

Comparison of Minimally Invasive Crestal Condensation with Lateral window Approach

*Dr. Segin Chandran K R MDS (OMFS)¹ Dr. Subramonian S MDS (OMFS)²

¹Assistant Professor, Department of Dentistry, SMCSI Medical College Karakonam, Kerala, India

²Corresponding Author,

²Associate Professor, Department of Dentistry, SMCSI Medical College Karakonam, Kerala, India

Corresponding author: Dr Subramonian S MDS(OMFS)

Abstract: Successful placement of dental implant is a challenge in posterior edentulous maxilla, where the alveolar bone is lost due to extensive resorption, and the pneumatization of maxillary sinus and spongy nature of bone. This study compares the merits and demerits of a new technique of crestal condensation - Minimally Invasive Crestal Condensation (MICC) with conventional lateral window approach. In this study we found the following advantages for this new technique which appears promising for doing routine sinus lift. It is minimally invasive with soft tissue punch to gain access, faster wound healing, very minimal blood and bone loss, less time consuming and cost effective. It allows immediate implant placement as it yields a better primary stability.

Keywords: Dental Implants, minimally invasive, Immediate Implants, crestal condensation

I. Introduction

The placement of dental implants in atrophied posterior maxilla is a challenge due to reduced maxillary bone height. Various techniques have been proposed to obtain adequate bone height for implant placement [1]. Summers technique published in 1994, [2] still stands as the gold standard in routine maxillary sinus lift procedures as it is one of the most conservative procedures. It is easier to perform with fewer postoperative complications compared to a lateral window technique. Several modifications were suggested for this technique in the last few years [3]. This study compares the merits and demerits of new condensation technique - Minimally Invasive Crestal Condensation (MICC) with conventional lateral window technique. It advocates flapless, punched and osteotomy using trephine for and maximum conservation of bone and seems to be a promising one for doing routine sinus lift.

II. Aim

To compare the merits and demerits of a new modification for crestal condensation technique with lateral window approach

III. Materials And Methods

A prospective clinical study, evaluating the simplicity, easiness of procedure and postoperative complications between lateral window technique and Minimally Invasive Crestal Condensation (MICC) was undertaken. [4], [5] 3.1 Inclusion criteria Healthy individuals in an age group of: 25-45 years with missing tooth in the posterior maxilla and history of minimum 6 months post extraction period were selected. All nonsmokers, non-alcoholics with no pre-existing sinus diseases, sub sinus bone 5-7mm in height, adequate mesio distal span of 8mm and bucco palatal width 7 mm or more.

3.2 Methodology

Total 32 patients included in this study were divided into two groups of 16 each

3.2.1 Group A (Lateral Window) : Fig 1, Fig 2, Fig 3, Fig 4

A category of implant patients whose radiographs showed a sub sinus bone height of 5-8 mm with sub antral treatment option SA-3 were selected. Under antibiotic cover, aseptic protocol and local anesthesia, off crestal incision was made. A full thickness broad based muco periosteal flap was raised to expose the complete lateral wall of maxilla and part of zygomatic prominence. The lateral window was created on bone with No.6 diamond bur until a bluish hue was observed, which shows the closeness of Schneiderian membrane. The window was expanded without breaching the sinus membrane, following which the sinus membrane was lifted off the floor using special elevators.



Fig 1

Fig 2

Fig 3

Fig 4

After giving an additional membrane protection using CollaTape® soaked with Cebanex (Cefaperazone +Sulbactam) IV in the roof of sub antral cavity, the bone graft mixture, a combination of autogenous bone graft, Human Demineralised Freeze-Dried Bone Allograft (DFDBA) and platelet rich fibrin (PRF) was placed and was secured in place by another membrane CollaTape® and wound closure done.

Delayed implant placement was done after a minimum period of four months with root form implants with 4.3 mm diameter and 10 mm length (Dentium, Superline Implant)

3.2.2 Group B (MICC) Fig 5, Fig 6, Fig 7, Fig 8

A category of implant patients whose radiographs showed a sub sinus bone height between 5-8 mm with treatment option subantral SA-3 were selected. Under antibiotic cover and aseptic protocol and local anaesthesia, Soft tissue punch smaller than proposed Implant diameter was used (3.5 mm for 4.3 diameter implant) keeping 1.5 mm spacing from adjacent teeth mesio distally to punch soft tissue in full thickness exposing crestal bone.



