Agenesis of an upper lateral incisor: case report and literature review

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Abstract

Agenesis is a condition, generally congenital, involving the absence of one or more elements in the arch. It can involve both deciduous and permanent dentition, compromising the aesthetics, but also the function, of the patient's dentition. The appropriate clinical approach does not involve the application of a single branch of dentistry, but rather a multidisciplinary approach is essential.

Key words: Agenesis, Lateral incisor, Single implants, Orthodontic treatment.

Purpose

The present study focuses on agenesis of the upper lateral incisors, in particular of the 2.2 element, by means of a literature review and the description of a case report that aims to propose a possible clinical approach for the treatment of agenesis of a 2.2. The treatment chosen was an implant-prosthetic rehabilitation, preceded by orthodontic treatment for the distalisation of the ectopic 2.3 element. We therefore present the clinical results obtained following the choice of this treatment plan.

Materials and Methods

Following the objective examination, it was possible to diagnose agenesis of element 2.2, the seat of which was occupied by element 2.3. This directed the treatment plan towards an initial orthodontic treatment that distalised the ectopic canine; it was subsequently treated endodontically and prosthetically. Once the treatment was completed, after informed consent and drug treatment, implant placement was performed in site 2.2 and subsequent prosthesis of the same.

Results

Follow-up at 12 months after functional loading showed excellent healing of the patient's hard and soft tissues on both intraoral objective examination and radiographic examination.

Conclusions

Agenesis of a tooth element can be treated optimally, with a good prognosis over time, if the clinical approach is multidisciplinary and accompanied by a correct clinical evaluation of the patient.

Introduction

Dental agenesis is defined as the failure to form a tooth follicle, which therefore does not lead to the development of the element itself [1,2]. The percentage of the population affected by agenesis is between 6-10% and there are cases in which this failure to develop affects more than one tooth: in this case, we will speak of multiple agenesis [3,4]. The factors that can lead to problems of this type are divided into internal and external. The factors defined as internal can be associated with genetic disorders, hereditary and/or hormonal imbalances; those defined as external can for example be due to trauma, malnutrition, systemic and/or local infections [5,6]. Agenesis can affect both milk and definitive teeth and tends to occur in a greater percentage in the lower jaw, bilaterally affecting the lateral incisors [5]. In the second case, it is important to assess the timing of tooth replacement. This is because we must neither be too hasty in giving a diagnosis of agenesis, nor too cautious and risk making the problem worse by not intervening. An agenesis, especially if multiple, can in fact bring various problems to the patient such as problems with occlusion, social problems due to incorrect phonetics or aesthetics and problems during chewing [7,8,9]. A dentist therefore has mainly three paths to follow to remedy this problem. That of the orthodontic approach, aimed at closing the spaces between the teeth left by the agenesis by means of orthodontic appliances; that of implantology, should the patient be at a useful age for implantation; and the road of prosthetics, going to replace the missing element with mobile solutions suitable even for young patients

[9,10,11,12]. The literature also suggests that dental implants are currently a successful therapeutic alternative that can also be used in patients with systemic diseases [13, 14].
Although in some situations the placement of axial implants in basal bone may be hindered by insufficient residual bone height, the placement of fixtures in native bone, when possible, should be preferred [15].
The choice of fixture type and prosthetic mode can influence implant success in the short and long term; it follows that pre-surgical planning is a key point of rehabilitation [16, 17].
The present study focuses on agenesis of the upper lateral incisors, in particular of the 2.2 element, by means of a literature review and the description of a case report that aims to propose a possible clinical approach for the treatment of agenesis of a 2.2. The treatment chosen was an implant-prosthetic rehabilitation, preceded by orthodontic treatment for the distalisation of the ectopic 2.3 element. All surgical procedures were carried out in compliance with the rules laid down in the wake of the Covid-19 pandemic situation, so as to promote patient and staff safety [18].

