

All-on-4 immediate load denture-to-bridge conversion



Jo Stevenson guides us through a fascinating step-by-step case study

An all-on-4 immediate load bridge

is a temporary solution for converting a denture to a temporary bridge on the same day implants are placed in the patient's mouth. This helps stabilise the implants while they integrate with the patient's hard and soft tissue. They go home with functional teeth after a single visit to the surgery, which the clinical practices will sometimes advertise as "teeth in a day".

Aim:

- to describe and discuss the management of a complex immediate denture to bridge conversion.

CPD Outcomes:

- to understand the technical stages of the denture to temporary bridge manufacturing over immediate implants.
- to be aware of the importance of the agreed prescribed procedure.
- to be aware of the importance of team work in off-site provision.

Development Outcome: A, B, C

PEER
REVIEWED

Part 1: Construction of a denture for conversion to a bridge in the surgery; plus, creation of a surgical guide for implant placement and a special tray to take an implant impression. These will be sent to the dentist before the day of surgery and implant placement.

For this case study the dentist provided instructions and photos of the patient's existing teeth to aid in the setting of the denture teeth. The patient's existing natural teeth were too long (due to over-eruption) and a large

amount of gum was showing when she smiled. The clinician's instructions required the teeth to be set shorter in the denture while 4mm of bone was to be surgically removed to make room for the teeth prior to implant placement. (Fig 1.)

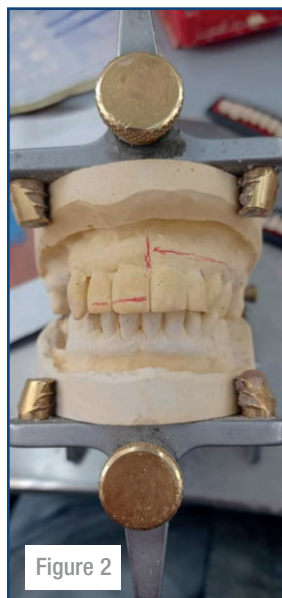
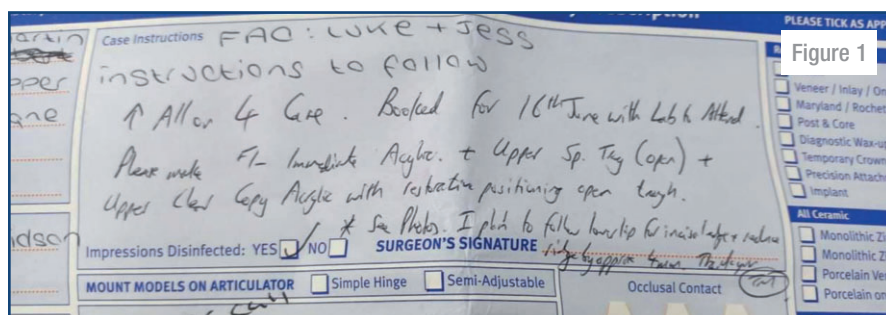


Figure 2

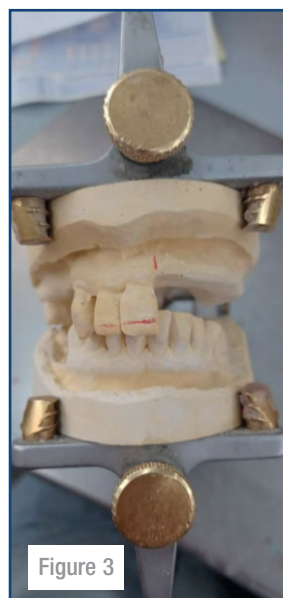


Figure 3



Figure 4

denture to bridge conversion



Figure 5



Figure 6



Figure 7

The models were articulated and assessed to see where the denture teeth were to be placed. A pencil was used to mark the new incisal level and indicated the amount of gum that needed to be removed to allow for the reduction in bone. (Fig 2.)

Teeth were trimmed off on one side of the model, removing gum up to the pencil lines indicated on the model. (Fig 3.) Anterior teeth are then set up to the new incisal level while also maintaining the same arch form as the original teeth. (Fig 4.)

Posterior teeth are set with appropriate occlusal contacts, and only extended as far back as the first molar because implants are not usually not set any further back than the this. A large cantilever of posterior occlusion past the last implant might put too much pressure on the implant while it is integrating, which would likely cause the implant to fail or acrylic to fracture. (Fig 5.)

The second half of the model is then trimmed back to match the first. (Fig 6.) The teeth on the second half are then set up to mirror the aesthetics and function of the first arch, while again maintaining the existing arch form and providing good functional occlusal contacts. (Fig 7.)

