Website

Prosthodontics: Pala "Mix & Match" for routine procedures

Part 2: Bilateral balanced occlusion

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This article presents Pala "Mix & Match" system's bestseller Mondial and its many application possibilities. MDT Kai Franke, technical adviser at Kulzer Dental, illustrates how to use Mondial in routine procedures. The first part of this four-part series focused on the model analysis. In this article, Kai Franke addresses the subject of bilateral balanced occlusion inspired by the set-up concept of Prof. Alfred Gysi. MDT Karl-Heinz Körholz with his professional expertise assisted and supported writing this article.

About the Author

MDT Kai Franke works as a technical expert adviser at Kulzer Dental. He offers courses focusing on full and combi prosthodontics as well as veneer techniques.

The complete four-part series:

- ✓ Part 1 - Model analysis according to Lerch/Kőrholz
- ✓ Part 2 - Bilateral balanced occlusion (inspired by the set-up concept of Prof. Dr. Gysi)
- Part 3 - Tif set-up according to MDT Karl-Heinz Kőrholz (inspired by the set-up concept of Prof. Dr. Gerber)
- Part 4 - Lingualized occlusion: redesigned

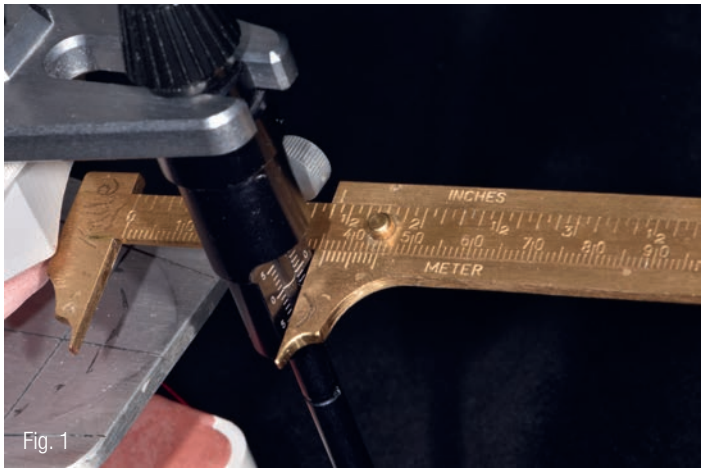


Fig. 1

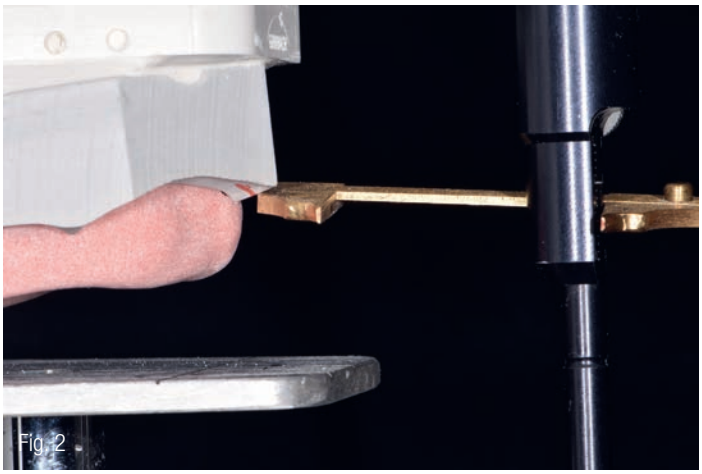


Fig. 2

Figs. 1 - 2 — The transfer of the set-up area with a caliper gauge for the central incisors in the maxilla.

