Seminar 6 Expectations

Diagnosis

1. FMA changes from skeletal average to “skeletal open” at 28 degrees in adults and 30 degrees in children. Where did these numbers come from? What does this mean to you clinically?
   These numbers came from McGann, defining where the changes in treatment happen. Skeletal open bite cases tend to get dental open bite when treated non extraction, the weak muscles not holding the teeth in occlusion. When you extract in skeletal open bite cases, the extraction spaces close quickly, sometimes spontaneously with the molars drifting forward.
   This does not happen in skeletal average cases, defined by these number transitions

2. Why do orthodontists tend to extract bicuspids in skeletal open bite cases (instead of treat non extraction)?
   Because these are the problem cases in their early clinical experience. The bite is open in non extraction cases and it does not take long to figure out that skeletal open bite is the common denominator and extraction will prevent the problem.

3. FMA changes from skeletal average to “skeletal closed” at 18 degrees in adults and 20 degrees in children. What does this mean to you clinically?
   In skeletal closed bite cases, the transition defined by these numbers, bites rarely open and the common dental deep bite is difficult to correct. When extracting in skeletal closed bite cases, the extraction space will not close spontaneously as with skeletal open, and it closing the extraction space can be expected to be longer, maybe 2x longer.

4. What is “skeletal class II” and how does this effect tooth movement in class II dental cases?
   When the ‘bones’ are class II, either the upper jaw positioned more forward than the lower or the lower jaw positioned back relative to the upper jaw, then attempts at trying to get the teeth to class I may be resisted by the bones.

5. What is “skeletal class III” and how does this effect tooth movement?
   When the bones are class III, the upper jaw is back compared to the lower or the lower is prognathic or forward relative to the upper, getting the teeth to class I may be resisted by the difference in the jaw bones.

6. What is “class III tendency” in the ANB measurement and why is there such a classification?
ANB 0 to +1.5 is considered skeletal class III tendency. Class I is from 2-4.5 and class III is less than zero. This inbetween classification is significant when trying to predict the class I dental case that will grow like a class III case. Today, with the growth system being developed, this concept will likely be proven inaccurate.

Class III tendency was invented by me to try and protect against late growth and class III dental changes due to growth (that the orthos would have in their pocket a set of crappy models from a gp that this happened to, so gps should not do ortho since they do not know growth...happened to me several times in meetings with orthos). Today this is not needed since I DEFINE a class III grower, where you add the big numbers of DHG as having a wits less than -5. (we are testing that definition right now). IN other words, even a class III case with wits greater than -5, may grow like a class I case.

7. **When should you consider extracting an upper first molar instead of the more accepted first or second bicuspid?**
   a) Upper first molars should ONLY be extracted when you will get the tooth ‘back’ in the form of a 3rd molar, leaving 2 molars in occlusion.
   b) ONLY when the more traditional bicuspid extraction has been ALSO considered with a dental vto of each showing advantages to first molar extraction
   c) When one or both of the molars are damaged or missing
   d) When the patient is non compliant, since this diagnosis is done independent of compliance
   e) Skeletal open or average cases (not skeletal closed)
   f) No maxillary constriction in model measuring since the upper will constrict

8. Why is the maxillary sinus position important when extracting upper 6s for ortho? How is sinus height classified in POS?
   Classification is ‘high’ where the sinus is not touching the molar roots, average when there is 1-3mm of roots in the sinus and “low” when ¼ or more of the tooth roots are in the sinus. The maxillary sinus, by having cortical bone lining the floor, will resist attempts to close the first molar extraction site.

9. When should you consider extracting upper 7s in class II cases? When should you NOT?
   a) Class II cases 3-5mm with dental deep bite in the anterior. The bite opens with distalization
   b) Compliant cases that will wear cervical headgear
   c) There is confirmed a third molar replacement of reasonable size
   d) No maxillary constriction
e) Skeletal closed or average, no skeletal open (unless using skeletal anchorage...section 4).

10. Under what circumstances should you consider extracting lower 6s for ortho?
   a) To constrict the lower arch
   b) For more extraction space than a first bicuspid to increase the ability to correct a class III case
   c) When there is a 3rd molar replacement in a good position.

11. When do you consider extracting upper 2s?
   a) When there is one or more Missing, damaged, poorly shaped, resorbed roots from 3 eruption, or poorly positioned lateral incisors
   b) When the molars are in a full class II position (not class I as this would demand you change the molar position)

12. Explain the methods used to make upper 3s look good in the lateral incisor position.
    How is the clinical crown height and gingival margin height adjusted from 4-3-1?
    a) Check tissue height 4-3-1 and be sure to place the bracket on the cuspid more gingival so it will extrude, bringing the tissue with it, and end with tissue height more inferior to the central incisor.
    b) Level the ‘incisal edge’ from cusp tip
    c) Thin Mesial Distal
    d) Grind lingual if you are extruding. (you will need local anesthetic to be aggressive enough with all this recontouring)
    e) Flatten the facial surface to accept a lateral incisor bracket pad.

