tory function, as well as a decreased general quality of life. Edentulous people exhibit a lower self-esteem by being excluded from normal masticatory function. The following article describes the fabrication of a fixed superstructure for the edentulous mandible that uses an innovative attachment system.

Dental implants as support for a removable dental prosthesis were introduced many years ago as a treatment option and as an alternative to a conventional complete denture. In the past ten years, considerable efforts have been made to develop new fixed treatment concepts. Attempts have even been made to implement treatment without bone augmentation procedures (e.g. Dr Paulo Malo’s All-on-4 concept). Most restorations are cement or screw-retained solutions. For the past year, an innovative attachment system has been available that combines the clinical comfort and structured laboratory techniques of a fixed complete prosthesis without the need for it to be cemented or screw-retained.

The LOCATOR F-Tx system (Zest Dental Solutions, USA) makes it possible to produce an aesthetic dental restoration. The prosthesis is attached to the implants by means of a snap-in attachment system. This new attachment gives the patient greater assurance of function and quality of life. It also allows the practitioner to remove the prosthesis and make corrections at any time. Furthermore, complex laboratory procedures, that require channels and screw retention, are not required.

Surgical measures

The surgical procedure was performed after clinical and naso-maxillary diagnostics and by using surgical templates (Figs. 4 & 5). Both arches were planned with a minimum of four implants in a cross arch placement and symmetrical distribution which is advantageous in order to guarantee optimised support and load distribution.

Prosthetic measures

Initially, complete prosthetic planning and laboratory procedures to re-establish the proper vertical and occlusal dimensions was completed. This required the positioning of teeth in the patient’s mouth in order to meet the functional, phonetic and aesthetic demands of the patient (Figs. 6-8). Of course, the focus was also on the spatial orientation of the attachments (LOCATOR F-Tx abutments and denture attachment housings), the prosthetic teeth and the prosthetic restorative material.

The LOCATOR F-Tx attachment system is delivered from the manufacturer in an all-in-one package. The spherical geometry interface between the abutment and denture attachment housings allows the correct positioning of the housing in the proper angulation for the best prosthetic outcome of the prosthesis. This spherical feature also makes it possible to use the attachment system with implants with up to 20 degrees angulation for the best prosthetic outcome.

The framework should always be signed and milled in such a way that the processing balls must be seated on the abutments before the pick-up procedure of the metal framework. The framework should always be designed and milled in such a way that a small (max. 0.2 mm) cement gap exists between the framework and denture attachment housings.

In order to ensure a passive fitting framework, final pickup of all the denture attachment housings in the framework must be done chair sided to a working model using laboratory analogs. The use of digital impression techniques to transfer implant positions is also possible. A metal framework was milled to fit over the denture attachment housings (Figs. 9 & 10). The selected abutment cuff heights matched the sulcus depth. This decision is preferably determined by the clinician intraorally (Figs. 11-14). It is recommended that the denture attachment housing be placed supra-gingival for maximum adhesion to the prosthesis. Also, the denture attachment housings with the processing balls must be seated on the abutments before the pick-up procedure of the metal framework.

Fig. 5: Post-op control radiograph. Fig. 6: Completed set-up and wax-up of the maxilla and mandible. Fig. 7: Sufficient inter-arch distance between the opposing dentition and the respective elements must be assured. Fig. 6: The framework dimension is defined by the available space between the anterior and posterior walls of the alveolar bone. Fig. 9: Impression and symmetrical distribution of implant placement across the edentulous arch for a balanced load distribution. Fig. 10: Preparation of the metal framework.

Clinical

Fixed complete prosthesis

with no screws and no cement

New restoration concept using LOCATOR F-Tx®.

By Dr Karl-Ludwig Ackermann, Gerhard Neuendorff & Janez Fiderschek, Germany.
side, all at the same time, and before any further laboratory adjustment steps are performed. The denture attachment housings were aligned as parallel as possible within the aesthetic contour of the prosthesis and blockout spacers were placed on the abutments below the denture attachment housings to block out all undercuts. The framework was cemented on using a metal-to-metal cement (Figs. 15–17). The setting time of the cement is ten minutes.

Final adjustments of the framework were performed (Fig. 18). In order to maximise aesthetics, the metal framework was coated with an opaque material (Fig. 19). In the meantime, a panoramic radiograph was taken to confirm that the abutments were seated gap-free on the four implants in the mandible (Fig. 20). In the maxilla, four telescopic abutments were screwed into the maxillary implants (Fig. 21).

The teeth were attached to the metal framework using denture acrylic. In addition to the aesthetic requirement of the case, it is important to design the shape of the prosthesis’ intaglio surface to be functional, aesthetic and offer better oral hygiene, which allows the patient easy access for self-cleaning (Figs. 22 & 23). A symmetrical implant placement distribution in the mandible and maxilla guaranteed a stable centric relation and articulation with no aesthetic compromise.

Integration

After removal of the processing balls, the appropriate retention balls were screwed into the denture attachment housings (Fig. 23). It is always advisable to inspect the abutments for a secure fit at the end of all treatment steps (Figs. 24–26). Seating the prosthesis should start in posterior, moving anteriorly; one attachment at a time. This is necessary for the LOCATOR F-Tx attachment system to be effective and mandible. This is most evident from the frontal view (Fig. 30). The edge of the mandibular prosthesis is given a scalloped shape to allow self-cleaning through salivary flow, use of a water pick and accurate intracural cleaning.

In addition, it should be mentioned that the LOCATOR F-Tx prosthesis can easily be removed by the clinician at any time. A user-friendly metal bar and loop tool allows easy removal of the prosthesis by leveraging off the retention balls. However, it also must be emphasised that the retention balls are single use only, so new unused retention balls must be used when reseating the prosthesis.

Conclusion

The attachment system presented here is a valuable addition to the prosthetic therapy options for fixed restorative procedures in the edentulous mandible and maxilla. The cost-benefit ratio is also favourable when compared to other options. The principle of a stable occlusion with symmetrical lateral distribution of implants and a limited posterior extension/cantilever ensures the secure retention of the prosthesis and contributes to the maximisation of speech and the recovery of unrestricted natuative function. If required, alternative measures such as the fabrication of a removable prosthesis are quite possible.

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* Figs. 11–14: Insertion of the abutments.
* Figs. 15 & 16: Placement of block-out spacers at the point of transition between the denture attachment housings and the abutments.
* Fig. 17: Panoramic view of metal framework without pressure.
* Fig. 18: Further adjustments of the framework were performed in the laboratory.
* Fig. 19: For maximum aesthetics, coating the metal framework with an opaque material is recommended.
* Fig. 20: The panoramic radiograph demonstrated the abutments seated gap-free on the four implants in the mandible.
* Figs. 21 & 22: Intracural adjusted occlusion and shaping.
* Figs. 23–26: Tightening of the processing balls and inspection of abutments for a secure fit.
* Figs. 27 & 28: A posterior/anterior seating of the superstructure is necessary for the LOCATOR F-Tx system to be effective.
* Fig. 29: Final control radiograph.
* Fig. 30: Final situation.