Critical Appraisal of Implant Connections and Veneering Materials

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The introduction of dental implants has enabled dentists to offer treatment possibilities that may enhance function and quality of life for partially or fully edentulous patients. Many dental implant systems have evolved, differing in macro design features, surfaces, and implant-abutment connection geometry. The originally introduced implant-abutment connection was the external hex, which was initially used to carry the implant but was later modified geometrically to act as an anti-rotational element. Internal connections were introduced in central Europe shortly after, and nowadays the market has been overtaken by an array of different internal connections. In 2013, an estimated 240 implant companies offered a variety of different, mainly internal, connections. Most of these connections are unique to the dental implant system and do not allow for interchangeability with other systems, in contrast to the compatibility of external connections across most manufacturers. The available literature[1,2] shows that no differences exist between external and internal connections regarding esthetic, technical, or biologic outcomes, provided that proper clinical procedures have been followed. These clinical findings challenge the claimed mechanical stability and microbial sealing advantages of some internal over external connections, as has been shown in laboratory studies. Two other troublesome issues also emerge from the literature: the lack of any documentation for the majority of internal connections regarding prosthodontic complications and the gradual increase in market share of low-cost implant systems due to the downturn of the global economy after 2008.[1–3] The proportion of this market share differs amongst geographical regions of the world, but the latest 2013 estimation for the European market was 40% for the low-cost implant systems. At the same time, a withdrawal of a significant number of (especially low-cost) implant systems from the market was witnessed without any further component support. This has started to become a major problem due to the global mobility of patients and the need for prosthodontic remakes. A global implant registry may be part of the solution, but this has not been implemented yet on a grand scale due to logistical and legal problems. Therefore, clinicians should use implant systems and components likely to be available in the long-term or at least those that are supported by various manufacturers.

On the issue of implant veneering materials, the available evidence[4] has demonstrated that implant-supported fixed partial dentures (IFPDs) present with two to three times increased risk of ceramic chipping compared to tooth-supported FPDs, probably due to the different proprioceptive capacity of the supporting component. This was demonstrated by a survival rate of 95% versus a success rate of 61% for IFPDs after 5 years of service.[4] The risk of complications seems to increase when the opposing teeth are also implant-supported and where parafunctional habits exist. Some of the available literature[5] appraising complication rates for implant-supported fixed complete dentures (IFCDs) showed that only screw-retained, metal-acrylic IFCDs have any mid- to long-term documentation that exceeded 5 years (available studies have a mean follow-up time between 5 and 21 years). These prostheses present with high maintenance requirements due to the high incidence of acrylic veneer fracture, which is close to 40% at 5 years and close to 80% at 15 years. Unfortunately, no long-term data (> 5 years) exist regarding the veneer complication rates of metal-ceramic IFCDs and available data is even scarcer for all-ceramic IFCDs. No studies directly compare the complication rates between various veneer materials for IFCDs. These findings highlight the need to inform patients about the long-term needs and costs of recall and maintenance and to ensure a prostheses design that would favor retrievability. From a socioeconomic point of view, the patient preference for specific treatment options should rely on the longitudinal efficacy of the option, along with associated costs and maintenance.

References

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