TEMPORARY MALOCCLUSION TREATMENT AT MIX DENTITION PERIOD
(PERAWATAN MALOKLUSI SEMENTARA PADA PERIODE GIGI CAMPURAN)

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ABSTRACT

The growth and development of primary teeth in children need attention from an early age because primary teeth have an important role in mastication, and speech development and provide a place for the eruption of their permanent teeth. Malocclusion is a condition of dentofacial disharmony that can interfere with mastication, swallowing, speech, and facial alignment. Case Report: A mother and her daughter, 9-year-old, came with the complaint that her daughter's teeth look crowding. The left mandibular canine looks more backward because previously, there were primary teeth that had accumulated and had been extracted, while the two maxillary canines looked crooked. The patient and parents were educated to push the teeth with the tongue daily as often as possible. After a 4-month evaluation, the tooth was in the proper dental arch. However, fixed orthodontic treatment was required when all of the patient's teeth fully erupted to correct the patient's maxillary malocclusion. Conclusion: The growth and development of primary teeth in children need attention from an early age. Malocclusions that are found early, can be treated early to prevent the severity of the malocclusion from increasing.

Keywords: malocclusions; primary teeth; tongue

ABSTRAK

Pertumbuhan dan perkembangan gigi sulung pada anak perlu mendapat perhatian sejak dini karena gigi sulung mempunyai peran penting dalam pengunyahan, perkembangan kemampuan bicara, serta untuk menyediakan tempat bagi erupsi gigi permanennya. Maloklusi merupakan keadaan ketidakharmonisan dentofasial yang dapat mengganggu fungsi pengunyahan, penelanan, berbicara, dan keselarasan wajah. Laporan Kasus: Seorang ibu dan anak perempuannya yang berusia 9 tahun datang dengan keluhan gigi anaknya terlihat tidak rapi. Gigi taring rahang bawah kiri terlihat lebih mundur karena sebelumnya ada gigi susu yang bertumpuk dan sudah dicabut, sedangkan kedua gigi taring rahang atas terlihat gingsul. Pasien dan orang tua diberikan edukasi untuk mendorong gigi tersebut dengan lidah setiap hari dan sesering mungkin. Setelah evaluasi selama 4 bulan, gigi tersebut sudah berada pada lengkung gigi semestinya. Namun, untuk mengoreksi maloklusi rahang atas pasien, diperlukan perawatan alat ortodonti cekat saat seluruh gigi pasien sudah erupsi sempurna. Simpulan: Pertumbuhan dan perkembangan gigi sulung pada anak perlu mendapat perhatian sejak dini. Maloklusi yang ditemukan sejak awal, dapat segera dilakukan perawatan dini untuk mencegah bertambahnya tingkat keparahan maloklusi.

Kata kunci: *Gigi sulung; lidah; maloklusi*

INTRODUCTION

Malocclusion is a condition of dentofacial disharmony that interfere with mastication, swallowing, speech, and facial alignment. Malocclusion can be a barrier to the patient's physical or emotional health that requires treatment. [1,2]

Based on the 2018 National Basic Health Research (Riskesdas) report, 34 provinces experienced dental and oral problems, namely 57.6%. The prevalence of malocclusion in Indonesia is still very high,

namely 80% of the population, and ranks third after caries and periodontal disease. Orthodontic treatment performed was in 0.3% of the 556,921 people examined, and the age group with the most orthodontic treatment was 15-24 years old, with a total of 1.1% of the 86,383 populations examined.[3]

Growth is a physical change and increase in size that can be measured quantitatively, including height, weight, bone size and weight, and tooth growth. The physiological growth pattern is the same for everyone, but the growth rate will differ for each person. Development is an increase in the complexity of functions and the advancement of skills possessed by individuals to adapt to the environment. Development is a behavioural aspect of growth, such as the individual developing the ability to walk, run, and talk, where the individual performs an increasingly complex activity.[4]

