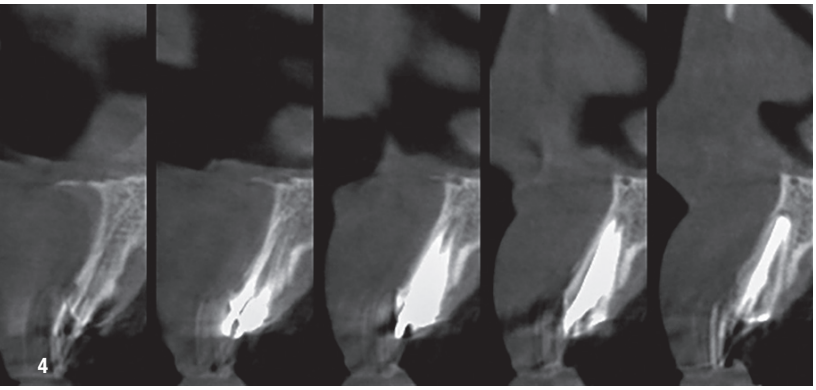
Interdisciplinary approach to treating the aesthetic zone in a young patient

A clinical case report

Dr David Garcia Baeza, Spain

Introduction

Implant dentistry demands an interdisciplinary approach that incorporates all of dentistry's knowledge, experience and skills to aid in delivering a comprehensive treatment plan. Aesthetics in dentistry is frequently the motivation for seeking dental care and treatment. In my private practice, it is usual to receive patients who demand natural-looking results. Before beginning therapy, our team examines all aspects that may influence the treatment outcome. With growing patient expectations, today, we cannot focus only on one tooth. That is the reason why an interdisciplinary approach involving all dental specialties should be employed to create a complete treatment plan and will produce undoubtedly better results.

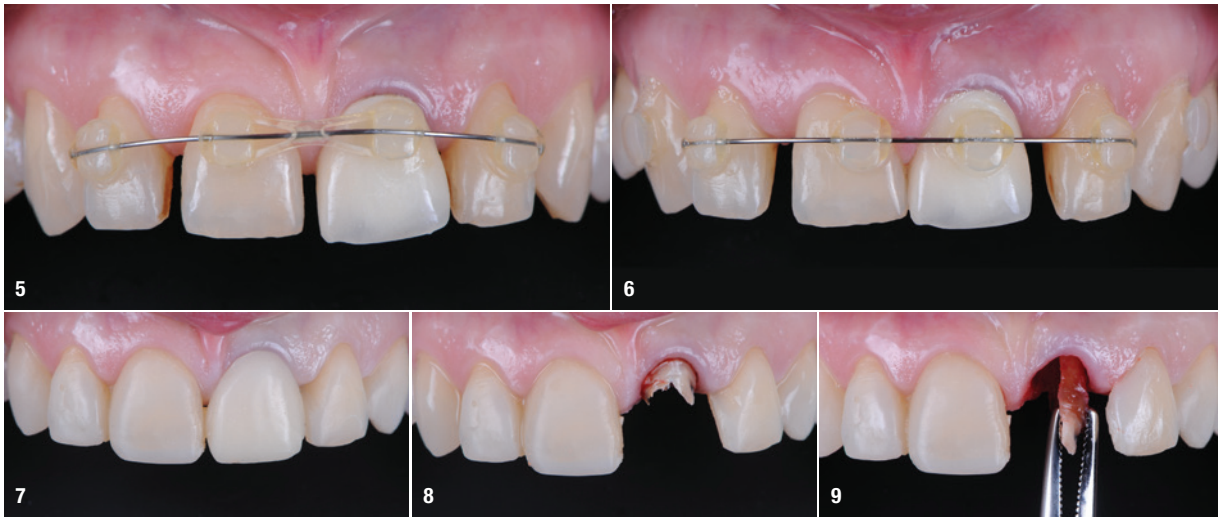


The following case report describes the successful interdisciplinary treatment of a hopeless maxillary central incisor in a young patient with very high expectations. The treatment included orthodontics, smile design, Straumann BLX implant placement, soft-tissue augmentation and aesthetic restorations.

