OSSEODENSIFICATION- INNOVATION IN IMPLANT DENTISTRY A CASE REPORT

A Case Report

Dr. Babita Chandwani*, Dr. Dipali Sampat**, Dr. Dhwanit Thakore***, Dr. Tejal Sheth****

ABSTRACT

Primary stability plays a pivotal role in osseointegration. The quality of bone and surgical procedure are the crucial factors which affect primary stability. Adequate density and bone to implant contact area are essential for achieving biomechanically stable implants. Osseodensification (OD), a novel technique using specially designed burs was developed by Huwais in 2013 for increasing the density of bone during simulateous osteotomy preparation. This technique allows bone preservation and condensation through compaction autografting thus increasing the bone density and implant stability for long term success.

Keywords: Osseodensification, primary stability, bone density

INTRODUCTION:

Dental implants have transformed the field of oral rehabilitation with a success rate of over 90% over 10 years, they can now be used for predicatable replacement of missing teeth in oral cavity[1]. Osseintegration is defined as the "direct structural and functional connection between living bone and the surface of a load bearing implant"[2]. Primary stability is one of the most important factor for achieving osseointegration [3].Many techniques have been developed to increase the primary stability of implants in conditions with reduced bone density. Salah Huwais in 2013 introduced a bone preserving technique to increase the density of bone at the osteotomy site by exapansion of bone during implant site preparation. It is a bone nonextraction technique that helps densify the bone as the osteotomy is prepared rather than excavation of bone as in during osteotomy by standardized drills, thereby increasing bone density and improving the biomechanical stability of implants. The present case report depicts the advantages of osseodensification procedure in a patient with low bone density and reduced bone width.

CASE REPORT:

A 40 year old male patient with a chief complaint of missing tooth in the left posterior tooth region visited the Department of Periodontics and Oral Implantology at Ahmedabad Dental College and Hospital.

On intra-oral examination, the patient had a missing left mandibular first molar. The patient's general periodontal condition was assessed and the patient was presented with various treatment options and implant placement was considered after discussing the advantages and disadvantages of each option.

A thorough oral hygiene prophylaxis was done and a CBCT was advised to evaluate the density and dimensions of bone at the site for implant placement. On, Radiographic examination the width of the bone was 5mm which was insufficient to place a standardized implant of diameter 3.75 mm. Osseodensification procedure was planned to increase the dimension of the osteotomy site with simultaneous implant placement.

After proper treatment planning, endosseous implant (Genesis) measuring 3.75x11.5 mm in dimension was selected. Following administration of local anaesthesia (2% lidocaine with 1: 80,000 anaesthetic agent) in the area of the missing first molar, a full thickness flap was elevated. Bone width was measured and was found to be 4.5 mm. The osteotomy was performed following the densah protocol where a pilot drill was done followed by sequential drilling with densifying burs of diameter 2.3mm, 2.5mm and 3mm. A parallel, threaded rough surface implant was then placed with a cover screw. The primary stability was found

*PG Student, **PG Student, *** Sr. Leacturer, ****Professor

DEPARTMENT OF PERIODONTICS AND IMPLANTOLOGY
AHMEDABAD DENTAL COLLEGE AND HOSPITAL, TA. KALOL, DIST: GANDHINAGAR, GUJARAT, INDIA.

ADDRESS FOR AUTHOR CORROSPONDENCE : DR. BABITA CHANDWANI, TEL: +91 90996 47483

to be about 35N and the flap was closed with the help of 4.0 polyamide sutures. Appropriate antibiotic (amoxycillin 500mg, 3 times daily for 5 days) and analgesic (ibuprofen 800 mg, twice daily). The patient was recalled after one week for suture removal and no untoward sign or symptom was noted.

Three months after implant placement the implant was exposed and healing abutment was placed. A radiograph was taken to confirm the seating of the healing abutment. Patient was recalled after 15 days for impression making. The healing abutment was removed and an impression coping was placed followed by open tray impression for determining the implant position. After the impression was taken the healing abutment was replaced and the shade was selected. The impression was sent to the laboratory for preparation of crown.

Patient was recalled after 10 days and the healing cap was removed and the abutment was placed followed by a radiograph to evaluate its seating on the implant. The abutment was torqued to 35N with a torque wrench and the crown was then tried- in. The occlusion and proximal contacts was verified and the crown was cemented using a resin modified glass-ionomer cement. Oral hygiene instructions were given and the patient was recalled for regular follow-up.