The growth and development of primary teeth in children need attention from an early age because primary teeth have an important role in mastication and speech development and provide a place for the eruption of their permanent teeth. So that the permanent teeth erupt with the perfect position and shape in the child's jaw.[4,5]

CASE REPORT

A mother and her daughter, 9-year-old, came with the complaint that her daughter's teeth looked crooked. The left mandibular canine looks more backward because previously, there were primary teeth that had accumulated and had been extracted, while the two maxillary canines looked crooked. The mother wants her daughter's teeth to be treated to make them look good. The patient has had a history of asthma since the age of 4 years. The patient's dental history was the persistence of teeth 33 and 73, then 73 was extracted at the dentist, and 33 grew in linguoversion. The patient denied premature loss and dental trauma and had no bad habits.

Based on family history, the patient's mother had crooked canines, while the patient's father had anterior crowding teeth. Examination of the patient's body mass index is underweight, so the patient is advised to take vitamins. The patient's growth and development are average, walking is normal, and there are no signs of secondary maturation. The patient and his parents expect treatment so that the lower canine teeth are neat.

Revealed an asymmetrical face with disharmonious facial proportions and a convex facial profile. The patient's lips are symmetrical, the proportions are normal, the relation is competent, and the tone is

normal. On palpation of the temporomandibular joint, there were no abnormalities. On intra-oral examination, the maxillary and mandibular labial frenulum and right and left buccal frenulum were classified as moderate. U-shaped palate, medium size, medium depth. There were no ulcerations, fissures, and no abnormalities in the papillae/rugae.

Figure 1. Extraoral photo.

Intraoral examination showed that in the lower jaw, teeth 43 had linguoversion, while in the maxilla, teeth 13 and 23 were ectopic. In addition, there was the persistence of teeth 25 and 65, so teeth 25 were palatoversion.

Figure 2. Intraoral photo before treatment.

At this age, this patient is in the ugly duckling face phase and can be seen on the patient's upper and lower jaws according to the phase of his age so that in the future, there will likely be enough space for permanent teeth to grow.

Diagnosis based on Angle classification includes extraoral and intraoral examination, one of which is an examination of the relationship between the maxillary and mandibular first molars and the relationship of the canines on both sides of the jaw. This patient was diagnosed with Malocclusion Class I Angle types 1 and 3.

Diagnosis based on Profit and Ackerman includes the following criteria: Evaluation of facial proportions and

aesthetics: The face is not symmetrical and not harmonic. Evaluation of alignment and symmetry with the dental arch: ALD in the maxilla showed results for extraction, whereas the maxilla showed results for expansion. Evaluation of skeletal and dental relationships in the transverse plane: The point analysis results showed indications for maxillary and mandibular expansion—assessment in the anterior-posterior plane. The last is evaluation in the vertical plane.

Then the patient and parents were educated to push the teeth with the tongue daily and as often as possible. After a four-month evaluation, the tooth was in the proper dental arch. However, fixed orthodontic treatment was required when all of the patient's teeth fully erupted to correct the patient's maxillary malocclusion.

Figure 3. Intraoral photo after treatment

DISCUSSION

The initial change in the outer tooth tissue before the crown erupts changes the connective tissue of the dental follicle to form a cavity or a pathway for tooth eruption. Histologically, the coronal portion of the dental hair is densely packed with monocytes with osteoclasts involved in bone resorption and the formation of ways for eruption. The eruption pathway appears as a zone where the connective tissue is not visible, the cells degenerate and decrease in number, the blood vessels become less, and the terminal nerves are damaged and degenerated.[4,6]

For successful tooth eruption, there must be a lot of resorption in the overlying bony crypt, the tooth germ and face growing forward and sideways. Osteoclast cells differentiate and reabsorb the bony crypt outside the tooth to have erupted. Resulting in an increase in the dimensions of the eruption pathway and the freedom of the tooth to move to the oral mucosa. [3]

