

# PLATFORM SWITCHING FOR DENTAL IMPLANTS- A REVIEW

---

## To access & cite this article

Website: [tmjpbs.com](http://tmjpbs.com)



## INTRODUCTION

The goal of modern dentistry for edentulous patients is to restore good oral health. Edentulous patients are traditionally restored with removable partial dentures or fixed partial dentures. Those traditional restorative dentures can only restore one sixth of the patients formerly masticating ability [1]. An ideal restoration of missing teeth with an dental implant can bring back the normal masticating ability and restore a good oral health.

A successful implant restoration depends on the amount of bone surrounding the implant. Adell et al was first person to give a criteria for acceptable marginal bone loss around the implant. An implant should have <0.2 mm annual loss of marginal bone level[2].

This crestal bone loss can result in increased bacterial accumulation resulting in secondary peri-implantitis and loss of bone support, which leads to occlusal overload resulting in implant failure.

This crestal level bone loss can be reduced to some extent by usage of smaller size abutment to a larger wide implant which is the so called Platform Switching [3].

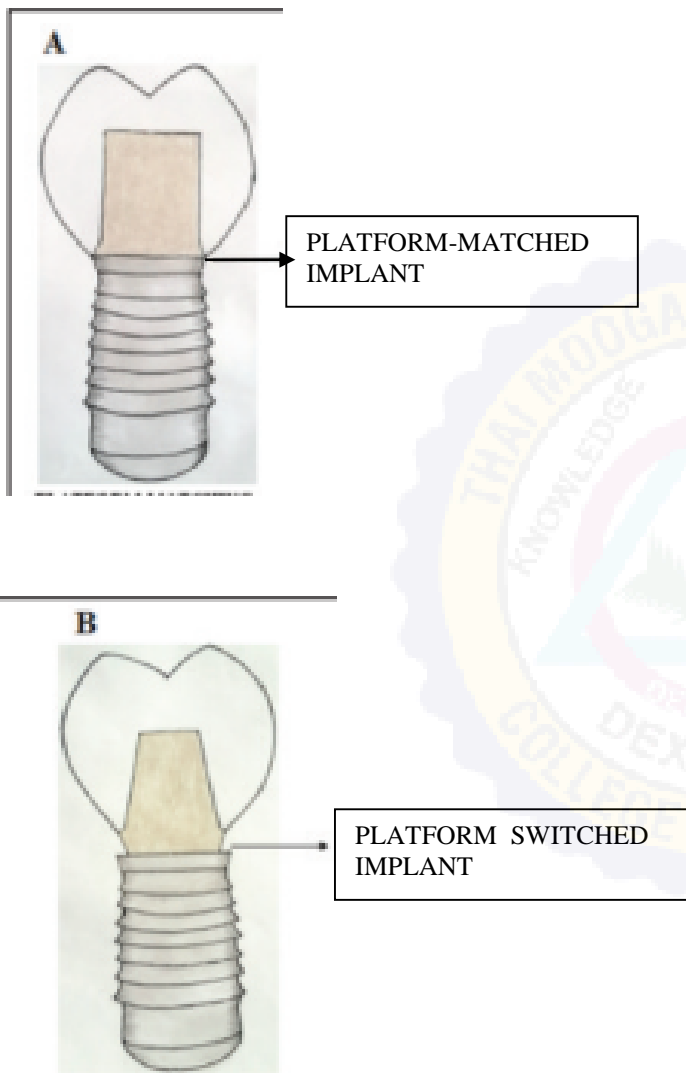


Figure 1: Platform-matched implant (A) in comparison to a platform switched implant (B).

### HISTORY OF PLATFORM SWITCHING:

In late 1980s large wider diameter implants were introduced in the market. But there was an unavailability of sufficient number of corresponding size abutment. This situation lead use of standard diameter abutment for wider diameter implants. This mismatch of implant and abutment sizes were evaluated after a decade by . They found those implants which where mismatched with smaller abutment size had better soft tissue and hard tissue preservation than those implants which were matched corresponding abutment sizes[4,5]. This mismatch of smaller abutment to wider implant was later termed as Platform switching of implants.

### RATIONALE :

The platform switching reduces the crestal bone loss through

1. The shift of Implant Abutment Junction(IAJ) inward is believed to shift the inflammatory cell infiltrate towards the centre of axis of implant and away from the adjacent crestal bone[3]

2. Microgap that is a space between the implant abutment and implant at the crestal bone area allows the epithelial cell proliferations to establish a biological width which could cause crestal bone loss [6]. platform switching reduces the influence of microgap on the crestal bone .

3. The platform switching has shifted the stress concentration away from bone implant interface . This reduces the stress at the peri implant crestal bone and crestal bone loss[7] .

### BIOLOGIC WIDTH AND PLATFORM SWITCHING

The peri-implant soft tissue seal comprises of a junctional epithelium and connective tissue. This biologic soft tissue coats the implant supporting bone in a 3–4 mm wide zone. Tarnow et al., showed that not only this width progresses apically, but also a lateral component of the biologic width exists around implants. This lateral component varies from 1.04 mm when two adjoining implants are placed <3 mm apart to 0.45 mm when the implants are placed more than 3 mm apart.[8]

The thickness of bone loss that exists as a halo around the implant at its most coronal aspect has been termed the horizontal component of the biologic width, and it is approximately 1.4 mm . If the implants are placed too close together, the overlap of the horizontal components of each implants biologic width serves to increase the effective vertical crestal bone loss between the implants.

