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TREATMENT

Soft tissue considerations in the management of diastemas

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Abstract Management of the diastema changes the mesio-distal dimensions of the clinical crown resulting in a discrepancy at the location of the zenith points as well as the papillae. Thus, management requires relocation of the zenith points as well as regeneration of the papillae. Treatment of the central diastema is a further challenge due to the unique nature of the interdental space between the two central incisors. Building up diastemas may considerably change the crown proportions due to unilateral build-up of the clinical crown. This may lead to further discrepancy between the zenith point and the midline of the teeth, depending on the extent of the diastema to be treated.

Keywords Diastema · Gingival phenotype · Interdental papilla

Quick reference/description

Diastema is a gap or space between two teeth. The presence of a diastema results in missing interdental tissue.

Treatment plan of diastemas includes soft tissue management depending on the extent of proportional change in the clinical crown diameters.

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Overview

Soft tissue consideration in the management of diastemas includes:

Soft tissue	Factors
I) The papilla	Factors affecting the position and shape of the interdental tissue: -Position of the contact point or surface -Lateral walls of the interdental space -Root surface cementum -The distance between neighboring teeth -Health status of the tissues -The gingival phenotype
II) The marginal gingiva	Factors affecting location of zenith: -Cementoenamel junction -The contour of the root surface -The marginal alveolar bone

Materials/instruments

The location of the zenith could be altered by changing the alveolar crest margin. This will affect the supracrestal attached tissues that may have consequences such as root sensitivity

Procedure

Treatment plan of diastemas includes soft tissue management which consists of:

The papilla

The interdental papilla is a small rounded protuberance in between two teeth, two implants, or a tooth and an implant or a pontic and a tooth or implant [1]. Management of the diastema includes relocating and rebuilding lateral walls of the papilla.

The presence and shape of the interdental papilla depend on:

- The existence of the contact between two lateral walls of neighboring teeth
- Restorative structures
- Healthy periodontal tissues at the base
- Shape of the lateral walls

Factors that may affect the position and shape of the interdental tissue are [2, 3]:

- Position of the contact point or surface

  A longer distance between the base of the papilla and the contact point is created due to coronal positioning of the contact between neighboring structures. This affects the fill of the interdental space. When the soft tissue is thick, then the space is filled properly.
- Lateral walls of the interdental space

  Lateral walls comprise two components:
- Apically the cementum surfaces
- The epithelial attachment to the root surface, coronal to the connective tissue attachment

  This attachment apparatus is outlined by the cementoenamel junction and coronally followed by enamel surfaces to the point of contact with neighboring tooth.
- Root surface cementum

  Collagen fibers are attached to the cementum. Not only attached they are also embedded in the cementum. The terminal portions of these fibers that are inserted to the cementum or bone are named as *Sharpey's fibers* (Fig. 1).

  They contribute to the tissue tonus and support the shape of the interdental tissue. The health of interproximal gingival tissue is related to the health of the cementum as well.
- The distance between neighboring teeth

  The presence and formation of the interdental tissue are affected by the distance between the roots or two neighboring teeth. Triangular crown forms and divergent roots are strongly associated with open gingival embrasures.

