



## Short Communication

# Platform switching implant

Sumedha Srivastava<sup>1,\*</sup>, Veena Kalburgi<sup>1</sup>, Kapil Jain<sup>1</sup>, Pooja Bharadwaj<sup>1</sup>

<sup>1</sup>Dept. of Periodontology, Peoples College of Dental Science and Research Centre, Bhopal, Madhya Pradesh, India



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### ABSTRACT

For the implant to function successfully, there should be a good integration between implant, hard, and soft tissue. The implant should be able to provide esthetics, good functioning of the masticatory muscles, phonetics, and above all to minimize the crestal bone loss and hence maintaining the crestal bone levels. Over the recent years, as compared to traditional implants which resulted in bacterial accumulation, inflammatory cell infiltrate and violation of biologic width and thus bone loss and hence compromising implant integrity, platform switching implants have proved to be better option in maintain crestal bone levels by keeping the inflammatory infiltrate away from the crestal bone, allowing horizontal and vertical extension of biologic width, equalize the distribution of stress to centre of implant and ultimately can help to preserve the crestal bone levels.

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## 1. Introduction

To provide the patients with good oral health is the main purpose of the dentistry. In case of the patients who have few teeth or are completely edentulous have poor masticatory ability, esthetics and speech. Such patients wearing the removal partial denture or complete denture have their esthetics, masticatory ability reduced as compared to natural dentition. Considering all these factors, now a days implant is one of the better option in comparison to removable partial denture or complete denture. But one of the fact that should be kept in mind is the maintenance of crestal bone levels following implant placement. In case of traditional implants there is always a certain amount of crestal bone loss during first year after placement of implant because of inflammatory infiltrate that forms around the implant as well as due to violation of biologic width. This was first reported by Adell et al.<sup>1</sup> Apart from these two major factors, there are various minor factors that are associated with the crestal bone loss. These factors are the presence of microgap between implant and

the abutment, traumatic surgical technique, shape and size of the abutment.

Hence the concept of platform switching (discovered accidentally) was introduced and later on become one of the better option for the modern dentistry in relation to the preservation of crestal bone levels as it has the abutment that is narrower than the implant that has wider collar. This type of connection has the ability to deal with various major and minor factors associated with crestal bone loss.

### 1.1. History

In 1980 wider diameter implants were used. This was the period were due to lacking of commercially available components, mismatched diameter implant and abutment were used. But later on it was found that due to this difference in the diameter of implant and abutment, there was a reduction in crestal bone loss (as firstly described by Lazzara, Porter, and Gardner) who introduced the concept of platform switching implants in literature.

\* Corresponding author.

E-mail address: [drsumi0109@gmail.com](mailto:drsumi0109@gmail.com) (S. Srivastava).

### 1.2. Rationale

Following the use of traditional implant, there is always certain amount of bone loss. To prevent this bone loss, there needs to be the movement of inflammatory cell infiltrate away (which is located 0.75mm above and 0.75 mm below the implant abutment junction) away from the crestal bone, increment in the surface area at the implant abutment junction (by horizontal and vertical extension of biologic width) and equal distribution of mechanical stress at the coronal portion of implant (hence reduction of microgap). But the traditional implant lack these characteristics as compared to platform switching implant which fulfill all these criteria and hence reduction of crestal bone loss. Thus this the main rationale to use the platform switching implant in dentistry in recent years.

### 1.3. Concept of platform switching

The implant is always surrounded by the soft tissue seal. This seal is present both laterally and apically. In case of two traditional implants, if they are placed close together, then it will result in increase vertical bone loss between the two implants. However in case of platform switching implant, due to difference in diameter of implant and abutment, when these two implants are placed together, it will result in horizontal and vertical extension of biologic width and as a result of which there will be the movement of microbes (and thus inflammatory cell infiltrate away from crestal bone), uniform distribution of stress in the centre of implant and thus preservation of crestal bone levels.

### 1.4. Microbiota associated with platform switching implant

It was found by Canullo et al<sup>2</sup> that the microbiota associated with the platform switching implant in was *Streptococcus sanguis*, *mitis oralis V. Parvula*, *Actinomyces*, *P. gingivalis*.

### 1.5. Indications

1. If the residual bone height is limited by the anatomic structures present.
2. If there is a need for the placement of shorter implants in the atrophic area.
3. When the distance between the two implants is less than 3 mm i.e. in the narrow edentulous ridge.
4. When aesthetics is of major concern.

