

Comparitive Study of Immediate Implant Placment Using Autografts and Nanoparticles

VIJAY EBENEZER¹, K.BALAKRISHNAN², PRADEEP CHRISTOPHER³ and PRABHU⁴

Department of Oral and Maxillofacial Surgery , Sree Balaji Dental College and Hospital, Bharath University, Pallikaranai, Chennai - 600100, India.

*Corresponding author E-mail: drvijayomfs@yahoo.com

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This comparative study is on immediate implant placement using autografts and hydroxyapatite nano particles.

Key words: Implants, Autogenous Bone Grafts , Hydroxyapatite Nano Particles.

INTRODUCTION

Dental implants is the replacement of missing teeth long lasting treatment modality providing functional and esthetic integrity ,making dental implants treatment more advanced and ameliorated¹. Grafts are widely used in immediate dental implants for stability and deficiency of bone. grafts may be autogenous bone grafts or hydroxyapatite nano particles bone grafts. Hydroxyapatite (HA) nano particles has been widely used as a biocompatible bone graft, mainly for contact with bone tissue, has resemblance to mineral bone. and presents a carbonated and partially substituted apatite, based on nanocrystal aggregates, and associated with collagen, building up 3-D structures present in various bone tissue conformations like trabecullar or cancellous bone. Autogenous bone remains the "Gold Standard" for grafting. Although allogenic bone, xenogeneic bone, bone substitutes, and alloplasts have shown some promise over the years, they do not transplant any osteocompetent cells²

The nanomechanical properties of the surrounding bone were evaluated by nanoindentation. While both implants revealed

similar bone-to-implant contact, the nanoindentation demonstrated that the tissue quality was significantly enhanced around the HA-coated implants, validating the postulated hypothesis.

DISCUSSION

In immediate implants after extraction of the teeth preserving the buccal bone the implant will act like a pole to hold the surrounding bones for the primary stability and give its functional requirements necessary to prevent it from undergoing atrophy , but in times it is impossible to regain the primary stability of immediate implants because of bone deficiency due to many factors like infection , trauma from extraction, size discrepancy between the tooth that is extracted . In these cases it is prudent to place a "ridge preservation graft." The graft is designed to fill the space left by the extracted tooth and hold the volume of this space while natural bone has the opportunity to proliferate and fill the space with high quality live bone. Depending on the size of the tooth that was extracted and the implant placed . the grafts to be placed can either be autogenous bone graft or hydroxyapatite nano particles .

The autogenous graft may be harvested from many intra-oral sites. The maxillary tuberosity, anterior nasal spine, and zygomatic buttress have been reported for the upper jaw^(3,4,5). The mandibular symphysis, ascending ramus, coronoid process, and horizontal ramus are useful sites from the lower jaw⁽⁶⁾. Prior to bone graft harvesting and augmentation of the defect, one must have a full appreciation of the defect. A preoperative 3-D CT scan is often imperative and some would argue the standard of care. This enables the clinician to have a full map of the missing bone volume, the vertical and horizontal nature of the defect. The scan can also be used to evaluate the cortical thickness from the potential donor sites. Study models and a diagnostic wax-up with the final crown or prosthesis morphology are important. This permits the surgeon to appreciate how much bone is to be grafted. A thorough past medical history should be obtained. Poorly controlled Insulin Dependent Diabetes Mellitus, cigarette smoking, and history of IV Bisphosphonate therapy are a few examples of contraindications⁷. These grafts are used after explaining the procedure in detail to the patient and obtaining the consent. These grafts help in

obtain the thickness of the bone and stability to the implants.

Hydroxyapatite nano particles are readily available material that is used in immediate implants for the bone deficiency, these are synthetic bone particles as it is non-toxic but it would not be targeted by the immune system as foreign body. The local tissue inflammation and eventual scarring caused by an immunological response would not be an issue if hydroxyapatite were used. These particles are economically acceptable and are used widely. The particles are three times more stronger than cortical bone.

CONCLUSION

Our short term study revealed that hydroxyapatite nano particles are relatively better than autogenous bone grafts as these particles are easy to use and readily available, but autogenous bone grafts need patient consent and some do not accept harvesting bone from the donor site, following this there are more chances of secondary infection following the grafts and non healing of donor site.

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