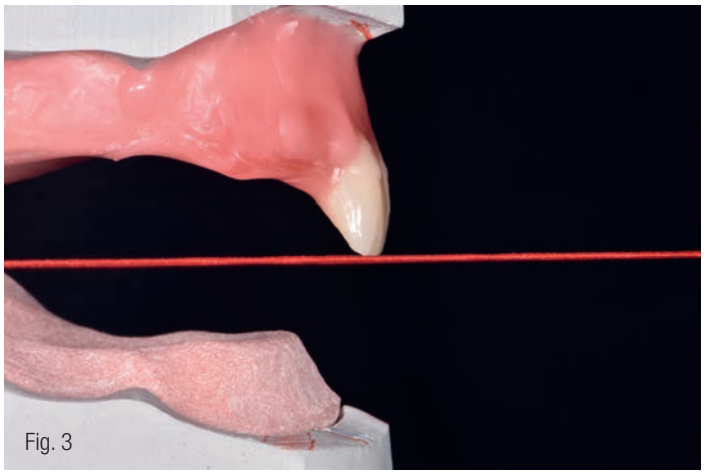


Fig. 3

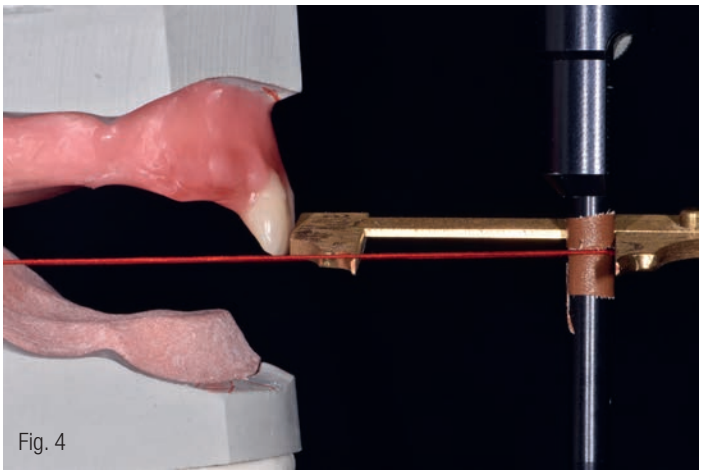


Fig. 4

Figs. 3 - 4 — The alignment of the upper central incisors using the determined values and specifications.

A note from Karl-Heinz Körholz:

"Why do we alternate between the set-up and the verification using the set-up plate with a rubber band? If we work according to average values, a plate can be fixed in the articulator parallel to the occlusal plane that is automatically in alignment with the correct plane. However, if we mount models with an individual occlusal plane in the articulator with the help of a face-bow, then this occlusal plane can only be reproduced with a rubber band that is aligned to the occlusal plane according to the specific situation. Logically, the set-up and verification process must also be performed with a rubber band. For this reason, both techniques are demonstrated in this article."

In this article we focus on the set-up technique inspired by Prof. Alfred Gysi. For the anterior and posterior, I used the Mondial tooth line which is perfectly suited for full prosthodontic restoration work. Thanks to its outstanding aesthetic characteristics, easy set-up and occlusion this tooth line has grown to be one of the best sold tooth lines in Germany. As already depicted in the first part of the article series, the model analysis pertains also to the anterior teeth region. In the mandible and maxilla, by starting at the support pin we can measure the relevant value to the identified marking on the set-up area of the labial surfaces on the upper anterior teeth with a caliper gauge (fig. 1 and 2). The set-up plate and also the rubber band will mirror the occlusal plane and be very useful during set-up and aid with the verification process (fig. 3 and 4).

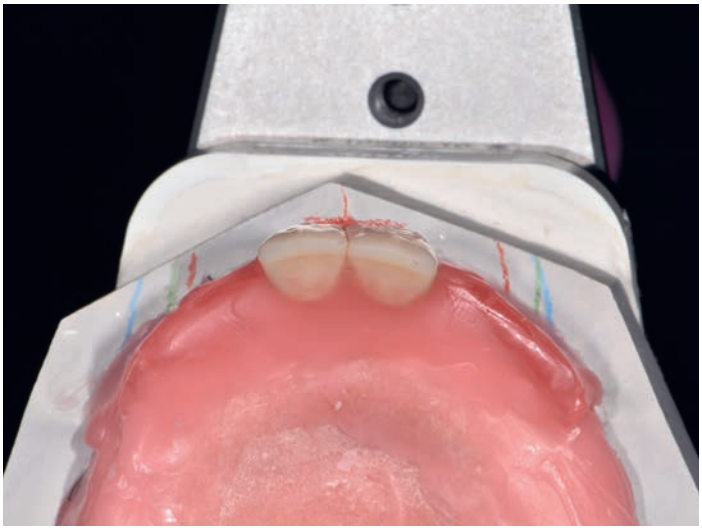


Fig. 5 — A vertical view from occlusal on the incisal edges with the markings for the labial margin on the model margin.