CASE REPORT

A 29-year-old female patient, a smoker, came to the Department of Dentistry of the IRCCS San Raffaele Hospital in Milan with the aim of improving the aesthetics of the anterior sector of her smile. A clinical and radiographic examination was then performed (Figure 1,2) from which multiple agenesis was revealed. Specifically, this clinical case deals with the rehabilitation of the agenesis of element 2.2.
The case evaluation also revealed that tooth 23 was in a mesial position compared to its usual position, which caused a reduction of the arch space between elements 2.1 and 2.3.

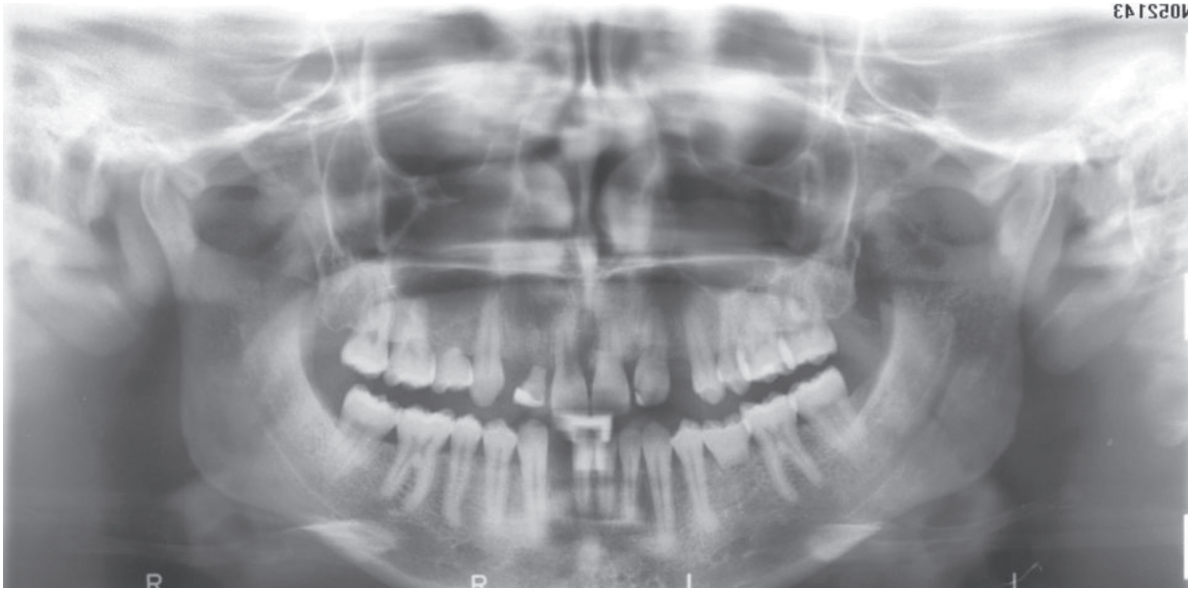

Figure 1. Pre-operative orthopantomography.

Figure 2. Intra-oral photo.

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It was proposed to the patient to perform an orthodontic correction, distalising tooth 23 and thus creating space for the subsequent implant-prosthetic rehabilitation of the edentulous site. The first phase of treatment involved orthodontic therapy in order to distalise element 2.3 which, due to agenesis, had occupied the site of element 2.2. Once the orthodontic treatment was completed, it was possible to obtain the necessary space for an implant-prosthetic rehabilitation of element 2.2. The second phase of treatment included endodontic treatment of element 2.3, which was subsequently prosthetised by performing a prosthetic preparation with modified chamfer (Figure 3).
After this procedure was completed, it was decided to schedule surgery for the insertion of the endosseous implant. Before starting surgery, the following drug therapy was prescribed: Levoxacin 500 mg (1 per day for 10 days to be started the day before surgery) and Medrol 0.16 mg (1 tablet the morning of surgery). The surgical phase was performed under local anaesthesia (Optocaine 20 mg/ml with adrenaline 1:80,000; Molteni Dental, Florence, Italy).
It then proceeded with implant insertion, in site 2.2, TTSI Winsix 2.9 mm diameter x 11 mm length (TTx, Winsix, Biosafin, Ancona, Italy) with open technique (figure 4-5). The previously raised flap was then repositioned and adjusted with 4-0 non-resorbable suture (Vicryl; Ethicon, Johnson & Johnson, New Brunswick, NJ, USA).
After surgery, the patient was prescribed post-surgical drug therapy including: Medrol 0.16 mg (1\2 two days after surgery and 1\4 three days after surgery) and Tora Dol drops 20 ml (25 drops as needed). Finally, the patient was advised to avoid any brushing trauma at the surgical site as well as smoking. After one week, the patient underwent a follow-up examination and at the same time the sutures were removed.
Approximately six months after surgery, in order to achieve complete healing of the tissues and proper osseointegration of the implant, a definitive prosthetic crown could be inserted.