13. Explain the size differences in 4vs3, 3vs.2 upper and lower and how this effects the fit of the teeth (tooth size discrepancy)
    The upper 4s are smaller mesial-distal than the upper 3s
    The upper 3s are wider mesial-distal than the upper 2s
    The lower 3s are wider mesial-distal than the lower 2s.
    You may need to finish a little class III “cuspid” to make the teeth fit together. Some rotate the first bicuspid mesial to use more space, in which case you will finish a little “class II cuspid”.

14. As a general rule when upper 2s are congenitally missing, when do you close the upper 2 spaces and when do you leave them open for restorative replacement? Why?
    Changing molar position from class I to class II or the other way is not easy to do. For this reason you ‘go with the flow’. If the molars are class I, then replace the missing 2s
with restorative, avoiding the big job of changing the molars to full class II. If the molars are class II, then close the space for the missing laterals, finishing class II molar.

15. Explain how each tooth in the arch drifts after the loss of lower 6(s) (unilateral and bilateral)
   The lower 7s drift mesial, the lower 3-4-5 drift distal.
   The lower incisors drift lingual, when bilateral, spaces opening after they reach the lingual cortical bone.
   If unilateral lower 6 loss, the lower incisors drift distal with the 3-4-5, changing the midline.

16. Explain how each tooth in the arch erupts and drifts after the premature loss of upper 6(s) in mixed dentition cases.
   The upper 7s erupt more to the mesial, occupying some of the space of the 6 that was extracted. The 7s will be mesial inclined and rotated Mesial-palatal. The upper 5s and 4s will erupt more to the distal with a distal inclination. The upper 3s will erupt slightly more distal. The upper incisors generally are not effected, but eventually will drift to the side if unilateral, making a midline discrepancy.

17. What is the problem of leaving large upper incisor marginal ridges or cusps when these are present naturally on upper incisors?
   There is less anterior overjet, so the posterior occlusion will be slightly class II when the incisors are in contact upper and lower. There will be a “feeling” of excess overjet by the patient if the lingual marginal ridges remain. In retention, the marginal ridges can interfere with the lower incisor alignment.

18. What does the patient feel when there is too much incisor advancement from non-extraction treatment? (case should have been extracted)
   The upper incisal edge is protruded because it is too proclined, giving the feeling of excess overjet.

19. What is the harm in not extracting supernumerary teeth (incisors or bicuspids) before starting ortho?
   You could have root resorption on teeth that you want to keep, AND the supernumerary teeth can get in the way of tooth movement.

20. Explain how the facial surface of the upper incisor to nasion point is used to determine final esthetics and which bracket torque to use.
   The facial surface of the upper incisor should point towards nasion. When it points in front of nasion, there is a retroclined look. When it points behind nasion, there is a
proclined look. The Roth retraction limit with 19x25 wire engaged in the slot generally points in front of nasion.

21. Explain the difference between lingual root torque and labial crown torque. How do you know which will happen when engaging a rectangular archwire?

Lingual root torque is the [incisor] root moving lingual. Labial crown torque is the [incisor] crown moving forward. If you prevent the crown from moving forward (lacing, chain, class II elastic), then the root will move lingual in response to the ‘twist’ of the rectangular wire in the bracket slot. If you prevent the root from moving lingual, the palatal cortical bone is engaged, then the crown will move forward, even if it is laced.

22. Explain why third molars (8s) should or should not be extracted prior to starting orthodontic treatment

If you plan to tipback the 7s for anchorage, then the lower 8s should be removed. If you are leveling the curve of spee, the lower 7s could move slightly distal, reducing incisor advancement, if the 8s were removed before leveling. Occasionally the 8s will interfere with banding, so they should then be removed.

In class II cases, if you are unsuccessful correcting the class II with bicuspid extraction, you may want the option of molar extraction to correct the class II. To do that, you need 8s as replacement teeth.

23. Explain why third molars should be extracted (or not) following orthodontic treatment

Most lay people “know” that the wisdom teeth need to be removed to keep the teeth straight. This has been tested in numerous studies and found to be false, but the concept remains in the profession. The 3\textsuperscript{rd} molars could erupt into a functional position in some cases where they are simply ‘unerupted’. To be classified as impacted, the teeth need to be 2 years past the normal age of eruption, about age 22.

24. Explain the McGann system of determining time until full eruption based on lower 5 tooth development.

Crown only on the lower 5 = 4 years
½ root formation on the lower 5 = 3 years
¾ root formation on the lower 5 = 2 years
¾ root formation = 1 year

25. What is the normal eruption sequence of permanent teeth?

Lower incisors
Upper incisors
First molars
First bicuspids
Cuspids
End bicuspsids
2nd molars

26. How much “E space” is there in the upper and lower arch and how can you use this to make more cases non extraction?

The lower E space is officially 1.5mm per side, and if the lower molars are not allowed to shift forward, then there would be an extra 3mm of space in the lower arch for teeth to align (without incisor advancement). Lower lingual arches (LLA) are often used for this purpose, but then you may need to distalize the upper molar to obtain class I if the lower molar is not allowed to shift forward.

