



Crown Margin Shifting: A New Approach for Re-establishment of the Biological Width

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BACKGROUND

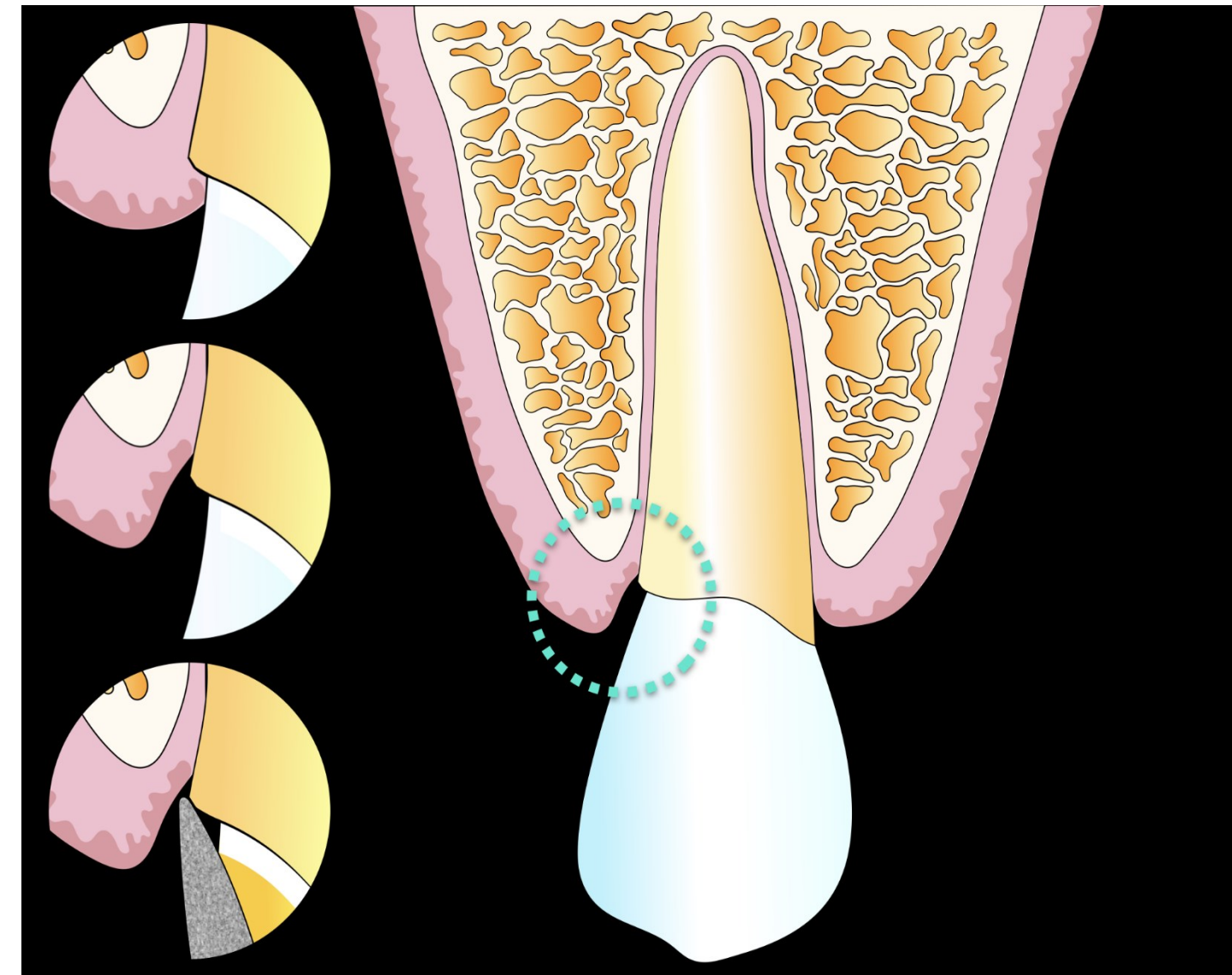
During surgical CL, compromising of the clinical parameter of the adjacent neighboring teeth could not be avoided. This has been a main drawback for the CL procedure, hence many clinicians have sought ways to avoid this procedure such as orthodontic force eruption. Recently, platform-switching concept was introduced in implant field with an attempt to minimize implant crestal bone loss while preserving/increasing soft tissue volume. Hence, a common question was raised, can platform-switching concept be applied in the natural dentition especially in the re-establishment of BW? Therefore, Crown Margin Shifting (CMS) was proposed by us to preserve soft tissue volume in order to re-establish BW. Conceptually, if a tooth has a deep proximal carious lesion, the prepared tooth finish line was left to be partially exposed to behave like the implant fixture platform and the restoration act like the implant abutment, this mimics the same junction of platform-switching in implants.

