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THUMB SUCKING'CHILD HIDING BEHIND HIS THUMB'- MULTIROOTED APPROACH AND MANAGEMENT

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ABSTRACT

Infants tend to have a habit of thumb sucking which is considered normal till a particular age. After the age of 4 years, it is believed to cause malocclusion in children. Intensity, frequency and duration are most important factors that determine the magnitude of effect of thumb sucking on the oral structures. There are various theories supporting the habit. To intercept the habit, multiple approaches are considered in respect to the preventive, psychological, chemical and mechanical aspect. The purpose of this article is to review through the cause, psychological aspect, types, and treatment methods with different appliances in managing the habit.

KEYWORDS: Digit sucking, Thumb sucking, Malocclusion, Palatal crib, Thumb guard.

INTRODUCTION

Sucking is the earliest and easiest coordinated muscular activity for a baby.[1] Any prolonged, repetitive action interfering with the normal development of teeth and bone, is known as habit. It results in malocclusion.[2] According to Dorland, habit is defined as a fixed or constant practice established by frequent repetition.[3] There are two types of sucking behaviours. Breastfeeding and bottle-feeding are nutritive type of sucking. The second is non-nutritive sucking, which includes sucking on objects or body parts like thumb, digits, which do not provide nutrition.[2] Suckling involves intense muscular activity and helps in further proper growth of oral structures.

Insufficient breast feeding leads to development of non nutritive sucking habits.[1] Thumb sucking is the act of placement of thumb in varying depths in mouth.[4] Subtelny's (1973) classification based on the depth of thumb placement.

Type A seen in 50% of children who place whole digit into mouth with pad of thumb, pressing over palate; Type B seen in 13 – 24% with thumb not touching the vault of palat; Type C in who place thumb just beyond 1st joint, contacting hard palate and maxillary incisors only,generally seen in 18% of children; Type D seen in 6% of children keeping very little portion into mouth.[5]

In a crossectional study by Kanika Dhull,higher prevalence rate was seen in boys (13.5%) than girls in the age group of 3-5 year old. Overall, thumb sucking was second most prevalent deleterious habit.[6] In a study conducted in Mewar city, India,the prevalence of thumb sucking was seen as 12.4% in the total sample with the percentage in males as 13% and 11.2% in females. At the age of 15 year, the maximum prevalence of 15.6% was seen and at the age of 9 year, it was 3.9%[7] Thumb sucking habit is considered normal in infancy and toddlers. It is generally done when they feel hungry, restless, quiet, sleepy. It gives a sense of security or urge for contact.[8,9,10,11,12] According to Woods and Miltenberger (2006), chronic digit sucking is the one that happens after 5 years of age and at multiple places e.g at home, at school and at other places.[2] According to AAPD, non nutritive sucking habits must be stopped before the age of 3 ,as the if the habit is stopped earlier, the chances of development of malocclusion are less.

According to most authors,it fades away by the age of 4-6 years old, but in some cases, malocclusion still occurs even after cessation of habit.[13] After the age of 4 years, if the child continues the habit, parents should discourage it. However, never put excessive pressure on the child instead try to find the root cause of anxiety,praise the child for not doing the act and reward the child accordingly.[14]

THEORIES INVOLVED ARE[4]

According to PSYCHOANALYTICAL THEORY by FREUD (1919) - the oral zone is an erogenous zone that requires constant stimulation, and this causes the infants to have an urge to suck. If sucking needs are not met this might lead to *fixation* of the habit or *regression* of the

habit redevelopment of a habit. According to BENJAMIN'S THEORY (1962) - Thumb sucking arises from the rooting reflex seen in all mammalian infants. According to LEARNING THEORY-DAVIDSON (1967) - habit of thumb sucking arises as a result of learned process. According to JOHNSON AND LARSON'S THEORY (1993)- It is a combination of psychoanalytical and learning theories. There is an inherent biological drive for sucking in every child.

