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Endosseous Fixtures in the Calotte used for retaining Wigs

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Author(s): Thomas Weischer, Christopher Mohr
Universitätsklinik für Mund-, Kiefer- und Gesichtschirurgie Essen, Germany

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Introduction

The treatment of patients with acquired or congenial defects of the craniofacial region poses great challenges. While reconstructive surgery is often not an option, these defects can only be restored with artificial replacements2,5,6,7,8. In these cases, craniofacial, endosseous, percutaneous implants offer significant advantages over traditional means of retaining craniofacial prostheses5,6,7,8. Meanwhile specific implant systems have been developed especially for craniofacial use (Fig. 1).

Fig. 1: Specific implant systems for maxillofacial and craniofacial use have been developed: a. IMZ® System, FRIATEC AG, Mannheim, Germany; b. Brånemark System, Nobel Biocare, Gothenborg, Sweden; c. Bonefit System, Straumann AG, Waldenburg, Switzerland.

The benefits and advantages of implant-retained and supported craniofacial prostheses include convenience in positioning the prosthesis, consistent retention, elimination of the problems associated with adhesives, positive marginal pressure, maintenance of marginal translucency, support for an adjecent prosthesis2,3,5,6,7,8. Since their introduction in 1977 for use with bone conduction hearing aids, percutaneous craniofacial implants have found more extensive applications in maxillofacial prosthetic rehabilitation.
The present study describes a further application of endosseous, percutaneous, craniofacial implants as anchoring elements for wigs.

Patients Presentation
Two patients were treated with craniofacial implants as retaining elements for wigs.
In one patient (male, status after surgical treatment of lip, alveolar and palate cleft, 17 years old) a split thickness skin graft was used for closing a soft tissue defect in the occipital, parietal, temporal and frontal region (defect size approximately 10 x 33 cm) (Fig. 2).

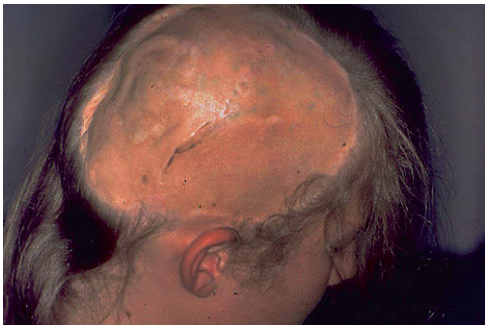

Fig. 2: 17 years old male patient. Status after surgical treatment of lip, alveolar and palate cleft. Status after pilous naevus excision occipital, parietal, temporal and frontal. A split thickness skin graft was used for closing the defect. Alopecial region right. Conventional wig rehabilitation would be unsatisfactory with regard to functionality and cosmetic improvement.

This defect was caused by pilous naevus excision. In the other patient (female, 29 years old) the defect was caused by trauma (defect (occipital, parietal, temporal, frontal) size approximately 10 x 14 cm).
Due to the disadvantages of conventional wig rehabilitation (reduced position stability, adhesive caused tissue reactions, cosmetic disadvantages) an implant retained wig was planed. After evaluation of the bone layer by computertomography implant number and implant positioning were determined by presurgical prosthetic analysis. Six screw implants for stable wig support were placed in each patient. The fixtures were inserted into the calotte in general anaesthesia. Implant length ranged between 3 to 4 mm, implant wideness was 3,75 mm in all fixtures (Fig. 3a/b, 4,5).

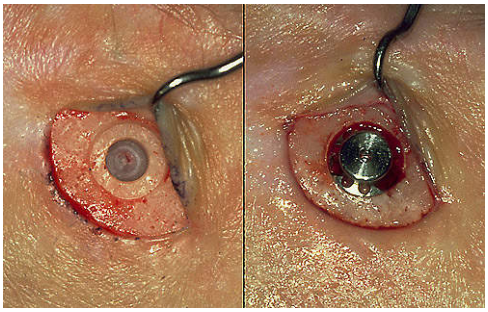

Fig. 3 a/b: Implant position and implant number were determined by presurgical computertomography and prosthetic analysis. Only implant cavities without bone defects were used as implant site. Primary implant stability was reached in all fixtures. Due cosmetic reasons implants were placed in distance to the hairy / alopecial border.

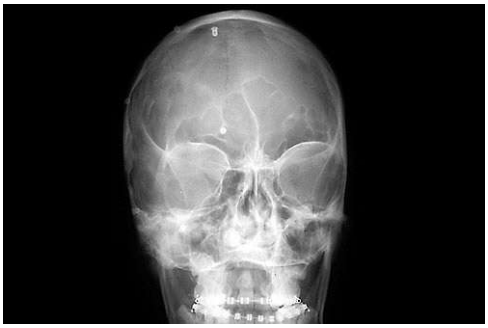

Fig. 4: Radiograph showing the placed titanium implants in the cranium by frontal view.

