



Surgical Guides in Implantology: The Plan and Place Dental Implant Prosthesis

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The reverse engineering science i.e. Dental implants, commonly known as the 3rd dentition, has always been the most preferred choice of prosthodontic treatment modality, more than the conventional fixed and removable prosthodontics. Failures in dental implantology are sometimes inevitable. This may be attributed to the improper diagnosis and treatment planning before and during the procedure. This gave birth to the concept of “surgical template”, also known as surgical guide or surgical stent. According to Glossary of Prosthodontic Terms Ninth edition, surgical guide can be defined as a guide used to assist in proper surgical placement and angulation of dental implants.

Surgical guides are templates that transfer information regarding the final tooth position to the dental surgeon prior to the dental implant placement. Previously, dental implant position and placement mainly depended on the residual bone availability [1]. This after planning of the implant prosthesis makes the implant placement relatively more difficult. Avoiding such issues in implantology, a concept of prosthetic driven implantology or restorative driven implantology was introduced. This prosthetic driven implantology approach includes surgical guides or surgical templates. Surgical guides assist in both diagnosis and treatment planning as well as facilitate proper positioning and angulation of the implants in the bone [2]. In addition to this, prosthetic driven implant placement in consonance with the surgical guide can actually reduce a number of implant complications mainly the clinical and laboratory complications. Hence, increasing demand for dental implants has resulted in the recent and innovative techniques for the fabrication of these guides [3].

Surgical guides have proved to be a boon in the field of dental implantology as it is associated with a number of advantages. The manual/human errors associated with free hand implant place-

ment are reduced • Provides a psychological benefit to both the clinician as well as the patient by reducing postoperative surgical problems • Precise placement of dental implants being the prosthetically driven components; any such deviation from the same can lead to abrupt results in the final outcome and function of the prosthesis. In addition to this, implant placement has become more accurate in respect to both the position as well as the angulation of the dental implant • Safety is one of the major factors during implant placement particularly in the critical or the anatomically important areas of the oral cavity. Even a minute error can lead to extensive complications. Henceforth, with the help of surgical guides, such errors can be minimized and ultimately prevented. Vital structure can be protected with surgical guides, hence need to be given due respect while placing the dental implant • Predictability of the final prosthodontic treatment is more using the surgical guides. • Aesthetics is always better due to the incorporation of the digital modalities i.e. computer aided treatment planning and implementation of the same resulting in excellent aesthetics. • Maintenance of the oral hygiene – meticulous oral hygiene can be ensured due correct implant placement • Survival - implant supported prosthesis should be placed in the proposed pre-planned position for the best implant survival. • Quality placement - quality placements of implants is always ensured using the surgical guides • Time reduction - surgery time during implant placement is reduced • Ease in fabrication: particularly when using the digital modalities i.e. computer aided designs (CAD) • Special surgical guides i.e. the bone reduction guides ensure graft harvesting • Surgical guide can also act as a temporary prosthesis in fully edentulous cases • Accessibility: surgical site is easily accessible and hence the flap exposure • Failure rate – reduces along with the reduction of the visits of the patient [4].

Apart from the multiple advantages, surgical guides are associated with a couple of issues. Surgical guides do not completely help

in predetermining the position of the dental implant particularly during the surgery. Any pathological changes in the soft tissue i.e. swelling or the hard tissue like loss of abutment teeth) may change the fit of the surgical guide altogether leading to the failure in the placement of the dental implant. Lodgement of the osteotomy drills in the guide and surgical guide dislocation i.e. lifting off the guide are some of the common issues occurring during the surgical phase.

- Learning curve associated with the surgical guide is steep
- Expense – cost issues related to the software as well as maintenance [5].

The surgical guides or the implant navigation [6] can be classified as:

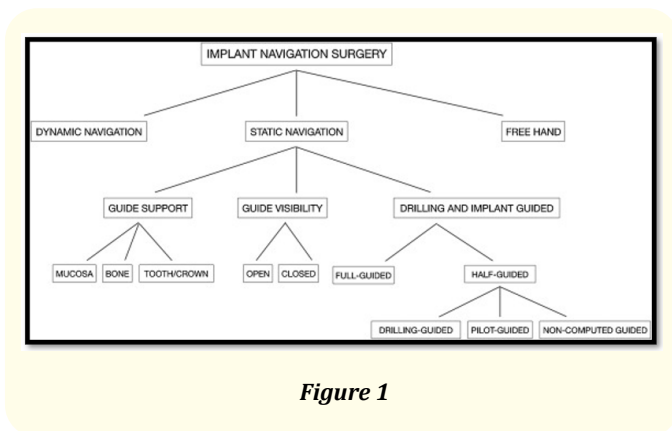


Figure 1

Implant surgical guides involve a stepwise approach [7]

Step 1: Proper diagnosis and treatment planning.

Step 2: CBCT software involving virtual treatment planning of dental implant and prosthesis.

Step 3: Selection of proper dental implant system and associated components.

Step 4: Surgical guide compatibility with a particular implant system. This also depends on the number of teeth. If more than 3 teeth, tooth borne surgical guide has to be selected, if less than 3 teeth, mucosa or bone borne surgical guide has to be selected.

Step 5: Anchor selection depending on the implant site, number, angulation, and anatomical limitations

Step 6: Fabrication of the surgical guide

Step 7: Disinfection of the received surgical guides and further evaluation. Teeth supported and mucosa supported surgical guides must be thoroughly evaluated on the cast as well as in the patient’s mouth.

Step 8: Verification of the surgical drills and associated drill keys.

Step 9: Stabilization of guides in patient’s mouth using anchor pins followed by the verification of the same

Step 10: Sequence of the osteotomy using appropriate drills

Step 11: Implant installation.

Conclusion

Dental implants have proved to be the best prosthodontic treatment modality for replacement of missing tooth/teeth. Proper diagnosis and treatment plan ensures proper outcome of the dental implant. Prosthetic driven approach needs to be given due importance in such procedures. This can be truly accomplished using surgical guides that are associated with a plethora of advantages and indications overcoming the various issues associated with the same. Although a number of literature, studies have proved the utmost importance of the surgical guides in dental implantology, further studies with strong level of evidence are still needed.

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