DELETERIOUS EFFECT ON THE DENTITION

There are various factors which contribute to the type of malocclusion i.e.[15]

- Position of the digit
- Associated oro-facial muscle contractions
- The position of the mandible during sucking
- The facial skeletal pattern
- Intensity, frequency, and duration of force applied

Habit of prolonged sucking beyond the age of 5 years can lead to various types of malocclusion like open bite, cross bite, increased overjet, crowding and increased probability of developing Class II malocclusion with flared and spaced maxillary incisors, lingually positioned lower incisors (or sometimes labially, with reverse occlusion, depending on sucking technique), anterior open-bite, narrow upper arch, cross-bite.[16] Usually, if anterior open bite occur due to thumb sucking, a secondary tongue thrust develops leading to the exaggeration of the condition.[17] Speech problems, including mispronouncing T and D, lisping, and thrusting out the tongue when talking, can be seen.[18] A study by Elise Baker concluded that, no phonological impairment is seen in young children with nonnutritive sucking habit by use of pacifier.[19] In a study by Hiu Tung Bonnie Ling et al. it was concluded that, with more than one year of daily pacifier use and thumb/digit sucking habit in children, cause high possibility of Class II incisal relationships, Class II canine relationships and increased overjet with anterior open bite in the primary dentition.[20] The best preferred treatment time is late primary or early mixed dentition stage as it is seen that in majority cases, prior to eruption of the permanent teeth if the activity is discontinued, minor tooth changes are resolved.[21]

FACTORS ASSOCIATED WITH THUMB SUCKING[4]

Factors like age of child, socioeconomic status of parents, working mothers, number of siblings etc. could influence the habit of thumb sucking.

TREATMENT

Counselling, remainder therapy, reward system and adjunctive therapy are the 4 approaches to treat thumb sucking habit.[20]

When reminder and the reward therapy fails,appliance therapy or adjunctive therapy may be used.

PREVENTIVE THERAPY- It includes avoiding the habit to start at first, or use of dummy, pacifier instead of thumb sucking.[4]

PSYCHOLOGICAL THERAPY/COUNSELLING THERAPY

– Time-out refers to the act in which if the habit occurs, a reinforcer is removed. For example, a mother could stop reading a story whenever thumb- sucking occurred and resume reading story when the child removed his/her thumb from their mouth. Positive reinforcement refers to act such as verbally praising the absence of sucking or placing reward stickers on a calendar.[22] Beta Dunlop hypothesis which states that if patient is made to stand and observe himself doing the act. This helps him to stop it in a better way.[4]

CHEMICAL TREATMENT

It includes application of foul tasting things like asoefetida, quinine, pepper on the hand of child as these bitter and sour chemicalswill avoid the child to place thumb in the mouth. It is generally used in patients who are at an initial stage and are not very involved in the activity.[4]

MECHANOTHERAPY/REMINDER THERAPY

It can be intraoral and extraoral.

I- INTRAORAL includes

I(a)- Modified quad helix- Quad helix was with 3 cribs, continuous with the anterior helices and the posterior component. The expansion arms extended up to the primary canine region. The crib acted as a habit breaking part.[23] (Fig 1).

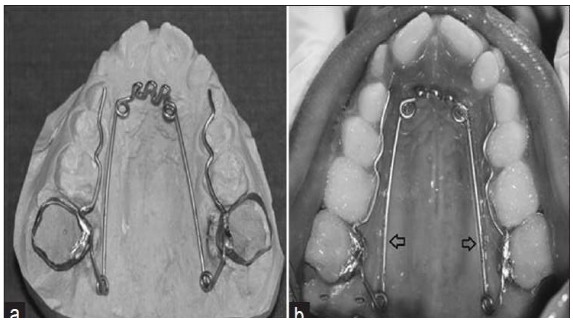

Fig 1: Modified quad helix.

I(b)- Hybrid Habit Correcting Appliance (HHCA)- It is used in patients in constricted maxilla and posterior cross bite which is a result of both thumb sucking and tongue thrusting habit. The appliance consists of a tongue bead, a palatal crib and a U-loop attached to the molar bands on either sides. The bead works as a reminder, palatal crib works as a reminder and physical restrainer. U loop is useful for the retraction phase in fixed orthodontic therapy.[17] (Fig 2)

Fig 2: Hybrid Habit Correcting Appliance.

I(c)- Palatal crib- The tooth that act as abutment is the permanent first molars or the primary second molars with a wire of 0.04-inch stainless steel orthodontic wire extending anteriorly along the palate. The wire forms a crib at the level of the maxillary canines, which extends vertically lingual to the level of the incisor edges of the lower anterior teeth.[24]
Palatal rakes and lingual spurs can also be used.

