

## Case Report

## The management of dental fracture on tooth 61 in a child with attention deficit hyperactivity disorders

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### ABSTRACT

**Background:** Attention deficit hyperactivity disorder (ADHD) is often characterized as a neurobehavioral developmental disorder, impaired concentration, impaired motor skills, impulsivity, and hyperactivity, and also diagnosed as psychiatric disorders. Children with ADHD would have a tendency of the traumatized anterior teeth because of their hyperactive behavior. Dental trauma is actually one of factors causing the damages of the deciduous teeth and the permanent teeth. Dental and mouth care for children with special needs, such as children with ADHD, requires special treatment. **Purpose:** This study is aimed to report the case management of the dental fracture of the tooth 61 in a child with ADHD. **Case:** A four-year old girl suffered from both ADHD and dental fracture involving the dentin of the tooth 61. **Case management:** The examination of the patient with dental fracture consists of emergency examination and further investigation. The emergency examination covers general condition and clinical situation. Based on the dental radiographic assessment, it is known that the dental fracture of the tooth 61 had involved the dentine, the resorption had reached 1/3 of the apical teeth and the permanent teeth had been formed. The application of calcium hydroxide on the opened dentin is aimed to improve the formation of the secondary dentin served as pulp protector. Next, the restoration of the traumatized teeth used compomer since it does not only meet all the aesthetic requirements, but it also releases fluoride. Management of the patient's behavior with ADHD was conducted by non-pharmacological method; tell show do (TSD) method combined with restrain method. **Conclusion:** It can be concluded that the application of calcium hydroxide and the restoration of the teeth with compomer could provide maximum results through the combination of TSD and restrain methods that can effectively increase the positive value to replace the negative behaviors that have been formed.

**Key words:** Attention deficit hyperactivity disorder, traumatized anterior teeth, compomer, tell show do, restrain

### ABSTRAK

**Latar belakang:** Gangguan pemusatan perhatian-hiperaktivitas (GPPH), sering dikarakteristikan sebagai gangguan perilaku, gangguan konsentrasi, motorik, impulsif, dan hiperaktivitas dan didiagnosa sebagai gangguan psikiatrik. Anak penderita GPPH mempunyai kecenderungan mengalami trauma gigi anterior karena perilaku hiperaktivitasnya. Trauma gigi anak merupakan salah satu penyebab kerusakan pada gigi sulung maupun pada gigi tetap. Perawatan gigi dan mulut pada anak berkebutuhan khusus seperti anak penderita GPPH memerlukan pendekatan khusus. **Tujuan:** Makalah ini bertujuan melaporkan kasus penatalaksanaan fraktur gigi 61 pada anak dengan GPPH. **Kasus:** Seorang anak perempuan berusia 4 tahun menderita GPPH dan mengalami fraktur yang melibatkan dentin pada gigi 61. **Tatalaksana kasus:** Pemeriksaan pasien yang mengalami fraktur terdiri dari pemeriksaan darurat dan pemeriksaan lanjutan. Pemeriksaan darurat meliputi keadaan umum dan keadaan klinis. Penilaian radiografis memperlihatkan fraktur gigi 61 melibatkan dentin, resopsi mencapai 1/3 apikal dengan benih gigi tetap telah terbentuk. Aplikasi kalsium hidroksida pada dentin terbuka bertujuan untuk meningkatkan pembentukan dentin sekunder dan berfungsi sebagai pelindung pulpa. Restorasi gigi yang mengalami trauma menggunakan kompomere karena selain memenuhi persyaratan estetik juga melepaskan fluor. Penanganan manajemen perilaku pada anak GPPH dilakukan dengan metode non farmakologi, yaitu melalui pendekatan tell show do (TSD) yang

dikombinasikan dengan metode restrain. **Kesimpulan:** Aplikasi kalsium hidoksida dan restorasi gigi dengan komposer memberikan hasil maksimal, melalui kombinasi TSD dan restrain, efektif meningkatkan nilai positif untuk menggantikan perilaku negatif yang telah terbentuk.

