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Evaluation Of Clinical Outcome Ofimmediately Placed Dental Implants (Type I) – A Prospective Study

Dr. Shabbir Ahamed. M, Dr. K. Malathi, Dr. A. Muthukumaraswamy, Dr. S. Nasreen, Dr. N. Srividya
Tamilnadu Government Dental College and Hospital, (The Tamilnadu Dr. M.G.R Medical University)

***Corresponding Author:**
Dr. N. Srividya
Tamilnadu Government Dental College and Hospital

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Abstract

Background: Type I immediate implant placement has gained popularity because it may reduce treatment time, number of surgeries and post-extraction bone loss. However, this is potentially challenged by inadequate keratinized mucosa for flap adaptation and difficulties in achieving primary stability. Moreover, it has been proven that post-extraction bone loss is an inevitable biological process, which affects treatment outcomes. Although this strategy offers obvious advantages such as time gain, immediate aesthetics and comfort, immediate implantation may not avert post-extraction remodelling .To draw factual conclusions on sound scientific knowledge an evaluation of immediate implants is required.

Aim: The aim of this prospective study is to evaluate the clinical outcome of immediately placed dental implants.

Objectives: The objective of this study is to assess clinically the soft tissue changes and to assess radiologically the hard tissue changes around immediately placed dental implants over a period of one year.

Materials & methods: Ten patients were treated for single tooth replacement in maxillary incisor region by means of immediate implant placement with provisionalization at 1 month and definitive crowns at 6 months. Clinical evaluation was done at baseline,3 months,6 months ,9 months & 12 months. The clinical parameters includes plaque scores, bleeding on probing (BOP),probing depth(PD) and soft tissue levels. Radiological evaluation was done by cone beam CT pre operatively and at 1 year. Hard tissue parameters that were assessed includes the height of labial, palatal , mesial and distal bone.

Results: Implant survival rate was 100%. CBCT evaluation of the bone levels was highly significant. The mean difference in the height of labial bone is 5.51±4.62mm with a p value of 0.004. The mean difference in the height of mesial bone is 1.73±1.15mm with a p value of 0.001 and that of distal bone is 2.00±.75mm with a p value of 0.00.Mdfacial soft tissue recession and mesial/distal papilla shrinkage were -1.9±1.66 , -0.60±0.69 and -1.10±0.73 respectively.

Conclusion: The one year follow up results of this short term study suggests that immediate implant placement is a valuable and predictable treatment option for well selected patients.

Keywords: immediate implants, single tooth, hard tissue, papilla levels, soft tissue recession.

Introduction

Implantology is a fully accepted discipline in todays periodontal practice. The concept of immediate implants challenges the traditional and conventional healing period of 3 to 6 months for implant placement in extraction sites. The advantages of immediate implant placement includes easier definition of the implant position ,reduced overall time, costs and preservation of bone at the site of

implantation, optimal soft tissue esthetics and enhanced patient acceptance.

The concerns with using a 2-stage approach, such as Branemark's protocol, includes: volume loss of alveolar bone, increased time of edentulism, longer treatment time, additional surgical procedure, and psychological impact on the patient. After tooth extraction, the alveolar ridge undergoes bone remodelling, especially within the first year. An overall decrease of 4.0 mm in ridge height and 25% loss of total bone volume occurs within 1 year post extraction. The volume of bone lost increases 40% to 60% in 3 years. Consequently, the necessity of a 2-stage approach has been questioned since the introduction of immediate placement of implants into fresh extraction sockets, in the 1970s.

In 1978,the first report of a situation, in which the extraction followed by the placement of an implant into the fresh socket at the same appointment, was described as the "Turbingen immediate implant".2 The primary advantage of immediate implant placement is the reduction of the healing time, which translates to an earlier restorative time. By placing the implant in fresh extraction socket the bone to implant healing begins immediately and the implant has all the advantages of an osteogenic healing socket. The novel concept of immediate implant placement has to address challenges such as long term soft and hard tissue level predictable and stable esthetics and difficulties in achieving implant primary stability Hence, the present dissertation was undertaken to address the pros and cons associated with immediate implants by evaluating them clinically and radiologically.

Materials And Methods

The study population was selected from the Outpatient Section of the Department of Periodontics ,Tamil Nadu Government Dental College and Hospital, Chennai, India. The aim of this prospective study is to evaluate the clinical outcome of immediately placed dental implants.The objectives of this study is: To clinically assess the osseointegration by evaluation of soft tissue changes around the implants and to radiographically assess the hard tissue changes around the implants.

Enlightened patient conscious of oral hygiene and willing to undergo restoration with dental implants, maxillary anteriors and premolars that are grossly decayed indicated for extraction and not amenable to endodontic restoration, periodontally healthy individual, either sex, vertical root fracture, avulsed teeth, systemically healthy individuals, retained deciduous teeth, teeth which do not respond to endodontic therapy, normal to thick, flat gingival biotype were included. Acute infection (painful swelling) ,chronic infection (sinus, pus discharge) periodontal pocket, poor oral hygeine, smoking and substance abuse, parafunction, bruxisim or clenching, medically compromised patients such as uncontrolled diabetes,immunosuppression, bleeding disorder, cancer, stroke & severe osteoporosis, patient under bisphosphonates medication, patient on radiotheraphy atleast 18 months before surgery, loss of the labial crest /plate after extraction of the failing tooth, non treated periodontal disease, pregnancy at the time of inclusion, lack of posterior occlusion were excluded.

Ethical clearances were obtained from the institution's ethical committee and the ethical principles were meticulously followed throughout the course of the study. Subjects for the study were selected randomly if they satisfied the inclusion criteria, with no discrimination on the basis of sex, caste, religion or socioeconomic status. After explaining the study procedure , written informed consent was obtained from all the subjects selected for the study . Examination was preceded by a thorough medical and dental history of the patients. A total of 10 patients were randomly selected for the study.

The clinical parameters evaluated before and after implant placement includes -Plaque index (Silness and Loe 1964) All teeth were examined at 4 sites each (disto-facial, facial, mesio-facial lingual / palatal) and were scored, Bleeding on probing (BOP) - dichotomous score was given (0-no bleeding; 1-bleeding) at four sites per implant (mesial, midfacial, distal, palatal), Probing pocket depth in mm (PPD) was measured to nearest 0.5mm at four sites per implant (mesial, midfacial, distal, palatal) using a manual probe (CP 15 UNC).

Soft tissue dimensions were measured which includes - Papilla levels: The levels were recorded by means of an acrylic stent provided with direction grooves. Papilla level (mesial and distal) was defined as the distance from the top of the groove to the top of the

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papilla measured to the nearest 0.5mm using a manual probe (CP 15 UNC). Midfacial mucosal level: The level of the peri-implant mucosa at the midfacial aspect of the tooth/restoration was measured using the same acrylic stent provided with a central direction groove. The midfacial level was defined as the distance from the top of the groove to the first contact with the peri-implant mucosa measured to the nearest 0.5mm using a manual probe (CP 15 UNC).In a similar fashion mid palatal mucosal level is measured.

