Hydraulic device and nanohydroxylapatite paste for minimally invasive transcrestal sinus floor elevation: 3 year results

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Background and aims

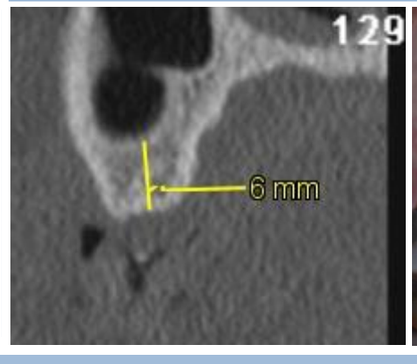
The use of a specially designed drill and nanohydrxylapatite paste can achieve minimally invasive transcrestal hydraulic sinus floor elevation without the use of an osteotome or a mallet.
The aims of this retrospective study are to describe the technique and present 3years outcomes .

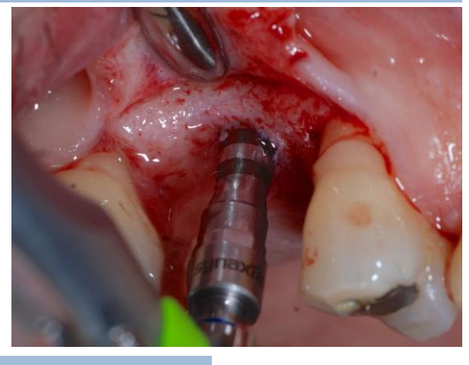
Materials and methods

A specially designed drill (Sinusjet – Synaxial) creates the osteotomy. Thanks to its inner irrigation system, physiological liquid flows through maxillary bone during drilling, unsticks the sinus membrane before the drill penetrates into the sinus cavity, and begins to elevate the sinus floor membrane. The drill backflowing security system ensures a safe intrabony working pressure. Direct visual inspection through the osteotomy and Valsalva's maneuver controls sinus membrane integrity.

1)Osteotomy with Sinusjet drill : physiological liquid unsticks sinus floor membrane

2)Primary nHA Bone grafting





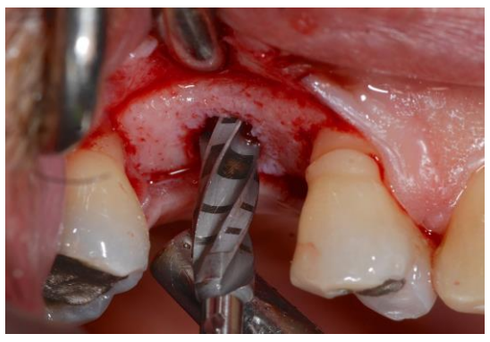
3)Implant bed prepared using the final drill

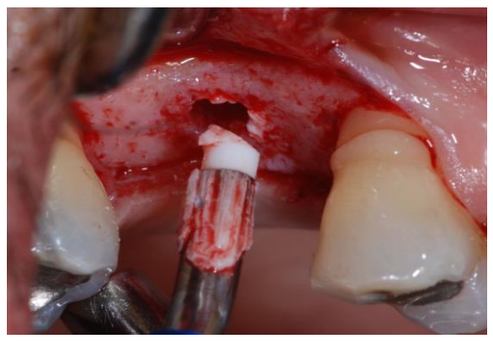
4)Additional Bone grafting and membrane elevation