The set-up in the maxilla

The upper posterior teeth are set-up according to the occlusal plane (rubber band plane) specifications in terms of length and the labial alignment. A vertical view from occlusal on the incisal edges shows the marking for the labial margin is clearly noticeable (fig. 5). Next the anterior teeth are added to the central incisors to form a harmonious arch (fig. 6 to 8). In general, this causes the lateral anterior teeth to be shorter and the canine teeth to be at the same level as the occlusal plane. Here we use the verification plate while in image 3 we verify the occlusal plane with a rubber band. Occlusion floss or paper can be used to illustrate the contact to the plate which will still be visible later on during the set-up of the posterior teeth (compare fig. 30). The centre of the set-up is determined by the marking derived from the previously performed model analysis. Incidentally, in this case the marking coincides with the centre of the set-up plate (fig. 8). The anterior teeth bow on the set-up plate with the markings can be a valuable aid (fig. 9). In the occlusal vertical view, we must not only focus on the labial margin of

Fig. 6

Fig. 7

Fig. 8

Figs. 6 - 8 — The set-up of the remaining anterior teeth forming a harmonious arch.

Fig. 9

Fig. 9 — Marking the anterior teeth arch on the set-up plate.

Fig. 10 — An occlusal vertical view of the entire anterior teeth arch and the contour of the vestibular fold.

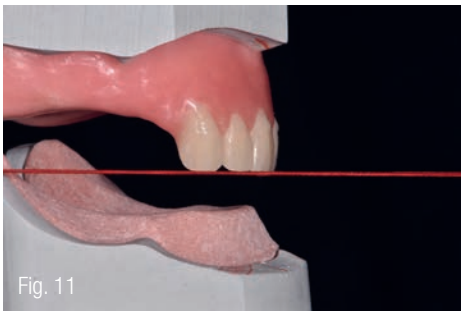


Fig. 11

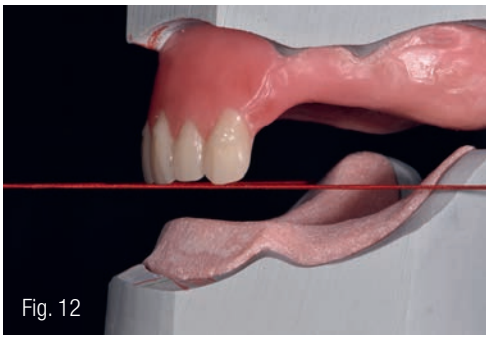


Fig. 12

Figs. 11 - 12 — Verifying the occlusal plane with a rubber band.

Fig. 13

Fig. 14

Figs. 13 - 14 — The set-up of the first premolars with a slight incline tendency and the vestibular cusp tip touching the occlusal plane.


Fig. 15


Fig. 16

Figs. 15- 16 — Verifying the first premolars on the verification plate.

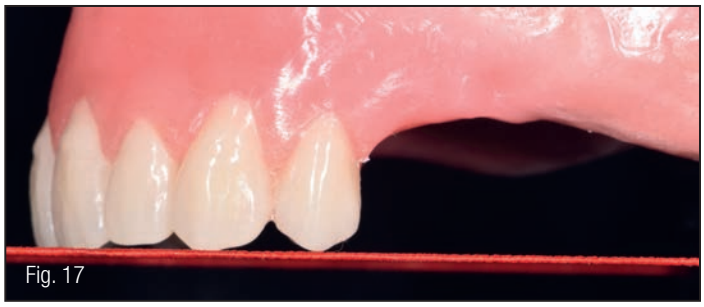


Fig. 17


Fig. 18

Figs. 17 - 18 — Using a rubber band for verification: The first premolar is positioned at a right angle to the occlusal plane.