Pre-operative examination

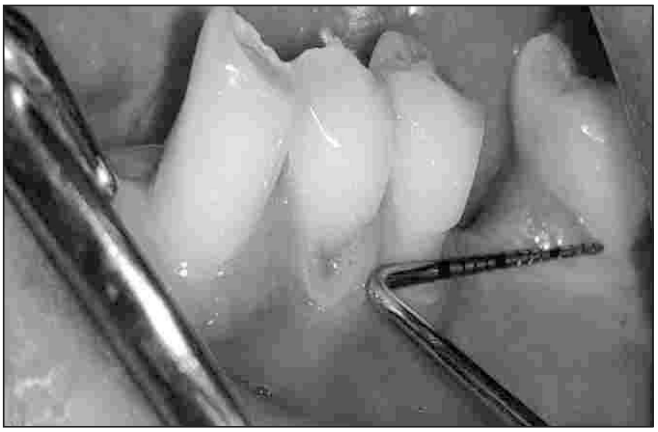

Figure 1 Mesio-Distal width (11mm)

Figure 2: Bucco-lingual width (6mm)

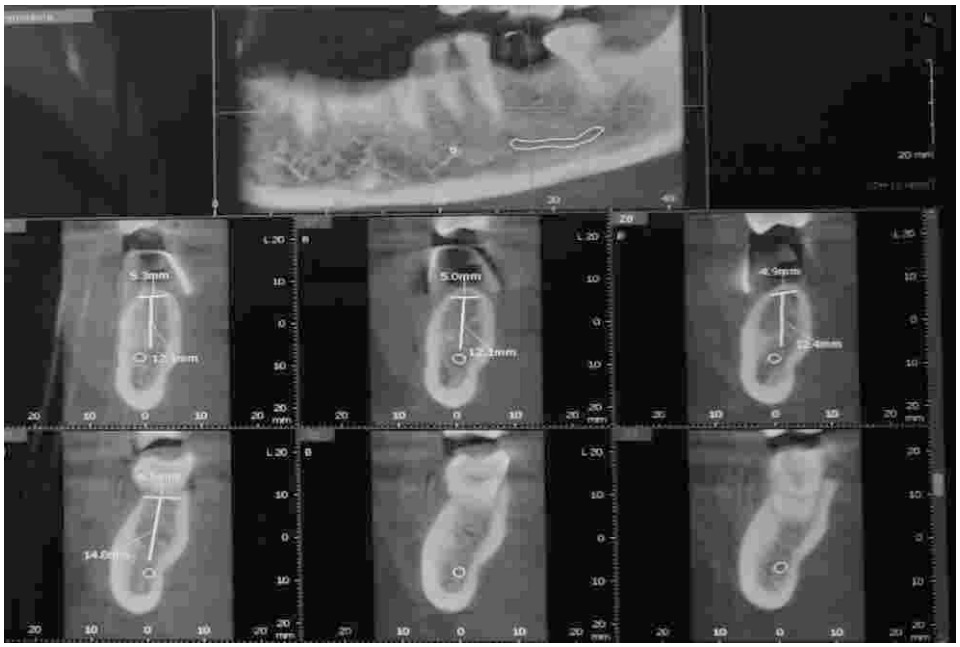

Figure 3: Pre-operative CBCT

Surgical procedure

Figure 4: Incision

Figure 5: Flap Reflection

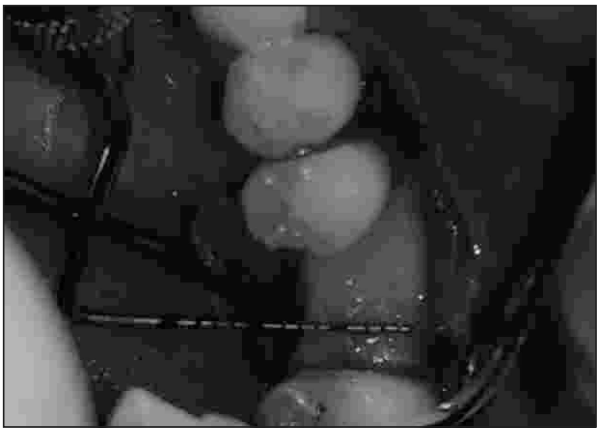

Figure 6: Intra – operative assessment of ridge width

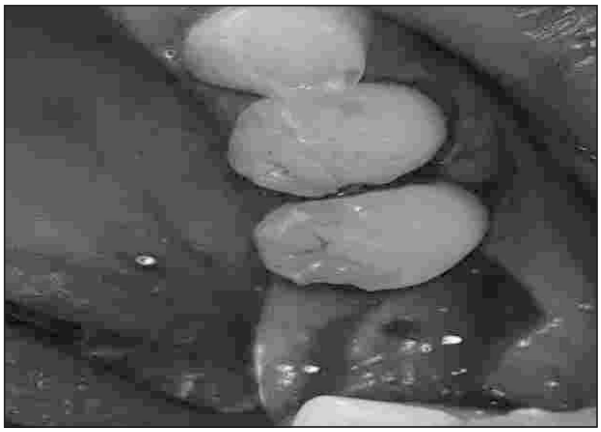

Figure 7: Pilot drill

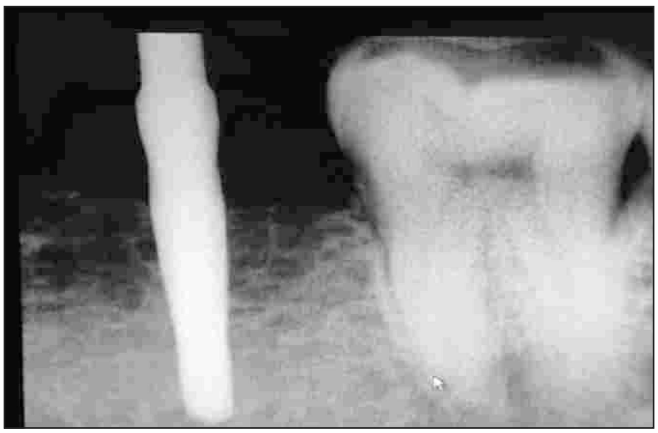

Figure 8: Intraoperative RVG

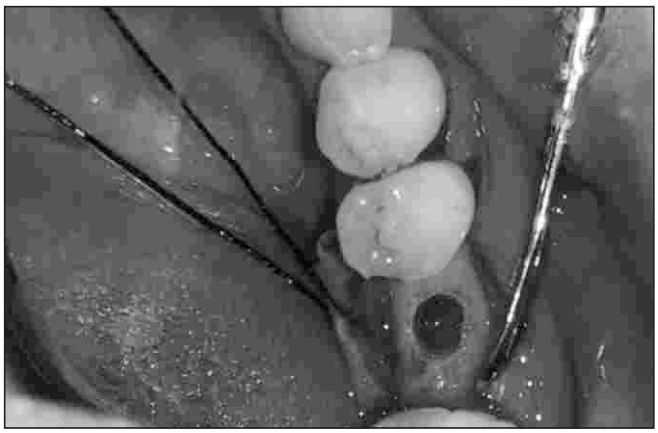

Figure 9: Osteotomy Prepared

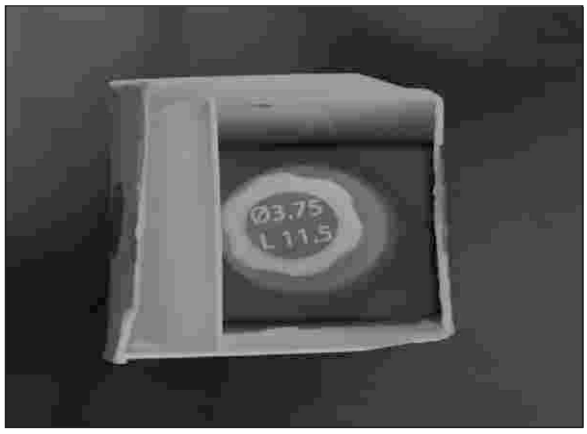

Figure 10_1 and 10_2: Implant 3.75x11.5mm

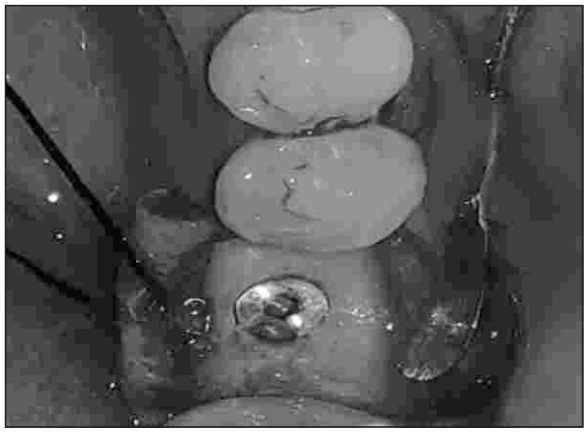

Figure 11: Implant in place

Figure 12: Sutures in place

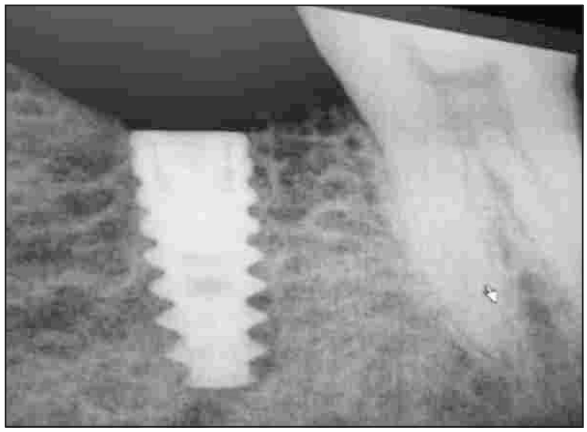

Figure 13: Post Operative RVG

Figure 14: Follow up after 1 week

Follow up after 3 months

Figure 15: Healing abutment in place

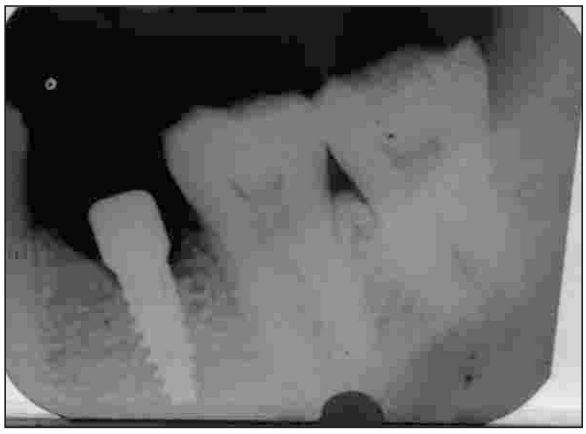

Figure 16: IOPA after healing abutment placement

DISCUSSION:

Osseointegration leads to bone formation on the implant surface and contributes to the secondary stability. In conditions of low bone density, there is decrease in the bone to implant contact area affecting the primary and secondary stability [4]. The rationale of osseodensification is that the densifying burs at the point of contact creates a densified layers along the base and walls of osteotomy, through autografting and compaction of the adjacent bone while plastically expanding the ridge at the same time [5].

