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RESEARCH ARTICLE

THE USE OF SURGICAL SUTURE AS AN IMPLANT PLACEMENT GUIDE – A RETROSPECTIVE OVER VIEW OF OVER TWO DECADES OF IMPLANT THERAPY

M. Lanka^{1*}, M. Glenn², S. Sagrika¹, P. Tanvi³, D. Zara¹

¹Private practitioner, New Delhi, Indi.

²Private practitioner, Mumbai, India.

³Sr. lecturer, K D dental college and hospital, UP, India.

*drlankamahesh@gmail.com

ABSTRACT

In the era of digital dentistry, positioning of implants can be designed with the help of CBCT and CAD CAM. Surgical guide can be made to direct the implant placement in bone. Although various researchers showed the importance of 3D planning but because of chances of errors at various levels of digital protocols may lead to deviations. Even no data is available to confirm the accuracy of GBR with digital workflow. This retrospective analysis of simple suture placement technique in anterior edentulous region will make clinicians to understand the positioning of drills, anatomical variations, directions and placements of implants, need of bone grafting and implant emergence.

Keywords: Suture guide, implant placement technique retrospective analysis, esthetic zone.

Introduction

Professor Per-Ingvar Branemark defined it “as a direct contact between the bone and metallic implants, without interposed soft tissue layers” (1969). It was later adapted to “as a direct structural and functional connection between ordered, living bone and the surface of a load carrying implant^{1,2}.” The numerous steps in the surgical process lead to mechanical trauma and injury to both the mucosa and the bone tissue, this leads to wound healing which ultimately allows the implant to become “ankylosed” with the bone or better understood as osseointegrated^{3,4}. The implant position should be at such a position so that when occlusal forces are applied to the prosthesis, it is able to maintain aesthetics, harmony, function and speech. Buser et al. recommended that dental implants in the esthetic zone should be placed in “comfort” zones. The authors proposed that implants should be placed 2 mm away from the adjacent roots, 2-3 mm apical to the cemento-enamel junction (CEJ) of the contralateral tooth, and 1 mm palatal to the emergence of adjacent teeth⁵. Bashutski and Wang proposed that at least 2 mm of buccal bone should lie anterior to the implant fixture. The implant platform should be 1.5 to 3 mm apical to the CEJ of adjacent teeth, with 1.5 mm between implant and root or 3 mm between implants⁶. Inspire of numerous efforts to preserve the socket by clinicians, facial plate resorption is often observed. Buccal plate augmentation by placing bone graft is effective in maintaining adequate bony housing around implants and preserves the buccal cortical plate at the site of surgery. Simple suture placement technique makes the

clinician understand these aspects with direct visualization.

Procedure

After diagnostic cast and radiographic interpretation, evaluation of soft tissue, sufficient amount of local anesthesia is injected at the site of surgery, full mucoperiosteal flap is raised. the silk suture 3-0 tightly tied to teeth at CEJ level adjacent to the edentulous space.(Figure 3) Level of bone is evident in both buccolingual and mesiodistal aspects.(Figure 4) Within the confined zone of suture, the position of drill is determined and subsequent drilling sequence steps are followed depending on the system of dental implants being used. Finally bone augmentation is done using suitable bone graft at the site of defect. Facial plate augmentation is advisable for all anterior esthetic cases as facial bone is thin and resorption is seen.

