ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 6, Issue – 3, May - 2023, Page No. : 137 – 143

Management of thumb sucking using rurs elbow guard in a child with hurlers syndrome.

[1]Dr. Megha C, Department of Pedodontics and Preventive Dentistry, A. J. Institute of Dental Sciences, Bangalore, Karnataka

[2]Dr. Sowmya B, HOD and Professor, Department of Pedodontics and Preventive Dentistry, A. J. Institute of Dental Sciences, Bangalore, Karnataka

[3]Dr. Bhargavi, Assistant Professor, Department of Pedodontics and Preventive Dentistry, A. J. Institute of Dental Sciences, Bangalore, Karnataka

[4]Dr. Fathima Ishrath, Postgraduate, Department of Pedodontics and Preventive Dentistry, A. J. Institute of Dental Sciences, Bangalore, Karnataka

[5]Dr. Aparna, Postgraduate, Department of Pedodontics and Preventive Dentistry, A.J. Institute of Dental Sciences, Bangalore, Karnataka

Corresponding Author: Dr. Megha C, Megha Nivas Doomappa Compound Pandeshwar Mangalore, Karnataka.

Citation of this Article: Dr. Megha C, Dr. Sowmya B, Dr. Bhargavi, Dr. Fathima Ishrath, Dr. Aparna, "Management of thumb sucking using rurs elbow guard in a child with hurlers syndrome", IJDSIR- May - 2023, Volume – 6, Issue - 3, P. No. 137 – 143.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

The act of sucking one's thumb for oral pleasure is known as thumb sucking. Nonnutritive sucking habits, such as thumb and finger sucking, are thought to be the most common oral habits. Thumb sucking worries some parents, who may even attempt to control the baby or young child. This is typically not required. Most kids stop sucking their thumbs on their own. Older kids who keep sucking their thumbs may be bored, anxious, or experiencing emotional issues like despair. In this article, a case study of a young child with Hurler's syn drome with a thumb-sucking is presented. Mucopolysaccharidosis I, often known as Hurler's syndrome, is a rare disease that is inherited as an autosomal-recessive trait.

The "RURS' elbow guard," a special device to stop thumb sucking or biting, has been effectively utilised to stop thumb sucking in a kid with Hurler syndrome. The methods in making this new habit-breaking device, which is also intended to shield the finger from the effects of the sucking habit, are also described in the present paper.

Keywords: Finger sucking, RURS elbow guard, Hurler syndrome.

Introduction

A wide variety of oral habits in infants and young child has been the centre of much controversy for many years. Parents, paediatricians, psychologist, speech pathologists and pedodontists have discussed and argued the significance of these habits, each from the view point of expertise and responsibility. Early diagnosis of abnormal habits may allow both dentists and parents to discourage these habits to avoid negative consequence. Oral habits, especially if they persist beyond the preschool age, have been implicated as an important environmental etio logical factor associated with the development of mal occlusion.(1)

Finger-sucking habit, or non-nutritive sucking, usually terminates spontaneously in childhood. It is considered to be the most prevalent of oral habits, ranges from 13% to 100% at the time of infancy. With the increase in age, thumb/finger-sucking habit gradually decreases almost by 3.5 to 4 years but some may still continue to adult hood. The continuation of oral habits is basically due to the physical stimuli. However other stimuli like hunger, hyper activity pleasure and also emotional stimuli such as boredom, stress, and sadness may lead to continuation of such habits.(2)

Prolonged digit sucking habit may affect the occlusion and dentofacial structures. Frequency and duration of the habit, intensity of the sucking, relationship of the dental arches and the child's state of health are the factors effective in the development of dental and skeletal problems. Reported maxillary changes associated with a prolonged sucking habit are proclination of the maxillary incisors, increased maxillary arch length, anterior placement of the maxillary apical base, increased sella-nasi on-point A angle and decreased palatal arch width. Effects on the mandible include proclination of the mandibular incisors, decreased sella-nasion- point B angle and increased intermolar distance. Other dental alterations are increased overjet, decreased overbite and posterior crossbite. The response to the changes in the axial inclination of the incisors is anterior rotation of the occlusal plane.