the centre posterior teeth as seen in image 5 but also tilt the model, as demonstrated in image 10, so that we are able to verify if the entire anterior teeth bow follows the contour of the vestibular fold. Images 11 and 12 show the verification of the occlusal plane with the rubber band (compare also fig. 6 and 7). The set-up process of the first premolars is almost identical to that of the canine teeth: showing a slight incline tendency and the vestibular cusp tips are in the area of the occlusal plane (fig. 13). In the images 14 to 16, the contacts to the verification plate are noticeable. The first premolars' palatinal cusps do not touch the verification

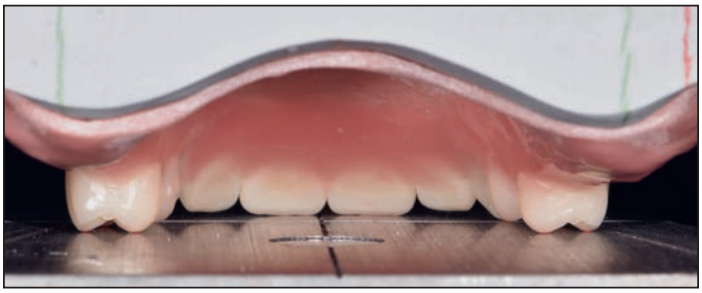


Fig. 19 — The second premolars with buccal and palatal cusps at occlusal plane level.


Fig. 20


Fig. 21

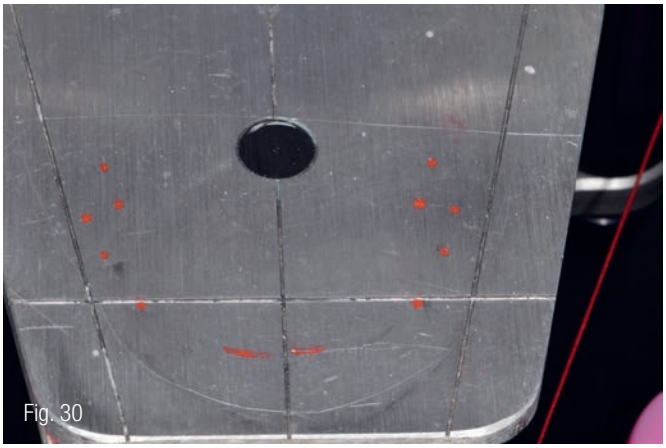

Fig. 22


Fig. 23

Figs. 20 - 23 — For the first molars, only the mesio-palatal cusps are in the occlusal plane area.

Figs. 24 - 26 — Comparing the inclining angles: the set-up of the first and second molar, with the first molar being the last tooth in the arch. In both cases, the same inclining angle to the occlusal plane can be detected.

Figs. 27 - 28 — Verification option of the inclining angles with a rubber band.



Figs. 29 - 30 — The incisal and occlusal contact points of the entire maxilla set-up.

plate due to their slight inclined position and the fact that they do not have distinct palatinal cusps as do the second premolars (compare also fig. 20 and 21). For the set-up and following verification, a rubber band can be used (fig.17 and 18).

If the occlusal plane is mounted individually and not according to the average value in the articulator the first premolars must be aligned at a right angle to this occlusal plane. The second premolars are aligned with the buccal and the palatinal cusps in the occlusal plane region (fig. 19) while for the first premolars only the buccal cusps are in the occlusal plane region(compare also fig. 14, 20 and 21). During the set-up of the first molars, it is important to ensure that only the mesio-palatal cusps are in the occlusal plane area. Repeated verification from the palatal side during the set-up is certainly helpful. The overview in images 20 and 21 clearly shows the space between the palatinal cusps of the first premolars and the occlusal plane.

