

# Radiologic comparative analysis between saline and venous blood filling after hydraulic lifting of sinus membrane without bone graft: a randomized case-control study

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## Introduction

Various maxillary sinus elevation techniques using bone grafts and bone substitutes are frequently used to enable the placement of dental implants in the posterior maxilla. Recently, it has been demonstrated that consistent bone gain within the sinus could be achieved without the addition of any bone graft material. Only the elevation of sinus membrane was sufficient to induce new bone formation beyond the original limit of the sinus floor. This preliminary study shows new bone formation, evidenced by radiographic evaluation, following application of saline versus peripheral venous blood in the space between the elevated sinus membrane and simultaneously placed implants.

## Purpose

The purpose of this randomized case-control clinical study was to evaluate implant survival and changes in residual alveolar bone height (RABH) after hydraulic sinus membrane elevation with saline as compared to venous blood. Instead of lateral approach, CAS kit (Osstem, Korea), which is well-known for its hydraulic sinus membrane elevation via crestal approach, is utilized in this study.

## Materials & Methods

### Patient selection

- A total of 40 Korean volunteers
- The patients were presented with edentulism in the posterior maxilla and a reduced RABH making the placement of implants with standard length longer than 8 mm impossible.

### Surgical technique

In a patient with the posterior maxillary edentulism, the placement of dental implants (TS III CA, Osstem), sinus lift surgery via crestal approach by CAS kit. Immediately prior to implant placement, 3 ml of saline or the peripheral venous blood from a patient per an implant site was injected to support the elevated sinus membrane. No bone graft materials were added at any implant site.

## Results

Table 1. Radiologic changes of the residual alveolar bone height (RABH) according to time periods.

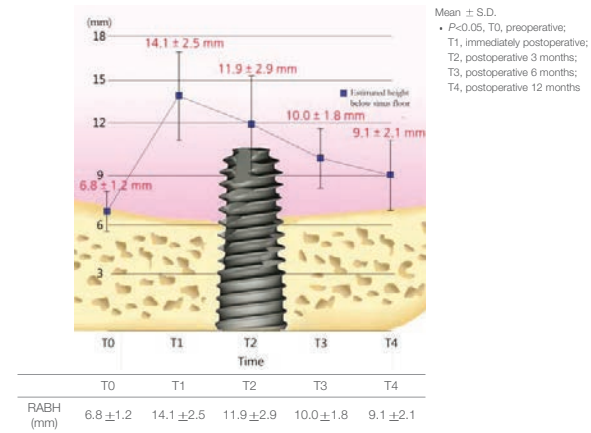


Table 2. Comparison of estimated gain of RABH.

	T0	T1	T2	T3	T4	
RABH (mm)	Saline group	6.4 ± 1.1	14.3 ± 2.7	12.1 ± 2.8	9.8 ± 1.8	8.1 ± 2.1
	Blood group	7.2 ± 1.1	13.8 ± 2.4	11.3 ± 2.9	10.2 ± 1.9	9.8 ± 2.2
P		0.020**	0.285	0.207	0.264	0.013**

Mean ± S.D. \* P < 0.05 by Bonferroni test for multiple comparisons; \*\* P < 0.05 by student t test

## Conclusion

Within limitations of this study, it could be concluded that:

- In crestal approach for sinus lift surgery, hydraulic sinus membrane elevation with saline or patient's own venous blood filling could be an alternative technique to bone grafting in cases where primary stability of implants with standard length was obtained.
- In spite of 'tent-pole' effect of implants, drooping of sinus membrane continued up to T4 after sinus membrane elevation with no bone grafts, however, this phenomenon is found to be stabilized at T3.
- Compared to saline, patient's own venous blood could be better filler to support and maintain the compartment created between the elevated sinus membrane and sinus floor at T4.