Underlying mechanisms of the malocclusion are direct pressure from the digit and reduced intraoral pressure produced by sucking. The tongue and lips are also affected by sucking. Lip incompetence and tongue thrust are usually associated with sucking habits. (3)

Because prolonged finger sucking may cause permanent damage to the digits, necessitating corrective surgery, the habit should be broken at an earlier age, before finger deformity or malocclusion have had time to develop. Once the decision for treatment has been made, one must then determine what intervention is appropriate.

The levels of treatment possibilities that are usually considered are age-appropriate explanations to the child, positive reinforcement, digital reminders and fixed or removable intraoral habit breakers to prevent sealing of the digit against the palate and to eliminate the pleasure associated with the habit.(3)

This article details a child who had Hurler's syndrome and a tendency of biting or sucking his thumb. Mucopolysaccharidosis I (MPS I-H), often known as Hurler's syndrome, is a rare disorder that is inherited as an auto somal-recessive trait.

Heparan sulphate, dermatan sulphate, and keratan sulphate are three groups of mucopolysaccharides that are degraded, and their lack results in a wide range of diseases (4). The mucopolysaccharide disorder's traditional prototype is the Hurler syndrome. It occurs rather infrequently; the global incidence has been estimated at 1 in 100,000(3).

The "RURS' elbow guard," a special device designed to stop thumb sucking, has been used successfully to stop

the habit in a kid with Hurler syndrome. The methods in making this new habit-breaking device, which is also intended to shield the finger from the effects of the sucking habit, are also described in the present paper.

Case report

A 4-year-old girl who came to the Department of Pedodontics and Preventive Dentistry with her mother stated that her main complaint had been bleeding from the mouth for the previous two weeks. She was diagnosed with Hurler syndrome, the classic prototype of mucopolysaccharide illness, according to a thorough medical history. She had a small stature for her chronological age and mildly stunted growth. She had a dolichocephalic head, frontal and parietal bulges, and hypertelorism. She had a wide nasal tip and a low nasal bridge. Her lips were swollen and patulous, and her mouth was enormous. She even demonstrated a tendency of sucking her thumbs, fingers, and left thumb keratinization was seen. Her behaviour of sucking and biting her thumb had been going on for a while, according to his parents, and it had been brought on by emotional causes like boredom, tension, or pleasure. Her impairment rendered explanations or encouraging feedback from his parents ineffective in breaking the behaviour.

Intra oral examination revealed that she a had a large tongue, and widely placed teeth set in thick gingival tissue which was bleeding. Grade two mobility with respect to upper right back teeth and lower right back teeth, deep dentinal caries and smooth surface caries. Mobile teeth was extracted and recalled after a week and checked for the healing.

Now, preventing the habit of thumb sucking and biting required special attention. Without using general anaesthesia, it was challenging to make an impression of her teeth, and due to the patient's condition, it appeared non-compliant for the use an intraoral habit-breaking appliance.

Intervention was necessary since the behaviour was severe enough to result in orthopaedic injury and a chronic infection of the thumb or finger. As the elbow guard prevented the thumb from reaching the mouth, it was decided to use it to break the habit.

A cast was formed after an elbow imprint was taken. The cast was modified using two layers of modelling wax that served as a spacer. self-cure acrylic was used for fabrication. The elbow could now move just a small amount after the spacer was taken out and replaced with a layer of sponge for cushioning. The acrylic elbow guard was covered with a velcro strap. The "RURS' elbow guard" was the name of the novel device that was given to the patient.

After a follow up of one month it was observed that there was healing around the fingers and the intensity of the thumb sucking had reduced.

Steps in fabrication of the “RURS’ elbow guard” was referred according to case report presented by Shetty et al in the year 2010

The first step was that the child was prepared for impression making. When making the elbow impression, vinyl polysiloxane putty was used and the elbow was kept at a 45-to-60-degree angle.

- Step 2: Impression was poured with dental stone and the cast was obtained
- Step 3: To function as a spacer, two layers of modelling wax were applied over the cast. Step 4: Self-curing acrylic was used to perform acrylization. The acrylic elbow guard's spacer was taken out, and any sharp edges were trimmed out.
- Step 5: A layer of sponge was inserted in place of the spacer to provide cushioning and to permit the elbow to move only slightly.