The try-in is then waxed up with no anterior flange and a full palate. We provide the full palate in order to aid the dentist when

fitting the bridge in the mouth after the existing teeth have been extracted and the implants placed. This is because the palate will be the only place in the mouth where no changes have been made during surgery.

Next a putty index is made of the try-in on the model (Fig 8), and the lab modified edentulous model is duplicated. The index is then placed on the duplicate model and filled with wax. This wax duplicate of the try-in will then be processed in clear acrylic in order to make the surgical guide for the clinician's use.

Also using the modified edentulous model, a special tray is constructed with a raised area and open top which runs from 6 to 6. This is for taking an implant impression on the day of surgery. The temporary denture and stent are then processed in heat cure acrylic before being trimmed and polished.

The stent requires a channel trimmed out from 6 to 6 which will aid the dentist when placing the implants, helping ensure they are precisely placed within the arch of the denture. The denture, stent and impression tray are then delivered to the dentist in preparation for the day of surgery. (Fig 8.)



Figure 8



Figure 9

denture to bridge conversion

Part 2: The day of surgery and converting the denture to an all-on-4 bridge

The day the patient's surgery takes place usually calls for an early morning start to allow sufficient time for the patient to have the remaining teeth extracted, excess bone removed, and the implants placed. The dental technician arrives at the surgery at the agreed time, after the implants have been already placed, and they set up their equipment in a separate room before laying out the materials they carry in their mobile kit. (Fig 1.)

The mobile kit contains: personal tools; hand-piece and burs; hand torch and gas; wax knife; scalpel and spare blades; screwdriver suitable for the implant system being used; Ash5 and lecron carver; UV light box; model former; compressed air in a can (for blowing dust off work); hand-held vacuum cleaner (for dust extraction and cleaning); spare implant components such as temp cylinders and screws; a hydro flask; and finally, and not forgetting a pen and pencil.

Materials used during the process include: gingifast [A] and separator; glue; wax; lab putty [B]; model sealant; cold cure polymer and monomer; Vaseline; gloves and masks; and Palaseal [C].

By the time the mobile kit has been set up the implant impression has been taken using the special tray supplied by the dental laboratory. A thin wash impression is also taken inside the denture over the healing caps in the mouth. This is to establish an accurate idea of where the implants will be placed in relation to the denture. (Fig 2.)

At this stage, after the extractions, the mouth is usually swollen, puffy, and has been sutured, the impression must be carefully checked for any rough areas or lumps which are then delicately cut away using a scalpel to smooth the areas around



Figure 1



Figure 2



Figure 3

the implants. Cross infection control measures, personal preventative equipment and standard decontamination procedures must be fully adhered to.

Model analogues are then screwed onto the cylinders in the impression, and a separating solution is painted over the impression before gingifast can be injected around the analogues and along the crest of the ridge. (Fig 3.)

The impressions are then cast up using a mixture of die stone [D] and articulating plaster [E]. This solution not only makes the model stronger but also sets quickly to help speed the overall procedure. (Fig 4.)

Once the plaster has set the impression can be unscrewed and removed from the model. It is then assessed once more and the gingifast trimmed back and smoothed so that when the bridge is fitted it



Figure 4 a (left) and b (right)

denture to bridge conversion



A putty index is made, covering the buccal and occlusal surfaces while still maintaining access to the ends of the long

prosthetic screws. (Fig 9.) The denture can now be detached from the model and all the wax removed. It must be roughened where acrylic is to be added and the filling surface trimmed back a little to allow acrylic to flow underneath.

Before screwing it back down, the model is first coated in model sealant and the long screws are dipped in Vaseline to stop them sticking to the acrylic. The tops of the cylinders are blocked out with wax to ensure that the acrylic does not flow down between the screws and the inside of the cylinders.

The putty matrix is then placed back over everything and cold cure acrylic is poured into the mould, ensuring that it flows underneath both around the buccal areas and the posterior cylinders. It is then placed in a hydro flask [F] in hot water to cure.

Once cured the denture can be unscrewed and removed from the model.