The osteotomy prepared by osseodensification is smaller than that of the conventional osteotomies and the BIC was also found to be increased three times compared with standardized drilling protocols by increasing the bone density around the osteotomy site. So by osseodensification wider diameter of implants can be placed in narrow ridges without leading to bone fenestration and dehiscence [7].

Trisi et al found an increase in insertion torque with reduction in micromotion by densification techniques in comparision with that of standard drilling [8]. High insertion torque is directly related to implant density and also improves the clinical outcome for immediate or early loading [9].

Berardini et al [10] and Li et al.[11] reported no significant difference in resorption of the crestal bone and failure rate of implants inserted at either high or low insertion torques. They demonstrated that the OD drills increased the amount of BV and the amount of BIC in poor density bone which helps in increasing osseointegration.

CONCLUSION:

The osseodensification technique is a unique, efficient process which reduces the amount of bone excavation which is unavoidable using conventional drills. It facilitates ridge expansion while maintaing the ridge integrity, thereby allowing for total implant placement in autogenous bone with adequate primary stability and a shorter waiting period for restoration. This concept has changed the paradigm of implant dentistry to a more preservative option over conventional protocols.

Implant Dent 2016;25:532-40.

References:

1. T. Albrektsson, T. Jansson, U. Lekhholm. Osseointegrated dental implants. Dent Clin N Am, 30 (1986), pp. 151-174.
2. P.I Branemark Osseointegration and its experimental background. J Prosthet Dent, 50 (1983), pp. 399-410.
