Journal Homepage: - www.journalijar.com
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)
Article DOI: 10.21474/IJAR01/2024
DOI URL: http://dx.doi.org/10.21474/IJAR01/2024
ISSN NO. 2320-5407

RESEARCH ARTICLE

DENTAL SPACE MAINTAINERS: A BRIEF REVIEW.

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Manuscript Info

Manuscript History

Received: 25 September2016
Final Accepted: 9 October 2016
Published: October 2016

Key words:-
Orthodontics, Maintainers Space, Historical Evolution, meta-analysis.

Abstract

Background:- In Brazil, found defects in primary teeth between the ages of 7 to 15 a prevalence of 6%. In another survey, 119,000 school children examined, an index of 51% of malocclusions was found, and in 80% of these, it would be one preventive orthodontic treatment guidance.

Objective:- To explore the literature findings on the importance of knowing the advances in orthodontics, as well as introduce the types of existing space maintainers and the importance of its use for rehabilitation in functional, aesthetic and psychological patient.

Methods:- To identify the studies in this review, a detailed search strategy was conducted for Medline (Pubmed), Scielo and Bireme in the years 1997-2016, as well as books and magazines related to the topic.

Brief review:- The space maintenance is one of the most important activities in the prevention of malocclusions. The purpose of the primary dentition is to keep the arch perimeter so that the successors erupt normally, hence great importance should be given to the loss of teeth at this stage. However, attention should be given to the loss also of young permanent teeth.

Conclusion:- The selection and use of space maintainers must be made with the view apparatus having the highest possible number of desirable requirements to achieve significant results.

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Introduction:-

In Brazil, it found defects in primary teeth between the ages of 7 to 15 a prevalence of 6% [1]. The largest numbers traumatic injuries in deciduous teeth, occur between one and a half and three years old and in permanent teeth between 7 to 10 years, and boys are more prone to dental injuries than girls [1,2].

In another survey, 119,000 school children examined, an index of 51% of malocclusions was found, and in 80% of these, it would be a guiding preventive orthodontic treatment [2]. In a study conducted by Brauer incidence of malocclusions, with a total of 41 patients examined, 42 were found premature extractions first primary molars and 71 premature extraction of primary second molars [3]. The aesthetic / functional rehabilitation is necessary until the

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occurrence of the eruption of permanent successors teeth [4]. A practical option to obtain this rehabilitation is through the installation of aesthetic space maintainers or functional [7].

Thus, space maintainers are orthodontic appliances that replace one or more primary teeth and are used to preserve the space for the successor permanent tooth, avoiding suffering deviations during its outburst [8,9]. These devices, regardless of the design chosen, should be as credible as possible to the case. However, there are a number of necessary requirements, such as maintaining the desired interproximal space, not interfere with occlusion of antagonist teeth or with the eruption of the permanent tooth, allow sufficient mesiodistal space for the alignment of the permanent tooth eruption, not inferring in phonetics and mastication and present a simple framework and be easy to clean. [10]

The space maintainers are important when there is early loss of deciduous teeth by caries and trauma. According Korytnichi et al (1994), the early loss of the second primary molars upper or lower after the eruption of the first permanent molars entail closing space, especially when the permanent successor to take erupt [11].

Barber (1982), said that even the permanent molars are in occlusion, this fact will not prevent the slope of permanent, though the loss of the space will be less severe than that observed during the active movement of the eruption [2]. Still, according to Hinrichsen (1982), the installation of a maintainer is necessary in order to avoid harmful effects to the normal development of occlusion which may result in future malocclusion problems such as shortening the arc, mesial slope of the first permanent molar and impaction of the second premolar even managing to break, be directed by lingual or palatal accompanied by spin-versions, supra-eruption of the antagonist teeth and commitment of future periodontal support [3].