It now needs to be trimmed into the bridge shape while ensuring that the fitting surface is smooth and ovate, which provides a more natural oval or egg-shaped form, and also that the buccal and palatal surfaces flow onto the gum and are not ridge

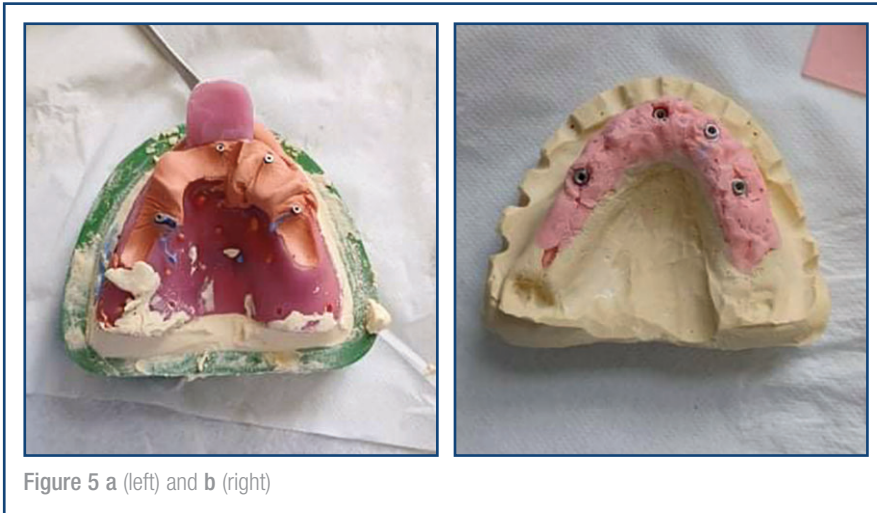


Figure 5 a (left) and b (right)

compresses the gums slightly. This is because the gums will naturally shrink a little once the swelling reduces.

Preparing the denture

The temporary denture is now trimmed back to fit the model using the palate as a location point. Holes are trimmed through the denture at the implant sites. This is achieved by trimming through the wash impression inside the denture where the healing caps show; first marking the fitting surface of the denture before grinding through to form a hole where the cylinders will be placed.

Two anterior temporary cylinders are screwed down onto the model and the denture placed on the model to make sure the holes in the denture go around the cylinders. This must be a very passive fitting with no actual contact on the cylinders. Maintaining a good space around them provides the necessary area to be filled with acrylic in the mouth.

The denture and cylinders are then passed to the dentist who screws the cylinders to the two anterior implants and places the denture in the mouth, first checking the incisal level and bite before picking up the cylinder in the denture using acrylic. It is then unscrewed from the mouth and returned to the dental technician on site. (Fig 5.)

These two cylinders are now the anchor points from which the bridge can be constructed on the model. The palate is now removed and the denture trimmed back so that the two anterior cylinders can be easily screwed down onto the model. The denture is then removed once more and the posterior cylinders screwed down on the model. (Fig 6.)

Holes are trimmed through the denture so that it fits passively around the posterior cylinders and the two anterior cylinders can easily be screwed down. (Fig 7.) The buccal areas are then waxed-up, making a neat seal to the model. (Fig 8.)



Figure 6



Figure 7



Figure 8

denture to bridge conversion

lapped. This will simplify cleaning under the bridge and around the implants. The bridge needs to be kept around 1cm wide for strength. (Fig 10.)

After the acrylic has been trimmed the bridge is then checked on the model – without using the gingifast – so we can then ensure that all the cylinders are sitting on top of the implants correctly. The bridge is then given a thin coating of palaseal and cured under UV light. This seals the acrylic surface and provides a smooth and shiny finish. (Fig 11.) It's now ready to be returned to the dentist and fitted in the mouth.

This temporary bridge will be worn for up to three months to allow the implants to integrate with the patient's hard and soft tissues, before a stronger, more permanent bridge will be constructed.

This process requires a general need for good communication between technologist and dentist, and sometimes even shared problem solving in what can be quite an intense environment, especially in those rare instances where the bridge does not fit perfectly first time. I would like to thank Dr Trevor Martin for being such a generous colleague, and for helping me perfect this article.

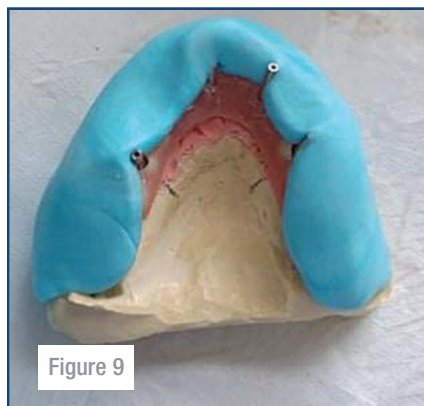


Figure 9



Figure 11



Figure 10 a (left) and b (right)

References

- A *Zhermack Gingifast*: <https://www.zhermack.com/en/product/gingifast-elastic/>
- B *Example Lab Putty, Dupiter Silicone Lab Putty*: <https://www.bracon.co.uk/catalogue/general-materials/silicone-lab-putty>
- C *Kulzer Palaseal®*: <https://www.kulzer.com/en/en/products/palaseal.html>
- D *Example Die Stone, Panadent*: <https://panadent.co.uk/shop/dentona-rapid-stone-die-stone/>
- E *Example Articulating plaster, Bracon*: <https://www.bracon.co.uk/catalogue/plaster-and-diestones/articulating-plaster.html>
- F Hydro flask example – Bracon: <https://www.bracon.co.uk/catalogue/general-materials/hydroflask/bowl-for-the-langs-hydroflask-aquapress.html>

Development Outcome A, B, C – 60 minutes

To complete your CPD, store your records and print a certificate, please visit www.dta-uk.org and log in using your member details.

