SBJ installation: clinical steps

Indications

Moderate to severe Class II cases

Asymmetric cases in sagittal direction (Class II one side, Class I other side).

You can find SBJ cases on website www.latkauskiene.lt in Galerija, Herbsto atvejai/Herbst cases

Additional effects

1. SBJ design allows the appliance to express itself as headgear. Class II cases with upper front crowding benefit due to distalization and derotation of upper first molars, followed by natural distal migration of upper premolars and space acquiring for alignment.

Picture 1. Distalization of premolars following the upper first molars. A- note the gaps in the upper arch, b- in case too much space is developed, upper premolars might rotate. Rotations might increase treatment time due to compulsory derotation of these teeth during the alignment stage. Therefore it is beneficial to have upper 5-5 brackets with wire inserted during active SBJ stage so premolars slide distally on the wire without rotations.

a  b 

Picture 2. Derotation of the upper first molar due to SBJ effects

2. Natural expansion by 1.5-2.5mm of upper first molars and upper premolars is highly predictable.
   Picture 3. From left to right. Pretreatment upper dental cast, postreatment upper cast after SBJ therapy, both dental casts superimposed. Expansion due to buccal movements and distalization of upper premolars and upper molars is detected on superimposition.

3. Vertical migration of upper and lower dentition not included into anchorage of SBJ makes open bite in posterior disappear gradually after the initial activation of the appliance (open bite is normally detected after initial activation of SBJ due to deeper curve of Spee normally present in Class II). Vertical migration of non-anchored teeth helps deep curves of Spee to align by themselves without any additional mechanics. Deep curves of Spee is common finding in Class II div 2 cases. Vertical contacts between the opposing non anchored teeth are present after debonding appliance to enhance stability of the correction.

Picture 4. Open bite in posterior disappears during vertical migration of non-anchored teeth. Relative intrusion of anchored teeth takes place during the process. Note migration of the teeth to close the Spee curve: a- intitial activation, b- after 5 months of SBJ, c- before debonding.

a  

b  

c  

4. One side activation is possible without developing the cant in occlusal plane because SBJ is not connected to other teeth with the wire and brackets. Due to rigid construction of rods and sleeves, one side activation will not significantly affect sagittal relationship on the contralateral side. This feature is beneficial for asymmetric Class I/ Class II cases.

   Picture 5. A- initial situation with Class I on the left and Class II on the right, central line is off by 2mm, b- after hypercorrection of the central line moving

it to the left, note more shims to activate right side, c-immediately after SBJ was debonded, d- after 10months of fixed treatment.

