Seminar 3: Expectations of the seminar

Separators

1. How long do separators need to be placed to make enough space to properly size a tooth with a fitting band? Is this the same for adults and children?

_for children, use the elastomeric separators since they can tolerate more force without disturbing pain, and 2-3 days is enough time to create the needed space. More time and some may fall out since the space is made and the separator gets pushed down into the gingival tissue. Children are not as sensitive to changes in their occlusion (high filling is not an emergency), and their periodontal ligament is immature, the tooth movement of eruption recently completed.

For adult patients, 1 week is good for most, but even then some do not get the needed space, usually skeletal closed bite cases. Using more force of the elastomeric separators only discourages the adult and does NOT make any more space any faster (McGann tested this in his first published article in Journal of Clinical ortho). Adults are sensitive to occlusion changes and less force is better for tooth movement and less pain. For this reason, use McGann’s invention, nickel-titanium separators to avoid losing a case due to the pain of tooth separation (maybe best to put some brackets on first, bands later!)

2. How do you place and remove elastomeric separators? What instruments? What do you do if the contact is too tight or there is a sharp filling that breaks the separator?

For elastomeric separators, the elastomeric separating instrument is made for that purpose, expanding the separator as you squeeze the handle. “Saw” the separator through the contact from occlusal to gingival. If a rough filling breaks the separator, then either use a nickel-titanium separator or put 2 pieces of dental floss through the elastomeric separator, floss through the contact, and pull the separator “UP” from the gingival to occlusal.

For nickel titanium separators, it is best to use a locking mosquito hemostat to place them, grabbing the ‘straight’ leg of the separator with the hemostat. The ‘hook’ the lingual or buccal of the contact with the curved end of the neet spring and extend the separator over the top of the contact and down. Be certain that the legs are between the papilla and the tooth (in the sulcus), not compressing the papilla against the tooth…that will cause pain.

Removing elastomeric separators is done with a scaler, especially the thin curettes that are no longer serviceable in the hygiene department from too much sharpening. Put your finger on top as you pull the separator out, avoiding an accident of the dirty separator going into someone’s eye and spraying you with grime. Be sure to COUNT the separators removed and document the number of separators placed to be sure that one is not left in the tissue...an x-ray can be used to see any lost separators.

For nickel titanium separators, tease the separator ‘up’ with an explorer and then ‘grab and pull’ the separator out. Sometimes it will have turned around the contact point, so just grab any part of the separator and pull it out.
3. What do you do when there is not enough space to seat both 6+7 bands in the same space distal to the 6?
   Temporarily seat the fitting band (or cement the treatment band) and place another separator between band on the 6 and the 7.

4. Explain why separators can be the most painful part of the orthodontic treatment experience
   The teeth are NOT ready for tooth movement biologically, especially in adult patients. There are no osteoclasts and osteoblasts in the periodontal ligament. So the force applied by the separators simply compresses the periodontal ligament between bone and tooth root, causing pain. Occlusal changes, the patient biting on the separator, can be very painful for the adult patient.

5. What is the protocol when a separator is ‘missing’ when you are removing them for band fitting
   First ask the patient if they remember losing a separator, and if they did, was it swallowed or recovered? If the answer is not specific, next search with a scaler under the contact, looking for the separator in the gingival tissue. If you are still unable to find it, and are uncertain, then take a bite-wing type x-ray to look under the contact. The elastomeric separators sold at PDS are radio-opaque and so are the nickel-titanium separators.

6. When should you use nickel-titanium (NEET) separators and when you should use elastomeric separators.
   Use elastomeric separators on kids (age 14 and under) and neet springs on adults. If there is a difficult contact to place the elastomeric separator (rough filling or between upper 6-7), then use a nickel-titanium separator.

Bonding and Adhesives

7. What is the advantage of using a “flexi” bonding retractor, invented by McGann, than a simple cheek retractor when bonding brackets 5-5.
   For orthodontic purposes, you want to have direct access with the bracket placement instruments to the 2nd bicuspsids for the best bracket positioning. “lobbing” brackets at the bicuspsids only causes problems later as you have more repositioning to do. The Velcro strap ‘behind the neck’ can be tightened UNTIL you have direct access where you need it, then loosened after you are finished. Nola dry field is another product to consider, but much more expensive.

