

Interdisciplinary Management of Aesthetic and Functional Rehabilitation Treatment in Anterior Teeth With Dental Anxiety: A Case Report

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Abstract

Patient with dental anxiety often requires special dental treatment. Anxiety for dental treatment still becomes significant issue for some people. They often lead to avoidance of dental care which may result in significant deterioration of oral and dental health. Music intervention can be a non-pharmacological management to overcome this issue. The need and demand for aesthetic dental restorations are increasing and should be responded by the dentist accordingly. Success in restoring teeth with optimal results will greatly affects self-confidence and improve their quality of life. Damaged anterior teeth due to complex caries has an effect on appearance and may impact confidence due to poor aesthetic. Restoration of anterior teeth from various damages in terms of form and function is highly valuable. Aim To report an aesthetic and rehabilitative management of complex caries on anterior teeth by endo-restoration with stomatognathic approach in patient with dental anxiety. Case: A 46-year-old female with complex caries in maxillary anterior teeth: 15, 14, 13, 12, 11, 23, 24 and mandibular anterior teeth: 44, 43, 42, 41, 31, 32, 33, 34, as well as missing 21 and 22 post-extraction came to the clinic with a complaint of unsightly appearance which affect her self-confidence. Patient desired to restore her upper and lower anterior teeth for functional and aesthetic purposes. Case management: Teeth with mild and moderate caries were managed with composite restoration, while severe caries was managed with root canal treatment, followed by the insertion of post and core, and mounted with porcelain fused to metal crown. To restore missing anterior teeth, bridge was fabricated. Damaged teeth by complex caries can be managed by restorative or endo-restorative treatment to restore their appearance, function, and aesthetic form in accordance with the stomatognathic system. Patient with dental anxiety can be safely treated with proper understanding. The result of this method was satisfying.

Case report (J Int Dent Med Res 2021; 14(2): 777-784)

Keywords: Dental anxiety, complex caries, aesthetic, self-confidence.

Received date: 16 January 2021

Accept date: 10 February 2021

Introduction

Dental anxiety can be a problem to clinician to completion of dental treatment in primary case. People with dental anxiety often to delay or avoid dental check up. This people may difficult to treat because they need more time to treat, and can act troublesome which can make an unpleasant experience to both clinician and the patient.¹

Anxiety comes from to main sources: a direct negative experience in the past or through

vicarious information. To overcome this problem, there are two methods: pharmacological and non-pharmacological. Parental presence and reassurance, tranquilizing verbal approaches, physical contact and music are non-pharmacological methods that commonly used to diminish anxiety. The aim of this case report is to inform clinician how to manage patient with dental anxiety using non-pharmacological methods during treatment.^{2,3}

Dental caries is one of the most widespread chronic diseases worldwide that can occur to one or more teeth surfaces and is experienced by everyone and can affect children and adults alike. Dental caries is a hard tissue disease involving enamel, dentine and pulp. Tooth damage due to caries or trauma can result in the disruption of its optimal function and

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greatly affect both the shape and aesthetic.^{4,5}

The prevalence of dental caries and oral diseases in developing countries is very high and reaches over 3.9 billion people. In this globalization era, aesthetic rehabilitation becomes more popular and has been known widely by people in general. Therefore, dentists must have a logical diagnostic approach when planning an aesthetic and functional rehabilitation of damaged tooth thus aesthetically-appealing appearance with good function can be achieved according to the stomatognathic system as expected by the patient.^{6,7}

Most common causes of damaged anterior teeth include dental caries and trauma. Loss of tooth structure not only affects aesthetics, but may also leads to mastication problem, speech impediment, and psychological disorder. People may lose their tooth due to damage occurring on the tooth hard tissue or tooth supporting structures making the tooth become loose and eventually detach.^{8,9}

