CT-guided technology for all on four, a novel technique for full mouth rehabilitation: Technique and case report

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Abstract
This case report will show a novel method for the utilization of customary all on four in mix with Cone Beam Computed Tomography guided embed surgery utilizing a surgical guide. It is not any more just an idea for the future, the utilization of these computerized strategies in the dentistry has turned out to be regular practice in the present days. Registered tomography (CT) guided dental implant surgery has significantly extended in the course of recent years as ideas and procedures have turned out to be progressively enhanced and more implant producers have changed their implant frameworks to these new advances in implant position. The All-on-four method for dental implant situation and reclamation for full mouth recovery, while built up somewhere in the range of two decades back, has as of late created expanded enthusiasm as a profoundly useful, feel, financially savvy elective for a vast gathering of edentulous patients who could profit by a full-curve, implant upheld settled prosthesis. This article portrays the All-on-four CT-guided implant surgery method.

Keywords: Computed tomography, All-on-four, Surgical guide, Drill, Planning, Dental implant.

Introduction
The accomplishment of implants depend generally on the exact situation of implant in light of the presurgical treatment design by the dentist.[1-2] Beforehand, numerous symptomatic instruments and strategies have been utilized for surgical implant arrangement among these indicative apparatuses are ordinary radiographs that are utilized to assess the accessible bone for the implant placement.[3] Panaromic radiographs are 2-dimensional (2D) have an amplification mistakes of around 24%, 36% flat and vertical respectively,[4-5] prompting trouble in amend implant arrangement. Irregular techniques for creation of surgical guide does not consider the thickness of delicate tissue and the area of anatomic and vitals near proposed implant sites.[6] Present day dentistry utilizes propelled innovation in finding, treatment arranging, and creation of machines and prosthetics has taken the field to a totally new level. CBCT check imaging enables the dental specialist to assess craniofacial structures in three measurements with exactness which is adequate, in this way lessening the amplification and discretionary arranging in implant dentistry.[7]

Implant arrangement utilizing the surgical guided innovation has appeared to have more prominent exactness and accuracy when contrasted with the traditional techniques.[8-14] This can lessen the event of harm including the essential structures and diminish persistent morbidity.[15-22] Using implant arranging programming, implants can be "practically" put at a right pre-arranged profundities and angulations in three measurement see at the given site. Surgical aides are then built from the virtual treatment get ready for very exact implant arrangement into the arranged implant positions for the patient.

The work of virtual surgical guided advances disparts with the training usually utilized for the arrangement of dental implants utilizing the traditional All-on-four convention, a procedure that has been utilized for add up to curve reclamation. Generally, after a clinical assessment, the All-on-four surgical technique includes a standard all encompassing or potentially a registered tomography (CT)/cone beam CT (CBCT) assessment of the patient's life structures with appropriate pre-treatment arranging. Later this prompts surgery including an entire curve entry point with fold height. Infrequently if fundamental, alveolar peak leveling ought to be performed for appropriate edge without any rises. A paralleling guide is utilized to substantiate implant angulation amid the technique. Osteotomies and implant arrangement are done freehand by the dental practitioner. Implants are regularly put at 30-degree edges (M-four maxilla and V-four mandible), and calculated projections are then put as required relying upon embed angulation.

The utilization of CAD helped plan/CAD supported assembling (CAD/CAM) and other computerized advances in oro-maxillofacial surgery and prosthodontics is not any more a propelled idea. These advances are being utilized ordinarily in dental practice today.[23,24] Over the previous 10 years the utilization of CT-guided dental implant surgery has expanded fundamentally as ideas and procedure has turned out to be more precise and numerous implant makers have acclimatized their implant frameworks to these more up to date advances. The All-on-four idea for implant position and rebuilding has been examined for a long time. As of late, the system has made expanded immersion as an exceptionally practical, tasteful, more financial, elective for a bigger gathering

of edentulous patients who could profit by a full-curve, implant upheld settled prosthesis.

The motivation behind this article is to depict the All-on-four CT-guided surgery strategy for full mouth recovery, for patients with resorbed edges.

Technique: Computed Tomography-guided implant arranging and surgery is a remedially determined treatment alternative. It initially includes arranging and rebuilding for a patient; this might be a total denture prosthesis.

