

Instructions for Fabrication of a Michigan Stabilisation Splint

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My splint treatment philosophy is outlined below. I will almost always make a true "Michigan-Style" splint fitted to the upper arch. This means the splint is designed with minimal (but practical) thickness, with simultaneous, even contact of all teeth, and with ALL guidance from the canine rises. Irrespective of whether the splint is waxed and processed, milled or printed, the laboratory should work through each stage and ensure the splint meets these design criteria.

1. Firstly, I recognise that the splint is a U-shaped appliance made from acrylic, and as such, it is susceptible to polymerisation shrinkage and distortion - therefore I always expect that some adjustment is required to the fitting appliance. Milled and printed appliances may decrease this phenomenon in the future.

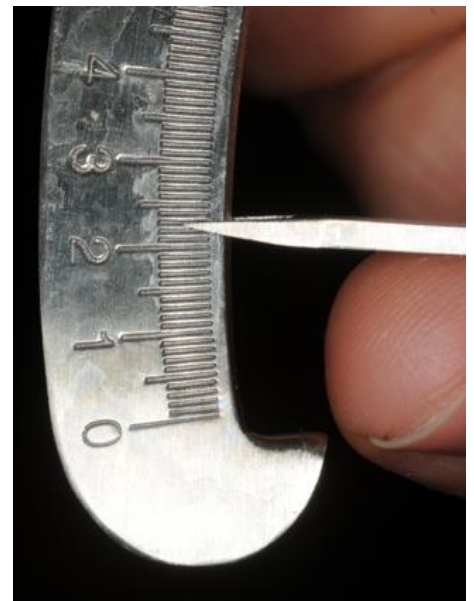
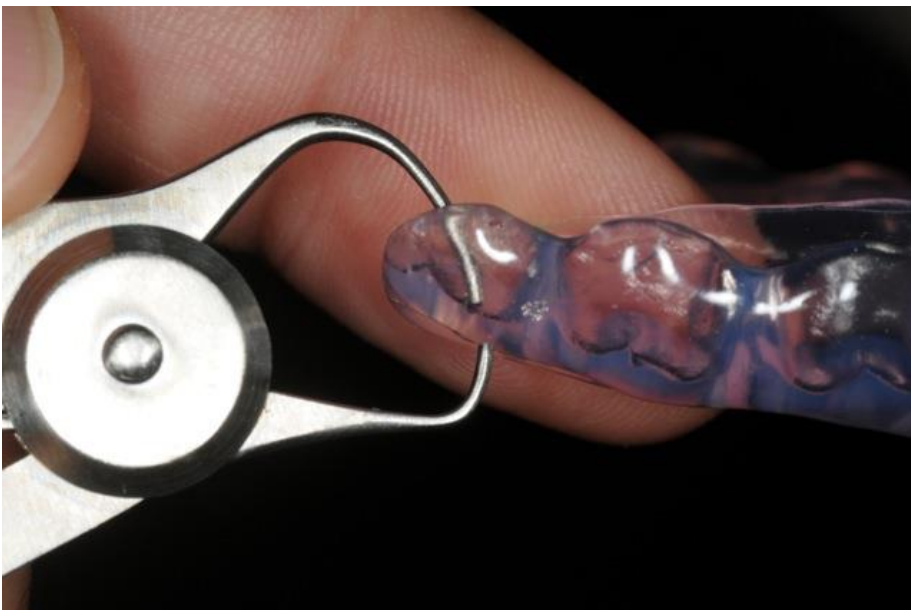
2. The most difficult, (and most frustrating) adjustment is the actual fitting of the appliance to the upper arch. Therefore, I have always ordered the hard-soft style of splint as this very slightly resilient internal surface allows the splint to seat without binding - as the 100% hard acrylic splint is likely to do. Note that the internal surface is slightly resilient - not flexible. A soft, flexible splint has been shown to encourage parafunction.

3. The records provided for a splint should include accurate PVS models, a bite record in CR, at (or as close to) the VDO for the fabrication of the actual splint. A facebow transfer should be provided if VDO changes need to be made on the articulator. Lateral checkbites are not provided as I would ask that the articulator used be set to average values of condylar inclination (30 degrees) and Bennett Angle of 15 degrees. I personally do not provide a facebow transfer as there is too much margin for error in mounting to it. Instead, knowing that some adjustment will always be needed to insert the splint, I endeavour to take a bite registration record at the treatment VDO.