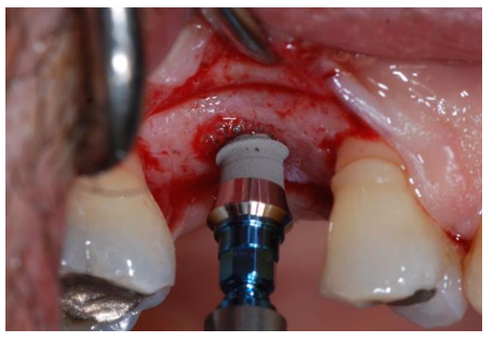
5)Implant placement

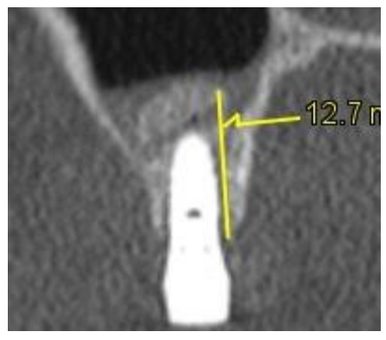
6 months healing

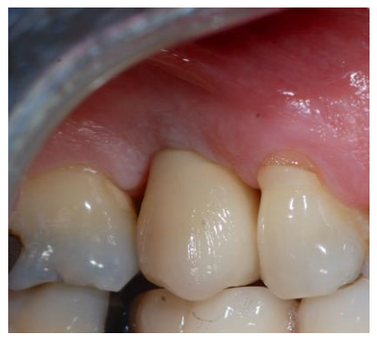
9 M loading : screw retained crown





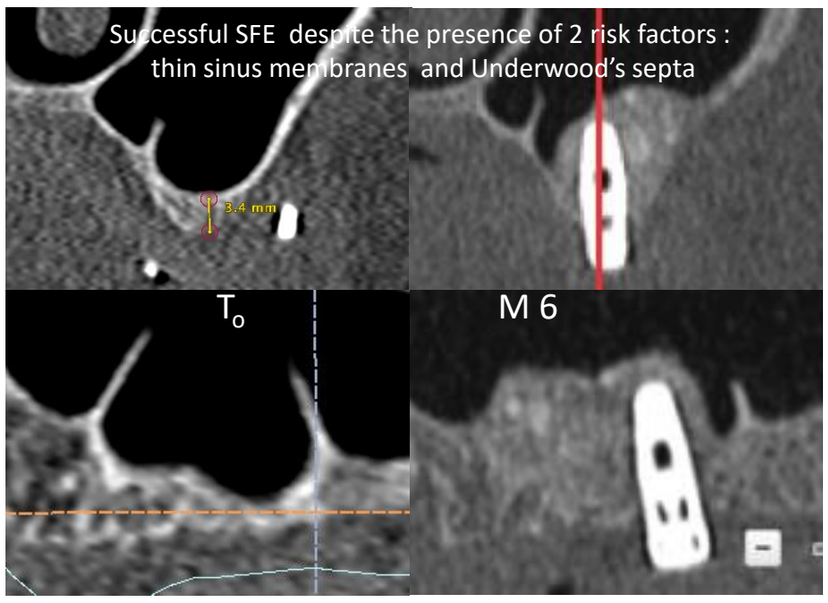






35% nanocrystalline hydroxyapatite aqueous paste (Ostim, Heraeus Kulzer, fully synthetic & resorbable) is injected through the osteotomy (primary bone grafting) . The augmentation material contributes to further membrane unsticking and elevation .
The implant bed is prepared using the final drill of the chosen implant system. The previously grafted biomaterial protects Schneider's membrane from the cutting edge of the drill. Bone grafting material is often visible on the drill head when it comes out of the implant socket.
Another 0,5 to 1 cc of biomaterial is injected through the osteotomy (additional bone grafting). Bone grafting paste reflow through the final osteotomy prevents pressure excess and demonstrates membrane sinus integrity . A direct visual control of the bone graft is done through the osteotomy, checking once again uniform aspect of the grafted material and gentle bleeding.
The implant is inserted at the right depth . A primary stability of at least 15 Nw is checked. 4 different implants were used : Xive Friadent , Anthogyr Axiom, Straumann, Nobel Biocare.

Main followed parameters : grafting material loss, implant survival rate, per-operative complications (sinus membrane perforation), post-operative complications, level of intraoperative and postoperative patient comfort using a visual analogue scale (0 = no pain to 10 = worst possible pain)



Results

130 transcrestal sinuslifts were performed in 104 patients with simultaneous placement of 194 implants with a mean length of 10.6 +/- 0.9 mm . The mean follow-up period was 3 Years ± 9 Months .

The mean height of the residual alveolar process was 4.5 +/- 1.6 mm .
A mean sinus floor elevation of 8.5 mm +/- 2.7 mm was performed (P < 0.0001).

Surgical duration was rather short with a mean time of 99.8 ± 31 seconds for osteotomy and of 49.5 ± 8 seconds for bone grafting .

There were 4 sinus membrane perforations (perforation rate = 3,1 %) although perforation risk factors were often noticed such as an oblique sinus floor in 49 % of cases, thin sinus membranes (1 mm or less) in 68 %, Underwood's septa in 28 % and the combination of thin sinus membrane and Underwood's septum in 28%.

No graft was lost, no surgical complications nor post-operative complications .

There were six early implant losses (implant survival rate = 97 %): one was lost after 3 weeks, 4 after 2 months and 1one year after prosthetic loading because of overload .`

96,4% of the patients experienced no or minimal discomfort during surgical procedure and post-operative healing period (VAS 0 or 1)

Conclusions

Within the limits of this retrospective study,
this minimally invasive hydraulic transcrestal procedure appears safe and predictable.
It is both patient friendly with very low discomfort, and practitioner friendly with a simple and fast procedure .
Observations on a larger number of patients
and on a longer period is needed to support the excellent clinical performance seen so far.

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Disclosure : Roland Dricot is majoritary shareholder of Synaxial sa