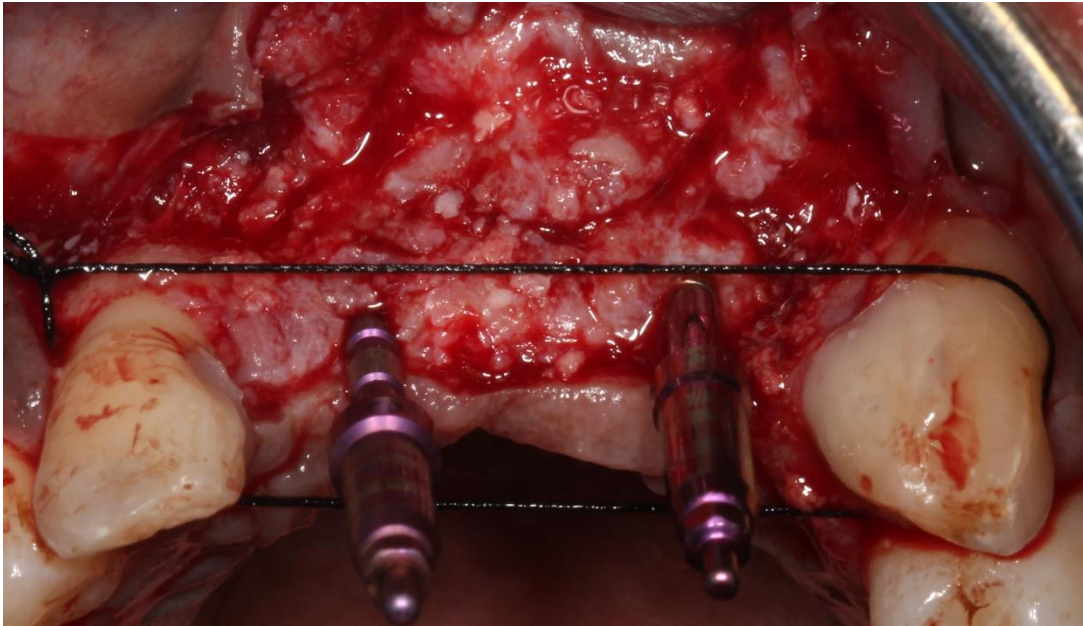


Figure: 3

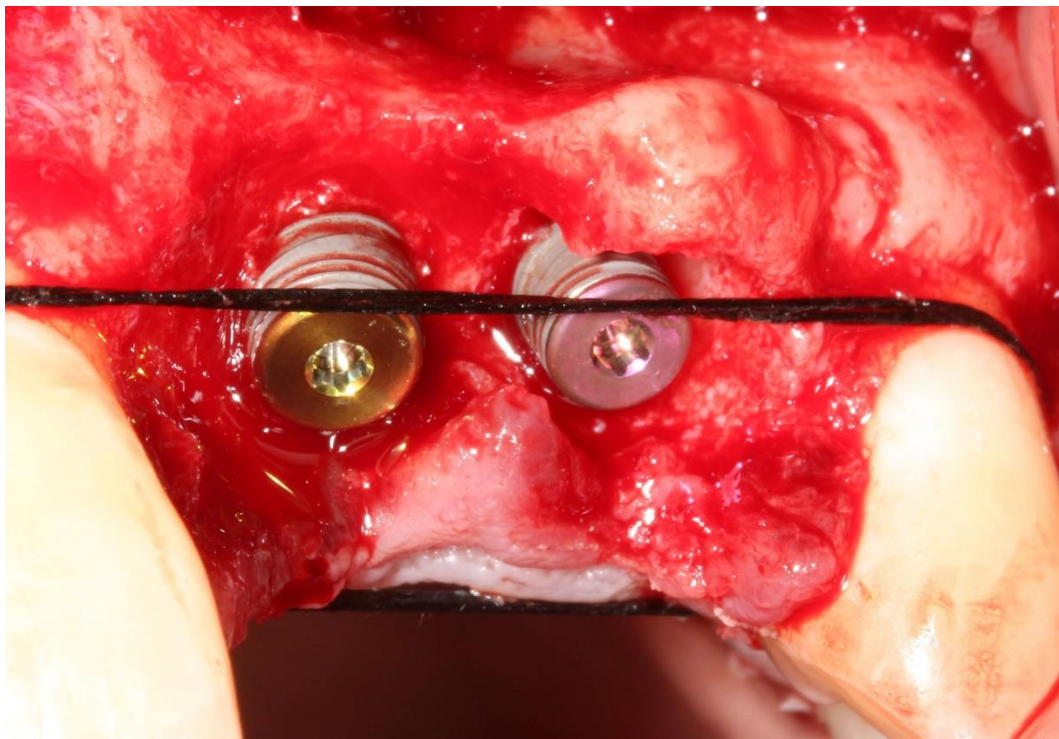


Figure 4

Discussion

Diagnostic cast and Radiographic evaluation helps clinicians to direct implant placement. Surgical templates are fabricated on dental casts, which are rigid, without the knowledge of underlying soft tissue resiliency. Bone topography and anatomical landmarks are not

precisely located. More chances of malpositioning in implant placement. Care should be taken for not damaging any neighboring anatomic structures particularly the nerves, vessels, schneiderian membrane of the maxillary sinus, and the roots of adjacent teeth. The success of the final

outcome always depends on clinician skill and alertness. It requires more chair time. Although conventional surgical templates will allow the placement of implant guiding, but they do not provide exact 3D guidance.

Suture silk 3-0 is then tied tightly to teeth at CEJ level adjacent to the edentulous space. Though the authors have tried with all suture materials, silk is preferred for this particular technique due to its strength. In anterior region, position of suture is so that the confined area represents the zone of implant placement and the area of Cingulum of adjacent teeth directly comes in this zone to guide implant placement. Bone contour can be visualized directly. Advantages can be seen in patient with less availability of intraoral space, posterior space with reduced mouth opening and accessibility where surgical guides placement is difficult but with the help of suturing technique, direction of drill can be determined. Other advantages associated with this technique includes: ease of use, saves time, can be replicated, prevents sequential drill direction errors, doesn't require special armamentarium and reduce presurgical multiple visits. Bone augmentation needs can be visualized directly by seeing the discrepancy in bone in labial aspect by seeing crest level and labial or palatal surface of adjacent teeth. Evaluation can be difficult if disparity within the adjacent teeth size is more in buccolingual width or in long span edentulous region and can't be performed in completely edentulous arch. If adjacent teeth are mobile, it would be difficult to keep the suture tight, similarly with the root stump cases. In short span edentulous region like canine to canine or 2nd premolar to molars

where no more jaw discrepancy seen, this technique can be performed with successful orientation of drill's direction in the bone. Although, this can be performed in cases of extreme atrophy where guided implant surgery fails but limited use in edentulous area adjacent to teeth with fixed partial prosthesis.

