Case Report

Application of Fluoride Tray for Treatment of Tongue Biting in a Wilms' Tumor Child: A Case Report

Suwaon Phumratprapin DDS, MDSc*

** Dental Department, Queen Sirikit National Institute of Child Health, Bangkok, Thailand*

Objective: *To describe the successful intervention with a ready-made fluoride tray for treatment of severe tongue biting problem in a 3-year-old Wilms' tumor child admitted in Surgical Intensive Care Unit (SICU).*
Material and Method: *The medical record of a tongue biting Wilms' tumor child was retrospectively reviewed.*
Results: *The outcome was complete healing and regaining of normal tongue size and function without any complication. At the follow-up, the patient could talk and swallow normally.*
Conclusion: *Ready-made fluoride trays as mouth guard can be successful in cases where patients are unable to have a custom-made mouth guard due to severe tongue protrusion. It could also be applied to similar situations and should be considered as another alternative treatment.*

Keywords: *Fluoride tray, Tongue biting*

J Med Assoc Thai 2014; 97 (Suppl. 6): S243-S247
Full text. e-Journal: *http://www.jmatonline.com*

Wilms' tumor, also known as nephroblastoma, is the most common malignant renal tumor in children[1,2]. Standard treatments of Wilms' tumor in children are the same as adults that include surgery, chemotherapy and radiotherapy. In general, the treatment will start with surgery and be followed by chemotherapy or radiotherapy. Sometimes the tumor may be too large to be removed, so the treatment will start with chemotherapy or radiotherapy in order to shrink the tumor size before the operation. When the tumor has been removed, there will be a very high chance that the disease will be cured. After the operation, the patient will have appointments every 3-4 weeks to receive continuing care.

Self-injury tongue biting in a child with Wilms' tumor is very rare. Normally, self-mutilation of the tongue is a behavior commonly observed in patients with some psychiatric disorders such as borderline personality disorders, depression or schizophrenia. Tongue biting in non-psychiatric cases may occur from different reasons[3-5]. Some may occur in an unconscious patient condition or with an unknown reason that can cause different levels of severity. Traumatic macroglossia can be severe enough to cause life-threatening upper airway obstruction[6,7].

There are many appliances used in tongue biting treatment such as modified bite guard[8], removable mandibular device[9] and thermoplastic splint[10]. In general, a mouth guard is used to prevent the teeth from biting the tongue that will protect the tongue and facilitate healing[11]. There are two main types of mouth guard: ready-made mouth guard and custom-made mouth guard. Ready-made mouth guard comes in various sizes and is more suitable for adults. In young patients, the dentist will construct a custom-made mouth guard by taking impression for a working model, and then molding it to fit the size of the young patient.

This case report is that of a 3 year-old girl with Wilms' tumor in the Surgical Intensive Care Unit (SICU) with a tongue-biting problem. According to her medical history, she had stage 4 Wilms' tumor and was receiving a chemotherapy. The patient had stayed in SICU for 2 months and her condition was serious. The tumor size was so large that she had distended abdomen with the circumference of 82 cm. She did not have any neurological problem that could cause tongue biting. The patient was in a very critical condition, intubated, on a ventilator, monitor and central intravenous lines. Oral examination was performed at the bedside in the SICU. The tongue was severely inflamed and swollen with large and deep laceration on both dorsal and ventral aspects. At that time, her physical condition was very

Correspondence to:
Phumratprapin S, 420/8 Rajavithi Road, Rajathewi, Bangkok 10400, Thailand.
Phone: 0-2354-8325, Fax: 0-2354-8326
E-mail: suwaon@gmail.com

weak and tired. She had tongue biting which caused severe inflammation, so she was unable to keep the tongue in her oral cavity (Fig. 1). The upper and lower teeth were not visible due to the swelling. Almost half of the tongue was protruding outside the mouth (Fig. 2, 3). The patient was unable to open or close her mouth or swallow. The patient needed to wear an appliance that covered the upper and lower teeth to protect from biting the tongue.

Material and Method

After the initial assessment of the patient's condition, it was clear that to take an impression for a custom-made mouth guard was impossible. Due to the thickness and hardness of the tongue, which was protruding outside the mouth, there was no place in her mouth for an impression material and the tray. The suitable appliance to separate the teeth from the tongue in this case should have no impression-making step. A ready-made fluoride tray was then applied. It was made of medical grade thermoplastic, which made the appliance extra thin, flexible and soft. The upper and lower parts attached to each other with a small strap and a handle. The appliance are available in three standard sizes: orange small size for deciduous dentition, green medium size for transitional dentition and blue large size for permanent dentition (Fig. 4). The dental examination showed that the patient had all deciduous teeth with neither cavity nor filling. The appropriate orange small sized fluoride tray was selected. The tray was then slowly inserted into the mouth. The

Fig. 2 Upper teeth sank into the tongue.

