Training in print:
Upper denture on four GPS implants

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Are you at ease with all types of attachments? To begin, we must distinguish between the GPS and the locator. As a matter of fact, the GPS attachment resembles in many respects a locator attachment. However, the main difference between them is the following: it is possible, in implantation, to screw the GPS attachment with a conventional screwdriver; for the locator, however, a special screwdriver must be used. The other differences concern the cap (or the body), the nylon, and the device used to position the nylon.

You can put a GPS cap or a locator cap on any kind of attachment, without any problem. On the other hand, if you have a GPS cap, you can only place a GPS nylon in the interior. If you have a locator cap, you can only place locator nylon. In both cases, you have to use the tool that corresponds to the type of cap.

So, I repeat: the GPS and the locator are similar attachments, but the nylons and the corresponding caps are not interchangeable.

For the practitioner, the attachments that interfere little or not at all in the implementation of the denture offer a fine advantage. The advantage of the GPS is that, the closer it is to the gum the better it functions. A ball attachment, on the contrary, functions best when it is away from the gum. The retention of the denture in the mouth is easily adjustable; it is the colour of the nylons that indicates the force of the retention. Also, with four implants for the upper denture, a large part of the palate of the denture can be removed, which will increase the comfort of the patient.

I would recommend that you always reinforce your denture, whatever type of attachment you are using.

A patient with implants will automatically have greater force of mastication, and thus

the risks of denture breaks are multiplied. With a reinforcement, it is possible to avoid breaks. The above visual illustrates a simple reinforcement set in eclipse resin on GPS attachments. This way, the risk of a break in the piece is reduced, and if a break occurs anyway, the position of the caps will not be affected. On the other hand, without reinforcement, after the repair, each cap must be directly repositioned in the mouth. As you well know, with implants, we do not work to the nearest millimeter, but rather to the millionth of a millimeter.

What I would recommend you to do for the reinforcement, is a little different from that seen in the preceding photo. It concerns making a piece of metal with a palatal part as if we were fabricating a metal partial, thus reducing the thickness of the acrylic on the lingual aspect.

The advantages for the patient are:

- Stability of the denture
- Freeing of the palate
- Significant reduction of bone loss
- Augmentation of mastication force
- Comfort
- Possibility of addition of implants in the future for a fixed denture

Four principal heights of GPS attachments exist (a fifth exists but is seldom used as it is too long). The different heights do not serve to offer higher GPS attachments, but rather to offset thickness of the gums (see photo). Thickness of the gums can vary from 1 to 4 mm, so the height of the GPS attachment compensates.

To facilitate the work, one must always have a space of 1.5 mm to 2 mm above the gum for the cap (see photo). The more this rule is followed, the better the GPS function and the greater the space to position the teeth.

In a training session I recently followed at the International Dental Institute, Dr. John Cavallaro, of New York, told us that one must calculate 4 mm for the GPS, 1 mm for the metal piece and 3 mm for the cap, which gives a height of 8 mm; only after that can one position the teeth. This is an enormous distance to seat the teeth of an upper denture. The available space is often much more restricted. That is why it is important to maintain a maximum of 2 mm of height for the GPS attachment, which gives a total of 6 mm of height. This is still a significant distance before the positioning of the teeth. If insufficient space exists, the surface of the metal reinforcements can be eliminated at the caps, which leaves us 1 mm less.

In this photo, the GPs is easily visible, too visible. A shorter GPS must be selected: this would allow more space and avoid stability problems.

The transfer

The transfer for the GPS is a black nylon part easily adjustable in height, unlike the Locator

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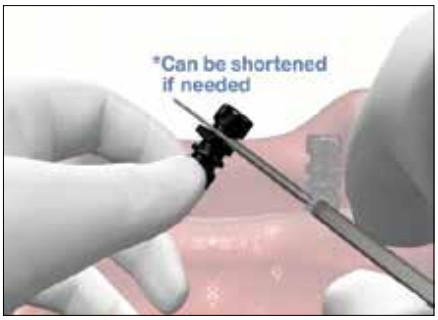


transfer which resembles a pint of milk and which is not adjustable in height. This piece can be utilized on the GPS.

The utilization of the transfer is itself useful to guide us in the fabrication of the metal framework, but I strongly recommend placement of the GPS caps on delivery. I will explain how to do this a little further on in the article. Whether it is the GPS or the locator, one in four times, if you position caps prior to placement in the flask, there will be poor retention of the denture on the GPS attachments, even if one has the impression that it is correct. The patient will return several times to change the nylons on the pretext that the retention is not holding.

The paralleling device and the guide

Another piece of equipment again met is the paralleling rod and the guide serving to point out the divergence between implants, thus permitting the selection of the proper strength of nylon to use in the cap.