The small foramina of the mandible and maxilla are evidence of the eruptive pathway of the permanent anterior teeth. Root resorption is primarily processed in the same way as bone

resorption. When the root is resorbed, the primary crown bond is reduced, and then the crown is lost, which forms an outlet for the eruption of the premolars. Most roots are entirely reabsorbed, and the primary pulp wholly degenerates. [1-3]

The dental follicle forms connective tissue, so gradually, an eruptive movement begins, and collagen fibres develop between the root and the alveolar surface. In periodontium, the fibres are prominent in the cervical area of the root and extend at a coronal angle to the alveolar processes. Alveolar bone undergoes remodelling to accommodate root formation, whereas when the large crown moves occlusally, the bone fills to match the smaller root diameter. [1-3,7]

Other collagen fibres are seen along the root formation during the eruption process. This area becomes filled with fibroblasts that have the contractile ability to bond to the periodontal joints. At the beginning of the eruption process, the fibre holes bind the cementum to the root surface and alveolar bone. Some of the fibres escape during the tooth's eruption, then enter and re-bind to stabilize the tooth. [7-8]

Alveolar bone remodelling continues during an eruption as the teeth move in an occlusal direction. The alveoli increase in height and change shape to accommodate the crown portion. The crown of the tooth moves in an occlusal direction and deposition of new bone around. The activity of osteoblasts and osteoclasts is at the top and around the crown. This action is coordinated throughout the entire eruption process. [7-8]

Changes also occur in the follicular tissue beneath developing teeth. When a tooth erupts, space is provided to extend the root as the crown moves occlusal and elevates the alveolar bone. The roots move much faster during the pre-eruption and early eruption phase than in other phases. The trabecular bone appears in the fundic area, compensating for tooth eruption and supporting the apical tissue. At the end of the pre functional eruption phase, when the teeth are occluded, about 1/3 of the enamel is covered by the gingiva. Root refinement continues long after the tooth has performed its function. This process occurs for 1-1.5 years in primary and 2-3 years in permanent teeth. [7]

The primary teeth are smaller and less numerous, according to the baby's small jaw. Detachment or tooth loss is the loss of primary teeth due to the physiological resorption of their roots. Permanent teeth will then replace the primary teeth that fall out. The process of changing primary teeth begins with the resorption of alveolar bone and roots from primary teeth. Then proceed with forming

roots by cementoblasts and odontoblasts—the periodontal ligament formed in the permanent teeth. The movement occurs the force that pushes the primary teeth towards the occlusal direction, and the adult teeth push to the resorption area. This causes the primary teeth to weaken and fall out.[1,2,8]

After the teeth emerge, the environment in the oral cavity will affect the further development of the teeth. The tongue in the lingual position changes the position of the incisivus maxilla & incisivus mandible from the buccal side, and lips & cheeks press against the tooth surface. [1,2,8]

Teeth continue to erupt until there is back pressure in the vertical direction through contact with opposing teeth. Placement of the tongue on the occlusal surface of teeth incisivus mandibula can act as back pressure against the eruption & stop the eruption. [1,2]

Occlusion is the way the maxilla and mandible teeth articulate. Dental occlusion is a complicated relationship because it includes the study of teeth, tooth morphology, angulations or angles, muscles of mastication, skeletal or skeletal structures that influence, TMJ and jaw movement. Occlusion also involves problems with the neuromuscular system.[1,9]

Occlusion of teeth is discussed under the following two headings: Static occlusion, which refers to the position where the upper and lower teeth are in contact. Functional occlusion refers to the functional movement of the mandible and the lower teeth in connection with the upper teeth. [3]

The pattern of varying tooth position is determined by the size, shape and relationship of the jaw to the muscles of the lips, cheeks, and tongue. The teeth develop in the jaws and erupt into the oral cavity. The teeth are directed into position by the face and tongue muscles, ideally with the tongue in the interior of the dental arch and the lips and cheeks forming a peripheral guiding pressure.[2,3]

