Fixed complete prosthesis with no screws and no cement

New restoration concept using LOCATOR F-Tx®
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The fifth German oral health study (Deutsche Mundgesundheitsstudie) showed that the population in many countries are ageing and the desire for better quality of life related to the preservation of teeth and their function, among other things is constantly increasing. Periodontal disease is a major cause of tooth loss, as tooth loss results in a decreased ability to maintain physiological masticatory 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 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.

The LOCATOR F-Tx attachement system with implants with up to two directional retaining elements. The LOCATOR F-Tx attachment system has been available on the market for around ten years, and the attachment systems have been used successfully in more than 150,000 cases.

Case presentation

The treatment plan consisted of a removable overdenture on four implants in the maxilla and a fixed prosthesis on four implants for the edentulous mandible with the aid of the LOCATOR F-Tx attachment system (Figs. 1–3). This treatment procedure, managed by means of prefabricated system components, will be presented in the following section step by step.

Surgical measures

The surgical procedure was performed after clinical and osseous diagnostics and by using surgical templates (Figs. 4 & 5). Both arches were planned with a minimum of four implants in each arch. The spatial orientation of the attachment components can be determined by the clinician intraorally (Figs. 11–14). It is recommended that the denture attachment housing be placed supragingival for maximum adhesion to the prosthesis. 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 abutment and denture attachment housings. The selected abutment cuff heights matched the sulcus depth. An indirect technique was used to transfer the position of the implants 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).

Figs. 1–3: Initial situation: an 83-year-old patient for whom the retention of the maxillary and mandibular prostheses was severely impaired resulting in successive tooth loss and the associated bone loss, making a conventional removable complete prosthesis virtually impossible. Fig. 4: Implant placement with backward planning.

Figs. 5–7: Sufficient inter-arch distance between the opposing dentition and the retentive elements must be assured. Fig. 8: The framework dimension is defined by the available space between the anterior and posterior walls of the alveolar bone. Fig. 9: Trapezoidal and symmetrical distribution of implant placement across the midline for a balanced load distribution. Fig. 10: Preparation of the metal framework.
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 block-out 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 self-cleaning (Figs. 22 & 23) 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 process 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 optimisation of speech and the recovery of unrestricted masticatory function. If required, alternative measures such as the fabrication of a removable prosthesis are quite possible.