Customized Lithium Disilicate Abutments for Implants in the Esthetic Zone

By Dr. Ali Tunkiwala, India & Danesh Vazifdar, India

Technological advances in recent past have provided the much need- ed impetus to the clinicians to pro- vide an immediate implant solution to the patients immediately after extractions, thereby truncating the overall treatment time while provid- ing a biologically safe and estheti- cally impeccable result.

Based on the time at which the im- plant is placed after extraction of the offending tooth, implant placement protocols are classified as Immedi- ate placement (T1), Early placement with soft tissue healing (T2- 6-8 weeks), Early placement with partial bone healing (T7-9 weeks) and Late placement (T4-12 weeks).

T1 protocol involves immediate placement of implant in extraction socket and has been a matter of discussion in literature for several years. The shortened treatment time and the immediate gratification that this protocol can offer to the patients is its greatest advantage. Although literature has shown, beyond doubt that the bundle bone is lost on average by 1mm irrespective of whether implant is placed in extraction socket or extraction socket is left as it is, there are several other advantages of immediate placement, this great- est being, the ability to support the soft tissues with an immediate pro- visional abutment on the implant. For this protocol to work predictably, it is mandatory for the clinicians to place the implant in a perfect 3 dimensional position such that the screw access hole of the final abutment would emerge from the cingu- lare area. An error in place- ment is catastrophic and it results in maligning of the protocol. When done right, in a wisely chosen case, immediate extraction and place- ment is a huge asset in managing implants in the esthetic zone.

Once the implant is inserted in its correct, prosthodontically driven posi- tion, customized abutments can be used to take the result to an accu- rate, predictable end point that looks seamless when compared to natural teeth and soft tissues. There are a large number of abutment options available to clinicians today, how- ever an abutment that is customized to the gingival architecture gener- ated by a well contoured provisional restoration, is by far the most desir- able in terms of achieving a perfect emergence profile for the implant restoration in the esthetic zone. This customization can be done with met- allic as well as ceramic abutments. Titanium and other grey metals are a distinct disadvantage in thinner biotypes, as they cast a dull shadow, leading to a show through of the abutment in the final result. Al- though zirconia has been the ‘go to’ material for customization of abut- ments in the anterior zone, recently lithium disilicate abutments have been introduced that provide several additional benefits over zirconia as abutments.

This article describes a case of im- plant placement with T1 protocol and use of customized IPS e.max abutment to provide a road map to achieve an esthetically good result.

Clinical Case Assessment
Before finalizing on the decision of doing immediate extraction and placement in the esthetic zone few parameters need to be assessed:
A. Free Gingival Margin Level of Implanted tooth
The more coronal the free gingival margin of the affected tooth as com- pared to adjacent teeth the better the chance of getting a good esthetic result. In such cases slight mucosal recession will not affect the esthetic outcome of the case adversely.
B. Tooth Shape
A triangular square tooth forms are better replaced with immediate ex- traction protocols. A triangular tooth means that the sharp interdental soft tissue peak may be lost due to trauma from extraction and pros- thetic procedures leading to a dark triangle in the end result that will need exacting prosthetic protocols to be employed to salvage the situa- tion.
C. Gingival Biotype
A thin biotype is more prone to mucosal recession as compared to a thicker one and requires precautions to be taken to prevent show through of the final abutment colour.
D. Scaling of Gingival Margin
A high scalloped gingival archite- ture is more prone to recession as the thin bone that accompanies the high scallop may be too fragile to hold on to its position once the extraction is done.
E. Interproximal Height of Bone
A greater than mean probing depth to bone in profferative assessment means that the interproximal bone is already deficient. The prognostic value of this bone sounding is evi- dent as in such cases on high bone crest situation the tendency to loose interproximal tissue is higher.
F. Upper Lip Line
In cases where the patients upper lip is long the chances of success with esthetic immediate implant place- ment are better as the crucial peri- odontal infrastructure will not be readily visible when patient smiles.

The next step was to determine the height of bone, that was within favour, especially, the Inter-proxi- mal height of bone, that was within normal limits. In cases of immediate placement after extraction in this region we need to have a plan for im- mediate provisionalization. A provi- sional abutment on the implant was planned that would be used in fabri- cation of a screw retained provision- al using a putty matrix generated from the profferative casts. This can be done only when implant is placed with good primary stability.

The surgery
The extraction is gently carried out without undue damage to the ad- jacent tissues. The socket is cleaned well and the integrity of the boccal cortex is assessed. Only if its intact, immediate placement may be con- sidered, else it’s better to defer it by 6-8 weeks. Raising the flap and the periosteum is strictly avoided to pre- vent mucosal recession from surgi- cal trauma.

