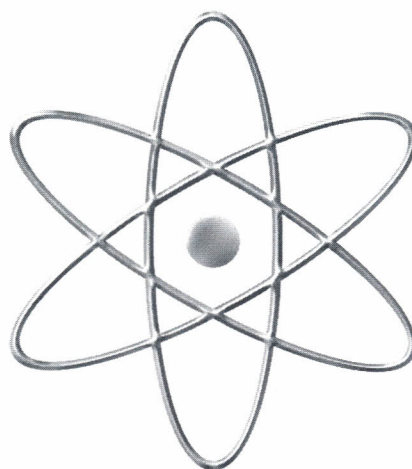


# **The Journal of American Science**



ISSN 1545-1003

Volume 8 – Number 9 (Cumulated No. 54), September 2012, ISSN 1545-1003

Marsland Press, New York, The United States

**Piezoelectric Osteotomy and Ridge Expansion Technique In Edentulous Mandibular For Dental Implants**

Abdel-Dayem H, Hassan Sh. R and Hala M. Abdelalim

Department of Oral and maxillofacial Surgery, Faculty of Dentistry, King Abdulaziz University, and Alexandria University, Egypt  
[ragab3000@hotmail.com](mailto:ragab3000@hotmail.com)

**Abstract: Introduction:** Piezosurgery a new cutting technique was developed and tried by Vercelotti in 1999, in osteotomies of resorbed narrow ridges in order to overcome the problems associated with traditional drilling techniques. **Aim of the work:** This work aims at evaluating the use of piezoelectric surgery osteotomy and bone expansion techniques for preparing the implant site in mandibular atrophic ridges. **Materials and Methods:** six male patients with narrow knife edge mandibular ridge class 2 Kent's classification were selected, based on specific inclusion and exclusion criteria. Insertion of the implants fixture in a surgically created site using Piezotome inserts, was followed by sequential bone expansion increasing in size. The assembled O-ring attachments housing was seated on the ball insert abutment after 3 months. **Results:** The clinical phase went uneventful, with no untoward complications. Statistical analysis at different follow up periods showed a significant increase in bone density, and significant decrease in marginal height after 12 months than the base line. **Conclusion:** piezoelectric ridge osteotomy technique is a promising osteotomy procedure successfully used with ridge expansion in narrow mandibular ridges without the risk of fracture, ensuring implant success since it takes place in protected and well vascularized environment. 120120.

[Abdel-Dayem H, Hassan Sh. R , Hala M. Abdelalim. **Piezoelectric Osteotomy And Ridge Expansion Technique In Edentulous Mandibular For Dental Implants.** *J Am Sci* 2012;8(9):120-247]. (ISSN: 1545-1003). <http://www.jofamericanscience.org>. 17

**Keywords:** Piezosurgery; osteotomy; surgery; mandibular ridges; environment

**1. Introduction**

The mandibular ridge is characterized by high resorption rate following teeth extraction in the early period, followed by a remarkably slowing rate within the first year, ending by a slower gradual continuous and irreversible decrease in resorption<sup>(1,2,3)</sup>. This may result in narrow ridges with associated problem of insufficient bone to accept future prosthesis<sup>(4)</sup>.

Several classifications were reported in the literature<sup>(5-10)</sup> as regards ridge resorption in order to describe the anatomical variations in different anatomic levels and estimation of the bone height and width and amount of basal bone to be used by the clinician for establishing a relational plan of treatment.

Problems associated with management of edentulous resorbed ridges with insufficient bone thickness presents a challenge for prosthetic replacement. Various surgical approaches were reported including: soft tissue vestibuloplasty; ridge augmentation with alloplastic or biologic materials; and implantation<sup>(11)</sup>

Placement of dental implants in narrow ridges using ridge split osteotomy may result in fracture during osteotomy<sup>(12)</sup>.

Ridge expansion techniques were described by Dr. Summers using osteotomes<sup>(13)</sup>, this was followed by other expansive techniques (split crest, edentulous ridge expansion [ERE], ridge expansion

osteotomy [REO]) which were used in Class IV premaxilla and posterior mandibular levels they uniformly claimed that the osteotome technique whenever compared with traditional drilling techniques using burs carries several advantages specially in atrophic bone<sup>(13-17)</sup>.

Trials on the development of ultrasonic devices throughout the literature started as early as 1934 by Hayes<sup>(18)</sup>. The true turning point occurred when in 1997 Vercelotti<sup>(19)</sup>, used some ultrasonic instruments for ablation to remove an ankylotic root and immediately realized the limits in cutting bone not more than 1mm thick with marginal necrosis due to overheating.

Subsequently, Vercelotti<sup>(19)</sup> realized that the limited power enabled osteotomy only with thin sharp inserts, hence he underwent a scientific technological research project with a team which purpose was to develop an ideal ultrasonic technology for bone cutting and ended up with the development of an initial prototype called "Piezosurgery".

Unfortunately, the higher power over ablaters only slightly improved cutting performance and caused excessive overheating of the bone. Pursuing researches with a team of scientists extensive research ended up by the invention of new surgical techniques with new disciplines in 1999 "Piezoelectric Bone Surgery" the greek word piezo means pressure, it is the result of