The partial or total loss of tooth structure results in a reduction of available space in the arc, causing structural and functional imbalance. Each tooth should remain harmoniously in its correct position, aligned with proximal contacts, semi-elliptic curves for the jaw and satellite to the jaw, receiving the action of external and internal muscle forces [4]. Where one of these forces is changed or removed, there will be changes as dental migration and loss of space, leading to occlusal disharmony with deleterious consequences to the stomatognathic system of the child and may cause discrepancy between this space and the space required for the irruption and accommodation of all permanent teeth [12-14, 15].

By the age of six, the first permanent molar should erupt, and the lower before higher, preferably [1]. These teeth after breaking out, they seek occlusion with antagonists guided by the distal surface of the second primary molars [2]. Thus, early loss of deciduous molars affect the occlusion of the first permanent molars. Changes in exfoliation time of deciduous teeth depend on several parameters, including genetic and environmental. It is considered a tooth lost prematurely when there is at least six months before the loss of the same tooth, or when the primary tooth does not exfoliate before half to three successor tooth root quarters is formed [4,18].

This study aimed to explore the literature findings on the importance of knowing the advances in orthodontics, as well as introduce the types of existing space maintainers and the importance of its use for rehabilitation in functional, aesthetic and psychological patient.

Methods:-

For the identification of studies in this review, a detailed search strategy was conducted for Medline (Pubmed), Scielo and Bireme in the years 1997-2016, as well as books and magazines related to the topic. They were used as descriptors: “orthodontics”, “space maintainers” and “historical evolution”. Analyzed studies systematic review (meta-analysis) based on PRISMA, controlled and randomized cases, clinical cases nonrandomized and opinion articles that addressed the term "Maintainers Space".

Continuous Predictors:-

The continuous predictors were malocclusions.

Response Predictor:-

The response was predictor maintenance space.

Literature Review:-

The idea of aligning the teeth back times 1,000 years A.C. Archaeologists have discovered ancient mummies with crude metal bands tied around individual teeth. So that the spaces were closed were used cords that did the work they do orthodontic wires today. Reports Romans 25 A.C. said the teeth could be moved by finger pressure [17].

Between 400 and 500 A.C. Hippocrates and Aristotle commented on the ways to align and fix the condition of several teeth. There are reports in ancient Greece on devices to keep spaces and prevent the collapse of teeth during life [1.17]. Although several reports and evidence of the desire to align teeth date back well before Christ, only around 1700 there were really significant events for orthodontics. In 1728, the French dentist Pierre Fauchard published a book called "The Surgeon Dentist" with a chapter on how to straighten teeth. Fauchard used a device called "Bandeau", a piece horseshoe-shaped and made of precious metal that helped expand the arch and align the teeth [12,14].

The term orthodontics only came in 1841, with Joachim Lefoulon. The first books on orthodontics were published around 1880. The first "Treaty of oral deformities" was written by Norman Kingsley, a dentist, writer, sculptor and artist. [13] In the early twentieth century came the first simplified system of classification of malocclusions (Class I, Class II and Class III), and is used today, this system was created by Edward H. Angle, perhaps the most famous character in the story orthodontics and considered by many as the father of modern orthodontics. Angle contributed much to orthodontics through orthodontic appliances enhancements and many other simplifications [21,22].

Also, Edward H. Angle founded the first school of orthodontics and organized the American Society of Orthodontics in 1901, which was to become the famous AAO (American Association of Orthodontics) in 1930. Angle founded the first orthodontic journal in 1907. it was from Angle that orthodontics has become a reputable specialty of dentistry. Angle left still famous disciples like Charles H. Tweed, Cecil Steiner and others [19].

]In 1940, in a survey of 476 children between two and nine and a half years old, a 40% incidence of premature extraction of primary molars were found. In many cases there seemed relationship between these extractions and intensity of certain malocclusions, although it was not possible to establish a relationship of cause and effect [20].

