Vivodent® S PE / Orthotyp® S PE

Dental Technical Documentation
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Introduction

Nature creates the most beautiful tooth shapes and shades. This has guided us in the design of the new SR Vivodent® S PE, a further development of a tooth line with decades of success. Presented in a contemporary design, esthetically and prosthetically improved, these teeth fulfil virtually all patient requirements in terms of material, shape and shade.

The demands of dentists, dental technicians and patients on modern denture teeth have risen steadily. It is so important to restore functional aspects because teeth are an expression of personality and give the patient a new zest for life. The tooth line meets these requirements with a wide variety of individually moulded anteriors which help underline the patients' individual appearance.

This documentation serves as a guideline for working with the tooth line SR Vivodent® S PE / SR Orthotyp® S PE taking optimal function and esthetics into account.
Stepping Stones to Success

**SR Vivodent® S PE**
Each of the 15 upper and five lower anterior sets were individually designed and moulded in a distinctive appearance and functionality.

**SR Orthotyp® S PE**
The SR Orthotyp S PE posterior tooth, further developed in four different sizes, displays a modern appearance for the classic tooth-to-two-teeth set-up.

**Shade**
The PE shade system comprises 20 brilliant shade nuances. Their characteristic intensity, brilliance and translucency closely replicate the shade of natural teeth. Key features are the distinctive, contrasting mesial and distal enamel edges and a slightly shade accentuated tooth neck. The results are dentures that harmoniously blend into their surroundings.

Both the anterior and posterior teeth are four-layer teeth.

**Material**
The teeth are made entirely from highly cross-linked DCL acrylic (Double Cross Linked). The material is a distinctly modified variant of polymethyl methacrylate, whereby both polymer and matrix are homogeneously cross-linked.

Compared to conventional PMMA, this material displays a higher compressive strength but a similar flexibility. As a result, extended denture longevity can be expected. In addition to this, it also achieves a sound bond of the denture teeth to the denture base material.

**Shade guide**
The multifunctional SR Vivodent S PE shade guide enables the operator to determine not only the tooth shade but also the tooth size and lip closure line. This has been achieved by integrating the facial meter and papilla meter into the new design.
**Indication**

Due to the DCL material and the optimal shape of the teeth for prosthetic restorations, the tooth lines SR Vivodent S PE and SR Orthotyp S PE are universally applicable; in the field of complete dentures and also

– for implant supported, removable complete denture restorations and

– for partial dentures.

**Model Orientation**

**Accessories**

The Ivoclar Vivadent Prosthetic Program allows both individually customized as well as standard removable dental restorations to be fabricated. The following list shows a short overview:

<table>
<thead>
<tr>
<th>For dental restorations according to average values</th>
<th>For dental restorations according to individual values</th>
</tr>
</thead>
<tbody>
<tr>
<td>For average model orientation in the Bonwill triangle of the articulator it is necessary to articulate the lower model with the help of the horizontal guide. The horizontal guide allows model orientation of both dentulous and edentulous cases in the Stratos® articulator.</td>
<td>Skull-related, individual model orientation in the Stratos 300 is carried out with the UTS 3D transferbow.</td>
</tr>
</tbody>
</table>

In this case the 2D or 2½D setting up template is recommended. A 3D template should be used for the set-up in conjunction with skull-related model orientation.

The definitive determination of the correct jaw relation is carried out using the Gnathometer M.
Application / Processing

**Important information**

The following requirements should be met to ensure that the dentures function correctly in the oral cavity in the long term:

- Planning and fabrication of the dentures should be performed in close collaboration with the dentist.
- There should be a balanced occlusion and articulation.
- Fabrication in the dental laboratory according to the principles of best practice.
- Application of dental materials according to the manufacturer’s instructions.

In particular, denture teeth should not be excessively weakened as a result of adjustments by grinding.

