A 10-YEAR CLINICAL AND RADIOLOGICAL FOLLOW-UP OF PATIENTS UNDERGOING MAXILLARY SINUS FLOOR ELEVATION USING ADIPOSE STEM CELLS

Vivian Wu[1,2], Jenneke Klein-Nulend[1], Nathalie Bravenboer[3], Marco N. Helder[2], Christaan M. ten Bruggenkate[2], Engelbert A.J.M. Schulten[2]

[1] Department of Oral Cell Biology, Academic Centre for Dentistry Amsterdam (ACTA), University of Amsterdam and Vrije Universiteit Amsterdam, Amsterdam Movement Sciences, Amsterdam, The Netherlands

[2] Department of Oral and Maxillofacial Surgery/Oral Pathology, Amsterdam University Medical Centers and Academic Centre for Dentistry Amsterdam (ACTA), Vrije Universiteit Amsterdam, Amsterdam Movement Sciences, Amsterdam, The Netherlands

[3] Department of Clinical Chemistry, Amsterdam University Medical Centers, Vrije Universiteit Amsterdam, Amsterdam Movement Sciences, Amsterdam, The Netherlands

Introduction 150.000 dental implants are placed annually in The Netherlands to replace missing teeth. Often bone-quantity at the implant-site is insufficient for dental implant-placement. Bone-augmentation is then required. Autologous bone is still the gold-standard, but this has major disadvantages e.g., limited bone-volume and donor-site morbidity. Bone tissue-engineering using stem cells is emerging as a promising alternative.[1] Earlier, we performed a phase-1 clinical trial using autologous adipose stem cells (ASCs) applied in a one-step surgical procedure.[2] Ten patients undergoing maxillary sinus floor elevation (MSFE) to increase vertical bone-height for implant-placement (**Fig. 1**) received a calcium-phosphate bone-substitute plus ASCs on one side, whereas bilaterally-treated patients (6 of 10) received pure calcium-phosphate on the opposite side. Short-term feasibility, safety, and potential efficacy of ASCs for bone-regeneration has already been demonstrated.[2]

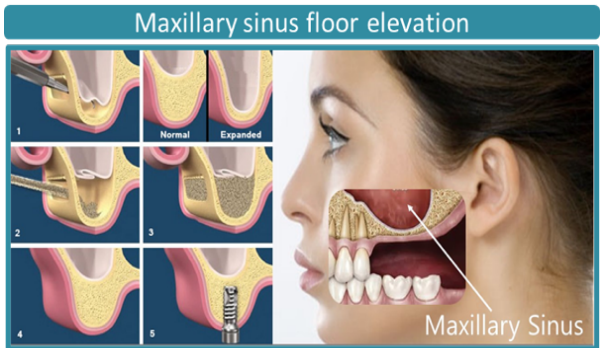

Figure 1. MSFE-procedure

Purpose This study aimed to assess the long-term, 10-year, clinical and radiographic outcome of ASC-supplementation in MSFE. Primary objectives were implant-survival and success rate. Secondary objectives were determination of soft tissue quality, oral hygiene, and radiological evaluation of peri-implant-bone and graft volume.

Methods All 10 patients who participated in the phase-1 clinical trial[2], were included in the 10-year follow-up. Clinical and radiographic assessments (panoramic-radiographs and cone-beam CT-scans) were performed on 44 implants (pre-MSFE and post-MSFE (0.5–10-year)).

Results No adverse events were reported during the 10-year follow-up**.** All 44 implants remained functional, with a 100% survival rate. No implants showed mobility or suppuration. Other secondary objectives are currently being analyzed.

Conclusions This is the first bone tissue-engineering study worldwide evaluating the long-term, 10-year, additive value of ASC-supplementation for jaw-bone reconstruction using MSFE. ASC-supplementation showed to be safe without negative clinical results. Whether it resulted in more bone-formation in the long-term still needs to be confirmed.

[1]Wu V ea Stem Cells Int. 2019:6279721.
[2]Prins HJ ea Stem Cells Transl Med. 2016:5:1362-74.