8. Where are the suction tip(s) placed when bonding brackets? (High speed evacuator and/or saliva ejector)
   The purpose of the evacuators is to avoid pooling of saliva that contaminates the bonding surface of the posterior teeth, leading to bond failure. A saliva ejector is the easiest to use for that purpose, having the patient biting on the tip in the 2nd molar area to keep the mouth propped open and stable. The high speed evacuator is used when you wash the etch or pumice from the teeth, following the 3-way syringe.
9. When should you use a light cure bonding adhesive and when should you use a “no mix” adhesive?

No mix adhesives give less bond strength than light cure, so they are best used with ceramic brackets, that NEED less bond strength. When repositioning brackets or rebonding brackets knocked off by the patient, light cure is superior since you do not have to wait for the material to reach full set.

10. What is different about bonding metal brackets and ceramic brackets?

The bond is ‘mechanical’ with metal brackets, the adhesive locking into the ‘mesh’. There can be a chemical bond with ceramic brackets that in severe situations can cause loss of the facial surface of enamel upon debonding. It is recommended that you use ‘indirect bonding with custom pads’ when using ceramic brackets, not only to eliminate the possibility of a bond that is too strong, but also to avoid repositioning, which is inconvenient with ceramic as you need to use a new bracket.

11. What is different about removing metal brackets and ceramic brackets?

Metal brackets tend to ‘snap’ off with the bracket removing plier. Ceramic brackets may break and you may need a high speed handpiece and diamond bur to remove the ceramic. With either it is a good idea to have the patient bite on a cotton roll to stabilize the teeth (loose from orthodontic tooth movement).

12. How to you recondition the bracket pad of a metal bracket to reuse it on the same patient (rebond or reposition)?

A GOOD sandblaster can remove all the composite from the metal mesh, but this is more often than not unavailable in the private practice. 100lbs per square inch air pressure is necessary.

The other choice is to ‘burn off’ the composite with a ‘lighter’ flame (not torch as this may weaken the braze between the bonding pad and bracket) and then micro-etching to remove the black from the bracket.

13. When during treatment should you reposition brackets?

When nickel titanium archwires are engaged, especially convenient during the minimum 6 months when 18x25N is in place and the teeth are approaching full alignment. This would be in the alignment stage. The second best time is during the finishing stage, again using 18x25N as the finishing wire to allow for realignment after repositioning.

Bracket positioning

14. Explain the different positioning prescriptions in IPsoft (open bite 0%, average 0%, deep bite 51%, deep bite 81%)

There are bracket height prescriptions programmed into the IP appliance tab that allows you to easily change on a patient by patient basis how the brackets are placed on the teeth, managing different treatment situations.
Open bite 0%: creates a curve of Spee in the lower arch by placing the brackets more gingival 3-3 than the posterior teeth. Same on the upper arch, creating a ‘reverse’ curve of Spee. Use this prescription in cases with starting dental open bite or in cases where the dental VTO predicts bite opening (from incisor advancement).

Average 0%: This is your denture setup. Some curve of Spee in the lower arch, upper arch is flat.

Deep bite 51%: A level curve of Spee in the lower arch. Otherwise the same bracket heights in the upper arch as the average 0% prescription. This is the most common prescription used.

Deep bite 81%: reverse curve of Spee in the lower arch and also intruding the upper anterior relative to the upper posterior teeth. Problem with this prescription is that you lose some torquing ability with the more incisal bracket position.

15. Explain the different upper 3-3 arrangements (standard, level, canine minus, canine plus)

These are computer controlled height prescriptions intended to reduce wire bending at the end of the case to get the best upper 3-3 arrangement. Choose in the beginning of the case how you would like the upper anterior teeth arranged, looking at the starting cusp prominence or lack of it. On adult patients, you may want the patient to choose which one they want, so you don’t have to hear about it later.

- **Standard:** your denture setup
- **Level:** some people think all the incisal edges should be straight for straight teeth
- **Canine minus:** less canine prominence, good in females
- **Canine plus:** more prominent canine, likely a male patient. Some have that look to start and want to retain it.

16. How do you use the IP bracket positioning instruments to duplicate the computer controlled positioning prescription.

Choose the instrument with the height that matches the prescription listed for each tooth (3.0, 3.5, 4.0, 4.5, 5.0mm). After first recontouring the incisal edge or cusp tip to ideal, reference the bracket slot to the edge, keeping the handle of the instrument parallel with the occlusal table. If a tooth is ‘blocked out’ of the arch, then the best reference will be the instrument handle perpendicular to the long axis of the tooth.

17. How do you use the ‘molar’ bracket positioning instruments?

Grab the bracket on the “side” (not mesial-distal as with 5-5 brackets), then place the bracket accessing the tooth from the horizontal direction to the occlusal table.