**Kata kunci:** Gangguan pemusatan perhatian-hiperaktivitas, trauma gigi anterior, komposer, tell show do, restrain

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## INTRODUCTION

Attention deficit hyperactivity disorder (ADHD), is often associated with cerebral dysfunction characterized as neurobehavioral developmental disorder, impaired concentration, impaired motor skills, impulsivity, and hyperactivity. Thus, ADHD can be diagnosed as psychiatric disorders. 3–5% of the total children even have these early symptoms before the age of seven.<sup>1</sup>

Children with ADHD actually have a tendency of the traumatized anterior teeth because of their hyperactive behavior.<sup>2</sup> This dental trauma is actually one of factors causing the damages of the deciduous teeth and the permanent teeth with the prevalence ranging between 22–30%. The fracture of the anterior teeth can be caused by the direct or indirect trauma and the high-risk games, such as playing ball and trampoline.<sup>3,4</sup>

The treatment of the traumatized anterior teeth is generally divided into two, namely emergency care and advanced treatment. If the treatment is conducted on the traumatized dental pulp as early as possible, the irritation can be possibly prevented further. Dental and mouth care for children with special needs, such as children with ADHD, nevertheless, requires a special approach. Generally, the approach of the child's abnormal behavior consists of non-pharmacology, involving tell-show-do (TSD) method, modeling method, retraining method, desensitization method, and so on. On the other side, pharmacologic approach becomes an alternative option in the management of the child's abnormal behavior.<sup>5</sup> Therefore, this study is aimed to report on the management of dental fracture of the tooth 61 in children with attention deficit-hyperactivity disorder.

## CASE

A four year-old girl (weight: 16 kg, height: 100 cm) came to the clinic of Pediatric Dental Clinic, University Indonesia on July 1, 2009, escorted by her mother with a chief complaint of broken upper front teeth because of being knocked on a chair in dining room a week ago while she was playing. At the time of the incident, the patient's parents, however, did not take their child to the dentist and not give any medical treatment. Her teeth were not either bleeding or rocking. The child even did not have any complaints of pain. Based on the information derived from her mother, it was

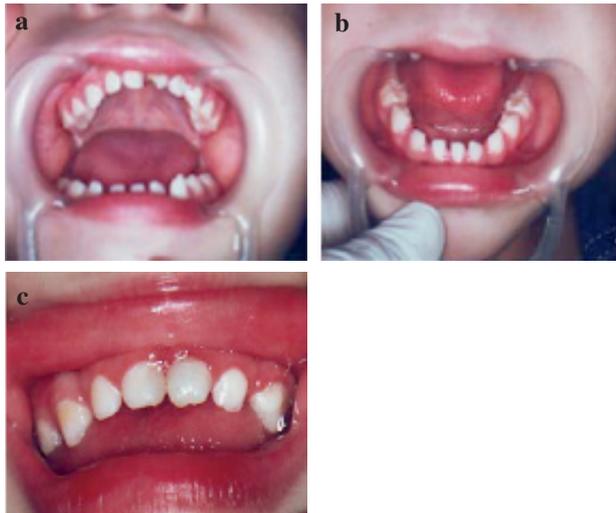
also known that according to diagnose of a psychologist, the patient had a behavioral disorder ADHD. The results of psychological test suggested that the patient had impaired concentration of attention, fine motor disorder, and delays in speaking. During the examination of the status of teeth and supporting tissues, it was known that the crown fracture of the teeth had involved the dentine of the tooth 61. Similarly, based on the radiographic assessment, it was also known that the crown fracture of the tooth 61 had involved the dentin, the resorption had reached 1/3 of the apical teeth, and the permanent teeth had been formed.

## CASE MANAGEMENT

The treatment was started with dental health education and oral prophylaxis. During the comprehensive examination, the operator conducted the special approach by using tell-show-do technique since the patient could not sit calmly, had a lot of moves (hyperactivity) and attention deficit, and also made less eye contact. For the reason, the behavior of the patient could not be controlled during the dental restoration procedures of the tooth 61. As a consequence, the operator then conducted the modeling approach by showing other patients who were next to them and behave cooperatively towards dental care. Afterwards, the operator conducted sensitized technique, for example, if the patient is afraid of dental light units, the operator will hold the lamp in a reasonably safe distance and then explain to the patient that the dental light unit is not painful, but useful to see the condition of the teeth and mouth. Since the patient remains uncooperative and getting out of control behavior, for efficiency of time and examining the behavior of the patient who were not restrained at the time of restoration, the operator then decided to use the restrain method to control the restrain movement of the patient.

Next, the operator explained the methods to the patient's mother who fully supported. The patient then lay in the lap of the patient's mother who sat on the dental chair and held the patient's hands in order to hold her if she moved excessively and abruptly. Afterwards, the operator used a low-speed round burr to make the retention of dental tissue which would be restored, and then applied calcium hydroxide in the opened dentin which was continued with the compomer restoration of the tooth 61 (Figure 1).

