

## INCIDENCE OF RIDGE SPLIT TECHNIQUE IN IMPLANT PLACEMENT.

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### ABSTRACT

**AIM:** To investigate the incidence of ridge split technique in implant placement.

**INTRODUCTION:** Dr. Hilt Tatum 1970s introduced a method of ridge splitting or bone spreading, which over a period have been used in implant dentistry for esthetic rehabilitation and implant site preparation in cases of deficient alveolar ridges to satisfy the basic ideal need of hard tissue augmentation for functional and esthetic outcome of implant.

**MATERIALS AND METHOD:** This is a single centered retrospective study. The data was collected from the dental hospital management system. The patient details were analysed between June 2015 to July 2019 of sample size 34 who fulfilled the inclusion and the exclusion criteria were included in the study. The data collected was tabulated under the following parameters: Age, Gender, and site of implant placement. The independent variables include age and gender, and the dependent variables include site of implant placement. The data was statistically analysed using SPSS software version 23. Chi Square test and Pearson correlation was performed and p value less than 0.05 was considered statistically significant.

**RESULTS AND DISCUSSION:** In the present study, In the year 2016, a higher percentage (40%) of implant is placed by ridge split technique and in the year 2017, higher percentage (24.62%) of implant is placed in anterior site.

**CONCLUSION:** Within the study's parameters, It can be concluded that the highest percentage of implant placement is done by ridge split technique in the year 2016 predominantly in anterior sites. Therefore there is gradual decline in the ridge split technique for implant placement.

**KEYWORDS:** Implantology, Implant, ridge split technique, Novel approach .

### INTRODUCTION:

Dental implants have become an integral part of various treatment modalities for replacement of missing teeth. Availability of adequate amount of bone in terms of vertical as well as horizontal dimension is first requirement for a successful implant therapy, but it becomes difficult to place the implant when adequate amount of bone is not available. Various techniques have been described in the literature to increase the bone volume which includes the autogenous or artificial bone grafting procedures, distraction osteogenesis, inferior alveolar nerve repositioning, sinus lift with bone grafts and guided bone regeneration. Ridge splitting technique can also be utilized to increase the width of bone by splitting and expansion of the existing residual ridge. (1)(2)

Dr. Hilt Tatum 1970s introduced a method of ridge splitting or bone spreading, which over a period have been used in implant dentistry for esthetic rehabilitation and implant site preparation in cases of deficient alveolar ridges to satisfy the basic ideal need of hard tissue augmentation for functional and esthetic outcome of implant.

A major limitation for successful implant placement remains the problem of inadequate alveolar ridge width. Thus, to satisfy the ideal goals of implant dentistry, the hard and soft tissues need to present in ideal volume and quality (3). In general in the esthetic anterior regions, the labial cortical plates are thinner than the lingual plate and are the first to be removed or resorbed after tooth extraction or trauma. The labial alveolar bone often undergoes rapid reconstruction after natural tooth loss with approximately 25% decrease in volume during 1st year, followed by 40–60% decrease in width in the following next 3 years leading to the labial cortex of bone more medial than its original position (4). Thus, this sequel of resorption after tooth loss jeopardizes the functional and esthetic outcome of treatment. Therefore, augmentation of deficient alveolar ridges is an important aspect of dental implant therapy with the end goal to provide functional restoration that is in harmony with the adjacent natural dentition.

The ridge deficiencies can be horizontal, vertical or combination of both as described by Siberts as classes A, B and C, respectively. Ridge augmentation in deficient alveolar ridge areas are achieved by block graft (autogenous or allograft), guided bone regeneration, distraction osteogenesis and alveolar ridge splitting or expansion with predictable outcomes either alone or in combination (5). The technique of ridge split or ridge expansion was introduced in early 1970s for

horizontal ridge augmentation while maintaining the periosteal attachment by carefully expanding the cortical plates. This technique had an added advantage of augmentation and implant placement in a single sitting. Ridge splitting techniques are useful for managing narrow edentulous ridge (>3.5 mm) for implant placement with predictable outcome in maxilla than in mandible.(6),(7) A proper case selection and evaluation is important to achieving a successful surgical and prosthetic outcome. In this case report, we describe a case of horizontal ridge augmentation using ridge split and simultaneous implant placement in esthetic maxillary premolar zone. Our team has extensive knowledge and research experience that has translate into high quality publications(8),(9),(10),(11),(12-21)(22),(23-25).(26,27).The aim of the study is to investigate the incidence of ridge split technique in implant placement .