a 

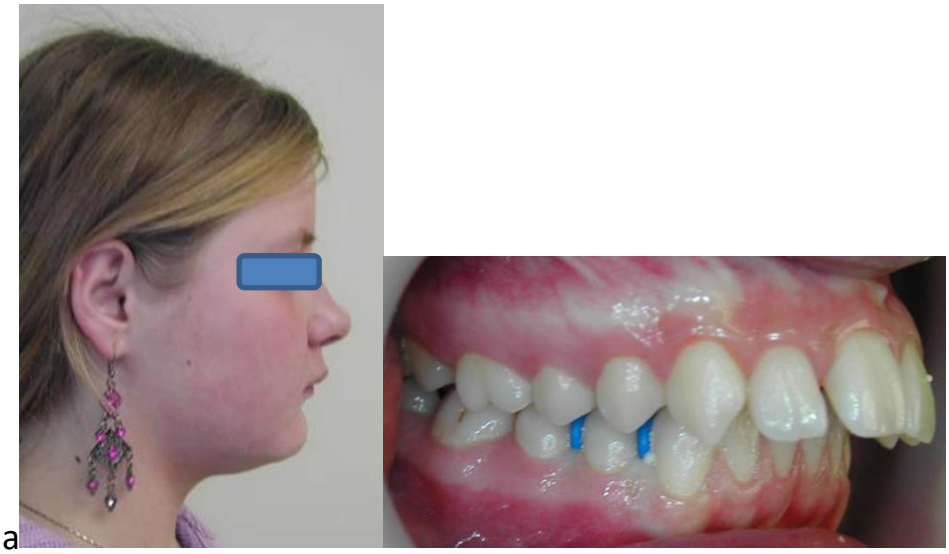
b 

c 

d 

5. Best facial esthetic results can be expected in case of protruded upper lip and retruded lower lip (Class II div 1, normal facial height).
   Picture 6. A- profile and occlusion before SBJ, b- profile and occlusion 6 months after SBJ, no other appliance was used after SBJ therapy. Note

cement remaining on upper first molar. It wears out gradually during the natural bite settling.

a 

b 

6. Relative intrusion and extrusion created by SBJ delivers vertical space for rebuilding the anatomy of the worn out or missing teeth.
   Picture 7. A – initial situation, note total extrusion of the upper first molar and no space to restore lower first molar vertically, b- immediately after SBJ was installed, c- after SBJ debonding and temporary crown cementation on lower first molar.

a 

b 

c 

Preparing the case for SBJ

1. Check the position of lower first premolars: teeth should be in the dental arch. In some cases lower first premolars are detected to be too much " in" or too much "out" in the arch. The positions must be detected in order to fit the crowns well. Rotations of the lower first premolars normally don't cause major problem fitting the crowns. Minor malpositions of lower first bicuspids may be compensated positioning and adapting the crown. Otherwise alignment of the lower first premolars is recommended.

Picture 8. Note in a- “in” positioned 44, normal position of 34, b- crown adapted on 44 to compensate “in” position, c- SBJ installed.

a 

b 

c 

Picture 9. A- “out” position of 44, normal position of 34, b- crown adapted, c- appliance installed.

a 

b 

c 

2. Check the width at first molar region protruding lower jaw on the casts into Class I. No crossbite tendency should be present. In case crossbite is detected, criss-cross elastics can be applied to position upper molars more buccally. Other expansion means such as goshgarian arch or RPE can be used prior to SBJ in case of narrow upper arch. When only the slight narrowing of the upper arch is detected, appliance may be installed without initial preparation to fit the transversal width. Due to slight transversal discrepancy, patient will not fully bite in the front immediately after SBJ is installed and activated. In such transversally deficient cases, 1-2mm gap can be detected in between incisal edges of the front teeth. Due to rather quick lateral movements of the upper first molars, as the upper first molars are pushed distally and bucally by the sleeves, patient will bite down comfortably in 2-3 weeks. SBJ creates expansion in between upper first molars during the active treatment stage as well as their derotation, therefore minor transversal problems are solved without additional means.

   Picture 10. A- appliance installed, open bite of 2mm present in the front, b- bite settled during SBJ treatment.

   a 

   b 

3. Sagittal overjet must be created in Class II div 2 cases. Alignment of upper front teeth before SBJ must be therefore accomplished. In some cases SBJ appliance can be bonded without aligning (when upper front teeth allow to move the mandible forward), but then greater open bite will be present in posterior after activating SBJ, which might not be comfortable for the patient.

As well, less initial activation is performed due to smaller sagittal discrepancy. Sagittal freedom is normally increased by aligning upper 5-5.

Picture 11. A- Class II div 2 case at the start of treatment, b- alignment performed, sagittal gap created for activation, c- appliance at the end of active stage prior to debonding. Note that no activation shims were necessary to reactivate SBJ more than initially. Enough activation was performed from the very beginning due to sufficient sagittal gap created after upper front teeth were aligned.

a 

b 

c 

4. In case the distal migration of upper premolars is wanted during the active SBJ stage, make upper wire to extend longer than second bicuspids in order to allow the migration of the teeth along the wire. They slide easier on round and rectangular wires that are not filling the slot, such as 16/22 Niti in 022 prescription. Larger wires increase the friction and slows down the migration.