Q1 The Immediate load denture to bridge concept as described in this article is where?

- A The restoration is fitted prior to the implants being inserted.
- B The implants are placed in the surgery at the initial stage.
- C The existing denture is developed into a temporary restoration, and b.)
- D The new permanent denture is fitted two weeks after the implants are placed.

Q2 What does the writer indicate as the advantages of immediate loading of the implants by using the denture as a temporary restoration?

- A Provides for a temporary functional restoration

- B Stabilises the implants during healing and c) only
- C Assists healing of the soft tissues around the implants
- D Meets the patient's desire for 'Teeth in a Day', and all the above.

Q3 What information did the dental technician have from the clinician prior to the planned surgery day?

- A Discussions and instructions from the clinician, including the shortening of the anterior teeth and the 4 mm labial bone reduction, and c) only
- B Examples of the patient's own pictures showing their teeth, and a) above
- C The assessment that the remaining upper anteriors were over-erupted and proclined, and all the answers.

denturetobridgeconversion



D The labial alveolar bone was bulky as seen via the initial study models when used to make the special trays, and a) only

Q4 What laboratory preparations did the writer first do to the articulated maxillary and mandibular cast?

- A** Socket fit the anterior natural remaining teeth into their previous root areas.
- B** Firstly set the anteriors on one side at a time to the correct position of occlusal plane.
- C** Reduce the length of the anterior teeth to the agreed level and trim the anterior labial gum work back on one side of the arch then set up the teeth on one side.
- D** Trim the whole of the buccal labial gum work back and lengthen the anterior teeth as indicated on the occlusal registration block.

Q5 Why was it planned that the upper trial denture was developed with nothing occluding posterior to the upper 6s?

- A** It creates a cheaper result in a costly restoration.
- B** Including 7s will always cause the implant abutment to fail
- C** The lower denture has no posterior teeth in the second molar area so there is no point in having too many upper posterior teeth.
- D** A cantilever on the upper posterior occlusion past the last implant might put too much pressure on the implant while it is gradually integrating with the bone.

Q6 For what reason does the writer suggest that they provided full palatal coverage so as to be useful to the clinician?

- A** Provides more stability for the patient when the upper denture is in use
- B** To assist the dentist when locating the case after extraction of the remaining teeth.
- C** To support the occlusion when the implants are about to be placed.
- D** To prevent lateral movement of the denture in various articulations.

Q7 Which of the following did the writer not clearly indicate they included as part of their mobile kit?

- A** Micro motor with dust extractor.
- B** UV light box; a pen and pencil, hand held vacuum cleaner
- C** Spare implant components such as temp cylinders and screws;
- D** Hydro flask, scalpel and spare blades, Ash5, and Le'cron carver

Q8 What did the writer provide as a surgical guide to the clinician?

- A** The special tray with open top which runs from 6 to 6
- B** A copy of the try-in in heat cure clear acrylic
- C** A pressure formed clear stent with metal indicator strips.
- D** A close fitting clear acrylic palatal section area just overlapping the ridge.

Q9 The dental technician in this case used their skills and knowledge to trim the premade complete denture as adjusted to fit the new model of the adjusted tissues using the palate as a location point, then...

- A** Screwing down the denture to the gypsum model
- B** Adding a preformed wire strengthener to support the denture
- C** Grinding away the healing caps
- D** Creating holes through the denture at the identified implant sites.

Q10 Which addition silicone was used by the dental technician in this implant case to reproduce ridge areas?

- A** GINGI **B** Elite HD+ **C** Gingifast **D** Dentax

Q11 The dental technician in this case provided the completed temporary denture and cylinders with a passive fit, for the clinician to...

- A** Screw into place in the mouth
- B** Take the location impression in an addition silicone
- C** Use as a clear stent to mark the implant location with a pen
- D** Check location in the mouth and fix in place with self-cure acrylic.

Q12 Once the cylinders are located in the temporary denture the dental technician in this case had to remodel the denture to an aesthetic shape and improve the fit surface on site using

- A** A light curing surface coating
- B** Auto-polymerising resin (cold cure)
- C** Addition silicone mask material
- D** Heat cure resin processed in a Hydro flask



Don't forget to reflect