Fig 5

Fig 6

Fig 7

Fig 8

Same diameter trephine as that of soft tissue punch is used to make the bone cut through punched soft tissue window. Cut was limited to 2 mm of the radiographic margin superiorly. Trepined bone was left in place by gentle removal of trephine. Osteotome of same diameter of trephine is used to condense D3 type of bone to D2 type and to push it apically as much as possible and then to indirectly fracture the sinus floor and to elevate as desired. Immediately after the condensation the larger diameter implant (4.3 mm Replace select) was inserted and wrenched in to achieve lateral condensation as well as primary stability. Abutment was given at the same time as that of implant placement above which the healing cap was given for soft tissue contouring around implant.

3.3 Statistical Analysis:

Statistical analysis was done by using Statistical Package for Social Sciences (version 12.0) (SPSS Inc., Chicago, IL, USA). Significance of percentage error of two groups was tested by ANOVA test and for level of significance “P” value was used. “P” value of less than 0.05 was considered statistically significant.

IV. Results

4.1 Assessment of Morbidity

In both procedures the patients were observed till their recovery and followed up for 6 months. All lateral window technique patients had a period of 5-12 days of morbidity. Signs of mild sinusitis; heaviness and nasal blockage were noted only in one patient for 2 days on the ipsilateral side with maximum 12 days of postoperative morbidity but all the 16 patients treated through MICC had a morbidity period of 1-3 days only "Table 1"

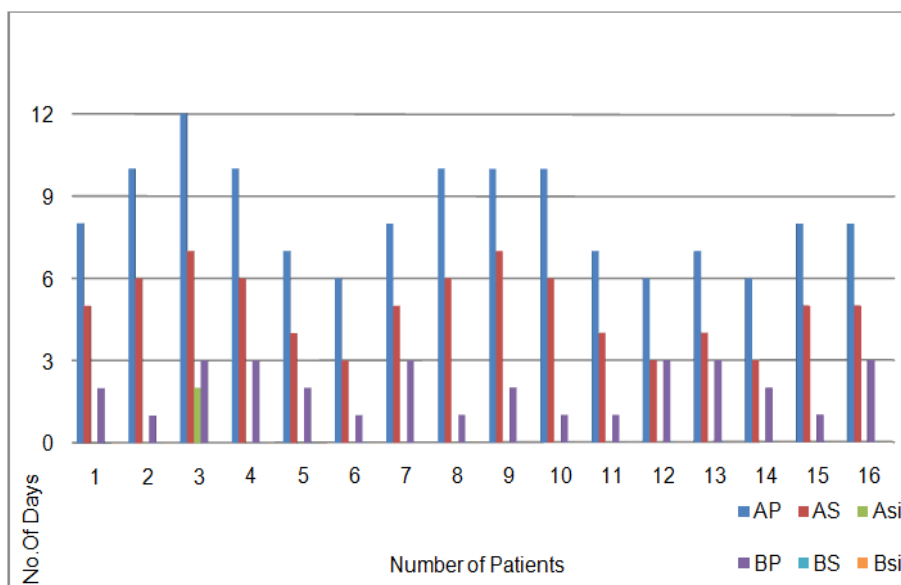


Table 1

4.2 Surgery Duration

Assessing procedural time, the time taken for MICC surgery was much less compared to conventional lateral window technique. "Table 2"

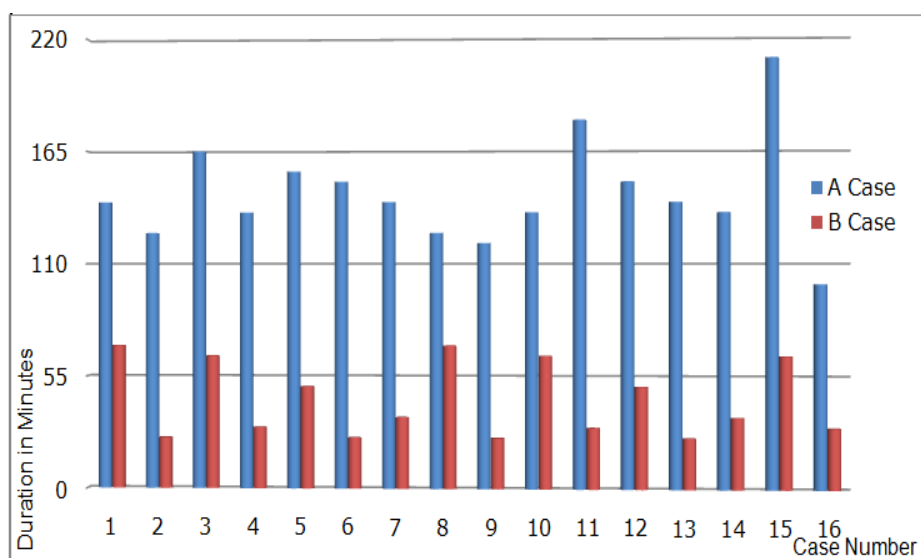


Table 2

4.3 Primary Stability

This study did not find any significant difference between the lateral windows and MICC in concern with the primary stability achieved during the implant placement. In the statistical analysis also the same was reflected, the Sum of value for the Group A is 660 and while that in Group B is 665. The Sum of Average value is 77.64 and 77.05 respectively. "Table 3"