The hard tissue parameters of this study was evaluated by cone beam computed tomography(CBCT).The parameters that were evaluated includes: a)Height of labial bone at baseline and at 1 year b)Height of palatal bone at baseline and at 1year c) Height of mesial bone at baseline and at 1year d) Height of distal bone at baseline and at 1year. Preoperatively, a sagittal section of the affected tooth is obtained from the CBCT .The sagittal slice is positioned and selected in such a way that it lies in the center/midway of the tooth when viewed in the axial view. The height of the labial bone is measured from the most incisal part on the labial crest (eg:pt A) to a fixed reference point on the nasal floor/nasal spine (eg:pt B).The height of the palatal bone is measured from pt B to the most coronal point on the palatal crest (eg:pt C).Thus the distance between pt A and pt B (AB) will represent the pre operative height of labial bone and the distance between pt B and pt C (BC) represents the pre operative height of palatal bone. The relative positions of pt A and pt C are expected to change over a period of time in accordance with bone resorption or opposition whereas pt B is a stable fixed reference point that will not undergo any change. The interproximal bone levels mesially and distally are measured in a similar fashion as described above from the most coronal point on the bony crest to a fixed reference point apically on the nasal floor .

The post operative values are calculated after a period of 1 year after implant installation.A sagittal section of the implant is selected at a level coinciding with the pre operative view in axial and sagittal sections.The post operative height of the labial bone is measured from the most coronal point on the labial crest (eg:pt D) to pt B. The post operative height of the palatal bone is measured from pt B to the most coronal aspect on the palatal plate (eg:pt E). Acrylic occlusal stents were fabricated over the study models. Self cured clear acrylic was used for the purpose. The stent covered the occlusal and coronal 1/ 3rd of the labial and palatal surfaces of the teeth. It involved two teeth on either side of the implant. Vertical grooves were made to guide the placement of the probe in the same plane and direction repeatedly during measurements to avoid any variation. The recordings were made using a15 UNC periodontal probe. Difference in height of labial bone = AB-BD, Difference in height of palatal bone = BC-BE .The interproximal bone difference (mesial & distal) is calculated in a similar way as mentioned above.

Surgical Procedure.

Following screening, all patients are consented to the planned treatment strategy. The patients were advised to start on antibiotic (Amoxicillin 500mg TDS 1 day before surgery) & analgesic (Ibuprofen 600mg 1hr preoperatively). Oral disinfection was performed using a 0.2% chlorhexidine digluconate mouthwash. The patient's face is disinfected with 7.5% povidone iodine. The oral cavity is prepared with 5% povidone iodine and the patient is draped as per routine surgical procedure. Under LA, intra sulcular incision is placed around the tooth without involving the interdental papilla. Teeth scheduled for immediate replacement were systematically extracted by a flapless procedure. Luxator and periotomes were used to extract as atraumatically as possible. Immediate implant placement was performed if the labial crest was intact. Remnants of the periodontal ligament are debrided using a curette or excavator. The socket is thoroughly irrigated with saline. The socket wall is examined with a blunt instrument for any fenestration or fractures.

Special attention was paid to the correct selection and three-dimensional positioning of the implant. The implant length and diameter for each patient is decided based on radiological evaluation, socket dimension ,length and width of the extracted tooth. In the labiopalatal dimension, the implant shoulder was positioned palatal to the point of emergence at adjacent teeth. In the mesiodistal dimension, a distance of the implant shoulder to the neighbouring teeth of about 2mm was pursued. In the apicocoronal dimension, the implant shoulder was positioned 1mm sub crestally or about 4mm below the outline of the

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peri-implant mucosa . In order to obtain primary implant stability of at least 35Ncm, which was considered to be a pre-requisite for immediate provisionalization in this study, surgical sites were frequently underprepared.

Osteotomy is started with 2mm diameter pilot drill. Care is taken such that osteotomy is performed palatally & 4-5 mm apically in the extraction socket. Osteotomy site is further enlarged to the desired diameter and implant is placed achieving a primary stability of atleast 35Ncm. If any void is present between the implant & socket wall (jumping distance) it is filled with bone graft (Osseograft TM). Finally a suitable abutment is placed and the wound was closed by means of single interrupted sutures (3-0 mersilk). Postoperative instructions included avoidanc of the surgical site while brushing and eating, the use of a 0.2% chlorhexidine mouthwash two times a day for 2 weeks , antibiotic therapy for 5 days (Amoxicillin 500 mg three times a day) and analgesic (Ibuprofen 600 mg maximum two times a day) was continued.

Root form implants (ADIN,TOUAREGTM) were used for this study. The Touareg™ spiral implant is a tapered implant with a spiral tap, that condenses the bone during implant placement for immediate stability. It has two large variable threads and a tapered design for accurate implant placement, self-drilling and better load distribution. The prosthetic connection of this implant system is a standard internal hex 3.5mm diameter for all implants regardless of the diameter. Provisionalization is done after one month by an acrylic jacket crown. Definitive prosthesis is planned after 6 months.

Statistical Analysis

Data analysis was performed using the patient as the experimental unit. For all parameters, the mean values per subject and per visit were calculated. The changes over time of these variables were examined by means of paired t test. The statistical analysis was done using the computer software program SPSS version 16.0 (Statistical Package for Social Science, Version 16). Descriptive data are presented as mean ± SD and range values. Paired sample t-test is a statistical technique that is used to compare two population means in the case of two samples that are correlated. Paired sample t-test is used in 'before-after' studies, or when the samples are the matched pairs.

Results And Discussion:

The study evaluated the 10 patients for a period of one year making a detailed note on the soft and hard tissue parameters.With respect to complications and failures ,no implant was excluded from the study as all the 10 implants showed good stability and osseointegration. All patients showed good compliance and healing period was uneventful. The observations and results of various parameters are summarized in the tables and figures.

The mean plaque index score at baseline was 0.72±0.18 which indicates a good oral hygiene.Oral prophylaxis was performed and oral hygiene instructions were given and reinforced during the follow up period.At 3 months the mean plaque scores was 0.50±0.11 ,at 6 months the mean plaque scores were .47±0.06, at 9 months 0.44±0.07 and at 12 months 0.42±0.10.The plaque scores all infer that the patient maintained a good oral hygiene through out the study.

The mean difference in the height of labial bone is 5.51±4.62mm .The p value is 0.004 suggesting the difference is significant. The mean difference in the height of palatal bone is 1.64±1.06mm with a p value of 0.001.The mean difference in the height of mesial bone is 1.73±1.15mm with a p value of 0.001. The mean difference in the height of distal bone is 2.00±.75mm with a p value of 0.00.

The mean difference in the level of mesial papilla at 3 months is 0.30±0.48 with a p value of 0.081.At 6 months in comparison with the baseline values the mean difference is -0.50±0.52 with a significance value of 0.015.The values at 9 months is the same as at 6 months.At 12 months the mean difference is -0.60±0.69 with a p value of 0.024. The mean difference in the level of distal papilla at 3 months is 0.60±0.69 with a p value of 0.024.At 6 months in comparison with the baseline values the mean difference is -0.90±0.87 with a significance value of 0.01. The mean difference in the level of distal papilla at 9 months is -1.10±0.73 with a p value of 0.001. At 12 months the mean difference is -1.10±0.73 with a p value of 0.001.