18. Why is it important to recontour each tooth to ideal anatomy before bonding?
This is the reference to bracket positioning. If the reference is incorrect, your bracket position will also be incorrect.

19. What is the difference between direct bonding and indirect bonding? What is a ‘transfer tray’?

Direct bonding is when you place each bracket one-at-a-time on the tooth, positioning with a bracket placement instrument in the mouth. Indirect bonding is when an impression is taken (polyvinylsiloxane) and the brackets are positioned on the stone model, getting better access to make the best positioning. Once the entire arch of brackets are positioned on the model, a transfer tray is made that allows the entire set of brackets to be bonded to the teeth at the same time.

**Note:** McGann has a different bracket positioning prescription with indirect, referencing the marginal ridges of the posterior teeth (instead of the cusp tips used in direct bonding).

20. Where do you find the ‘indirect’ bonding prescription and where are the instructions on how do to this?

In the IP appliance tab, click indirect bonding, then print prescription. Instructions on how to do indirect bonding are on your memory stick, session 3.

21. Where are IP bonded brackets placed on the tooth?

In the center of each tooth mesial-distal, at the computer prescribed height (and angulation if tapered incisor or special tip needed). The vertical references should be parallel with the clinical crown long axis.

22. Where are IP bands to be positioned?

So the top of the band material is at the level of the marginal ridges mesial and distal. Note: the band material should also be level buccal and lingual.

23. How do you determine the band size using fitting bands? Is there any difference when adding a Goshgarian TPA sheath on upper molar bands?

The size should be the band that gives the “reasonably tight” fit, with the band material at the level of the marginal ridges. When adding a goshgarian sheath with band sizes smaller than 15, you should add a size to the band size you have chosen to account for the flat surface of the sheath being welded to the band (changing the shape)
24. What is the ‘partial erupted’ lower 7 bracket and where is this bracket positioned on the tooth?
This is a 2mm wide (mesial-distal) bracket that is placed on the mesial cusp of lower 7s. To be used with partial erupted lower 7s and is very popular on the lower 7s, erupted or not.

Designing IP appliance
25. What is a “customized” appliance and why is this better than a straight wire appliance?
A customized appliance is an appliance designed specifically for a treatment situation, compensating for unwanted tooth movements. Straight wire appliances are ‘one-size fits all’ type, with one bracket choice per tooth. The specific characteristics of the malocclusion and planned treatment are then left in the hands of the orthodontist to compensate by making archwire bends.

The IP appliance® has choices of bracket designs for each tooth, including a variety of performed archwire shapes and sizes, so a preformed appliance can be prescribed for a patient, eliminating the need for wire bending, which obtaining the highest quality tooth movement.

26. What is the ‘default’ prescription in the IP appliance tab?
The Roth straight archwire prescription. This prescription is composed of bracket designs from the original [Larry] Andrews straightwire® prescription (1974). Ron Roth (practiced in San Mateo, California) typically treated cases with first bicuspid extraction, sliding mechanics. He advocated the use of full size rectangular archwires (21x25ss) in the edgewise slot. This archwire is rather inconvenient for most to insert and causes a lot of pain to the patient when it is first inserted. Roth stole the thunder from Andrews for the straight wire appliance since the specialty did not want the inventory of many brackets (mainly cuspids for different anchorage planning) in the Andrews straightwire. Keep in mind that in those days, bands were used and the inventory would be huge for every variation.

Important features you should know of the original Roth Rx as it relates to IP:
1. Incisor torque: Andrews 7 degrees was changed to 12 degrees by Roth on the upper central incisor. This means more ‘lingual root torque’ on the Roth. 12 degrees with a 21x25 archwire is a fairly good inclination for the incisor. Andrews used 18x25 which would be nearly 100% round wire in an extraction case until the incisor was VERY retroclined.

McGann/IP: Variations of Li and La torque were added to the Roth prescription as an option for use on individual cases. The Li bracket compensated for the extra wire spin between 21x25 and 19x25, the preferred archwire size. La torque brackets fully compensated for the wire spin when teeth were advancing. Now dentists could get the “Roth ideal inclination” in both extraction cases and non extraction cases. The development of dental vto predictions and later Range of bracket torque templates, enabled the practitioner to reliably select in the diagnosis stage the correct bracket for the best incisor inclination on finish.
2. **Cuspids:** Roth had distal rotation (4deg upper, 2 deg lower) to compensate for the distal-lingual rotation of cuspids during retraction. This is ok for an extraction case, I suppose, but for non extraction cases with cuspids rotated mesial in the original malocclusion (most of them are), the distal rotation causes a built in under-correction of the rotation. To make the cuspids look good, we routinely made step bends between cuspids and lateral incisors (step mesial ‘out’ on the cuspids was the terms we used).

