

VITA VIONIC® DENT DISC multiColor

The milled tooth for long-lasting full and partial dentures



Occlusal freedom with VITA VIONIC DENT DISC multiColor

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I had the opportunity to challenge myself, as well as the digital technology. An implant-supported full class 1 denture in the upper jaw was to be manufactured using the most recent 3shape software (3shape A/S, Copenhagen, Denmark) and polychromatic composite disk VITA VIONIC DENT DISC multiColor (VITA Zahnfabrik, Bad Säckingen, Germany), which has

recently arrived on the market, for the subtractive manufacturing of denture teeth. The interaction of traditional experience with new technology inspired me to once again break new ground, and to challenge the status quo and my own professional complacency when treating complex implant cases.

Final Result



Case study

The patient came to the practice because he needed a new restoration in the edentulous upper jaw. Since the patient did not like the fit, the foreign body sensation or the functionality of a conventional denture, implant insertion had been suggested in advance, to which the patient consented. The new full denture was to be stabilized on top of four implants with Novaloc abutments (Straumann, Freiburg, Germany). In the treatment plan, we decided to manufacture the full denture



Fig. 1: The upper jaw after the insertion of the four implants.

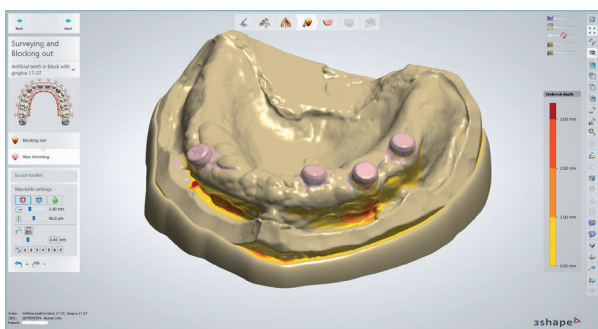


Fig. 2: The virtual model during the analysis and block out phase.

using the digital workflow. The goal was to show whether the digital denture could be manufactured more easily, and whether a similar or even better fit could be achieved after integration, compared with conventional full dentures. Of particular interest here was the integration itself, as well as whether the abutments had to be integrated into the denture base in the treatment chair or in the laboratory.

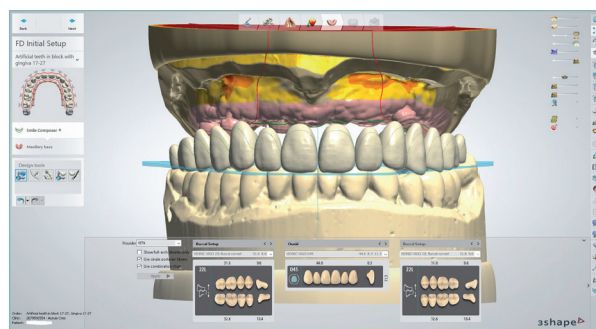


Fig. 3: The virtual setup with the selection of tooth shapes.

The treatment phase included the following steps:

- The palate portion was to be freely designed.
- The base from the VITA VIONIC BASE DISC HI should not be additionally reinforced.
- The angulation of the implants should not be corrected. This decision was made because of the flexible angulation compensation with the different Novaloc Locators. They make it possible to compensate for the leverage provided by the extended free end. At the same time, the strain on the implants was reduced despite the unfavorable positioning while chewing. A prosthetic correction of the angulation would only increase and strengthen the leverage effect. A trouble-free, occlusal freedom in centric was also essential in order to provide even more compensation for the load stress.
- The focus was on making the occlusal morphology of the teeth functional within the patient's chewing cycles, while at the same time transferring the freedom of movement concept to the VITAPAN LINGOFORM posterior teeth. The VITA VIONIC DIGITAL VIGO denture tooth library, available in the 3shape software, is based on the design of the VITA VIONIC VIGO prefabricated teeth, which are in turn based on the design of the VITAPAN EXCELL anterior teeth and the VITAPAN LINGOFORM posterior teeth. Their basic functional principle was automatically transferred to the patient's occlusion. Note: The VITA VIONIC DENT DISC multiColor is made from the same VITA MRP (Microfiller Reinforced Polymermatrix) composite formulation as the premium teeth VITAPAN EXCELL and VITAPAN LINGOFORM.

- Treatment continued with intraoral scans of the lower dental arch and the alveolar ridge in the upper jaw. Note: The updated version of 3shape software (3Shape Dental System 2022) includes an option for the prosthetic implant components used in this treatment. Once the scans and registration were uploaded, the design of the denture began. VITA VIONIC VIGO 045 and 22L were the teeth selected. The posterior contacts were adjusted and confirmed in order to implement freedom in centric.
- The dental arch and denture base were manufactured subtractively and fixed using VITA VIONIC BOND.
- Due to the virtual integration of the Novaloc Locators in the software and the high milling precision, the matrices clicked into the denture base after subtractive manufacturing. To ensure a secure bond, the matrices were also integrated into the denture base using DTK adhesive (Bredent, Senden, Bavaria).