Tooth eruption is directed by the muscle activity of the lips, cheeks, and tongue. The development of mixed dentition occlusion is considered to be in 2 stages.[1]

Stage I Relates to replacing the primary incisors and adding the four permanent first molars to the dentition. This condition usually occurs at the age of 6-8 years. The permanent incisors will erupt slightly more proximally than the primary incisors to form a smaller incisor overbite when the teeth are in occlusion. This proclination also plays a role in increasing the size of the jaw arch.[1]

Stage II involves the replacement of primary molars and canines with permanent premolars and canines, and the

addition of second molars. This stage usually takes place at the age of 10-13 years. The first premolars usually erupt first at this stage and occlude in such a way that the distal slope of the mandible premolars occludes with the mesial slope of the occlusive surface of the maxilla premolars. Thus, the tip of the cusp of the upper premolar will be in the same vertical plane as the distal surface of the lower premolar.[1]

The premolars will then erupt into the same relationship. At approximately the same time, the canines will erupt into occlusion so that the tips of their protrusions differ in the same vertical plane as the distal surface of the lower canine.[1]

The physiological functions of the oral cavity are swallowing, mastication, speech and respiration.1 The pressure pattern of the orofacial muscle complex is related to normal swallowing patterns. Swallowing activity produces pressure on the orofacial complex. A person swallows 2000-2400 times for 24 hours, while a child swallows 800-1200 times for 24 hours. The results showed that the pressure produced by the tongue during swallowing was 40-700g/cm^2. Therefore, the wrong swallowing pattern will affect the orofacial muscle complex.[7,8]

According to Garliner, the three muscles that affect the occlusion of teeth during swallowing are (1) the tongue muscle, which functions as a propulsion and restraint force from within the mouth; (2) the masseter and buccinator muscles. These two muscles will be activated every swallowing movement. There is a failure of muscle activation caused by an incorrect tongue position; (3) the orbicularis orris muscle plays a role in stabilizing the teeth, namely as a natural anchor for the anterior teeth. The balance between these three muscles is called the triangular force concept.[8]

The tongue's position in relation to the upper and lower incisors during swallowing will interfere with lip function. Placement of the tip of the tongue between the upper and lower incisors during swallowing, the tongue will hold the lower lip in contact with the upper teeth. The result is blocking the function of the orbicularis orris as a stabilizing barrier, so that eventually the muscle becomes weak.[7.9]

Development of the Swallowing Process The orofacial muscle complex is complete from birth. This is useful for babies to survive and learn about their surroundings. Swallowing patterns in infants are called infantile swallowing patterns. The hallmark of infantile swallowing is characterized by active contraction of the lip muscles and the tongue's tip in contact with the lower lip. In contrast, the posterior tongue and

pharyngeal muscles contract slightly. The posterior tongue and pharyngeal muscles are not fully maturated. The infantile swallowing pattern will last until the child is one year old or after the eruption of the primary incisors.[3,8]

In line with the child's development, the mandible elevator muscles begin to function and the child's swallowing pattern begins to change, called the transition period. The complex posterior tongue movements show a marked transition from the infantile swallowing pattern. The adult swallowing pattern is characterized by reduced lip muscle activity. When the lips are relaxed, the tip of the tongue is placed on the alveolar process behind the upper incisors, and the posterior teeth are occluded during swallowing. [1,7]

The normal adult swallowing process is (1) the tip of the tongue is placed behind the maxillary incisors; (2) the centre of the tongue is raised so that it is in contact with the hard palate; (3) the back of the tongue forms a 450 position against the pharyngeal wall; (4) in line with the activity of the tongue, masseter and buccinator muscles, pressing towards the mid-line; (5) the orbicularis oris muscle presses the upper incisors posteriorly.[1,7,9]

CONCLUSION

The growth and development of primary teeth in children need attention from an early age. Malocclusions that are found early, can be treated early to prevent the severity of the malocclusion from increasing. This is so that the permanent teeth can erupt with the perfect position and shape in the jaw arch.

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