Dental caries can be classified according to the severity or rapidity of the attack, and different teeth and surfaces involved. According to Pickard et al, mild caries attacks only the most vulnerable teeth and surfaces such as occlusal pits and fissures. Moderate caries occurs in the occlusal and approximal surfaces of posterior teeth, while severe caries affect anterior teeth which are usually caries-free. The term complex caries can be defined as caries that attacks more than one tooth surfaces.¹⁰

Damaged anterior teeth due to caries usually only shows symptoms in the advanced stage which is marked by a change in teeth color to brown and black, visible cavity on teeth surface, or even pain. One cause of dental severe pain is pulpitis, which arises in the later stage of caries propagation. Untreated caries will lead to pulp necrosis and consequently tooth fracture over time. Therefore, caries management in order to restore tooth's function and aesthetic according to the patient's needs and expectations are fundamental, as it also positively affects patient's physical appearance. Natural and harmonious appearance is a form of aesthetics that is widely expected by the society, this is consistent with Jablonski who stated that aesthetic in the field of dentistry is a philosophy that is closely related with self-appearance created by a restoration that can be achieved

through color and natural shapes. To achieve aesthetic excellence, dentist should fabricate restorations that mimic the natural characteristics of teeth, by considering its alignment in the dental arch, contour of the restoration and harmony with the adjacent teeth.^{8,5,11}

In the field of dentistry, especially aesthetic dental conservation, aesthetic restoration is often required to correct active caries, tooth discoloration due to pulp necrosis (after endodontic treatment), fractures, dental anomalies, malalignment of tooth, tooth crowding, central diastema, abrasion, attrition, and erosion of tooth. Anterior teeth are the most prominent elements when smiling. Damaged to anterior teeth will definitely reduce the beauty of a smile. Attractive smile leads to a growing acceptance in the society, thus motivates one to obtain both dental and facial care, following the community demand for aesthetic.¹²

Teeth that have been treated endodontically can be restored using post and crown. Retentive and stable post and crown restoration will ensure its longevity in the oral cavity. The success of a restoration is determined by its retention, stability, aesthetic (especially for anterior teeth), as well as its biological aspect.⁵ Damaged of anterior maxillary teeth due to complex caries greatly disrupts one's appearance and reduces one's self confidence. This condition can be managed through endorestoration procedures to restore the shape, function, and aesthetic of the damaged tooth to its original state.¹³

This current case report describes the treatment of complex caries of anterior maxillary and mandibular teeth through endorestoration and the fabrication of bridge in patient dental anxiety. The aim of this report is to provide information that tooth with severe dental caries (complex caries) does not always needed to be extracted as it can still be restored by endorestorative treatment which integrates the use of post, core and porcelain fused to metal crown. Furthermore, missing anterior teeth (post-extraction) can also be replaced by fabrication of dental bridge.

Case Report

46-year-old female patient come to a private clinic with complaints of her two left upper anterior teeth were missing due to extraction and her left canine was severely damaged due to

caries (complex caries). Her right upper anterior teeth also had severe caries on the teeth entire surfaces until they were blackish in color, while for the right and left lower anterior teeth, they were also damaged by moderate caries (Figure. 1B).



Figure 1. Initial condition of anterior teeth before treatment. A Right side; B. Front side; C Left side.

Patient felt very disturbed by her appearance and lacked self-confidence. Patient desperately needed a dental treatment that could

restore her teeth defects and may be able to eliminate her psychological disorders that have long been suffered. Patient expect restorations for her anterior teeth that can function well and improve her appearance, but the patient was very afraid of the injection and sound of dental burs during treatment.

Intraoral examination of the teeth was as follows: teeth 13, 12, 11 and 23 were damaged by complex caries involving the entire surface of the dental crown and some parts had lost their enamel layer thus appeared black. Teeth 21 and 22 were missing due to extraction. Teeth 33, 43 had class IV mesial caries, tooth 32 had class IV distal caries, and teeth 14, 24, 31, 34, 41, 42, 44 had class V cervical caries. For diagnosis and treatment plan purposes, panoramic and periapical X-rays (Figure. 2) were taken.



Figure 2. Panoramic radiograph.