Initial situation

A 27-year-old healthy female patient who was a non-smoker visited our dental office seeking aesthetic solutions in the anterior zone. She was dissatisfied with the crown she had worn for years and disliked the large spaces between her teeth. She emphasised her desire for a uniform, brighter smile with a minimally invasive treatment approach.

The extra-oral examination found a symmetrical, slightly convex face and a slightly high smile line (Fig. 1). The intra-oral examination revealed irregular interdental spaces in the maxillary and mandibular anterior region and a Class I dental malocclusion (Figs. 2 & 3). The patient was



periodontally stable and had sufficient soft and hard tissue at the prospective implant site. The radiographic assessment also revealed adequate bone availability for implantation of a standard length implant (Fig. 4). The casts revealed tooth size discrepancy. After a thorough discussion of the various treatment options, an implant-supported fixed prosthesis and aesthetic restorations on the adjacent teeth were chosen after orthodontic treatment to reduce the mesiodistal distance of the diastema between teeth #11 and 21.

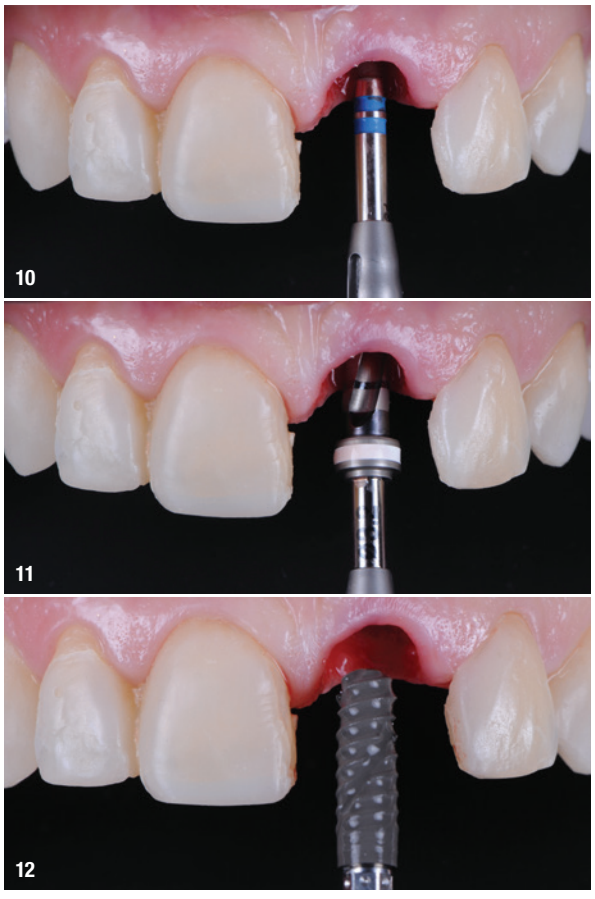
"State-of-the-art dentistry requires an interdisciplinary approach using the best available materials and focusing on our patients' needs."