The advanced imaging and correspondence in prescription (DICOM) pictures are made from the outputs are then foreign into outsider exclusive programming projects. The programming projects utilize the fiducial marker focuses to orchestrate the information produced from the output, making CAD pictures that correctly, relate the arranged rebuilding to the patient's hidden hard life systems. implant positions and angulations would then be able to be precisely arranged in a virtual condition and later treated in like manner by the dental specialist.

This virtual treatment design is then sent to a maker or lab for development of an apparatus that is utilized at the season of surgery to precisely put the implants in their arranged position. Most implant makers give guided surgery-particular instrumentation to flapless implant situation. Whenever wanted and showed, methods and armamentarium are accessible for extractions, bone diminishment, prompt implant situation, and quick stacking, which are all generally utilized as a part of the All-on-four convention.

Case Report

A 63-year-old completely edentulous man displayed wanting a full-curve, settled maxillary and mandibular rebuilding. He had been wearing a maxillary denture for a long time after rashly losing his teeth from rot and periodontal ailment. The denture had never been relined. His past restorative history was non-contributory.

At first clinical examination that incorporates ordinary dental and all encompassing radiographs was taken. After a broad dialog of the surgical and prosthodontic choices, an All-on-four, alternative with a retrofit of his current maxillary and mandibular denture as a quick mixture temporary prosthesis was arranged. Initial, a denture reline was performed on his current maxillary and mandibular denture for good denture adjustment to the mucosa.

Gutta percha indicates were included in the maxillary and mandibular dentures as markers. According to the twofold sweep convention, two proper outputs were taken. The DICOM sets were then included into the arranging programming. As a result of the decay of the maxillary edge in width, position of four implants was arranged practically for the patient. Four customary measurement, vertically situated implants (Adin implants) were arranged in the front regions. Once finished, the arrangement was carefully sent to the maker for manufacture of a stereolithographic surgical guide.

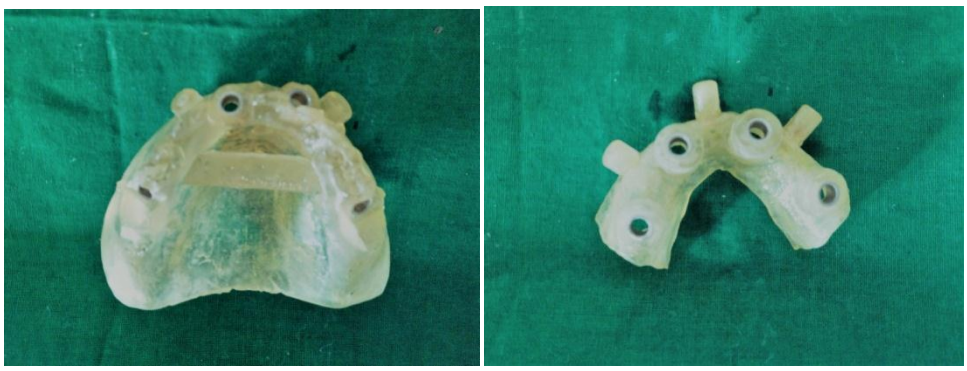

Fig. 1: Maxillary and mandibular surgical guide

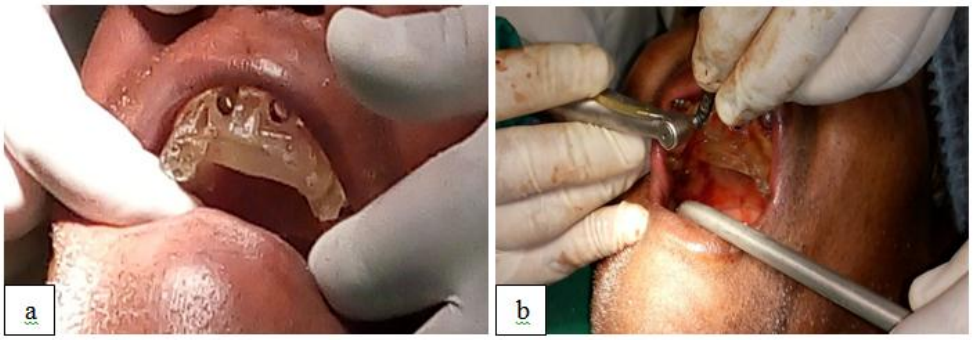

Fig. 2: (a. Surgical stent placed in position; (b. Bone osteotomy (drill)

