

MANDIBULAR model block surgery – mandibular model surgery form

1. Facebow mounting – accurate relationship of mandible to maxilla **via waxbite** is crucial
 - A. Posterior model distortions, positive artifacts, soft tissue to wax contact, and orthodontic appliance to wax contact produce inaccurate mandibular to maxillary alignment – you just did a mini LFI
 - B. Examine for soft tissue to wax contact – remove on model or waxbite
 - Anterior soft palate
 - Tuberosity
 - Retromolar
 - C. Examine for orthodontic appliance to waxbite contact – remove contacts
 - Brackets
 - Bands
 - Headgear tubes
 - Lingual cleats and sheaths
 - D. Interferences are avoided and proper seating are possible when the wax bite is trimmed tight to the lingual cusps
 - E. Use magnification to remove positive artifacts and interferences – for bubbles don't remove too much, better to leave slight excess than leave a void, mark in red pencil areas for block out
 - F. Press models firmly into waxbite – *waxbite misalignment is the equivalent of unintended LFI movement*
 - G. Mount the maxillary cast using the facebow and the mandibular cast using the waxbite
2. Confirm consistency (dream on) between headfilm and model mounting occlusions
 - A. Same waxbite was used for model mount and cephalometric X-ray – expect identical relationship of mandible to maxilla on models and ceph tracing
 - B. Check that molar separation on R and L model (it will be different) matches molar separation on presurgical ceph tracing – this is an impossible dream, you just did a small LFI
 - C. Check that overjet and overbite on models matches presurgical headfilm – surprise, surprise you just did another baby LFI
 - D. Reasons for discrepancy
 - Models mounted incorrectly on wax bite (see above # 1)
 - On headfilm, L and R superimposed Mx and Md molars are traced as one Mx and one Md molar - impossible to trace 2 accurately as 1
 - Difficult but not impossible to accurately trace upper and lower incisors
 - Molar separation on models is different from L to R and therefore can't match the one recorded headfilm molar separation
 - E. *Understanding the limitations allows improved accuracy*
 - F. Check off the appropriate green box on model surgery form
3. Mark following sites on models while on articulator:
 - A. "R" on right side and "L" on left side of models to eliminate confusion
 - B. With pin out, place vertical right and left posterior alignment marks – avoid parallax
 - C. Mark facial midline on maxillary incisor with red pencil; replace pin
 - D. Check off the appropriate green boxes on model surgery form
4. Headfilm measurements (see figure 1, use original tracing)
 - A. Line A – perpendicular to TVL, through Md1 tip (draw from Md1 past molar)
 - B. Line B – parallel to TVL touching anterior of labial crown Md1 (draw from labial Md1 past Pog)
 - C. Line C – parallel to TVL through Md molar mesial buccal cusp (draw through mesial buccal cusp)
 - D. Line D – perpendicular to TVL through anticipated level of soft tissue Pog
 - E. Measurements (calculations from these measurements to be used in step 5)
 - Md1 labial to MB cusp Md molar (distance from B to C along A)
 - Md1 tip to anticipated soft tissue Pog (distance from A to D along B)

