

Implant retained hybrid dentures using the CAM StructSURE® bar

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Introduction

Restoring a patient with 4 implants using a cast bar has always been a time consuming and costly part of implant dentistry. The gold components, the gold alloy and the actual technique used to cast a passive bar is not easy and can take a good technician most of the day to cast and trim a bridge. With that in mind and the rising cost of gold has made the implant retained hybrid bar a costly and almost exclusive treatment option.

However, advances in CAD-CAM technology have seen some dramatic changes for the hybrid bar. The ARCHITECH® CAM StructSURE (BIOMET 3i) is a good example of using CAD-CAM to resolve the issues mentioned above.

The authors have been using the CAM StructSURE bars with great success for over 18 months with 14 completed cases in situ and several more in the pipeline. This article will show the techniques used to design and produce a hybrid CamStructure bar and have enclosed all the vital clinical stages to ensure the bar is produced accurately and with ease.

Impression and model stages

It is vital that an accurate impression is taken using a modern silicone or, ideally, a polyether like Impregum (3M Espe) or similar. A special tray to assist in the ease of taking the implant impression will ensure as high a level of accuracy as possible. Once the impression is taken all the impression copings are checked to make sure they are solid and have no movement. The implant replicas are carefully

screwed on a soft tissue model is poured. Gingifast Rigid (Zhermack) is used as the soft tissue and the models are poured in a high quality, low expansion die stone.

Verification jig

This stage is essential to verify the accuracy of the model before it is sent away to have the bar constructed. The jig is made using metal temporary cylinders so they can be x-rayed in the mouth to check for passivity. The bar is constructed from Pi-Ku-Plast HP36 (Bredent), as a solid bar which is milled and then sliced into smaller parts to ensure an accurate fit. The bar is re-joined and then left for 24 hours before passivity is checked again by screwing down with a single screw at the most distal point on the left then checking the right and repeating vice versa. If the bridge rocks then it is cut and re-joined. While the bar is milled a secondary framework sleeve is made onto the bar in order to produce the bite block and set up. The sleeve is made from Pi-Ku-Plast and slides easily onto the bar and locates with a click to ensure it is seated. On this frame a standard bite block for the bite and tooth position to be marked by the clinician is made.

Set up and Design

The denture is set up according to the clinicians requirements and whilst it is set up with a palate, no flange is used as the denture will not have a flange when finished. This eliminates the risk of any tissue collapse on fitting and also checks the facial features at this stage. The try in can be made on the bite block bar for accuracy or as a conventional try in minus the flange as stated before.

Ordering of the bar

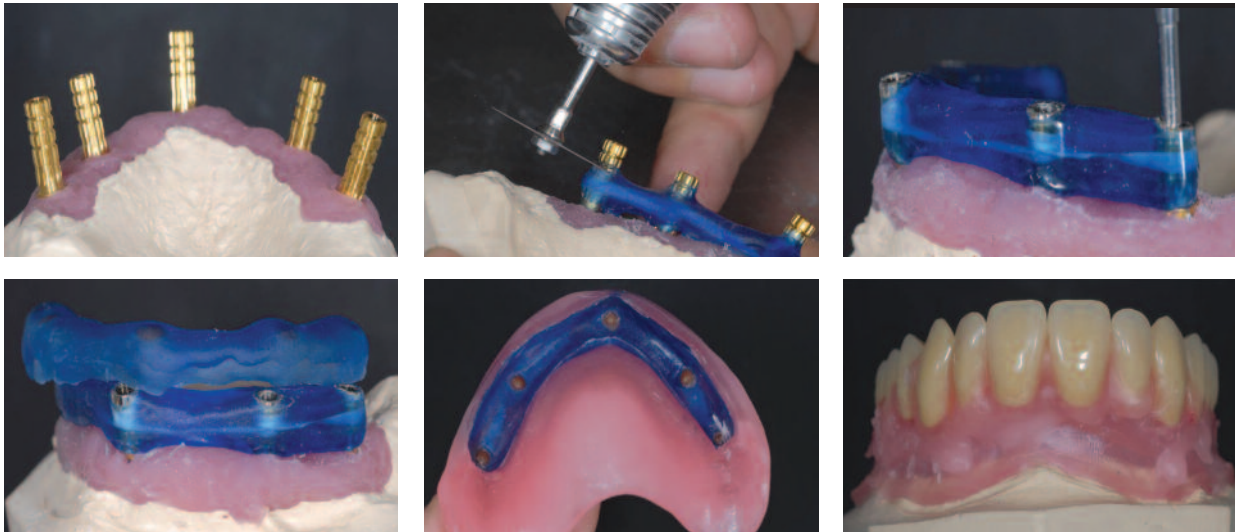
Once the set up has been approved it is easy to have the bar designed and manufactured. A self explanatory form