Picture 12. A- immediately after SBJ installation, b- note the spaces in between the upper canine and premolars due to migration after 4 months in treatment. The wire was longer to allow migration and sliding along it.

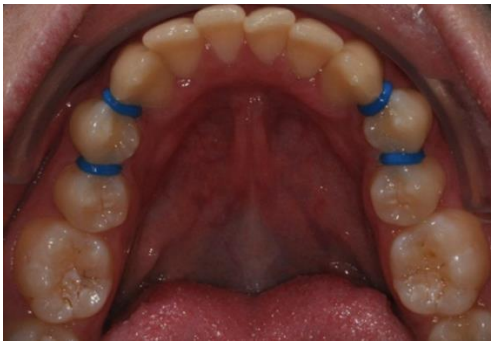
a b

Installation

Visit 1

Separation of lower first premolars for one week in order to avoid pain whilst trying on the crowns during the second visit.

Picture 13. Separation rings for lower first premolars.



Visit 2

1.Remove separation rings, gaps between lower first premolars and adjacent teeth must be detected.

2.Try on lower first premolar crowns. Make sure crowns are not too tight, so they have some freedom as they will be welded to lingual arch later. In case crowns are too tight, it will be difficult to fit with them together with lingual arch due to lack of parallelism.

3. Remove crown portions from interdental spaces as required to make the crown fit the gingiva in the contacts between lower first premolars and adjacent teeth. This is accomplished with metal trimming bur. Then remove the crown impinging the lingual portion of the gingiva.

Picture 14. A- correctly fitting crowns, b- contact areas removed first, c- lingual part removed last.

a 

b 

c 

4. Check the trimmed crown on tooth. Vestibular surface is normally trimmed just a little and last, it is more just contoured to fit the outline of the gingiva. Use pusher and bite stick to seat the crown fully after it was fully contoured. If the crown is not seated well, it will raise the bite which is not comfortable for the patient.

5. Check the position of the crowns. Attachments on crowns should be close to 90 degrees to tooth surface. This will become important when the rods and poles are installed and screws are inserted, so the patient has more freedom to move the lower jaw laterally and vertically.

Picture 15. Note the position of attachments.

a 

b 

6. Make sure the crowns do not rotate on teeth freely, adapt them crimping the gingival part of the crown with special band pliers or Weingart pliers. If

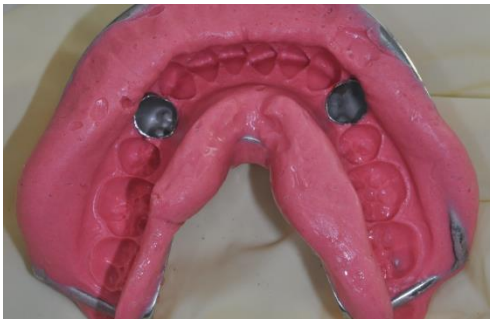
crowns rotate a bit, there is a chance of the change in their positions on teeth during the impression taking and then lingual arch will be welded on rotated crown. This might disturb the SBJ activation.

7. Pick the impression tray. Make sure the tray doesn't touch extending attachments of the crowns, so the crowns are not dislodged.

8.Take alginate impression.

9.Remove the crowns gently lifting them up with Weingarts holding on attachment (hard pressure may distort attachment). Make sure you place the crowns correctly into the impression as for sides and fit. The attachment will guide to the good fit of the crown into the alginate. Take impression to the laboratory to perform welded lingual arch.

Picture 16. Crowns fitted into alginate impression.



10. Separate lower first premolars and upper first molars before patient leaves the office, next visit is scheduled in one week. Separation rings of the lower first premolars may be lost for they are already inserted into open spaces. Inform the patient. Usually this is not a problem, the remaining gaps during the third visit are sufficient for cementation of the lower construction.

Picture 17. Patient separated before leaving the office after the second visit.