OBJECTIVE

This study aimed to evaluate the ability of crown margin shifting (CMS) to re-establish the biological width.

MATERIAL & METHODS

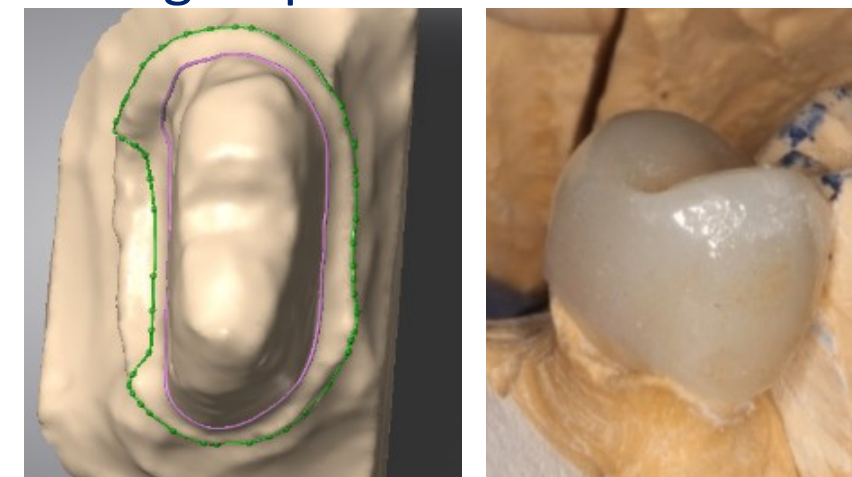
Seven patients aged between 25-45 years old, presented with bilateral maxillary premolars with deep proximal caries violating the biological width (BW) were recruited for this study. The control site (CS) received computer-aided design/computer-aided manufacturing (CAD/CAM) monolithic zirconia with a heavy chamfer finish line, while the experiment site (CMS) received the same restoration and finish line except CMS concept was adopted to re-establish the BW. Modified plaque index (MPI), modified bleeding index (MBI), periodontal probing depth (PPD) and gingival index (GI) were clinically evaluated at base line, 6 and 12 months after. Radiographic evaluation using cone beam computed tomography (CBCT) was done to measure marginal bone loss (MBL) and the established BW at the deep proximal finish line.



