

The components in the prosthesis on implants - Part I: single crowns

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In the midst of a never-before experienced situation, the covid-19 pandemic, an unprecedented event, has been observed in Dentistry: the additional pandemic of Instagram live streams. Such an unusual and, at the same time, fantastic phenomenon has led to an avalanche of rather pertinent, well-grounded and free information, which has certainly helped many colleagues have a better understanding of several conditions and facts associated with our profession. I participated in some streams about different topics and discussions. In one of them, in which the topic discussed was implant-supported restorations on the routine of a clinical dentist, I got the idea to write this column.

I see that those colleagues that occasionally work with implant-supported restorations have a great difficulty in understanding what elements have to be selected for this technique. Well, in this issue I briefly summarize how we should think about and select components for single implant-supported crowns.

First, we have to understand what is what. Provisory abutments, transfers, implant analogs and definitive abutments are all available to us (Fig 1). Let us suppose that the patient comes to us with the implant already in place and with a healing cap positioned. The first things we have to know are the type of implant placed, the type of connection used and the platform diameter¹ (Fig 2). The types of platforms are external hexagon, internal connection and internal Morse taper connection. This information will guide you in the correct selection of components.

To fabricate the provisional crown, essential for the mechanical activation of the implant and the shaping of the prosthetic emergence profile, we should always work with antirotational abutments, so that we achieve a positional index. The provisional restoration may be fabricated directly on the implant platform when the platform is at the same level or above the bone. In contrast, when the platform is below the bone crest, an abutment should be used, to bring the crown/abutment connection line to a more superficial position (Fig 3).

There is a current trend to use abutments, such as CONNECT (MIS Implants, São Paulo, Brazil) or On1 (Nobel Biocare, Gothenburg, Sweden), which are placed immediately after implant placement and not removed after later if the implant is placed below the bone crest. However, few companies already manufacture these abutments. When I think of provisional crowns, I see that I prefer to work with the screw-retained technique, regardless of implant position in relation to the long axis of the tooth.² After a short time, when the interim restoration is already in place and the emergence profile has already been shaped, it is time for implant transfer (impressions).

When we fabricate the provisional crown for a single-tooth restoration directly on the implant platform, we should select an antirotational transfer device, used with

a closed tray or not, compatible with the implant and its platform. If an abutment is used, we should select an antirotational coping that corresponds to that abutment, and also use a closed tray. When intraoral scanning is available, we should transfer using an intraoral scan body device, which should be placed in position after the removal of the provisional crown, and this provisional should then be scanned intraorally (Fig 5). Both non-digital and digital workflows should be conducted carefully, as the fabrication of the definitive crown depends on the resulting quality. After transfers, we should select an implant analog to be connected to the transfer and positioned in the impression material. The prosthetic laboratory already has implant analogs and will position them in the impression model when the transfer is digital (Fig 6).

