**Abstract:** This clinical report describes the use of biological tissue adaptation technique for placement of a porcelain laminate veneer in a 50-year-old woman. The author developed this prosthetic technique to facilitate alignment of gingival levels for esthetic purposes. The laminate veneer was seated on the maxillary central incisor with an adhesive system. Although the margin of the restoration overhangs, no gingival inflammation or recession has been observed during a follow-up period of 10 years and 9 months.

**Keywords:** biologic width; biological tissue adaptation; crown lengthening; gingival recession; gingivectomy.

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**Introduction**

Crown lengthening is useful for apical movement of gingival levels (1,2). However, it can be invasive to periodontal tissue and may increase patient stress. Additionally, it is time-consuming because flap surgery and ostectomy are required in most cases. Biological tissue adaptation (BTA) is a prosthetic technique for aligning gingival levels without flap surgery or ostectomy (Tsubota K. Ann Jpn Prosthodont Soc 2, 26-35, 2010) (Figs. 1, 2). BTA overcomes the disadvantages of crown lengthening and has the advantage of preventing gingival recession, which can result in black margins, wedge-shaped defect of the root surface, and secondary dental caries. This clinical report describes the use of BTA for placement of a porcelain laminate veneer (PLV) on a maxillary central incisor that was followed up for more than 10 years.

**Case Report**

Figure 1 shows the procedure for BTA. Gingivectomy is performed at a position that ensures an esthetic gingival level and biologic width (3,4) after bone sounding. The finish line of the labial preparation of abutment teeth should be at the position of the gingivectomy. The margin of the prosthesis is fabricated to be the same thickness as the gingiva after gingivectomy. A restoration with an overhanging margin is placed.

The author treated a 50-year-old woman who was concerned about the unaesthetic appearance of her maxillary central incisors. Clinical examination revealed that the gingival levels of the incisors were not symmetrical because the gingival level of the right central incisor was approximately 1.0 mm coronal, as compared with the level of the left central incisor, and the left central incisor was protruding and twisted (Fig. 3). The treatment plan called for porcelain PLVs to be placed on both central incisors, and for BTA technique to be used for the right incisor.

First, PLVs were prepared with a chamfer line at the maxillary central incisors. Then, the bone margin (osseous ridge) was examined by inserting a pocket probe into the gingival sulcus to measure the distance from the gingival margin to the bone margin at the right incisor. The distance was 3.0 mm (Fig. 4). After determining the biologic width on the labial side, an electrocautery knife was used for gingivectomy, to remove approximately 1.0 mm of tissue. The finish line of the labial preparation was established at the position of the gingivectomy (Fig. 5). An impression was made immediately after hemostasis.
The PLVs for both central incisors were fabricated with feldspathic porcelain (Vintage MP, Shofu Inc, Kyoto, Japan) (Fig. 6). A conventional PLV was fabricated for the left central incisor, and BTA technique was used to fabricate a PLV for the right incisor (Fig. 6b). The outer margin was positioned on the gingival surface of the working cast, i.e., the thickness of the margin was approximately 1 mm, the same thickness as the gingiva (Fig. 6b, c).

The intaglio of the PLVs was etched with 8% hydrofluoric acid gel (Porcelain Etchant Gel, Bisco Inc., Schaumburg, IL, USA) for 60 s. After rinsing and drying the intaglio, silane (Rely X Ceramic Primer, 3M ESPE, St. Paul, MN, USA) was applied to the acid-etched surfaces, which were then air-dried for 60 s. The surfaces of the abutment teeth were etched with 35% phosphoric acid (Ultra-Etch, Ultradent Products Inc, South Jordan, UT, USA) for 15 s and gently dried with an air syringe. Subsequently, a bonding agent (Super-Bond D Liner Dual, Sun Medical Co., Ltd, Moriyama, Japan) was applied for 20 s and blown gently with an air syringe. The PLVs were bonded to the abutments by using a clear shade of a dual-polymerizing resin-based material (Lute-It Esthetic Luting Cement, Pentron Clinical Technologies LLC, Wallingford, CT, USA). Excess resin cement was removed and light-polymerized (Translux CL, Kulzer Ltd, Hanau, Germany) for 40 s from the lingual and palatal surfaces of the teeth. Polymerization of resin material was achieved after 4 min (Fig. 7).

At a follow-up examination 7.5 years after the procedure, visual and X-ray examinations showed healthy periodontal tissue and no gingival recession or bone absorption (Fig. 8). At 10 years and 9 months after the procedure, a follow-up examination revealed no gingival inflammation or recession (Fig. 9). Pocket probing did not cause bleeding of the gingiva, which had adapted to the BTA margin. The pocket probe could not enter the space between the BTA margin and gingiva.
Discussion

The present clinical outcome indicates that BTA technique is effective when using PLV to achieve a symmetrical gingival margin for maxillary anterior teeth. BTA ensures a balanced gingival level and thus achieves an esthetically superior long-term outcome, without gingival inflammation. This result seems to contradict the commonly accepted belief in prosthetic dentistry that biologic width is required in order to maintain healthy periodontal tissue (3,4).

The BTA technique may enable formation of biologic width in three dimensions (Fig. 10). The reasons for this favorable outcome are similar to those for platform switching, in which an implant abutment with a diameter smaller than that of the implant fixture is used to create a functional implant-bone distance, which counteracts bone resorption and gingival recession (5).

Additionally, the overhanging margin is thought to induce gingival inflammation as a result of plaque accumulation (6). In the BTA technique, gingival pressure causes gingival tissue to adapt to the crown margin (Fig.)
Therefore, by tissue adaptation to the BTA margin, the gingival sulcus will be shallower and smaller, which reduces plaque accumulation and bacterial invasion. Similar conditions are seen in the interface between an ovate pontic and gingiva, which establishes a tight interface with the mucous membrane, thereby preventing plaque attachment (7).

Gingival pressure is believed to be created by two mechanisms, namely, the pressure of gingival rebounding after gingivectomy and the pressure created when the BTA margin pushes the gingiva. In the first mechanism, rebounding toward the original position is observed after gingivectomy. The crown lengthening procedure requires ostectomy to prevent this; however, in the BTA technique the overhanging margin blocks gingival rebounding and seems to produce gingival pressure. In the second mechanism, gingival bleaching is observed when the gingival margin is placed under pressure by the restoration margin.

The shape of the margin of the BTA restoration is an overhang before placement; however, after placement, the gap between the gingiva and crown margin is considerably smaller and a flat surface develops (Fig. 10). Therefore, plaque does not accumulate and can be easily removed by brushing and self-cleaning the buccal mucosa and tongue. In addition, the gingival margin remains thick after placement, which improves blood circulation and prevents gingival recession (8) (Fig. 10).

Although the BTA technique requires further clinical study, the present findings suggest it is a useful prosthetic technique for maintaining esthetics and periodontal health.

Conflict of interest
None declared.

References