The Effect of Using Two Different Suturing Techniques on Free Gingival Marginal Stability after Esthetic Crown Lengthening for Treatment of Gummy Smile

(Randomized Clinical Trial)

Methodology

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Sample selection and assignment:

Thirty patients (26 females, 4 males), who were candidates for esthetic crown lengthening, participated in this prospective clinical trial.

The subject was recruited consecutively from the outpatient clinic of Oral Medicine, Periodontology, oral Diagnosis and Radiology Department, Faculty of Dentistry, Ain Shams University and faculty of dental medicine, Misr international University. The purpose of the study was explained to all patients and an informed consent was signed before the conduction of the study. The proposal was presented to the faculty of Dentistry Ain Shams University Research Ethics committee and was approved before starting the research ()

Patient selection:

Inclusion Criteria:

1. Patients complaining from gummy smile (altered passive eruption)
2. Age range (21-40) years.

3. Bone level is 2 mm or less from the cemento enamel junction

4. Teeth included were free from any periodontal destruction

5. Good compliance with the plaque control instructions following initial therapy.

6. Availability for follow up and maintenance program.

Exclusion criteria:

1. Presence of systemic diseases which could influence the outcome of the therapy (***American society of anesthesiologists I, ASA I***).
2. Patient suffering from periodontitis stage 4 grade C.
3. Presence of smoking habit.
4. Presence of occlusal interferences.
5. Pregnant females and lactating females. .
6. Vulnerable groups of patients (handicapped, mentally retarded and prisoners).
7. Restored teeth.

Grouping Criteria:

The study consisted of two groups the number of patient was determined by sample size calculation through G power analysis (15 patients). Patients were randomly selected using computer generated randomization (www.randomizer.org).

Group 1 (15 patients) (Periosteal suture) :

Esthetic crown lengthening procedure: internal bevel, sulcular and interdental incisions, flap elevation, bone removal then External vertical mattress suture was done (periosteal suture).

Group 2 (15 patients) (Figure of eight suture) :

Esthetic crown lengthening procedure: internal bevel, sulcular and interdental incisions, flap elevation, bone removal then modified interrupted suture was done (Figure of eight suture).

III- Assessments:

1-Clinical parameters:

For the selected sites, the following clinical parameters were assessed preoperative (baseline) 3 and 6 months after surgical procedure.

1. Plaque index *Silness and Löe 1964*
2. Gingival Index *Löe and Silness 1963*.
3. Probing depth (PD) *Glavind and Loe, 1967*
4. Length of Attached gingiva

2-Esthetic outcome evaluation:

The following parameters were assessed 1, 3 and 6 months after surgical procedure:

- Level of the gingival margin (**GM**) through measurement of the crown length from the reference point in the surgical stent to the gingival margin (***Deas et al., 2004***).
- Marginal tissue contour (**MTC**) using root coverage esthetic score (RES) system (***Cairo et al. 2009***): Zero points = irregular gingival margin (does not follow the CEJ); 1 point =proper marginal contour/ scalloped gingival margin (follows the CEJ).

- Papillary fill using classification of papillary fill ***(Jemt 1997)*** which it's score is as follows:

  PIS1: entire papilla missing, lack of convexity

  PIS 2: fills less than the interdental space, slight convexity.

  PIS 3: fills more than half the interdental space but no complete fill

  PIS 4: papilla fills the entire space, harmonic gingival contour

  PIS 5: hyperplastic papilla covering too much tooth structure, irregular tissue contour

- Patient satisfaction prior surgery and 6 months post-surgery (***Silva et al., 2015***).

Patient satisfaction criteria

Prior to surgery

- How would the patient rate the gun shown when smiling, size of the upper teeth, the length of upper teeth and the width of it (way too little, too little, about enough and too much way too much)

After surgery

- Is the patient satisfied with the gingival display during talking and smiling, teeth display during

talking and smiling (not at all, slightly, somewhat, very and extremely).

- How was the procedure experience (much worse, worse, same as I thought, better and much better).

