Simultaneous guided bone regeneration (sGBR) at the time of implant placement has been advocated in the aesthetic zone to achieve optimal aesthetic outcome. The grafted material is expected to regenerate missing bone, prevent excessive resorption around the implant and maintain the alveolar contour. This process is costly, carries associated morbidity and it's aim to regenerate bone volume quantitatively has no evidence linking it to aesthetic outcome.

Immediate implant placement (Type 1) has often been associated with sub-optimal aesthetic outcome with increased mucosal recession which has been attributed to insufficient thickness of the labial bone wall. Around 50% reduction in the width of buccal ridge dimension has been reported in Type 1 implants. Resorption of the bundle bone after tooth extraction has a significant role to play in this remodelling process which immediate implants have failed to prevent.

To evaluate the labial bone thickness with or without simultaneous guided bone regeneration around single tooth implants after at least one year in function using cone beam CBCT imaging. Furthermore, the influence of timing of implant placement on the labial bone thickness was evaluated.

Materials & Methods

46 single tooth implant restorations in the maxillary aesthetic zone (inter-canine) with at least 12 months post-loading follow-up period were evaluated using CBCT scans. Rough hydrophilic (Straumann SLA) active implants placed without guided bone regeneration (non-GBR) were compared to the ones placed with sGBR using deproteinized bovine bone and porcine collagen membrane.

Two experienced radiologists measured the labial bone thickness (LBT) on CBCT scans at three different points along the implant length (i) L0 - identified as the shoulder in a bone level (BL) and the SLA junction in a tissue level (TL) implant; (ii) L25 - 25% and; (iii) L50 - 50% of the junction in a tissue level (TL) implant; (ii) shoulder in a bone level (BL) and the SLA implant length (i) L0 – identified as the

Mean age of patients was 33y. Mean time from surgery to CBCT was 3.7y (max. 5.6y). The inter-examiner reliability was confirmed (r=0.8).

Mean LBT (SD) in Type 1 placement protocol at L0, L25 and L50 for nonGBR were 0.8(0.4), and 1.3(0.8)mm respectively in comparison to 1.1(0.8), 1.6(1.3), and 2.1(0.9)mm for the sGBR group. The differences for L0 and L25 were statistically significant (p<0.05).

In Type 2 placement the mean LBT at L0, L25 and L50 were 1.2(0.7), 0.9(0.5), and 0.5(0.4)mm respectively in the non-GBR group and 1.6(1.3), 2.5(0.9), and 2.1(1.3)mm for the sGBR group. The differences for L0 and L50 were statistically significant.

Type 2 had greater LBT than Type 1 particularly in cases with dehiscence or fenestrations.

Within the limitations of this study, sGBR with deproteinized bovine bone and porcine collagen membrane on rough hydrophilic implants seem to be predictable in maintaining LBT up to a mean follow up of 3.7y. In Type 1 implants sGBR appears to preserve some but not increase the LBT.

On the contrary, sGBR in Type 2 placement (even with dehiscence or fenestrations) significantly increases the amount of labial peri-implant bone thickness in implants that have been in function for at least one year.

To rethink, and this will involve a move away from soft tissue coverage to be replaced by resorption of bundle bone as the main rationale behind 4-6 week post extraction implant placement.

References