

# Fast and predictable aesthetics with injectable composites

Restoring young permanent teeth with distinct internal and surface characteristics can pose a challenge in daily clinical practice. With the new Beautifil range of bioactive nano-hybrid Injectable composites, clinicians can efficiently achieve a high degree of aesthetic predictability with a fast and simple technique.

By Dr Amit Gulati

Aesthetic dentistry is a highly demanding clinical science especially when it comes to restoring anterior dentition in young individuals. Young permanent teeth display an array of characterisations. These characterisations range from visible dentinal effects like mamelon patterns to enamel effects like high translucency, opalescence, surface effects and macro-micro textures. These variations and characterisations make it challenging for clinicians to create natural, life-like restorations in the anterior aesthetic zone with predictability and long-term success.

Achieving the desired aesthetic outcomes in such cases generally requires intricate layering of packable composites that consequently takes up a significant amount of clinical chairside time. However, with advances in composite resin technology today, clinicians have the option to replicate natural aesthetics with increased efficiency. The Beautifil range of bioactive nano-hybrid composites from Shofu provides additional benefits of minimising plaque accumulation<sup>1</sup> with anti-bacterial<sup>2</sup> and acid-neutralising properties to reduce secondary caries<sup>3</sup>, promoting gingival health and enhancing the longevity of the restorations. The following clinical case demonstrates an anterior Class IV restoration where bioactive Beautifil Injectable X composites and colour tints were used to achieve a high degree of aesthetic success in a fraction of the chair time as compared to the conventional layered technique commonly used for anterior restorations.

## PATIENT CASE

A young, 15-year-old female patient was presented with an Ellis Class I fracture involving tooth 21 (Fig. 1), caused due to a minor traumatic sports injury that occurred almost immediately after debonding of her orthodontic appliance



Fig. 1

Fig. 1: Ellis Class-I fracture in tooth 21

a few months ago. The patient had no symptom of pain or discomfort to said tooth and the concern was purely aesthetic. Upon intraoral examination, there was no pain or sensitivity observed in relation to tooth 21. It was not tender to percussion and the radiographic examination revealed healthy peri-radicular tissues. Vitality test was performed and the tooth gave similar readings as the adjacent teeth. It was concluded that the tooth was healthy and free from any pulpal or peri-radicular pathology.

After careful examination and discussion with the patient, it was decided that the fractured tooth will be restored with a minimally invasive treatment approach utilising MiCD (Minimally Invasive Cosmetic Dentistry) concept. As the patient was a 15-year-old, the restorative procedure was modified to reduce the clinical chairside time using a new type of bioactive injectable composite materials.

## MATERIALS AND RESTORATIVE PROCESS

### Shade selection, mock-up and putty index

Tooth 21 was thoroughly examined for internal and external

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characterisations. A high degree of enamel translucency was observed in the incisal third, along with a fair amount of surface texture and incisal opalescence. Before commencing isolation of the anterior segment with rubber dam, shade selection was completed using the VITA classical shade guide. The closest shade tab in terms of hue and chroma match was identified as A2 (Fig. 2). A quick freehand mock-up was created using Beautifil II LS Composite shade A2 (Shofu Inc. Japan) and aesthetic evaluation was done for shade verification (Fig. 3). After occlusal adjustment, a palatal putty index was made with A-Silicon impression material (Fig. 4).

## Isolation and tooth preparation

The anterior sextant was isolated with a rubber dam (Sanctuary Dental, Malaysia) with its margins everted, and floss ties were secured to maintain retraction (Fig. 5). The teeth were polished with pumice slurry using a prophylaxis rubber cup to remove the plaque biofilm (Fig. 6). Sharp enamel edges were removed

and a long bevel was created on the facial surface with TR11F fine-grit bur (Mani Inc. Japan) (Fig. 7), followed by smoothing of the prepared surface and defining short and long bevels with Super-Snap coarse disk (Shofu Inc. Japan) (Fig. 8).

## Etching and bonding

The prepared tooth was ready for the bonding protocol. First, the prepared palatal putty index was checked to confirm the fit (Fig. 9). Then, the enamel was etched with 37% ortho-phosphoric acid (Etch-Rite, Pulpdent, USA) for 30 seconds (Fig. 10). The adjacent central incisor, tooth 11, was protected with Teflon tape. The etching was done slightly beyond the long bevels prepared on the tooth to help achieve a smooth restorative margin. FL-Bond II Primer was applied on a slightly exposed dentin surface and left undisturbed for 10 seconds followed by FL-Bond II bonding agent (Shofu Inc. Japan) applied in an even layer over the entire etched tooth surface (Fig. 11) and photocured for 20 seconds.