The upper E space is officially 0.9mm per side, for a total of 1.8mm of space if this is controlled by a TPA 6-6 space maintainer.

27. Explain the reasoning to extract C, D, E, 4s in serial extraction thinking

Cs: upper Cs (cuspids) may be extracted to allow better eruption of crowded upper 2s. Lower Cs may be extracted to allow alignment of the lower incisors, or to balance the premature loss of one side C that could lead to a midline shift of the incisors.

Ds: the lower Ds are removed to speed the eruption of the lower 4s (assuming they are more superior than the 3s), to get them into the arch first (so they can then be extracted). The upper Ds are not generally extracted for that reason or any reason in serial extraction except to maybe balance the eruption sequence right vs. left of the 4s.

Es: the lower Es are generally not extracted in serial extraction, but could be if the lower 4s are blocked from erupting (under the mesial of the Es). The upper Es are not extracted in serial extraction treatment.

4s: The 4s are extracted to allow better eruption of the 3s (and 5s) into the arch, avoiding eruption into the mucosa with a lack of attached gingival, etc.

28. What is treatment plan 150 and how do you use this to plan your mixed dentition treatments?

Clicking on the link in the treatment option tab, tx plan 150 guides you through McGann’s thinking when planning mixed dentition cases and gives you suggestions on the use of appliances for each problem.

29. What is an “observation” visit in phase I treatment planning?

When a patient does not need to be seen to maintain appliances, then they are seen at 4-6 month observation visits to simply check eruption, growth, and see if they are ready for the next stage or if something unforeseen needs to be done.

30. What are the space maintainers used when Es are lost upper and lower
For the lower the Lower Lingual arch (LLA) 6-6 is used as the space maintainer. For the upper, a TPA 6-6 is used as a space maintainer.

31. What is bimaxillary protrusion? How is it defined and what are the special problems of treating this type of case?
   Bimaxillary can be defined as any case with an interincisal angle less than 115 degrees. These cases are often more difficult than expected due to the starting occlusion often being a class I dental and skeletal occlusion. Anchorage planning and determining skeletal resistance as the anterior teeth are retracted is key to understanding why these cases are under-estimated in difficulty.

32. Explain the treatment options to consider when there are one or more missing 5s upper and lower.
   a) Retain the Es until they fall out and then do the appropriate restorative replacement. The space of course is larger than a 5 since Es are larger than 5s.
   b) Extract the Es and reduce the space to ideal 5 width
   c) Extract the Es and 5s, closing the spaces, possibly gaining space for eruption of the 8s into functional occlusion
   d) If the lower only is missing, then extract 5s, closing spaces for a class III molar finish.

33. What do you do when there is gingival hypertrophy during fixed orthodontic treatment?
   Check around the brackets for excess adhesive and if there is, remove with a bur, scaler, or ‘ceramic wedge placement instrument”. Next check hygiene and do cleaning, and inform the patient that hygiene must improve or they may need a gingivectomy after the brackets are removed. Schedule for 3-4 month scaling. Suggest they get an oral irrigation type tooth brush or machine.

34. What should you do with patients that have poor oral hygiene during fixed orthodontic treatment.
   Document the lack of hygiene (or improvement), attempts made to educate and correct the problem, and if significant damage is being done to the teeth, then remove the brackets. Give a grade at every appointment (on every patient) for hygiene.

35. Explain how palatal anatomy can effect the ability to torque and upper incisor.
   Patients with vertical palatal anatomy have less medullary space to torque the roots of upper (or lower) incisors lingually before the roots hit the palatal cortical bone.

Growth
36. When is a hand-wrist x-ray recommended to be included in your records?  
*On all girls age 10-13 and all boys starting treatment at age 12-15 to better identify stage 2-3-4 growth. Extend this age to 15 for girls and 17 for boys to find patients with “late” growth, most appropriate in class III cases.*

37. Where do you look on the hand-wrist x-ray to determine if growth is still possible on a 16 year old boy?  
*At the growth plate of the Ulna and radius bones.*

38. Explain how to adjust model measuring in growing non-extraction treatment following adjusting the ceph for growth  
*Move the upper 16/26M points forward the amount of added growth to keep the same dental relationship you had before adding the differential horizontal growth to the ceph*

39. Explain the 3 options to adjust model measuring in growing extraction treatment?  
*Move the mesial points in the lower extraction space back the amount of added growth  
Move the mesial points in the upper extraction space forward the amount of added growth  
A combination of these*

40. What happens when you under-estimate growth in a class II case? Over-estimate?  
*If you under-estimate the actual differential horizontal growth, then the case is easier to treat than you expected, and the upper incisors will finish in a more forward position  
If you over-estimate the actual DHG, then growth does not help you as much to correct the class II and the case is more difficult than expected. The upper incisor may need to be retracted further than planned, with more skeletal resistance and deep bite problems.*

41. What happens when you under-estimate growth in a class III case? Over-estimate?  
*If you under-estimate the actual DHG in a class III case, then the upper teeth need to come more forward, or the lower teeth need to be retracted more than planned, making the case more difficult than expected.  
If you over-estimate the actual DHG in a class III case, then the case is easier than expected as growth is not making as much discrepancy upper vs. lower.*

**Dentalcad**

42. List the standard dental vto predictions for class II cases  
*Alignment  
Class II elastic*
Distalization
Extraction moderate anchorage lower
Extraction mod-max anchorage in the upper (most you can retract the upper without skeletal anchorage).
Surgery for severe class II cases.

