



COMPARISON OF CLINICAL MOBILITY AND PERFORATION OF SINUS MEMBRANE BETWEEN TATUM'S OSTEOTOME AND HYDRAULIC SINUS LIFTING PROCEDURE IN DENTAL IMPLANT

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ABSTRACT **Aim & Objectives:** To compare the stability of the implant, Infection, Sinus membrane perforation between Tatum's osteotome sinus lift and hydraulic sinus lift procedure.

Material & Method: We conducted a randomized study on 40 patients which were suffering from maxillary posterior missing teeth, on same perform, tatum's osteotome and hydraulic sinus lifting procedure for implants placement. After perform surgery, evaluate clinical and radiographic comparison was done on the bases of clinical mobility and sinus membrane perforation. After evaluation, hypothetical data found and calculated.

Results: No significant difference of soft tissue inflammation between two groups. Infection was present in both group at end of 1 month but less in Hydraulic group compare to other. Clinical mobility and sinus membrane perforation was found to be absent in both the groups.

Conclusion: Sinus lift with hydraulic pressure has provided a viable restorative solution to edentulous areas especially in a compromised or insufficient alveolar bone volume in areas like posterior maxilla and results are highly predictable with low morbidity; shorten the surgery duration and in turn reducing the cost of treatment comparatively others one.

KEYWORDS : Sinus Lift Procedure, Hydraulic sinus lifting, Tantum Sinus Lifting

INTRODUCTION

It can be challenging to place implants in the posterior maxilla because various anatomical limitations can jeopardize the long-term success of implant rehabilitation¹. In particular, reduced vertical alveolar bone height resulting from pneumatization of the maxillary sinus^{2,3} and resorption of the ridge following tooth extraction⁴ often hamper placement of the implant with a proper length. Implant dentistry has become an excellent treatment and advanced modality since its inception into the modern era of dentistry. It not only allows for a conservative and esthetic alternative to treating partial edentulism, as well as it also provides a stable foundation for treating complete edentulous space. Dental implants are a viable treatment option when there is sufficient quantity and quality of bone. However, when patients present with deficient alveolar ridges there implant placement is so difficult. This problem is especially magnified in the posterior maxilla where ridge resorption and sinus pneumatization, compounded with a poor quality of bone. The technique of sinus floor elevation has expanded prosthetic options by enabling the placement of additional implant support in maxillary segments with atrophic ridges and pneumatized sinuses. Maxillary sinus floor elevation was initially was so difficult approach to surgeon but now this is so easy and adoptable by so many authors. Present study attempts to compare the efficacy of both Tatum's osteotome sinus lift procedure and Hydraulic sinus lift procedure for dental implant placement in terms of initial and final implant stability and the gain in bone height.

Aim & Objectives:

To clinically and radio-graphically evaluate; Stability of the implant, Infection, Sinus membrane perforation.

MATERIALS AND METHOD:

A prospective, randomized, study conducted in the department of oral and maxillofacial surgery, Azamgarh Dental College, Azamgarh U.P. in our study 40 patients included and among patients with at least one or more missing teeth in posterior maxillary arch. 40 Patients were selected from departmental OPD with seeking of replacement of missing tooth/teeth divided into two groups, group 1 Osteotome group (n=20) in which placement of dental implants with Tatum's osteotome sinus lift procedure and another group 2, Hydraulic group (n=20) in which placement of dental implants with Hydraulic sinus lift procedure. Post procedure clinical parametric assessment was done on the bases of Stability of the implant with resonance frequency analysis

by intra-oral peri-apical radiograph and evaluate clinically. After 7th day, 1 month, 3 months evaluate infection and sinus membrane perforation.

RESULTS AND OBSERVATIONS:

The Chi-square and Unpaired t-test was used to compare continuous variables between the groups at follow-ups. The Paired t-test was used for intra group comparisons. The p-value<0.05 was considered significant.

Table 1: Comparison Of Clinical Mobility And Perforation Of Sinus Membrane Between The Groups

Comparison of clinical mobility between the groups				Comparison of Perforation of sinus membrane between the groups							
Clinical mobility	Target group (n=20)		Control group (n=20)		P Value	Clinical mobility	Target group (n=20)		Control group (n=20)		P Value
	No.	%	No.	%			No.	%	No.	%	
Present	0	0.0	0	0.0	NA	Present	0	0.0	0	0.0	NA
Absent	20	100.0	10	100.0		Absent	20	100.0	10	100.0	

¹Chi-square test, NA-Not applicable as all absent in both the groups

Table-1 shows the comparison of clinical mobility and perforation of sinus membrane between the groups. Clinical mobility and perforation was found to be absent in all the patients in both the groups.

Table-2: Comparison Of Sinus Membrane Perforation Between The Groups At Follow-ups

Time period	Target group (n=10)		Control group (n=10)		p-value ¹
	No.	%	No.	%	
1 week					
Present	0	0.0	0	0.0	NA
Absent	20	100.0	20	100.0	
1 month					
Present	0	0.0	0	0.0	NA
Absent	20	100.0	20	100.0	

3 months					
Present	0	0.0	0	0.0	NA
Absent	20	100.0	20	100.0	

¹Chi-square test, NA-Not applicable as all absent in both the groups

Table-2 shows the comparison of sinus membrane perforation between the groups at follow-ups. Sinus membrane perforation was absent among the patients in both the groups at all the follow-ups.