Laboratory part

Lower lingual arch is performed out of 1mm diameter stainless steel wire and welded to the crowns, occlusal rests are bended to fit the grooves of the lower first molars as well they are flattened for better fit. Sandblasting the inner surface of the crowns is important for better retention.

Third visit

1. Remove separation rings, clean teeth prior to cementing the crowns onto them. Use pumice paste. Clean occlusal surfaces of the lower first molars.
2. Check the lower construction first. Use pusher and bite stick to seat the crowns, make sure the occlusal rests of the lower lingual arch fit the grooves of the molars. Construction should be passive and stable.
3. Adapt upper first molar crowns from the kit. They can be tighter than ones for lower first premolars. Trim the crowns to fit the gingiva if needed, contour a bit for better grip. Upper first molar crowns are rarely contoured with the bur due to less variations in shapes and better anatomical fit. Make sure attachments are close to 90 degrees to tooth surface as in picture 20.
4. Clean the crowns. Use conventional glass ionomer luting cement. Fill half of the crowns so you can easily press the crowns onto the teeth. In order to seat the crowns properly, consistency of the cement should be flowing.

Picture 19. Half filled crowns.

5. Cement upper crowns first, separately right and left, seat them well using bite stick and pusher. Remove excess of the cement from interdental spaces using conventional dental floss.

Picture 20. Immediately after cementation of upper molar crowns, note the positions of the attachments, they are nearly 90 degrees to the molar surface.

6. Cement lower construction. Remove excess of the cement.
7. Etch occlusal surfaces of the lower first molars with conventional phosphoric acid used for bracket bonding. Apply conventional bonding agent and use any type of flowable composite to fix the occlusal rests of the lingual arch onto the lower first molars. Make sure the layer of the flowable composite is thin, just to cover the wire lightly in order to raise the bite as little as possible.

Picture 21. Lower construction installed.

8. Ask the patient to protrude the lower jaw into the desired position (1mm overjet and overbite) and keep it whilst the length of sleeves is picked. In case the patient is not keeping the mandible stable, you can use bite wax to stabilize the mandible as you pick the sleeves. Put the sleeves on upper molar crown attachments, sleeve must not touch the lower crown attachment by approximately 1.5-2mm (picture 22a). In case the sleeve is too long, mark 1.5-2mm distance with the bur to make sure you cut the sleeve correctly and leave the space for the rod (too long sleeve in picture 22b).

   Picture 22. A- correct sleeve length, b- sleeve too long, there is no space for the head of the rod, has to be accordigly cut with the disc.

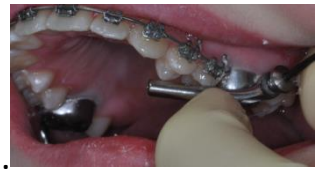
a  b 

9. Pick the rods accordingly. The rod should not extend further than the middle of the sleeve hole. In case activation is not big and there is a tendency of SBJ disengaging during wider mouth opening, try the rod extending to the distal end of the sleeve head. Cut the rods with the disc and smoothen the endings with the polishing stone or bur.
   Picture 23. Correct length of the rods.

10. 1mm overbite and overjet is suggested as the first activation of SBJ. In case more than 10mm of sagittal overjet is present, activation may be performed in two steps due to patient comfort. If the patient has expressed chin button, consider less sagittal activation due to esthetic reasons. Protruding chin may disappoint the patient and this might influence cooperation in the future. Some Herbst users advocate step by step activation of the appliance, based on better skeletal effects and better patient comfort. Nevertheless, this will increase number of patient's visits, more rods and sleeves will be required to fulfill the functional treatment stage, short rods and sleeves will increase the number of disengaging incidents. One may pick activation type according to philosophy of Class II treatment followed.

11. Take 2 screws. Fix right and left sleeves first. Use Ceka bond in order to increase the bonding strength in between the screw and attachment inner threads.

Picture 24. Sleeves fixed



12. Insert rods, check their extensions distally as the patient occludes into the protrusion. Don’t make rods too long for they might irritate buccal mucosa. Too short rods will increase the rate of disengagement.