Radiographic results showed radiolucent area in the periapical region of teeth 13, 12, 11 and 23. Teeth 21 and 22 were lost post-retraction due to severe caries. Dental treatment for teeth 13, 12, 11 and 23 were chosen to be endorestitution which includes root canal treatment with cast-core as retention and fused to metal porcelain crown as restoration. Bridge was also fabricated for teeth 11, 21, 22 and 23.

Case Management

On patient's first visit, intraoral and extraoral examinations were performed. Clinical photographs of patient's anterior maxillary and mandibular teeth were taken from right side, the front and left side prior to the dental treatment (Figure 1A, B and C.) and after the treatment (Fig 7). Informed consent was obtained from the patient. Saliva test, DHE (Dental Health Education), and color selection were also done for the patient. Preliminary impression using

irreversible hydrocolloid impression material was taken for study model, and to determine patient's occlusion, as well as for the fabrication of temporary 13, 12 jacket crown and temporary bridge on teeth 11, 21, 22, and 23.

Treatment plan was determined and explained to the patient. However, patient became anxious. She refused to open her mouth and said she was afraid of the injection part and the tool to clean the root canal. The patient had a bad memory about going to the dentist. She often heard misinformation about dentists when she was a child. The clinician tried to convince her by saying that the needle used very small, therefore the pain would be minimal. She still refused the treatment. The clinician then suggested her to listen the music using earphone and let her to play game using her cellular phone during treatment and finally, she agreed to continue the treatment. During the whole dental procedure, the patient's behavior and body movement were observed.

Teeth 13 and 23 were diagnosed as irreversible pulpitis, while teeth 11 and 12 were diagnosed as pulp necrosis. All these teeth were treated with endorestorative treatment which consisted of root canal treatment, post, and core, as well the fabrication of porcelain fused to metal crown. Endodontic treatment was done in one visit (one visit endodontic). Teeth 13 and 23 were diagnosed as irreversible pulpitis thus local anesthesia was administered before root canal treatment. These teeth would also be used as abutment for bridge.

Diagnostic wire photo (DWP) was performed on teeth 13,12,11, and 23 following access opening. Root canal preparation using crown down pressure less technique with ProTaper® rotary instrument and root canal lubricant was done in reference to the working length for each tooth. ProTaper® file that was used for tooth 12, is until file # F3, while for teeth 13 and 23 until file # F5. Tooth 11 was prepared endodontically with standard technique using K file until file # 80, then irrigated with NaOCl 2,5%, EDTA 17%, and Chlorhexidine 2%, and aquadest in between the change of irrigation liquids, activated using endoactivator, and dried using paper point. Following the root canal preparation, gutta-percha point trial was performed and obturation with single cone technique was done for each tooth. Tooth 12 was obturated with gutta-percha point # F3, while 13 and 23 with

gutta-percha point # F5, and tooth 11 with gutta-percha point # 80, as well as with root canal paste.

Gutta-percha point on teeth 13,12,11 and 23 were taken out as much as 2/3 of the tooth length using penetration drill and then shaped for post fabrication using calibration drill. Next, total decapitation and seat shaping was done for those teeth (Figure 3).



Figure 3. Crown decapitation for teeth 13, 12, 11 and 23.



Figure 4. Insertion of post and core for teeth 13, 12, 11 and 23.

The following procedure was to make impression of the root canal using elastomer for the fabrication of post and core (fabricated post). Antagonist dentition was also recorded using irreversible hydrocolloid impression material. Both impression models were then sent to the dental laboratory. Fabricated posts and cores for teeth no. 13,12,11, and 23 were then cemented

using luting cement (Figure 4). Another impression using elastomer for maxilla and irreversible hydrocolloid for mandible were made and sent to the dental laboratory for the fabrication of porcelain fused to metal crowns. Cast was sent to dental laboratory for porcelain fused to metal crown for teeth no 21, 22 with bite registration for porcelain bridge fabrication with design for teeth no 11 and 23 as abutment while teeth no 21 and 22 as pontic. In addition, temporary crown insertion was made (Figure 5.).



