Computer Guided Implantology: For Optimal Implant Planning

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apless approach is planned. is reduces pain and swelling, that reduces the number of appointments and patient morbidity [6].

Cost-saving: Pertaining to the reduced appointments and faster healing, the technique is less expensive [6].

Fast treatment: Guided planning of implant placement involves fabrication of immediate prosthesis from the surgical guide that can be worn by the patient soon a er surgery [7].

Operator bene ts

Increased predictability and safety: As the entire surgery is virtually planned including implant location, depth and angulation, the operator achieves higher safety and predictability. 3D-surgical planning program results in exceptional predictability and optimal implant placement [8].

Easy to perform: is concept a complete solution from the virtual planning to prosthetic rehabilitation, which makes the process of implant surgery easy and conductive [9].

Reduced equipment: It does not need extensive surgical instruments due to apless and less invasive technique [10].

e patient's dental anatomy is captured on the CT using ducially markers and planning is transferred to the real patient during surgery by superimposing the markers.

e system guides the operator to prepare the recipient site according to the predetermined virtual planning in terms of angulation, depth and position of implant.

In case of deviation from the planned path of drilling the system will trigger an audio and visual alert. is helps the surgeon to maintain the planned course and avoid encroaching on vital anatomical structures during surgery [7].

Discussion

e goal of dental Implantology is the accurate and predictable replacement of a patient's lost dentition. is involves meticulous planning involving the surgical and restorative team working together on the diagnosis, planning, and reconstruction. 3 dimensional visualization of anatomy of patient's anatomy has changed the way of approaching a case for dental implants. It has changed from the available bone dictating the implant position to a more predictable and precise prosthetic driven treatment plan [15].

Use of panoramic radiograph was condemned as it provides only a two-dimensional view that does not indicate the buccal-lingual width known as the "third dimension" of the proposed implant site [18].

Introduction of CBCT scanners enabled the operator to visualize the height and width of available bone for implant placement, thickness of the so tissue, proximity and root anatomy of adjacent teeth, extent of the maxillary sinuses, sinus septae, and other vital anatomical structures such as the mandibular canal, mental foramen, and incisive canal [15].

It is very important to seat the guide properly in the patient's mouth to achieve the planned implant position. If the radiographic guide were not placed correctly, the resulting implants would be placed di erently using the surgical guide than from the actual planned position [9].

e estimated scanning time is 70 seconds. Errors have been reported due to patient movement during the CT scan, especially for elderly patients. is caused an angular deviation of approx. 3.1 degrees in the maxilla and 2.4 degrees in the mandible. erefore it is important to maintain patient position during scanning [9].

Fiducial markers in radiographic guides can be gutta percha or use of 20% to 30% barium sulfate mixture in the acrylic to allow for radiopacity of the planned restorations in the CT/CBCT images. In the double scan technique, rst scan is made of the prosthesis alone, while the second scan is made with the patient wearing the radiographic guide. e scans are transferred to the planning so ware using DICOM (Digital Imaging and Communication in Medicine). e radiographic markers on both the scans are then superimposed to virtually plan the optimum implant position speci c to the patient's anatomy. Decisions can be made regarding the type and size of the implant, its position within the bone, its relationship to the planned restoration and adjacent teeth and/or implants, and its proximity to vital structures before performing surgery on the patient [19]. Surgical drilling guides can then be fabricated from the virtual treatment plan. ese surgical guides are used by the clinician to place the planned implants in the same positions as those of the virtual treatment plan, allowing for more accurate and predictable implant placement and reduced patient morbidity [20].

Conclusion

e location, size, angulation and depth of implant are planned before beginning the surgery. Patients undergo less invasive surgery without ap elevation leading to faster healing and early rehabilitation that makes it an acceptable treatment plan. is results in minimizing the treatment time and enhanced patient comfort.

References