Based on the evaluation of the second visit, one week later, it is known that the patient had no complaints, that



**Figure 1.** The intra-oral photographs (a,b) and dental restorations of the tooth 61 (c).

the dental restorations of the tooth 61 were still in good condition, and that there were no abnormalities in the dental supporting tissue. At that time, the patient was more cooperative and willing to receive oral prophylactic. Similarly, on the third visit, one month later, the condition of the dental restoration was also in good condition. However, before starting the dental care in each visit, the operator always began with the tell-show-do approach to the patient.

## DISCUSSION

General guide of ADHD patients defines the attention deficit hyperactivity disorder with three major symptoms: inattention, impulsivity, and hyperactivity. There are actually two proposed types of ADHD: attention deficit disorder accompanied with hyperactivity indicated by those three symptoms found; and attention deficit disorder without being accompanied by hyperactivity indicated by attention deficit and impulsivity symptoms.<sup>1</sup>

Etiology factors of ADHD are not specifically known yet, however, structural disease and brain trauma are playing important roles in which the suspected ADHD child will have attention deficit, hyperactivity, and impulsivity because of the reflection of the frontal lobe dysfunction.<sup>1</sup>

One of clinical descriptions of ADHD is that the child is unable to concentrate for long periods of time or the child's attention can easily be distracted. Besides that, the patients of ADHD also suffer from hyperactivity and impulsivity. The impulsivity may manifest as impatience, while the effect of the hyperactivity can make the patients tend to get trauma easily.<sup>1</sup>

Trauma is actually a state of emergency condition that must require a treatment immediately to relieve the pain in order to reduce the risk of the increasing dental damage.<sup>5</sup> Dental trauma in children can occur directly or indirectly.

The direct trauma can occur if the teeth are directly hit by objects, such as a hard ball, stick, or fist. Meanwhile, the indirect one can be caused by the hard collision on the chin because of being fallen, fighting, getting traffic accidents, and so on.<sup>3,4</sup> The dental fractures can be classified into an enamel fracture, dentine fracture, periodontal tissue fracture, and root fracture.<sup>6</sup>

In addition, the examination conducted on the patients suffering from those dental fractures consists of the emergency examination and further examination. The emergency examination involves general and clinical conditions. Examining the general condition, moreover, involves identity, case histories, and medical history. The identity includes name, age, address, and gender. Case histories must not only concern with the complaints or symptoms of the spontaneous pain in the teeth during chewing, and the sensitive taste towards the occurrence of injury; but must also concern with the location of the trauma occurred. For medical history, the history of general health and systemic conditions of the patients must be recorded, such as allergies to certain medications, and immunization status of anti-toxoid serum. Clinical examination is then conducted after trauma-affected areas are cleaned with warm water, and the types of fracture, extension, tooth disposition, wounds, bleeding, and swelling are recorded. Palpation is conducted around the soft tissue in order to see the degree of tooth unsteadiness. Vitality test is not recommended at the time of imminent trauma because it will increase the burden of the pulp newly exposed to trauma so that the vitality test becomes inaccurate.<sup>7</sup>

Further investigations involving complete clinical examinations consist of extra oral and intra-oral examinations, and radiological examination. These investigations are aimed to determine not only the growth and development of the teeth, the shape of the pulp, and the expansion of the fracture, but also the existence of the root fractures, the alveolar bone fractures, and the presence of both foreign bodies in the tissues and abnormalities in the areas experiencing trauma. With the careful and complete examinations, diagnosis according to the classification of dental damages due to trauma then will be obtained, and the treatments can be properly planned.<sup>7</sup>

In this case report, the patient is a 4-year-old girl with crown fracture involving the dentine of tooth 61 since it was hit by chair in the dining room a week ago when she was playing. The condition of the patient is actually the same as what is found in the research conducted by Beltrao *et al.*<sup>8</sup> in Brazil stating that the teeth often traumatized are upper central incisor which has the highest prevalence involving one tooth only.