The dentist should check the following points before beginning the treatment:

1. Does the patient belong to a risk group, which may generally jeopardize the success of the treatment?
   a. Are there signs of bruxism (patient’s statements, tooth wear, masseter hypertrophy)?
   b. Are there signs of significantly increased masticatory forces?

Patients restored with implant-supported restorations have been shown to exert higher masticatory forces than patients with tissue-supported dentures. The increase in these forces is related to the fact that implant-supported restorations are anchored in the bone and therefore lack the sensory receptive feedback necessary to control these forces. The heightened forces may lead to an increase in chipping in composite teeth. It may therefore be indicated to use PMMA-based denture teeth for these patients.

2. What type of removable or partially removable restoration should be implemented?

All PMMA/composite-based denture teeth are suitable for tissue-supported dentures and partial dentures in patients that do not belong to any of the above risk groups.
General information
- After the functional impression and registration, the shade is taken using the new SR Vivodent S PE shade guide.
- Ideally, tooth shade and shape are selected together with the patient. Anatomical specifications and individual patient wishes can be discussed and taken into consideration.
- The shade, shape, size and position of the teeth can be reconstructed best when previous patient photos are used.

Shade selection
- Shade selection should be performed on the patient under defined light conditions (5500K colour temperature) or in daylight.
- The tooth samples of the SR Vivodent S PE shade guide feature the same layer structure and material as the original SR Vivodent S PE teeth. Shade deviations during the shade selection are therefore minimized.

Anterior mould selection
- The multifunctional shade guide enables the operator to determine the tooth size and lip closure line. This is possible with the facial meter and the papilla meter.
- The three tooth shape characteristics available – triangular, oval and rectangular – represent the most popular natural tooth shapes found in human teeth.
- The classification of sizes S, M and L allow the correct tooth size to be found quickly and easily.
- Even when no information is available regarding size, shape or position of the teeth, the shape can be assumed according to specific reference points on the maxillary model.

Posterior mould selection
The size of the posterior teeth is selected in line with the anterior tooth moulds determined during the preceding stage and the structural anatomy within the mouth. The combination table aids in finding the correct posterior teeth quickly and easily.
## Combination table

<table>
<thead>
<tr>
<th>Application / Processing</th>
<th>SR Vivodent® S PE</th>
<th>SR Orthotyp® S PE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upper anteriors</strong></td>
<td><strong>Lower anteriors</strong></td>
<td><strong>Upper/lower posteriors</strong></td>
</tr>
<tr>
<td>SMALL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▲ A22</td>
<td>A3, A5</td>
<td>N3U/N3L</td>
</tr>
<tr>
<td>▼ A42</td>
<td>A3, A5</td>
<td>N3U/N3L</td>
</tr>
<tr>
<td>▼ A44</td>
<td>A3, A5</td>
<td>N3U/N3L</td>
</tr>
<tr>
<td>▪ A11</td>
<td>A3, A5</td>
<td>N3U/N3L</td>
</tr>
<tr>
<td>▪ A13</td>
<td>A3, A5</td>
<td>N3U/N3L</td>
</tr>
<tr>
<td>MEDIUM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▲ A25</td>
<td>A6, A8</td>
<td>N4U/N4L, N5U/N5L</td>
</tr>
<tr>
<td>▼ A26</td>
<td>A6, A8</td>
<td>N4U/N4L, N5U/N5L</td>
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<tr>
<td>▼ A54</td>
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</tr>
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<tr>
<td>▪ A248</td>
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<tr>
<td>▪ A66</td>
<td>A6, A8</td>
<td>N4U/N4L, N5U/N5L</td>
</tr>
<tr>
<td>LARGE</td>
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</tr>
<tr>
<td>▲ A27</td>
<td>A9</td>
<td>N6U/N6L</td>
</tr>
<tr>
<td>▼ A14</td>
<td>A9</td>
<td>N6U/N6L</td>
</tr>
<tr>
<td>▼ A15</td>
<td>A9</td>
<td>N6U/N6L</td>
</tr>
<tr>
<td>▪ A17</td>
<td>A9</td>
<td>N6U/N6L</td>
</tr>
</tbody>
</table>
Comprehensive model analysis