   Distal root tip was added to the upper and lower cuspids (similar to Andrews) that compensated for the tipping into the extraction space during mechanics. I cannot imagine that Ron Roth had trouble with this when using 21x25 archwire, but this is a feature. In the Andrews Rx, the more [molar] anchorage you needed, the more distal root tip on the cuspids you used. OK for an extraction case, but NOT good for non extraction cases, which then get a look of the cuspid roots touching the first bicuspids (or not enough distal root tip on the lower laterals...some think this (eg. Wick Alexander)).

   **McGann/IP:** I removed the distal rotation on the upper cuspids, manufacturing a new bracket, but kept the name Roth. I left the distal root tip on the upper cuspids since this looks good in occlusion (upright cuspid crowns do not look very good). In the lower, I left the 2 degree distal rotation on the lower cuspids, at the same time making a non-extraction bracket (Ne) for use in non extraction lower arches. So Roth 33/43 would only be used in extraction cases (which we typically use Li torque instead). The distal root tip remains in the IP Roth, looking good on the final panoramic in first bicuspid extraction cases. So 43/33 Roth is very much like the original Roth.

3. **Molars:** Roth used a prescription with distal offset (mesial rotation) to compensate for the mesial-lingual rotation from mechanics applied to the buccal surface on the molar hook. This worked ok for the first bicuspid extraction cases, but did NOT work well in 2nd bicuspid (or first molar) extraction cases...the distal offset was not enough. There was no compensation for mesial crown tipping.

   The upper molars also had distal offset, and this was adequate for the second bicuspid and first bicuspid extraction sites. The big problem in all of these, plus the non extraction cases was the crown tipped mesial, making the fit with the lower arch less than ideal in the cuspid area.

   **McGann/IP:** He made custom [metal injection] molds to create the CIIE and UP variations. The added distal offset (mesial rotation) compensated for the added need for mesial-lingual rotation control. Tip welds were added to the custom welding offered in IP to compensate for the crown from tipping mesial. NOW chain was not needed on the lingual cleats for 5/6 extraction mechanics in the lower. TipD custom welds on the upper molars compensated for the tipping in extraction cases, and later became popular in non extraction case treatment.

4. **Rotations:** With all straight wire appliances, there was 0 degree rotation, supposedly this would give full rotation correction (zero degrees)...but there
is bracket archwire inefficiency, and under-correction of rotations in straightwire is expected. To compensate for this, orthodontists would offset the bracket to the side of the rotation (mesial or distal) and some would even adjust the adhesive thickness when bonding the brackets. This was only a partial fix. Wire bending in the finishing stage was a tremendous burden for those that wanted to get full rotation correction (including McGann). The wire bending, typically done in the finishing stage was time consuming and skill dependent for success.

McGann/IP: diagnosis of rotations was added with supporting rotation brackets, specifically made for mesial or distal rotated teeth. Inventory was now massive, but the single patient custom assembled service allowed for larger inventory. Now the brackets could all be centered m-d on the tooth, facilitating lab indirect bonding setups, and the rotations could be expected to be fully corrected in the alignment stage! Retention is better when the rotation is corrected for a longer time, not wire bending in the finishing stage. The talent of wire bending was removed and now all dentists can get full rotation correction!

27. When should you use a band instead of a bonded bracket?
Whenever you feel there is an increased risk of bond failure. By standard, we tend to band the 6’s, but if you are good at bonding, then banding the 7 and bonding the 6 can make the initial job of bonding/banding easier. IF the bracket debonds, then you may wish that you had simply banded the tooth from the beginning. The IP bicuspid brackets have enlarged pads (than standard) that reduce bracket debonding, but if a bracket keeps falling off, then a band is the way to help solve that problem...bands withstand more force than bonded brackets.

Another situation to use bands is when you have a gold or ceramic crown on a posterior tooth. Bonding to ceramic is possible, but the bond strength is less than bonding to enamel.

28. Explain the difference between a mesial rotation and a distal rotation and how this diagnosis is made
A mesial rotation is a tooth with the facial surface rotated towards the midline of the arch. A distal rotation is a tooth rotated so the facial surface is rotated away from the midline. The diagnosis of a tooth rotation is dependent on the archwire shape you use during treatment. For this reason, we use model measuring to make the rotation diagnosis, as this has the treatment archwire selected. First edit the dots so the red line between mesial and distal dots represents the rotation of each tooth 5-5 (no rotation diagnosis on molars). Then compare the red line to the archwire shape. If the red line is parallel, then there is no rotation. Note: it is BEST, but not required, if you move the archwire in front of the incisors when making the rotation diagnosis.

