

Expert Commentary
Biologic Width: 'A Matter of Concern'

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The concept of Biologic Width has been widely described by periodontists and restorative dentists. An adequate understanding of relationship between periodontal tissues and restorative dentistry is paramount to ensure adequate form, function and esthetics, and comfort of the dentition. The biological width is defined as the dimension of the soft tissue, which is attached to the portion of the tooth coronal to the crest of the alveolar bone. This term was based on the work of Gargiulo et al (1961), who described the dimensions and relationship of the dentogingival junction in humans.^[1] There is general agreement that placing restorative margins within the biologic width frequently leads to gingival inflammation, clinical attachment loss, and bone loss. This is thought to be due to the destructive inflammatory response to microbial plaque located at deeply periodontal pockets or gingival recession. Newcomb (1974) analyzed 66 anterior crowns with subgingival margins of varying depths and compared them to uncrowned contra lateral controls.^[2] The results showed that the nearer a subgingival crown margin was to the epithelial attachment (hence nearer the biologic width), the more likely that severe gingival inflammation occurred. Parma-Benfenati et al (1986) observed approximately 5 mm of osseous resorption when restorative margins were placed at the alveolar crest in beagle dogs.^[3] Minimal resorption was observed where restorations were placed 4 mm coronal to the alveolar crest. Tal et al. (1989) further demonstrated that biological width violation results in loss of periodontal

support.^[4] Encroachment of the biologic width becomes of particular concern when considering the restoration of a tooth that has fractured or been caries near the alveolar crest. Also, esthetic demands often require “burying” of restorative margins subgingivally, which can lead to violation of this space. Various authors have recommended minimal distances restorative margins must be from the bone crest to avoid deleterious effects. Ingber et al (1977) suggested that a minimum of 3 mm was required from the restorative margin to the alveolar crest to permit adequate healing and restoration of the tooth.^[5] Maynard & Wilson (1979) divided the periodontium into three dimensions; superficial physiologic, crevicular physiologic and subcrevicular physiologic.^[6] The superficial physiologic dimension represents the free and attached gingival surrounding the tooth, while the crevicular physiologic dimension represents the gingival dimension from the gingival margin to the junctional epithelium. The subcrevicular physiologic space is analogous to the biologic width described (Gargiulo et al. 1961), consisting of the junctional epithelium and connective tissue attachment.^[1] Maynard & Wilson claimed that all three of these dimensions affect restorative treatment decisions and the clinician should 'conceptualize' all three areas and the interplay between them and restorative margins.^[6] In particular, the authors claimed that margin placement into the subcrevicular physiologic space should be avoided to prevent the placement of 'permanent calculus' beyond the crevice. Nevins & Skurow

(1984) stated that when subgingival margins are indicated, the restorative dentist must not disrupt the junctional epithelium or connective tissue apparatus during preparation and impressing taking.^[7] The authors recommended limiting subgingival margin extension to 0.5-1.0mm because it is impossible for the clinician to detect where the sulcular epithelium ends and the junctional epithelium begins. They also emphasized allowing a minimum 3.0 mm distance from the alveolar crest to crown margin. A clinician is presented with three options for margin placement: supragingival, equigingival (even with the tissue), and subgingival locations. The supragingival margin has the least impact on the periodontium. Classically, this margin location has been applied in non-esthetic areas due to the marked contrast in colour and opacity of traditional restorative materials against the tooth. With the advent of more translucent restorative materials, adhesive dentistry, and resin cements, the ability to place supragingival margins in esthetic areas is now a reality. Therefore, whenever possible, these restorations should be chosen not just for their esthetic advantage but for their favorable periodontal impact as well. Waerhaug (1980) demonstrated gingivitis and attachment loss associated with sub marginal restorations in monkeys and dogs.^[8] Clinical and histological observations of human teeth by Dragoo & Williams (1981) demonstrated compromised healing associated with gingival bevel crown margins compared to shoulder preparations.^[9] Flores-de-je-Coby et al (1989) studied the effects of crown margin location on periodontal health and bacterial morphotypes in humans 6-8 weeks and 1 year post insertion.^[10] Subgingival margins demonstrated increased plaque, gingival index scores, and probing depths. Furthermore, more spirochetes, fusiforms, rods and filamentous bacteria were found to be associated with subgingival margins. Biologic width violations can be

corrected by either surgically removing bone away from proximity to the restoration margin or orthodontically extruding the tooth and thus moving the margin away from the bone. Surgery is the more rapid of the two treatment options. It is also preferred if the resulting crown lengthening will create a more pleasing tooth length. In these situations, the bone should be moved away from the margin by the measured distance of the ideal biologic width for that patient, with an additional 0.5mm of bone removed as a safety zone. The health of the periodontal tissues is dependent on properly designed restorative materials. Overhanging restorations and open interproximal contacts should be addressed and remedied during the disease control phase of periodontal therapy. Regarding restorative margins can remain coronal to the free gingival margin. Obviously, subgingival margin placement is often unavoidable. However, care must be taken to involve as little of the sulcus as possible. Evidence suggests that even minimal encroachment on the subgingival tissue can lead to deleterious effects on the periodontium. Keeping in view the facts mentioned above, 'Biologic Width' is actually a matter of concern.

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