The mean difference in the level of mid facial mucosal at 3 months is 1.50±1.17 with a p value of

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0.003.At 6 months in comparison with the baseline values the mean difference is -1.50±1.17 with a significance value of 0.003. The mean difference in the level of distal papilla at 9 months is -1.8±1.47 with a p value of 0.004. At 12 months the mean difference is -1.9±1.66 with a p value of 0.006. Palatal tissue level the correlation and t cannot be computed because the standard error of the difference is 0.

The mean mesial implant probing depth at 3 months is 3.3±0.48,at 6 months 3.4±0.51 and remained unchanged at 9 and 12 months. The mean distal implant probing depth at 3 months and 12 months was 3.7±0.67.At 6 and 9 months the implant probing depth is 3.6±0.51. The mean facial implant probing depth at 3 months and 12 months was 3.3±0.82.At 6 and 9 months the implant probing depth is 3.1±0.56. The mean palatal implant probing depth at 3 months is 3.8±0.91 ,at 6 months 0.36±0.84 ,at 9 months 3.7±0.82 ,at 12 months 3.7±0.82. The bleeding sites at 3, 6, 9 and 12 months were evaluated.

Discussion

This study involved a method for immediate replacement of a hopeless tooth with an implant-supported fixed prosthesis. For the patient, this appears to be an inviting strategy: it is a one stage procedure and eliminates the need for a removable partial denture in the early stages of healing. Thus, the patient benefits from immediate aesthetics and comfort. From a clinical point of view, the procedure also has its advantages. These are mainly related to time gain as post-extraction healing and osseointegration coincide.

In our study, screw-type tapered implants (ADIN TOURAEGTM) with a micro-roughened body and a machined collar were used. This selection seemed evident as more bone to- implant contact is found around screw-type implants in comparison with cylindrical implants and high primary stability can be achieved easily with a tapered implant design.3 In addition, micro-roughened implants have shown significant biomechanical advantages over machined implants as a result of contact osteogenesis and increased bone-to-implant contact, the former benefit from rapid bone apposition and superior anchorage (Cosyn et al. 20074). Finally, we used implants with a standard machined collar in this study as the additional value of a micro textured collar is currently unclear.

Besides these geometrical implant aspects, osseointegration was further optimized as follows: first, primary implant stability of at least 35Ncm to 40Ncm was pursued in every case and considered to be a pre-requisite for immediate provisionalization. This seemed appropriate because the study of Ottoni et al (2005)5 revealed a correlation between placement torque and survival of single-tooth implants: nine out of 10 failing implants were placed with an insertion torque of only 20Ncm. Appropriate initial insertion torque was advocated by the authors to proceed with early loading. Secondly, provisional restorations were cleared of all centric and eccentric contacts to avoid micro-movements, which may jeopardize the osseointegration process . 6,7

Plaque scores remained low through out the study and indicates good oral hygiene by the patients. A relatively high mean probing depth of about 3.5mm after 1 year of function was found in this study, which can be considered to be a normal phenomenon around two-piece implants as described by Lekholm et al 19868, Apse et al 19919, Proussaefs et al 200210. An interesting observation was the decreasing trend in probing depth between 3 month of follow-up (3.30 mm in the midfacial) and at study termination (3.0 mm). Similar pocket shrinkage was reported by Proussaefs et al (2002) from 3.6mm at 3 months to 3.2mm at 12 months of follow-up .Similar results are shown by Apse et al in 1991.

It has been clearly established by Botticelli et al 200411, Covani et al 200412, Araujo et al 200513 that immediate implant placement cannot prevent dimensional changes of the alveolar ridge following tooth extraction . This phenomenon was also emphasized by Schropp et al14 in 2003, Araujo & Lindhe in 2005. However, dimensional changes may be predicted on the basis of the defect size and configuration resulting from tooth extraction (Tomasi et al. 2010).15 One measurement of concern is the gap distance between the implant and the bone wall socket. This situation may be encountered because the dimensions of a tooth is not the same as that of the implant. Unfortunately, the gap distance between the implant and the bone wall socket was not considered in our study.

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All the implants that were used in the study were of the platform 3.5mm ,nine out of ten implants measured 4.2 mm in diameter and one implant was 5mm in diameter. Even though such larger diameter implants were used there was always a "jumping distance" between the implant and the socket wall. A gap of 1.5–2mm between the implant and the socket bone walls can readily heal without compromising the degree of osseointegration, however, some vertical resorption of the buccal bone wall cannot be excluded. Animal studies have shown that a gap of 1–2.25mm at the time of implant placement in healed sites could be readily filled when allowed to heal for 4 months and using rough implant surfaces (Botticelli et al 2003).16,17 Human studies show, resorption of some marginal bone tissue and these values were consistently higher for the buccal site as compared with mesial, distal and lingual sites (Botticelli et al. 2004). These results coincides with our study which showed the mean difference in the height of labial bone as 5.51±4.62mm whereas a mean bone loss of 1.73±1.15 mm mesially and 2.00±0.75mm distally was seen.

The healing pattern is less favourable when implants are placed in fresh extraction sockets.Botticelli et al. (2006)18 compared the healing of implants placed in a surgically created self-contained defect with that of implants placed in a fresh extraction socket. The four-wall self-contained defect healed almost completely with de novo bone formation with the bone crest close to the abutment/fixture junction. Conversely, the crestal bone level at the implant placed in the fresh extraction socket underwent marked resorption, and after a 4-month healing period, the crest was located roughly 3mm below the abutment/fixture junction on the buccal site. In the context of immediate implant placement, the width of the buccal bone wall is definitely of interest. The dimensions of the residual buccal bony wall is significantly thinner than the palatal bony wall. There is a general agreement among clinicians that a minimal width of 2mm of the buccal bony wall is a prerequisite to maintain the vertical dimension of the alveolar crest (Spray et al. 200019, Belser et al. 200720).

Maintenance of the crestal buccal bone will allow a better optimal soft tissue level and stability. However, the relationship between bone remodelling after implant placement and soft tissue stability is not well understood. Interestingly, in our study even in cases of advanced labial plate resorption (mean diff of 5.51±4.62) the facial tissue did not recede proportionally (mean diff of mid facial -1.9±1.6). No predictable pattern of soft tissue changes following implant installation has been identified so far (Belser et al. 2004).21 Taken all together, the current knowledge shows that implant placement cannot prevent the occurrence of dimensional ridge changes following tooth extraction. The buccal bone wall width is an important factor in determining the amount of vertical crestal resorption following extraction. In a healed site, a minimal width of 2mm has been suggested in order to maintain the crest around an implant. It can be speculated that in the case of immediate implant placement, an even greater width would be needed to account for the dimensional changes following tooth extraction.