Picture 25. Too long rods impinged the mucosa.

13. Central line is usually coincident after SBJ is activated, but it also may be off due to asymmetries in the jaws or dental arches. This may be corrected with the help of activating shims during the following check-up visits until the central line corrects.

Picture 26. A- coinciding central line after SBJ activation, b- non-coinciding central line after initial SBJ activation, may be corrected adding shims onto the right rod during the following visit c.

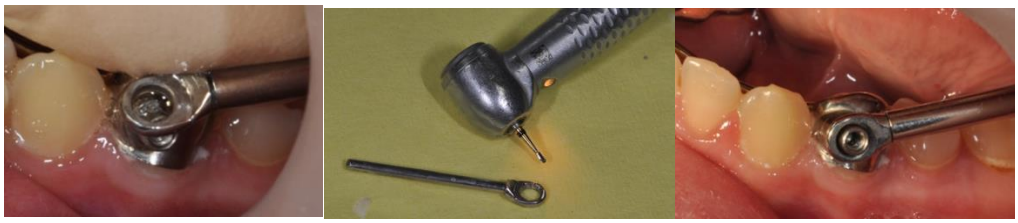
a 

b  c 

14. Check the bite- it has to be as desired. In rare cases the sleeves appear too long, then de-attach them and trim as needed.

15. Ask the patient to open and bite with the rods not secured yet. In case upper jaw is a bit too narrow or the crowns are not parallel, patient might have difficulty to close the mouth. Then the hole of the rod can be increased a bit using the metal bur for easier fixation of the rod. In case there is slight 1.5 mm open bite in the front and the patient cannot bite to the end, spontaneous correction will take place before the next visit (see picture 10). In case the activation is as desired, fix two more screws into the crowns of the lower first premolars to secure the rods in place. Use Ceka Bond if needed.

Picture 26A. Note the widening of the hole with the bur for easier screwing and in order to alleviate movements of the lower jaw.



16. Make sure the patient can open and close the mouth and slightly move to sides.
    Picture 27. Lateral movements immediately after installation.

<u>Instructions to the patient.</u>

- No hard food to be consumed as nuts, carrots, etc.
- Pain of tension is normal for three days, use NSAIDs if necessary.
- Brush normally, use rinsing agents and one tooth brush to clean around the parts of appliance.
- Don’t open mouth too wide, this will disengage the appliance.

- Cover the sticking parts of the appliance with the cotton (make up removal pads).
- In case of any problem contact the office immediately.

Additional explanations:

1. Facial changes will settle. Explain the patient that lower jaw will not be grown to the extent as it looks after the activation. The main change in occlusion will take place due to teeth moved towards different positions.
2. After appliance is activated, two bumps are detected under the lower lip, as soon as appliance relapses a bit from its initial activation and as soon as lip is not much tensed, the bumps will be slightly detected or no longer noticed.
3. Discomfort for one week, use NSAID medications if needed to relieve the pain. Ibuprophenum of 400mg two times per day suggested. Pain is due to the tension, no acute pain is expected.
4. Lower screws may impinge the gingiva. This usually happens during the night as the patient sleeps on side pressing the cheek into the pillow. Please use cotton pads for make-up removal in order to cover the lower screws.
5. Upper crowns do not cause trouble for the patient in case the length of the rods is appropriate and patient doesn't experience cheek irritation
6. Disengaging. In case of wide opening of the mouth due to yawning or singing SBJ may disengage. Patient can be instructed on how to place the rods back, opening the mouth and sliding the rod into sleeve. In case activation shims are present on rods, make sure the patient realizes this and doesn't lose them. In case shims are lost, activation changes and lower jaw might shift.
7. Unscrewing. Most frequent complication. Unscrewing is rare in case Ceka Bond is used and screws are screwed in properly up to the end.
8. Broken occlusal rests on the lower first molars. Remove the broken occlusal rest polishing the crown lingual arch is welded to.