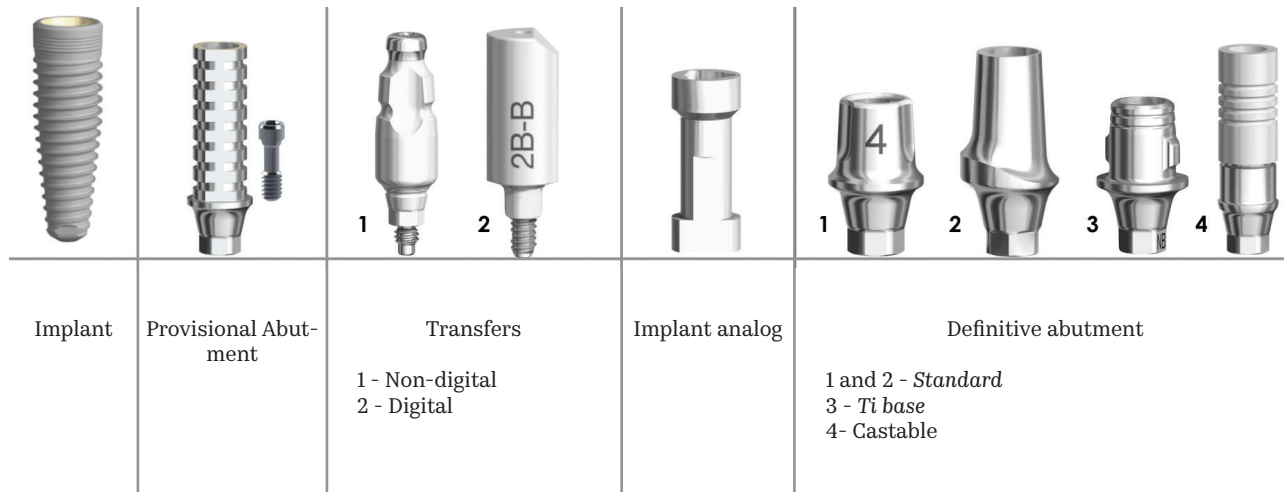


Figure 1: Sequence and different types of components that may be used to fabricate a single implant-supported crown.

Type and Diameter of the Connection

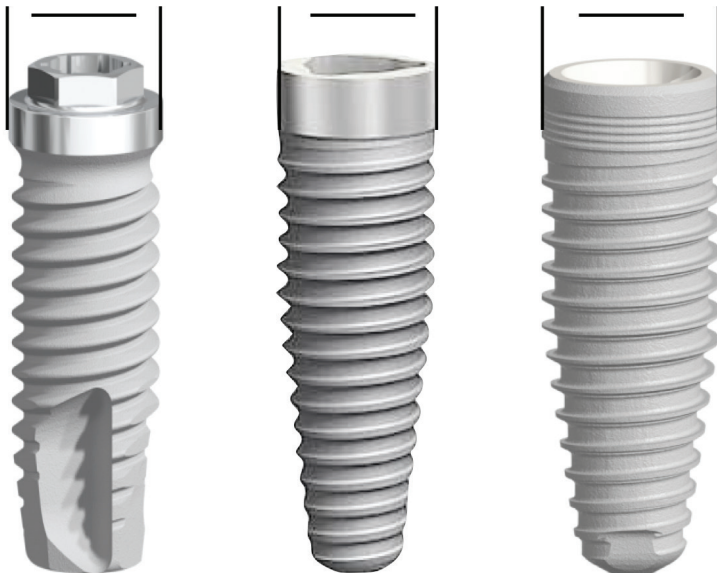


Figure 2: Different types of implant-abutment connections and their diameters: external hexagon, internal connection, Morse taper connection.

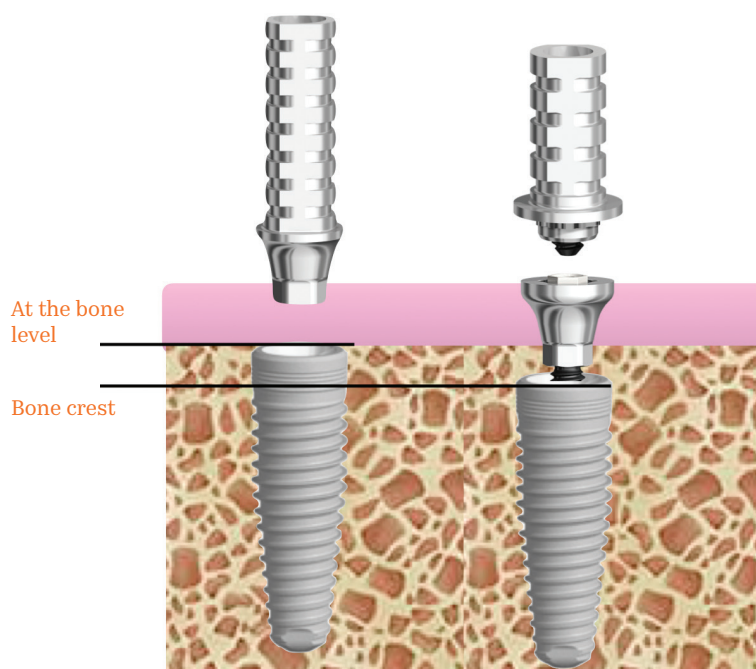


Figure 3: Diagram shows whether an abutment has to be used.