The implant site preparation is be- gun on the palatal wall with the pilot drill, such that at the end of drilling protocol we do not touch the bucal wall with any drills. The diameter and mesiodistal position of the im- plant in this region should be chosen such that at least 2mm bone is left on both sides between implant and the adjacent tooth. Apically on the implant platform must be 2mm deeper than the CEJ of the adjacent tooth. When done with the implant placement, the screw access hole should be ideally accessible from the cingu- lare of the proposed final crown. These principles are univer- sally applicable to all implant place- ment protocols in anterior maxilla.

The provisional
Our choice of provisionalization in this case was to use a permanent me- tallic abutment to fabricate the im- mediate provisional crown. A putty matrix of the profferative cast will aid in making the provisional with Type IV silicone. Once the cast is done, the impression is taken and the abutment is placed in its estimated position. The matrix is trimmed down to achieve a biologically correct contour of the implant. The matrix is then removed and the abutment is polished.

The final restoration
The restoration is delivered as per the preoperative assessment and the pontic is made to sit within the emergence profile of abutment to achieve an esthetically good result.

The final result
The final result visually shows that the implant is retained in its correct position and that the entire crown is within the embrasures of the adjacent teeth.

Fig 1: Pre- Operative View of offending tooth #12
Fig 2: Pre- Operative X-ray tooth #12
Fig 3: Pre- Operative View of #12 after removal of faulty restoration
Fig 4: Implant placed in correct 3 dimensional position
Fig 5: Provisional Restoration contoured to mimic natural tooth form
Fig 6: Provisional Restoration delivered on the stable implant
Fig 7: Gingival architecture formed by provisional at 4 months
Fig 8: Customized impression coping for implant interim impression
Fig 9: Soft tissue mask to reproduce gingival contour on stone model
Fig 10: Full contour wax-up for customized E-max abutment
Fig 11: Cut-back of full contour abutment for receivi- ing E-max veneer
Fig 12: Finalised E-max abutment wax-up on stone model
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A Ti-base abutment is used from the tissue emergence profile and a stone to capture the already perfected soft tissue. During final impressions a custom-ration:

- The final impression is processed with a soft tissue cast fabrication, a Ti base abutment is selected and a wax-up to final contour is done based on the gingival architecture created by the provisional (Fig 10). A purity index of this situation is made.
- The wax is then cut back from the facial surface using the putty index as a guide for reduction (Fig 11).
- The wax up is then finished to a high polish using silicone polishers to achieve a smooth surface and remove any ceramic residue.
- The IPS e.max abutment is now ready to receive the pressed veneer for Bonding.
- The IPS e.max abutment is etched and so is the internal surface of the IPS e.max veneer for 20 seconds each. The fact that there can be such predictable bonding on IPS e.max abutments is a distinct advantage over Zirconia frameworks.
- Monobond plus is applied to both the bonding areas on the IPS e.max abutment as well as the IPS e.max veneer.
- Vantoline 2 is used to lute the IPS e.max veneer to the IPS e.max abutment. Excess luting material is removed and the veneer margins are covered with a glycercine gel and then light cured for final polymerization. Thereafter, the IPS e.max abutment and veneer margin junction is finished with silicone polishers.
- The restoration is delivered by toning the abutment screw to 50 Ncm intraorally. The palatal cingulum of the abutment is protected with air that is water and oil free.
- The IPS e.max Abutment is then cemented to the Ti base.

The customized IPS e.max abutment is then stained and characterized as required. This allows the colours to be built in from within, as found in natural teeth. The surface of the abutment that is in contact with the soft tissue is finished to a high glaze. Using the putty index as a guide the veneer is then waxed up and pressed to final contour.
- Once the veneer fit is verified, it is cut back facially on the incisal 1/3 to increase the brightness level (Fig 9). A try in is done at chairside to check for fit and form of the restoration to provide a good emergence profile. Thereafter the veneer is stained and characterized and polished.
- The IPS e.max abutment is then cemented to the Ti-base. The Ti base is screwed onto a cover screw/implant replica. The surface of the Ti base in contact with the soft tissue and the screw access hole of the Ti base is protected with a glycerine gel and then covered with a glycerine gel and then covered with air that is water and oil free.
- The IPS e.max abutment is then cemented to the Ti base. The glycerine gel is used at the cervical joint between the IPS e.max abutment and Ti base to prevent the formation of an inhibition layer and this is then cured in a light curing unit.
- The abutment is then finished with silicone polishers to achieve a smooth surface and remove any ceramic residue.

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