In order to compensate for the ridge dimensional changes, grafting of the socket and of the outer part of the socket has been suggested. Simon et al in 200022, Iasella et al in 200323 have demonstrated that the vertical resorption could be limited by overbuilding the contour of the ridge. In order to achieve this, in all the implants that were placed in our study, graft material , osseograft (DMBM) was filled on the coronal part (jumping distance) and on the buccal aspect of the internal side of the socket. If the criterion of a minimal buccal bone width of 2mm to maintain a stable buccal bony wall is valid, only a limited number of sites in the anterior maxilla represent such a clinical situation. This in turn might mean that in most situations, when immediate implants are considered in esthetic sites, auxiliary procedures, such as guided bone regeneration, may be needed to achieve adequate bone contour around the implant and optimal esthetic outcome.

CBCT evaluation at 1 year after implant placement revealed a mean bone loss of 1.73±1.15 mm mesially and 2.00±0.75mm distally. In contrast, three studies on immediate implantation and provisionalization presented limited bone loss, yielding only 0.50mm after 1 year of function. Kan et al (2003)24 even observed several implants with bone gain, a phenomenon that was not observed in our study. This could be explained by a difference in the surgical technique. Even though ample reports have been published on immediate implant insertion and provisionalization for replacing maxillary anterior

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teeth, few have documented the aesthetic treatment outcome. Hence, one of the objectives of our prospective study was to monitor changes in soft tissue dimensions. As midfacial gingival levels may be liable to variation, especially in case of immediate implants, an acrylic stent with fixed reference points was used in this study proved highly reproducible.

In the present investigation, significant reductions in papilla height were found. The mean difference in the level of mesial papilla at 3 months is 0.30±0.48 with a p value of 0.081. At 12 months the mean difference of mesial papilla is -0.60±0.69 with a p value of 0.024. The mean difference in the level of distal papilla at 3 months is -0.60±0.69 with a p value of 0.024. At 12 months the mean difference of distal papilla is -1.10±0.73 with a p value of 0.001. Kan and co-workers (2003)24 reported only 0.33mm mean loss for mesial papillae and 0.25mm for distal papillae at 3 months following single-tooth replacement in the incisor cuspid maxillary region by means of immediate implant insertion and provisionalization. As the present study and the report by Kan et al24. (2003) indicate comparable levels of papilla loss after 1 year of function, a possible impact of the surgical technique seems negligible in the longer run. In this regard, it has been well documented that the presence of a papilla adjacent to a single-tooth implant restoration is principally driven by the level of the alveolar bone on the neighbouring tooth.

In this study, significant midfacial soft tissue recession of -1.9±1.66 with a p value of 0.006 in the first year of function was found, which is higher when compared with a report by Kan et al (200324) indicating only 0.55mm. Cornelini et al (2005)25 described 0.75mm midfacial soft tissue loss within the same time frame. Other studies have been published on soft tissue topography following single-tooth implant placement in healed sites demonstrating comparable levels of midfacial recession in the first year of function, yielding to 0.6mm. In addition, long-term studies have demonstrated ongoing soft tissue shrinkage up to 1.7 mm (Adell et al26).

The above findings indicate that remodelling is an inevitable and continuous event, making long-term soft tissue monitoring a necessity. In the first year of function, our data demonstrate considerable loss at the midfacial aspect, which may be explained as follows: patients with a thin-scalloped biotype pose a high risk. As the risk for aesthetic complications is considerably high in these subjects, hard tissue conditioning and/ or periodontal plastic surgery are often necessary. Patients with a thin scalloped gingival biotype have been shown to be at risk for mid facial recession as reported in two studies (Cordaro et al in 200927, Kan et al in 201124). This may not be surprising because this biotype reflects the limited underlying bone support. As the buccal bone wall in these patients is predominantly built up by bundle bone that entirely resorbs following tooth loss and regardless of implant placement, midfacial recession may be a logic consequence. Hence, immediate placement placement should be avoided in patients with a thin-scalloped gingival biotype.

Apart from diagnostic considerations, clinicians should also take into account aspects specifically relating to implant surgery in extraction sockets. A correct three-dimensional implant positioning has been considered important for predicable soft tissue levels, which may be hampered by the alveolar socket.The urge to engage pristine bone for primary stability, immediate implants are angulated in the palatal wall and this in turn puts more pressure on the coronal third of the socket resulting in labial plate resorption. An association of buccal malpositioning and midfacial recession has been described and calls for experienced and skilled surgeons when pursuing immediate implant placement.

Another surgical aspect relates to flapless procedure. Remarkably, midfacial mucosa level was not affected by implant surgery in four studies and in all these a flapless approach was used. All the implants in our study were placed using a flapless procedure. Significantly less midfacial recession following flapless surgery was demonstrated showing a trend towards less recession and smaller biologic width dimensions for flapless procedures.

A flapless surgical technique for anterior implant placement has been earlier advocated for optimal aesthetic results. Another advantage of a flapless approach in immediate implant cases is the preservation of blood supply of the buccal socket wall. The soft tissue levels in our study was recorded before tooth extraction. Only then ,the total amount of recession, being the result of post extraction

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remodelling and implant treatment, may be properly assessed and compared with the amount of recession following immediate implant placement. The presented protocol of immediate implant placement offers many advantages for the patient as for the clinician. However, careful patient selection and treatment planning appear to be of critical importance in achieving a predictable treatment outcome. Evidently, further research is needed to monitor hard and soft tissue changes on a long-term basis.

Conclusion:

In the present study 10 patients underwent immediate implant placement replacing maxillary incisors. The level of soft tissue changes, probing depth, bleeding on probing ,hard tissue changes were evaluated periodically and the following conclusions were drawn: Single tooth replacement by means of flapless surgery, immediate implant placement, insertion of a grafting material and connection of a provisional restoration can be considered to be a valuable and predictable treatment option. The overall cumulative success rate was 100%. It has been clearly established that immediate implant placement cannot prevent dimensional changes of the alveolar ridge following tooth extraction. To counteract the socket remodelling the buccal bone wall should be more than 2mm. Although bone graft procedures in the implant-socket gap are beneficial for bone stability, bone losses should still be expected, especially the labial plate.

The risk of inter proximal recession is low as the papilla adjacent to a single-tooth implant restoration is principally driven by the level of the alveolar bone on the neighbouring tooth. Mid facial recession was significant and should be anticipated. The risk for advanced mid facial recession is reduced in patients with an intact buccal bone wall , thick gingival biotype, treated by means of flapless surgery and an immediate implant crown. Within the limits of present study, immediate implant placement offers many advantages for the patients and the clinician. However ,careful patient selection and treatment planning appears to be of critical importance in achieving a predictable outcome. More prospective studies monitoring soft tissue dynamics & hard tissue changes over longer time periods are needed.

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FIGURES

Root canal treated tooth (21) with crown fracture below the alveolar crest.

IOPA of the fractured tooth 21.

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Extraction of the affected tooth by luxator.

Flapless surgical procedure with intact interproximal papilla & labial bone.

Measuring the diameter of the root fragment.