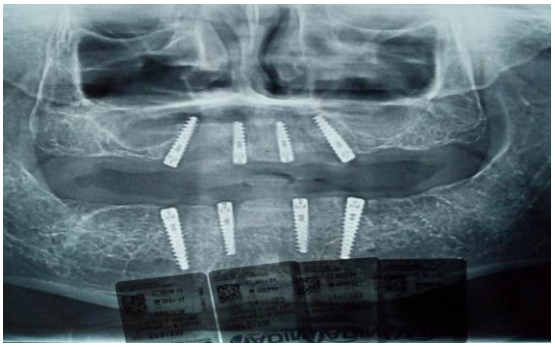

Fig. 3: Panoramic radiograph after implant placement

At the season of surgical technique, the surgical guide was appropriately set in position. The machine was balanced out utilizing adjustment pins gave on the surgical guide. Implant particular instrumentation was utilized to put the four arranged implants to full profundity and exact bearing utilizing guided-surgery strategies with implant mounts for maxilla and mandible. Following a month and a half gingival formers were set and later impressions were made for prosthetic manufacture i.e full curve resrtoration. Once trimmed, balanced and cleaned the denture was secured utilizing prosthetic fastens put. Every one of the implants were osseointegrated and stable set up, patient is quiet happy with the treatment.

Discussion

There is no CT-guided bore direct innovation with 100% exactness for implant position. Stereolithographic control digresses amongst virtual and got implant positions have been appeared in three dimensions.[29] The most noteworthy mean deviations are found in implants put by bone-upheld guides, while Implants set by mucosa-bolstered guides tend to indicate bring down deviations.[26] Tooth-bolstered penetrate guides measure the least deviations amid implant placement.[27] Deviations can be additionally limited by utilizing inflexible screw or stick obsession of a solitary guide, metal guide sleeves, boring instrumentation are particular to the implant to be put, and instrumentation for the completely guided situation of implants through the surgical guide. Most frameworks utilize screws or sticks to settle mucosal-bolstered guides; a few frameworks prescribe them to balance out all aides.

Insignificantly obtrusive systems amplify understanding solace by limiting damage to the tissues amid the implant position. Flapless dental implant position diminishes potential delicate tissue rise intricacies, for example, contamination, dehiscence, and delicate and hard-tissue corruption and has appeared to have implant achievement rates same to regular techniques.[22,28-30] A flapless system utilizing surgical direction for most extreme control of penetrate profundity and angulation diminishes potential damage to hidden anatomical indispensable structures amid implant osteotomies.

Mathews detailed the All-on-four idea at first which was advanced by Malo.[31] The idea is arrangement of four dental implants in the maxillary and mandibular dental arch. Two implants are put in the maxillary or mandibular front horizontal incisor/canine zone in a regular vertical manner. Two extra front back calculated implants are set in the back locales, for the most part in the premolar areas, at a 30-degree angulation. The back calculated implants are put to stay away from the maxillary sinuses and the psychological foramina, while growing the front back spread of the implant stages keeping in mind the end goal to build the quantity of teeth created in the last prosthesis. These methods limited the requirement for bone-joining techniques and diminished the quantity of implants required for an entire arch reclamation. Makers started making stock 30-degree calculated projections particularly for this method. The last rebuilding is for the most part a total arch, which is typically restricted to the second premolar or first molar teeth. As the All-on-four idea has picked up acknowledgment, changes to the system have been produced by the dental practitioner and displayed keeping in mind the end goal to diminish the issues of extreme decay with restricted bone stock or constrained interocclusal space for full mouth reclamations in totally edentulous patients.[26-31]

Conclusion

The utilization of CT-guided surgery to play out the All-on-four strategy is an admix of methods that is in the beginning periods of normal practice among dental practitioner. In this manner, early experience proposes an effective "marriage" of these two strategies, with the likelihood of enhanced results for the patient. Future research is required to totally look at the constraints of the two innovations in the innumerable circumstances found in the terminal dentition or atrophic jaw conditions.

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