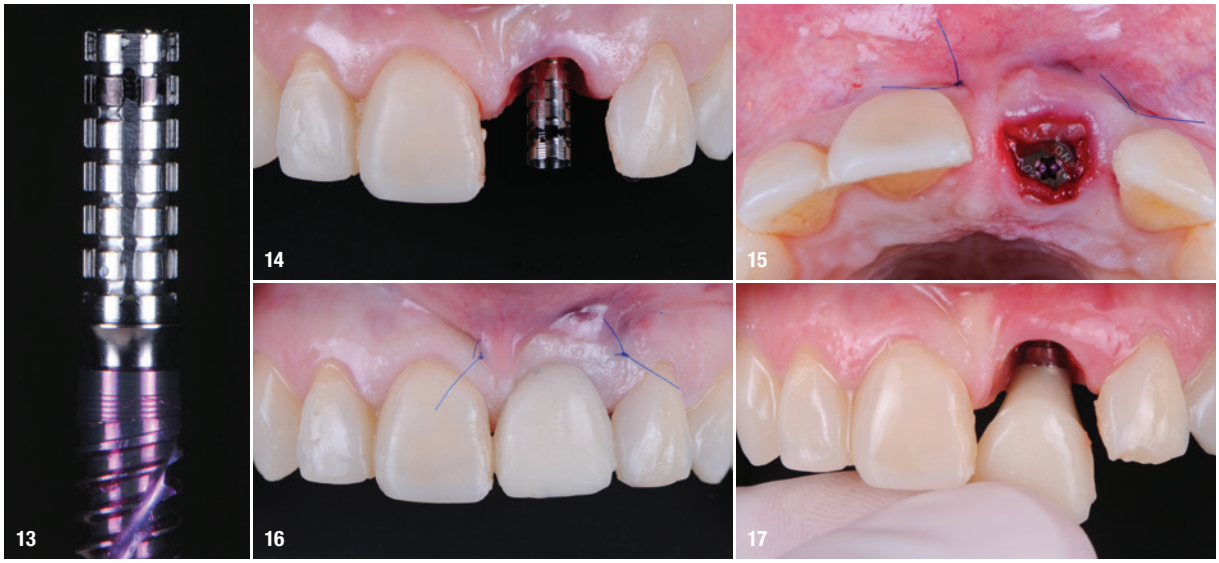
Treatment planning

Taking into account the significant aesthetic and functional factors, the planning was performed as follows. Orthodontic treatment would be performed to position the teeth in the most aesthetic and functionally optimal position. Aesthetic brackets were to be used for all the maxillary incisors, leading to space closure for the anterior teeth. Aligning and levelling were planned with 0.014 in. and 0.016 in. nickel–titanium sectional archwires, followed by 0.016 in. and 0.018 in. stainless-steel archwires. Space closure was to be achieved with elastomeric power chains (Figs. 5 & 6).

Digital aesthetic planning was performed four weeks after the orthodontic treatment using the Digital Smile Design system. First, a diagnostic wax-up was made and used for the preparation of the silicone guide. Then, a direct mock-up with composite resin was placed in the mouth, evaluated, discussed and approved by the patient (Fig. 7). The mock-up in the patient's mouth enables a preview of the treatment outcome and evaluation of the aesthetic result the patient is expecting. Moreover, we also evaluated the functionality, phonetics, harmony and position of the lips.

Atraumatic extraction of tooth #21 prior to the removal of the unaesthetic restoration was planned and was to be





followed by immediate implant placement in position #21 and provisionalisation. After six weeks of healing, impression for the definitive restorations would be taken. Porcelain veneers would be placed on teeth #12, 11 and 22, and a crown would be placed on implant #21.

Surgical procedure

On the day of surgery, the patient was instructed to rinse her mouth with 0.12% chlorhexidine gluconate. The surgery was performed under local anaesthesia with 2% lidocaine and 1:100,000 adrenaline. The atraumatic dental extraction was focused on the gentle removal of the root. The goal was to preserve alveolar crestal height in all three dimensions, maintaining the buccal hard- and soft-tissue integrity. The procedure was initiated by syndesmotomy with a periotome with gentle movements (Fig. 8). Subsequently, the root was split into two parts and carefully removed with rotational movements to prevent damage to the surrounding tissue (Fig. 9). To eliminate any inflammatory or infectious tissue that may have remained in the socket, the periapical region was carefully curetted and extensive irrigation with physiological saline was performed.

