Infraposition of Implant-Retained Maxillary Incisor Crown Placed in an Adult Patient: Case Report

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Several studies have clearly shown that osseointegrated implants, when inserted in growing bone, such as in adolescents, do not follow the eruptive path of adjacent teeth; instead, they act like ankylosed teeth, remaining in a stationary position for the lifetime, thus developing a progressive infraposition of the implant-supported crown. However, further studies have demonstrated that similar changes also occur in adult patients, although mostly in a small amount and over long time spans. Here the case of a female patient aged 35 years is presented, in which infraposition of the maxillary central incisor developed in a very short time (15 months). The treatment provided was a combined orthodontic/prosthetic approach with a 4-year follow-up. Int J Oral Maxillofac Implants 2018;33:e107–e111. doi: 10.11607/jomi.6681

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It is well-known that osseointegrated implants do not adapt to the eruptive processes of teeth in growing patients because they act as ankylosed teeth; this is due to the lack of periodontal ligament, which seems to cause a localized arrest of growth of the alveolar processes. Therefore, it has been suggested that the most appropriate time for implant placement is the age at which skeletal growth is thought to be completed. The end of adolescence and the beginning of adulthood coincide with the exhaustion of growth potential, but adaptive changes of the jaws continue throughout the patient’s life.

Until recently, it was thought that these continuous movements were negligible in adults and had little clinical effect on the esthetic outcome. However, several studies have also shown that in adult patients, the effect of continuous growth of the maxilla and mandible, both of which undergo antero-inferior displacement during craniofacial morphogenesis, may become visible in many cases. In particular, when implants are used to replace a missing maxillary tooth, the crown can often exhibit a vertical discrepancy compared with the adjacent tooth, a situation mostly defined as infraposition. The onset, the magnitude, and the rate at which this phenomenon takes place are difficult to predict, but in most cases, it is barely noticeable and tends to develop over several years. However, in other cases, this complication can develop much faster and severely compromise the esthetic appearance of the patient.

Case Presentation
A female patient aged 35 years asked for a consultation about an esthetic problem with the central maxillary incisors. During the first visit, the patient clearly appeared to belong to the “long face” type of craniofacial morphology. The intraoral examination documented good oral hygiene, lack of periodontal problems, and good occlusion with no crowding. However, the maxillary central incisors had been treated endodontically 6 years before and presented a yellowish color (Figs 1 and 2); additionally, the maxillary left central incisor showed a deep subgingival caries extending below the bony level (Fig 3). After a thorough examination and a cone beam computed tomography (CBCT) site analysis, the treatment plan was explained, understood, and approved by the patient as follows. The affected tooth, which was considered hopeless, was carefully extracted, and an immediate implant was placed in a flapless approach. A minor regenerative procedure was carried out, filling the gap between the intact buccal plate and the implant surface with a particulate bone substitute and a collagen sponge. An impression was taken, and after a few hours, a definitive titanium abutment was connected to the implant, following a prosthetic “one abutment–one time” protocol. Two splinted acrylic crowns were then cemented to the tooth and to the titanium abutment, and the patient was instructed to avoid biting on the two central incisors for 3 months, in order to avoid micromovements.
that could endanger the osseointegration process. Finally, two single ceramometal crowns were cemented with zinc oxide luting material (Fig 4). It is interesting to note that both the dental and the implant crowns had a feather-edge margin because the natural tooth and the implant abutment had been prepared with no finish line (this feature was of some importance in the retrofitting of the successive crowns in the final part of the treatment). Esthetically, the gingival margin of the implant crown was slightly more apical, but the incisal edges were perfectly even (Fig 5). A radiograph was also taken (Fig 6).

The patient, who lived in another city, missed the 1-year follow-up, but after 15 months called the office complaining that the left tooth was “shorter than the right one”. At the visit, the left crown (implant site) was actually infrapositioned by 1.2 mm (Figs 7 and 8). The treatment planning options were considered. The simplest option was to elongate the incisal margin of the crown, but this would further increase the tooth length without solving the problem of the uneven gingival margin, which was also a consequence of the eruption of the right incisor. A more complex treatment plan was proposed to the patient, who willingly accepted it because it allowed the correction of various aspects of the problem. After separating the two original acrylic provisional crowns on both the natural tooth and the implant abutments, they were temporarily cemented to allow the second step of the treatment: the orthodontic intrusion of the right tooth until the gingival margins of both teeth were even, thus also compensating the initial discrepancy (Figs 9 and 10). After only 8 weeks, the original ceramometal crowns were etched, splinted with composite, and transferred with a polyether impression into a new working model (Fig 11). In the laboratory, the ceramic was removed from the metal frameworks, and then, the gingival margin of the intruded crown was shortened as much as needed to put the finish line just 1.0 mm below the gingival margin. This was possible only due to the absence of a prepared margin in the vertical feather-edge preparation technique (Fig 12), which had been chosen by the authors as part of the usual prosthetic protocol. If the tooth had been prepared with a definite finish line, the intrusion could have generated an invasion of the biologic width with chronic inflammation. The two crowns were then laser-welded and newly ceramized (Fig 13). The decision to splint the two crowns was taken as a postorthodontic permanent stabilization. The final result is shown with
The gingival margin of the maxillary left central incisor is slightly more apical.

Fig 6 (Right) Radiograph of definitive crowns.

Fig 5

After 15 months, infraposition of maxillary left central incisor is clearly visible.

Fig 7

Orthodontic intrusion after 4 weeks.

Fig 9

The infraposition severely compromises the esthetic result.

Fig 8

Orthodontic intrusion after 4 weeks.

Fig 10

Completed intrusion at 8 weeks. Gingival margins appear slightly inflamed.

Fig 11

Original ceramometal crowns etched and then splinted with composite resin.

Fig 12

Transfer impression of the crowns. Both frameworks have a feather-edge margin.
the two splinted crowns luted with zinc-phosphate cement; the periodontal tissues were healthy, and the correct dento-gingival architecture was re-established (Figs 14 to 16). The 4-year follow-up showed a stable clinical situation with no sign of periodontal pathology (Figs 17 and 18). The tooth/implant complex did not show any further sign of infraocclusion in relation to the adjacent lateral incisors.

To the authors’ knowledge, the case presented here is the first report of a phenomenon developed at the considerable rate of 0.08 mm per month, or 0.96 mm per year, a magnitude many times greater than any other similar case reported so far in the literature. If untreated, it could have theoretically resulted in almost 3 mm of infraocclusion at the 3-year interval, a time frame at which no other case observed by the authors showed signs of the problem (a retrospective analysis of 60 cases of patients treated with implants in the maxillary esthetic zone with 5- to 20-year follow-up is in preparation).
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REFERENCES