The choice of nylons is always made according to the needs of the force required and of the angle of the implants. The more the implants diverge, the softer the nylon required. Still, in certain cases and especially when there are only two implants, the only option is to put a tougher nylon, which will require more frequent replacement.

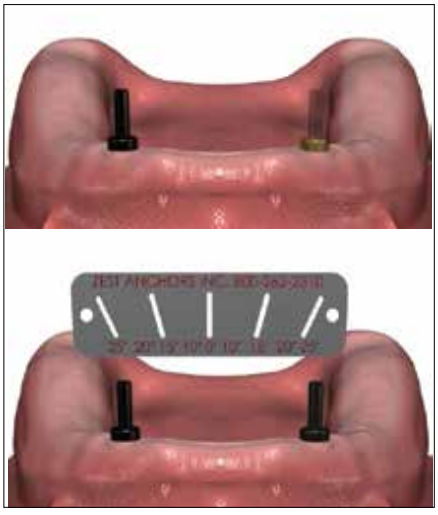
The analogue and the blank spacer (ring spacer)

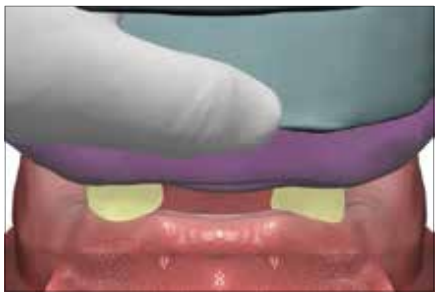
Another piece of equipment you will meet is the analogue, which will replace the implant in the stone model, and the blank spacer, a rubber ring useful on the model and in the positioning of the caps directly in the mouth. This spacer covers the space between the cap and the gum, and it serves to stop the acrylic entering the gum, a situation which would make re-moval of the denture extremely difficult. The number of spacers always depends on the space to be covered between the gum and the cap.

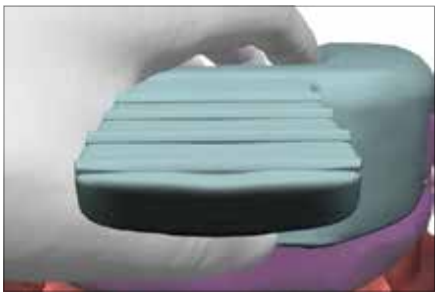
To take the impression

Here the photos are of lower models, but the principle is the same for the upper. The custom impression tray must be prepared according to the position of the transfers.

I recommend you to make the outer circumference of your custom impression tray with heavy density polysiloxane. Afterwards, the transfers must be placed in the patient's mouth at the height estimated not to interfere with the impression. If necessary, the transfer can be cut to obtain the desired height.







Afterwards, the custom impression tray must be filled. Here, several theories can be applied, but I recommend putting either polysiloxane monophase, as it is supple at the beginning and becomes sufficiently firm when hardening, or light if you have experience with these products. If you use a light you have to put polysiloxane monophase in the section of the implants in the impression tray.

Now, in the patient's mouth, you have to put heavy or even rigid polysiloxane; that will fix the transfer in the impression tray and prevent it from moving when the impression tray is removed. Moreover, for implants on the upper gum, with the viscosity selected, the density of the material will prevent it flowing downwards.

Next, you just have to put the impression tray in the mouth and wait for the final reaction of the products. I recommend using products from a single company to have an equal result. If the products are different, you will have different reaction times and a result that might be disturbed.

Afterwards, the impression is removed from the mouth and the analogs are positioned in the impression tray.

Prior to pouring stone into the impression tray, it is important to put Gingifast: this is a rubbery material that will permit better positioning of the caps on the model when they are near the gum.

The only thing left is to follow the usual procedures to confection the denture. If you position the caps before the curing, make sure that you have placed the spacers on the stone model to avoid the acrylic entering inside the cap. The number of spacers depends on the space to cover.

This procedure and the information is pertinent for the upper or lower dentures. From this you have all the basic information to confection an upper denture on four GPS implants. I hope you have added to your fund of knowledge, or at least have refreshed your memory.

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Recipient of Paul Auprix, ***Richard Emond dd*** *was responsible for the training committee at the College of Denturists of Quebec (ODQ) from 2007 to 2011. He is certified BPS (Ivoclar) in 2006 and 2011, EPIC (Dentsply) in 2009, in addition to getting a prosthetic implant diplomat in 2012. He is co-author of the course on bleaching teeth ODQ, and he also wrote several scientific papers in journals ODQ, the ADQ, the ADC and the magazine denturist Canada. It has provided training for Dentsply companies, Myerson, as well as advanced training in implantology and the occlusion and TMJ problems.*