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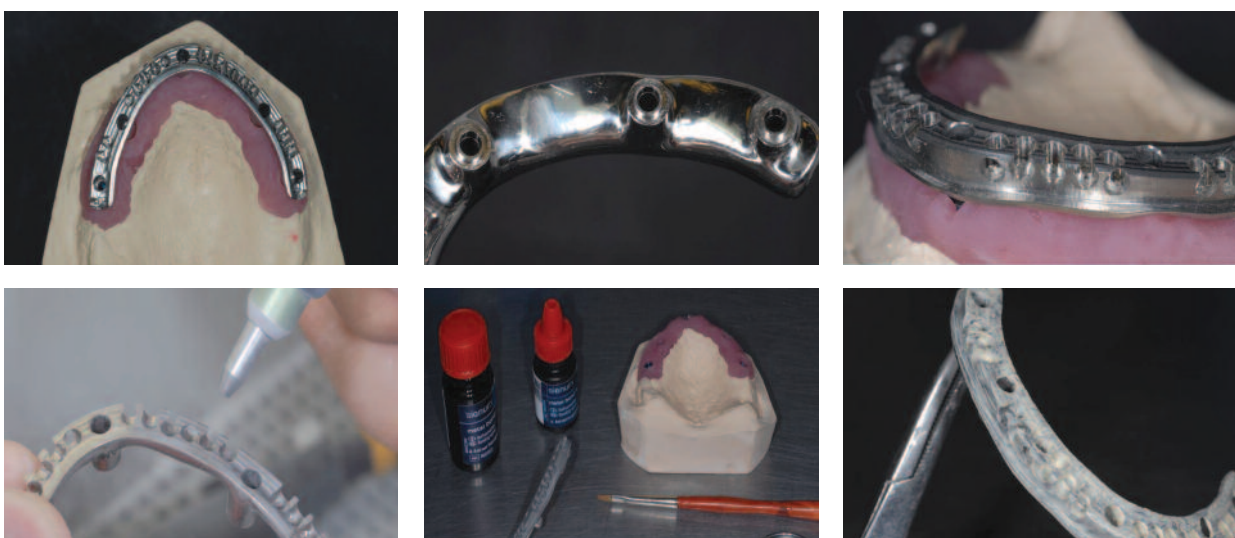


from the manufacturer is filled in, detailing account details, implant manufacturer, bar type and design and the implants used. The form is sent with the model and the denture to the Valencia manufacturing facility via courier. From Hader bars to fixed hybrid bars, the CAM StructSURE system offers a vast array of design types for selection. In this scenario, a type 1 Hybrid bar was chosen which will be screw retained in the patients mouth. As this case is on BIOMET 3i implants the screws can be ordered at this stage. If the bar is on any of the other implant systems then the screws must be ordered from the relevant implant company.

After three days the bar design was returned allowing the framework design to be checked three dimensionally. Once confirmed by the lab, the bar is milled from a solid block of titanium. After 7 days the CAM StructSURE bar is

returned and the fit on the model is perfect with complete passivity. The under surface is polished to perfection and the acrylic side is full of retention for the acrylic to attach mechanically. The bars are so well finished that work can start on them immediately after checking and then sand blasting the retentive surface with Alumina oxide (50 microns). The surface is then steamed and painted with the Sigma bonding agent (Heraeus Kulzer). The preparation of the bar is then finished with the pink Gradia opaque (GC) taking care not to lose or block out the mechanical retention.

The denture wax up is transferred to the bar for try-in with great care and accuracy. A silicone index is taken of the denture and then the teeth are placed into this to check the space for the bar. If the teeth make contact with the bar, the teeth are carefully trimmed and adjusted until there





is a space between the bar and the teeth of roughly 1mm minimum. This space allows the acrylic to flow between the bar and teeth, giving strength for the acrylic. The teeth are locked into the index by using the Bredent location matrix drill and wax is flowed into the indices with the bar in place. Using the location matrix drill ensures the teeth do not move when the wax is poured in. When the wax has set, the teeth are cleaned and the wax is finished to look as it will when complete. This is then sent as a final try to check the bar and the set up.

Flasking

If the bar and set up are approved and no further try-ins are required then the bar is ready to be flaked, packed and processed. The holes are blocked out with light body silicone but we leave an indent to aid in the drilling out when processed. The model is never flaked as this is the only point of reference, so plaster is vacuum mixed to ensure no bubbles, and then carefully poured onto the denture. This is then allowed to set before starting to boil out the wax. The wax is conventionally boiled out using a wax flushing agent to ensure no residue is left. Bredent isolation liquid is used as a separator for the plaster and then Palabond (Heraeus Kulzer) to assist in achieving the best bond between the acrylic and the teeth as is possible. The separating solution is left to dry and is then ready for processing.

Processing

All the bars are processed using the Enigma system so the initial stage is to use the colour tone to give the acrylic a depth of colour and help to bring out the subtle contouring. Once this stage is reached additional fixture replicas are ordered and screwed to the beam. When flasking the lower part, the replicas allow the user to create a new model in the flasking plaster. Gnathostone is used for this stage as it sets quickly and has a very low expansion. This is sanded and then the secondary part is ready for flasking. This is done this using Whipmix silky rocky to ensure all the details of the wax are kept and minimal finishing is required. Once complete it is packed and cured on an overnight cycle.

Finishing

As so much care is taken in the wax, flasking and processing stages the denture requires very little finishing. The micro flash is removed and the denture is trimmed in. The bite is checked and then a final polish is given to the denture. As the CAM StructSURE bar is polished by the manufacturer this requires no work and the acrylic is only given a light pumice and polish before it is finished. Once again the bite is checked on the articulator as is the fit on the definitive model. The screw retained hybrid denture is now finished and sent out to be fitted.