Presurgical therapy:

- Full Conventional periodontal treatment including supra, subgingival scaling and root planning were performed using hand scalers and curettes.
- Oral hygiene instructions(regular brushing 3 times/day, flossing and using mouthwash) were repeated until patients had achieved a proper level of oral hygiene where plaque index (PI) ≤ 1.
- Teeth were examined for caries, periapical infection and restorative procedures in order to be treated.
- Assessment parameters were recorded prior to surgery using UNC-15* manual probe (Hu Friedy)
- Alginate impressions were made 4 weeks following initial therapy of each maxillary arch to fabricate customized probing stents. Full-arch probing stents were made on stone casts Stents were trimmed to the height of contour, and

* PCPUNC15 Single-ended, color-coded probe. ergonomic handle. University of North Carolina, Hu Friedy, USA.

grooves were placed at sites to be measured with a narrow fissure bur to act as reference points for clinical parameters assessment.

(IV) Surgical procedures

Group (1)

1) Anesthesia (Articaine HCL 4% containing epinephrine at a concentration of 1:100,000)[†] was administrated at the selected teeth.

2) The tooth width to length ratio was determined according to the golden proportions (RED: The successive width proportion, when viewed from the facial aspect, should remain constant as we move posteriorly from the midline) (***Ward 2001***)

3) Bone sounding was done(patient was given anesthesia probing until the bone level was done using UNC-15[‡] manual probe) to determine the bone position in relevance to the CEJ position then bleeding points were done to determine the amount of the gingival tissue that was removed

[†] Artinibsa 4%cartouches de 1.8ml ,inibisa dental.

[‡] PCPUNC15 Single-ended, color-coded probe. ergonomic handle. University of North Carolina, Hu Friedy, USA.

4) Primary submarginal incision, secondary intrasulcular then tertiary incision at the papillary area were done using the surgical blade (15c)[§]

5) Full thickness flap reflection at the crestal bone area using mucoperiosteal [**]elevator was done, while at the papillary area partial thickness flap using the surgical blade (15c)[††] was done.

6) After flap reflection the supracrestal soft tissue were removed using surgical curette[‡‡] (universal curette 2R/2L,4R/4L)

7) Ostectomy 3mm from the cemento enamel junction were performed using end cutting burs[§§]. Root surfaces were scaled to remove remnants of supracrestal connective tissue fibers.

8) Flap was repositioned by external vertical mattress (periosteal suture) suturing technique using resorbable 5-0 vicryl sutures[***]

[§] Trinon sterile scalpel Blades ,lot0483,Germany
[**] Buser Periosteal handle #6, Hu- Friedy, USA.
[††] Trinon sterile scalpel Blades ,lot0483,Germany
[‡‡] Universal Curettes(2R/2L),(4R/4L), Hu-Friedy ,USA
[§§] Midwest operative Carbide burs,FG,End cutting, #957,1.0mmdiamter,3.7mm length,10/Pkg,Dentsply Midwest,Patterson item#493-0079,Mfg item#:389278.
[***] Assut Sutures, Absorbabale (PGA) 5-0 USP, braided violet coated 3/8 rev.cutt.17mm, AM trading.

Fig (3): Showing diagram for the periosteal suture

Group (2)

1) Anesthesia (Articaine HCL 4% containing epinephrine at a concentration of 1:100,000)[†††] was administrated at the selected teeth.

2) The tooth width to length ratio was determined according to the golden proportions (RED).

3) Bone sounding was done to determine the bone position to in relevance to the CEJ position then bleeding points were done to determine the amount of the gingival tissue that was removed

4) Primary submarginal incision, secondary intrasulcular then tertiary incision at the papillary area were done.

5) Full thickness flap reflection at the crestal bone area using mucoperiosteal[‡‡‡] elevator was done, while at the papillary area partial thickness flap using the surgical blade (15c)[§§§] was done.

