Review Article

IMPLANT PLATFORM SWITCHING CONCEPT: A REVIEW

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Abstract:
The main drawback with respect to implant restoration is achieving good osseointegration along with satisfactory stress distribution, which in turn will improve the prognosis of implant prosthesis by reducing the crestal bone loss. The platform switching concept involves the reduction of the restoration abutment diameter with respect to the diameter of dental implant. Long-term follow up around these wide-platforms showed higher levels of bone preservation. Platform switching is a simple and effective way to control circumferential bone loss around dental implants.
Key words: Biologic width, dental implants, platform switching.

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This article may be cited as: Singla M. Implant Platform Switching Concept: A Review. J Adv Med Dent Scie Res 2014;2(4):159-161.

Introduction

There are a range of factors involved in achieving good aesthetic result with implants. The correct positioning of the implant is one of the most important factors, along with establishing the optimum volume of hard and soft tissues. The success of dental implants is highly dependent upon the integration between the implant and the intraoral hard/soft tissue. The initial breakdown of the implant‑tissue interface generally begins at the crestal region in successfully osseointegrated endosteal implants regardless of surgical approaches used, with the potential to cause implant failure.[1]

Platform switching involves reducing the restoration abutment diameter in comparison with the diameter of the dental implant. The platform switching effect was accidentally established in the 1980s and early 1990s when different commercial dental implant manufacturers introduced implants of larger diameter before producing the corresponding abutments of the same measures. 14 years later, evaluation of those treatments in which abutments of lesser diameter were used revealed better preservation of the hard and soft tissues than treatment that use abutments with diameters matched to the implant.[2]

The connection between implant fixture and its restorative abutment is termed the implant abutment interface (IAI) or “microgap”. In most cases, it is susceptible to micromovements during clinical function and also permits micro-leakage of fluids. This infiltration results in the permanent presence of an area of abutment inflammatory cell infiltrate (aICT). The sustained state of inflammation promotes osteoclast formation and activation, which contributes to bone loss.[3]

Platform Switching Concept

This concept consists of using prosthetic components that are undersized in relation

to the diameter of the implant collar in order to limit peri-implant bone. resorption. This strategy arose from observation and analysis, as early as 1991, of situations in which bone resorption didn't occur or occurred minimally around wide 5 mm implants.

The crestal bone level remained stable for the entire length of the implant, up to the collar, and this was the case regardless of the loading period. In all cases, undersized prosthetic abutments, 4 mm in diameter, had been used. The reproducibility of the results leads us to believe that the position of the abutment/implant interface constitutes an essential element in the location and the degree of crestal resorption, and leads us, furthermore, to design the mechanisms governing the biological peri-implant space differently.[4]

Advantages[3]

- Increased implant longevity
- Improved esthetics
- The effect of inter‑implant distance is minimized.
- A minimum of 3 mm inter-implant distance is needed to preserve marginal bone.

Limitations[3]

- If normal sized abutments are to be used, implants of larger size need to be placed. This might not be possible clinically always
- If normal implants are to be used, smaller diameter abutments may compromise the emergence profile in aesthetic areas
- Around 3 mm of soft tissue should be present to place platform switched implants or else bone resorption is likely to occur
- For platform switching to be effective, the under sizing of the components must be carried out during all phases of the implant treatment.

Clinical Applications

"Platform-switching" is particularly indicated in all cases where an optimal aesthetic result is desired. By applying the concept of "Platform-switching", using simple means, it is possible to obtain greater stability of the peri-implant tissues, using undersized components for the implant in question. "Platform-switching" can be applied simply by screwing an abutment with a 4 mm diameter onto an implant with a 5 mm diameter without using a specific component. The same procedure can be repeated by providing an implant 6 mm in diameter with an abutment 5 mm in diameter. This procedure can take place when an implant is loaded upon placement, using the single-stage surgical protocol, in single cases of immediate placement of a temporary prosthesis in subocclusion, and finally, in cases of immediate loading for completely edentulous patients. During all phases of the implant treatment, it is important to respect the under sizing of the components, up until the final implant-supported prosthesis is made.[4]

Biomechanical Behavior

The close relationship between the bone and the implant is the essence of osteointegration. The bone changes occurring at the margins adjacent to the dental implants have been the subject of many clinical and experimental studies. The most appropriate reduced platform abutment design for securing lesser implant abutment material fatigue is represented by conical emergence abutments with a variable height of 1.5-2mm, freeing extension of the implant platform between 0.5-0.75mm. Such platform switching is not advisable in mandibular implant-mucosal support prostheses, since reduction of the diameter of the junction lessens the abutment resistance in response to occlusal loading applied in the posterior area of the overdentures-fundamentally

compromising the connecting abutment closest to the area where loading is applied.[2]

Soft Tissue Response

Of the different theories proposed to explain maxillary bone remodeling after dental implant placement, the most widely studied has been the formation of a new biological space. The creation of this mechanical barrier serves as a defense mechanism, preventing the penetration of bacteria from the oral environment. Such physiological sealing shows morphological differences according to whether it is formed in relation to a tooth or a dental implant. The biological space adjacent to an implant is greater than the space adjacent to a natural tooth, with histological differences in terms of the organization and distribution of the fibers. In addition to differences attributable to location, the biological space of an epicrestal implant forms at subcrestal level, while in the case of a natural tooth the space is formed at supracrestal level.[2]

Source of support: Nil

Conflict of Interest: None declared

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