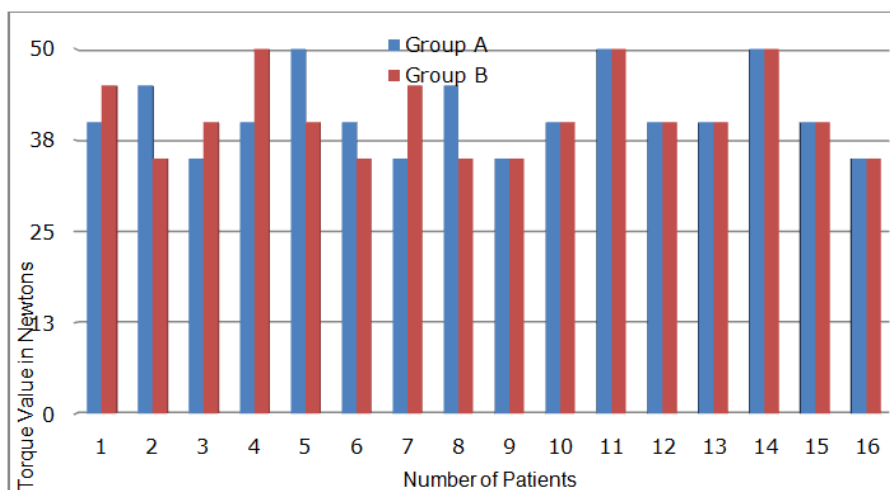


Table 3

4.4 Post-operative sub sinus bone Height

The Lateral window technique yielded more sub sinus bone height than that of MCSC But amount of bone resorbed from sub sinus area after sinus lift achieved and implants placed were in almost same pattern (Table-4.1, 4.2, 4.3)

