Occlusal splints with and without adjusted occlusion

Materials & Accessories

Fabrication:
- **Hard splints:** Erkodur, adjusted splints 1.5 - 5.0 mm, stabilization splints 0.8 - 1.5 mm
- **Hard/soft splints:** Erkoloc-pro, adjusted splints 2.0 - 5.0 mm, stabilization splints 2.0 mm (2-layered) (Erkoloc, 1.8/3.0 mm, max. 3 months durability)
- **Semi-soft splints:** Erkoflex-95, adjusted splints (biting) 2.5 and 4.0 mm
- **Tough-hard splints:** Erkolign, 1.0 and 2.0 mm (at extreme stress, most resistant, but only limitedly adjustable)

For adjustment by addition:
- **Resilit-S** (817 501) (817 503) auto-polymerizing resin for Erkodur and Erkoloc-pro (Erkoloc)
- **Erkolocsticks-95** (117 006) with fusing gun (117 000) for Erkoflex-95. If necessary, hot air burner (177 540) for the adjustment of Erkoflex-95.
- **Stabilization splints:** Erkodur-A1/A3, 1.0 mm, hard

Model preparation:
- With large undercuts and hard splint material, parallelometer for marking the prosthetic equator.
- **Erkogum** (110 844) for blocking out, high-fusing wax (725 080) to fill bubbles in the plaster.
- **Erkoskin** (625 050) to relieve the gingival margin.

Finishing:
- **Recommendation:** Finishing set Quick 2 (110 877) with fissure bur, rightward cutting, left spiral (110 836) for rough cutting out, HSS-twist drill (110 876) to cut out the desired form, crosscut tungsten carbide bur (110 837) for fine grinding, to prepolish the edges, Lisko-S (223 200) and narrow interdental spaces, Liskoid (223 205)
- **Polishing set** (110 878) to polish Erkodur and Erkoloc-pro, hot air burner (177 540) to shine Erkoflex-95.

Hints
- This instruction is limited to the general fabrication of splints. Functional individualizations as required for the therapy with reflex, repositioning, distraction, centric (Michigan) and many other type of splints can be realized except for a few type of splints only with materials that are at least in the occlusal area hard.
- Areas of the model (exterior vestibulum, oral floor), which obstruct the thermoforming process have to be removed. Remove sharp plaster edges.
- In order to have transparent splints out of Erkoloc-pro or Erkoflex-95 without insulating foil, the model should be insulated with Isolac.
- For splints that exceed the gingival margin apply a layer of Erkoskin to the margin to relieve tension.
- In order to avoid the creation of tension cracks brush the area that has to be built up with Resilit-S with little monomer before the splint is cut out or taken off the model.
- For splints out of Erkoloc-pro the hard layer may be ground through.

Occlusal splint without adjustment, for ex. stabilization splints

Thermoforming material: Erkodur, 0.8 - 1.5 mm, hard • Erkodur-A1/A3, 1.0 mm, hard • Erkoloc-pro, 2.0 mm, soft/hard • Erkolign, 1.0 mm, tough-hard. In regard to fabrication the materials do not differ, in regard to finishing only slightly.

1. Pay attention to the hints for model preparation (see BasicPrinciplesTF.pdf). When there are thick undercuts, mark the prosthetic equator with a parallelometer and block out large undercuts.
2. If necessary (see hints), apply Erkoskin on the gingival margin. Embed the models so far into the high grade steel granules that only the thermoforming area plus 3 mm protrude from the granules.
3. If applicable, cover granules with a cover template (Erkoloc-pro/Erkoflex-95). Thermoform.
4. Cut in the thermoformed plate with the fissure bur (> 20 000 rev./min.) for an easier removal of the model. Use the twist drill HSS without pressure (> 20 000 rev./min.) to cut out the final shape.
5. If necessary, grind the edges with the crosscut tungsten carbide bur (> 20 000 rev./min.). Smooth the edges with Lisko-S (10 000 rev./min.).
6. Smooth narrow interdental spaces with Liskoid (10 000 rev./min.). Erkolign: smooth with Lisko-S and Liskoid and white silicone polishers. It would be best to now take-off the insulating foil.
Occlusal splint with adjustment by reduction (grinding), for ex. centric splint

Thermoforming material: Erkodur, 1.5 - 5.0 mm, hard • Erkodur-A1, 2.0 mm, hard • Erkoloc-pro, 2.0 - 5.0 mm, soft/hard • Erkolign, 2.0 mm*, tough-hard. In regard to fabrication the materials do not differ, in regard to finishing only slightly.
*because of its high shrinkage Erkolign, 2.0 mm should be provided with a further insulating foil, UZF-Plus, 0.1 mm.

7. If necessary, polish the matt areas with the polishing set using a lab handpiece, however, for this relatively thin splints a polish is mostly superfluous.


9. Same procedure as up to point 6.
Grind the splint as per the usual manner in the articulator according to the prescriptions. Recommendation: pear-shaped crosscut tungsten carbide bur (110 835).

10. Smooth and pre-polish the edges and grinding areas with Lisko-S respectively Liskoid (10 000 rev./min.).

11. Polish the matt areas with the polishing set using a lab handpiece.
Or polish at the polishing lathe according to the technique for plastics.

12. Finished splint, adjusted by grinding.
Pay attention to the cleaning and maintenance instructions (pflege_E.pdf).

Occlusal splint with adjustment by addition and grinding, for ex. Michigan splint

Thermoforming material: Erkodur, 1.5 - 5.0 mm, hard • Erkoloc-pro, 2.0 - 5.0 mm, soft/hard
In regard to fabrication the materials do not differ, in regard to finishing only slightly.