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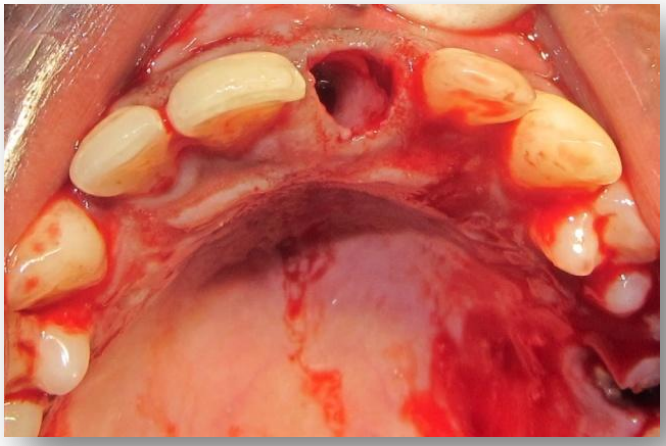
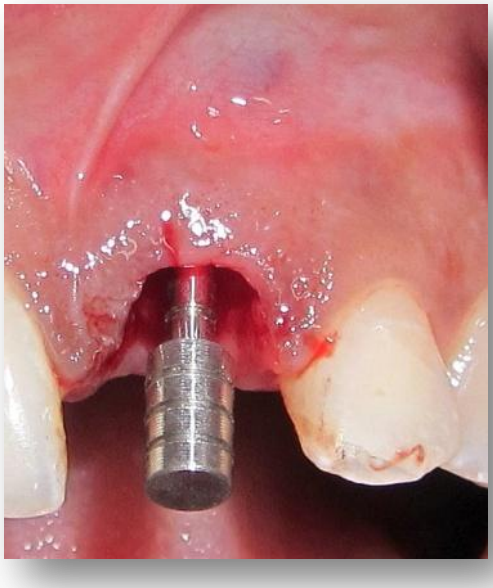
Osteotomy started with pilot drill 2mm.



Paralleling pin used to confirm the orientation of the implant.



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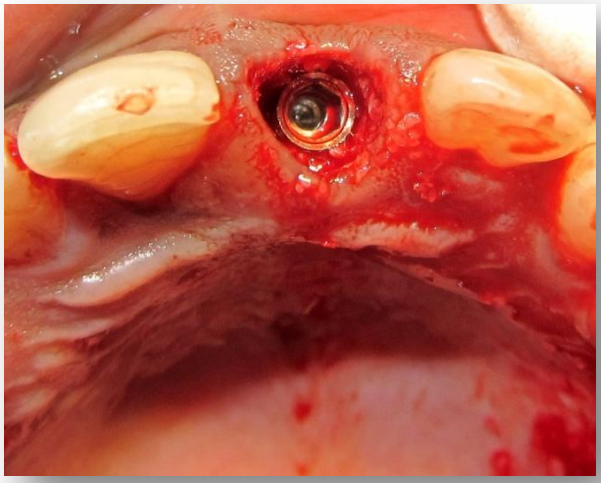
Adin implant (Touraeg^{TM}).

The gap between the implant shoulder and socket wall is filled with osseograft.



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Imediate post operative radiograph

A suitable abutment is connected.

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Simple interrupted sutures (3- 0 mersilk) is given to adapt the tissues to the implant.

Healthy gingiva around the implant at 6 months.

Porcelain fused metal crown cemented to the abutment.

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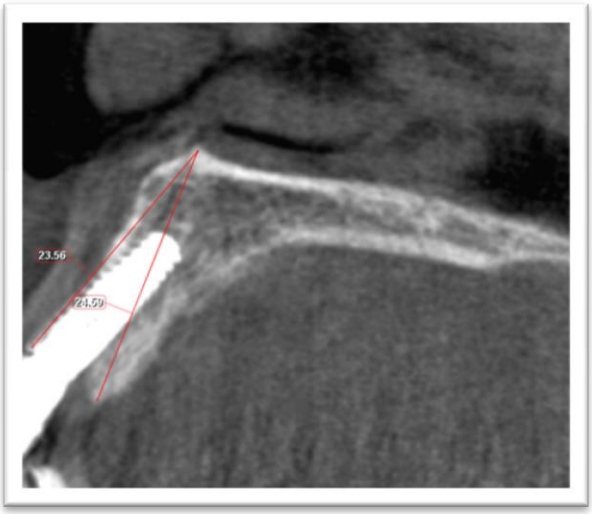
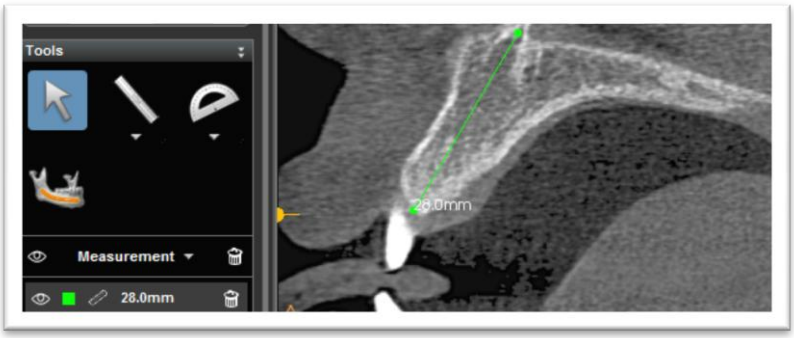
Pre operative measurement of labial & palatal bone around the affected tooth.

Post operative measurement of labial & palatal bone around the implant at 1 year.



Pre operative measurement of mesial bone around the affected tooth.



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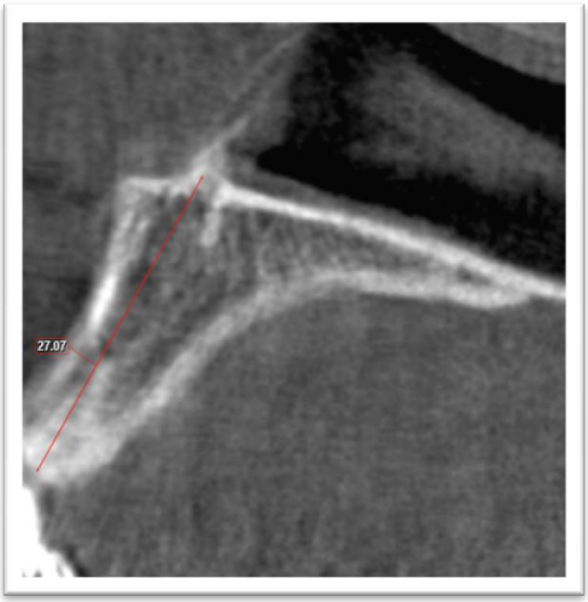
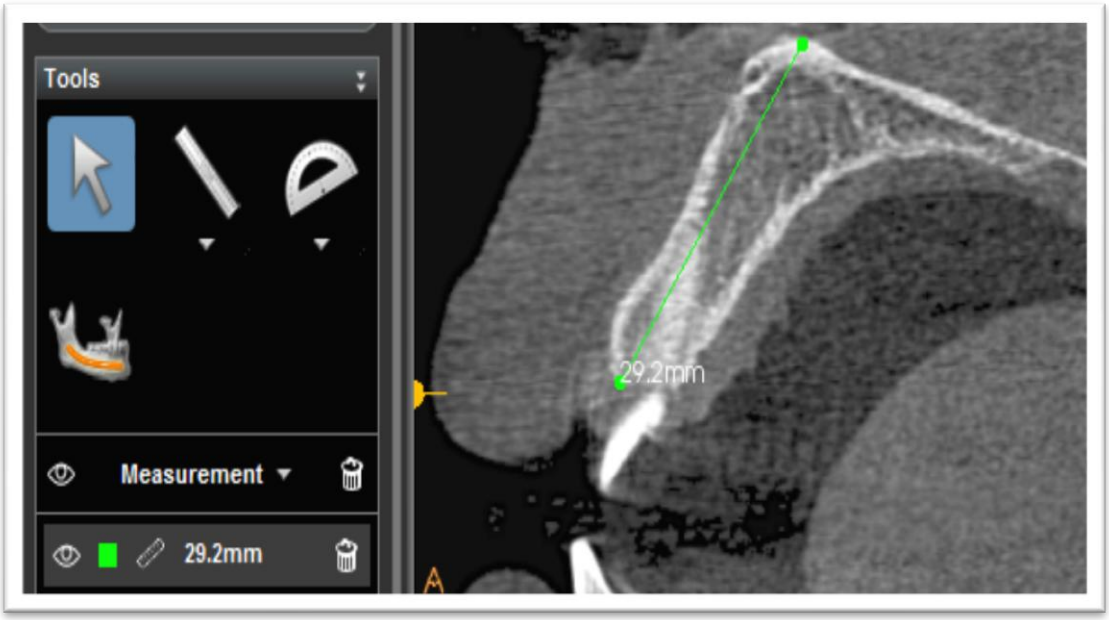
Post operative measurement of mesial bone around the implant at 1 year.