Figure 5. Insertion of temporary crown of teeth no. 13, 12, 11, 21, 22 and 23.



Figure 6. Insertion of porcelain fused to metal crown restorations on teeth no. 13, 12 and bridge on teeth 11, 21, 22 and 23.

Final treatment procedure is to try the final restorations (fused to metal crown restorations on teeth 13 and 12, as well as bridge for teeth no. 11, 21, 22 and 23). Good initial fit, shape and color of the restorations were obtained, as well as no premature contact during function, thus insertion of the permanent restorations was done using glass ionomer luting-type (Fuji I) (Figure 6) Patient were then advised to come for control periodically (Figure 7).



Figure 7. Final condition of anterior teeth after treatment followed up after 1 year. A Right side; B. Front side; C Left side.

Teeth 15, 24, 41, 44, 31, 34, 35 class V caries were restored using resin composite, as well as for teeth 43 and 33 class III caries and teeth 14, 42, 32 class IV caries. All of these teeth were diagnosed as reversible pulpitis. Tooth preparation for class V caries was done in the enamel on the cervical region of the tooth. The cavity preparation was shaped like a kidney with a depth down to the dentine, and the color adjusted with the shade guide of the restorative material. Afterwards, etch and bonding (generation 7), as well as curing for 20 seconds with visible light (according to the factory instruction) were performed. Lastly, cavity was

filled using micro-filled resin composite material with the help of aluminum cervical matrix and then cured for 20 seconds under visible light (according to factory instruction). The exact same procedures were also conducted for class IV restoration, except for the location and shape of cavity preparation. Cavity preparation for class IV restoration was adjusted according to the extent of caries in the mesial and distal tooth surfaces.

Discussion

Dental caries is a dental tissue disease which damages the hard tissue of the tooth, starting from the tooth surfaces (commonly pits, fissures, and interproximal areas) and extends towards the dental pulp. Caries can be considered as one of the most common diseases suffered by humans, as the prevalence of caries in developing countries strikingly can reach to over 90%.³ In this particular case report, rehabilitation of function and aesthetic of damaged anterior teeth due to complex caries, as well as the replacement of missing teeth, is conveyed.

A female patient came with a chief complaint of severely damaged anterior teeth due to caries. Black discoloration was seen on almost entire surface of these teeth, with a higher degree of severity in the teeth no. 13,12,11, and 23. Teeth no. 21 and 22 were missing due to previous extraction. The patient felt a definite need for a dental care to restore the lost form, function, and aesthetic of the damaged and missing teeth, so that natural-looking smile can be attained and boost her self-confidence. Therefore, the objective of the dental treatment carried out for this patient is to create an attractive smile through appropriate selection of restoration which is also in harmony with the stomatognathic system.¹⁴

Endorestorations were the best possible choice to restore severely damaged 13,12,11, and 23. Root canal preparations for 13,12, and 23 were done using Crown Down Pressure less technique with ProTaper® rotary instrument, while for 11 using Standard technique with K file. Crown Down Pressureless technique with ProTaper® has many advantages in canal preparation. Crown Down Pressureless technique allows the elimination of most microorganisms in the coronal and middle third of the root canal prior entering the apex, hence

excellent irrigation in the apical third of root canal can be achieved.¹⁵ Furthermore, ProTaper® clinically also exhibits high flexibility and cutting performance to reduce the need of excessive recapitulation, as well as a centering ability to ensure its position in the center of root canal and prevent apical transportation. This is unlike the NiTi instrument in which due to its super-elastic properties, the instrument is not able to be pressed to the lateral walls of root canal, thus preparation with NiTi often results in unprepared apical third, especially in root canal with oval cross-section.¹⁶ On the contrary, tooth no. 11 was prepared using Standard technique with K file based on its large and wide anatomy of the main and apical root canal. All 13,12,11, and 23 were endodontically treated in one visit (one visit endodontic). Beside for the matter of time efficiency, with the advances in technology, all endodontic procedures are now feasible to be completed in one visit, e.g. by performing access cavity preparation, root canal negotiation, preparation and obturation of the root canal at the same time. One visit endodontic will reduce the probability of errors and difficulty in locating back the root canals as with multiple visit endodontic. In addition, other advantages of one-visit endodontic are to prevent the spread of the disease from the pulp to the periapical tissue, reduce patient's fear and anxiety, lower the risk of infection between visits, reduce pain arises during treatment, and teeth can be immediately restored, thereby reducing the likelihood of fracture.¹²