**MATERIALS AND METHODS:**

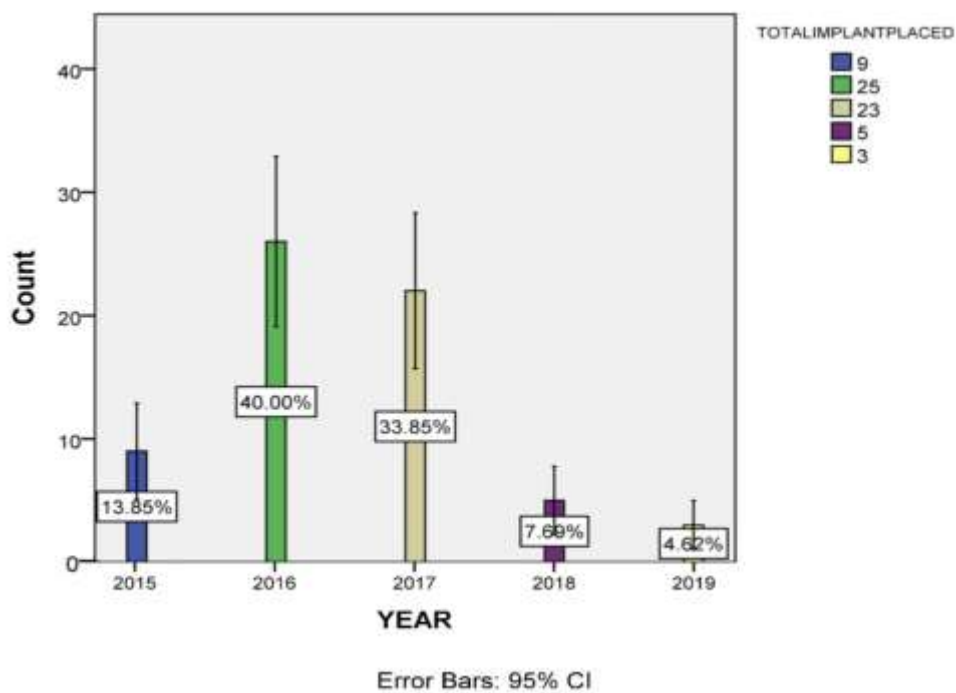
This single centered retrospective study was conducted in a private dental college,Chennai,India. In this study, the sampling method used is the Random sampling method. Data collection was done by reviewing the patient records and analysing the data of patient's from June 2015 to july 2019. A sample size of 34 who fulfilled the inclusion and the exclusion criteria were included in the study.Ethical clearance for the study was obtained from the Institutional review board.All the case sheets were reviewed and cross verified by two examiners.The data collected was tabulated under the following parameters: Age, Gender, site of implant placement.The independent variables include age and gender, and the dependent variables include site of implant placement. The data was statistically analysed using spss IBM version 23.0. The correlation analysis used was the Chi square test. The person's Chi square value and p value was determined.Significant p value was set at <0.05.