Figure 3. Prosthetic preparation of the modified chamfer

FOLLOW-UP

The patient was placed in a follow-up program to monitor hard and soft tissue healing following implant placement. The patient was monitored one week after implant placement, then after 6 and 12 months. Meanwhile, the patient was instructed in home oral hygiene manoeuvres in order to maintain proper implant health. The home oral hygiene sessions were flanked by quarterly, and then six-monthly, professional oral hygiene sessions. Home and professional hygiene maintenance is one of the main prerequisites for implant success [19, 20]

RESULTS

The patient was then reassessed at a follow-up of approximately 12 months after functional prosthetic loading (Figure 6). The radiographic evaluation was performed by taking an endoral radiograph from which a correct implant osseointegration was revealed (Figure 7). On the other hand, the healing of the peri-implant soft tissues was assessed by means of an intraoral clinical examination, from which it was inferred that they had excellent osseointegration.

Figure 4 e 5. Implant placement.

Figure 6. Prosthetic finalisation.

Figure 7. Rx - endoral performed at 12 months follow-up

DISCUSSION

Dental agenesis is a number anomaly due to the failure of one or more dental elements to form a dental follicle [6]. Despite the extreme prevalence of this malformation, the aetiology remains undetermined, although both environmental and genetic factors are believed to be at the root [4,5,21]. Possible environmental causes include trauma, radiotherapy and chemotherapy, as well as osteomyelitis, hormonal and metabolic influences. The diagnostic phase in the first place, and then correct treatment planning in agreement with the patient, are extremely important, as the therapeutic solutions chosen and subsequently implemented may focus on several possible options.

In accordance with the literature, it can be stated that successful and satisfactory dental treatment is always the goal of the patient and the dentist, which means that the patient's needs are resolved in a functional and aesthetic manner. Optimal results require multidisciplinary coordination between the orthodontist and oral surgeon, in collaboration with the restorative dentist and periodontist [22].

Among the various treatment options, implants seem to be the best therapeutic solution as they are more predictable than traditional prosthetic solutions such as bridges over natural teeth or adhesive bridges such as Maryland [2,9,11].

Although the clinical case presented itself with a need for prosthetic rehabilitation related to tooth 23, with a view to a correct diagnosis, preservation of tooth substance and an aesthetically performing rehabilitation, in this rare case we proceeded with the rehabilitation of tooth 22 with an implant-prosthetic solution.

A correct diagnosis and an appropriate treatment strategy for these rare conditions are mandatory to prevent future complications. Furthermore, this rare case could contribute to future studies on the incidence of agenesis of lateral incisors in cases already treated prosthetically.

In conclusion, implants appear to be an excellent therapeutic option for the rehabilitation of agenesis in aesthetic areas provided the clinical conditions are favourable. Indeed, it is necessary that the bone thickness and quality, as well as the tissue phenotype, are adequate.

CONCLUSION

The Authors of this paper agree that implant-prosthetic rehabilitation of one or more agenesis in aesthetic areas can be an excellent treatment option provided the patient's clinical condition is favourable. This predictable and safe procedure will allow the restoration of adequate masticatory function.

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