43. When making model measuring for extraction of 7,6,5,or 4s may all look the same on the dental vto. Why is this?
The computer does not know where the space is made in the arch, it is all the same, fill up the available space mesial to the first molar Mesial points with crowding and if there is any extra space remaining, then the archwire moves back. If not enough space available to resolve the crowding on the shape you selected (archwire), then the archwire moves forward until there is enough space. The distance the archwire must move back or forward is the ‘incisor advancement or retraction’.

44. Explain how to make a surgical VTO for mandibular advance, maxillary advance, and maxillary intrusion.

**Mandibular advance**: make a copy of the start ceph and label surgical vto, refer to the alignment dental vto as the pre-surgical setup, move the teeth to approximate on your ceph copy, then move the lower incisor to be in the best occlusion with the upper incisor, move the mandible and symphysis to fit the new position of the lower incisor, move the molar forward, move the soft tissue forward to keep the soft tissue thickness, hold shift key down as you drag the most inferior end point if you want to rotate the chin. Calculate and save.

**Maxillary advance**: make a copy of the start ceph and label surgical vto, refer to the alignment dental vto as the pre-surgical setup, move the teeth to approximate on your ceph copy, then move the upper incisor to be in the best occlusion with the lower incisor. Move the maxilla to fit the new upper incisor position, move the upper molar forward, rotate the upper lip forward (1:1) by holding down the shift key and dragging the most inferior point of the upper profile…then move the points to fit the nose and sublabial point. Calculate and save.

**Maxillary intrusion**: make a copy of the start ceph and label surgical vto, refer to the alignment dental vto as the pre-surgical setup, move the teeth to approximate on your ceph copy, then move the maxilla UP the amount of intended intrusion (refer to upper resting lip to the upper incisor information), next move the upper molar and incisor to fit the new maxilla position.

Next, move the lower teeth ‘up’ to fit with the lower teeth. Then the mandible and symphysis “up” to fit the new lower tooth position...note the mandible will be in a more forward position now. Select the mandible, and hold down the shift key as you drag the
most superior end point on the condyle, rotating the mandible until the condyle fits. Last, adjust the soft tissue to the new mandible position. Calculate and save.

45. When should you add a surgical vto to your dentalcad projects and why?
You should add this prediction to any case where ANY orthodontist in your community would diagnose surgery for the case being diagnosed. This is to clearly establish that you considered surgery (and presented this option to the patient at consultations). This gives you documentation to fight off criticism from the outside.

46. How to you print a “line drawing” of a surgical vto so you can compare with other dental vto predictions?
Turn off the vectors, points, and x-ray. Print the line drawing.

IP Appliance

47. What bracket should be placed on upper 3s when being used in the lateral incisor position (and why)?
It is best to use an upper lateral incisor bracket on the cuspid. The bracket base is “inset” on lateral incisor brackets and cuspid bracket base is small to make this tooth more prominent. The lateral incisor bracket pad is ‘flat’, so you will need to flatten the curved facial surface of the cuspid some. Cuspid brackets have too much distal root tip, so lateral incisor brackets would be preferred for that reason.

48. What molar buccal tube is used to close upper 6 space? Upper 5 space? Why?
Upper 6 space is closed with TipD weld on the upper 7s. Same with upper 5 space. The tipD weld refers to tipping the crown back and root forward (5 degrees) which compensates for the tipping into the extraction space. Keeping roots parallel after closing spaces is a basic principle in orthodontics.

49. What molar buccal tube is used to close lower 6 space? Lower 5 space? Why?
**Lower 6 space is closed** with the UP variation which has compensation for the crown tipping into the extraction space (tipD 5 degrees), mesial-buccal rotation to compensate for the molar tendency to rotate mesial lingual into the lingual cortical bone, PLUS buccal crown torque to keep the crown upright from a buccal-lingual perspective. **Lower 5 space standard** is CIIE variation, which has the Roth lingual crown inclination, the extra mesial-buccal rotation (“distal offset”) and a 3 degree tipD weld to keep the roots parallel.

50. Explain the differences of indirect bonding (vs. direct bonding), including adhesives, positioning prescription.
Indirect bonding is when you take an impression (polyvinylsiloxane) of the teeth to be bonded, and set the bracket position on the models on the lab bench to get more accurate bracket position and less bracket repositioning during treatment. The bracket setup is bonded to the mouth from a ‘transfer tray’ made on the lab study model, all the brackets seated at once for each arch.