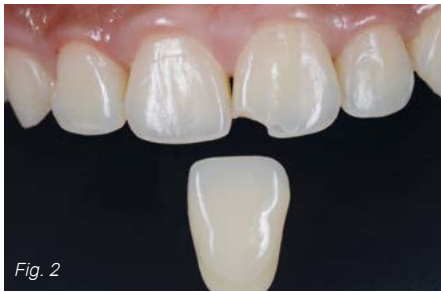


Fig. 2: Shade selection using Vita Classical shade guide

Fig. 3: Free hand mock-up created with Beautifil II LS shade A2

Fig. 4: Putty index made with A-Silicon impression

Fig. 5: Isolation achieved with rubber dam

Fig. 6: Teeth polished with pumice slurry to remove the plaque biofilm

Fig. 7: Minimal surface preparation and bevels done with a fine diamond point

Fig. 8: Smoothing of prepared surface and defining of the short and long bevels with Super-Snap coarse disk

Fig. 9: Palatal putty index checked before the bonding protocol

Fig. 10: Etching of enamel surface with 37% phosphoric acid

**Creating the palatal shell**

A small amount of Beautifil Injectable XSL shade A2 (Shofu Inc. Japan), a bioactive restorative material, was injected in a small amount and placed on the palatal putty index in the area of the tooth to be restored (Fig. 12). The putty index was then placed on the palatal aspect of anterior teeth. The restorative material was spread and teased with a thin probe onto the palatal aspect of the preparation and photocured for 20 seconds (Fig. 13). The self-levelling flow properties of this novel restorative material permits gentle spread and preparation of a thin even palatal base layer. The putty index is removed and the prepared palatal shell is examined (Fig. 14). Photocuring is done for 20 seconds from the palatal aspect. Excess material was gently trimmed using No.12 surgical blade. This palatal shell will serve as a base for further placement of restorative material.

**Inject and shape with bioactive injectable composite**

A layer of Beautifil Injectable X was then placed on the palatal shell

layer and gently spread using a probe and No. 5 Unibrush (Shofu Inc. Japan). The unique properties of this restorative prevented the material from flowing freely and allowed the material to holds its shape. The material was injected and shaped to be slightly thick on the apical aspect of the defect and gently spread over the fracture line while forming a thinner layer towards the incisal aspect (Figs. 15-16). The injectable composite layer was then photocured for 20 seconds.

The translucency effect was created by adding Lite Art blue stain (Shofu Inc. Japan) on the incisal aspect and gently spread using No. 5 Unibrush before photocuring for 20 seconds (Figs. 17-18). Two more layers of Beautifil Injectable X A2 were added subsequently to get the desired shape and anatomy of the fractured segment (Figs. 19-20). Each layer was photocured for 20 seconds and final curing of 40 seconds for each surface was carried out after application of glycerine to minimise the oxygen inhibited layer on the surface (Fig. 21).



Fig. 11: Bonding with FL-Bond II sixth generation bonding system

Fig. 12: Small amount of Beautifil Injectable XSL bioactive composite injected on to the putty index

Fig. 13: Putty index placed on palatal aspect injected material spread evenly and photocured

Fig. 14: Palatal shell created to form a thin and even base layer

Fig. 15: Beautifil Injectable X was injected and placed on the palatal shell layer

Fig. 16: Material was gently spread using a probe and No. 5 Unibrush

Figs. 17-18: Translucency effect was created by adding Lite Art blue stain

Figs. 19-20: Beautifil Injectable X was injected in layers to obtain the desired anatomy and minimise adjustments

Fig. 21: Oxy-barrier applied and light-cured to minimise the inhibition layer



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## Finishing and polishing protocol

Gross finishing was completed under rubber dam using Super-Snap medium disk (purple) and TR21F (Mani Inc. Japan) fine-grit bur on slow speed handpiece (Figs. 22-23). OneGloss Midi point (Shofu Inc. Japan) was then used to smoothen the surface and create secondary surface anatomy (Fig. 24). After fine finishing, the rubber dam was removed, occlusion

was adjusted and the final aesthetic outcome was examined (Figs. 25-26).