On1
Nobel Biocare



Connect
MIS Implants



Figure 4: Immediate abutments. Crown is developed from this level.

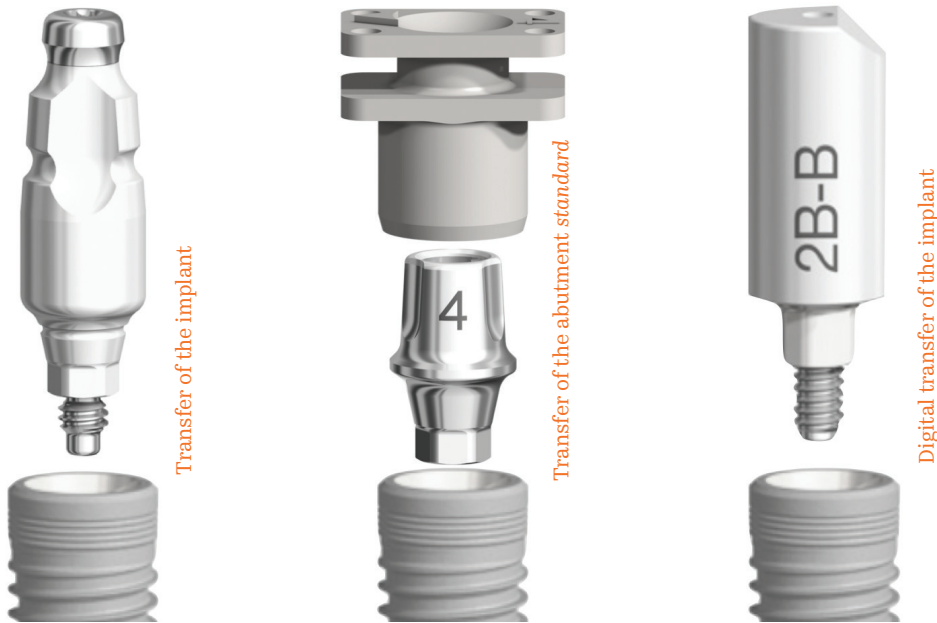


Figure 5: Types of transfers used with different techniques.

