Surgical guide techniques and treatment planning for dental implant placement

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Commentary:
Surgical guides play a crucial role in facilitating the correct angulation and positioning of dental implants1. They serve as a template for the dentist which provide information regarding the positioning of implants before placing it. Surgical guides help in improving the accuracy of implant placement. A multidisciplinary approach involving a prosthodontist and an oral surgeon with close collaboration with a dental laboratory technician is required for optimal positioning of the dental implant2. By following the correct technique, surgical guides boost the confidence of the clinician, avoids damage to the anatomic structures and also prevents any further complications such as fenestrations and dehiscence. There are three types of surgical guides which are tooth-borne, mucosal borne, and bone borne guides. Depending on the case, anyone or a combination of the above guides may be chosen3. For the long term functional success of an implant the correct alignment is also a must which can withstand the occlusal forces4. The most common materials used to make surgical implants includes composite resin or acrylic resin(Auto-polymerizing) type. Polyvinyl siloxane has been recommended for use to adjust areas which have poor contact areas and achieve better seating and stability2. Some precautions to be taken include, placing of fixation pins to avoid the rotation of surgical guide during implant placement, use of bite index is recommended but it may produce some inaccuracy on the occlusal surface of the guide hence it must be assessed. Recent studies have shown that most common errors while using the surgical guide have occurred in the vertical direction. This is reasoned out by stating that it is due to the inability of the implant in reaching its final position due to debris in the implant cavity and due to the compressibility of mucosal tissue resulting in the implant being placed at a more subcrustal level6. Various designs of surgical guides have been classified mainly as non-limiting design, partially limiting the design and completely limiting design. The non-limiting design indicates the ideal position of the implant without any importance on the angulation of the drill. This may result in unsatisfactory angulation of implants possibly leading to a failure. Hence not advocated. They can only be used as imaging indicators. In partially limiting design, the osteotomy drill which is done first using the surgical template, the rest of the osteotomy, and implant placement is done freehand by the clinician. Completely limiting design limits the surgeon in performing the osteotomy in buccolingual and mesiodistal planes only. It comprises of two types, cast based guided surgical guide and CAD/CAM (computer-aided design/computer-aided manufacturing) based surgical guide. It uses data from the CT scan in the planning of rehabilitation using implants. The completely limiting design is considered to be better in terms of clinical outcome, a however large number of clinicians still use the partially limiting design as it is cost effective7. In today’s times of prosthodontically driven implants, surgical guides play a valuable role in serving as an adjunct to implant placement2. With the correct treatment planning using latest technologies such as stereolithography, CAD/CAM and computer-assisted tomography (CT) predictable clinical outcomes of implant placement may be achieved5.
Keywords: Implants, Surgical, Guide, Stereolithography, CAD/CAM.

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