Marking:
Centre of the incisive papilla

Relevance:
- Anatomical midline of the upper jaw
- Labial positioning of the central incisors

Marking:
First large pair of rugae

Relevance:
Labial positioning of the canine teeth at the tip of the rugae

Marking:
Post dam

Relevance:
Posterior palatal limit of the denture base

Marking:
Distal half of the retromolar pad (trigonum retromolare)

Relevance:
- Positioning of the setting up template on the dorsal aspect (corresponds to the height of the occlusal plane)
- Dorsal positioning of the lateral wings of the horizontal guide

Marking:
Model midline transferred from maxilla model, anatomical midline

Relevance:
- Bilateral orientation for the anterior set-up
- Position of the symphysis fork of the horizontal guide

Marking:
Deepest point of the vestibule

Relevance:
Starting point for measuring the vertical dimension and the incisal height of the central incisors

Marking:
Palatal suture (raphe palatina), anatomical midline

Relevance:
Reference point for the transversal symmetry of the anterior set-up

Marking:
Crest of the alveolar ridge

Relevance:
Provides orientation for a static set-up

Marking:
Lingual limit of the retromolar pads

Relevance:
Pound's Line, consideration for tongue space

Marking:
Crest of the alveolar ridge

Relevance:
Course of the central fissure of the posterior teeth (static positioning)

Marking:
Deepest point of the vestibule

Relevance:
Starting point for measuring the total vertical dimension

Comprehensive model analysis

Application / Processing
**Anterior set-up**

As the dental technician often only has the articulated models as a reference it is essential that the dentist provides as much additional information as possible. In particular the midline, canine line or the width of the nasal base and the smile line.

The incisive papilla provides a reliable reference point for the anterior set-up.

The *central incisors* are aligned with the incisive papilla, if no other information is provided by the dentist (esthetic midline/lip support). In a normal bite situation, the labial surface is positioned approx. 7–9 mm towards the front from the centre of the incisive papilla. The raphe median plane determines the symmetry axis of the anterior set-up in the upper jaw. The course of the incisal edges of the central incisors is determined by half the height of the overall vertical dimension plus a 2 mm overlap.

The position of the *canines* plays a decisive role in achieving a harmonious facial expression. In the dental arch, the canines are positioned in the area of the first large pair of palatine rugae, with the labial surface of the maxillary canines being placed at a distance of approx. 9 mm to the end of the first large pair of palatine rugae. The vertical alignment of the canines significantly influences the curvature of the smile line.

Once the canines are in position, the *lateral incisors* are placed in the space between the central incisors and canines. By slightly rotating or interlacing the lateral incisors, highly individualized effects can be achieved.

The lower canines are set up in relation to tooth 13 and 23. The direct axis of the lower canine points between the upper lateral incisor and the canine.

It is important that the canines are set up without contact to the antagonist teeth, thus providing assured group guiding contact of the posterior teeth.

If necessary, the canines can be repositioned. The incisors are set up in the lower anterior arch once the posterior teeth are in position.
Vertical overbite / horizontal overbite

Guiding contacts during laterotrusion and protrusion are not desirable in the anterior region.

• As an average value, the vertical and horizontal overlap in an anterior set-up should be approx. 0.5 – 1.0 mm.
• The overlap should be designed in such a way that the anterior teeth are prevented from contacting in functioning.
• Too strong anterior contacts during mastication may lead to parafunctions.

The esthetically and prosthetically optimized anterior teeth SR Vivodent S PE enable a variety of set-up possibilities due to the following characteristics.
Posterior set-up

The classical occlusion
The Ivoclar Vivadent “Typ” tooth lines are based on the principle of group function of the working and balancing side (latero- and mediotrusion) according to Dr Strack. They are set up in a one-to-two-tooth relation as in a normal bite situation. Consequently, the primary contacts in the centric position are located in the central fossae of the mandible and on the marginal ridges. The “Typ” moulds are supported by a secondary contact area on the buccal cusps in the mandible.