Adhesives for indirect bonding are different than direct bonding. The adhesive cannot be light cured effectively through the transfer tray and even if it could, you would spend too much time cleaning up the excess (cured) adhesive from around the brackets. The recommended adhesive is Sondhi rapid set by 3M, which is like a ‘contact cement’...one part is painted on the etched teeth and the 2nd part on the ‘custom pad’, made of transbond XT when the brackets are set on the model in the lab. The exact fit of the custom pad is key to the two parts liquid making the bond. This adhesive system has worked well over time, but if you do not do a lot of bondings, then place the bottles of sondhi on the lab vibrator to mix them up before using for the best results.

The positioning prescription for indirect bonding is different than direct bonding in that the marginal ridges of the posterior teeth are referenced instead of the (variable) cusp tips used in direct bonding. Lines are drawn between the marginal ridges and heights for the bicuspid brackets are adjusted according to the molar bracket height. The IP appliance tab in IPsoft is used to give the lab the positioning prescription for indirect, using the direct bonding answers you have prescribed for that patient.

All of this is done to reduce the time of bonding at the chair, and to reduce the time spent in repositioning. A technique sensitive procedure, discipline is needed to make it work for you, but when it does, you never will return to direct bonding.

51. Why is indirect bonding cost effective even though there is a lab cost (or cost in your time) to pay?
   Less time in the practice bonding the brackets, and less time repositioning, adds up to savings that outweigh the lab cost of indirect.

52. Why should you place the sondhi rapid set on the lab vibrator before using it for indirect bonding?
   The material settles and loses some of its properties over time, leading to more bond failure. This has been solved by a clever POS graduate who used the lab vibrator method with great success.

53. Explain how brackets may deform and how to determine if this has happened?
   In a few cases, occlusal forces can deform the bracket tie-wings, closing and distorting the bracket slot. Another way is to distort the bracket when removing it for repositioning with the bracket removal pliers. To prevent this, the bracket should be grabbed mesial-distal, NOT occlusal gingival.
Insert a 19x25 or 21x25 archwire into the bracket slot and see if it fits fully into the slot. If not, it has been distorted and a new bracket is needed.

54. Explain how to remove brackets for repositioning to avoid the bracket from deforming. 
   *Grab the bracket at the base, not the tie wings, from the mesial-distal, NOT occlusal- gingival.*

55. Explain the differences in the advancing limit of lower Sla, La, Roth, and Li brackets and why is this important in non-extraction treatment.
   *The advancing limit is the most ‘retroclined’ for Sla, next La, next Roth, and last Li. In non extraction treatment, where the crowded incisors are usually advancing, the most retroclined advancing limit (Sla) will reduce the amount of incisor advancement the most. Roth and Li would have very little effect on reducing incisor advancement, the patient already feeling protrusive before the archwire engages the advancing limit of the bracket slot.*

56. Which brackets have an advancing limit at the Roth ideal inclination (dotted line) 
   Sla 19x25 lower and La 19x25 upper have advancing limit at the Roth ideal inclination. These are the most common to memorize and use. 21x25 La also has this characteristic.

57. Which brackets have a retraction limit at the Roth ideal inclination 
   Li 19x25 Upper, SLi 18x25 upper, SLi 19x25 lower have retraction limits at the Roth ideal inclination. These are the most common to memorize. LOWER 21x25 Li also has this characteristic.

58. Explain the round wire range and how this is different when using 18x25 or 19x25 archwires. 
   *The round wire range is when the rectangular wire has not yet engaged the sides of the bracket slot. There is a range of tooth movement where this is true. The smaller the rectangular wire, 18x25 being smaller than 19x25, the larger the round wire range.*

59. How can you predict bone remodeling in the lower labial? (hint: RBT skeletal resistance) 
   *If the predicted final incisor position is more proclined than the advancing limit of the bracket, then there is skeletal resistance. You determine the amount of skeletal resistance by referencing the incisal edge and occlusal plane of the final tooth position and see if the advancing limit is encroaching on the labial cortical bone and if the apex of the tooth will still be in medullary space or in the cortical bone layer at that inclination and position. Bone remodeling is what must happen for the tooth to get to that position and inclination.*
60. What is the purpose of cleats welded to bands and how are these used? When can you leave off the cleats and why is this preferred by the patient?

Cleats are used to attach chain or elastics to the lingual of the tooth. This can be to rotate the tooth or to upright the crown (posterior cross elastic). If you do not anticipate using these mechanics, then do not have them welded to the bands. The patient will be happier with less tongue irritation.

Some clinicians want cleats on the bands for ease in seating and removing the band.

61. Why is a CIIE variation better than Roth on lower first molars when using class II elastics?

The CIIE variation has distal crown tip (3 degrees) by the weld or 3 deg MG bracket positioning, and has extra mesial-buccal rotation (12 degrees instead of 8 degrees) to counter the unwanted tooth movements (crown tips forward and rotates mesial-lingual) of the Roth Rx in 19x25 or smaller archwires.

62. When might you choose UP instead of CIIE variation when using class II elastics from lower 6s and why?

In dental deep bite cases, the UP variation is “slightly” better than CIIE in that UP has buccal crown torque (molar crown uprights to buccal) and has more distal crown tip (5 degrees instead of 3).

63. When is the TipM variation used on upper 6 or 7s?

When distalizing the 6s or 7s, compensating for the crown tipping distal.