I expect that I will be + or - 1mm from the desired vertical, and so I ask that the casts be mounted to the record provided, equidistant between the upper and lower members of the pre-programmed semi-adjustable articulator, and with the incisal plane set parallel to the benchtop, and the occlusal plane set with a very slight forward inclination. Once the plaster has set, I ask for the bite record to be removed and the Technician to then adjust the VDO by raising or lowering the pin 1 to 1.5mm as needed, to either widen the inter-tooth space, or close it down - depending on how thick my bite record was.



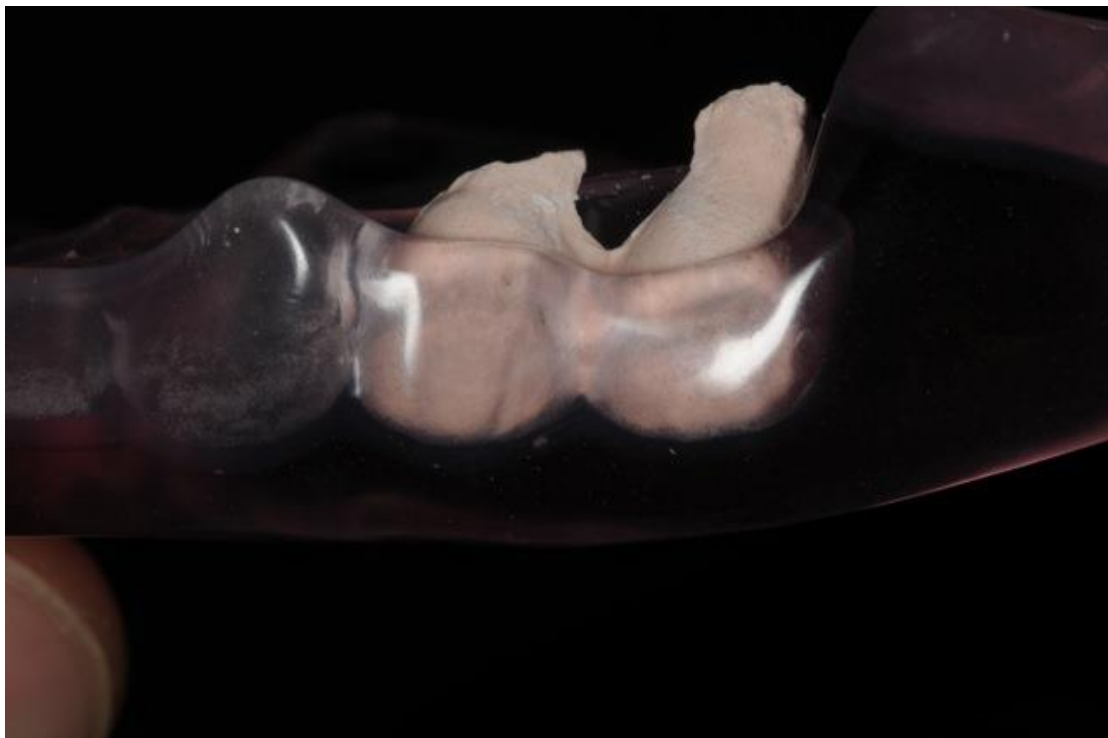
I expect that an interocclusal space of 3mm at the molars would allow for a splint to be made with 1mm of soft and 2mm of hard plastic. Photos of a previous case are attached for reference.



4. The maxillary cast must be surveyed to determine the buccal and palatal heights of contour of the teeth. Depending on the material of fabrication, slightly different amounts of undercut may be needed. The Technician will know this based on the material that they use for the splint. Hence the Technician will survey according to that retentiveness and work out how far past the height of contour they need to wax the splint to.

Accordingly, they must then block out all greater undercuts and extend the peripheral wax-up for the splint just to this point and not beyond. Too often excessive buccal tooth coverage occurs, and there is then so much extension into the buccal undercuts of the teeth that it is not possible to seat the splints in the mouth. This situation is totally unacceptable - and the constructed splints must glide and ultimately click into place, designed to the right amount of retention.

The photo below shows a splint with too much buccal extension and the expected fracturing off of the teeth on the model. A splint designed like this will of course never actually fit in the mouth.