Posterior mandibular set-up using a template
The template ensures that the sagittal curve of Spee and the transversal curve of Wilson are taken into account. Both curves of the natural dentition are essential for bilateral balanced group guidance.
Align the template with the height of the distal third of the retromolar pad in the posterior region and the height of the distal edges of the mandibular canines in the anterior region.

When viewed from an occlusal perspective, the central fossae of the mandibular posterior teeth are positioned over the crest of the alveolar ridge. The lingual border of the posterior set-up is defined by Pound’s line. Pound’s line extends from the mesial corner of the mandibular canine to the lingual border of the trigonum on the same side.

The markings on the template assist in achieving a symmetrical set-up. Begin the set-up of the mandibular teeth by positioning the first premolars, followed by the second premolars, first molars and then second molars.

Ensure that both the buccal cusp tips and mesio-lingual cusps make contact with the template.
Application / Processing

Viewed from the buccal side, the axes of the first and second premolars should be aligned perpendicular to the template. The vertical axes of the first and second molars are automatically aligned in the process.

Contacts in the centric position

The maxillary teeth can now be aligned with the mandibular teeth in a one-tooth-to-two-teeth relationship to achieve optimum intercuspatation.
Application / Processing

- The palatal working cusp of the maxillary premolars engages the marginal ridges of its antagonist.
- The alignment of the 1st premolar establishes the buccal corridor.

1st maxillary premolar:

The mesio-palatal working cusp engages the central fossa of the mandibular 1st molar.
- The distal-palatal working cusp engages the marginal ridge of its antagonist.
- Viewed from the buccal, the mesio-buccal cusp of the maxillary 1st molar points towards the mesio-buccal fissure of its antagonist. This is a typical characteristic of a classic bite with normal intercuspation.

1st maxillary molar:

- The palatal working cusp of the maxillary premolars engages the marginal ridges of its antagonist.

2nd maxillary premolar:

The mesio-palatal working cusp engages the central fossa of the mandibular 1st molar.

2nd maxillary molar:
**Gingiva design**

Waxing-up the denture is made easier when the teeth are fixed with a hard wax. The rest of the denture body can be modelled with a slightly softer wax which is easier to handle.

The following points must be observed:

**Cervical gingival contour**

Generally, the gingiva must be designed in such a way that it is easy to keep clean and has a natural appearance. Dominantly modelled curvature of the gingiva (balconies) should be avoided. In particular, there is often an unattractive step in the area between the canine and the first premolar. This occurs when the posterior teeth are too short.

In the maxillary anterior region the gingival margin tends to be higher in the distal area. In the mandible it is at its lowest in the centre.

**Rules of grinding**

**Checking the centric:**

In complete denture prosthetics, it is generally not recommended to perform major occlusal adjustments prior to processing the denture base.

If there is an increase in vertical dimension this must be corrected prior to removing the polymerized dentures from the model. Make sure the centric lock in the articulator is engaged. Grinding should be performed using the following guidelines:

- **Do not** adjust the working cusps.
- Reduce premature contacts in the antagonist fossa.

If the occlusal height is adjusted, all the centric contacts – as determined by the set-up - must be established.
**Completion**

**Adjusting functional movement:**
Relatively large guiding contacts are desirable to ensure a balanced occlusion within the functional range. The following adjustment guidelines are recommended:

- **Centric contacts**: do not adjust
- **Working side** (laterotrusion): grind mesio-buccal cusps in the maxilla, lingual cusps in the mandible
- **Balancing side** (mediotrusion): grind mesio-buccal cusps in the mandible
- Protrusion: grind disto-buccal cusps in the maxilla, mesio-buccal cusps in the mandible
- Retrusion: grind mesio-buccal cusps in the maxilla, disto-buccal cusps in the mandible

**Areas of adjustment to establish centric contacts:**

![Areas of adjustment to establish centric contacts](image)

To replicate the abrasion in natural dentition adjust the incisal edges of the anterior teeth in the maxilla from the palatal side and in the mandible from the labial side.

