

# BIOLOGIC WIDTH: RESTORATIVE IMPLICATIONS

Dr. Raju Biswas\*, Dr. Tirthankar Debnath\*\*

## Abstract

The concept of Biologic Width is vital for the dental surgeons especially for the restorative dentists. The restorative margins should maintain the biologic width to ensure adequate form, function and esthetics of the dentition. The violations lead to complications like gingivitis, periodontitis, alveolar bone loss and improper fit of the restorative component. Preservation of the biologic width paves way for a longer life of the restoration with a healthy periodontium.

**Key Words** Biologic width, Periodontium, Restoration.

## INTRODUCTION

The biologic width is defined as the physiologic dimension of the space occupied by the junctional epithelium and connective tissue attachment. The biologic width was conceptualized by Gargiulo et al in 1961.<sup>[1]</sup> With the cadaveric studies, Gargiulo et al., concluded the following mean dimensions i.e., they measured the dentogingival components of 287 teeth from 30 cadavers and found that there is a definite proportion between the sulcus depth, the epithelial attachment, the connective tissue attachment and the alveolar crest. They established the mean sulcular depth as 0.69 mm, junctional epithelium as 0.97mm (range between 0.71 to 1.35mm) and the mean of supraalveolar connective tissue attachment as 1.07mm (1.06 to 1.08mm). The total width of junctional epithelium and supraalveolar connective tissue attachment which forms the biologic width is  $0.97\text{mm} + 1.07\text{mm} = 2.04\text{ mm}$  (Fig.1). This measurement has been found to be relatively constant at approximately 2 mm (30%). However, biologic width can be as narrow 0.75 mm to as tall as 4.3mm. The dimensions of periodontium are not constant and it varies from tooth to tooth and with each aspect of a tooth. It depends on the location of tooth within the alveolus. The significance of biologic width is that, it acts as a barrier and prevents penetration of microorganisms into the periodontium.<sup>[2]</sup>

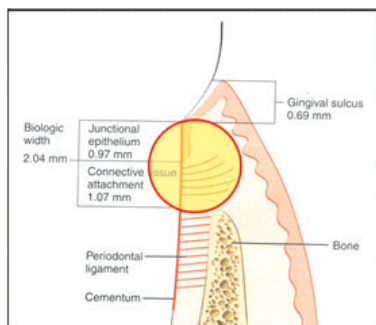


Fig : 1

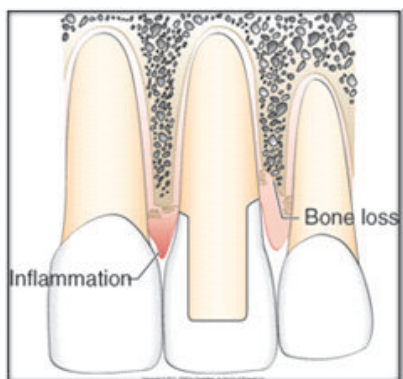


Fig : 2

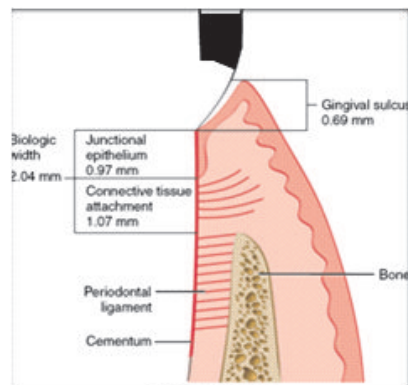
## ABOUT THE AUTHORS

\*Dental Surgeon, \*\*Asst Professor

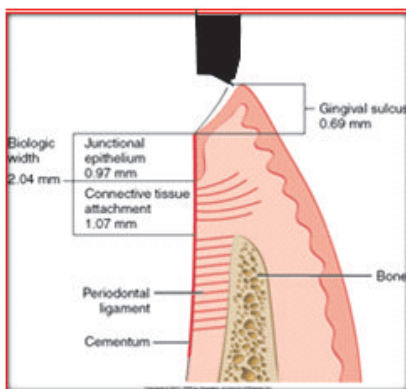
Dept of Periodontology, Dr. R. Ahmed Dental College & Hospital, Kolkata