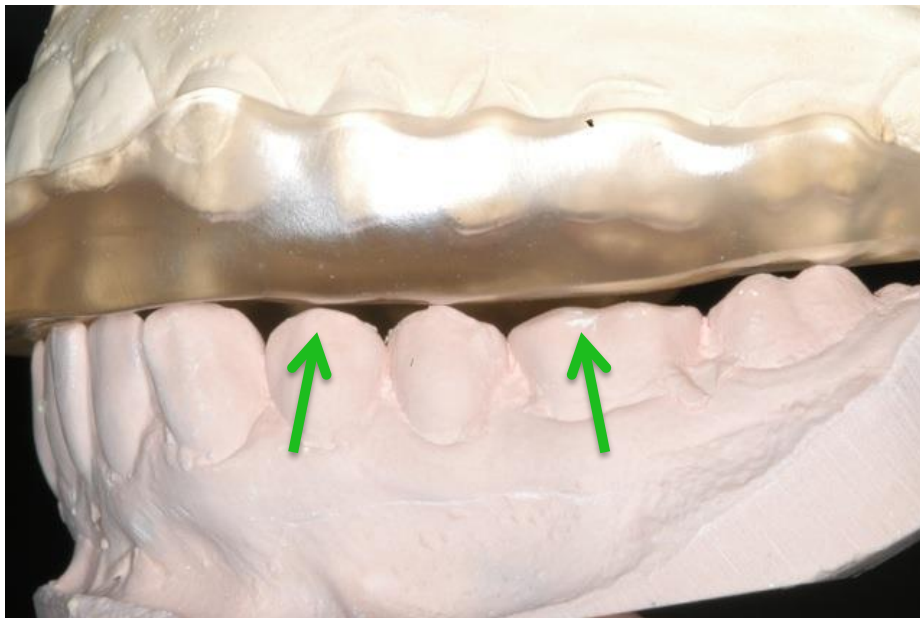
5. The Splint must then be waxed to cover all occlusal surfaces of the maxillary teeth. Similarly, it must be waxed to make contact with ALL of

the mandibular teeth. In a normal bite relationship (Class I or Class II), this would mean contact with the buccal cusps of the mandibular molars and premolars, and the incisal tips of the canines and lower incisors.

ALL teeth must make contact with the maxillary splint - only then is it truly a splint - as only then is it holding all of the teeth in stable positions, like an orthodontic retainer.

If the patient has Wisdom Teeth, then it is acceptable to cover only half of the occlusal surfaces of these teeth, as once again, the splint will hold the teeth in static position and prevent tooth movement.

It is not acceptable to have some teeth out of contact as in the photograph below.



6. The contacts formed between the maxillary splint and the mandibular teeth must be point contacts, and not indents into the maxillary splint. In fact, the contacts should almost be the opposite - that is, they should be the "high points" off the occluding surface of the maxillary splint. Such a design facilitates easy adjustment in the mouth, and eliminates the possibility of posterior contacts in all excursive movements.

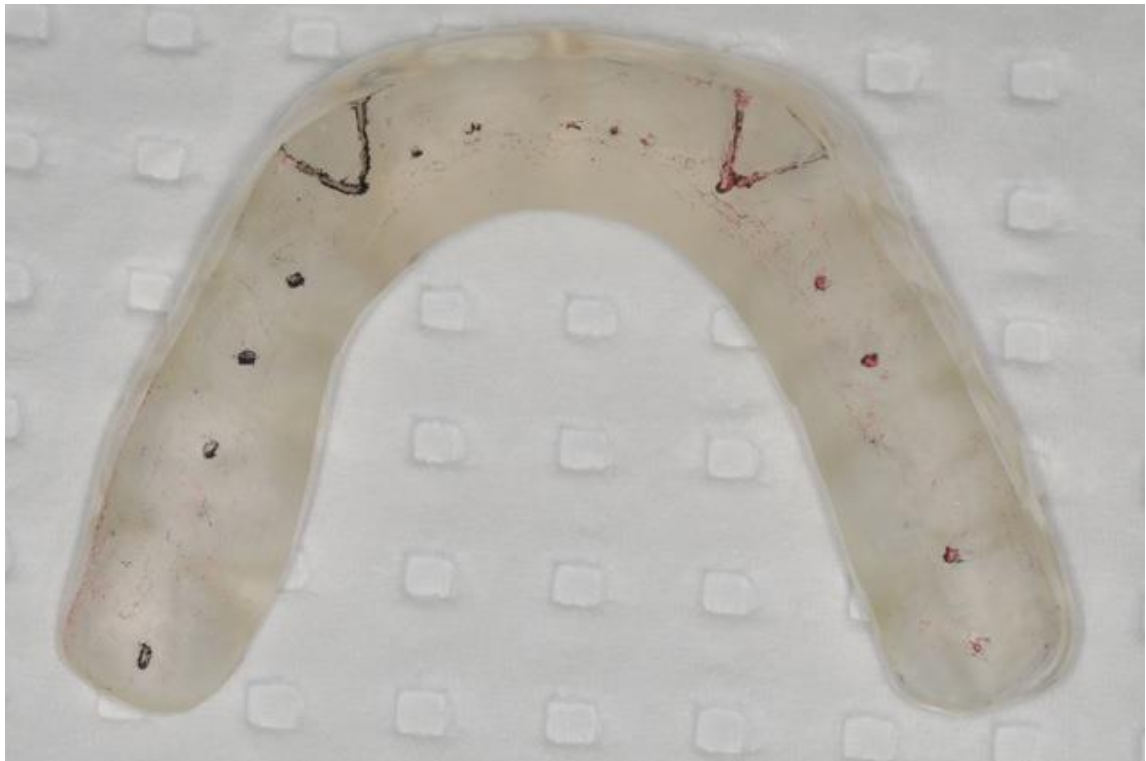
7. The contacts should only be one per mandibular tooth. For molars which can thus have up to 3 buccal cusp tips, the higher of the mid-buccal or mesio buccal should be selected and waxed to.