29. How does a IP metal rotation bracket differ from a “Roth” type bracket?
The slot is cut at 4 degrees different than the 0 degree Roth bracket in the rotation direction. 4 degrees one way is a distal rotation bracket, 4 degrees the other way is a mesial rotation bracket.

30. How is rotation correction done with an IP Ceramic bracket?
A bracket with a special slot, cut “deep” to accept a rotation wedge. Wedges are made in 4, 6, and 8 degree. You start on 18x25N (do not place on 012N), with 4 degree wedges. After full archwire engagement, check rotation and if under-corrected, change to 6 degree. Otherwise leave in the 4 degree. 8 degree is intended for over-correction of rotations.

There are 2 different size wedges, one for the lower incisor brackets and the other for all other brackets 5-5 (not an accident that these brackets were all made the same mesial-distal width).

31. Why can the use of ‘open coil’ or ‘chain’ change the rotation diagnosis
When you apply open coil between two teeth, the coil rotates each adjacent tooth, the force being applied away from the center of rotation. Chain can also rotate teeth, the most noticeable is at the end of the chain…the last tooth, which is rotated the direction of the chain.

IN the IP appliance tab, you can indicate which teeth, on which side of each tooth, is receiving open coil and the software will edit the rotation diagnosis for you. If the tooth starts straight, chain pushing on the distal, a mesial rotation bracket will be selected to compensate.

There is no question in the IP appliance tab to change rotations when chain is used.

32. How do I get the most common Li (lingual root torque) bracket on the upper 4 incisors?
IN question 2 of the IP appliance tab, check ‘retracting upper incisors”

33. How do I get the most common tipD weld on the upper 6 bands?
If you are closing upper 5 space, and this is indicated on the program (question 2, closing space), then the software may automatically select TipD for you. Otherwise, you need to “custom select” this variation from the list of buccal tubes for 16/26…do this AFTER completing all the questions, since customizing disables the questions.

34. How do I get the very common CIIE bracket and tip weld on the lower 6 bands?
Question 4, additional options, check class II elastics. Also, if you are closing lower 5 spaces, the program will automatically select for you.
35. How do I get Roth, La, Li brackets on the lower incisors?
Roth is the default prescription, so do nothing.
La is selected in question 2, Limit lower incisor advancement
Li is selected in question 2, maintain lower incisor in a forward position.

36. How do I get the Ne bracket for non extraction lower arches, on the lower 3s?
After completing the questions in IP appliance tab, custom select for 33/43 Ne.

37. Which molar buccal tube do you use to close lower 5 space? CIIE
lower 6 space? UP
upper 5 space? TipD

38. When you ‘customize’ for a bracket not in the questions, what happens? How do you change back to computer generated prescription and what is lost when you do this?

The questions are no longer available to change. If you do change anything (such as adding a rotation in the tooth diagram), the appliance that is sent in the order is NOT changed, until you uncheck custom designed appliance. When you ‘uncheck’ custom, returning to computer generated, you lose any custom selected bracket variations.

39. If I add rotation brackets [tooth diagram] after customizing, how can I get these into the prescription to be ordered?
Uncheck custom designed, then select the custom bracket variations again.

40. How do I determine the loop size for upper and lower looped [keyhole or T loop] archwires?
Refer to model measuring, upper+lower loop size. Round up to the nearest even number, add 4mm. In the example below, the lower should be 30mm, upper 38mm.
41. Why is it typical to order 2x 18x25N archwires. What is each used for?

One is used in the alignment stage, the 2nd is used as the finishing wire (needed especially if you bond/band any 7s, otherwise you can use the alignment 18x25N for finishing in many cases). Put into inventory any unused wires at the end of the case.

Ordering IP appliance

42. How do you send the patients archwires, bands, and brackets to the ordering tab?

You must send the bands (band sizes must be input to do this), brackets, and archwires (can do this from the IP appliance tab or the archwire tab), to the ordering tab. To do this, click one of the buttons found in these tabs (seen below). If these do NOT work, then click the ‘final check’ button, and see if there are any [warning] messages that need to be first cleared before you can send the information on the ordering tab.

The order is placed from the ordering tab (not the IP appliance nor archwire tab).