**RESULTS:**

**Table -1: Total number of implants placed each year by ridge split technique and its site.**

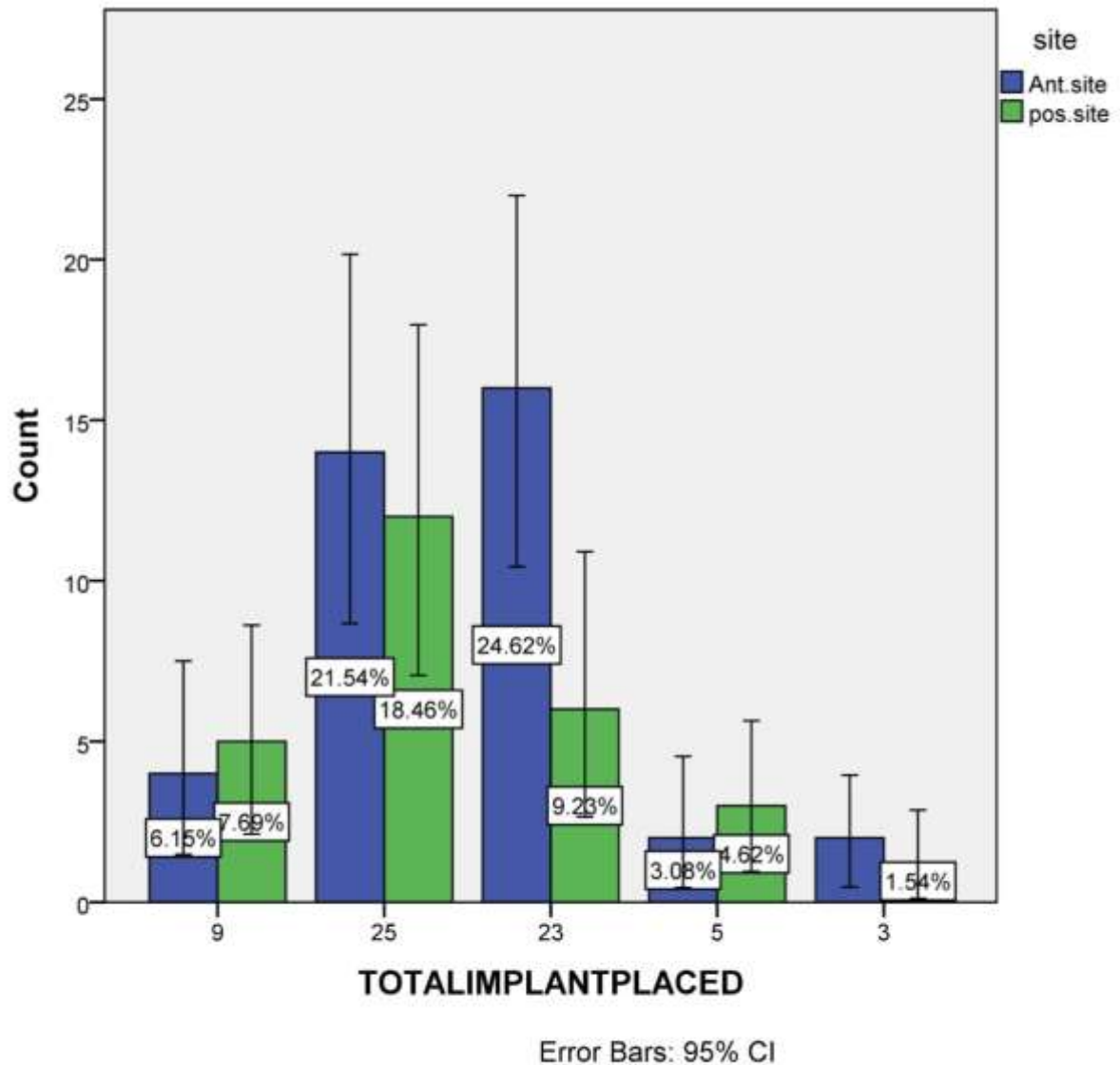
YEAR	TOTAL IMPLANT PLACED	ANTERIOR SITE	POSTERIOR SITE
2015	9	4	5
2016	25	13	12
2017	23	16	7
2018	5	3	2
2019	3	3	0

**Figure-1:**



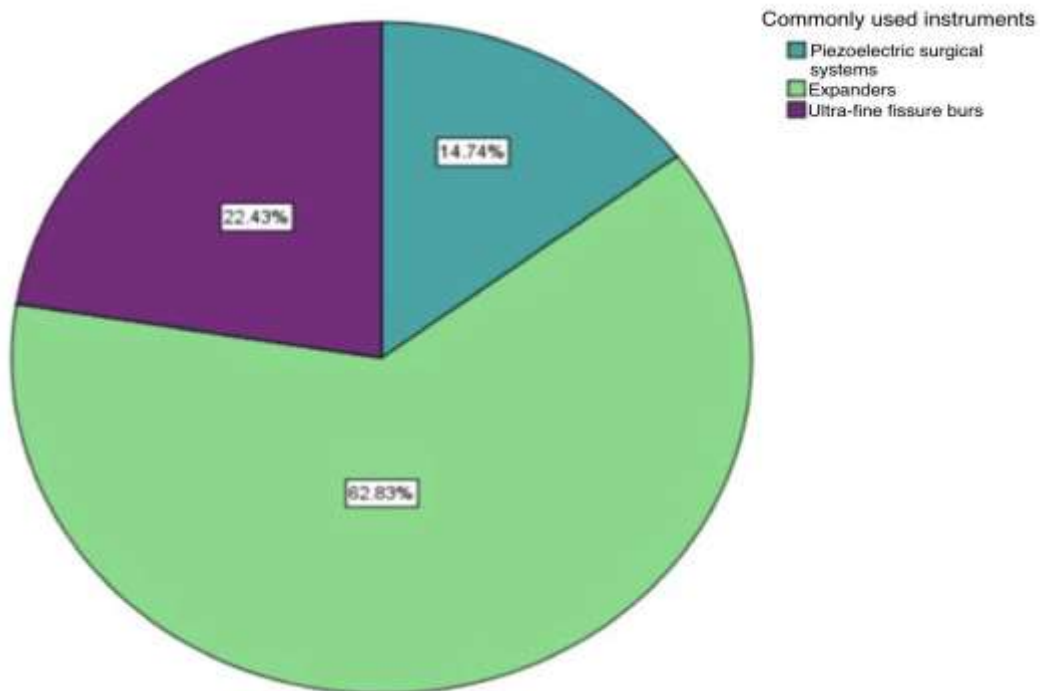
This Bar graph represents the association between the total number of implants placed by ridge split technique in each year from 2015 to 2019 respectively. X-axis represents the year and the Y-axis represents count. Pearson's chi square value is 2.456, df:2, p-value:0.164(>0.05), hence statistically not significant; although in the year 2016, higher percentage (40%) of implant is placed .