The ideia to maintain by artificial means the spaces produced by the early loss of temporary teeth seems to belong originally to Angle. Convinced that a high percentage of malocclusions are caused by these early losses, proposed in 1907, a space maintainer that remained without many variations, even for prolonged residence time in the oral cavity [23].

In the literature there are initiatives to use maintainers since 1924. From 1930, the authors recommend and talk about the need to use such devices. Quinteros, Fischer, Goberer, Hogeboon, among others, are authors who proposed rigid type space maintainers. The author mentions that such devices have spent some time of his advent, totally repudiated by its rigidity as compared to the normal development of the jaws. With a few variations, were bands adapted to molars and welded wire joining the two extremes [25]. Furthermore, Chapin, Strang, BiermanLancett, Foster, Morgan and Willet physiological maintainers were first mentioned in the literature, which allow the normal movements of the teeth and had shape variations [26].

Types of Maintainers Space:-

With respect to the function of the space maintainers can be classified as functional, presenting advantages: restores mastication, extrusion prevents the antagonist is aesthetic [1]. Disadvantage: it depends on the cooperation of the patient, eg removable plate with artificial teeth [2]. They can also be non-functional, with the advantages: it keeps this space for the eruption of the permanent successor, keeps the perimeter and shape of the arch, and also prevent the midline shift and disadvantages: they are not aesthetic, do not return to mastication, extrusion or prevent tooth antagonist, for example: lingual arch, band-crown strap and handle [1-3].

In relation to your use of the space maintainers can be fixed Advantage: no collaboration Disadvantage: it is not functional. Example: lingual arch, band-handle and crown handle. And also removable, presenting the advantages: they are functional, easy to clean, less pressure on the remaining teeth are aesthetic and disadvantages: loss, fractures, tissue irritation, depends on the cooperation of the patient [3,4].

The maintainer appliance removable functional space, suitable for bilateral tooth loss and multiple extractions are used for their manufacture teeth prefabricated acrylic resin, featuring advantages: preserve the space and maintain the adjacent teeth in their positions; Antagonists prevent extrusion of the teeth; They are functional aesthetic; easy to clean and easy construction [9].

The band strap is a fixed device, suitable for maintaining the space of the posterior teeth of the arch. The handle should be sufficiently wide to allow the eruption of the permanent tooth without the need for device removal, should also be close to the mucosa without pressing it. The band-strap advantages is the ease of manufacture, short clinical sessions, and the low cost of the material, however, does not return the masticatory function or prevent antagonist extrusion [31].

There is also a variation of the strap band called crown-handle where the handle is welded on a chrome steel crown that are used in cases of extensive carious lesions requiring restoration of dental crown. When there is no more need for the device to handle is removed, remaining the crown as tooth restoration [13]. The aesthetic device Functional Fixed is indicated when there is loss of a primary tooth before the correct period under normal conditions, occurring malocclusion [13].

The Lingual Nance Arch is a maintainer device fixed space, consisting of an arc tangent to the lingual surface of the lower incisors at the time of cervical thirds, and welded the ends of the strips installed in the lower first permanent molars. Suitable for in cases of bilateral multiple extractions of deciduous teeth [32].

The Nance button is a fixed orthodontic appliance supported dental-mucus, suitable for multiple and bilateral loss of upper molars, and serves as intraoral anchoring mechanism as: stabilization of molars distalized for coupled orthodontic forces or not to own Nance button, anchoring the upper arch during the alignment phase and anchorage for retraction of the premolars and canines, and allows various modifications to the original device. The Nance button can be welded in the molar band or embedded in placed lingual tube on the palatal face of the bands, allowing the removal [32].

The Palatine bar usually serves as an anchor, keeping the molar teeth in place not to lose space in the dental arch, or to not have working version. The Palatine Bar can also be welded in the bands of the molars, or embedded in the lingual tube on the palatal face of the bands allowing the removal and activation more easily [34].