Pre operative measurement of distal bone around the affected tooth.



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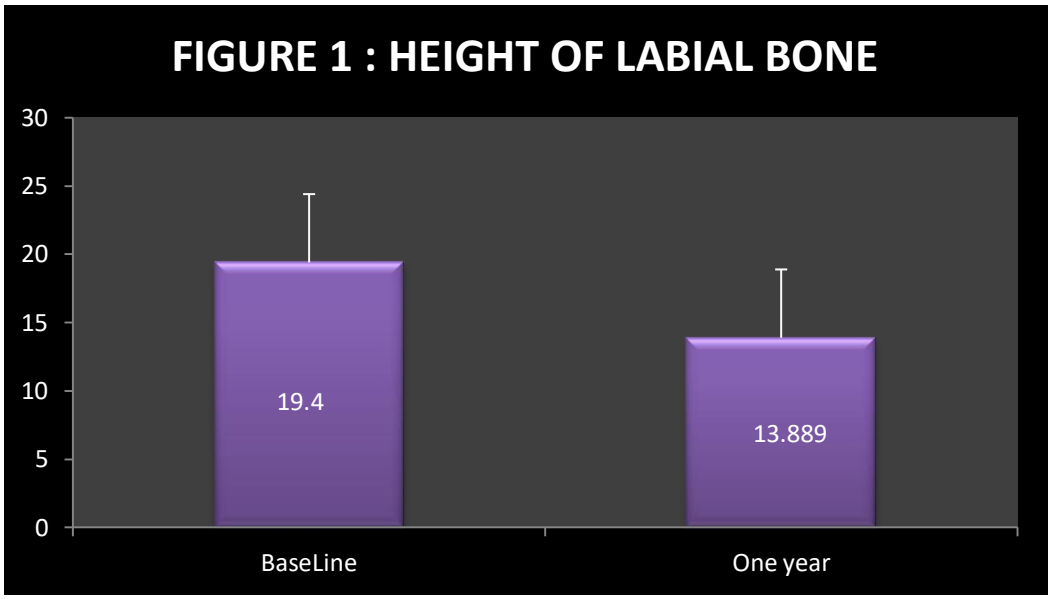
Post operative measurement of distal bone around the implant at 1 year.

TABLES



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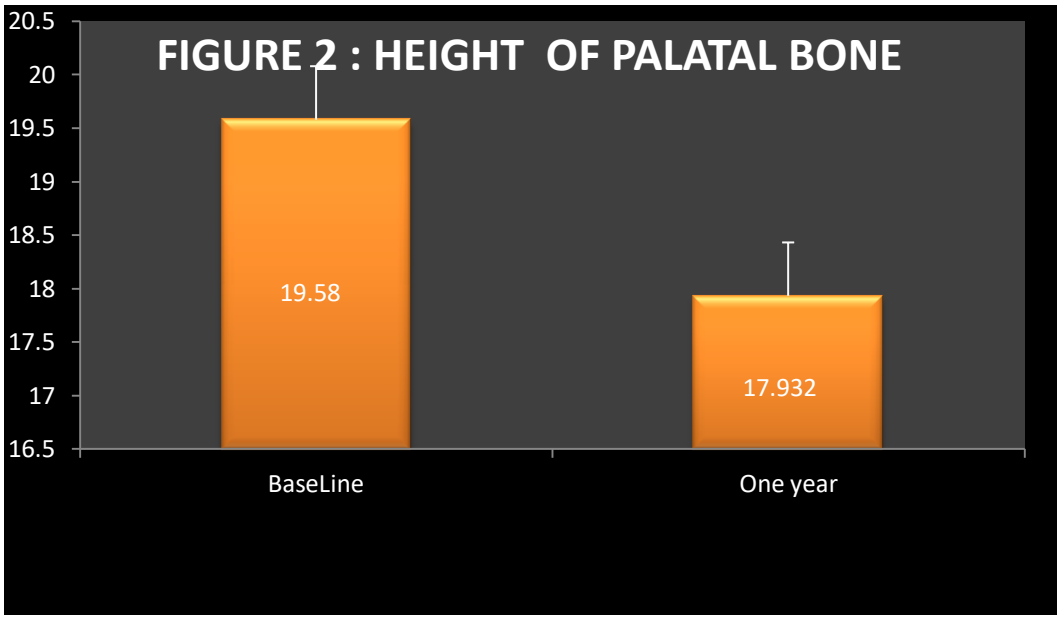

