

# SURGICAL GUIDE IN THE IMPLANTOPROSTHETIC TREATMENT

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**Abstract:** In the case of extended edentations and of accentuated atrophies, the correct positioning of implants at crest ridge level and inside the bone is hindered by the absence of the reference points. The use of the surgical guide significantly facilitates the insertion of implants in an optimum topography. This article briefly describes some of the methods used for the accomplishment of the surgical guide, as well as the procedure of using it during the implants insertion surgical intervention.

**Keywords:** surgical guide, implantoprosthetic treatment, implants insertion.

**Rezumat:** În cazul edentațiilor întinse și a atrofiilor accentuate, poziționarea corectă a implanturilor la nivelul coamei crestei și în interiorul osului este îngreunată de dispariția reperelor. Utilizarea ghidului chirurgical facilitează în mod semnificativ inserția implanturilor într-o topografie optimă. Acest articol descrie pe scurt câteva modalități de confecționare ale ghidului chirurgical, precum și procedura propriu-zisă de utilizare a acestuia în timpul intervenției chirurgicale de inserție a implanturilor.

**Cuvinte cheie:** ghid chirurgical, tratament implantoprotetic, inserția implanturilor

The finality of the implantoprosthetic treatment consists in the oral rehabilitation of the patient through implant supported prosthetic restoration.

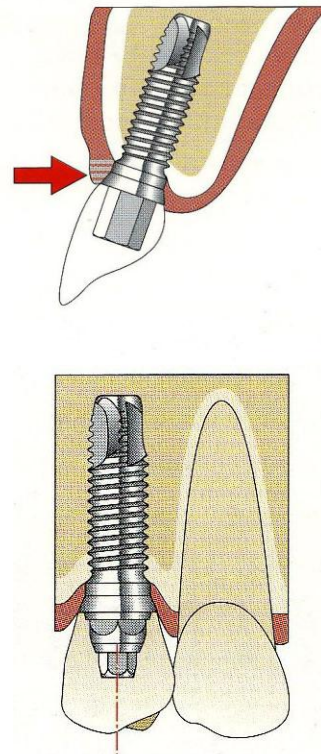
The uniform transmission of forces towards the implant complex and the bone around the implants supposes an optimum positioning of the implants at the level of the crest ridge and inside the bone, so that the forces should be transmitted in the long axle of each implant.

In order to accomplish this, the implant should correspond V-O (vestibule-orally) and M-D (mesial-distally) to the centre of the occlusal surface (lateral teeth) or of oral surface (frontal teeth) of the crown that will be applied on the implant, while in the interior of the long axle crest, it should be almost perpendicularly on the occlusion plane.

In current practice, an optimum positioning of implants is difficult to accomplish due to the fact that most of the patients who request the accomplishment of an implantoprosthetic treatment show total and extended

edentations, as well as a significant osseous re-absorptions of the edentate crests.

**Picture no. 1. The correct positioning of the implant on the crest ridge and inside the bone.**



Extended edentations mainly bring about the loss of the M-D positioning reference points of the implants on the crest, while the accentuated re-absorptions lead to the disappearance of the V-O reference points, through the alteration of the inter-maxillary relations.

In order to facilitate the insertion of implants in an optimum topography, the mostly used method by patients is the use of the surgical guide.

The surgical guide is accomplished by the technician in laboratory and is made up of transparent acrylate.

Regarding the partial edentation, the accomplishment of the surgical guide is preceded by the

## CLINICAL ASPECTS

impression of the prosthetic field, moulding the study materials and the shape of the future restoration model. A thin sheet made up of transparent acrylate will be placed in the study pattern and model that will be fixed tightly on the model through pressure under vacuum. A groove will result, similar with that used for whitening the teeth. At the level of the model that performs the restoration of the missing teeth, the groove will be filled in with transparent acrylate. Thus, the surgical guide used in the partial edentations will comprise the edentate areas, as well as the remaining teeth for a better stabilization on the prosthetic field.

**Picture no. 2. Surgical guide in a partial edentation**



Regarding the total edentation, when the old prosthetic is still corresponding from the functional point of view, the surgical guide may be obtained through the duplication of prosthesis. An impression of the prosthetic field will be made by using as the individual spoon, the total prosthesis of the patient, following to shape the model. The transparent acrylate sheet will be moulded under vacuum on the entire area of the prosthesis and will be filled in with transparent acrylate.

**Picture no. 3. Surgical guide in a total edentation**



If the patient has never used a prosthesis or if the prosthesis is no longer functional, it is necessary to accomplish a prosthesis until the accomplishment of the model and its testing in the oral cavity.

There is another method for accomplishing the surgical guide, that is the CAD/CAM technology.

A first step in this respect consists in the use of the computer-tomography images in order to simulate the position of the implants on the computer display. The bi and three-dimensional computer-tomography images are sent to the technician in order to accomplish the model and the surgical guide with the help of the CAD/CAM system.

Although the device is expensive, the surgical guide obtained through the CAD/CAM technology is extremely used in the complex cases, substantially simplifying the surgery technique and reducing at minimum the surgical and prosthetic complications.

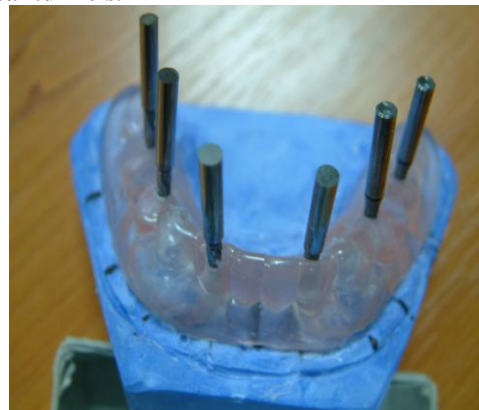
Irrespective of the method of manufacture, within the surgical intervention of inserting the implants, the surgical guide provides a parallel insertion of the implants, in a topography that corresponds to the natural lost teeth and with an insertion axle, adapted to the alterations brought to the osseous angulation by the atrophy process.