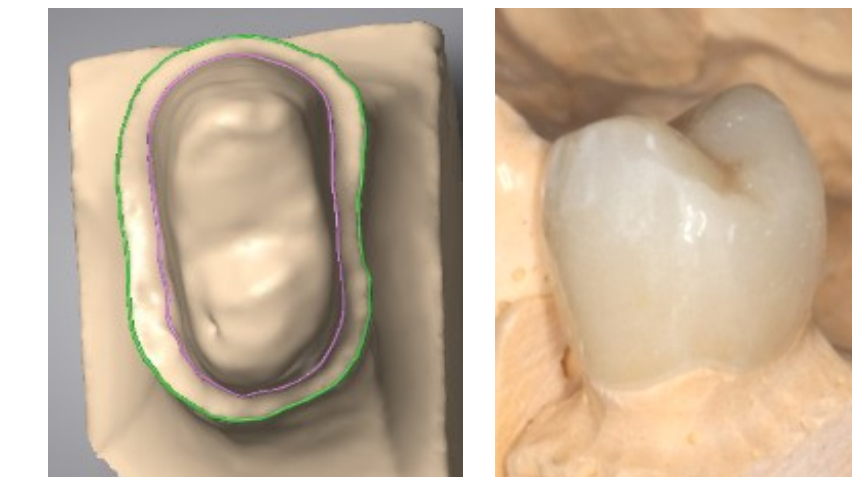
Results

- There was no statistical significant difference in MPI between both CMS and CS abutments on buccal and palatal surfaces, since plaque was carefully controlled to be as minimum as possible.
- No statistical significant differences were found in GI between SS and CMS in both buccal and palatal surfaces except at 12 months, both sites showed a significant improved GI at the end of the study with better values for CS.
- There was no statistical difference of MBI between both SS and CMS abutments at baseline, as well as 12 months. At 6 months, CS showed a significant lower MBI than CMS. At 12-month, both treated sites had a better MBI than baseline.

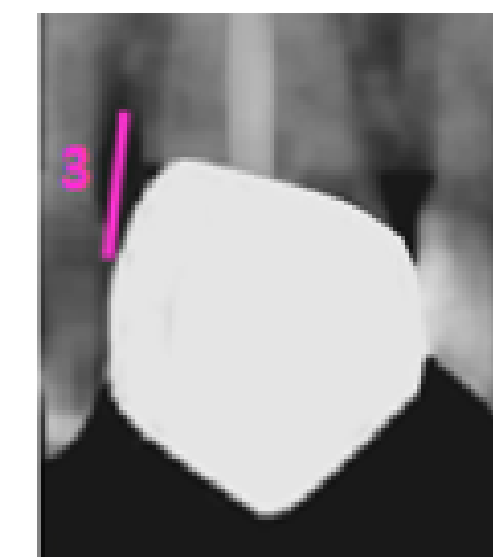
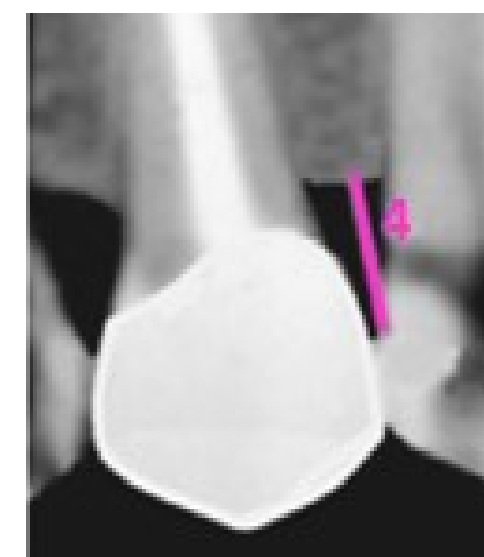
- CMS showed significant increase in PPD during the 12 months, whereas CS was significant only in the first 6-month. Values of MBL indicated that bone loss was significant in the middle apical bone in both sites. **Established biological width measurements confirmed that the significant bone loss took place in the first 6-month at all examined sites for CMS.** For CS significant palatal crestal bone loss was noted in the first 6 months while the middle and apical bone loss was significant throughout the study period. Positive correlation was found between PPD and MBL in both groups.