The patient was recalled after three days for the final finishing and polishing of the restoration (Fig. 27). The aesthetic outcome observed after hydration appeared satisfactory. Final finishing was done using One-Gloss with minimal pressure and fleeting strokes (Fig. 28). This method of

finishing with One-Gloss can be easily termed as pre-polishing as it creates a smooth surface ready to be polished (Fig. 29). The polishing step was initiated with Super-Snap X-Treme Disk fine (Green) followed by extra-fine (Pink) (Figs. 30-31). As the disks are flat and tend to flatten the surface characterisations, they should be held at a slight angle while polishing the facial surface so as not to flatten the lobular anatomy.



Fig. 22



Fig. 23



Fig. 24



Fig. 25



Fig. 26



Fig. 27



Fig. 28



Fig. 29



Fig. 30



Fig. 31

Fig. 22: Gross finishing with fine diamond CA point

Fig. 23: Finishing with Super-Snap medium disk (purple)

Fig. 24: OneGloss Midi point was used to smoothen the surface and obtain surface texture

Fig. 25: Fine finishing completed before removal of the rubber dam

Fig. 26: Immediate post-op

Fig. 27: Restoration at the three-day recall visit for finishing and polishing

Fig. 28: Final finishing was done using One-Gloss with minimal pressure and fleeting strokes

Fig. 29: Pre-polished surface after finishing with OneGloss Midi

Fig. 30: Polishing step was initiated with Super-Snap X-Treme disk fine (Green)

Fig. 31: Further polish was achieved with Super-Snap X-Treme super fine disk (Pink)



Fig. 32



Fig. 33

Fig. 32: Final lustre was achieved with Super-Snap Buff disk used with fleeting strokes

Fig. 33: Final restoration with natural aesthetics that blend well with the rest of the dentition

Final lustre was achieved with Super-Snap Buff disk (Shofu Inc. Japan) used with fleeting strokes (Fig. 32).

## RESULT AND CONCLUSION

An aesthetically pleasing restoration was easily created using the above protocol, where the restoration was almost undetectable from the rest of the tooth and also the adjacent tooth (Fig. 33). The translucency of the incisal third appeared optimal with the body of the restoration having the depth of colour which matched perfectly with the rest of the tooth structure making the restoration invisible. The fracture line appeared well masked where the restoration margins were well blended with the natural tooth surface. Overall, the aesthetic outcomes achieved were beyond the patient's expectations and she was very happy.

The new injectable restorative materials, Beautifil Injectable XSL and Beautifil Injectable X, used in this clinical case demonstrated very good handling and optical properties to make a complicated restoration plan simple and predictable with a mono shade restorative procedure. The optical properties of these bioactive composites are truly impressive as the restoration does not appear too translucent or greyish in colour, however at the same time permits the optical effects of tints used in sub-surface layer to create the effect of the natural translucency required to perfectly match the adjacent tooth. The fracture lines were masked well, along with seamless integration of restoration margins and tooth surface. Though no

attempt was made to create an incisal halo using any opaque tints, except for mimicking the natural incisal edge slope towards palatal, the incisal halo was still distinctly visible in the final restoration. This points towards the good refractive opalescence properties of the restorative material. The final finish and polish of the restoration were easily achieved with the comparable lustre of the natural enamel surface. **DA**

## REFERENCES

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## About the author



Dr Amit Gulati, is a BDS and MDS from the University of Mumbai, India. He completed an advanced training in aesthetic perioplastic surgery, implantology and osseous regeneration at the University of Hamburg, Germany, and further expanded his expertise with advanced prosthodontic training under eminent clinicians in Germany.

A diplomate of the Indian Society of Oral Implantologists (ISOI), a fellow of International Congress of Oral Implantology (ICOI) and associate fellow of World Clinical Laser Institute (WCLI), Dr Amit is trained in Digital Smile Design (DSD) under Dr Christian Coachman and was instrumental in introducing the Style Italiano concept in India through his academy. He also had extensive training on Minimally Invasive Cosmetic Dentistry (MiCD) and is a certified MiCD clinical trainer.

During his 17 years of aesthetic and implant practice, Dr Amit has delivered numerous scientific presentations and conducted training programmes on implants and aesthetics both locally and internationally. Apart from consulting for various aesthetic clinics in Mumbai, he also runs a busy practice with special focus on aesthetics, implantology and oral rehabilitation. He is a passionate teacher and runs "Synqronize", an academy established with other like-minded colleagues, to share knowledge and train extensively on implant and aesthetic dentistry.