[†††] Artinibsa 4%cartouches de 1.8ml ,inibisa dental.
[‡‡‡] Buser Periosteal handle #6, Hu- Friedy, USA.
[§§§] Trinon sterile scalpel Blades ,lot0483,Germany

6) After flap reflection the supracrestal soft tissue were removed using surgical curette[****] (universal curette 2R/2L,4R/4L)

7) Ostectomy 3mm from the cemento enamel junction were performed using end cutting burs[††††]. Root surfaces were scaled to remove remnants of supracrestal connective tissue fibers.

8) Flap was repositioned by modified interrupted (figure of 8 suture) suturing technique using resorbable 5-0 vicryl sutures[‡‡‡‡].

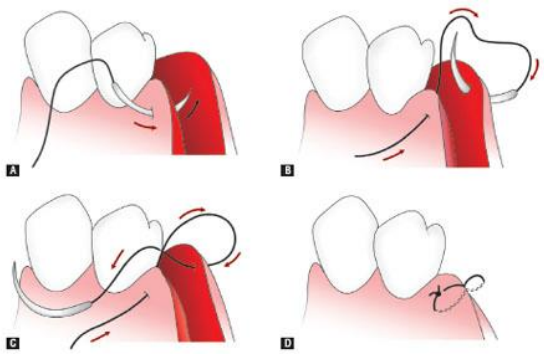

Fig (4): Showing a diagram for the interrupted modified sutur

[****] Universal Curettes(2R/2L),(4R/4L), Hu-Friedy ,USA
[††††] Midwest operative Carbide burs,FG,End cutting, #957,1.0mmdiamter,3.7mm length,10/Pkg,Dentsply Midwest,Patterson item#493-0079,Mfg item#:389278.
[‡‡‡‡] Assut Sutures, Absorbabale (PGA) 5-0 USP, braided violet coated 3/8 rev.cutt.17mm, AM trading.

V-Postoperative care:

- All patients had received antibiotic for 1 week

(Augmentin 1 gm every 12 hours[§§§§], metronidazole[*****] 500gm every 12 hours) and analgesics(Brufen [†††††]400 every 8 hours) were prescribed for the patient and instructed to avoid brushing at the surgical site

- Patients were instructed to rinse twice daily with Tantum verde[▫] mouth rinse or hot saline mouthwash and to avoid mechanical plaque removal at the site of surgery

- Sutures were removed after 2 week.

- Patients were instructed not to brush for 2 weeks and not to floss the surgical area for 4 weeks.

- After 15 days patient were instructed to use modified bass technique for tooth brushing (***Carranzaa 12th edition***)

[§§§§] Augmentin 1gm,Medical union pharmaceuticals(MUP) Egypt under license from ,Glaxosmithkline

[*****] Flagyl 500 mg, sanafi Aventis Egypt under license of sanafi Aventis French.

[†††††] Brufen 400mg, Al kahira pharm. and chem..Ind.Co. under license from abbott laboratories

[▫]Tantum Verde Mouthwash and Gargle(Benzydamine hydrochloride 0.15g): Bottle of 125 ml, Eipico Egypt under license of A.C.R Angelini Francesco.SpA.Italy

VI-Postoperative evaluation and assessment:

Monthly recall appointments were scheduled

- The follow up period included oral examination, plaque and calculus removal when necessary
- Clinical and esthetic parameters were evaluated and scored by a separate operator at 1, 3 and 6 months postoperative the patient satisfaction was evaluated 6 months post-operative only
- All data were statistically analyzed

VII-Statistical analysis:

Statistical analysis was then performed using a commercially available software program (SPSS 18; SPSS, Chicago, IL, USA).

Values were presented as mean, standard deviation (SD), median, range and confidence intervals. Data were explored for normality using Kolmogorov-Smirnov test of normality. For parametric data, Independent t test was used for 2 group's comparisons, while ANOVA test was used to compare different observations.

Plaque and gingival indices and most values of difference and percent change were non-parametric and were compared using Mann Whitney U test for intergroup comparisons, while Friedman test and Wilcoxon signed Rank test were used for intragroup comparisons

Qualitative data were expressed as frequencies and percentages and were compared using Chi square test

The level of significance was set at $P \leq 0.05$.