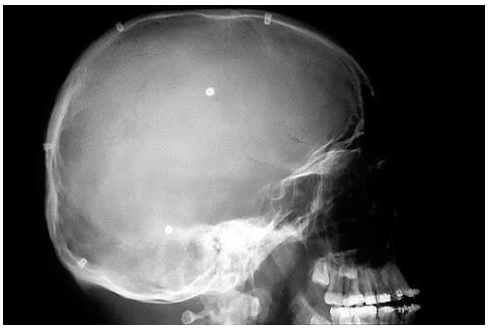

Fig. 5: Radiograph showing the placed titanium implants in the cranium by lateral view.

According to the presurgical analysis fixtures were placed in distance to the hairy / alopecial border in order to reach the best cosmetical result. A total of two implant cavities have not been used as implant sites because of a reduced, unfavorable bone supply. New implant cavities were prepared close to these ones. Primary stability was reached in all implants. All implants were covered with local soft tissue. Commencing one day before stage 1 implant surgery, patients were prescribed 1g amoxicillin three times a day for seven days. Sutures were removed seven days after surgery. During healing period recall was performed in intervals of 4 weeks. No wound disturbencies were observed.
Six months after fixture installation abutment connection was performed in general anaestesia in the male patient and in local anaesthesia in the female patient. Healing abutments were connected with the fixtures (Fig. 6).

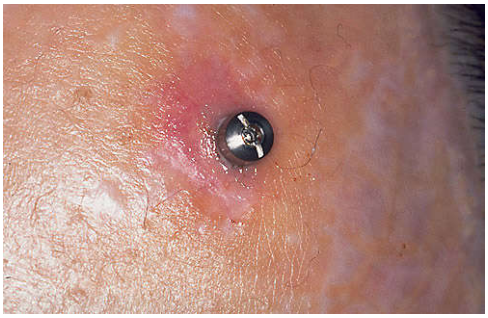

Fig. 6: Status after second stage surgery. Status after healing abutment connection. Peri-implant abutment tissue reaction: mild peri-implant inflammation, slight rubor, slight edema, non-tender (Gitto et al.2 grade 1). Peri-implant abutment tissue contour and attachment: tissue raised around abutment /Gitto et al.2 grade 1).

After a healing period about four weeks and after peri-implant soft tissue management titanium abutments were substituted by titanium magnetics (Fig.7a). The top of the magnetics ranged approximately 1mm above tissue surface. Patients were instructed in implant hygiene. Subsequently a fixture retained wig was constructed (Fig. 7b,8a/b).

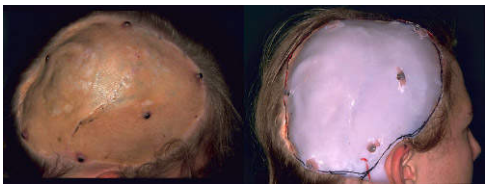

Fig. 7 a/b: Status after substitution of the titanium abutments with titanium magnets. Titanium magnetics are connected with tranfer posts. Peri-implant inflammation grade 1 according to Gitto et al.2 in all implants. After primary silicone impression an individual template was constructed. This template is used for precise transfering of the transfering posts by a pick-up impression.

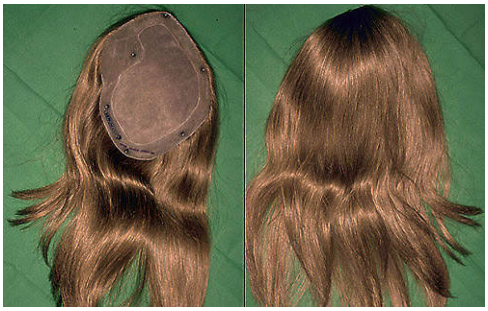

Fig. 8 a/b: Manufactored wig ex situ. In the lower side, metal clips are incorporated which correspond with the magnetic abutments. Due to patients natural long hair likewise long wig hair.

Patients were recalled in one to three months intervals involving an intensive implant hygiene re-instruction.
In a follow-up period between three (female patient) and 15 (male patient) months no fixture has been failed. Implant mobility, measured by periotest values1, ranged between -5 and +6. Pocket depth ranged between 2 to 5 mm. Peri-implant inflammation was recognized only shortly after second stage surgery (Gitto et al.2 grade 1). This inflammation was successfully treated by means of instrumental and chemical implant cleaning. All patients were satiesfied with regard to wigs stability, functionality and cosmetic improvement (Fig. 9,10).