9. Debonding construction. Usually due to loose crowns fitted, not properly seated construction whilst cementation, too little cement in the crowns. Construction must be taken off, cleaned and fixed again.
10. Lost attachments of the crowns. Rare complication. Remove the crown and replace with a new one from the kit.
11. Broken lingual arch in between premolars. Rare complication, due to laboratory procedure normally. Remove the crowns, fit new ones and make new lower construction.

<u>After SBJ installed</u>

1. Next visit in 2 months. Check the integrity of the appliance. Check the activation. Reactivate as needed by removing the lower screws and adding activation shims as desired. New screw is used for every single activation. Stretching the old screw too much might cause its breakage inside the attachment and then the crown has to be changed into the new one. Other means of activation is asking the patient to open very wide to disengage the appliance, slide the activators on and put the rods back into sleeves without unscrewing them.
2. Main target would be keeping the premolars is super class I so they can erupt spontaneously and lock vertically in Class I to increase stability of the correction.
3. As soon as stable vertical contacts in premolar region are established and no relapse occurs in 2 months, appliance can be debonded.
4. Duration of SBJ stage is usually 7-12 months depending on the severity of Class II malocclusion.

Picture 28. A- additional SBJ activation by 2mm during the treatment process, b- bite settling after 4mm activation (note shims on rods), vertical contact in between upper and lower premolars detected, c- after 2 more months, no relapse to Class II detected, SBJ is removed.

a  b  c 

Debonding and proceeding with further treatment

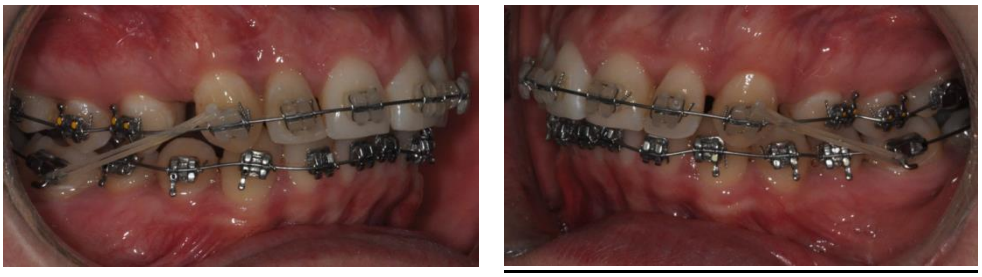
1. Unscrew the screws. Cut the crowns with the metal bur. Be careful not to touch the gingiva. Take the crown off making the turning move with the Weingart plier secured on the attachment.
   Picture 29. Twisting the cut crown off.

2. In case the patient is not starting braces immediately after SBJ is removed, make sure the remainings of the luting cement stay on anchoring teeth in order to keep them closer to the occlusal plane. Cement will wear out by itself gradually during the normal function. Cement remainings after debonding lower crown is shown in picture 28.
3. We strongly recommend to wait for 2 months before proceeding with the further fixed treatment. We do wait in almost all our cases, the contacts become super tight and the probability to relapse back to Class II is much less. If you wait for 2 months before you proceed with the further treatment, the step between upper first and second molar will disappear and it will be easy to manage the case.
4. See the case before treatment, during SBJ, SBJ debonded (see the step between upper first and second molars from occlusal view), case in 2 months with natural bite settling (see the disappearing step).


5. In case you start fixed treatment without waiting, make sure you may have to use Class II elastics to support the settling occlusion. Bond the brackets so they don't disturb the occlusion. Since the patient presents with Class I after SBJ, usually this is not a problem. Lower brackets may disturb only if the rotations of the lower teeth are detected. Trim the wings of the disturbing brackets as well consider bonding lower arch a bit closer to gingiva.
   Picture 30. Bonding the brackets immediately after SBJ removal, upper front was aligned before the functional treatment. Note the stable vertical contact in between opposing premolars and no bite rising after lower brackets are bonded.

