**Refurbishing implant fixed dental prostheses**

**A simple method**

**Introduction**

This article describes a method for refurbishing fixed restorations composed of a metal-based substructure covered with acrylic or composite resin gingivae and teeth. These restorations have been given a variety of names in the literature, including: hybrid implant prosthesis; implant-supported fixed partial denture; implant-supported fixed complete denture; fixed bone-anchored prosthesis; and fixed dental prosthesis. They have been successfully used for a number of years to provide full arch restorations on dental implants in edentulous patients. Recent systematic reviews have shown good five-year implant survival rates of 87–100%\(^6\). These restorations do, however, exhibit biological and technical complications, with cumulative prosthetic survival rates ranging from 82–100% in studies with ten years or more follow-up\(^6\).

One of the most frequent technical complications is fracture of the metal framework, as there was no indication to replace it. By contrast, fracture of the metal framework is rare. There is a high cost involved in a full remake of this type of fixed dental prosthesis, so any technique that enables the metal framework to be reused, rather than remade, is advantageous. This article describes a process that is frequently used by our team to refurbish fixed implant dental prostheses where the teeth have worn or fractured. It is illustrated with two clinical case examples.

**Clinical case 1**

A 50-year-old woman presented to the dental hospital with two fractured maxillary teeth. Six years previously, five maxillary implants had been placed and the patient had been provided with a full arch hybrid titanium-acrylic implant fixed dental prosthesis. Examination revealed the acrylic teeth had fractured in the 12 and 11 positions (Figure 1).

The woman was happy with her implant fixed dental prosthesis: she liked its appearance, and was able to maintain oral hygiene around it easily using interdental and single-tufted brushes. She asked for it to be repaired or replaced.

The prosthesis was intact apart from the fractured teeth. The underlying abutments showed no abnormalities, and the implants were osseointegrated. Soft tissues were normal and healthy and the patient had good oral hygiene. In the lower arch, she also had a full arch hybrid titanium-acrylic implant fixed dental prosthesis which was functioning well.

The following technique was used to refurbish the fractured prosthesis. It included retaining the metal framework substructure, as there was no indication to replace it.

**Appointment visit 1**

The first appointment involved removing the maxillary prosthesis for a few hours. The patient was alerted to this beforehand and brought an old upper complete denture with her. Following removal of the implant prosthesis she was able to wear the denture as a temporary measure.

An alginate impression was taken of the opposing arch, as well as a silicone registration record. The fractured prosthesis was removed, and healing caps placed on the implant abutments intraorally (Figure 2). The prosthesis was checked on the master cast and then sent to the laboratory, along with the master cast, alginate impression and registration record. It was copied in the lab within a few hours. Laboratory putty (Sheraduplica) was applied around the prosthesis, which was retained on the master cast to copy its shape (Figures 3–5).

Having been copied, the prosthesis was returned to the patient. As a temporary measure, the fractured area of acrylic was restored intraorally using acrylic teeth and composite. The acrylic surface was sandblasted beforehand, with grooves added to aid retention of the composite (Figure 6). This was purposefully kept out of occlusion to minimise the risk of further debond/fracture.

**Appointment visit 2**

Prior to this appointment, the laboratory technician had made an occlusal registration record block in wax and acrylic on the original master cast, using prosthetic implant cylinders on the implants and the putty copy of the fixed dental prosthesis to aid in the design and shape of the registration block. The acrylic was as similar in shape as possible to the metal substructure of the original damaged prosthesis. Wax was placed on top of the acrylic.

The purpose of this appointment was to remove the old prosthesis and, using the registration block, obtain an appropriate registration. Softened wax and a silicone registration material were used to record this at an appropriate occlusal vertical dimension. The shade for the new teeth for the prosthesis was recorded at the same time. The tooth mould was to be as similar as possible to those on the damaged prosthesis. The old prosthesis was replaced in the patient’s mouth after completing the registration.

**Appointment visit 3**

Using the registration recorded at the previous appointment, the laboratory technician had made a wax and tooth try-in for this appointment. The old fixed prosthesis was removed and the try-in completed, with small adjustments made to the tooth position as required (Figure 7). The patient was shown the try-in using a mirror to ensure she was happy with the tooth shape and colour. The old fixed prosthesis was reinserted.

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**Figure 1. Prosthesis showing fractured acrylic teeth at 12 and 11.**

**Figure 2. Healing caps were placed on the multi-unit abutments once the prosthesis had been removed to protect both the patient’s soft tissues and the abutments.**

**Figure 3. The fractured prosthesis seated on the original master cast.**
The patient was warned that her next visit would involve two appointments on the same day: one in the morning and one in the afternoon, and that for the few hours between these appointments her maxillary prosthesis would be in the laboratory and she would have healing caps placed on her implant abutments. She was advised to bring her old temporary denture to wear for these few hours if she so wished.

Appointment visit 4

**Morning visit.** The patient had her old maxillary prosthesis removed and healing caps placed on the implant abutments. She was asked to return to the clinic later that day. Meanwhile, the old prosthesis was taken to the laboratory. Prior to this visit the technician had flasked the copy prosthesis using abutment replicas and guide pins. The flask was prepared using the lost wax technique and the acrylic substructure (which had been part of the registration block) was removed. The technician removed all of the acrylic from the metal framework of the old prosthesis and screwed the original metal framework to the abutment replicas within the opened flask using 15mm guide pins. She then processed new acrylic teeth and gingivae superstructure on to it. This frequently takes 3–4 hours depending upon what acrylic is used, so a fast curing cycle is recommended (Figures 8–11).

**Afternoon visit.** The healing caps were removed, and the new full arch titanium-acrylic implant fixed dental prosthesis was fitted using new implant screws. The occlusion was checked and adjusted as necessary. The screw holes were filled with PTFE tape and tooth-coloured composite. Oral hygiene instruction was reinforced to ensure the patient could keep her new restoration clean (Figure 12).

Appointment visit 5

At review, the patient reported that she was delighted with the result. She had no concerns and her good oral hygiene had been maintained.

**Clinical case 2**

The same method of refurbishment was also successfully used in the case of an 80-year-old woman who presented complaining that her lower teeth were very worn. She had had four mandibular implants placed 15 years previously, and her current mandibular implant fixed dental prosthesis had been functioning well for eight years. It was of a hybrid design with a gold beam substructure and acrylic gingivae and teeth. She had noticed the teeth wearing over the years and was now unhappy with their appearance. Clinical examination revealed significant wear of the teeth on the lower prosthesis (Figures 13 and 14). It was opposing a dentate upper arch. The worn prosthesis was successfully refurbished using the same technique as for clinical case 1 (Figures 15 and 16).

**Conclusion**

Fracture or wear of the veneering material of full arch implant fixed dental prostheses can be a common occurrence. If this complication occurs, the prosthesis can be refurbished using the method described, without the need to remake the metal bar framework. This is a relatively quick, cost-effective and accurate method of refurbishing a prosthesis which has been performing well for the patient. When providing implant prostheses, it is imperative that patients are informed of the potential maintenance required.
References