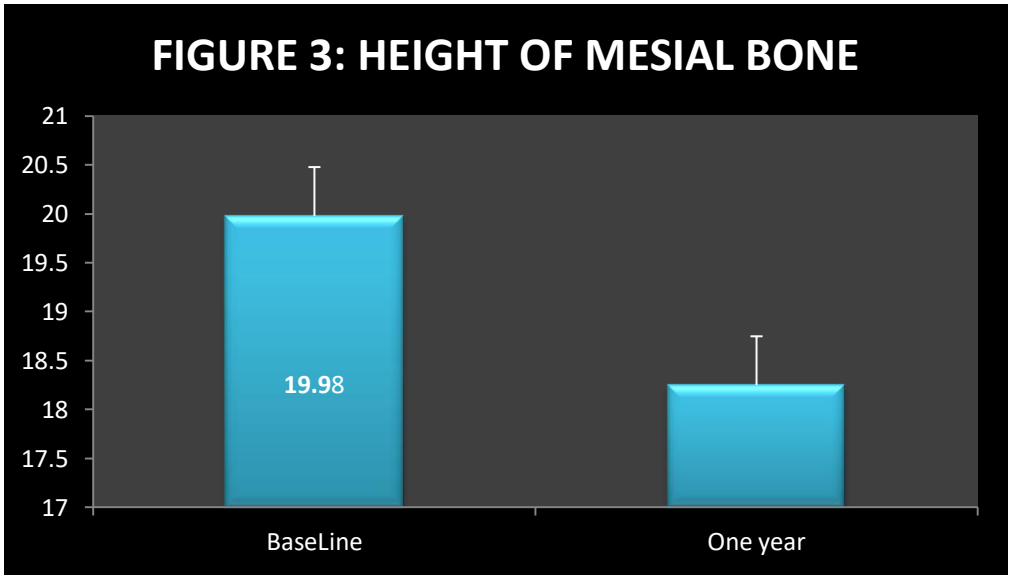

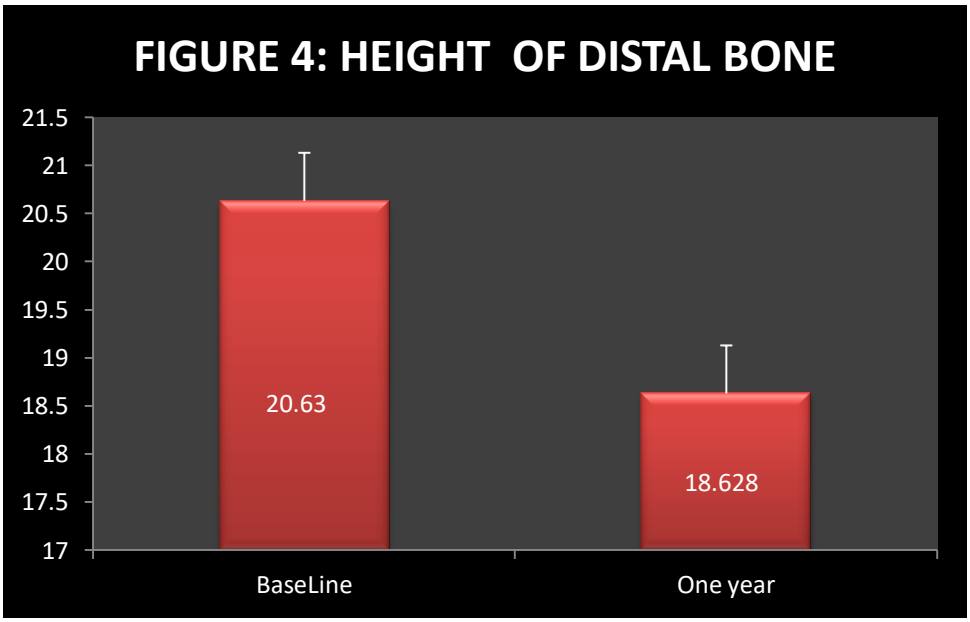

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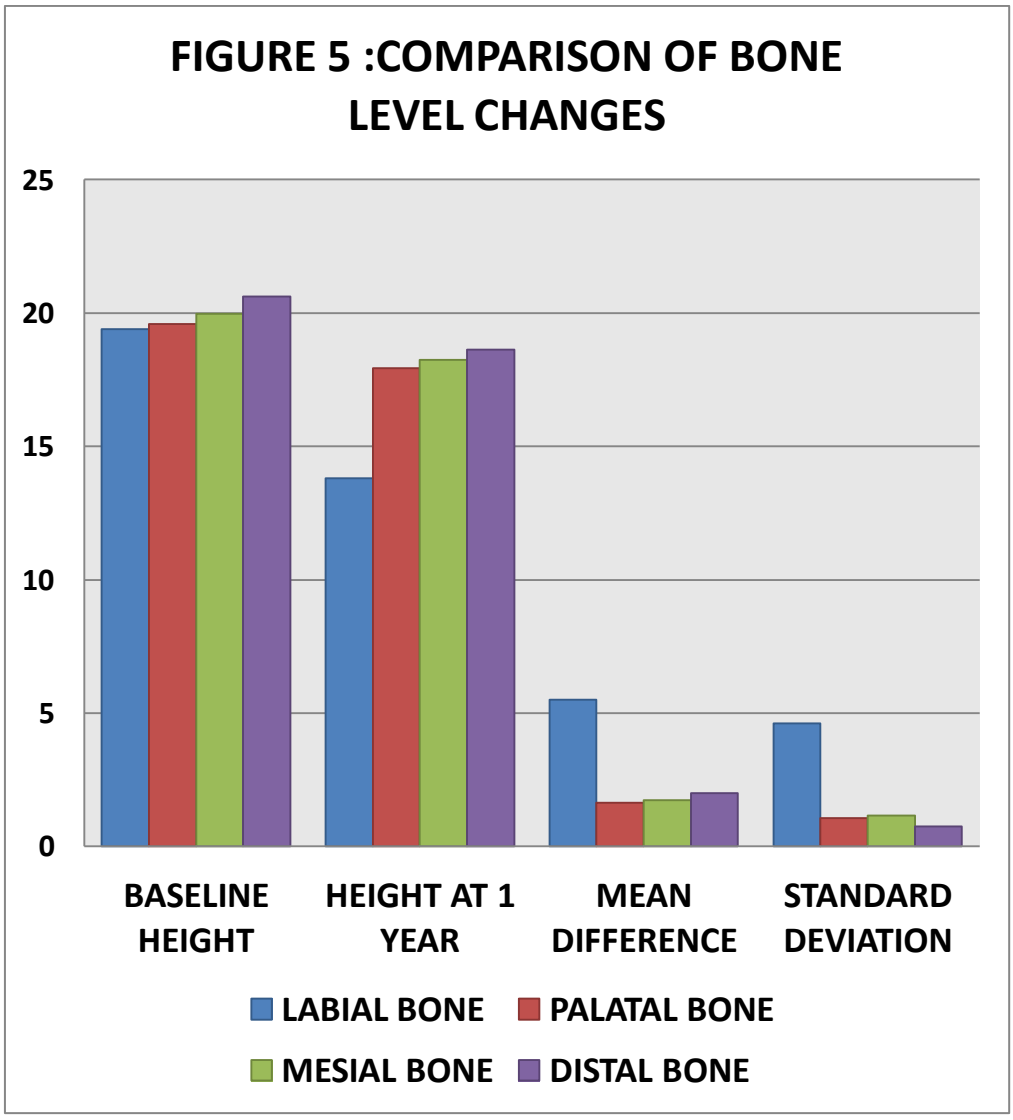