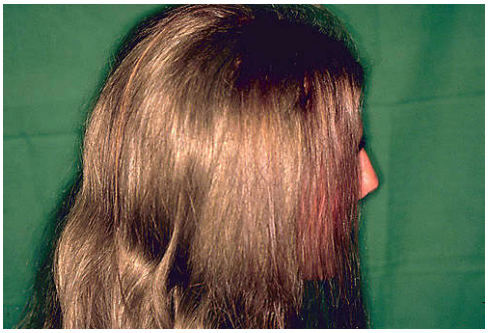

Fig. 9: Manufactured wig in situ. Lateral view. Sufficient cosmetical and functional result.

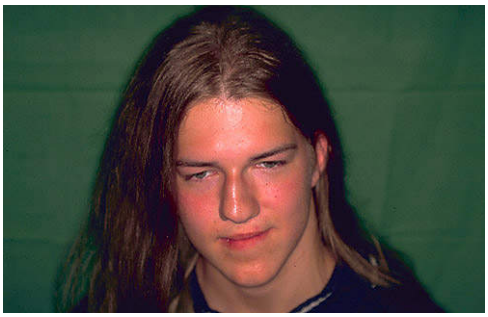

Fig. 10: Manufactured wig in situ. Frontal view. Sufficient cosmetical and functional result.

Wigs are even worn by sport activities and swimming.

Discussion and Conclusions

In the literature several studies have described the successful use of craniofacial implants placed into the temporal, frontal, parietal bone or the orbital rim1,2,3,4,5,6,7,8. Furthermore, several studies have pointed out the successful use of craniofacial implants used as retaining elements for craniofacial protheses respectively hearing aids even in irradiated bone4,8.
The present study describes a further application of craniofacial, endosseous, percutaneous implants by using these fixtures as anchoring elements for wigs.
Periotest values, peri-implant pocket depths and the peri-implant abutment soft tissue reaction did not show any differences in comparison to other studies about craniofacial implants used for orbital / maxillofacial prostheses or hearing aids1,2,8. No general soft tissue problems, often associated with adhesives2, have been recognized. Due to the fixtures number and positioning wigs stability and cosmetic improvement was sufficient. Prerequisite may be, with special regard to cosmetic successful wigs, an implant placement not close to the border hairy / alopecial region.
Comprehensively, in the patients discussed, implants proved be clinically, that means functionally and cosmetically, successful in short time period of functional loading.
However, further studies are needed before craniofacial implants as anchoring elements for wigs will be manifested as a standard option in the rehabilitation of craniofacial, alopecial defects.

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This Poster was submitted on 15.05.01 by PD Dr. med. dent. Thomas Weischer.

Correspondence address:
PD Dr. med. dent. Thomas Weischer
Universitätsklinik für Mund-, Kiefer- und Gesichtschirurgie Essen
Hufelandstraße 55
45122 Essen

Poster Faksimile:

Endosseous Fixtures in the Calotte Used for Retaining Wigs

Weischer T., DDS, Mohr C., MD, DDS, PhD

Department of Oral and Maxillofacial Surgery, University Essen, Germany
(Head: Prof. Dr. Dr. med. C. Mohr)

Abstract

Endosseous implants are being placed with increasing frequency in the craniofacial region. The frontiers for craniofacial endosseous implants are expanded more and more. The present study describes a new application of craniofacial implants as anchoring elements for wigs.

In two patients (one male, 17 years, one female, 29 years) a split skin graft was used for closing a soft tissue defect in the occipital, parietal, temporal and frontal region (defect size between 10 and 33 cm respectively between 10 and 14 cm). The defect was caused by trauma or pious naevus excision. A functionally and cosmetically sufficient provision of the hairless region by a conventional wig was not possible. Therefore six titanium implants (length: 3 or 4 mm, width: 3.75 mm) were placed in each patient. The fixtures were inserted into the cranium under general anaesthesia. Primary implant stability was reached in each implant. Six months after fixture installation abutment connection was performed in general respectively local anaesthesia. After a healing period about four weeks and after peri-implant soft tissue management titanium abutments were substituted by titanium magnetics. Subsequently a fixture retained wig was constructed. In a follow-up period between 5 and 15 months no fixtures have failed.

To date, the wigs are incorporated in both patients. The incorporated wigs have been shown to effectively retain a functionally and cosmetically successful craniofacial rehabilitation. Strategy, outcomes and complications of the treatment, especially regarding the peri-implant soft tissue, will be described and discussed.

Introduction

The treatment of patients with acquired or congenial defects of the craniofacial region poses great challenges. While reconstructive surgery is often not an option, these defects can only be restored with artificial replacements [1-4]. In these cases, craniofacial, endosseous, percutaneous implants offer significant advantages over traditional means of retaining craniofacial prostheses [5-12]. Meanwhile specific implant systems have been developed especially for craniofacial use (Fig. 1). The benefits and advantages of implant-retained and supported craniofacial prostheses include convenience in positioning the prosthesis, consistent retention, elimination of the problems associated with adhesives, positive marginal pressure, maintenance of marginal fluid/saliva support for an adjacent prosthesis [1-4,6,7,9,12]. Since their introduction in 1977 for use with bone conduction hearing aids, percutaneous craniofacial implants have found more extensive applications in maxillofacial prosthetic rehabilitation.

