Computer guided immediate implant placement into fresh extracted socket and soft tissue augmentation using a three-dimensional collagen matrix and immediate provisional restoration in the esthetic zone- 12-month results

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Background: Different procedures has been presented to minimize the soft tissue shrinkage after immediate implant placement. Soft tissue augmentation can be successfully performed using autogenous connective tissue (CTG). The main disadvantages of CTG are the increasing morbidity and postoperative discomfort due to a second surgical site.

Aim/Hypothesis: The aim of the present clinical trial was to evaluate the hard and soft tissue level changes around implants using demineralized freeze-dried allograft bone substitute (AB) and a collagen matrix (CM).

Material and Methods: In this parallel-designed, randomized, prospective, double blind controlled clinical trial, participants were randomly assigned to the test-group (immediate implant placement, bone augmentation with AB and immediate provisionalization with application of a collagen matrix in the labial area) and control-group (immediate implant placement, bone augmentation with AB and immediate provisionalization) with an allocation ratio of 1:1. Clinical, radiological, esthetic and patient reported outcomes were recorded at baseline, after 3 and 6 months. Impressions were taken and digitally scanned to evaluate the volumetric soft tissue changes in the operative region. Measurements were performed by calibrated and masked examiners. Data were analyzed using Wilcoxon signed-rank, and Mann-Whitney U tests at the significance level of $\alpha = 0.5$.

Results: Twenty implants (10 test, 10 control) were placed in 20 patients (10 men, 10 women) between the ages of 25 and 74 (mean age 48.5 years). All implants remained osseointegrated, with overall mean marginal bone changes of $-0.25 \text{ mm} \pm 0.35$ for the test group and $-0.07 \text{ mm} \pm 0.12$ control groups ($P = 0.74$). No differences were observed in volume shrinkage (test-group $-8.91 \text{ mm}^3 \pm 9.4$, control-group $-10.08 \text{ mm}^3 \pm 8.8$, $P = 0.7$), pink esthetic score (test-group 12.7 ± 1.5 and 13.1 ± 0.87, $P = 0.69$) and patient reported outcomes.

Conclusions and Clinical Implications: The 12-month results of this prospective study indicated no additional advantage of placing a collagen matrix at the time of immediate implant placement in the esthetic zone. All over, all implants showed successful osseointegration with high clinical and esthetic outcomes as well as great patient satisfaction. Long term follow-up evaluations are needed to confirm these findings.