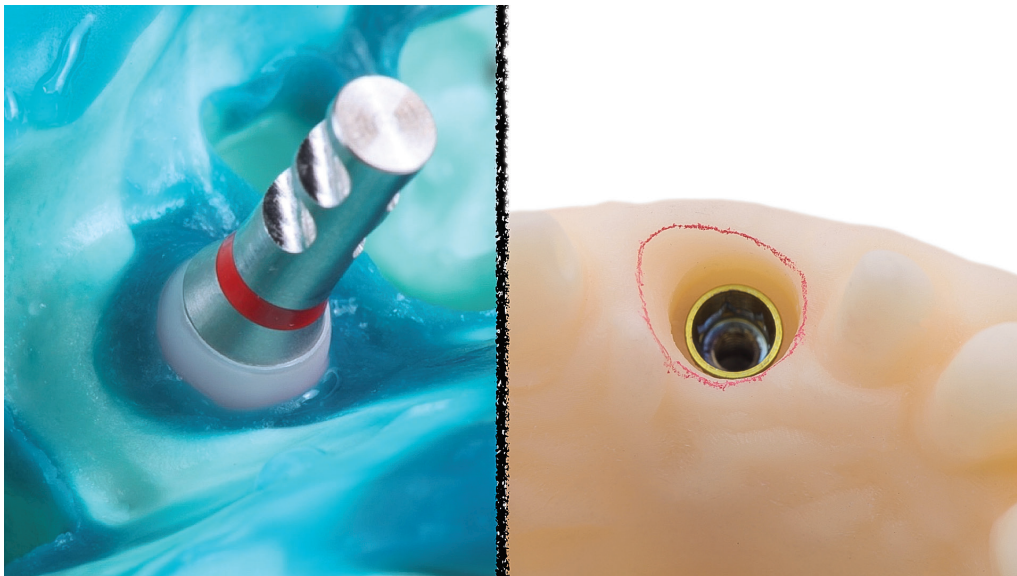


Figure 6: Analogs for non-digital (impression material) and digital (impression model) workflows.

At this point, we have to decide if we will work with a definitive cemented or screw-retained restoration. This will depend on the position of the implant in relation to the long axis of the crown or on the personal preference of each dentist.

When the implants are well positioned in relation to the long axis of the tooth, we have the option to work with either screw-retained or cemented restorations. In the posterior zone, I always prefer to use screw-retained restorations, but in the anterior zone, my decision is more flexible, and I may use either one or the other, depending on some clinical conditions, such as the number of teeth and the restorative techniques to be used. In contrast, when implants are not well positioned in relation to the long axis of the tooth and the implant screw emerges on the buccal, lingual or incisal surface, we have to work with cemented crowns. The strategy selected, either screw-retained or cemented, defines the type of definitive abutment for

the restoration.³ If we choose a screw-retained crown, we will use the components that companies provide for that type of case.

There are different types of definitive abutments, which have variations according to the different manufacturers. Basically, we may find three abutment types for a single screw-retained crown: a tapered mini abutment, a castable UCLA abutment and a Ti-based abutment (Fig 7).

If we choose a cemented crown, we may use standard abutments for cemented crowns and their corresponding castable cylinders, which should be planned, casted and used as a framework. (Fig 8). When we select a prefabricated abutment to fabricate a cemented crown, we should measure the abutment collar height. The reference point for this measurement is the distance from the implant platform to the buccal gingival contour, as the collar should be about 1 mm below the bone crest (Fig 9).

Abutments for single screw-retained crowns



Figure 7: Abutments for single screw-retained crowns according to different techniques: tapered mini-abutment, castable abutment with CoCr collar and Ti base.

Castable abutments and cylinders



Figure 8: Castable abutments and cylinders for single cemented crown.