Figure-2:



This Bar graph represents the association between total number of implants placed by ridge split technique in each year from 2015 to 2019 respectively and its site. X-axis represents total number of implant placed in each year respectively and the Y-axis represents count. blue colour represents implant placed in anterior and green colour represents implant site in posterior, Pearson's chi square value is 3.585, df:4, p-value:0.465(>0.05), hence statistically not significant; although in the year 2017, higher percentage (24.62%) of implant is placed in anterior site .

Figure-3:



This pie chart represents Percentile distribution of Commonly performed instruments for ridge split technique, 62.83% (green) represents Expanders while 22.43% (purple) represents ultra sound fissure burs, 14.74% (dark green) represents piezoelectric surgical systems.

#### DISCUSSION:

According to the study, within the study limitations, the total number of patients is 34. Table-1 represents the total number of implants done in patients by ridge split technique in each year from 2015 to 2019 and its respective site.

According to the study, In the year 2016, a higher percentage (40%) of implants were placed by ridge split technique and further observed gradual decline (figure-1), in contrast the study by Alessandro Moro et al reported that all the expanded areas were successful in providing an adequate width and height to insert implants according to the prosthetic plan and the proposed tips allowed obtaining the most from the ridge split technique. These tips have made alveolar ridge split technique simple, safe, and effective for implant placement (28).

According to the study, In 2017, a higher percentage (24.62%) of implants were placed in the anterior site (figure-2). In contrast study by Vikas Gowd F reported that The anterior esthetic zone is always a challenge as the ridge resorption could be magnified. The high esthetic requirements coupled with resorbed alveolar ridge remain a serious challenge for the successful placement of endosseous implants (29).

According to the study, predominantly used instrument for ridge split technique is expanders (62.83%) (figure-3). Ridge splitting is a technique-sensitive procedure that may be performed with many different instruments, ranging from chisel and mallet to scalpel blades, expanders, spatula, osteotomes, piezoelectric surgical systems, lasers, and ultra-fine fissure burs (30). The advantageous devices used for ridge expansion include motorized ridge expanders used for ultrasonic bone surgery. They are non-cutting drills that can facilitate width expansion of atrophic ridges without using a surgical mallet; they can also be used as condensers of trabecular bone (31). For all cases, where motorized ridge expanders were used, 100% success rate was noted.

The ridge-splitting technique allows placement of implants in a narrow crestal ridge in a single procedure (32). The split crest technique is a suitable procedure particularly for the maxilla as the maxillary cortical plates are relatively thin and the cancellous bone is sparse. Thus, the separation between the cortical plates can be achieved with relative ease (33). Conversely, the mandible demonstrates thicker cortical plates and denser cancellous bone and separation between the cortical plates may prove to be more difficult (34). Complete fusion between the buccal and lingual cortical plates, which can exist particularly in a case of a very thin and resorbed alveolar ridge, is a contraindication for this procedure. The

separation between the bony plates is a delicate task. The maintenance of the integrity of the small bony bridge in the apical part of the osteotomy is extremely important as it stabilizes the buccal plate in its new position and preserves its blood supply(35)(36). Therefore, the split crest approach is suitable for treatment of ridge.

#### **CONCLUSION:**

It can be concluded that the highest percentage of implant placement is done by ridge split technique in the year 2016 predominantly in anterior sites. Therefore there is gradual decline in the ridge split technique for implant placement.

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#### **CONFLICT OF INTEREST:**

None declared.

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