64. When is the tipD weld variation used on upper 6s and 7s?

When you are relying on the upper 6 or 7s for anchorage, supporting nitie closed coils. When you are treating class I and II cases on the upper 6s for a better occlusal fit of 3-4-5

65. Why should you use ‘archwires to maintain” in extraction cases? What is wrong with using expanded archwires?

Archwires to maintain will guide the teeth between the buccal and lingual cortical plates of bone, making extraction space closure efficient.

Expanded archwires guide the molars and cuspids into the buccal cortical plate, slowing tooth movement similar to a TPA.

66. What are the potential problems of assembling a single patient appliance from inventory in the practice?
It is easy to get the wrong bracket on the tooth, and not know this had happened, since you cannot see the bracket slot features and the staff would be unfamiliar with the color coding system.

Mechanics

67. When is a TPA needed to prevent mesial drifting of the upper molars? What technique can be used to reduce the time the palatal bar is in the mouth and in some cases eliminate the need for TPA all together?

TPA is used in skeletal open bite cases to prevent mesial drifting of the upper molars. The same can be done by placing stainless steel closed coils in the extraction space, OR delaying extraction until you are ready to close the extraction space (19x25ss archwires engaged).

68. How can you add to the upper molar anchorage for mechanics?
   a) TipD weld on upper 6s or 7s
   b) Band the upper 7s to increase root surface area and apply the coil forces from the 7s
   c) TPA 6-6, 7-7 or both
   d) Skeletal anchorage

69. What archwire do you place stainless steel closed coils in the extraction space and how might this influence when you extract teeth for ortho?

18x25N or 016N are stiff enough to support the stainless steel closed coils. If anchorage is critical (maximum anchorage, using all the extraction space for the anterior teeth), you may want to delay the extraction of teeth during 012N stage, until you make the wire change to 18x25N.

70. In the lower arch of skeletal open bite cases, how do you prevent mesial molar drifting and add to molar anchorage in mechanics? (LLA, skeletal anchorage)

You can add tipback to the bands (CIIE or UP or TipD) but this is not that effective. LLA is also not very effective. Placing stainless steel closed coil in the extraction space is effective, but when mechanics start, then skeletal anchorage is the most effective (temporary orthodontic anchor ..TAD for temporary anchorage device) with ligation to the molar bracket base or auxillary tube (pig variation)…section 3.

71. Explain how to use 18x25N to eliminate a stainless steel wire progression (014ss, 016ss, 020ss), reducing the number of archwire changes to get to 19x25ss.

Place 18x25N after the initial alignment with round nitie wires (012N OR 014N OR 016N), for a period of at least 6 months, “cool and retie” to finish alignment and
repositioning brackets as needed during this time period. Then change directly to 19x25ss.

72. Explain what 18x25N does during the alignment stage that 016N does NOT do
In addition to what 016N does (correct rotations), 18x25N will level the curve of spee, establish the archform you want, and in some cases establish incisor torque.

73. Why is there a dimple on 18x25N upper archwires? Why is it not on lower archwires
The dimple is to prevent the archwire from sliding side to side. In the lower, there is really not room between the lower central incisor brackets, especially when both are mesial rotated.

74. How can you keep nitie archwires from sliding side to side in the lower arch?
Either cinch them back, or place an elastomeric ligature tie on the first molars. The elastomeric tie will cover the slot on the distal of the tube, preventing the archwire from extending further. This is NOT possible when 7s are banded.

75. List what elastics, coils, and chain can be used on 18x25N and what mechanics should NOT be done on this archwire (and why). (eg. Distalization, closing extraction space, closing anterior spaces, retracting cuspids, short or long elastics, chain or ligature wire lacing).
Short class II or III elastics (not long elastics from the molars) can be used on 18x25N without significant arch distortion. Chain or ligature wire lacing can be used to close spaces. You should NOT distalize molars as the archwire will allow too much distal tipping...some successfully do this using TipM weld to compensate. Do NOT close extraction spaces as there will be too much tipping in the extraction space. Do NOT retract cuspids as the archwire is not stiff enough to resist the distal crown tipping, so the incisors will extrude.

76. When is it an advantage to use chain to the lingual (cleats) of molars and bicuspid?
When there is a severe rotation

77. Why is it preferred to use closing coils to Keyhole loops instead of T loops?
The KH loops are stiffer and maintain the incisor torque (retraction limit) better. KH loops are less irritating to the patient than T loops.

78. What are the advantages of using a T loop (instead of keyhole loop)?
Frictionless closing loop mechanics can be used with a T loop to retract incisors nearly 100%. Activating a KH loop this way results in too much force and the molars move forward.
79. Explain the terms “sliding mechanics” and “frictionless closing loop” mechanics

Sliding mechanics is when the archwire is sliding through the bracket slots. This usually refers to the anterior segment (3-3 or 4-4) being moved “en masse” into the extraction space, with the archwire extending out the most distal molar (“distal end”) indicating how much extraction space closed during that time period. There is friction in the sliding of the archwire through the bracket slots.