By Platform switching , implants can be placed closer to teeth and to each other while maintaining more crestal bone. Platform switched implants has been shown to have the potential to reduce the vertical bone resorption by as much as 70% [9]

### INDICATION FOR PLATFORM SWITCHED IMPLANTS:

- Short Implants In The Posterior Region
- The Anterior Aesthetic Zone
- Papilla Preservation Adjacent To Teeth
- Where implants are placed <3 mm apart in narrow edentulous ridge

## ADVANTAGES OF PLATFORM SWITCHING:

- Improved bone support for shorter implants.[10]
- Increased implant longevity.
- Improved esthetics as crestal bone preservation helps preserve papilla.
- The effect of inter-implant distance is minimized. A minimum of 3 mm inter-implant distance is needed to preserve marginal bone [11]

## LIMITATIONS OF PLATFORM SWITCHING:

If normal size abutments are to be used, larger size implants need to be placed. This is not possible every time clinically, especially if bone width is less.

If normal sized implants are placed, smaller-diameter abutments are necessary, which may compromise the emergence profile, especially in anterior cases.[12]

## DISCUSSION:

The presence of at least one well-conducted randomized controlled trial (RCT) is considered the highest level of evidence. In this article, we have reviewed RCTs, controlled clinical trials (CCTs) and systematic reviews which have analyzed RCTs conducted until date in English only that compared platform-switched implants to platform-matched implants with a minimum follow-up period of 1 year.

Having reviewed the available literature, it has been confirmed that platform switching is a major contributing factor in limiting crestal bone resorption. Certain biological width is necessary to maintain the soft tissues and hard tissue. In platform switching, the IAJ is shifted inward. This will not only shift the inflammatory infiltrate inward away from the crestal bone but also provides an additional horizontal biological width, hence preserving the crestal bone. At the same time, the micro-gap is shifted away from the crestal bone, decreasing the probability of resorption.[13]

Another reason suggested for maintenance of marginal bone by platform switching is the decreased stresses around the implant neck, but the differences are very slight. So, decreased stresses may not be the only reason for the positive results shown by platform switching. Moreover, by decreasing the abutment diameter, more stresses are concentrated near the abutment, increasing the likelihood of abutment fracture. However, further studies in this area are wanted before definite conclusions are made[14]

All studies comparing the platform-switched and non-platform-switched implants suggested that platform-switched implants result in lesser marginal bone resorption.

## CONCLUSION:

The success of dental implants is highly dependent on integration between implant and intraoral hard and soft tissues. Hence, an understanding of the etiology of crestal bone loss is very important. Crestal bone preservation is a very important key to success in implant dentistry. The use of prosthetic abutments with a reduced diameter in relation to the implant diameter (platform switching) limits crestal resorption usually seen after loading. It maintains the biological width and helps improve esthetics by preserving the inter-proximal papilla. Thus, platform switching may be clinically applied in implant placement every time the clinical situation permits.

## REFERENCES:

1. Misch CE. Rationale for dental implants. In: Contemporary Implant Dentistry. Vol. 3. Elsevier Publications; 2008. p. 21.
2. Adell R, Eriksson B, Lekholm U, Brånemark PI, Jemt T. Long-term follow-up study of osseointegrated implants in the treatment of totally edentulous jaws. *Int J Oral Maxillofac Implants.* 1990 Winter;5(4):347-59.
3. Lazzara RJ, Porter SS. Platform Switching: A New Concept In Implant Dentistry For Controlling Postrestorative Crestal Bone Levels. *Int J Periodontics Restorative Dent* 2006;26:9- 17
4. Gardner DM. Platform switching as a means to achieving implant esthetics. *N Y State Dent J.* 2005;71:34-7.
5. Luongo R, Traini T, Guidone PC, Bianco G, Cocchetto R, Celletti R. Hard and soft tissue responses to the platform-switching technique. *Int J Periodontics Restorative Dent.* 2008;28:551-7.
6. Hermann J, Buser D, Schenk RK, Schoolfield JD, Cochrane DL. Influence of the size of the microgap on crestal bone changes around titanium

implants. A histometric evaluation of unloaded non-submerged implants in canine mandible. *J Periodontol* 2001; 72:1372-83

7. Maeda Y, Horisaka M, Yagi K. Biomechanical rationale for a single implant-retained mandibular overdenture: an in vitro study. *Clin Oral Implants Res.* 2008 Mar;19(3):271

8. Tarnow D, Elian N, Fletcher P, Froum S, Magner A, Cho SC, et al. Vertical distance from the crest of bone to the height of the interproximal papilla between adjacent implants. *J Periodontol* 2003;74:1785-8

9. Zechner W, Trinkl N, Watzak G, Busenlechner D, Tepper G, Haas R, et al. Radiologic follow-up of peri-implant bone loss around machine-surfaced and rough-surfaced interforaminal implants in the mandible functionally loaded for 3 to 7 years. *Int J Oral Maxillofac Implants* 2004;19:216-21

10. Kalavathy N, Sridevi J, Gehlot R, Kumar S. "Platform switching": Serendipity. *Indian J Dent Res* 2014;25:254-9.

11. Prasad KD, Shetty M, Bansal N, Hegde C. Platform switching: An answer to crestal bone loss. *J Dent Implant* 2011;1:13-7

12. Grunder U, Gracis S, Capelli M. Influence of 3-D bone to implant relationship on esthetics. *Int J Periodontics Restorative Dent* 2005;25:113-9.

13. . Luongo, Roberto & Traini, Tonino & Guidone, Placido & Bianco, Giuseppe & Cocchetto, Roberto & Celletti, Renato. (2009). Hard and Soft Tissue Responses to the Platform-Switching Technique. *The International journal of periodontics & restorative dentistry.* 28. 551

14. Tabata LF, Rocha EP, Barão VA, Assunção WG. Platform switching: biomechanical evaluation using three-dimensional finite element analysis. *Int J Oral Maxillofac Implants.* 2011 May-Jun;26(3):482-91.