6. Support the correction with light Class II elastics night time to maintain the case in Class I. Elastics will extrude lower first molar a bit into the contact with the upper first molar which is beneficial for the stability. In case stable occlusal contact in between upper and lower premolars is present, Class II elastics are not obligatory. Elastic traction can be added during the following check-up in case slipping of the bite occurs. Elastics worn night time only. As soon as 18/25 SS wire is inserted in the upper arch as following 18/25Niti and 18/25 NiTi is inserted in the lower arch following 16/22 Niti, medium Class II elastics can be applied 24/7 if needed.
   Picture 31. Note increasing contact in molar region due to light Class II elastic traction during active aligning process, patient is wearing elastics night time.

A- light 3/16 elastics on 16/22 Niti upper wire, 016 NiTi lower wire, b- following with light elastics on 18/25NiTi upper wire and 16/22 NiTi lower wire.



a

b

7. In case there is moderate or severe crowding in the lower arch, finish the case in overcorrected class I. Then you will avoid disturbance of the class II elastic whilst the lower teeth are aligning. Make sure you IPR lower teeth during the alignment if needed.
   Picture 32. A- case finishing CBAA in hypercorrected Class I due to severe crowding in the lower arch, b- initial aligning after stripping the lower front teeth with the metal stripes, c- additional stripping on lower rectangular Niti wire, d- after debonding, fixed treatment after SBJ lasted 13 months.

a 

b 

c 

d 

8. In case upper 5-5 are aligned prior to SBJ, there is possibility to engage 18/25 NiTi wire as a start wire in the upper arch. Then there is a better opportunity to install stabilizing light Class II elastics in case the case is slipping back to Class II. It is difficult to prevent distal rotation of the upper canines in case elastics are applied onto upper round NiTi wire.

9. Pay attention to the position of the upper first and second molars. They may be not in the same height due to crown of SBJ cemented on upper first molar. After upper crowns are debonded and cement is removed, infraocclusion of upper first molars is present, therefore vertical step in between upper first and second molars is detected. In order to align both molar teeth into one occlusal plane upper second molars need to be bonded more occlusally than first molars. Make sure you don't angulate the tubes of upper second and first molars in order not to extrude the palatal cusps so the bite can slip to class II. *Again, we suggest to wait for 2 months after debonding of SBJ to make sure this step disappears by itself during the natural settling.*

Picture 33.Vertical step developed between upper first and second molars has to be respected whilst bonding the tubes.

10. Suggested wire sequence. Best sequence is achieved in case upper 5-5 are aligned prior to SBJ installation. Then, as soon as SBJ is debonded and the rest of the brackets are bonded, 18/25 NiTi in the upper arch is engaged and initial aligning wire is engaged in the lower arch, usual protocol is 014 or 016 NiTi in the lower arch.
11. During the upper distalisation, gaps may appear in between upper premolars and canines. Gaps may be collected into three segments- 12 to 22 and 13-17 and 23-27, spaces in between laterals and canines may be closed with T loop TMA wires or other preferred mechanics.

Picture 34. Closing the spaces on T loop TMA wire. A- during the closing, b- case debonded.

a 

b 

Normally 10-12months of fixed treatment is enough to finish the case.

Retention

Fixed lingual retainers upper 12-22 and lower 33-43 are installed after debonding the brackets, functional Andreasen type appliance night time 2.5 years is suggested.

Picture 35. Retention device

Patient should be checked after 3 months. Appliance can be trimmed for better occlusal settling. In some cases overcorrection of Class I is detected during the retention period. In such cases, retention with separate removable plates can be suggested. Second check-up takes place after 3more months- same concerns. Then another visit in 3 more months. In case no instability is detected, patient is followed every 6 months until 2.5 years after debonding. Functional appliance wearing is gradually reduced afterwards. Discontinuation depends on clinical situation and doctor’s concerns.