Immediate implant placement in extraction wounds has been performed for more than 20 years. According to a number of authors the success rate is comparable to that of delayed implant placement. The reduced treatment time has huge benefits both for the dentist and for the patient, and the predictability of this method is comparable to the protocols for delayed and early implantation.

On the other hand, immediate implant loading also has many advantages for the patient like immediate function, good aesthetics and improved self-esteem. Many studies support the excellent outcomes that immediate loading can provide. Massimo Del Fabbro et al. conducted a study on 2000 implants, placed and immediately loaded in the aesthetic zone. They reported a success rate of around 97.60% after a period of 10 years.

Nowadays the implant treatment in the aesthetic zone is made accordingly the anatomical and aesthetic rules. The golden standard is to place the implant 2-3mm from the CEJ of the adjacent teeth. There is number of criteria for the deciding the design of the future restoration and smile and to determinate the vertical position of the implant. Guided surgery is increasing its popularity, giving the clinician very good VL, MD positioning and giving the right torque.
Initial situation. The clinical case described below illustrates an aesthetic rehabilitation of the smile through the use of a personalized smile design in combination with immediate implantation and immediate loading protocols. The patient is a 22-year-old female who came to our practice with pain, swelling and indications for extraction of tooth 11. She asked for a complete treatment plan as she was generally dissatisfied with the look of her smile.
Fig. 2  
Initial clinical situation. The treatment plan involved extraction of tooth 11, immediate implant placement, fabrication of an implant-supported all ceramic crown on tooth 11 and restoration of the upper frontal teeth 13, 12, 21, 22, 23 with ceramic veneers. For this purpose a project of the smile was created using the innovative software for Personal Smile Design® VisagiSmile. The analysis indicated the shape, size, inclination and arrangement of the anterior teeth.
Fig. 3  The radiographic examination reveals root resorption of tooth 11.

Fig. 4  Facial map with landmark points and type classification.
Fig. 5   Personality interview
Fig. 6 Final design with detailed text description analysis summary of face reading, interview and patient choice.
Final design digitally positioned on patient’s face. Two main photographs were made on each patient: one full-face with maximal smile and visible dentition and the other photograph of the upper jaw with retracted lips and black contrasting tool. A short video was filmed with the patient asked by the clinician to go through a state of rest to maximal smile position. During the first stage of planning an analysis of the face was carried out in order to determine the psychological type of the patient. The shape of the forehead, eyes, nose, mouth and chin corresponds to one of the four psychological types: delicate, dynamic, strong or calm. The predominant psychological type in its turn is used to determine the size of the teeth, the inclination of their axes, the incisal projection and the dominance of the teeth. The shape of the teeth was determined at the second stage during an interview with the patient (questionnaire in the software, an adapted version of Dr. Susan Dellinger’s test and Eysenk’s personality questionnaire). Using the data from the interview we can define the preferences and type of temperament of the patient and the software automatically chooses the optimal combination of tooth shapes conformed to individual characteristics of the patient: strong (rectangle), dynamic (triangle), sensitive (circle), peaceful (square). Based on that project a wax up was created in the dental technician lab and a prosthetic guide for the implant site preparation. Additional details like incisal embrasures and silhouette, texture and color were further discussed with the patient during the third planning stage. Based on this project, we planned the vertical and mesio-distal position of the implant as well as the need of crown lengthening of the adjacent teeth. The implant has to be placed 3 mm above the future CEJ after the crown lengthening procedure.
After extraction of tooth 11 the walls of the extraction socket were sterilized with an ER-CR YSGG laser.
Fig. 9 After the extraction
The implant (TSVT-Zimmer Dental, USA) was placed in a palatal position and the remaining volume of the extraction socket was filled with an allograft bone grafting material (Puros Cortical - Tutogen, Germany). The vertical position of the implant was determinate 3 mm from the future CEJ and the implant platform was not placed according to the anatomical bone structure. The stability of the implant was evaluated using an ultrasound method in terms of ISQ units (Osstell Mentor; Integration Diagnostics, Göteborg, Sweden) during the surgery. Two measurements were performed with a torque wrench, on the vestibular and mesial sides, and the average value was recorded.
Fig. 11  After implant placement.
An X-ray image of the implant.
Fig. 13 The multiunit tapered abutment in place. The tapered abutment is fixed on the implant platform.
The multiunit tapered abutment in place: the second abutment is fixed onto the first one and is then scanned for the fabrication of a provisional crown. Immediate provisionalization was performed once primary stability of all implant (35 N·cm or more, ISQ above 55) was achieved. The provisional abutment was scanned in the mouth with a Digital intra-oral scanner (Bluecam, Cerec, Dentsply Sirona). The field was isolated with a sterile rubber dam. CEREC Powder was carefully applied for to the abutment and the adjacent teeth. The teeth were precisely scanned and correlated in the CEREC Software. The shape of the restoration was designed using CEREC 4.0 and was milled in the CEREC Milling Unit. Lava Ultimate blocks was used for the fabrication of the crown. The construction was tested and then cemented out of the mouth with composite cement (Choice, Bisco). The multiunit tapered abutment allows a bone level implant to be used as a tissue level implant. In this way a temporary crown can be fixed without inducing tension on the implant platform and without compromising the good oral hygiene. The two screws provide for a certain degree of protection of the implant body, transferring the load to the gingival level. The different heights, diameters and angles of the multiunit abutments allow for the achievement of an individualized emergence profile.
Fig. 15  Intraoral scanning of the second abutment with a sterile piece of rubber dam in place.
Fig. 16  A 3D image of the scanned abutment.
The 3D model and fabrication of a temporary crown using a Cerec III CAD/CAM unit. The crown was fabricated from a Lava Ultimate block. Mattress stitches were placed with 6/0 monofilament PTFE sutures (Omnia, Italy). The restoration was out of occlusion. The vertical level was corresponding to the CEJ of the adjacent teeth. The patients were called for follow-up visits on the 3rd, 10th and 15th day after the surgery. The sutures were removed on the 10th day after surgery. The first provisional restoration was removed after the second month and a new provisional was fabricated. The vertical level was corresponding to the aesthetic project and harmonized with the adjacent teeth.
Fixation of the temporary crown in the mouth.
Shaping of the emergence profile after the second provisional construction. After shaping the individual emergence profile, a permanent construction with individualized abutment was placed. After 6 months the patients were called for follow-up visits and the implants were clinically and radiologically examined. First provisional was designed in order to create a volume of soft tissues around the implant and a second provisional according to the smile design was placed for a final contouring of the gingival margin, based on the software proposal. The patient was able to make a test drive of the new smile design. After the final soft tissue contouring and impression was taken and a final restoration was designed, following the recommendations of the software and the comments of the patient.