**Minimum thickness**
The structural integrity and shade effect of the tooth must be preserved. Ensure that the minimum thickness is maintained.

Anterior teeth: min. 2.5 mm
Posterior teeth: Central fossa min. 2 mm, cusp tips min. 2.5 mm, in the cervical area min. 2.5 mm

**Anterior layering**

![Anterior layering](image)

**Posterior layering**

![Posterior layering](image)
General Information

**Important information**

- It is important to cover the teeth in a thin layer of addition silicone (Shore hardness > 90) when they are invested in the flask to protect them from damage.
- Do not divest the dentures with a hammer; the impact of the hammer may damage the teeth.
- Thermoplastic injection moulding processes (e.g. Polyapress, Valplast) use temperatures of > 200 °C. These temperatures may cause damage to the tooth material. These heating processes are not recommended.
- Roughen the bonding surfaces either with a cross-cut tungsten carbide bur or by abrasive blasting Al₂O₃ (grit size: max. –100 μm) under 1–2 bar pressure. The tooth necks should also be carefully roughened.
- Before conditioning with the relevant denture base monomer, the surface of the tooth must be free from dust, moisture and grease. Each individual tooth must be cleaned with a steam cleaner and all wax residues removed. When applying compressed air, make sure that the system is free of oil.

**Processing in the laboratory**

- After modifying the denture tooth with PMMA or composite, remove polymerized excess material with a finishing diamond (grit size < 25 microns) and/or a flexible disc.
- After functional adjustments: Use cross-cut burs to remove material, do not use diamond discs or abrasive stones.

**Finishing / polishing**

- Pre-polishing: Polish ground surfaces with silicone rubber polishers that are suitable for composite or ceramic materials.
- High-gloss polishing: Use composite polishing material (e.g. Ivoclar Vivadent Universal Polishing Paste) and a goat’s hair brush for high-gloss polishing.
- Glaze varnish or denture cleaning spray is not recommended.
- Do not expose the teeth to a flame or direct heat.
- Do not press too hard against tooth surfaces to avoid heat build-up.
- We recommend using a face mask and suction equipment to avoid breathing in grinding dust.

**Processing in the dental practice**

- Processed tooth surfaces should have a polished surface finish before insertion.
- Use silicone rubber polishers (e.g. Astropol®, Astrobrush®) for final polishing.
General Information

Care instructions for the patient

- Thoroughly clean the dentures with a denture brush, soap/toothpaste/non-abrasive denture cleaning paste and warm water every morning and every evening.
- Soaking the dentures in cleaning solution is not sufficient to remove bacteria.
- It is advisable to use an ultrasonic denture cleaner to clean your dentures.
- After each meal, rinse your dentures and your mouth, with the dentures removed, with water.
- Do not soak or clean the dentures in pure alcohol or solvent. Alcohol or solvent may attack the denture base or tooth material and cause white staining.
- Do not use washing-up or dish washing liquid to clean the dentures.
- Never clean your dentures in hot water or in a dishwasher and never boil your dentures.
- Have your dentures professionally cleaned by your dentist if hard deposits have built up on them.

Safety information

- This material has been developed solely for use in dentistry and must be processed according to the Instructions. Liability cannot be accepted for damages resulting from misuse or failure to observe the Instructions. The user is solely responsible for testing the material for its suitability for any purpose not explicitly stated in the Instructions.
- Do not use if the patient is known to be allergic to any component of the product.
- Store out of the reach of children.

Literature references

Clinical and Dental Technical Protocol, Ivoclar Vivadent, 2014
Handbook of Complete Denture Prosthetics, Ivoclar Vivadent, 1994
BPS Totalprothetik, Kurt Fiedler, Verlag Neuer Merkur GmbH, 2003