DISCUSSION & CONCLUSION

The clinical mobility was absent in both the groups at every follow up. We could achieve this because of a strict surgical protocol followed i.e; in soft bone and in fresh extraction sockets, implants were placed in underprepared osteotomies. It was possible to achieve implant primary stability even when the available bone height was limited down to 5 mm. Expansion-osteotomies were used instead of drills, to avoid ovalization of the osteotomy site and condense the surrounding bone. **Huang HL et al 2011**,⁵ to maximize initial stability recommended that the recipient bed should be prepared in a slightly smaller size than the implant diameter; at the same time, the use of a fixture with specific microscopical features may be helpful. In our present study, a strict surgical protocol has been followed: in soft bone and in fresh extraction sockets, implants were placed in underprepared osteotomies. In addition, the threads of the implant used in this study were designed to provide high insertion torque, by increasing their dimensions toward the coronal end of the implant. This specific macro-topographical feature may allow for axial and radial bone compression during implant insertion, and it may be particularly useful in areas of poor bone quality, providing the increased primary stability that is necessary for immediate loading.

The load-free healing period of 3 to 6 months is believed necessary to allow the implant to osseointegrate and prevent formation of connective tissue interface between implant and bone. The implant-connective tissue interface at the collar of implant is important to support the epithelium and block apical migration (**Bori, 1989**)⁶, and associated with the implant failure (**El Askary et al., 1999**)⁷. The immediate loading may interrupt the formation of implant-connective tissue interface due to the stress of crown (**Ding et al., 2009**)⁸, which may be the main reason resulting the implant mobility.

The most common complication of sinus augmentation is perforation of the Schneiderian membrane. The importance of sinus membrane integrity is warranted to confine the particulate graft and prevent infection for overall graft and implant success.⁹ There are many options for treating perforation of the Schneiderian membrane. Suggested surgical techniques to overcome these perforations include suturing, using fibrin adhesive, and over lapping with a resorbable collagen membrane¹⁰. Internal sinus lift procedure has the advantage of the protection of the intra-osseous vessels in the maxilla and less intra-operative and postoperative morbidity and seems to be a less invasive method with minimal risk of sinus membrane perforation.

In our study Sinus membrane perforation was absent in both group which could be attributed to the careful examination performed to ensure membrane integrity and standardized clinic protocol. **J.Philip. et al in 2013**¹¹, found perforation rates for indirect sinus floor augmentations usually vary between 0% and 44%. In reality, microscopic tears are, in many instances, impossible to diagnose and therefore their incidence frequency is often underestimated. Some authors explicitly state that small perforations might not have been detected, which means that the perforation rates reported in their studies would be too low. **leon chen & Jennifer cha in 2005**¹¹, Using special sinus burs and condensers in the hydraulic condensing technique can improve the internal crestal (osteotome) approach because the instruments provide a greater margin of tactile control and a more straightforward method for placing implants in deficient maxillary ridges. Hydraulic sinus condensing, on the other hand, relies on the gentler tapping of a rotating sinus bur to create a tiny hole through which hydraulic pressure can be introduced. This allows us not only to avoid lacerations, but to place implants even when less than 1 mm of cortical bone is present.

No statistical significant difference was found, the overall patient satisfaction was high in both study groups. In our knowledge there has been a no direct comparison between Tatum's ostetotome and hydraulic sinus lift procedure for dental implant placement, due to limited number of sinus lift procedure in a limited period of study; it is

worthwhile to mention that sinus lift with hydraulic pressure has provided a viable restorative solution to edentulous areas especially in a compromised or insufficient alveolar bone volume in areas like posterior maxilla. Results are highly predictable lowered morbidity shorten the surgery duration and in turn reducing the cost of treatment. Further studies with larger number of sample size with longer follow could be done to prove its efficacy.

REFERENCES:

1. Jaffin RA, Berman CL. The excessive loss of Branemark fixtures in type IV bone: a 5-year analysis. *J Periodontol.* 1991;62:2-4.
2. Chanavaz M. Anatomy and histophysiology of the periosteum: quantification of the periosteal blood supply to the adjacent bone with 85Sr and gamma spectrometry. *J Oral Implantol.* 1995;21:214-219
3. Sharan A, Madjar D. Maxillary sinus pneumatization following extractions: a radiographic study. *Int J Oral Maxillofac Implants.* 2008;23:48-56
4. Pietrokovski J, Massler M. Alveolar ridge resorption following tooth extraction. *J Prosthet Dent.* 1967;17:21-27.
5. **Huang HL, Chang Y, Lin DJ, Yu-Fen Li, Hsu J.** Initial stability and bone strain of the immediately loaded dental implant: an in vitro model study. *Clin. Oral Impl. Res.* 2011;22: 691-698
6. **Bori JE.** Dental implant and method. Google Patents, 1989
7. **El Askary AS, Meffert RM, Griffin T.** Why do dental implants fail? Part I. *Implant Dent* 1999; 8: 173e185.
8. **Ding X, Zhu XH, Liao SH, Zhang XH, Chen H.** Implant bone interface stress distribution in immediately loaded implants of different diameters: a three-dimensional finite element analysis. *J Prosthodont* 2009;18: 393e402.
9. **Sakkas A, Konstantinidis I, Winter K, Schramm A, Wilde F.** Effect of Schneiderian membrane perforation on sinus lift graft out come using two different donor sites :a retrospective study of 105 maxillary sinus elevation procedures. *GMS Interdisciplinary Plastic and Reconstructive Surgery* :DGPW2016, Vol.5.
10. **Proussaefs P, Lozada J, Kim J, Rohrer MD.** Repair of the perforated sinus membrane with aresorbablecollagen membrane: a human study. *Int Joral Maxillofac Implants.* 2004 May-Jun;19(3):413-20.
11. **Jesch P, Bruckmoser E, Bayerle A, Eder K, Eder B M, and Watzinger F.** A pilot-study of a minimally invasive technique to elevate the sinusfloor membrane and place graft for augmentation using highhydraulic pressure: 18-month follow-up of 20 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2013;116:293-300.