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Editor in Chief

Dr. Amar Bhochhibhoya

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Dynamic Navigation: A Novel Tool for Dental Implant Surgery

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Dynamic navigation is an advanced technology that has revolutionized dental implant surgeries. Before being used in implant dentistry, navigation technique has been practiced in neurosurgery for performing minimally invasive brain surgeries. Navigation surgery for implant placement can be broadly categorized as dynamic and static navigation. The static navigation uses static surgical guide for the sequential drilling of osteotomy site and the implant placement. The static navigation can either be fully guided or partial/half-guided.

Dynamic navigation is a computer-assisted implant placement technique that uses real-time imaging to guide the implant placement procedure. In dynamic navigation, a three-dimensional (3D) software monitors and tracks the bone drilling and the implant placement in real time during the entire procedure. This technique involves prosthetically driven virtual implant placement planning with Cone Beam Computed Tomograph (CBCT) before the implant surgery. The 3D image of the patient is analyzed in a CBCT scan. This image is then used to plan the placement of the implant and create a surgical guide. A resin guided template is 3D printed or milled which is used during the surgery. The CBCT scan images are transferred into a 3D virtual image using a digital software, which allows 3D viewing of the structures using Computer Aided Design (CAD). A calibrated special navigation instrument with a specific software guides the bone drilling sequence and the implant placement. The drilling procedure is completely tracked and the patient's anatomy and the surgical procedures in real time is shown in a 3D software. The use of real-time imaging and computer-guided technology ensures that the implant is placed precisely in the desired location, reducing the risks associated with conventional implant placement.

Dynamic navigation is an effective and precise method that allows for more accurate placement of dental implants, which reduces the chance of damaging anatomical structures. It also gives clinicians the possibility to modify the planned surgical approach during the surgery. Additionally, because the implant is placed more accurately, there is less risk of the implant failure. However, a learning curve and a training period is required before one masters this novel technology. Dynamic navigation has a potential for becoming a preferred method for dental implant placement in near future.

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