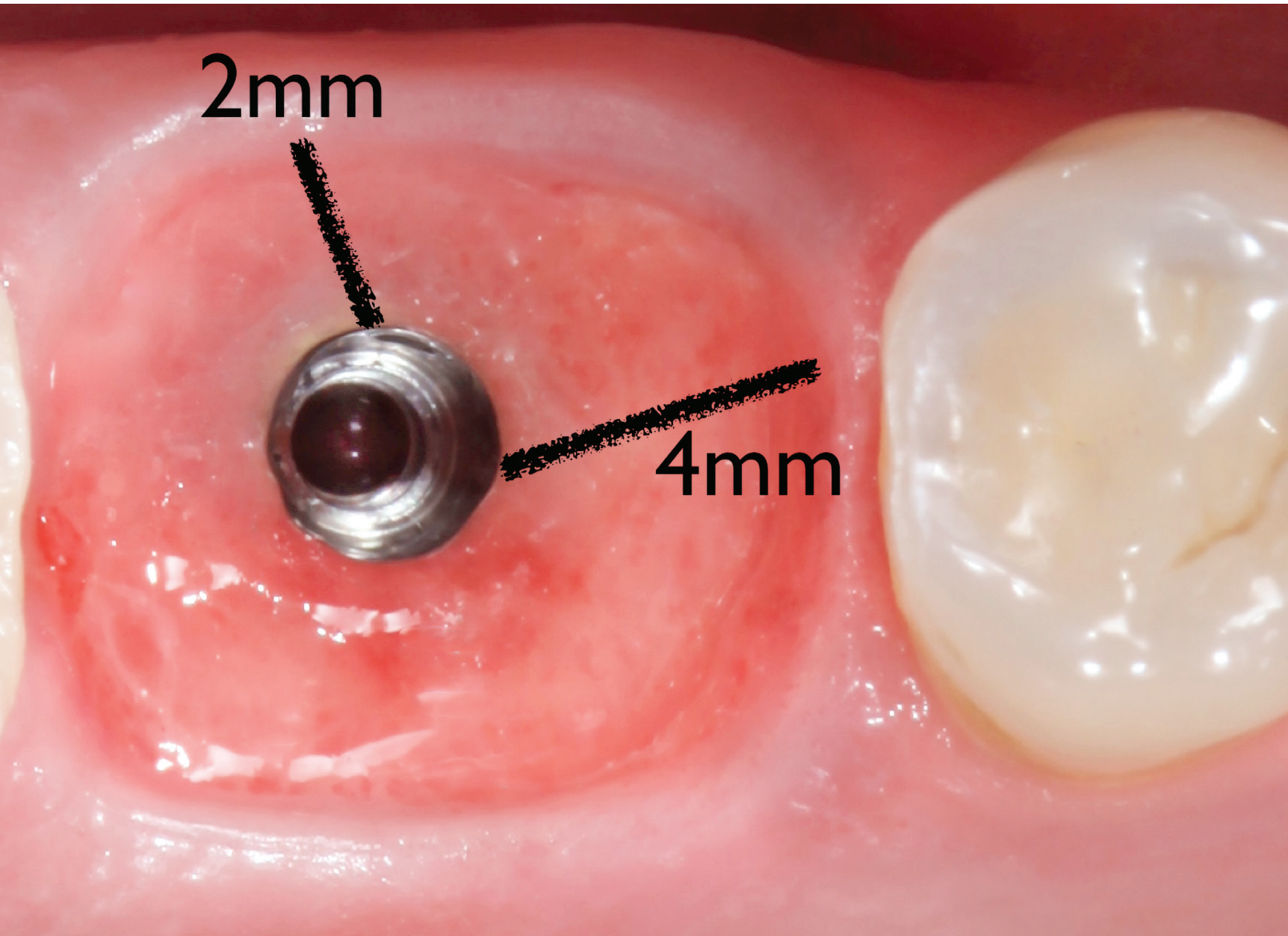


Figure 9: Clinical photo shows height of buccal (2 mm) and proximal (4 mm) areas. Definitive abutment collar should be defined according to esthetic zone. In this case, the area chosen was buccal, usually shorter than proximal area.

Below we describe five basic protocols for each type of clinical case, keeping in mind that some initial questions should always be asked: Will the restoration be cemented or screw-retained? Is it a single- or multiple-tooth restoration?

Protocol 1

Metal-ceramic single screw-retained crown directly on implant platform (Fig 10).

What components do I need?

- ✓ 1 implant transfer – antirotational, closed tray
- ✓ 1 implant analog
- ✓ 1 castable UCLA abutment – antirotational