The present study describes a further application of endosseous, percutaneous, craniofacial implants as anchoring elements for wigs.

References

Patients Presentation

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Due to the disadvantages of conventional wig rehabilitation (reduced position stability, adhesive caused tissue reactions, cosmetic disadvantages) an implant retained wig was planned. After evaluation of the bone layer by computertomography implant number and implant positioning were determined by presurgical prosthetic analysis. Six screw implants for stable wig support were placed in each patient. The fixtures were inserted into the calotte in general anaesthesia. Implant length ranged between 3 to 4 mm, implant extension was 3.75 mm in all fixtures (Fig. 3a/b, 4,5). According to the presurgical analyses fixtures were placed in distance to the hairy / alopecial border in order to reach the best cosmetical result. A total of two implant cavities have not been used as implant sites because of a reduced, unfavorable bone supply. New implant cavities were prepared close to these ones. Primary stability was reached in all implants. All implants were covered with local soft tissue.

Commencing one day before stage I implant surgery, patients were prescribed 1g amoxicillin three times a day for seven days. Sutures were removed seven days after surgery. During healing period recall was performed in intervals of 4 weeks. No wound disturbancies were observed.

Six months after fixture installation abutment connection was performed in general anaesthesia in the male patient and in local anaesthesia in the female patient. Healing abutments were connected with the fixtures (Fig. 6). After a healing period about four weeks and after peri-implant soft tissue management titanium abutments were substituted by titanium magnetics (Fig.7a). The top of the magnetics ranged approximately 1mm above tissue surface. Patients were instructed in implant hygiene. Subsequently a fixture retained wig was constructed (Fig. 7b,8a/b). Patients were recalled in one to three months intervals involving an intensive implant hygiene re-instruction.

In a follow-up period between three (female patient) and 15 (male patient) months no fixture has been failed. Implant mobility, measured by percussion waves , ranged between -5 and +9. Pocket depth ranged between 2 to 5 mm. Peri-implant inflammation was recognized only shortly after second stage surgery (Gitts et al.[13] grade 1). This inflammation was successfully treated by means of instrumental and chemical implant cleaning. All patients were satisfied with regard to wigs stability, functionality and cosmetic improvement (Fig. 8,10). Wigs are even worn by sport activities and swimming.

Discussion

In the literature several studies have described the successful use of craniofacial implants placed into the temporal, frontal, parietal bone or the orbital rim [1,2,4,5,6,7,12]. Furthermore, several studies have pointed out the successful use of craniofacial implants used as retaining elements for craniofacial prostheses respectively hearing aids even in irradiated bone[4,6].

The present study describes a further application of craniofacial, endosseous, percutaneous implants by using these fixtures as anchoring elements for wigs.

Revisited values, peri-implant pocket depths and the peri-implant abutment soft tissue reaction did not show any differences in comparison to other studies about craniofacial implants used for orbital / maxillofacial prostheses or hearing aids [1-4]. No general soft tissue problems, often associated with adhesives, have been recognized. Due to the fixtures number and positioning wigs stability and cosmetic improvement was sufficient. Prerequisite may be, with special regard to cosmetic successful wigs, an implant placement not close to the border hairy / alopecial region.

Comprehensively, in the patients discussed, implants proved be clinically, that means functionally and cosmetically, successful in short time period of functional loading.

However, further studies are needed before craniofacial implants as anchoring elements for wigs will be manifested as a standard option in the rehabilitation of craniofacial, acquired defects.

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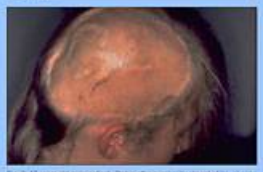

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Fig. 4: Radiograph showing the placed titanium implants in the cranium by frontal view.

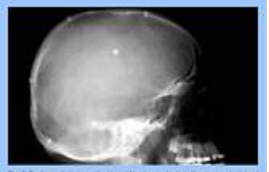
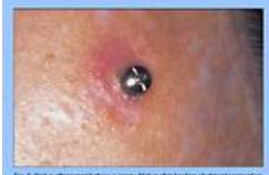


Fig. 5: Radiograph showing the placed titanium implants in the cranium by lateral view.



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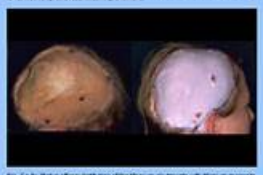

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