The Use Of Erbium Chromium Laser In Recipient Bed Bio-modification And Connective Tissue Harvesting for Management of Gingival Recession (Randomized Clinical Study)

Thesis

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Tarek Mahmoud Eltayeb

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List of Abbreviations

Abb.	Full term
%RC	Percentage of root coverage
ADM	Acellular dermal matrix
ATP	Adenosine triphosphate
BL	Baseline
CAF	Cornally advanced flap
CAL	Clinical attachment level
CBCT	Cone beam computed tomography
CEJ	Cemento-enamel junction
CRC	Complete root coverage
CTG	Connective tissue graft
DGG	De-epthelialized gingival graft
EG	Epithelialized Graft
EMD	Enamel matrix derivatives
Er,Cr:YSGG	Erbium, Chromium, Scandium, Gallium and Garnet
Er:YAG	Erbium-doped yttrium aluminium garnet
FGG	Free gingival graft
GI	Gingival index
GM	Gingival margin
GR	Gingival recession
GRD	Gingival thickness
GT	Gingival recession depth
GTR	Guided tissue regeneration
HKT	Higth of keratinized of tissue
HLLT	High level laser therapy
Hz	Hertz
LASER	Light Amplification by Stimulated Emission of Radiation
LLLT	Low level laser therapy
MGJ	Mucogingival junction

Abb.	Full term
Nd:YAG	Neodymium-doped yttrium aluminium garnet
PI	Plaque index
PPD	Probing pocket depth
PR	Palatal recession
PRC	Partial root coverage
RD	Recession depth
RW	Recession width
SCTG	Subepithelial connective tissue graft
SD	Standard deviation
SE	Standard error
VAS	Visual analogue scale
VISTA	Vestibular incision subperiosteal tunnel access
W	Watt

INTRODUCTION AND REVIEW OF LITERATURE

Mucogingival therapy is a general term used to describe periodontal treatment involving procedures for the correction of defects in the morphology, position and/or amount of soft tissue and underlying bone support around teeth **(American Academy of Periodontology, 2001)**.

Friedman in **1957** introduced surgical procedures designed to preserve gingival tissue, remove aberrant frenal or muscle attachments and increase the depth of the vestibule. In **1996,** the international scientific community accepted the term 'periodontal plastic surgery' introduced by **Miller** in **1993**, which was defined as 'surgical procedures performed to prevent or correct anatomic, developmental, traumatic or disease-induced defects of the gingiva, alveolar mucosa or bone **(Wennstrom, 1996)**. This definition includes various soft and hard tissue procedures aimed at gingival augmentation and root coverage.

Etiology and pathogenesis of gingival recession

The gingival margin (GM) is clinically scalloped located 1-2 mm coronal to the cemento-enamel junction (CEJ). Gingival recession (GR) was first defined by **Gorman (1967)** as the apical migration of the gingiva exposing the root. It was also defined as the term used to characterize the apical shift of the marginal gingiva from its normal position on the crown of the tooth to levels on the root surface beyond the CEJ **(Löe et al., 1992)**.

Afterwards, **Smith (1997)** redefined it as a condition where the GM lies against any part of the root surface of the tooth. He noted that it is better not to correlate the recession to the CEJ as it is sometimes obliterated by restorations, so it is enough to mention that the GM lies on the root. Later on, in the Glossary of Periodontal Terms **(American Academy of Periodontology, 2001);** GR was defined as the location of the GM apical to the cemento-enamel junction.

A. Anatomical factors:

These include fenestration and dehiscence of the alveolar bone, abnormal tooth position in the arch, an aberrant path of eruption of the tooth and the shape of the individual tooth. The deficiencies in alveolar bone may be developmental (anatomical) or acquired (physiological or pathological) **(Alldritt, 1968).**

All those anatomical factors are interconnected and may lead to an alveolar osseous plate that is thinner than normal and consequently be more susceptible to resorption**.** One surgical study found a correlation between GR and bone dehiscence **(Bernimoulin and Curilovie, 1977; Modeer and Odenrick, 1980; Lost, 1984; Kassab and Cohen, 2003)**.

Dehiscence may be present where the bucco-lingual thickness of a root is similar to or exceeds the crestal bone thickness. It has been also postulated that patients with morphological biotypes characterized by narrow, long teeth are more susceptible to dehiscence than are people with broad short teeth. In teeth where GR has developed, an underlying dehiscence may be considered and possibly discovered during flap procedures **(Olsson and Lindhe, 1991)**.

B. Physiological iatrogenic factors:

Physiological factors may include the orthodontic movement of teeth to positions outside the labial or lingual alveolar plate, leading to dehiscence formation. It has been suggested that the acquired loss of alveolar bone might be associated with a number of identifiable physiological or pathological conditions for which bone loss is part of a physiological or pathological process **(Wennstrom et al., 1987)**. The GR may appear as a deep and narrow lesion, similar to a 'Stillman cleft', in which oral hygiene measures becomes very difficult to perform, and bacterial infection may induce the formation of a buccal probing pocket of sufficient depth to reach the periapical environment of the tooth. Sometimes a delayed diagnosis is made only when an endodontic abscess occurs **(Zucchelli and Mounssif, 2015)**.

The volume of the facial soft tissue may be a factor in anticipating whether GR will take place during or after active orthodontic treatment. A thin biotype may be a greater risk factor for progression of GR in the presence of plaque-induced inflammation or tooth brushing trauma **(Wennstrom et al., 1987)**. Consequently, the active orthodontic movement of the teeth outside the alveolar bone may be considered as an etiological factor **(Zucchelli and Mounssif, 2015).**

During the post-orthodontic retention phase, wide and deep multiple GR may occur as a result of tooth malposition. In such condition, orthodontic therapy is considered as a predisposing factor for GR. Sometimes, isolated deep GRs occur in the lower incisors a few years after orthodontic therapy. Common characteristics associated with these gingival defects are the presence of a round-wire lingual bonded retainer