4.4.1 Immediate bone height

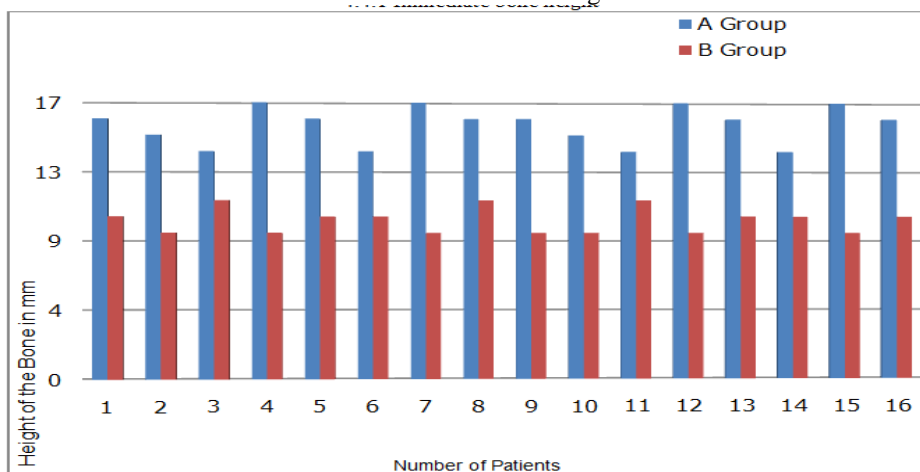


Table 4.1

Bone height after 2 months

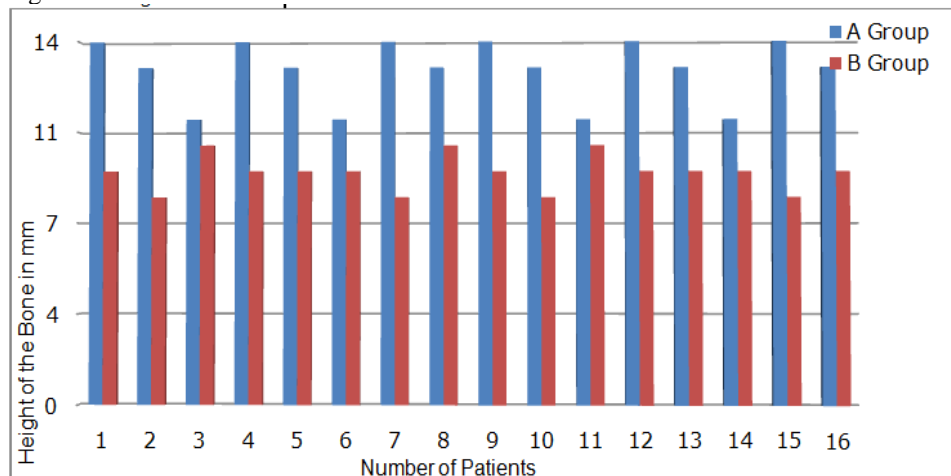


Table 4.2

4.4.3 Bone height after 6 months

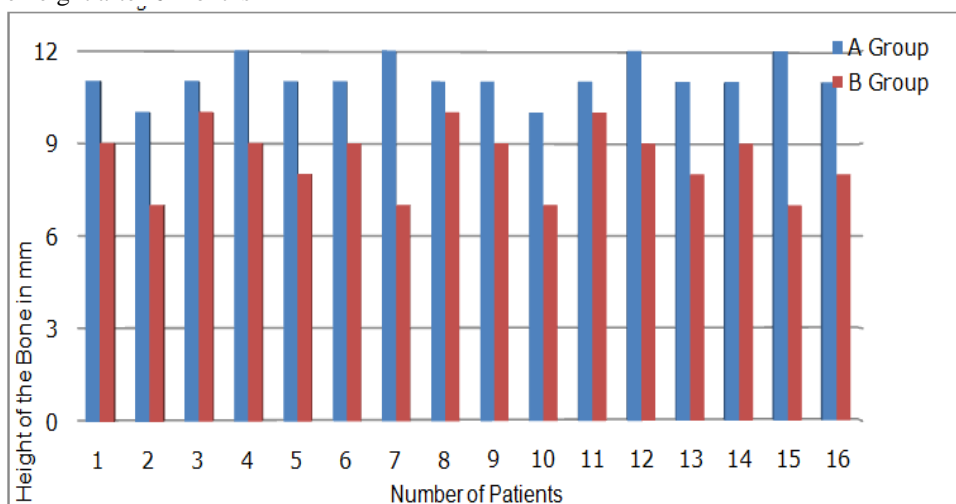


Table 4.3

4.5 Statistical analysis

The 'P' value is highly significant the while compared with 'F-Crit value at the value of less than 0.05.

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Number of Patients	9650	15	643.3333	1.893317	0.11395	2.403447
Patients Group	81003.13	1	81003.13	238.3906	1.29E-10	4.543077
Error	5096.875	15	339.7917			

V. Discussion

Maxillary Sinus Elevation by Lateral Window Approach utilize the bone replacement grafts, implants, and barrier membranes result in the most positive outcomes when considering implant survival. Sinus lifting through a lateral approach is a viable technique when less than 4- 5 mm of residual bone height is present 'When more than 5 mm of residual bone height is available, a crestal approach could be indicated for making the treatment less invasive and morbid' [6] The sinus lift techniques were modified many times from its initial protocol. In 1960 Philip Boyene - published sinus lift with lateral access. In the beginning it was used for achieving an optimal inter ridge distance needed for denture making. But in 1980 Boyen and James [7]published that the same procedure can be done for increasing height of sub sinus bone for dental implant placement. The Summers (1994) introduced a less invasive crestal surgical protocol, was modified many times from 1994 and made the surgical protocol easier, [8]. There were no biomaterials used to initiate the bone formation in the sinus region [9]. The MICC technique provide the comfort to the patients by not raising the flap [10],thus decreasing the morbidity like pain, swelling and sinus inflammation are reduced less than 50%. Thesesurgical duration of the procedure was reduced by about 30%.Therefore the total treatment duration was reduced since no bone graft was used and implant and abutment were inserted immediately with good primary stability. Comparison of the MICC and lateral window technique shows the primary stability of the implant were almost of similar values. However, the lateral window technique showed a greater bone growth than the MICC postoperatively but with a higher resorption ratio.

VI. Conclusion

In this study we found the following advantages for this new technique which seems to be a promising one for doing sinus lift in cases where sub sinus bone height is approximately 5-7 mm. minimally invasive soft tissue punch to gain access, faster wound healing, very minimal blood and bone loss, less time consuming and cost effective and immediate implant placement possible.

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*Dr. Segin Chandran K R Mds (Omf). "Comparison of Minimally Invasive Crestal Condensation with Lateral window Approach." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* 16.7 (2017): 26-31.