- Step 6 involved sewing a cover with Velcro straps over the acrylic elbow protector.
- Step 7: RURS' elbow guard was delivered to the patient.

The RURS enabled some elbow movement but prevented the thumb from reaching the mouth.

Discussion

Oral habits are common in children but near the end of early childhood and the beginning of grade school, any prolonged oral habit is considered socially unacceptable and can lead to undesirable dental effects. The etiology of digit sucking has been explained by two theories, which involves emotional and learned behaviour theories. The psycho analytic theory of Sigmund Freud relates finger sucking is the product of pleasure, that child derives from stimulating the oral erogenous zone. Fixation of the habit occurs if the infant sucking needs are not met. Thumb and finger sucking, in children, might develop in their early life, are proven to occur in a high proportion of children globally with no discrimenation regarding the socioeconomic status of the child. [1,5]

The chronic persistence of a non-nutritive sucking habit like thumb sucking can lead to serious complications in facial structure. It may be associated with the development of asymmetrical anterior open bite. Other forms of occlusions secondary to thumb sucking habit include, exaggerated overjet, posterior crossbite, diastema, temporomandibular joint disorders and the presence of the mandible in a retracted position. [5,6]

Freire et al conducted a study on children that had the habit of finger sucking and found that in these children, the risk for developing malocclusions from finger sucking increased by 4.25 than other children that did not have a history of finger sucking. Borrie et al also proved that the severity of malocclusion deformities is significantly associated with the chronicity and period of the thumb-sucking habits. [6]

Orthopaedic problems that have resuited from prolonged thumb sucking include the development of a radial angular deformity, with the digitmalaligned. Other effects to the thumb include soreness and callous formation, chronic paronychia, irritant eczema, and herpetic whitlow. Thumb sucking also has been reported to be a source of introducing infection such as Candida or of accidental ingestion of harmful substances in contact with the digit and then introduced into the mouth. [7]

Treatment aimed at eliminating prolonged thumb sucking should be considered as it affects the child's health or functioning. In previous reports, several methods have been demonstrated for the treatment of finger-sucking habits. These methods can be classified as preventive therapy and appliance therapy. Preventive methods include the application of a bitter solution or adhesive tape and wearing a sock, glove, mitten, thumb guard or long-sleeve gown. Appliance therapy includes the use of fixed or removable habit breakers designed to make the sucking habit difficult or unpleasant. Age-appropriate explanations to the child and positive re in for cement are other treatment possibilities for digit suckers and are also necessary for the success of clinical management.

Some of the methods have certain disadvantages such as bitter solutions are shown to have less affect. Adhesive tapes cause sweating, infection and may reduce blood circulation in the area. Removable appliances need patient cooperation and fixed appliance may cause decalcification of enamel. Moreover, intraoral appliances may cause discomfort.

Hurler syndrome (HS) belongs to the category of mucopolysaccharidosis (MPS), a spectrum of rare

genetic disorders of the mucopolysaccharides metabolism. To date, seven different types of MPS are described (I, II, III, IV, VI, VII, IX), determined by which of the enzyme defects identified are found. MPS I-H is a life-threatening disease, involving progressive neurological disease, mental retardation, skeletal malformations, upper airway obstruction, and cardiac, ophthalmological, and orofacial changes.

Among the clinical features, that involve the head and neck regions, are gargoyle-like facies with hypertelorism, a prominent forehead and supraorbital ridges, scaphocephaly, flattening of the nasal bridge with a snub nose and large nostrils, and short neck. The range of intraoral abnormalities is vast and can be observed either clinically or radiographically. Orofacial features are dependent on the MPS subtype (Table below). [8]

MPS Sub type	Dental Features	Periodontal Features
MPS I	Delayed tooth eruption, malocclusion, taurodontism, hypodontia, microdontia	Gingival hyperplasia, radiolucency in maxilla / mandible, condylar defects
MPS II	Delayed tooth eruption, malocclusion	Gingival hyperplasia, radiolucency in maxilla / mandible, condylar defects
MPS III	Obliteration of pulp chambers, irregular pulp morphology	
MPS IV	Enamel defects (discoloration, hypoplasia), tooth surface loss, spaced dentition, peg-shaped incisors, cross bites	Flattened condyles
MPS VI	Tooth impaction, root resorption, Tauro dontism	Fibrous gingival dysplasia, dentigerous cysts, bony rarefactions, enlarged marrow spaces, osteosclerosis, TMJ dysfunction

These clinical aspects are often associated with poor cooperation for oral hygiene, and, consequently, gross caries, which are not suitable for conservative treatment and may also lead to dental intervention under general anesthesia. Therefore, when an anaesthesiologist is required, they must be aware of cardiac comorbidity, obstructive airway disease, and atlantoaxial instability, which are frequent in these patients and lead to elevated anesthetic risk.