All these desiderata are possible through the positioning of the surgical guide on the mode assembled on the parallelogram table and by creating certain parallel tunnel through each crown of the guide, following to make the insertion of each implant at this level.

**Picture no. 4. Positioning the surgical guide on the parallelogram table in order to trace the osseous tunnels.**



**Picture no. 5. Evidencing the line of the tunnels in the surgical tunnels.**

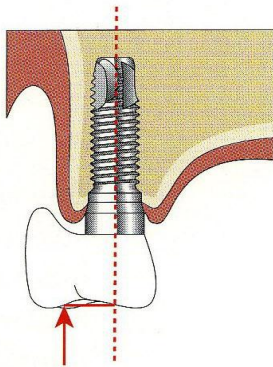


In case, atrophy is minimal, the guide will trepan up to the middle of the occlusal or oral surfaces of the

teeth prefigured by the guide, and in case atrophy is evident and was not adjusted through procedures of preimplantologic augmentation, trepanation will be made in a slightly oralized position.

It is also important to take into consideration a vestibulo-oral positioning of the implant 1,5-2mm away from the vestibular area of the artificial crown prefigured in the surgical guide. The oral orientation with more than 2 mm will compel the prosthetician to model the artificial crown with one step towards the vestibular, what will lead to unfavourable biochemical and aesthetic effects. (picture no. 6).

**Picture no. 6. Crown modelling one step towards the vestibular area**



In case of a deep occlusion (class II/2), a too palatal position of implants may lead to the impossibility of performing the prosthetic restoration.

In mesio-distal sense, the tunnel will be localized by taking into account the fact that the distance between the tooth and implant should be of 1.5-3mm, while between two implants, this distance should be of 3 mm at least.

A distance smaller than 1,5 mm between the tooth and the implant may bring about the ischemia of the interdental papilla and may accelerate the re-absorption of the bone placed between the two structures.

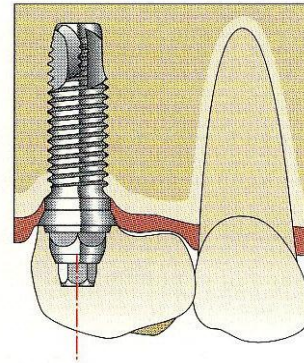
Yet, there are particular situations in which the distance between the implant and tooth is not observed, and it is larger.

- Adjacent tooth with curved root or oriented towards the edentate space;
- Other anatomic formations that interpose on the implant line and require to be avoided, with a view to avoid the insertion of too short implants.

Such particular situations may lead to the creation of a crown which is too extended in mesio-distal sense (picture no. 7). This extension of the crown towards the tooth which is adjacent to the edentate space will act as an extension of the restoration supported on implants, exercising flexions and torsions, especially on the implant most closely to the extension.

In such cases, the inclusion in restoration of the neighbouring tooth with a mixed support is preferred.

**Picture no. 7. Exaggerated extension of the crowns**



Regarding the distance between the two implants, studies of Greenstein and his collaborators prove that by reducing the distance between two implants below 3 mm will increase the bone re-absorption, as against an average of 0,45 mm obtained at the level of the interimplantar bone, in the case of implants where the distance of 3 mm was observed.

At the same time, the existence of a space of minimum 3 mm between two implants gives sufficient space to the transfer devices in the moment of impression and allows the creation of large interdental embrasures due to restoration, with the possibility of accomplishing a better peri-implantar hygienization.

In the case of a total edentation that will be restored by overdenture, there is a certain acceptance regarding the mesio-distal topography of the implants, while in vestibule-oral sense, the orifices of the surgical guide will be placed more orally, being comprised in the basis of prosthesis, in the immediate neighbourhood of the artificial teeth. It is recommended to avoid a too oral localization of the implants, because the thickness of prosthesis acrylate at the level of implants may alter phonation.

The surgical pattern, thus prepared, will be positioned in the oral cavity and the practitioner will enter through the tunnels, initially with the milling cutter, marking the localization of the future alveoli, then he will drill by using the pilot milling cutter, making the osseous tunnels, which will be parallel and will have a proper vestibule-oral axle.

**Picture no. 8. Intrasurgical use of the surgical guide.**





During the milling procedure, the final length of the tunnel will be established, so that a safety limit of minimum 2mm will be left as against the neighbouring anatomic structures (sinus, maxillary, nasal fossa, mandibular channel). In order to preserve this minimal distance of 2 mm and in order not to enter the mandibular channel of other anatomic structures with the pilot milling cutter, depth indicators will be used, or stoppers, attached to the pilot milling cutters, up to the level at which the bone drilling is necessary.

The surgical guide proves its utility not only in the insertion stage, but within the stage of uncovering the implants, as well in order to easily detect the covering screws under the gingival mucosa.

### CONCLUSIONS

The use of the surgical guide in the stage of inserting the implants provides:

- Implants parallelism;
- Adequate mesio-distal positioning of the implants on the crest;
- Individualization of the insertion vestibulo-oral axle of each implant.

The possibility of positioning the implants in an optimum topography prevents the occurrence of intrasurgical accidents and provides a proper transmission of forces on implants and peri-implantar bone through the prosthetic restoration.

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