I(d)-Blue grass appliance- It is a fixed appliance with Teflon roller.The Teflon roller acts a reminder.[25] (Fig 3)

Addy et al.reported increased chances of candida infection in patients with use of fixed/removable appliance.[26]

I(e)-'Invisalign Teen'- This is usually a preferable treatment in adolescent patients. Orthodontic aligners are also used for removing the habit of thumb sucking. On the occlusal aspect, small areas of the aligners were flipped like on the palatal surface of the upper incisors creating the effect of bite ramp.

This prevented the placement of thumb in mouth[27] (Fig 4)

Fig 4: Invisalign Teen j– aligners placed on palatal surface.

I(f)- Light emitting diode habit breaking appliance- The appliance consists of Hawley's fabrication with light-emittingdiode bulb and switch attached to it. When the child's tongue or the finger touches the appliance,for the act to suckthe thumb, the light bulb gets illuminated acting as a reminder.The associated theory behind this is psychological re-rooting of the patient's action.[28] (Fig 5)

Fig 5: Light emitting diode habit breaking appliance.

I(g)- Sudipta Kar's cribbed thumb guard- Habit breaking appliance with palatal crib was fixed intraorally. (Fig 6) Thumb guard with 3 cribs and two holes are made in the opposite side of the cribs to incorporate one smooth elastic band into the appliance. It was made on duplicate thumb, after taking impression from alginate (Fig 7)

Fig 6: Palatal crib intraoral component of Sudipta Kar's cribbed thumb guard.

II (c)-Modified three- alarm system- Three alarm system initially was introduced by Norton and Gellin in year 1968. Later it was revised to overcome the drawbacks like, pin prick or injury to elbow. The modified three alarm system had an acrylic elbow guard with a musical chip and speaker incorporated carefully on the outer side of the acrylic (Fig 10). The switch button was placed in the inner side of the acrylic elbow guard with a zip and velcro strap cover over the acrylic elbow guard for retention of the appliance. (Fig11) So, whenever, the child tries to suck the thumb or digit the switch button was pressed by the elbow joint and music would play loud marking as reminder to stop the habit.[32] (Fig 12).

Fig 7 - Thumb guard with cribs made on duplicate alginate thumb.

II- EXTRAORAL includes

II (a)-RURS elbow guard- RURS elbow guard is an extraoral appliance for antithumb sucking. (Fig 8). An acrylic elbow guard was made with cast impression of elbow at 45-60 degree. It was tied with Velcro straps. It does not affect the oral status of the patient.[30]

Fig 8: RURs elbow guard tied with Velcro strap.

II (b)-Modified RURS elbow guard with the conventional design but modified length of the appliance extended at both the ends by2.5 inches worked the same for anti thumbsucking.[31](Fig. 9)

Fig 9: Modified RURS elbow guard.

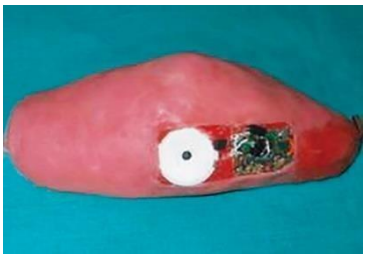

Fig 10: Modified three alarm system- an acrylic elbow guard with a musical chip and speaker incorporated carefully on the outer side of the acrylic.

Fig 11: The switch button was placed in the inner side of the acrylic elbow guard.

Fig 12: Patient wearing the modified three alarm system.

II (d)-Alarming wrist watch- A new device with an alarm placed inside a wristwatch, that was activated when the child tried to move the finger towards and place into the mouth.[33]

(Fig 13) and (Fig 14)

Fig 13: Alarming wrist watch.

Fig 14: Child wearing the alarming wrist watch.

Other methods include use of hand puppet, long sleeve night gowns.[4]

CONCLUSION

The treatment approach of a child with thumb sucking is based on their willingness and severity of the act. The choice of treatment plan must be carefully done keeping in mind the psychological aspect of the child, also. The role of pedodontist is for early intervention as it can prevent the chances of malocclusion due to the habit, at later stage.

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