line meets the maxillary dental midline. Four types of GAL are described, assuming a normal w/l ratio, anatomy, location, and alignment of the anterior dental segment: (Ahmad and colleagues)

Class I: The gingival aesthetic line angle is 45 to 90, and the lateral incisor is touching or below the gum line (1-2 mm).

Class II: The gingival aesthetic line angle is between 45 and 90, but the lateral incisor is above (1-2 mm) the GAL, and its mesial half overlaps the central incisor's distal aspect. This is a common occurrence under Angle's class II or pseudo-class II settings, and it adds to the dental composition's diversity.

Class III: The gingival aesthetic line angle is 90, and the canine, lateral, and central incisors are all below the GAL.

Class IV: The gingival shape does not fit into any of the other three categories.

The angle formed by the GAL can be sharp or obtuse. Recession, passive and altered passive eruption, eccentric eruption patterns, loss of interdental papillae, clefts, and high frenal insertions are just a few of the gingival asymmetries that can be seen clinically.

Anatomy of lips: The vermilion took up one-third of the upper lip, while the cutaneous component took up the other two-thirds. The vermilion took up nearly half of the overall height of the lower lip, with the skin area taking up the rest. The lower lip took up more than a third of the lower third of the face, while the upper lip took up nearly a third of the lower half. Almost two-thirds of the lower region of the face was covered by the chin.

The superior labial artery is the upper lip's major artery, and it always comes from the facial artery. The superior labial artery measures 45.4 millimetres in length, with a diameter ranging from 29 to 85 millimetres. The superior labial artery's origin is 12.1 mm away from the labial commissure on average. At its beginning, the superior labial artery had an exterior diameter of 1.3 mm. The superior labial artery has a mean origin distance of 46.4 mm from the lower border of the jaw. The superior labial artery's alar division is typically discovered as a single branch (82%). It has a mean length of 14.8 mm and a mean diameter of 0.5 mm at the origin. The superior labial artery and the septal branch are 33.3 mm apart at their beginnings. In the majority of cases, the septal branch is solitary (90%). The septal branch has an average length of 18.0 mm and a diameter of 0.9 mm at its origin. The superior labial artery can be found in a

variety of sites, both unilaterally and bilaterally, with a variety of branches.

Lip repositioning

A medium smile line with low Gingival Display (GD) is considered the most appealing in the western world. A "gummy smile" is a condition that occurs when an excessive amount of gingiva is seen while smiling, and it is widespread in the general population.

Etiology of excessive gingival display

- Vertical Maxillary Excess
- Delayed Passive Eruption
- Compensatory Eruption
- Hypermobility Upper Lip (HUL)/Short Upper Lip

Indication

- Excessive gingival display with non-skeletal cause
- Excessive gingival show of up to 7 mm

Contraindication

- Same as for any periodontal surgery
- Inadequate attached gingiva in the maxillary anterior sextant
- Severe vertical maxillary excess.

Surgical procedures for lip repositioning

- **Original lip reposition technique:** In this surgical procedure, partial thickness mucogingival incision is made maxillary from 1st molar to 1st molar including the labial frenum.
- **Modified lip reposition technique:** In this surgical procedure, the maxillary labial frenum is not excised in order to maintain midline and philtrum in position.
- Both these techniques were given by Rubinstein and Kostianovskiy in 1973.

Complications

- Occasional postoperative bruising, discomfort, paresthesia, transient paralysis, and swelling of upper lip
- Formation of mucoceles as a complication of suturing and the indulgence of minor salivary glands
- Chances of relapse in Class III musculoskeletal pattern of growth
- In Original lip reposition technique, shift of midline or distortion of philtrum may occur

Lip reduction

Lip reduction surgery involves removing mucosal tissues from labial site of the lower or upper lip or sometimes both. This is done in an effort to reshape the entire lip area.