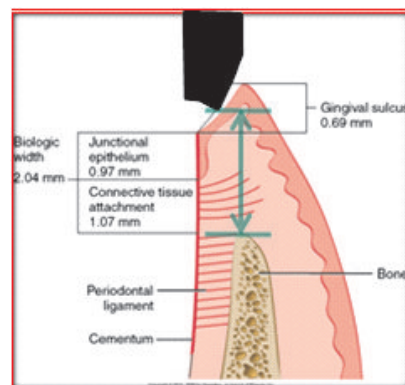
**Fig : 3**



**Fig : 4**



**Fig : 5**



**Fig : 6**

Transgingival probing (Fig 2) is the method of measuring biologic width. Transgingival probing is done under local anesthesia to bone level. Biologic width is assessed by subtracting the sulcular depth from the resulting bone sounding measurement.<sup>[3]</sup>

Biologic width violation can lead to chronic gingivitis, clinical attachment loss and alveolar bone loss. (Fig 3). This may be due to the destructive inflammatory response to plaque located subgingivally. There may be genetic predilection too. Gingival hyperplasia might also be found in subgingivally placed restorative margins. It has been theorized that infringement on the biologic width by the placement of a restoration within its zone may result in gingival inflammation, pocket formation and alveolar bone loss. Crestal bone loss inferior to the encroaching margin, results in a localized infrabony pocket, gingival recession and localized bone loss. This will occur as the body attempt to recreate room between the alveolar bone and the margin to allow space for tissue attachment. Trauma from restorative procedures can play a major role in causing this fragile tissue to recede.<sup>[4]</sup>

To avoid such occurrence restorative margins can be kept in following manners. According to the esthetic, functional and anatomical need, the restorative margins can be grouped into any of the three categories: - supragingival, equigingival, and subgingival.<sup>[5]</sup>

**Supragingival margin (Fig 4):** It is the least irritating to the periodontium and is easy to prepare. The final fit and finish of the margins and removal of excess cement are also the easiest to achieve. Though this type of margin has the least impact to the periodontium, it is unaesthetic and preferred only in non-esthetic areas.

**Equigingival margin (Fig 5):** Equigingival margin can be easily blended with the tooth and can be finished easily to provide a smooth and polished margins. But such margins are not desirable as they are thought to favor more plaque accumulation and therefore result in inflammation.

**Subgingival margin (Fig 6) :** Though it is esthetic, it is detrimental to periodontal health as it acts as a permanent irritant to the periodontium. Many studies have demonstrated qualitative and quantitative changes in subgingival microbes, increased plaque index, gingival recession and pocket depth. Biologic width encroachment becomes more common when planning for subgingival restorations in cases that are fractured or carious, near the alveolar crest. Also esthetics demands often require hiding of restorative margins below the gingival margins i.e., pushing them down into the sulcus, which may cause biologic width violation. Maintenance of biologic width is essential to preserve the periodontal health and to remove any irritation that may damage the