Frictionless closing loop refers to activating a loop in the archwire (T, double delta, boot loop) by cinchback or tie-back, the loop then applying an equal force on each side as the loop wants to close to its passive position (vertical legs together). There is no friction since this was removed when the loop was activated.

80. When is step 4 closed coil activation used? Step 3? Step 2? Step 1?

Step 1: retracting one tooth on round wire

Step 2: retracting cuspids on rectangular wire, or sliding mechanics 6-KH where you want the molar to be stable and the incisors to retract, often with palatal/lingual cortical bone remodeling.

Step 3: sliding mechanics 6-KH where you want 50:50 space closure, OR in minimum anchorage cases where you want the molar moving forward but the incisors to be stable (retraction limit engages palatal/lingual cortical bone).

Step 4: same as step 3, but when the patient may not return for his/her 8 week appointment interval.

81. What does it mean to ‘toe-in’ the lower 7s or 6s and how is this done?

Toe-in refers to moving the distal of the molar(s) more to the lingual/palatal. This is done by making a toe-in bend on an archwire (a bend angled towards the center of the archform).

82. In class II mechanics, what is your problem when you see edge-to-edge incisors and class II posterior? How can you correct this?

Incisor torque upper vs. lower is not consistent. One or more of the following is a problem:

1. Upper incisor has detorqued
2. Lower incisor has tipped forward
3. Upper and lower arches are not coordinated. (upper wider than lower, especially seen in the cuspid horizontal overjet)

To correct this, you first need to identify which problem(s) you have with a progress cephal and range of bracket torque templates, and then either change bracket (torque), twist the rectangular wires to change the torque, or change the archform upper
and/or lower. Taper the upper gives more overjet, square the lower gives more overjet.

83. How can you add lingual root torque to the upper incisors?
   *Either change the bracket to one with more lingual root torque, increase the size of the rectangular wire (18x25, 19x25, 21x25) for less wire spin, add a gable bend distal to the loop, or twist the wire (sweep in torque) into the rectangular wire with two pliers.*

84. What does a gable bend distal to the [KH, T] loop do and how do you determine how much to add?
   *This bend adds an intrusive force on the incisors, tips the roots to the distal, and adds lingual root torque. You can use the RBT templates to determine how much to add from a progress cephalometric, referring to the retraction limit. Change the occlusal plane reference from parallel to 5 or 10 degrees and see if this is what you want (referring also to the cortical bone)*

85. Why should you NOT use a gable bend in the upper arch when using Li torque brackets?
   *This adds to the skeletal resistance, which Li torque is usually sufficient inclination and skeletal resistance that you do not need more!*

86. What are ‘arch coordination problems’ during class II treatment? Why do you see this when using expanded archwires and how is this corrected?
   *The upper is wider than the lower, especially in the horizontal overjet of the cuspids upper vs. lower. The problem is not the upper being over-expanded, but the lower not expanding enough as the buccal cortical bone resists buccal expansion of the expanded archwires. The upper archwire expansion is easier to obtain since the cortical bone is thinner and less dense.*
   
   To correct the problem, constrict the upper archwire, but do not expect it to come back quickly since cortical bone has been added as the teeth expanded and now you have to resorb that cortical bone! The process can take up to 1 year.

87. Explain the methods that can be used to add [lingual root] torque to an upper incisor
   *Either change the bracket to one with more lingual root torque, increase the size of the rectangular wire (18x25, 19x25, 21x25) for less wire spin, add a gable bend distal to the loop, or twist the wire (sweep in torque) into the rectangular wire with two pliers.*

88. Why do spaces develop between upper incisors after rectangular wire is engaged in the bracket slots? How can you know this is coming? What should you do about this?
   *The incisor inclination is more retoclined than the bracket-archwire combination, so the rectangular archwire must be twisted to engage the incisor bracket slots. The response to
the twist is either the crown moves forward, the root moves lingual, or a combination of these depending if the crown is restricted from moving forward (lacing, chain, class II elastics) or the root is prevented from moving lingual (palatal cortical bone).

You know that this is coming when you have to twist the rectangular wire to engage the bracket slots. Lacing 2-2 will prevent the spaces from forming between the incisors, all the space then forming between 3-2, which later can be corrected with a looped archwire.

89. Why should steel ligature ties be used under power chain?
   The power chain will rotate teeth, which then must be derotated again with a nitie archwire. Steel ligature ties will prevent the teeth from rotating, saving treatment time.

90. When should steel ligature wire lacing be used on the bracket bases, under the archwire?
   To hold spaces closed, especially if you think you may forget to lace in the future, the spaces reopening. Then archwires can be changed without this worry.

91. How do 9mm and 12mm nitie closed coils “look different” when activated step 2 or 3?
   Step 3 has a longer activation, so the coils are further apart, ‘looking’ more like a spring.

92. How long should it take to close bicuspid extraction space and why?
   1mm per month is the standard in tooth movement with sliding mechanics, so the extraction space may take 8 months at this rate. If you are trying to maintain molar anchorage and/or remodel lingual cortical bone on the incisors, then the space closure is slower, 1 year or more is not unusual in such an arch.

