Effect of soft tissue grafting on peri-implant buccal tissue in single immediate implant treatment

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Background: Aesthetics in single immediate implants in the anterior maxilla treatment are, amongst others, determined by peri-implant soft tissue levels, which in return are thought to be dependent on changes in buccal bone thickness (BBT). The application of a connective tissue graft (CTG) at implant placement is presumed to be beneficial for the preservation of peri-implant soft tissue levels. It is unknown, however, if and to which extent the technique of soft tissue grafting influences BBT.

Aim/Hypothesis: To assess the effect of soft tissue grafting (CTG) at implant placement on the mid-buccal mucosal level (MBML) and BBT of single immediate implants in the aesthetic zone in a randomized controlled study design.

Material and Methods: 60 patients received an immediately placed implant without flap elevation in an extraction socket with a vertical buccal bone wall defect not exceeding 5 mm. The implant-socket gap was grafted with autologous and anorganic bovine bone. Randomly, patients received either a CTG harvested from the tuberosity (test group, n = 30) or no CTG (control group, n = 30). The CTG was inserted supraperiosteally in an envelope flap at the buccal side. The same day, patients received a non-occluding temporary crown. Three months thereafter, the final implant crown was placed. MBML and BBT were assessed before removal of the tooth (Tpre) and twelve months (T12) after final crown placement. Changes in MBML were measured on standardized intra-oral pictures using a digital picture editing program. CBCTs were used to assess changes in BBT with the aid of implant planning software. Data were analyzed with independent t-test, Mann-Whitney test and Pearson’s test.

Results: In total, data of 55 patients (test group, n = 28+ control group, n = 27) was available for analysis. In both groups one implant was lost during osseointegration. Three patients were excluded due to unavailability of pretreatment CBCTs. The study population consisted of 12 men and 16 women in the test and 12 men and 15 women in the control group. Mean age was 45.3 years+ SD 15.3 years in the test group and 47.2 years+ SD 16.5 years in the control group. At T12, change in MBML was +0.07 mm+ SD 0.85 mm and −0.53 mm+ SD 1.16 mm in the test and control group, respectively (P = 0.03). The change in BBT at T12 was −0.84 mm+ SD 0.61 mm (test group) and −0.46 mm+ SD 0.54 mm (control group, P = 0.02). No significant correlation was found between change in MBML and change in BBT, regardless of study group (P = 0.26 for test group+ P = 0.67 for control group).

Conclusions and Clinical Implications: Connective tissue grafting combined with immediate implant placement and provisionalization of single implants in the aesthetic zone results in a better preservation of the MBML. Soft tissue grafting negatively influenced the change in BBT, however.