Implant Rehabilitation in Edentulous Jaw using MK1 System: A Case Report

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Abstract:
A full-arch rehabilitation with implants is often hampered by the presence of excessive bone resorption, whether by early tooth loss or due to the cleaning deficiency of supporting tissues and prosthetic infrastructure in areas that have already been rehabilitated with dental implants. In extensive cases, a new surgical-prosthetic approach is required that aims to recover some lost aspects, such as function and conditions, for a good location and esthetic cleaning. Thus, rehabilitation using the system MK1 fittings is well indicated. Such fittings provide the convenience of a fixed prosthesis without easy accumulation of pathogens due to difficult sanitation. Patients who undergo this type of treatment should adhere to strict hygiene measures and control the development of severe plaque. Doing so prevents the onset of peri-implant disease, especially in cases of rehabilitation of the protocol type, where the prosthetic infrastructure becomes a framework of easy accumulation of pathogens due to difficult sanitation.

With regard to this situation, some types of fittings that are available on the market offer advantages to patients who are predisposed to the development of peri-implant disease. Manfred Kipp (1986-1988) was responsible for the development and manufacture of MK1 attachments. The MK1 system consists of a molten metal infrastructure for a metallic bar that fits on the implants and contains two mounting holes at the ends. The superstructure placed in the inner portion of the denture has 2 pins that block the prosthesis when they are introduced into the bar holes. The assembly can be unlocked by inserting a small key in a hole which is easily accessible to the patient and is strategically located on the labial surface of the prosthesis in a region that has no influence on the esthetics.

The adjustment is safe and allows the prosthesis and the bar to be separated with little effort. Therefore, the insertion and removal of the dentures do not require potentially harmful forces and are easily handled by patient.

The MK1 system is a versatile, precisely fitting option for use in full rehabilitations. Its advantages include better stability and retention, favorable esthetics, preserved masticatory function, and easy handling by the patient. The system also allows a better distribution of forces, does not contain a cantilever and provides for easy cleaning of tissue and prosthetic support infrastructure; thus, it is indicated for patients who are deficient in controlling bacterial plate. This system offers rehabilitation for patients with significant bone loss due to the presence of the double bar, which provides greater freedom in positioning implants and supporting the lips. However, the lack of indications and especially the implementation of a laboratory technique account for the reduced use of this system in oral rehabilitations.

The aim of this study was to present the case of a patient rehabilitated with a full prosthesis-type protocol established by the MK1 fittings system.

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Case Report

A 56-year-old male patient sought rehabilitation treatment that included a revaluation of dental implants that he had obtained 8 years earlier. During the interview, the patient was not found to be carrying any comorbidity. An examination revealed that the patient had an upper-denture-type protocol and fixed prostheses on implants in the premolar and molar regions. He showed indications of poor oral hygiene and extensive gingival retraction in the right and left lower regions and complained of chewing mobility and suppuration. An imaging test confirmed the presence of peri-implants with extensive bone resorption and disease in the implant anchorage area (Figure 1a and b).

An upper and lower arch molding study was carried out with irreversible hydrocolloid (alginate) Jeltrate Plus (Dentsply - Rio de Janeiro, RJ, Brazil) and stainless steel tray stock. The proposal to remove all committed implants and teeth (33, 32, 31, 41, 42, and 43) was then made to treat the existing disease and solely retain tooth 48 for proprioception. After 3 months, autograft was performed in the jaw area to increase thickness and facilitate the retention of future dentures. New lower implants and protocol-type prosthesis were inserted.

During the second surgery, 5 implants were inserted into the jaw as a basis for the installation protocol for the lower prosthesis.

8 months later, the MK1 kit was selected to rehabilitate the lower arch with the verification of the implants’ osseointegration (Figure 2a and b).

The abutments were selected according to the height of the healing abutments. All columns were installed with twist 20 N in accord with the manufacturer’s recommendations.

The molding procedure was used to drag transference open tray, apertured plastic trays, and silicon by addition (Elite®, Zhermack, Germany). Before molding, the transferees of each implant were joined by acrylic autopolimerization resin (Pattern®). After polymerization, the flowable silicon resin was injected around the transfer copings and on the mucosal of the flange with its own syringe for the material and both the tray, which was loaded with a dense mass of silicon, was positioned on the arc to expose the screws of the transfer copings. With the polymerization of the material, the transfer copings were unscrewed and the whole set (tray, impression material, and transferees) were removed. A reply of the respective pillar was screwed in each transferor.

The casting mold was carried out with plaster. A model of the soft tissue around the joint transferees and reply and on the edge of the crest served as a reference for constructing the metal bar in chrome-cobalt. Thus, the chrome cobalt alloy metal bar, with MK1 fittings at both ends, was created to accommodate the predetermined space by mounting teeth (Figure 3).

Further, the acrylic resin teeth were arranged on the superstructure and the unprocessed prosthesis was proved by standard compression and cured acrylic heat molding.

A perfectly adapted superstructure of chrome cobalt was made and fixed to the infrastructure with MK1 attachments. During the clinical trial, the metallic bar was found to adapt to the pillars to perform the bite registration and vertical occlusion dimension for assembly and test of the teeth in
wax (Figure 4a and b). During the wax tooth test, esthetic evaluation, phonetics, and occlusion were performed and approved by the patient and sent to the laboratory for acrylization (Figure 5a and b).

After acrylization, the prosthesis was positioned and the necessary adjustments were made, taking into account the occlusal contacts and the distance from the internal base of the prosthesis to the crest of the gingival tissue so that there is enough space for cleaning (Figure 6a and b).

When the patient returned 30 days later, he did not report any discomfort and was very satisfied with the treatment (Figure 7a and b).

Conclusion
The MK1 system allows for better distribution of forces, has a simple design, facilitates easy cleaning, and an absence of a cantilever in comparison to other types of attachments.

MK1 fittings benefit hygiene-deficient patients with significant bone resorption who require full-arch, implant-supported rehabilitation by providing advantages that include easy cleaning of the prosthetic infrastructure for favorable esthetics. Thus, such fittings provide large clinical applicability when they are properly indicated.
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References