13. Same procedure as up to step 6.
Brush areas that have to be adjusted with an autopolymer resin (Resilit-S) with little monomer.
See also next to last point of the hints!

14. Insulate the opposing bite (Isolac), put the splint back on the model, apply the mixed Resilit-S and brush the plate with monomer. Put the models in the articulator.

15. Close the articulator and cure in the polymerisation pot at 40 - 50 °C. After curing open the articulator carefully (model may break!) and remove the splint.

16. Finish the area that has been adjusted by addition and the splint (9 to 12).

17. Finished adjusted Michigan splint produced by addition, with restored cuspid guidance.
Pay attention to the cleaning and maintenance instructions (pflege_E.pdf).

18. ...for this purpose it would be best to work with an Occluform installed at the Erkoform units (also see other chapters).
Take the bite with the Occluform...

19. ...and immediately press the hot plastic foil material in the cuspid area with a suitable instrument against the antagonistic jaw.

20. After cooling take it off the unit and finish as described in step 9 to 12.

21. Finished adjusted Michigan splint without addition, the splint consists in the occlusal area only of one material type.
Pay attention to the cleaning and maintenance instructions (pflege_E.pdf).

Hot foil material (Erkodur, Erkoloc-pro, 4.0/5.0 mm) can also be formed to a cuspid guidance in the unit by a manual moulding...
22. Addition: Erkoflex-95, 1.5/2.5 mm
Embed the models so far into the high grade steel granules that only the thermoforming area plus 5 mm protrude from the granules. Cover the granules with the cover template.

24. Pull the insulating foil off.
Put the splint back onto the model and degrease well with degreasing agent (613 050). Put the models into the articulator. Insulate the opposing bite (Isolac).

26. In the articulator immediately imprint the opposing bite...
...or build up all areas step by step and later on imprint the opposing bite as shown in step 31.

28. Smooth with Lisko-S and Liskoid (10 000 rev.min.).
Carefully shine with the hot air burner.

30. Imprint: Erkoflex-95, 4.0 mm
Same procedure as step 22 to 24, however, without degreasing.

32. The imprint can also be done in the mouth. Therefore put the splint finished up to step 23 on the model into a flat bath with cool water. The occlusal area has to protrude from the water,...

23. Thermoform, after cooling take it off the model and roughly cut out the shape with the fissure bur or the scissors, leave the shape longer than the final splint.

25. Apply material onto the required areas using the Erkoflexsticks-95 and the fusing gun (max. 2 cm length per application). Hold the point of the fusing gun very close to the splint.

27. Cut out the final shape of the splint with the HSS twist drill (> 20 000 rev./min.). Work the built-up with the crosscut tungsten carbide bur (> 20 000 rev./min.).

29. Finished adjusted splint by addition.
Pay attention to the cleaning and maintenance instructions (pflege_E.pdf).

31. Warm occlusal area with the hot air burner until it becomes clear and imprint the opposing bite, see also step 26.
Finish as shown in step 27 and 28.

33. ... warm the occlusal area, see 31.
Briefly pour cool water over it, immediately remove the splint from the model and place it into the mouth. Obtain an occlusal registration. Allow to cool for 2 min. in the mouth and finish as shown in step 24.

34. In the example, fix the upper jaw in the model pot.
For the fabrication of an adjusted occlusal splint the model only has to protrude of the model pot by height of the teeth plus 3 mm.

36. Fix the antagonistic jaw onto the upper model plate. Prefix the model in a preferably high position with the arrest joint.
Close the Occluform.

35. Put the model pot that way into the unit that the markings (arrows) are opposite.

37. Point the supporting pin on the 0-line (arrow), open the arrest joint and articulate the models.
The bite can be elevated to a median value.
38. If a construction bite is available the models are articulated in the same way (3).
    That way the imprint corresponds exactly to the bite registration.

39. Hold the upper model plate in position and firmly close the arrest joint.
    Open the Occluform.

40. Fill as many high grade steel granules in the pot that only the thermoforming area plus 3 mm are visible. Ensure that also the hollow spaces under the model are filled with granules.

41. Insulate the opposing bite (Isolac).
    Now it can be thermoformed. Immediately after adaptation close the Occluform until the supporting pin gets contact.

42. After the thermoforming material has cooled down open the Occluform. The imprint corresponds to the bite elevation or the construction bite.

43. Open the foil securing ring, lift the foil frame of the unit together with the model pot and take off the foil frame with the foil.
    Finish as described in step 9 to 12.

44. The plane occlusal surface will be pressed on with an Erkolen-foil, 0.8 mm or 1.0 mm and the Occluform. Thereto pull the insulating foil off (the Erkolen-foil can be used several times).

45. Carry out working steps 34 - 41 analogically.
    The Erkolen-foil and foil frame should possibly be held and operated with one hand. Apply the Erkolen-foil immediately after the adaptation...

46. ...and immediately close the Occluform so far that the supporting pin does not have contact yet (app. 3 mm opening)...

47. ...immediately open the Occluform a little again, remove the Erkolen-foil and...

48. ...immediately close the Occluform until the supporting pin gets contact.
    By this mode of operation a plane occlusal surface with imprint of the cuspid tips will be obtained.

49. Take it out of the unit after cooling down and finish as described in step 9 to 12.
    Pay attention to the cleaning and maintenance instructions (pflege_E.pdf).

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Imprint of the opposing bite with plane occlusion in the Erkoform-3d/3 and Occluform-3 (Erkoform-RVE and Occluform)

Thermoforming material: Erkodur, 3.0 - 5.0 mm, hard • Erkoloc-pro, 3.0 - 5.0 mm, soft/hard
In the example: Erkoloc-pro. The working steps have to be carried out quickly one after the other.