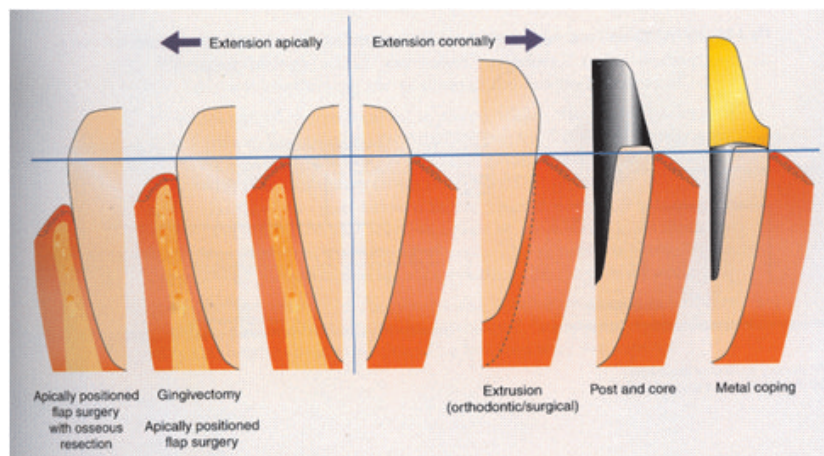


Fig : 7

periodontium. It is said that a minimum of 3mm space between the restoration margin and the alveolar bone is required to permit adequate healing and to maintain a healthy periodontium.[6] This 3 mm consists of 1mm of supraalveolar connective tissue, 1mm of junctional epithelium and 1mm of sulcular depth. This allows for adequate biologic width (2.04mm) even when the margins are placed 0.5mm within the sulcus. The location, fit and finish of restorative margins are critical factors in the maintenance of periodontal health.

Biologic width violation can be corrected surgically or orthodontically. (Fig 7). Surgical correction is aimed at removing the bone away from the restorative margin while in orthodontic correction, the tooth is moved coronally away from the bone. Surgical correction is done by crown lengthening procedure.<sup>[7]</sup> Orthodontic correction is done either by extrusion with supracrestal fiberotomy.<sup>[8]</sup>

Successful prosthesis is one which restores both esthetics and functions with a healthy periodontium. Periodontal health depends on appropriately designed restorations with correctly placed margins without violating the biologic width. Evidence suggests that even minimal encroachment on subgingival tissues leads to deleterious effects on the periodontium. As inter-individual variability exists in the dimensions of biologic width, it has to be evaluated before planning for subgingival placement of the restoration. If dimensions are found to be insufficient, the most appropriate corrective procedure - surgical or orthodontic crown lengthening can be undertaken for establishment of sufficient width. The factors to be considered while placing sub-gingival margins (0.5 mm to 1 mm) are proper contour, correct polishing and rounding of gingival margins, adequate attached gingiva, careful removal of excess cement, and finally no biologic width encroachment by the restorative margin. Periodic maintenance visits with proper home care are essential for a healthy and functional periodontium around the restored tooth.<sup>[9]</sup>

## REFERENCES:

- [1]. Gargiulo AW: Dimensions and relations of the dento gingival junction in humans, J Periodontol 1961;32:264.
- [2]. Luis Antonia Fellippe, Monteiro Jr, Luis Clovis, Cardoso Viera, Elito Araujo. Reestablishing biologic width with forced eruption. Quintessence Int 2003;34:733-8
- [3]. Galgali SR, Gontiya G. Evaluation of an innovative radiographic technique - parallel profile radiography to determine the dimensions of the dento gingival unit. Indian J Dent Res 2011;22:237-41.
- [4]. Jorgic-Srdjak K, Plancak D, Maricevic T, Dragoo MR, Bosnjak A. Periodontal and prosthetic aspect of biologic width part I: Violation of biologic width. Acta Stomatol Croat 2000;34:195-7.
- [5]. Nevins M, Skurow HM. The intracrevicular restorative margin, the biologic width, and the maintenance of the gingival margin. Int Periodontics Restorative Dent 1984;4(3):30-49.
- [6]. Ingber JS, Rose LF, Coslet JG. The "biologic width"—a concept in periodontics and restorative dentistry. Alpha Omegan 1977; 70(3):62-5.
- [7]. Smukler H, Chaibi M. Periodontal and dental considerations in clinical crown extension: A rationale basis for treatment. Int J Periodont Restor Dent. 1997;17:464-77
- [8]. Nugala B, Kumar S, Sahitya S, Krishna P M. Biologic width and its importance in periodontal and restorative dentistry. Journal of Conservative Dentistry. 2012;15:12-17.
- [9]. Valderhaug J, Birkeland JM. Periodontal conditions in patients 5 years following insertion of fixed prostheses. Pocket depth and loss of attachment. J Oral Rehabil 1976;3:237-43.