The in vestibular direction inclining angle of the molar was deliberately set-up with different inclines: in fig. 23 the angle is flatter than in fig. 22. Here the molar in the second quadrant is intentionally meant to be the last tooth in the maxilla set-up while his antagonist in the first quadrant has a flatter alignment so that a second molar can be positioned if necessary. If the molar is the last tooth in the set-up, then its dorsal inclination must be raised more than if a second molar will be placed behind it. In which case, the second molar must be raised to the final correct level. By comparing the two end molars, the second molar in the first and the first molar in the second quadrant, the same inclining angle to the occlusal plane can be detected (fig. 24 to 26). A verification with the rubber band displayed the same

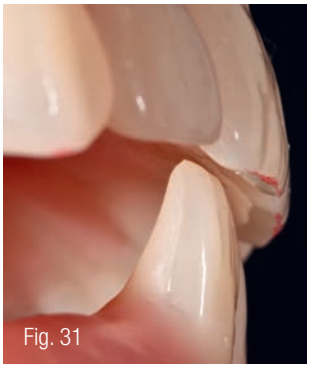


Fig. 31


Fig. 32


Fig. 33

Figs. 31 - 33 — The set-up of the central incisors in the mandible with an even sagittal step to the upper antagonists.


Fig. 34


Fig. 35

Figs. 34 - 35 — The posterior teeth situation optically displays a harmonious one-tooth-on-two-teeth position caused by the set-up of the first premolars before the lateral and canine teeth in the mandible.


Fig. 36


Fig. 37


Fig. 38


Fig. 39

Figs. 36 - 39 — The functional contact points of the first premolars to their antagonists.

Figs. 40 - 42 — Comparing the inclining angles: The first molar being the last tooth in the arch and the first and second molars in the set-up. In both cases, the same inclining angle to the occlusal plane can be detected.

Figs. 43 - 44 — The first molars positioned as determined during the model analysis and according to the maxilla mandible relation.

Figs. 45 - 47 — The contact points of the first molars:The upper mesio-palatal cusps touch the lower central fossae.

Figs. 48 - 49 — Completing the second premolars in the mandible: Here the same contact balance principle applies as for the first molars.


Fig. 50


Fig. 51


Fig. 52


Fig. 53


Fig. 54

Figs. 50 - 54 — The highlight of the restoration work: harmonious tooth arches with gingival areas.

result that we saw with the set-up plate (fig. 27 and 28). The incisal as well as the occlusal points on the incisal edges of the anterior teeth and on the cusps are a sure indicator of a proper maxilla set-up (fig. 29 and 30).

The set-up in the mandible

For the mandible set-up, it is recommended to start with the central incisors to define a correct centre line of the maxilla and mandible, so it is important to create an even sagittal step in a case with average values or for verification purposes (fig. 31 to 33). In order to ensure the best possible interplay of the posterior teeth in the maxilla and mandible, it is recommended to first mount the first premolars and to set up their perfect occlusion before positioning the remaining anterior teeth in the mandible.

Optic and function

The posterior teeth situation displays optically a one-tooth-on-two-teeth position. This is a familiar situation that many dental technicians have come across during their professional training (fig. 34 and 35). Functionally though, the posterior teeth are in a tooth-on-tooth position. This is not very noticeable during the set-up of the first premolars since they do not have an adjacent antagonist like the remaining posterior teeth (fig. 36 to 39). Afterwards, the anterior section in the mandible is ready to be completed since at this point, once the first premolars have been positioned, patient-specific characteristics no longer have a negative impact on the function of the posterior teeth (fig. 40 to 42).

Next the first molars are set-up so it is important to respect the relation between maxilla and mandible and to take the marking of the molar positions which were determined during model analysis into consideration (fig. 43 and 44). To achieve the proper contact balance for the first molars, it is important to ensure that the upper mesio-palatal cusps fit into the antagonist's fossae (fig 45 to 47). In terms of average values, we can assume an angle class 1 whereby the cusp ridge of the mesio-vestibular cusp of the upper molar points to the cross fissure of the lower antagonist (compare also fig. 43 and 44). Finally, the second premolars, for which the same contact balance principle applies as for the first molars, are added in the mandible (fig. 48 and 49).

The overview displays that if all tooth relations are consistently observed starting with the first premolars, this last step should not cause any issues (fig. 50 to 53). Finally, the modelling of such a successful restoration work presents the highlight for any dental technician. In general, the exact tooth relation and tooth axes are visible once the teeth have been exposed in their entirety up to the tooth neck (fig. 54).

The question as to whether an individual set-up with surface structure or a set-up with a smooth surface should be performed is determined by the dentist after consultation with the patient.

In the next article we will focus on the TiF set-up. We will show two options both with the Mondial tooth line. ■