Fig. 1 A Wilms' tumor patient with tongue biting problem.

Fig. 3 Lower teeth that bite inner the tongue.

tray was placed on the upper and lower teeth and kept in place by estimate the rim of the tray, after that it did not press the soft tissues in the mouth. All the teeth adjoined the inner side of the tray, which made the fluoride tray of upper and lower teeth attach firmly. After wearing the fluoride tray, the tongue became free and the dentist pushed the tongue back into the oval cavity. However, the patient tried to push the appliance out, so it kept in place with a plaster seal around the mouth (Fig. 5). The dentist not only taught SICU nurses and parents about how to place and remove the tray but also the method to clean the appliance by using toothbrush and toothpaste/soap everyday along with the patient's oral hygiene.

Results

The patient wore the appliance for ten days. On the second day, deep wounds on upper and lower tongue show much improvement with healing taking place daily (Fig. 6). The tongue gradually return to normal size and consistency there was no need to put an effort to push the tongue back into the mouth. However, the patient was intermittently uncomfortable and still pushed her tongue out but her mother helped to guide it back inside. A few days later, the wounds healed and the patient did not push her tongue out anymore. By the 10th day, the healing was completed and the tongue regained normal size and position making the appliance unnecessary. The result of this patient was satisfying and there were no complications (Fig. 7). Two weeks after removal of the appliance, the patient was extubated and regained her normal speech and swallowing function (Fig. 8).

Fig. 4 Standard 3 types of fluoride trays.

Fig. 5 Fluoride tray was loaded with plaster sealed.

Discussion

The patient had to be admitted in SICU for 2 months and needed special care. As she was only 3 years old, she had stranger anxiety, and was, not at all cooperative during the treatment. She usually pulled the SICU equipment out. One month before the treatment, she developed a habit of tongue-biting resulting in severe inflammation, causing extreme

Fig. 6 Day 2 after the intervention.

Fig. 7 The wounded tongue was completely healed by day 10 of intervention.

Fig. 8 Patient at two week after fluoride tray removal.

tongue protrusion. Upon assessment, the author found that the patient's condition did not permit for a custom-made mouth guard. Her stage 4, very large sized Wilms' tumor made her an unsuitable condition for surgery and hence she had to undergo chemotherapy with all its side effects. The patient was practically immobilized by the equipment (ventilator, tube feeding, Foley catheter, pulse oximeter and IV catheters). Since the complete dental treatment was to be done in the ICU, a ready-made appliance would have been idea. However, ready-made mouth guards are only available for adults, hence there was no suitable size for this young patient. The author had to find some other appliance having the following qualities: a ready- made removable oral device to prevent tongue biting; reduction in the preparation process; convenient for the dental treatment in ICU; protection of upper and lower teeth; rigidity to bear the teeth clenching and grinding; sufficient elasticity for easy removal and insertion; soft and light, comfortable to wear, no irritation soft tissue in oral cavity; easily cleaned by nurses in SICU and the patient's relatives. In this patient, with deep cuts to the tongue, it was very important to clean the wound properly so that nothing can interfere with the healing process. The color of the appliance was easily visible and a handle, extending outside the mouth, made it easy to keep the appliance in the right position. In this case, the author applied a ready-made fluoride tray as a mouth guard. A fluoride tray is standard equipment, which is used to insert fluoride gel, as an aid to control decay and strengthen tooth structure in children. Usually an appropriate proportion of fluoride gel is applied in the tray and inserted into the patient's mouth. The tray is removed after 3-5 minutes. The fluoride trays come in different sizes and its thermoplastic property increases elasticity of the tray, comfort and reduces irritation. In addition, the tray has been designed as anatomical tooth shape that makes it compact. Children with no cavities have a better hold of the tray. Upper and lower parts of the tray are attached into one piece with a visual U (upper) and L (lower). The strap has a hinge design, which adds more comfort during extraction and insertion. The tray costs 30 Thai Baht per pair and can be used several times (shelf life, 1 year). Fluoride trays are simple to use and because they are ready-made, there is no need for an impression. The successful treatment in this case was the result of good cooperation between dentist, dental assistant, SICU nurses and the patient's mother. However, when the appliance was first removed, the patient still protruded her tongue but the mother encouraged her to keep the tongue inside until her condition was normal. The abdominal swelling, initially 82 cm, reduced to 60 cm after completion of chemotherapy and the patient regained sufficient health to allow surgery. This case suggests that the ready-made fluoride tray may be substituted as a mouth guard in difficult tongue biting case.