### 1.6. Limitations

1. Normal size abutments require larger implants
2. Normal implants require smaller abutments as if it is not so then the esthetics would be compromised.
3. Three to four mm of soft tissue seal is essential for the platform switched implants to prevent the bone resorption.

4. Decreased abutment diameter can result in fracture of the abutment as because of smaller size abutment, stresses are more concentrated near the abutment.

### 1.7. Advantages

1. Since the abutment is smaller in diameter than the implant neck hence it helps to provide more effective soft tissue seal.
2. Equal distribution of stress.
3. Prevent or minimize the crestal bone resorption as the inflammatory infiltrate moves away from the crestal bone.
4. Results in a horizontal extension of the biologic width.
5. Provides bone support for shorter implants.
6. Platform switching implants can be placed in the area where aesthetics is of major concern.
7. Improved implant stability and thus enhanced longevity.

### 1.8. Disadvantages

1. Esthetics can be compromised if there is no sufficient space.
2. Similar design of the components is essential for the platform switched implants to function properly.

### 1.9. Non-platform switched to platform switched implants

Many factors should be considered while planning for the placement of implant. Various studies have been done by various researchers that gives us the indication that platform switching implants are one of the better option as compared to the traditional implants. A study was conducted by Markus Hurzeler et al<sup>3</sup> for the comparison of bone loss between platform switching implant and non platform switching implant and by his study he concluded that marginal bone loss was more in non platform switched implant as compared to platform switched implant. Vela N et al<sup>4</sup> conducted the study on the horizontal circular extension of biologic width and found that this extension was more in platform switching implant as compared to non platform switching implant. Amount of vertical bone loss was compared by Cappiello et al<sup>5</sup> and he found that it was minimal in platform switching implant as compared to non platform switched implants. Lazzara, Porter<sup>6</sup> during the 13 years radiographic period found that crestal bone loss was more in non platform switching implants as compared to platform switching implants. A study was conducted by Degidi<sup>7</sup> on the microgap of platform switching and non platform switching implants and he concluded that there was zero microgap in case of platform switching implants.

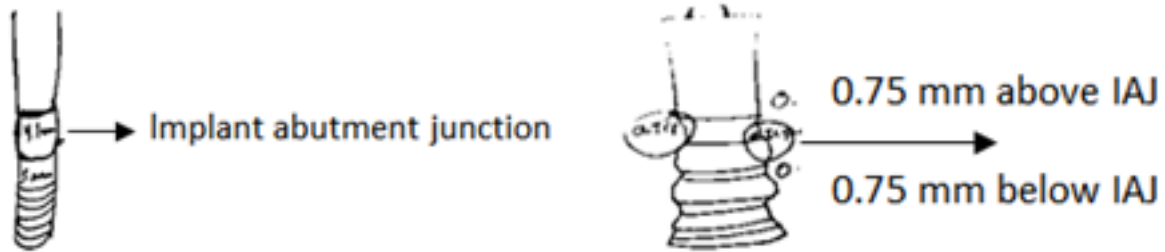


Fig. 1:

## 2. Discussion

The most important criteria for the implant to function successfully is the preservation of crestal bone levels. Traditional implants lack this criteria as there is always a certain amount of bone loss by these implants. Hence in this regard, platform switching implants are one of the better option to prevent the crestal bone loss by moving the inflammatory cell infiltrate away from the crestal bone, by preservation of biologic width and by reduction of microgap. Baumgarten et al.<sup>8</sup> described the platform switching technique and its usefulness in situations where shorter implants must be used, where implants are placed in the esthetic zone and where a larger implant is desirable, but prosthetic space is limited. They believed that a sufficient tissue depth of approximately 3 mm or more is necessary to accommodate an adequate biologic width. Platform switching implant prevent the crestal bone loss and thus preserves the crestal bone. Cappiello et al.<sup>9</sup> found that microgap is an important factor in the remodeling of peri-implant crestal bone and platform switching implant helps to reduce this microgap and thus preventing the crestal bone resorption.

## 3. Conclusion

One of the advantage of platform switching implant is the equal distribution of mechanical stress at the centre of the implant, horizontal and vertical extension of biologic width and moving inflammatory cell infiltrate away from the crestal bone thus preventing or minimizing the crestal bone loss. Platform switching implants has proved to be one of the better option in these recent years as it fulfill all the factors that are essential for the implant to function successfully.

## 4. Source of funding

None.

## 5. Conflict of interest

None.

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## Author biography

**Sumedha Srivastava** Reader

**Veena Kalburgi** Professor and Head of Department

**Kapil Jain** Professor

**Pooja Bharadwaj** Post Graduate Student

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