- Where lines A and D intersect B
 - Subtract this distance from vertical Md1
 - Set caliper at this height
- Scribe osteotomy line at Pog level
 - Mark Pog location on model (right above junction of osteotomy line and dental midline scribe)
 - Measure and record Pog in green box
- D. Vertical - mark remaining 2 sites: left and right molars
- Measure distance from cephalometric Md1 to mesial buccal cusp of mandibular molar perpendicular to TVL
 - Where lines C and B intersect A
 - Subtract this distance from horizontal Md1
 - Set caliper at this height
 - Transfer distance from cephalometric Md1 to mesial buccal cusp to model right and left molar; model block will be on it's back as with horizontal measurements; marks now indicate where *vertical* molar measurements will be taken from
 - Measure and record in green box
6. Enter "headfilm change" (*from the CTP-model surgery version*) for vertical and horizontal landmarks on model block form (enter + or – carefully)
 - Down is negative
 - Up is positive
 - Forward is positive
 - Backward is negative
 - Specific sites: Md1 tip vertical, R Molar vertical, L Molar vertical, Md1 tip horizontal
 7. Enter desired canine cant change into vertical molar
 - Double canine cant recorded on clinical examination
 - Add to down side recorded on clinical examination (this side will come up)
 8. Enter "desired change" for mandibular midline on model block form (from clinical examination)
 - Move to R is negative, move to L is positive
 9. Calculate "desired values" on the model block sheet; check math 2 times ("model start" \pm "headfilm change" + "canine cant" when applicable)
 10. Cut model off – **make sure 1 – 9 are complete prior to cut**
 11. Vertical plaster removal (dry) from model block side (5 mm minimum + measured mandibular movements at Md1 and Md molar)
 12. New occlusion bonding to block (sticky wax / white utility wax)
 - Sticky wax to both cut surfaces
 - Start with 3 layers of white utility wax
 13. Move mandible on model block to match "desired values"
 14. Re-measure the same landmarks measured in step 5 above in the following order
 - Mandibular vertical sites (3)
 - Mandibular transverse site (1)
 - Mandibular horizontal site (1)
 15. Mandibular midline alignment – place the models back on the articulator with the pin out, visually assess the mandibular midline to the red facial midline marked on the maxillary incisor, align as indicated; be careful not to chip teeth

16. With pin still out, visually assess the change in posterior alignment pencil marks on articulator – align the mandible symmetrically to the maxilla – posterior asymmetry is almost always in the mandible; replace pin
17. Place the mandible back on the model block, repeat step 5 mandibular landmark measurements for second time and enter into “model end” on model block form
 - Mandibular vertical sites (3)
 - Mandibular transverse site (1) –a visual check of the movements will override the clinical exam desired movements
 - Mandibular horizontal site (1)
 - Final measurements should be within .10 mm of desired value(s)
 - If measurements are incorrect, move model and repeat steps 13-16
18. Once all five sites are within .10 mm of desired values, record the measurements into “model end”
 - Mandibular vertical sites (5)
 - Mandibular transverse site (1)
 - Mandibular horizontal sites (2)
19. Calculate “actual changes” on model block form (model start to model end)
20. Calculate occlusal plane change and cant changes (Md R/L 3 and Md R/L molar) in blue boxes
 - If desired Md 3 cant change is not achieved, move molar(s) to get desired amount of change
 - Recheck vertical (5), transverse (1) and horizontal (2) numbers to make sure desired movements are still correct
21. Compare articulator anteroposterior distance from pre surgical Mx1 to post surgical Md1 tips with CTP – cross check, should match; check off “final accuracy check” (red box)
22. Add white rope wax for strength
23. Intermediate splint fabrication
 - Fill palate and tongue with model stone to decrease amount of acrylic removal
 - No acrylic contact with orthodontic appliances
 - Wax out orthodontic appliances which will contact the splint (HG tubes, lingual cleats, etc.)
 - Wax out areas of tooth abrasion(s)
24. Vertical Mx1 surgical movement (to be used in the OR)
 - Place a “screw” mark at soft tissue nasion
 - Measure screw position to pre-op Mx1; write measurement on model surgery CTP.
 - Measure screw position to post-op Mx1; write measurement on model surgery CTP
 - Measurements are NOT done perpendicular or parallel to TVL
 - Subtract measurements – this is distance Mx1 will change pre to post op
 - Enter measurements into the red boxes on the mandibular model surgery sheet
25. Hand-held CI model analysis (check overbite, arch width, arch shape)
 - A. If performing a multi-segment maxilla, record arch widths of maxillary canine to second molars
 - i. Mark cusp tips or central grooves right and left
 - ii. Measure widths and place measurement in arch width change box (lower right of form)
 - B. Maximize occlusal intercuspation and overbite
 - i. Mark model where to segment and then cut it (at occlusal plane and/or arch form break)
 - ii. Equilibrate segments (mark with red pencil)
 - C. Sticky wax new occlusion and plaster bond new occlusion
 - D. Re-measure widths and calculate arch width changes canines to molars
26. Final splint fabrication – not me