

Multidisciplinary treatment in cases of dental agenesis - literature review

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Abstract—Tooth agenesis is the absence of one or more teeth in both deciduous and permanent dentition. This anomaly occurs during intrauterine life and is usually associated with other developmental anomalies. It is one of the most common anomalies in human beings, affecting about 25% of the population, with higher prevalence in females. The aim of this study was to perform a literature review on the multidisciplinary treatment between orthodontics and implant dentistry in cases of tooth agenesis. The affected patients require orthodontic treatment prior to implant installation because, in addition to aesthetic dissatisfaction, they also present with functional complications such as Class II and III malocclusions. This approach is still not widely used and studies are scarce, but it is the best when the goal is to restore aesthetics and function to the patient. An effective orthodontic treatment performed before installing an implant is of utmost importance to achieve good results at the end of treatment. The immediate load implants are the most indicated for these cases because they have several benefits and the number of surgical interventions is only one.

I. INTRODUCTION

Dental agenesis is one of the most common anomalies in human beings, affecting about 25% of the population, with a higher prevalence in females. Ethnicity is related to the predominance of agenesis, with black patients being less affected and Asian patients being more affected. It is an anomaly arising from disturbances during the stages of odontogenesis, it is usually present during permanent dentition. Its etiology is multifactorial and may involve genetic, environmental, radiation, and the main one is heredity (BARBOSA et al., 2016; E SILVA et al., 2018; SIRIANNI et al., 2019).

This anomaly can be classified as hypodontia, oligodontia and anodontia, according to the amount of

dental elements involved. Hypodontia affects 0-6 dental elements except third molars, oligodontia affects more than 6 dental elements except third molars and anodontia is the absence of all dental elements. Hypodontia is the most common alteration and even though it is not a public health problem, this alteration can cause some problems such as speech disorders and chewing difficulties, and can also cause aesthetic problems and harm the individual's self-esteem (BARBOSA et al., 2016; SIRIANNI et al., 2019).

The diagnosis can be made through clinical and radiographic examinations, it is extremely important that this diagnosis is made as soon as possible, in order to receive the proper treatment. Patients affected by this

anomaly present complications in their masticatory and phonetic conditions, malocclusions, and compromised esthetics (BARBOSA et al., 2016).

Orthodontic treatment is one of the options for patients with this condition and who are still in the growth phase, another dental element is used to correct the absence and after this movement, to have a more favored esthetics, it is necessary to make a contour with composite resin in moved element to look more like missing tooth element. However, the best treatment option, considering functional and aesthetic factors, is that of a multidisciplinary approach, involving orthodontics to maintain space, align and level the dentition, and implantology (RÉDUA, R.B; RÉDUA, P.C., 2018).

The installation of implants with immediate loading has been presented as an excellent option for rehabilitation of patients with no dental elements, they demonstrate great satisfaction with the procedure during and after surgery. The success rate of this technique is high if all surgery protocols are followed, and the main one is primary stability, as it is involved with the implant osseointegration process. And among the main benefits, we can mention: less time to complete the treatment, possibility of applying load in a few days, recovery of esthetics and functionality in a way that the biomechanics of the implant is not harmed (ASSIS et al., 2019; MONEZI et al., 2019).

Oral rehabilitation through implants was facilitated through pre-surgical planning, thus having excellent results and predictability of treatments with immediate loading implants, returning with the aesthetics and functionality of the patients' dental elements in addition to providing psychological well-being and safety for professionals who will perform the treatment (MENEZES et al., 2020).

In this paper we will present a literature review on dental agenesis, its causes and possible forms of treatment, aiming at a multidisciplinary treatment that restores function and aesthetics to patients, articles published from 2016 to 2020 were used.

II. LITERATURE REVIEW

Dental agenesis is the absence of one or more dental elements in both primary and permanent dentition. This anomaly occurs in intrauterine life when there is a change in normality and is constantly associated with other developmental anomalies, such as microdontia (SILVA et al., 2018; SIRIANNI et al., 2019). Dental agenesis can generate several problems for the patient, such as malocclusion, periodontal problems and problems in the

temporomandibular joint, thus being very important for orthodontics and pediatric dentistry. patient self-esteem (SILVA et al., 2018; SIRIANNI et al., 2019; SANTOS et al., 2017).

This change from normality is classified according to the number of dental elements that did not develop, being hypodontia, oligodontia and anodontia. Hypodontia is the absence of 1 to 6 dental elements, patients who have hypodontia differ in skeletal features, a common feature in these patients that occurs because of an absence of neighboring dental elements or because of a shortage of space for the eruption of the teeth. dental elements is the ectopic location of adjacent dental elements (BARBOSA et al., 2016; RÉDUA et al., 2018).

Dental agenesis refers to a genetic syndrome that causes mutations in genes MSX1, AXIN2 and especially in PAX9, as it acts in the formation of the mesenchyme during odontogenesis. These genes are responsible for the development, shape and position of dental elements, so if any disorder or mutation affects any of them during the initial phase of the element's development, it may result in deformation or even loss of the element. Recently, in some studies it was verified that the mutation in the LRP6 gene also involves tooth agenesis (FAUZI et al., 2019; SILVA et al., 2018).

Tooth agenesis can affect both primary and permanent dentition, however, it is more often diagnosed during permanent dentition. In primary dentition, it is more unilateral, and in permanent dentition its greatest prevalence is bilaterally when it involves the upper lateral incisors, whereas in other dental groups it is more unilateral (AL-ANI et al., 2017). The dental elements most affected by this anomaly are the third molars, followed by the lower second premolar, upper lateral incisor and upper second premolar (MORENO et al., 2019).