The conservation of deciduous teeth with changes caused by carious lesions and trauma is one of the major objectives in pediatric dentistry. Premature loss of those teeth can leave many consequences, including the loss of space needed for permanent replacements [33]. Traumatic injuries of the anterior teeth in children reach a high percentage of difficult prevention. Falls always appear as the main factor, because they occur in sports, games and toys very often, usually with children. However, they are also common traumas of reports produced by some object or automobile accident. [33]

Whatever the type of early tooth loss, will cause unwanted movements that could compromise the occlusion of the patient. Therefore the correct diagnosis prevents not occur inadequate planning space maintenance. The clinical and radiological are basically correct and safe to make the diagnosis. In radiography can check the stage of development of the germ and the eruption chronology tables that will be useful for a proper diagnosis of early loss, as well as the consequences suffered the trauma [33].

Keep space for the eruption of permanent successors teeth during periods of deciduous and mixed dentition is important for the normal development of occlusion, but also other requirements must be observed and analyzed, because the loss of the teeth lead speech problems, swallowing, chewing , bringing the language and aesthetics. [34]

Thus, it is recommended to install the maintainer of space apparatus, since their aim is to prevent or reduce irregularities that may make permanent teeth as dental deviations. The types of space maintainers should be given to patients taking into consideration the age and the factor of cooperation, generally children at an early age are recommended fixtures, and removable for children with greater awareness of the use and cleaning [28.34].

The maintainers devices can not remain in the archway beyond the time that would normally be the tooth which replace. If they do, they are preventing the normal migration of permanent molars and may also cause malocclusions

similar to the stay in the arcade, temporary teeth retained beyond the normal time. So, so break the permanent tooth in the oral mucosa, the device that keeps your space should be removed immediately. [28]

Table 1:- Main Requirements Of Space Maintainers [2].

Main Requirements Of Space Maintainers(Based on Mc Donald e Telles)
• Fulfilltheirpurposes;
• Maintain adequate space for eruption of permanent tooth;
• Be functional;
• Restore function if the eruption of the permanent tooth is longer than six months;
• Be sturdyandsimple;
• Lowcost;
• Easypreparation;
• Aesthetic;
• Easycleaning;
• Do not exert pressure on the tissues;
• Do not damage the teeth that were serving support by applying excessive force;
• Not prevent the growth and development of surrounding structures;
• Not interfere with the eruption of permanent;
• Do not change the speech, chewing and swallowing;
• Preserve the independence of the teeth that serve as a basis;
• Have at least two supporting bases;

Discussion:-

The space maintenance is one of the most important in the prevention of malocclusion activities. The purpose of the primary dentition is to keep the arch perimeter so that the successors erupt normally, hence great importance should be given to the loss of teeth at this stage. However, attention should be given to the loss also of young permanent teeth [27].

Manipulation of premature loss of deciduous teeth requires care, especially when done by the clinical dentist. Consequences of inadequate procedures have serious repercussions on the normal tooth development [28]. The loss can compromise the eruption of permanent teeth and decrease in arch perimeter. Maintaining the loss of space is of paramount importance to ensure the outbreak and normal dentition [28].

The strategy for maintaining space in the primary dentition and mixed is first understand the problem to plan treatment. The subsequent treatment differs from region to above and also causes. Loss in the anterior region is usually due to trauma, which is common when the child is learning to walk. Cavities rampant would be the reason for loss of anterior and posterior teeth.

Most later are lost by caries, rarely trauma [29]. For the maintenance of tooth loss spaces indicated is the use of maintainers devices space, if you have not been wasted space because the permanent tooth may take months to erupt [30].

Conclusion:-

The orthodontic appliances, dental rebuilding faces properly, are a means of keeping the primary longer before extraction. However, there are still professionals who do extractions of deciduous teeth without considering the consequences and the ways to prevent complications and malocclusions. Thus, the selection and use of space maintainers must be made with the view apparatus having the highest possible number of desirable requirements to achieve significant results.

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