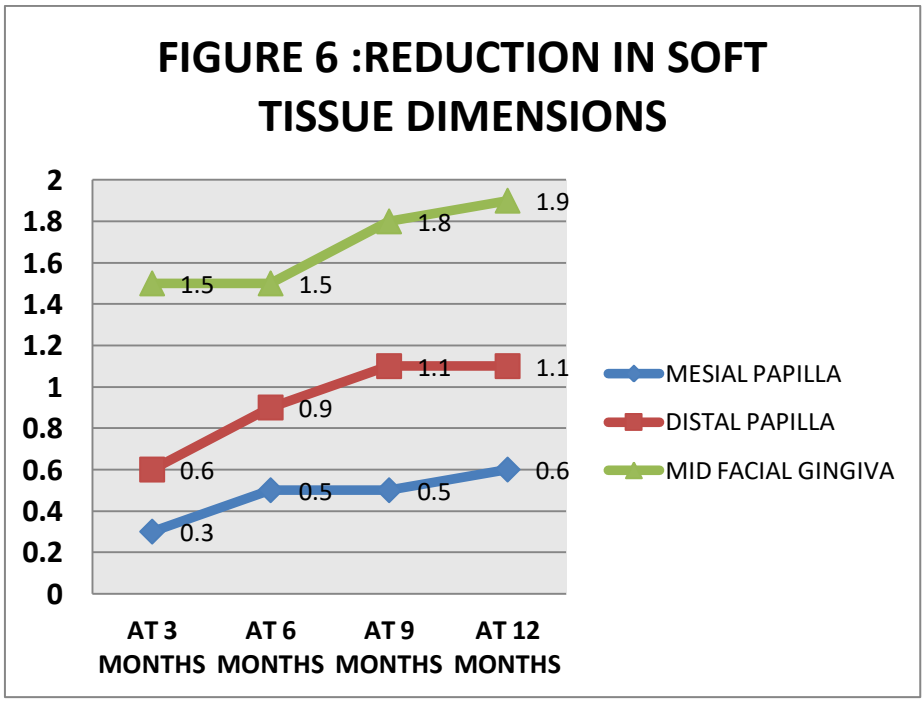

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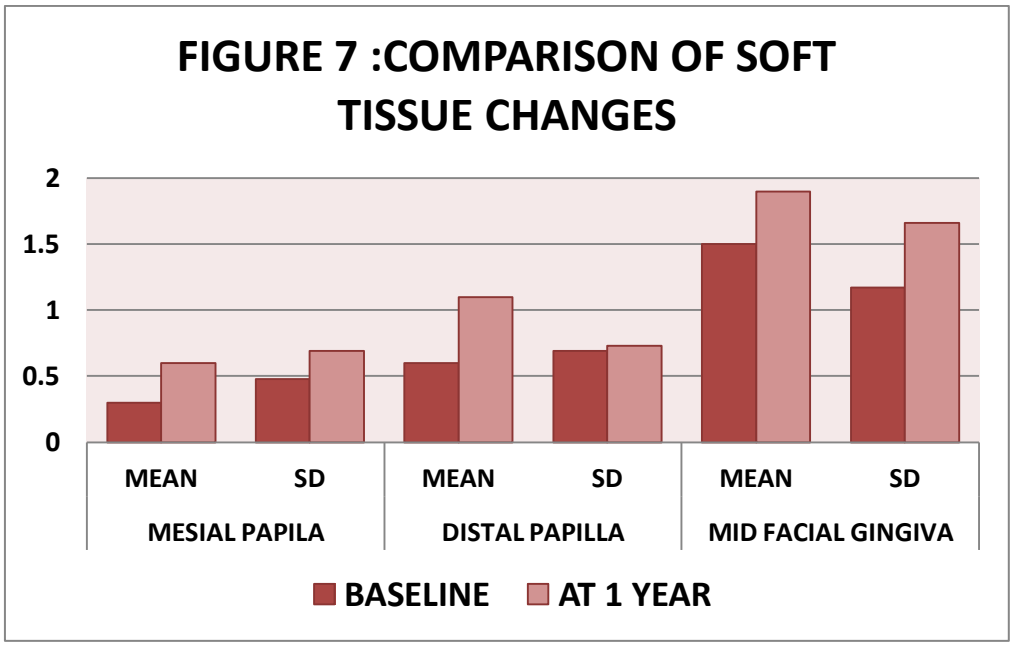

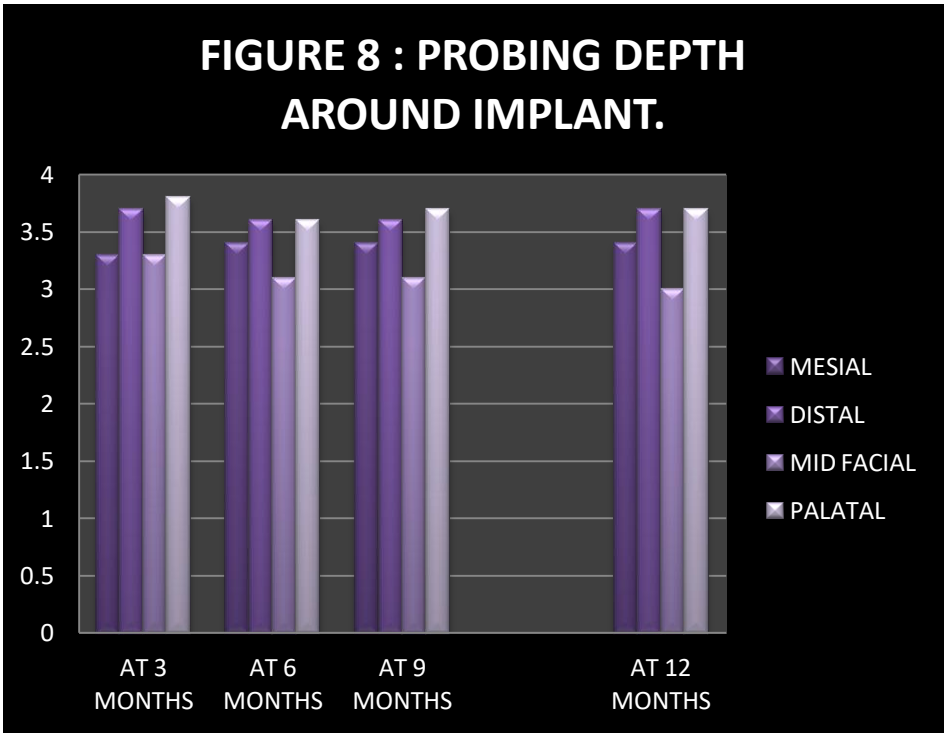

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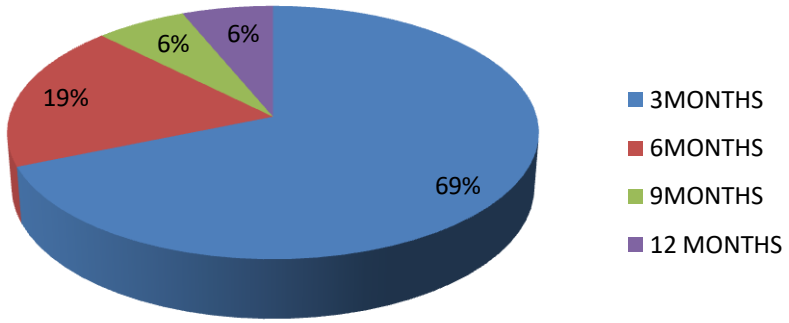
FIGURE 9 :BLEEDING ON PROBING



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