The principle of dental care for tooth that has undergone endodontic treatment is to restore the root and crown of the tooth with retentive and stable post-core crown, so it not easily removed and can be used for as long as possible in the oral cavity like a natural tooth. In this patient, teeth no. 13 12, 11 and 23 used a fabricated post and core since fabricated post and core can be made as a single unit according to the form of root canal preparation.

Fabricated post and cores insertion was done one by one in the same time to get same normal size and form and also good alignment (normal overjet and overbite) for each tooth thus aesthetic aspect can be achieved. Afterwards, inserted posts and cores were further adjusted to obtain favorable axial parallelism that allows easy placement of the porcelain fused to metal crowns. According to Bitter Kerstin the success of post

and core to be used as foundation in restoration reaches an average of 90.6% in 6 years.¹⁴ Inserted metal crowns were then checked for their position in the dental arch in reference to the normal measurement of overbite and overjet. To replace missing 21 and 22, bridge was then fabricated with 11 and 23 as abutments. The pontics were adjusted to fill the space previously occupied by 21 and 22 and aligned according to the normal curve of the dental arch to ensure optimal aesthetic and function of the restoration could be achieved in the stomatognathic system.

The case in the report using audiovisual methods showed positive changes in the behavior from the reactions before the use of the audiovisual methods. This methods allowed completion of complex dental treatment who had unpleasant experience of dental treatment, by decrease in pain threshold and tolerance and an enhanced level of anxiety. Using audiovisual methods not only avoidance of discomfort and improvement the patient behavior during the treatment, but also prevented the distressing memories and anticipatory anxiety and fear.^{2-3,17-18}

The use of an audiovisual distraction system (music and video/game) is a beneficial option for patients with mild fear and anxiety associated with dental hygiene treatment. The audiovisual distraction system used may be a useful adjunct in dental offices to help reduce anxiety, discomfort, boredom and the time required to perform routine dental procedures.¹⁷

Anxiety can cause pain on patient that has no pathophysiologic based. For example, pain on non vital tooth preparation. it is possible patient still feel the pain contrary anesthetic agent has been administrated. This situation relates strongly to afraid level of each patient to dental treatment. Because of individual subjectivity, pain can not be classified exactly, not psychological nor tissue reaction related pain. Music known as save, cheap, effective non formative relaxation stimulant. Music has significant role in patient with anxiety. Based on studies, music has an ability to decrease psychosomatacal symptoms, anxiety for example, and can make patient feel comfort and save. Music has ability to decrease pain perception and experience, and increase acute and chronic pain tolerance. Music can distract patient from pain, disrupt cycle of anxiety and afraid that can enhance pain reaction, and lead to exciting moment. It is supported by

endorphin release that produce paliative effect.^{2-3,17,19}

Conclusion

In the present case a minimally-invasive approach and audiovisual distraction for patient with dental anxiety resulted in a highly aesthetic, to make patients comfortable during the treatment and great satisfaction at the end of the treatment. From the description above, it can be concluded that severely damaged anterior teeth due to complex caries, as well as missing anterior teeth due to trauma or post extraction can be restored through a combination of aesthetic treatments, which are bridge fabrication to replace missing teeth and endo-restorative treatment using post and core for retention, and porcelain fused to metal crown as restoration. This combination of treatments aims to bring back best possible teeth function and aesthetic in accordance with the stomatognathic system.

Declaration of Interest

The authors declare that there is no competing and conflict of interests.

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