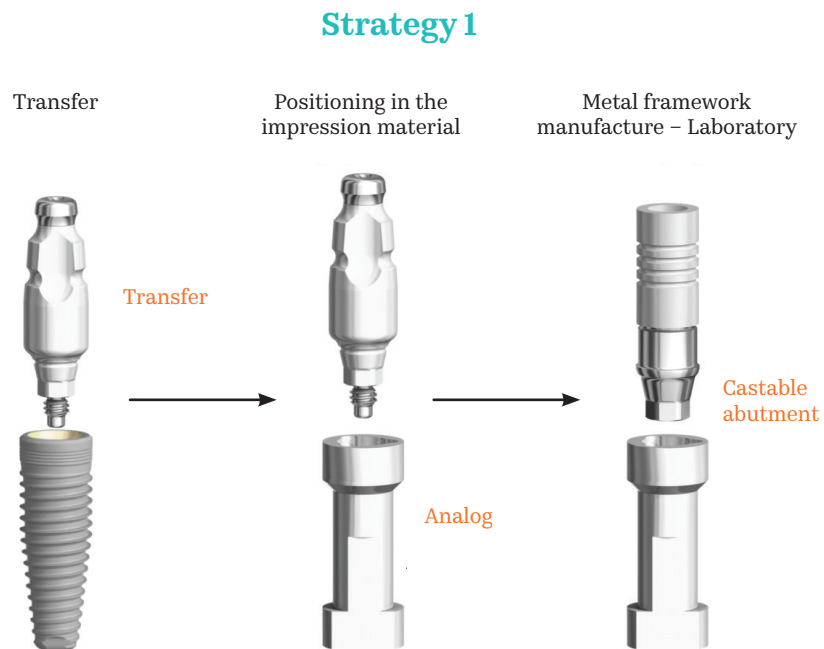


Figure 10: Protocol 1. Implant transfer and analog and castable abutment with CoCr collar for metal framework manufacture.

Protocol 2

Metal-ceramic single screw-retained crown on abutment (Fig 11):

What components do I need?

- ✓ 1 abutment
- ✓ 1 abutment coping - antirotational, closed tray
- ✓ 1 abutment analog
- ✓ 1 Castable UCLA cylinder - antirotational

Strategy 2

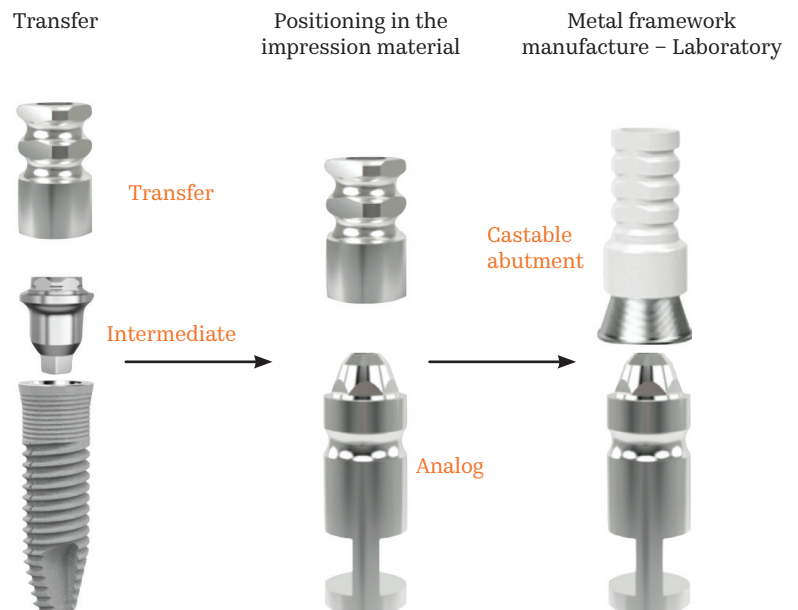


Figura 11: Protocol 2. Abutment, abutment transfer and analog and castable abutment cylinder to manufacture metal framework.

Protocol 3

Single screw-retained crown on Ti base (Fig 12A, B).

What components do I need?

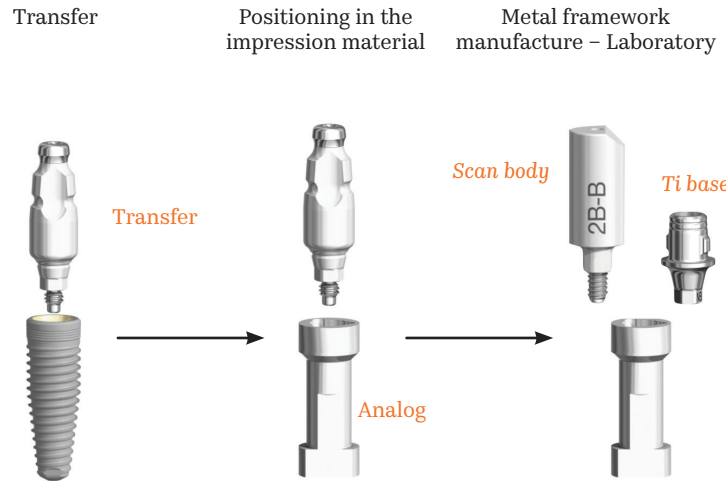
Non-digital workflow:

- ✓ 1 implant transfer – antirotational, closed tray
- ✓ 1 implant analog
- ✓ 1 scan body, (the prosthetic laboratory has it)
- ✓ 1 Ti base (the prosthetic laboratory provides it)

Digital workflow:

- ✓ 1 scan body
- ✓ 1 implant analog for the impression model (the prosthetic laboratory provides it)
- ✓ 1 Ti base (the prosthetic laboratory provides it)

Strategy 3 - Non-digital workflow (A)



Strategy 3 - Digital workflow (B)

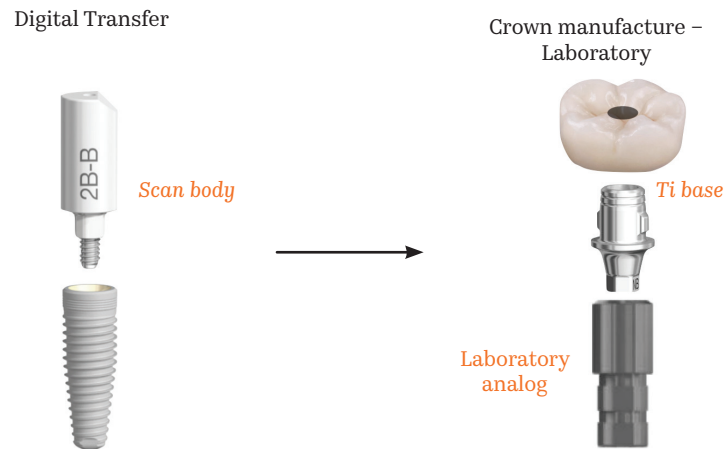


Figure 12: A) Protocol 3: non-digital workflow. Implant transfer and analog. Scan body and Ti-based abutment to be used by laboratory technicians to manufacture screw-retained crown, which may be fabricated using different framework materials (metal, zirconia, disilicate). B) Protocol 3: digital workflow. Intraoral scanning using implant scan body. Laboratory fabricates and uses implant analog for impression model, and Ti base is used for screw-retained crown.

Protocol 4

Single cemented crown on standard prefabricated abutment (Fig 13):

What components do I need?

- ✓ 1 implant transfer – antirotational, closed tray
- ✓ 1 implant analog
- ✓ 1 standard prefabricated abutment – antirotational
- ✓ 1 castable cylinder – antirotational

Strategy 4

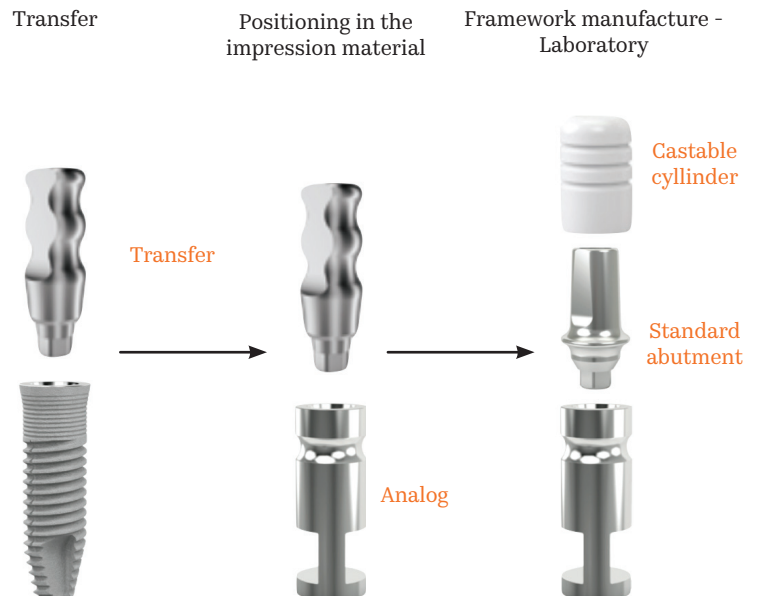


Figure 13: Protocol 4: Implant transfer and analog. Standard abutment for cemented crown and fully castable cylinder for manufacture of cemented crown framework.