In the Order tab, click “place order”, confirm all the brackets/bands/archwires and patients you want to order for are included, enter your confirmation code (last name? don’t worry, system reads the hard drive number so someone else would also have to have your computer to place an order), complete the steps…be certain to get the confirmation # at the end (means the supply has received your order, and write it down for easy reference.

43. How can you order bands only or brackets only?
IN the IP appliance tab, click on the button you want, to send these items for that patient to the ordering tab, waiting for the ordering process on-line.

<table>
<thead>
<tr>
<th>Final Check</th>
<th>Add to Order Bands +Brackets</th>
<th>Add to Order Archwires</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print prescription</td>
<td>Add to Order Bands Only</td>
<td>Add to Order Brackets Only</td>
</tr>
</tbody>
</table>

44. How can you order an extra bracket [with different prescription] for a tooth or an extra archwire [different size and shape than the main prescription]
IN the ordering tab, with the patient you want the extra item for, select from the fields and click ‘add’.

45. How many days after placing the individual patient appliance order will the assembled appliance be delivered to your practice?
7 calendar days. Unless you are in a rural area where delivery is irregular, then add for your situation.

46. How can I be sure the assembly plant has received my order?
Confirmation number at the end of the on-line ordering process.

47. What security do you have that no one else can place an order on your account?
You must have the proper confirmation code PLUS the actual computer registered to that account. The system reads and confirms the hard drive #

48. What is the most common problem when an order cannot be placed?
You do NOT have an internet connection.

49. How many patient orders can be placed at the same time?
Batch ordering, unlimited patients, can be done at the same time, shipping costs, of course, are saved by this method.

Inventory IP appliance
50. What is the typical inventory of IP bonded brackets and how is this packaged?
2 of each possible bracket variation for metal and 1 for ceramic. Packaged in ‘wheels’, all on a ‘ring’.

51. What is the typical inventory of IP archwires and how is this packaged? Be sure to discuss also keyhole loops and T loops.
   2 of each possible archwire, packaged in a binder. Looped archwires are 2 per possible size/shape, packaged in bags, in a box.

52. How do you re-order as inventory is used?
   Create a patient named “AAA inventory” and add items to that patient as they are consumed from inventory. Order with the next full patient order, the replacement inventory will arrive under the patient name “AAA inventory”.

53. What are the inventory options for bands? (fitting bands, prewelds)
   The original design for the IP appliance custom welding bands, is to have 2 fitting bands (to determine size) of each size for molars and bicuspid. This gives options of many buccal tubes, custom welds, etc. The welder has the same bands you have.

   Over the years, some larger practices have chosen inventory (in addition to or even without fitting bands). 16/26TipD is the most common variation on the upper first molars. [some then get inventory of TPA sheaths, and have a welder in the practice to add this part] Inventory is in ‘weighted’ sizes, the most common sizes having more bands. 36/46CIIE is a band variation that you cannot go very wrong with, so this would be the inventory choice for the lower. 37/47R is the most common lower 7 variation. Then for bicuspid, get fitting bands, upper 7s are the same as upper 6s.

   If the patient case calls for the above variations, seat the band immediately. If another variation is needed, then use the bands above for sizing bands, and order the appropriate variation.

Range of bracket torque
54. What is the Roth ideal inclination and how is that represented in the RBT templates?

   Dr. Ron Roth, orthodontist from San Mateo, California, borrowed and modified brackets from the Larry Andrews “straight wire” (trademarked) prescription, that the specialty had rejected due to more than 1 bracket design for each tooth (customized appliance). The inventory was too much, especially since ‘bands’, not bonded brackets made the inventory massive. (I know an orthodontist that bought the crate of bands for the Andrews system!). Roth selected 1 bracket for each tooth for his practice which was nearly 100% first bicuspid extraction, sliding mechanics. Roth changed the upper central incisor torque to 12 degrees from Andrews 7 degrees, more lingual root torque, and added more torque by using 21x25 archwires instead of Andrews 18x25 archwires.

   The Roth ideal inclination, established and defined by McGann, is the incisor inclinations IF there was NO “wirespin” of the archwire in the bracket slot, as if you could pour molten metal into the slot and harden it to make an archwire.
Roth never attained this, since 21x25 in a 022 slot gives 4 degrees wire spin in each direction (total 8 degrees round wire range).

In the McGann range of bracket torque templates, this reference inclination is represented by a dotted line.