The hereditary factor is considered the greatest determinant of hypodontia, yet a study was carried out in order to investigate some possible risk factors for causing hypodontia, in this study it was found that consuming 10 or more cigarettes a day during pregnancy causes greater chances of a child developing hypodontia (AL-ANI et al., 2017; SILVA et al., 2018). Hypodontia can cause several problems, both functional, such as decreased chewing ability, open bite and malocclusion, as well as aesthetic problems, which can cause psychological disorders to the patient. multidisciplinary (RÉDUA et al., 2018; SILVA et al., 2018).

The treatment of patients with hypodontia is flexible according to the severity, in many cases a multidisciplinary approach is necessary, however the use

of removable partial dentures has its weaknesses, as the results can be unsatisfactory. The multidisciplinary approach between orthodontics and implantology is very effective in the treatment of hypodontics, with an adequate use of orthodontic treatment may be able to reduce the loss of bone tissue, and this treatment also brings root parallelism, thus facilitating the surgery of placement of dental implants, the strategy of orthodontic treatment is the preservation of bone tissue and keratinized mucosa, the use of space retainers is essential so that the place for placement of dental implants is reserved for patients who have been treated with the use of implants dental procedures showed very satisfactory results, with the return of functionality and favorable aesthetics (ATTIA et al., 2019; REDUA et al., 2018).

Patients affected by tooth agenesis need orthodontic treatment prior to implant placement because, in addition to dissatisfaction with esthetics, they present impairment in the functional part, such as Class II and III malocclusions (BORALI et al., 2018). Orthodontic treatment is also extremely important to maintain the space for the installation of the definitive implant, because through some studies it was possible to observe that the implant must present a distance of 1.5 to 2.0 mm from the adjacent teeth to avoid complications such as: root damage and peri-implant bone loss (REDUA et al., 2018; SASAKI et al., 2018).

The planning of orthodontic treatment needs to be very well prepared and in conjunction with the installation of implants that will take place later, since it has been proven in research that patients who undergo treatment with fixed braces for a very long time or poorly planned have bone loss significant due to the movement of dental elements (JAGER et al., 2017). This bone loss can negatively interfere in the osseointegration process, the key to dental implant success, and this can be considered a risk factor for it (ALGHAMDI, H.S; JANSEN, J.A., 2020).

A multidisciplinary approach in these cases of tooth agenesis is necessary from the beginning to the end of the treatment in order to have a satisfactory result in esthetics for the patient and a stable occlusion for the installation of implants (AOKI et al., 2018). Having a stable occlusion is one of the criteria for indicating immediate loading implants, as it is believed that this factor, together with: healthy periodontium, bone quality, absence of parafunctional habits, good hygiene, systemic condition of the patient and others, are closely related. linked to the implant success rate (MONEZI et al., 2019).

III. DISCUSSION

Sasaki et al. (2018), mention that without performing an orthodontic treatment prior to implant placement, in cases of agenesis, it is not possible to guarantee that the mesiodistal space will be adequate to receive it. After all, the deciduous dental elements have quite different sizes from the permanent ones, which are usually affected by agenesis. Likewise, Al-Ani et al. (2017) report that treatment in orthodontics should be carried out in early adolescence, which is when most of the growth has already taken place and the other dental elements in development are erupting.

In the study by Hong et al. (2017), it was observed that over the last 30 years the use of dental implants for the rehabilitation of patients who have lost dental elements congenitally or not, has grown a lot, becoming popular due to its high success rate and few complications. Yildiz et al., (2018) add that the immediate load implant has been quite indicated, especially for anterior regions of the maxilla and mandible, because in addition to reducing surgical interventions, it also reduces bone loss in the peri-implant crest, resulting in a good soft tissue healing and positively contributing to esthetics.

According to Assis et al. (2019), the installation of dental implants with immediate loading has become an excellent alternative to replace missing dental elements, meeting the expectations of patients immediately in terms of aesthetic issues. For Buser et al. (2017), it is mentioned that there are still cases in which the installation of implants needs to be postponed, for reasons of the patient: not being at the appropriate age to receive the implants, pregnant or for work reasons; and for local factors: bone lesions, root cysts and inadequate bone volume to receive an immediate loading implant.

Assis et al. (2019) also describe that the immediate loading technique is contraindicated in cases where the patient has a diagnosis of bruxism, changes in bone metabolism, uncontrolled diabetes and habits such as smoking, as these factors are capable of interfering with the primary stability of the implant. It is enhanced by Gupta et al. (2017) that the essential requirement for the successful installation of a dental implant with immediate load is primary stability, because during the osseointegration process it will be gradually replaced by biological stability.

Thus, Tettamanti et al. (2017) identified that the success of this technique depends not only on bone quantity, but also on bone quality and on the type of occlusal load that this implant will receive. The rehabilitation of one or more missing dental elements

using this technique proves to be reliable and effective, offering comfort, esthetics and function to the patient.

IV. CONCLUSION

Multidisciplinary treatment for cases of tooth agenesis has not been widely used and there is a scarcity of studies on the subject, but it can be concluded that it is the best technique aimed at the patient's aesthetics and function. Thus, an effective orthodontic treatment performed before the installation of an implant is extremely important to obtain good results at the end of the treatment. Immediate load implants are the most indicated for these cases because they have several benefits and the number of surgical interventions is only one.

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