Protocol 5

Single cemented crown on hybrid customized abutment (Ti base + zirconia)
(Fig 14 a, b):

What components do I need?

Non-digital workflow:

- ✓ 1 implant transfer – antirotational, closed tray
- ✓ 1 implant analog
- ✓ 1 scan body, (the prosthetic laboratory has it)
- ✓ 1 Ti base (the prosthetic laboratory provides it)

Digital workflow:

- ✓ 1 scan body
- ✓ 1 implant analog for the impression model (the prosthetic laboratory provides it)
- ✓ 1 Ti base abutment (the prosthetic laboratory provides it)

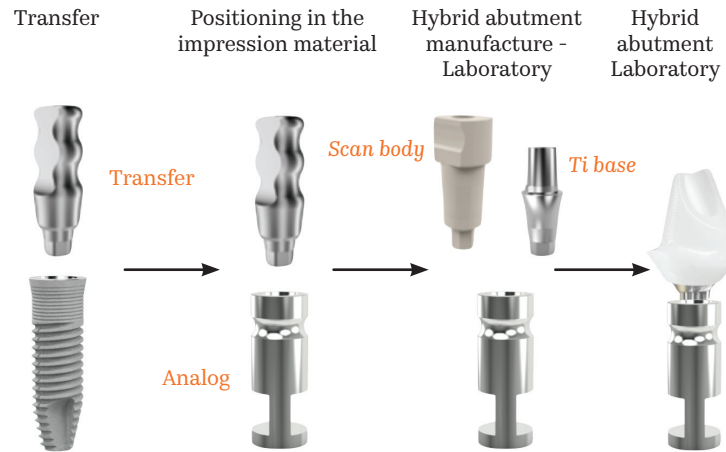
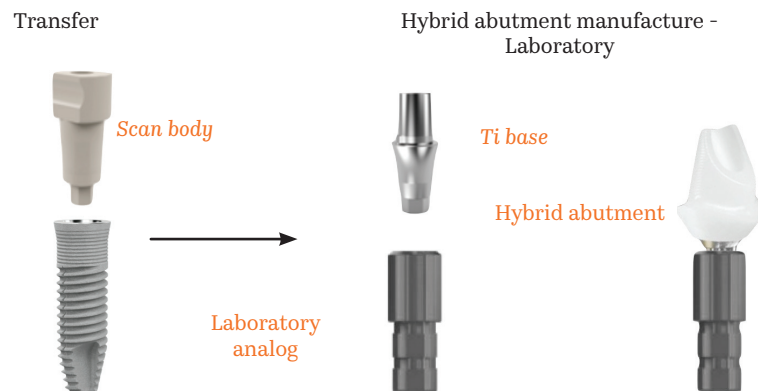
Strategy 5 - Non-digital workflow (A)**Strategy 5 - Digital workflow (B)**

Figure 14: A) Protocol 5: non-digital workflow. Implant transfer and analog. Scan body and Ti base used in laboratory for zirconia milling. B) Protocol 5: digital workflow. Intraoral scanning using implant scan body. Laboratory fabricates and uses implant analog for impression model, and Ti base is used for screw-retained crown.

The selection of components should not stop clinical dentists from conducting their work with implant-supported restorations. Read, look for more information, ask your more experience colleagues and company consultants for help. For each case you finish, questions will be answered, and the protocols will gradually become part of your routine practice. See you next time!

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