Surgical procedures for lip reduction

- **Lip reduction surgery:** It can be performed on lower lip or upper lip or both.
- **The "Bikini" lip reduction:** An approach to oversized lips. This procedure focuses on the shape of lower lip, taking inspiration from the "Bikini line" which is traditionally more triangular shaped at the bottom.

Lip augmentation

Lip augmentation which provides fuller and plumper lips is a cosmetic procedure. Dermal fillers can be injected into the lips and around the mouth in a variety of ways. However, today's most popular fillers are products containing molecules that are related to hyaluronic acid. Hyaluronic acid is a naturally occurring chemical in the human body. It aids in the development of lip volume.

Appearance of the lips can be improved, when hyaluronic acid is added, by: A) Structure, B) Shape, C) Volume.

The effect stays for around 6 months and to keep the volume of lips more injections are needed. Juvederm and other lip fillers are a series of injections that contour and plump up your lips. Lip fillers are just a semi-permanent treatment for lip enhancement. Perm lip implants are a soft, solid silicone implant that mimics the form of a natural lip [16]. Perm lip implants are available in a variety of sizes. This sort of silicone implant will not leak or rupture because it is a solid rather than a liquid. Lip augmentation using Perm lip implants is a long-term treatment. Other than lip fillers and lip implants, fat grafting and tissue grafting are also the techniques used in lip augmentation.

DISCUSSION

As said earlier, millennials are more focused towards making statement by their appearance. Some also use this in order to hide their flaws and draw attention towards something blinky. This involves both non-surgical as well as surgical procedures. Non-surgical procedure includes tooth jewellery which is discussed above under sub-headings such as tooth gem, tooth studs, tooth rings, tooth tattoo, dental grills. History regarding these procedures shows that it is practiced from the era of Mahabharata and is still practiced under the name of beliefs or some under fashion. Materials used for these procedures consist of vast variety starting from diamonds to sapphire, ruby, etc. and that too of different colours and sizes. Procedures include etching of enamel, drilling hole into the incisal edge, tooth preparation, etc. for retention of the tooth jewellery [15].

Surgical procedures include oral piercing and lip piercings. In oral piercing, tongue piercing, lip piercing, cheek piercing and tongue splitting. Different names have been assigned according to the place of piercing like upper lip, if done on left side then called Monroe piercing, and if on right side then Madonna piercing, on lower lip it is called labret piercing on cheeks it is called dimple piercing, on philtrum called medusa piercing, smiley

piercing if done on maxillary labial frenum, frowny piercing if done on mandibular labial frenum, on mandibular lingual frenum it becomes web piercing, on nose it is called rhino piercing and uvula piercing. Lip procedures include lip reduction, lip repositioning. Healing for all these oral piercing procedures and tongue splitting takes 4-6 weeks minimum without complication. Lip surgical procedures are complex one as it has rich vascular supply. Lip procedures include lip repositioning which is majorly used for 'gummy smile' correction, lip reduction where mass of mucosal tissue from the lip is removed and lip augmentation in which fillers are used to give lips appearance of fullness. In lip surgical procedures, aesthetic smile is an important factor which includes three components that is teeth, lip framework and gingival scaffold.

Non-surgical and surgical procedures have complications. Non-surgical complications include dental sensitivity, caries, allergy, injury to adjacent teeth and mucosa, etc. whereas surgical complications include bleeding, swelling, infection, aspiration, etc. Though for time being it is appreciated in the name of fashion and bravery but its long-term effects are more harmful. Non-surgical procedures are reversible but cannot provide the natural form and surgical procedures show irreversible damage to the natural structures of the oral cavity. Many times, if failed, these procedures may lead to permanent damage and rehabilitative procedures would be required to correct them.

CONCLUSION

People of 21st century are more into showing-off things which helps them to put a strong statement in society. Both surgical and non-surgical procedures are performed on large scale in both rural as well as urban areas. A lot of research is required to be done in this field so as to decrease complications.

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