Frontal view of the preparation design of the teeth and the abutment.
Fig. 21  Friction fit abutment with a CAD/CAM-designed e.max supra-structure.
The final tooth composition from e.max ready for cementation. The laboratory work was accomplished by Dr. Vincenzo Musella, MDT.

Fixation of the final constructions in the mouth – the shape, inclination and gingival contour follow the parameters of the Personal Smile Design project.
The technique of immediate implantation and immediate loading allows for the achievement of an excellent vestibular profile of the soft tissues.
Fig. 25 Side view.
Follow-up after one year.
Fig. 27 Radiographic follow-up examination 1 year after treatment.
Follow-up after 3 years, the soft tissues remain completely stable.
Fig. 29 The final result.
It is extremely important for every single patient the teeth proportions to be correctly diagnosed before an irreversible restorative dental procedure to be done. By creating a smile design we are building a conception of perception by which we are trying to satisfy the patients’ wish for an aesthetic vision.

Our knowledge and experience so far indicate that there are several key factors for the predictability of the immediate implantation used in combination with immediate loading in the aesthetic zone:

1. The esthetic analysis done prior to the treatment is of utmost importance for creating a project of the desired outcome.
2. The implant should be placed in the exact position according to the project and should have a slightly palatal orientation so as to ensure the stability of the vestibular bone.
3. A conservative insertion protocol should be applied which involves drilling of the bone at a low speed.
4. The use of multiunit abutments has various advantages: first of all, they allow for the conversion of bone level implants into tissue level implants. Secondly, they concentrate the stress into the tissues at the gingival level, away from the implant’s body. Last but not least, with these abutments a screw retained crown with the right emergence profile can be easily fabricated.
5. The occlusion should be taken into consideration – articulators should be always used and the constructions should always be tried in function, without full contacts or articulation blocks on them for the first 2 months.
6. A second provisional construction should be used in order to adjust the tissues and to allow for an esthetic preview.
7. An abutment with friction fit connection should be used for the final prosthetic construction.

The conception of “VisagiSmile” helps dentists to do restorations that corresponds not only to the esthetic but also to the psychological features of the created image which affects the emotions, identity, behavior and confidence of the patient. On the other side these factors affect the way the observed persons react to the definite treatment of the patient.