Potential conflicts of interest

None.

References

1. Ko EY, Ritchey ML. Current management of Wilms' tumor in children. J Pediatr Urol 2009; 5: 56-65.
2. Bhatnagar S. Management of Wilms' tumor: NWTS vs SIOP. J Indian Assoc Pediatr Surg 2009; 14: 6-14.
3. McGlinch BP, Martin DP, Volcheck GW, Carmichael SW. Tongue engorgement with prolonged use of the esophageal-tracheal Combitube. Ann Emerg Med 2004; 44: 320-2.
4. Gaither JB, Matheson J, Eberhardt A, Colwell CB. Tongue engorgement associated with prolonged use of the King-LT laryngeal tube device. Ann Emerg Med 2010; 55: 367-9.
5. Kuhn MA, Zeitler DM, Myssiorek DJ. Tongue necrosis: a rare complication of oral intubation. Laryngoscope 2010; 120 (Suppl 4): S159.
6. Jakobson DJ, Einav S, Krichevsky I, Sprung CL, Sela MS. Traumatic macroglossia: a life-threatening complication. Crit Care Med 1999; 27: 1643-5.
7. Saah D, Braverman I, Elidan J, Nageris B. Traumatic macroglossia. Ann Otol Rhinol Laryngol 1993; 102: 729-30.
8. Karayazgan-Saracoglu B, Kecik D. Utilization of a modified bite guard for preventing traumatic macroglossia. J Craniofac Surg 2011; 22: 238-40.
9. Pigno MA, Funk JJ. Prevention of tongue biting with a removable oral device: a clinical report. J Prosthet Dent 2000; 83: 508-10.
10. Suchak A, Mars M. Case report: A unique presentation of severe tongue biting in 10 month-old twins with a novel approach to management. Eur Arch Paediatr Dent 2010; 11: 149-50.
11. Guevara PH, Hondrum SO, Reichl RB. A comparison of commercially available mouthguards and a custom mouthguard. Gen Dent 2001; 49: 402-6.

การประยุกต์ใช้ถาดฟลูออไรด์เพื่อรักษาการกัดลิ้นของผู้ป่วยเด็กวิลม์ทูเมอร์: รายงานผู้ป่วย

สุวอร ภูมิรัตนประพิณ

วัตถุประสงค์: *เพื่อศึกษาถึงประสิทธิผลการประยุกต์ใช้ถาดฟลูออไรด์ในการรักษาผู้ป่วยเด็กวิลม์ทูเมอร์อายุ 3 ปี ซึ่งเป็นผู้ป่วยในของหอผู้ป่วยเด็กหนักศัลยกรรมหรือเอสไอซียู (surgical intensive care unit (SICU)) ที่มีปัญหาการกัดลิ้นอย่างรุนแรง*

วัสดุและวิธีการ: *การศึกษาย้อนหลังจากเวชระเบียนของผู้ป่วยวิลม์ทูเมอร์ที่มีปัญหาการกัดลิ้น 1 ราย*

ผลการศึกษา: *ผลการรักษาดีมากไม่มีอาการแทรกซ้อนใดๆ แผลที่ลิ้นหายสนิทและผู้ป่วยเก็บลิ้นเข้าไปอยู่ในช่องปากได้ตามปกติ จากการติดตามผลการรักษาอย่างต่อเนื่อง พบว่าผู้ป่วยสามารถพูดคุยและรับประทานอาหารได้ดี*

สรุป: *การประยุกต์ใช้ถาดฟลูออไรด์สำเร็จรูปแทนเครื่องมือกันฟันกระแทกเฉพาะคนใช้ได้ผลดีสำหรับผู้ป่วยที่มีการกัดลิ้นอย่างรุนแรงมีลิ้นยื่นออกมานอกช่องปากจนไม่สามารถทำเครื่องมือกันฟันกระแทกเฉพาะคน การประยุกต์ใช้เครื่องมือนี้เป็นทางเลือกหนึ่งในการรักษาสำหรับผู้ป่วยที่มีการกัดลิ้นอย่างรุนแรงและในผู้ป่วยรายอื่นๆ ที่มีปัญหาคล้ายคลึงกันได้*