The freehand and flapless surgery involved the immediate placement of a Straumann BLX implant (diameter: 3.75 mm; length: 12.0 mm; regular base; SLActive; Roxolid) in position #21 following the manufacturer's instructions to ensure primary stability (Figs. 10–12). The drilling was performed in the centre of the extraction socket in the palatal wall, and the implant site was oriented to the palatal side in a prosthetically driven position. Primary implant stability was achieved, and subsequently, a prefabricated titanium temporary abutment (regular base/wide base) was hand tightened on to the implant for immediate provisionalisation. The height of the temporary abutment was measured, and it was then removed and adjusted extra-orally (Fig. 13). After that, the temporary abutment was reseated on to the implant and hand tightened, and the height was rechecked (Fig. 14).

Tooth #21 was placed into the silicone jig that had previously been constructed. The jig was placed in the

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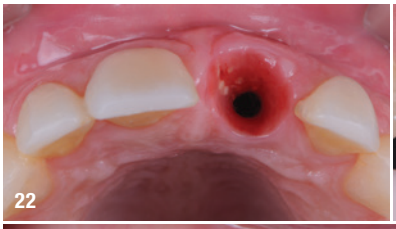
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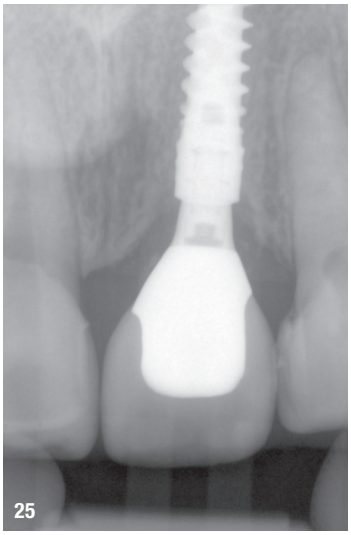
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patient's mouth, and the tooth was attached to the temporary abutment with light-polymerised composite resin. The abutment was removed, the excess was cleaned and the transitions were carefully polished and finished. The healing abutment was placed and screwed on prior to the graft transplantation.

A subepithelial connective tissue graft was obtained from the palate and was adapted to the implant site with the aim of increasing the thickness of the keratinised mucosa. Lastly, the graft was fixed with #5/0 nylon interrupted suture thread (Fig. 15). The provisional crown was then screwed on to the implant, and the access hole was sealed (Fig. 16).

After a six-week healing period with stable osseointegration and no post-surgical complications, the healing abutment was removed and the site irrigated with 0.12% chlorhexidine gluconate. It was verified that the healing was satisfactory (Fig. 17).

Prosthetic procedure

Conservative preparation of the adjacent incisors for the porcelain veneers was performed (Figs. 18 & 19). The transfer impression coping was placed and hand torqued. Retraction cords were used to ensure an optimal impression of the prepared adjacent teeth. A polyvinylsiloxane impression with an open tray transfer technique for the implant-supported restoration was taken. This information was sent to the laboratory (Fig. 20).

The implant-supported restoration and veneers were delivered. The provisional restoration was removed, and an ideal emergence profile and appealing aesthetics were observed. These adequate tissue dimensions were achieved thanks to soft-tissue augmentation and provisional restorative therapy. The implant-supported crown was screwed on and the veneers cemented (Figs. 21–23).

Treatment outcome

The patient has been recalled for prophylaxis and follow-up every year. After three years, the clinical and radiographic outcomes have shown good aesthetics, osseointegration and maintenance of peri-implant tissue. The patient was delighted with the aesthetic and functional result and presented no mechanical nor biological complications (Figs. 24 & 25).

Dr David Garcia Baeza

Complete online gallery

about the author

Dr David Garcia Baeza obtained his DMD from the European University of Madrid in Spain in 2002 and was awarded his specialist qualification in implantology and oral rehabilitation specialist from the same university in 2006. He runs a private practice (CIMA DENTAL) in Madrid dedicated to aesthetics, restorative dentistry and implantology. Dr Garcia Baeza has held multiple courses in aesthetic dentistry throughout Spain and has given more than 100 national and international lectures on aesthetic and restorative dentistry.

contact

Dr David Garcia Baeza
+34 917 392865
clinica@cimadental.es
www.cimadental.es

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