3. T. Albrektsson, P.I. Branemark, H.A. Hansson, J. Lindstrom. Osseointegrated titanium implants: requirements for ensuring a long- lasting, direct bone- to – implant anchorage in man. Acta Orthop Scand, 52(2) (1981), pp. 155-170.
4. Pai, Umesh y. and Rodrigues, Shobha J and Talreja, Karishma S and Mundathaje, Mahesh

(2018) Osseodensification – A Novel approach in Implant Dentistry. The Journal of Prosthodontic Society, 18(3). ISSN 0972-4052.

5. Gayathri S. "Osseodensification Technique – A Novel Bone Preservation Method to Enhance Implant Stability". Acta Scientific Dental Sciences 2.12(2018): 17-22
6. Huwais S.., et al. "A Novel Osseous Densification Approach in Implant Osteotomy Preparation to increase biomechanical primary stability, bone mineral density, abd bone to implant contact". The International of Oral and Maxillofacial Implants. (2016): 1-10
7. Trisi P., et al. "New Osseodensification Implant site preparation Method to increase bone density in low density bone bone: In- vivo evaluation in sheep". Implant Dentistry 25.1 (2016): 24-31.
8. Trisi P., et al. "Implant micromotion is related to peak insertion torque and bone density". Clinical Oral Implants Research 20 (2009);467-471.
9. Szmukler-Moncler S., et al "Considerations Preliminary to the application of early and immediate loading protocols in Dental Implantology". Clinical Oral Implants Research 11(2000);12-25.
10. Berardini M, Trisi P, Sinjari B, Rutjes AW, Caputi S. The effects of high insertion torque versus low insertion torques on marginal bone resorption and implant failure rates: A systematic Review with meta-analyses.
11. Li. H. Liang Y, Zheng Q. Meta-analysis of Correlations between marginal bone resorption and high insertion torque of dental implants. Int J Oral Maxxillofac Implants 2015;30:767-72.