55. What is the advancing limit and when is this important?
   The incisor inclination where the bracket and archwire combination engage (bind) to change tooth movement from tipping to bodily movement, when incisors are moving forward (or are already in a proclined inclination) is named the Advancing limit (by McGann). It is important when teeth are either proclined to start, or advance [when crowding is aligned in a non extraction treatment plan, first predicted on the dental vto]

56. what is the retraction limit and when is this important?
   The incisor inclination where the bracket and archwire combination engage (bind) to change the tooth movement from tipping to bodily movement, as teeth are retracted [in an extraction treatment plan or closing spaces]. This is also important when treating cases with ‘retroclined’ incisors, as the starting incisor position may be outside the retraction limit of the bracket/archwire combination, the tooth feeling a twist after the rectangular archwire is engaged.

57. when is there skeletal resistance to tooth movement and how is this represented when using the RBT templates?
   Whenever the predicted tooth movement is ‘outside’ the advancing or retraction limit of the bracket/rectangular archwire combination, there is ‘skeletal resistance’. Skeletal resistance is represented by aligning the appropriate archwire and bracket ‘template’ on the dental vto, referencing the incisal edge and occlusal plane. The inclination of the advancing (or retracting) limit will show how much cortical bone resistance there is to move the incisor to that position and inclination.

58. How do you use the powerpoint “all templates” to determine and document the best bracket to use and the skeletal resistance (if any).
   Paste a screenshot of the treatment decision dental vto, including molars and incisors so the screenshot can be aligned to the occlusal plane. Then move in the suggested bracket torque template, aligning to the occlusal plane and APEX edge (to determine the tooth movement within the bracket slot of that bracket and archwire combination) and then aligning the occlusal plane + INCISAL EDGE of the final predicted position, to determine skeletal resistance (cortical bone that stands in the way of getting the incisor to the final position at the desired inclination)

Archwire tie-in

59. When should steel ligature ties be used and when should elastomeric ligature ties be used?
Steel ligature ties should be used whenever the time interval between appointments exceeds 4 weeks, AND when the archwire is NOT PASSIVE in the bracket slot. Since the typical appointment interval is 8 weeks in POS, steel ties are preferred in nearly all cases. Steel ties take longer to tie-in, but in a system where there are very few archwire changes, steel ties eventually are more efficient, since they do not need to be replaced at each appointment UNLESS they are loose.

Elastomeric ties can be used on 012N if the next appointment is at 4 weeks, increasing patient comfort. They can also be placed “on top” of steel ties for comfort (sensitive adults) or for colors.

60. When should you use a ‘rotation tie’ instead of a 4-tie wing tie?
A rotation tie is usually at steel ligature tie, ligated to the mesial or distal tie wings of a “twin” bracket. This tie is used since it is a ‘tighter’ tie, making rotation correction more efficient with nickel-titanium archwires. When rotations are tied with elastomeric ties, the weakest link is the ‘decaying’ elasticity of the poly-urethane elastomeric tie, negating the effectiveness of the nitie archwire.

Rotation ties are also used on the distal tie-wings of cuspids being retracted, used to prevent the distal-lingual rotation of the cuspid (which then must be re-aligned).

61. When should you use a ‘double overtie’?
When the archwire cannot be secured to the bracket slot by the other more standard ties (4 tie-wing or rotation tie (2-tie wing)). This tie is essentially eliminated by the use of 012N as the initial alignment wire (instead of 016N).
Another application of double overties is when securing a ‘piggyback’ wire to the bracket bases, common when retrieving impacted teeth (cuspids).

62. Describe where the pigtail should be positioned, where to cut the pigtail, and where to ‘tuck’ the pigtail on a steel ligature tie
The pigtail should be on the side of the bracket where the MOST deflection is needed (the side of the rotation classification), since this is the tightest part of the ligature. The Twist of the pigtail should NOT be placed on top of the archwire as this is the most irritating, but instead on the ‘side’ of the archwire, either gingival or incisal, to reduce tissue irritation.
The pigtail should be cut 2-3mm in length, and then ‘tucked’ under the archwire or even under the bracket tie-wings to reduce tissue irritation.

63. what happens if the distal ends are not cut? What instrument is used for this?
Explain the advantages and disadvantages of the two different designs of distal end cutters
If distal ends of the archwire are not cut ‘flush’ with the last (molar) tube, then the patient can have tissue irritation or ulcer. A distal end cutter is used to cut the distal end.
Distal end cutters can either be a ‘cutter’ with a sharp blade to cut the archwire closest to the molar tube. These cutters, however, will ‘dull’ more quickly than the other shearing design.

The shearing design is more durable, but does not make as close a cut, may make a bur on the end of the archwire that prevents it from sliding through the tube, and can ‘crimp’ a second molar tube, preventing the future sliding of the archwire through the tube.