Based on information gathered from the patient's mother, it is known that the patient suffering from ADHD is under therapy and counseling with a psychologist. Usually, the patients with attention deficit-hyperactivity disorder are associated with cerebral dysfunction, which is characterized with impaired concentration, motoric disorders, impulsivity, and hyperactivity. Hyperactivity is

a word used to describe excessive motor behavior. Children suffering from ADHD generally have a tendency to suffer from traumatized anterior teeth due to their hyperactive behavior.<sup>1,3</sup>

On the first visit, the attitude of the patient was considered to be brave to conduct a complete examination. However, the dental and mouth cares conducted in our faculty clinic were started with the education of dental health and oral prophylaxis. The parents were involved in the education of dental health in order to be able to train the patient. As a result, the patient could be more independent, especially in maintaining oral hygiene. The treatment was conducted together with the application of calcium hydroxide on tooth 61, followed by the restoration of compomer. Crown fracture involving enamel and dentin needs aesthetical and functional restoration. Besides that, maintaining the pulp vitality is also necessary. If the fracture of the dentine and the enamel occurs, a large number of the dentin tubules will open, as a result, it gives access to bacteria and environmental toxins from the mouth into the pulp resulting inflammation. The application of calcium hydroxide on tooth 61 must be conducted because the fracture had caused the opening of the dentin. Calcium hydroxide is very effective not only in increasing the formation of the secondary dentin, but also in producing a thick layer of dentin that can be used to protect the pulp from irritants causing the inflammation of pulp.<sup>4</sup>

Aesthetic restorative materials should be able to resemble the natural teeth in color, translucency, texture, strength, edge adaptation, and adhesion. They must also be both soluble uneasily and biocompatible. Restorative material often used for anterior deciduous teeth is polyacid-modified composite resin, known well as compomer. This material can be used for restoring damaged teeth caused by caries. This compomer, contains calcium aluminum fluorosilicate glass filler and polyacid component. Both these materials have the basic components of glass ionomer cement without water contain, so the acid-base reactions can occur. The acid-base reactions occurred in the compomer accompanied with moist circumstances in the mouth then make the fluoride released. The success of adhesion depends on the use of dentine-bonding primer before this material is applied.<sup>4,9,10</sup>

The behavioral approach generally consists of non-pharmacologic approaches, involving tell-show do technique, positive reinforcement technique, distraction technique, modeling technique, and desensitization technique. The tell-show do technique is widely used for children with special needs, such as ADHD. In this technique, eye contact must be done when instructions are given. In short, technical procedures of the tell-show do are as follows: a) the dentist explains to those children what will be done by using language that is easily understood by those children; b) the dentist then shows them how the procedure is performed; c) the dentist finally acts as what he said and showed to them. Other non-pharmacologic

approaches are modeling technique, a technique using the children's ability to imitate their parents, brothers/sisters, friends, or other children who have similar experiences and have succeeded. Desensitization technique is a way to reduce fear or anxiety of children by providing stimulation of fear or anxiety continuously until the children are not afraid or worried again.<sup>5</sup>

TSD technique can actually be conducted by an operator to a patient since this tell-show-do technique is considered as a method that can be used for all ages and all children's behavior, including for children with special needs. In a complete examination, those children with special needs are brave, but when they get restorations on their tooth, their behavior become unmanageable. The other techniques, such as modeling and desensitization techniques, have been conducted, but the patients sometimes still cannot cooperate. Because of this inconducive situation, restrain method must be conducted as treatment. Restrain method is a non-pharmacologic approach used not only for very young children under 3 years of age, for children with health and mental disorders, for children with disabilities who cannot control sudden movements, but also for children who can be potentially uncooperative. In other words, this method is a technique designed to promote positive values used for replacing the negative behaviors that have been formed. Before the restrain method is conducted, the cause of bad behavior in those children must be known in order to make restrain process more effective. Therefore, before the restrain method is conducted, those children and their parents must be notified in advance about the aims of this method.<sup>5,11</sup>

In this case, moreover, the impulsive behaviors of the patient could be obviously visualized. Impulsivity may actually manifest as impatience, which is one of the typical symptoms in patients with ADHD. Unlike normal children who have no psychiatric disorder and psychological trauma, the patient must be generally explained by the daily language about the dental treatment that will be conducted by using TSD approach. Unlike three year old normal children who are be able to sit quietly, the patient suffered from ADHD could not control her behavior.

It can be concluded that dental trauma in children is one of the causes of the damages of the deciduous teeth and the permanent teeth. This situation often occurs in young patients of ADHD because of their hyperactive behavior. The application of calcium hydroxide on the opened dentin and the use of compomer restoration must be conducted because of possessing a good aesthetics and a character of releasing fluoride. For those reasons, it can be finally said that through such non-pharmacologic approaches like tell-show-do technique combined together with the method of restrain, co-operative attitudes of children towards dental care can be increased. Counseling with a psychologist is needed, so that not only positive behaviors of patients can be improved, but impulsive and hyperactive behaviors can also be suppressed.

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