The premolars should be waxed to their one buccal cusp - the same for the canines, and the incisors ideally should be waxed to their highest point, or mid incisal edge, but not the full rectangular form of the incisal edge as was done in the image below.

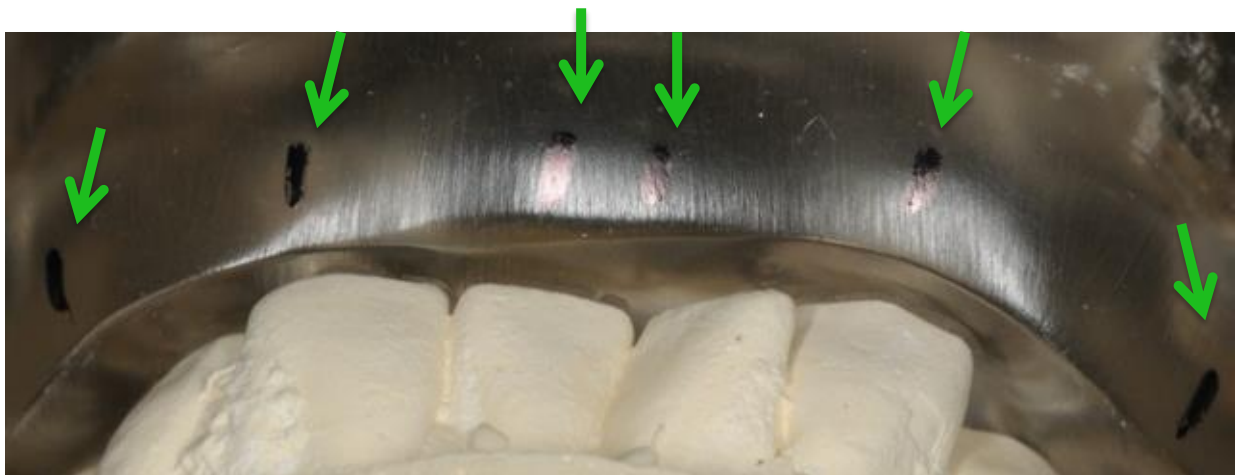


With respect, Items #6 and #7 are not rocket science, but too often I can see a splint has been made by merely heating the wax, and closing the articulator so that the lower teeth bite into and leave indents on the splint wax-up - and then it gets processed like that.

8. The palatal surface of the canine teeth is then waxed into a ramp. The ramp need not become a huge triangular wedge or "fang" that hangs down off the splint. It merely needs enough dimension to allow ALL excursive movements to occur on it, and cause disclusion of ALL other teeth. When protruding, the two canine ramps should be in contact. When moving to left and right lateral, only the canine ramp on that respective side should be in contact. There should be no other contacts - it is that simple. A photo of a properly adjusted splint is seen below.



9. Once the occlusion has been established, I would like the buccal surface of the splint to receive a very small groove per tooth. This groove should be almost at the bucco-occlusal line angle of the splint, and each groove should line up with the lower cusp tip that is in contact. (see the photograph below where I have used black marker pen dots instead of grooves). This allows one to readily see where the occlusal contact should be on the splint, so all aberrant markings can be removed and only the correct one kept, during the splint insert process.



10. A highly polished acrylic surface is preferred, and the polish can be retained post adjustment, if the occlusal contact points are in fact made as described in point #6 above.

That is the design for a Michigan Stabilisation Splint, that will be easy to insert clinically. It is very specific, yet very simple.