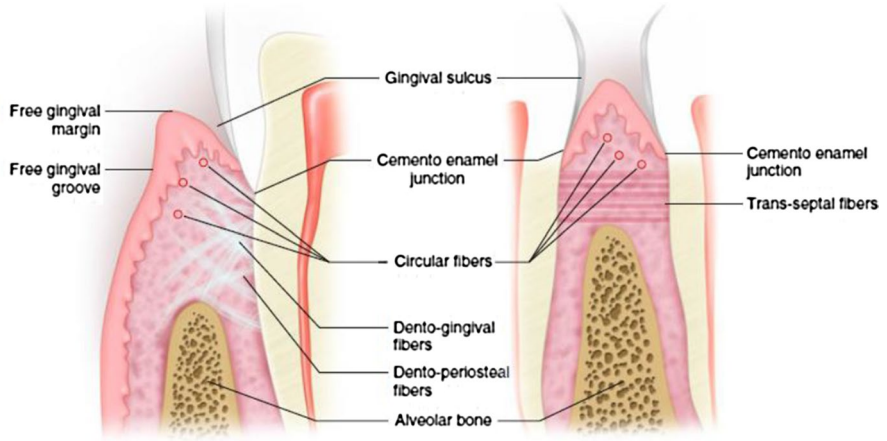

Fig. 1 The connective tissue fiber system provides attachment to the cementum surface. **a** Frontal plane, **b** sagittal plane. The circular fibers run their course through the free gingiva; dentogingival fibers are embedded in the cementum of supra-alveolar root surface, and dento-periosteal fibers run their course apically over the alveolar bone. Transseptal fibers run straight across the interdental septum and are embedded in the cementum of adjacent teeth

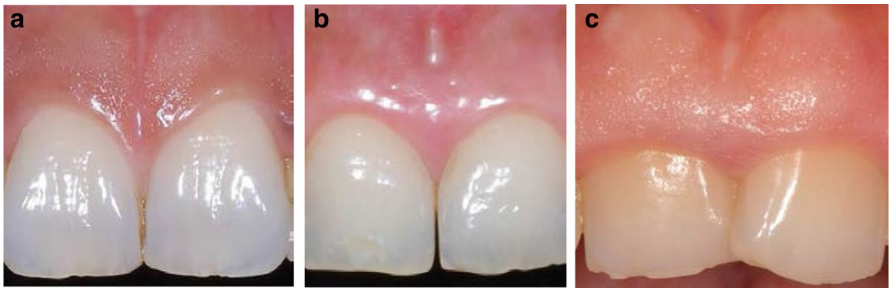

Fig. 2 Gingival phenotype is one of the key determinants of interdental presence of soft tissue. The thin phenotype **a** is likely to fill the interdental space only if the conditions are in favor and the normal **b** provides relatively more tissue volume at the interdental space; however, thick **c** phenotype supports enough tissue to fill the space even in cases when other variables are not optimal

- Health status of the tissues
  Periodontal disease may result in the loss of interdental hard and tissue.
- The gingival phenotype
  Sufficient soft tissue volume is required in order to facilitate the interproximal tissue to elevate up to the contact point or area (Fig. 2). Thick gingival phenotype allows better tissue manipulation and encourages creeping attachment.

The marginal gingiva

The gingival zenith is defined as the most apical point of the buccal marginal gingiva. The location of zenith is defined by cementoenamel junction, the contour of the root surface as well as the marginal alveolar bone in healthy gingival tissues [4].

The zenith of central incisors is always a few millimeters distal to the midline. In lateral incisors, zenith point is usually concurrent with or slightly distal to midline whereas in canines the zenith points are at the midline or distal to it. Arrangement of teeth and their location can affect the position of zenith (Fig. 3).

Pitfalls and complications

– Building up contact between two teeth may cause [5]:
  - Gingival inflammation due to improper contour
  - Promotion of microbial dental plaque accumulation
  - Physical irritation
– Building up diastemas may change the crown proportions due to unilateral buildup of the clinical crown.

Fig. 3 Zenith of the central incisors is located approximately 1 mm distal to the midline of the anatomical crown

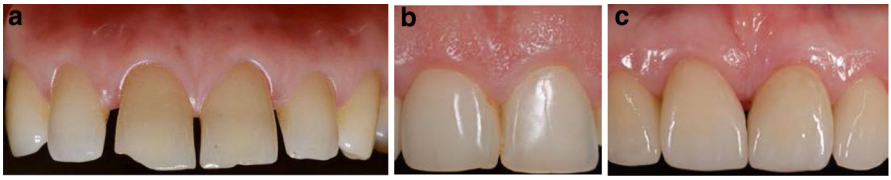

Fig. 4 **a** Thin marginal gingiva with apparent zenith points requires special attention. **b** The median diastema treated without soft tissue arrangement leaving a zenith far distal than the ideal position in tooth 11. **c** The median diastema treated without compensating the relocation of the gingival zenith in tooth 11

– Management of the diastema may change the mesiodistal dimensions of the clinical crown resulting in a discrepancy at the location of the zenith points (Fig. 4).

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