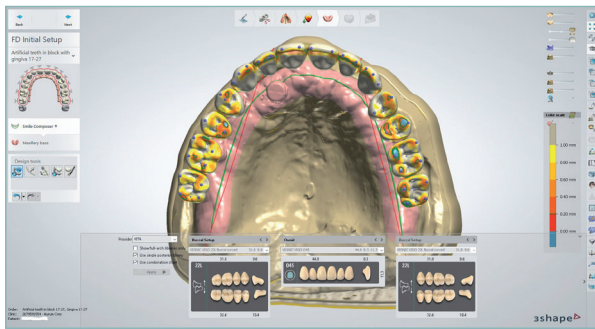


Fig. 4: Checking the occlusal contacts and the freedom in centric.

Background information

Freedom in centric: Freedom in centric is defined as a “flat area” in the central fossa in which the antagonist cusps have 0.5 to 1 mm of eccentric freedom of movement upon contact, unaffected by tooth inclination. All natural teeth work according to this concept, but very few denture teeth have it integrated.

Why is freedom in centric important? This concept is important because denture teeth are not innervated. This means that a patient cannot feel when the teeth are in occlusion or if they are almost in occlusion. It is important to note that there is food between the teeth during chewing and it is not possible to create perfect centric contact with each individual chewing cycle, as is possible in the articulator during the manufacture of dentures. And then there is also the fact that full dentures are supported by mucous membranes. When considering these two aspects, it is actually inconceivable that a patient with full dentures can always return precisely

to centricity. For the same reason, the natural dentition – even if we can feel our teeth during the chewing process – cannot achieve precise centricity after each chewing cycle. This is also the main cause of instability and tension within the denture.

Why was freedom in centric important for the success of this treatment? Due to the distribution of the implant abutments, a free occlusal concept without interference was important for preventing a leverage effect. A prefabricated tooth with a locked centric would not allow this compensation to achieve a good denture fit and the desired function. This applies in the present case, especially with regard to the pronounced free end distal from the area of the implant support. For this reason, the patient needs a flexible and adjustable occlusal design.

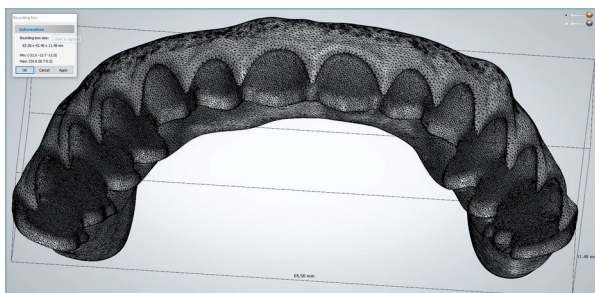


Fig. 5: The STL file of the dental arch for the denture.

¹Schuyler CH. Freedom in centric. *Dent Clin North Am* 1969 Jul; 13(3): 681-6.

Matrix

As already described, special attention was paid to the locators because the matrices were integrated into the denture base in the laboratory and not at the patient's chair. As a result, we had to check whether the dimensional transfer of the implant position into the software, in conjunction with the precise subtractive manufacturing, would make it unnecessary to integrate the matrices on the patient chairside. Bonding in the laboratory can reduce chair time by 1.5 to 2 hours. That is much more comfortable for the patient because less

work needs to be performed inside the mouth. However, the matrices can also be fixed in the laboratory with an accurate model and a careful, precise conventional procedure. Subtractive manufacturing of the base and bonding of the matrices in the laboratory was effective and accurate in this case. Due to the complex implant distribution, a precise relationship between implant head and matrix was a must, especially in this clinical situation.



Fig. 6: VITA VIONIC BASE DISC HI and VITA VIONIC DENT DISC multiColor.



Fig. 7: The completed digital denture.



Figure 8: Basal view of the denture with the integrated matrices.

Summary

- Analog or digitally manufactured denture teeth that are designed with occlusal freedom provide stability, flexibility and adaptability to the patient's chewing cycle. The occlusal design can be modified in the production of tooth material with the VITA VIONIC DENT DISC multiColor to obtain the desired reliability and function.
- Hitting and sliding on the main cusps is the main cause of these well-known denture problems.
- This treatment plan demonstrates the challenges of dealing with one's own professional complacency, and the digital workflow for the production of implant-supported dentures.
- The VITA VIONIC DENT DISC multiColor enabled an easy-to-implement and time-saving workflow that created a high-quality denture.



Fig. 9: The upper denture in situ.

Summary

As denture professionals, we have to create this form of care specifically for each patient and not expect them to simply adapt to their new dentures. In order to achieve this, denture teeth that are adaptable must be used. On the other hand, self-reflection is important to prevent complacency and to allow an adaptation of the skills needed for the specific requirements of the patient case.

Freedom in centric is the possibility of moving within the centric contact and therefore not to be blocked in a bite. This concept allows for flexible occlusal adjustment to the patient's needs, but has only been integrated into a few prosthetic tooth designs available to us. In this case, the successful treatment can be attributed to precisely this freedom, which is contained in the VITA tooth library and in the subtractively manufactured dental arch from the VITA VIONIC DENT DISC multiColor.

If we want to be superheroes for our patients, we need to think outside the box when it comes to complete dentures. Digital workflow manufacturing is another viable "tool in your arsenal" to provide your patients with consistent, high-quality removable dentures. It matters what type of teeth you use for traditional or digital manufacturing. Find out about the freedom in centric of the VITAPAN LINGOFORM posterior toothset and the VITA VIONIC DIGITAL VIGO denture tooth library with the VITA VIONIC DENT DISC multiColor. Freedom is great!

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Additional information and case reports at:
www.vita-zahnfabrik.com/VIONIC