Thus regular oral care appointments, Centered on prevention with oral health promotion protocols, intensive oral hygiene instruction, early identification of dental caries with the application of premature fissure sealants to the first permanent molars on eruption, and fluoride supplementation is required. [8]

In the case presented, it was decided to place an acrylic elbow guard instead of using an intraoral habit breaker because making an impression of the teeth and applying an intraoral appliance is difficult.

Also, the patient already poor oral hygiene and patient compliance. Applying appliance on patient's elbow has advantage over intraoral appliance therapy. It does not create difficulty in speech and chewing. Also, it is easier to make impression of elbow rather than intra oral impression, especially in syndromic child or children with mental retardation.

Preparation of the elbow guard appliance is simple, economic and this type of appliance does not affect oral hygiene negatively. [3,9]

Conclusion

The RURS may be an effective substitute as an intraoral habit breaker. This kind of extraoral device should be preferred in the treatment of a mentally challenged youngster who has a digit-sucking habit because of its benefits.

In order to assess the immediate and long-term impacts of the suggested approach, additional research on a sizable sample of either mentally impaired or healthy kids is necessary.

Figure 1: Extraoral view of the patient demonstrating clinical features of Hurler's syndrome.

Figure 2: Extraoral view of the patient exhibiting thumb-sucking habit

Figure 3: Impression making of the elbow using vinyl polysiloxane putty impression material

Figure 4: Acrylic elbow guard after removal of spacer

Figure 5: Acrylic elbow guard after placement of a layer of sponge

Figure 6: RURS' elbow guard with velcro strap

Figure 7: Patient wearing RURS' elbow guard

References

1. Shetty RM, Shetty M, Shetty NS, Reddy H, Shetty S, Agrawal A. Oral Habits in children of Rajnandgaon, Chhattisgarh, India- A prevalence study.
2. Shetty M, Deoghare A, Shetty NS. Three-Alarm System: Revisited to treat Thumb sucking Habit. Int J Clin Pediatr Dent. 2015 Apr;8(1):82–6.
3. Shetty R, Dixit U, Hegde R, Shivprakash P. RURS′ elbow guard: An innovative treatment of the thumb-sucking habit in a child with Hurler′s syndrome. J Indian Soc Pedod Prev Dent. 2010;28(3):212.
4. Shetty RM, Shetty M, Shetty NS, Deoghare A, Goyal A. Manage ment of Thumb Sucking by RURS-Elbow Guard: Report of Two Cases. 2015;1(5).
5. Gairuboyina S, Chandra P, Anand Krishna L, Kamath PS, Shetty AK, Ramya M. Non-nutritive Sucking Habits: A Review. 10(2).
6. Ahmed ZN, Hussin AM, Alanazi AF, Alhuraish AM, Abomelha SA, Tulbah TH, et al. Etiology of thumb sucking habit and its effect on developing malocclusion. Int J Community Med Public Health. 2021 Jan 27; 8 (2): 905.
7. Rosenberg MD. Thumb sucking. Pediatr Rev. 1995 Feb 1;16 (2):73–4.
8. Rodrigues Barros C, Ferrão J, Machado M do C, Fernandes A, Proença F. Hurler Syndrome: Orofacial Clinical Findings. Cureus [Internet]. 2023 Jan 3 [cited 2023 Apr 29]; Available from: https:// www. cureus. com/ articles/131658-hurler-syndrome-orofacial-clinical-findings
9. Singh A, Anand S, Shukla JN, Jyoti D, Sulekha F. Modified RURS Elbow Guard: An Alternative Approach for Thumb Sucking. Int J Clin Pediatr Dent. 2021 Oct 29;14(4):590–2.