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The current state of facial prosthetics – A multicenter analysis



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ABSTRACT

Even though modern surgical techniques are dominating reconstructive facial procedures, the capability to use facial epitheses for reconstruction is still an important skill for the maxillofacial surgeon. We present an international multicenter analysis to clarify which techniques are used to fixate facial prostheses.

We contacted all maxillofacial departments in Germany, Austria, Switzerland and Norway which were registered with the German society for oral and maxillofacial surgery (DGMKG). These centers were asked via electronic mail to provide information on the type of epithesis fixation systems currently in use. The return rate from 58 departments was 43.1% (n = 25). Overall, implant fixation was the preferred

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fixation system (92%). Plates were the second most common fixation technique (32%). No centers reported the standard use of non-invasive fixation techniques for permanent epithesis fixation. The main retention systems in use were magnets (24/25), other retention systems are used much less often.

The current preferred fixation technique for facial epitheses consists of implant-based, magnet-fixed epitheses. For nasal prostheses, a plate-based, magnet-fixed system is often used.

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1. Introduction

Facial prostheses are described in the medical literature since the 17th century (van Doorne, 1994). Reconstruction of large facial defects is still the main challenge for the reconstructive facial plastic surgeon. Large facial defects with partial or complete loss of organs like the eye, nose or ear are occurring due to severe trauma, ablative tumour surgery or congenital disorders (Cuesta-Gil et al., 2004; Gentile et al., 2008). Optimal aesthetical and functional reconstruction in the head and neck area is vitally important for the social integration and for the quality of life of our patients. All kinds of different materials have been used over the centuries to provide some kind of facial prosthesis (Ring, 1991). Modern techniques in plastic facial surgery, especially the constantly evolving use of microvascular flaps, provide a wide range of possibilities for the reconstruction of large hard and soft tissue defects in the head and neck area (Thiele et al., 2014). Still, in some selected cases, the reconstruction of a facial defect can only be sufficiently achieved with a facial epithesis (Leonardi et al., 2008; Federspil, 2010; Brom et al., 2013). Especially complete organ defects of the eye and orbit, but also sometimes of the nose and ear are eligible for this kind of reconstruction (Selçuk et al., 2011). Some patients are not willing or physically not capable to receive complete surgical reconstruction. This type of reconstructive surgery often requires long and complicated operations and not every patient is suitable for these procedures.

In this survey, we show the variety of possibilities and the different techniques and materials of facial epithetics currently in use.

2. Material and methods

In this analysis, we present a multicenter evaluation of the current fixation techniques of facial prostheses. The aim was to analyse what kind of primary (implants, plates, non-invasive) and secondary (magnets, screws, etc.) fixations for epitheses are currently in use in Germany, also including some more maxillofacial clinics in central Europe. We contacted all maxillofacial departments in Germany, Austria, Switzerland and Norway which were registered with the German society for oral and maxillofacial surgery (DGMKG) in October 2014. The centers were asked via electronic mail to provide information on the type of epithesis systems currently in use. The techniques of primary fixation (i.e. implants, plates, non-invasive techniques) and secondary retention system (i.e. magnets, screws, bars, buttons) were analysed. We did not apply for approval of the ethical committee for this study because no patient data were used in this solely technical analysis.

3. Results

Overall, 58 Departments in Germany (n = 49), Austria (n = 4), Switzerland (n = 4) and Norway (n = 1) were contacted via electronic mail. The departments were asked to provide data on what kind of epithesis system they are currently using, what kind of

primary fixation they are favouring and what kind of secondary retention system they are working with at the moment. The overall return rate of the questionnaire was 44.8% (26 of 58). 23 answers came from German institutions (47%), and 1 each from Switzerland (25%), Austria (25%) and Norway (1 of 1) (see Table 1). Overall, 88% (23 of 26) answers came from German institutions, 12% (3 of 26) came from non-German hospitals. All departments were specialised centers of tertiary care in head and neck surgery. The type of hospital included 20 university hospitals, 5 teaching hospitals and 1 army hospital (see Table 2).

Implants were used for primary fixation for facial prostheses in 24 centers (92%). Plates were used in 8 hospitals (32%). In this analysis, 3 different systems of facial epitheses were in use, the Straumann EO[®] implant system (Straumann, Basel, Switzerland), the Medicon Ti-Epiplating[®] plate system (Medicon, Tuttlingen, Germany), and the Cochlear Vistafix[®] implant system (Cochlear Vistafix, Centennial, USA) which is the successor of the Branemark-implant system by Entific Medical (see Tables 3 and 4). Out of the 3 non-German institutions, 2 are using the Straumann EO system, 1 is using the Cochlear Vistafix system.

Some centers (4 of 25, 16%) reported occasional problems with wound healing over the plates because of insufficient skin thickness.

As secondary retention, mainly magnets are in use in nearly all departments (25 of 26, 96.2%), followed by screw-fixed bar constructions (5 of 26, 19.2%) and button fixations (2 of 26, 7.7%) (see Table 5).

Facial prosthesis fixed with glue directly to the skin or spectacle frames as loose retention systems are not reported anymore. These systems are only in use as temporary solutions while the definite epithesis is in production. Very few centers reported that a few patients are still wearing these kinds of facial prosthesis, and they refuse to receive any other (more stable) fixation system because they are used to the old system and master their everyday life well with it.

4. Discussion

Especially complete organ defects in the facial region (i.e. eye, nose and orbit), but also partial defects of the nose and ear are sometimes eligible for reconstruction with facial epitheses. Some patients are not willing or physically not capable to receive complex surgical reconstruction of these defects.

Here we present the first multicenter analysis of the current state of the art in extraoral prosthesis fixation devices. In this study, we found 3 different epitheses systems currently in use on the market in central Europe, with a definite focus on Germany. Most of the data used in this study are showing the responses from German hospitals (88%). Therefore, one could see this analysis with a main focus on the state of the art in Germany, with 12% of the data coming from non-German Hospitals. Extraoral implants and plate systems are mainly used to provide basic stability for facial epitheses. In most of the centers, magnets are the preferred way for

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