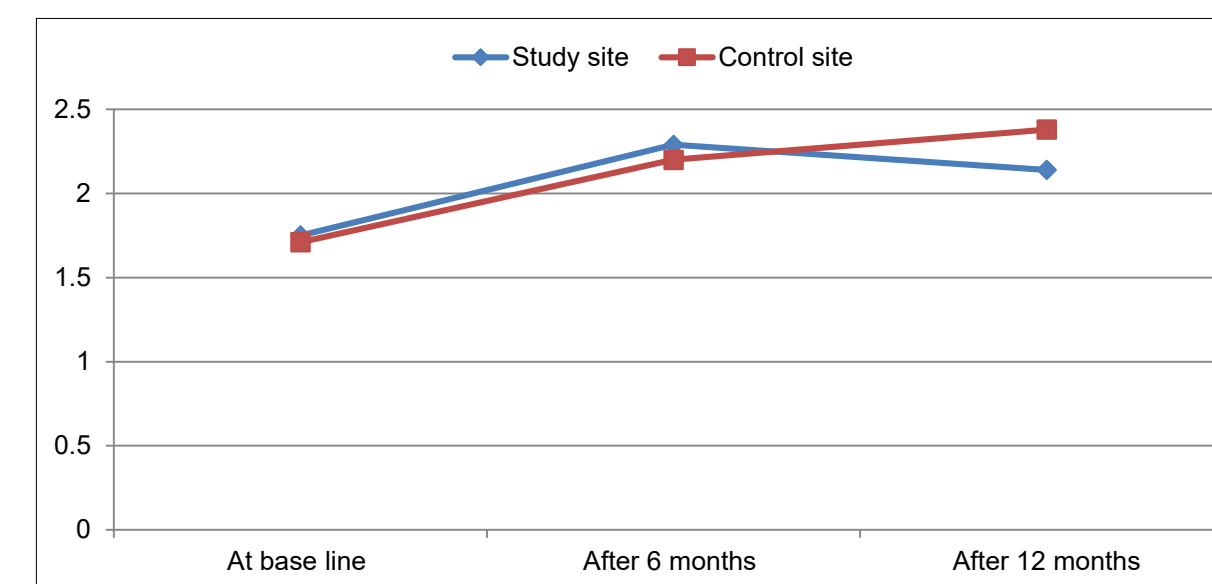
CMS concept. A- Computerized die image showing an occlusal view of contoured heavy chamfer finish line and CMS on the wide heavy round shoulder with bevel. B- Monolithic zirconia crown on the die presenting the exposed finish line which was produced according to C- the measurements of HBW on the computerized die.



Images of CS. A- Computerized die image showing an occlusal view of contoured heavy chamfer finish line. B- Monolithic zirconia crown on the die, showing complete finish line coverage.



Periapical x-ray of monolithic zirconia crowns at try is session, to check seating and to make sure that the height of the interdental papilla at the examined site does not exceed 5 mm. A- CS, B- CMS.



Line chart representing mean PPD (probing pocket depth) of buccal surface at different time periods in each site.

Discussion

- Data from our study reported some early inflammation, this phenomenon was expected due to soft tissue healing with some marginal bone remodeling.
- Interestingly, significant bone loss was observed at 6-month in both groups (CMS and CS), and it continued increasing to 12-month in CS group. This was in agreement with Noguchi et al who stated that destruction of periodontal tissue and loss of attachment is increased in tissue containing long junctional epithelium caused by infiltration of inflammatory cells and osteoclasts
- . Similarly, Bosshart et al also noted that in the phase of pocket formation, long junctional epithelium is permeable and allow inflammatory factors to be infiltrated to the marginal papilla.
- MBI and GI, at 6 months period, showed significant increase which could be due to inadequate oral hygiene since patients were unable to perform proper flossing technique.
- MBL was present through the whole period of the study; with its highest significant values in the first 6 months at both groups, then it showed no significant increase up to 12- month, except at the middle and apical crestal bone in CS group. This is agreement with Tal et al [6], who found that there was no further bone loss when normal healthy junctional epithelium was re-established.

Conclusion

Within the limitation of this study, it was concluded that CMS approach was able to re-establish the biologic width without a negative influence on the clinical parameters.