With the CAD/CAM and CBCT, Surgical guide is one of the advanced methods to direct the implant drilling system.(Figure 1 and 2) But these stereolithographic guides do not allow the modifications at the time of surgery because of predetermined position. If any tissue changes occur, it may alter the fit as well as dislocation which lead to the failure of the implant placement. Other limitations could be no intra-surgical visualization of apical gingival contour, drill lodgment in stent, torsional forces on the sleeves in hard bone penetration leads lifting off the guide, software errors and greater learning curves. However its more accurate way but deviations are present and according to researches, long term survival of the implant, bone structure and peri - implant health is the same as all conventional methods.

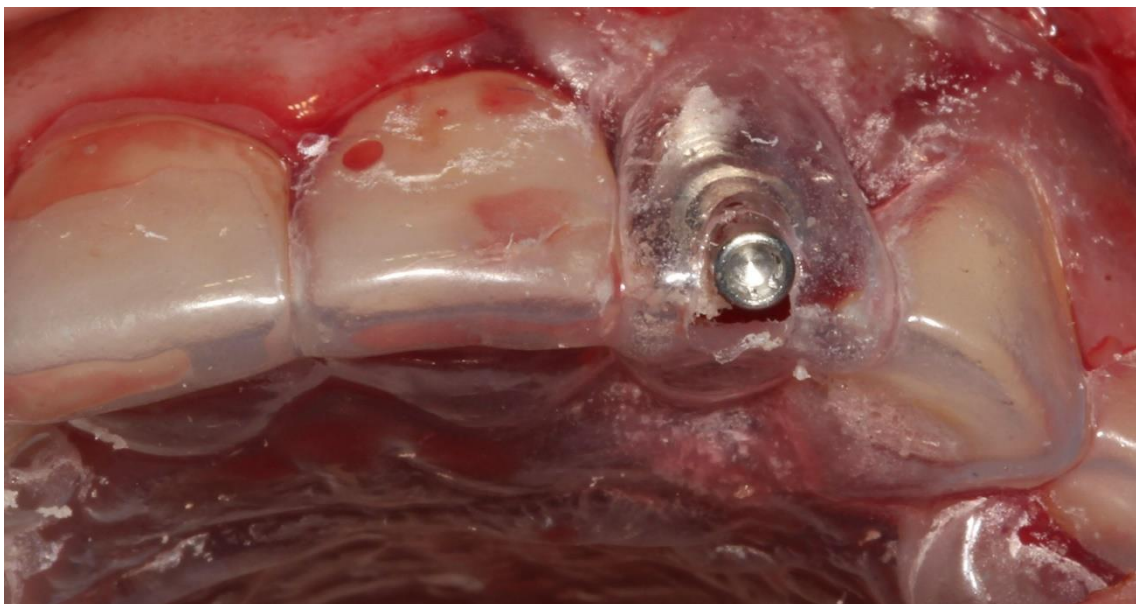


Figure 1

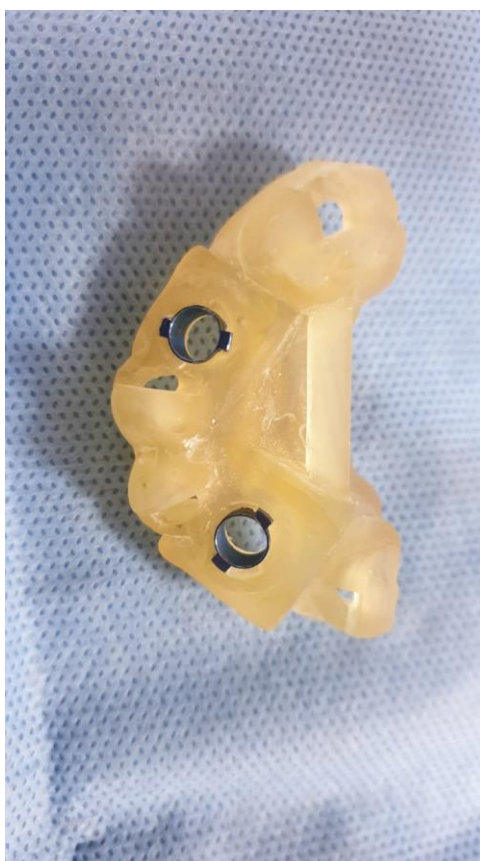


Figure 2

Conclusion

Over 8000 cases were done using this technique successfully. While the authors use all techniques for their clinical practice, this

method is one that is preferred. The authors of this article have named this technique "The New Delhi Suture Technique."

Conflict of Interest Statement:

None

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