64. What is the difference between closing spaces with [elastomeric] chain and ligature wire lacing? When should you use each method?

Chain will have an active force that is quite heavy, and then rapidly degrade over the period of 1 month to near zero. This will close spaces, but with the most distal tooth (molar) moving forward. Space closure takes place all month. Teeth can rotate from the force of the chain (acting away from the center of rotation), so should be secured first with steel ligature ties, especially at the end of the chain. Use chain upper or lower 2-2 at any time to close spaces, but avoid using chain 3-3 or 6-6 unless you want the posterior teeth to move forward.

Chain also detorques teeth (more retroclined), and for this reason should only be used on rectangular archwires (18x25N or 19x25ss), since these wires have a limit to how far the teeth can detorque.

With ligature wire lacing, the periodontal ligaments are compressed at the “lacing” appointment, the bone is then stimulated to resorb and lay down bone on the tension side (apposition) to the new tooth position. As soon as this process is completed, the space closure stops, unlike chain which may continue. Use ligature wire lacing to close small spaces, and to prevent previously closed spaces from reopening. Lacing 6-6, 6-3, 2-2 are all common, and do not have the unwanted tooth movements associated with chain.

65. If the teeth on my patient are not aligning as I see on the slides shown in class, what is different and how do I correct this?

It is likely that you are NOT deflecting the archwire into the bracket slot (with a steel ligature tie). Force is generated to the tooth by deflection of the archwire, not simply by the ligature tie (although there may be a short time of tooth movement of 1-2 weeks with elastomeric ties before they degrade).

66. When do I change to 18x25N from a round nitie archwire?

When the round nitie archwire (012N or 014N or 016N) shape becomes deformed OR when the teeth in that arch are “nearly aligned”, whichever comes first. It is NOT required that the teeth are fully aligned, the archwire passive in the slot, since 18x25N can also align teeth by “cool and retie” methods.

67. What are the various methods to chill the heat activated 18x25N archwire?

   a) Chilling pen with water frozen inside
   b) Glass or cup of ice water, dipping the ligature director into the water and then held onto the archwire to chill
   c) Frozen water with toothpick in spent local anesthetic vials or needle caps.
d) Endo ice spray on the ligature director (or radio shack keyboard spray with the can held upside down).

68. Describe what a cinchback is and how this is done on a nickel titanium archwire

A cinchback is a bend made in the archwire, usually describing this being done behind the molar tube. With nickel titanium archwires (eg. 18x25N), first size the archwire 3-4mm long, then heat the end of the archwire with a ‘bic lighter’ flame. The wire in the heated section can easily be bent and hold the bend.

69. How often should I reactivate nitie alignment archwires? What happens when I reactivate these wires too frequently?

8-weeks has been found to be the average best time to reactivate nitie alignment wires that have been FULLY ACTIVATED with steel ligature ties. If activating with elastomeric ties, then 4 weeks is needed, and all the ties must be replaced.

If you reactivate too frequently, then the archwire and ligature ties will not yet be ‘loose’, so there is nothing to reactivate.

70. How many months will 012N, 014N, and 016N last in the mouth before deforming

012N officially will last 4 months, but sometimes 6 months. 014N officially lasts 6 months, but can be 8 months in some mouths. 016N can be up to 1 year, but as short as 6 months.

71. What are the various methods to derotate a severely rotated bicuspid?

a) Ligature tie the [nitie] archwire to the bracket, repositioning the bracket each time the archwire is passive in the slot, until the rotation is fully corrected.

b) Add chain to a lingual cleat or button. The cleat either bonded to the lingual of the tooth or welded to a band. Bands are easier and faster to ‘reposition’ on severely rotated teeth that may require 2-3 repositions.

c) Do NOT tie the (bicuspid) tooth to the archwire, using 4 chains from the two adjacent teeth to cleats bonded to the buccal and lingual.

72. How do I “convert” a convertible first molar tube to a bracket? When should I do this?

Using the bracket conversion tool in a bard parker blade to ‘pry’ the plate from the first molar bracket. It is best in the mouth to pry the plate most of the way, then grabbing the end with a light wire plier. (there is also a special instrument to do this more efficiently).

This should be done when,

a) You want to make a finishing bend between the 6-7

b) You cannot push a stiff archwire through the 6 into the bracket slot of the 7...by converting the 6 you easily place the archwire into the 7 and then ‘tie’ the archwire to the 6 with steel ligature ties (often 2 ligatures are used).

c) When cement has clogged the tube of the 6 and you want to remove this from the slot.