93. How long should it take to close first molar extraction space?
   6 months to 1 year, no more time than bicuspid extraction space. We tend to extract 6s in more skeletal open bite cases, where the space closes quicker (sometimes too quickly!)

94. What do we mean by “anchorage planning by the dots”?
   Referring to the model measuring that made the treatment decision ‘picture’, the variation in the dots from simple alignment tells you what mechanics to use, and how far the teeth must move. For example, closing a bicuspid extraction space in an arch with 50:50 space closure, the method is nitie closed coil 6-KH, activated step 3. Dots with moderate-maximum anchorage (3/4 of the bicuspid space is for the anterior teeth), then the method is nitie closed coil, 6-KH, activated step 2.

95. Why do you see mesial-lingual rotation of lower molars? Why is this bad when closing lower 5 or 6 extraction space? How can this be prevented? How can this be corrected?
This happens when forces are applied to the buccal of the molar, usually the ball hook, which is located away from the center of rotation of the molar from an occlusal viewpoint, causing a moment and rotation Mesial lingual. The archwire is not of sufficient stiffness and the archwire – slot relationship is not perfect (“slop”) to prevent this rotation.

If the molar rotates into the lingual cortical plate, the molar will stop moving forward (or move slower). This can be prevented by:

a) Using a molar buccal tube with more mesial-buccal compensation (CIIE or UP)

b) Toe-in or increase the buccal sweep of the archwire

c) Chain to the lingual cleats of the molar

The same preventive methods can be used to make a correction of a molar that rotated.

96. What are ‘warren springs”? how are they used and under what circumstances? Why are these NOT used on upper Li brackets?

A wire wound on each end to fit a specific rectangular archwire size (19x25). The spring is ‘slid’ onto the archwire with the U part of the spring facing towards the center of the archwire. When engaging the archwire into the bracket slot, the U part of the spring is forced against the gingival of the clinical crown, “pushing back the root” and eventually twisting the bracket around the archwire until they engage at the ‘advancing limit”, which is quite proclined.

They are used to give a single tooth more lingual root torque. Li brackets are not common to need warren springs since the retraction limit does the job.

97. What happens when the force applied is too much for the archwire to support?

The archwire distorts, so its shape is lost.

98. Why should there be a distinct appointment to check bracket position during the alignment stage and how is this done

Bracket positioning error should be corrected when nitie archwires are being used at the start of treatment. This reduces the time of finishing and makes for a more consistent mechanics stage. You really cannot change bracket position with 19x25ss engaged, so if you notice something that needs to be fixed, then you must wait until finishing, which is late in treatment and likely to be less stable in retention.

Finishing

99. What are the possible problems when you see ‘edge-to-edge’ incisors? How can you identify which problem(s) is in the specific patient? how do you make the correction

Same as question 82:
Incisor torque upper vs. lower is not consistent. One or more of the following is a problem:

4. Upper incisor has detorqued
5. Lower incisor has tipped forward
6. Upper and lower arches are not coordinated. (upper wider than lower, especially seen in the cuspid horizontal overjet)

To correct this, you first need to identify which problem(s) you have with a progress cephal and evaluate with RBT and then either change bracket (torque), twist the rectangular wires to change the torque, or change the archform upper and/or lower.

Taper the upper gives more overjet, square the lower gives more overjet.

100. Why might you change to non-coordinated archwires during finishing (eg. Square upper, taper lower)?

To change the overjet. Square upper and taper lower would reduce the anterior overjet.

101. Explain HOW to change the archform to be more squared or tapered. How is this different when using 018ss, 18x25N or 19x25ss.

Either change to a preformed archwire shape, which is a must when using 18x25N since you cannot change the shape reliably, OR reform the wire in your fingers (018ss) OR reform using light wire and hollow chop pliers (19x25ss)

102. How do you “skew” an archwire and how/why is this done?

This is done with two hands fingers distorting the shape to one side, making it ‘lopsided’. This is done to shift the midline to one side. Note: shifting the archwire ‘off-center’ can be considered a ‘mild’ skew.

103. How can you correct an occlusal plane “cant” in the anterior during finishing

Either by correcting bracket positioning error right vs. left, or by reforming the archwire by pushing one side up (the side that needs to go up) and the other side down.

104. When should you use short class II elastics instead of ‘long’ class II elastics in finishing?

When the class II or III is only slight and when using 18x25N or 018ss finishing wires that can distort with longer elastics.

105. When might you add kobyashi hooks to the upper 2s and why?

To attach elastics, which could be to close an open bite or to reduce anterior overjet.

106. How can you close a “window” between two incisors?
Either tip the roots more mesial (and level the incisal edges after the teeth move with enamelplasty) or stripping the mesial of the incisors and closing this space.

107. Explain when you should consider supracrestal fiberotomy? How is this done and why?
On all moderate to severe tooth rotations that may be visible to the patient in retention. A 12 blade is placed in the sulcus, severing the fibers from the tooth all the way to bone, 360 degrees (unless thin tissue). The tissue heals, attaching to the tooth again in its new position, relieving tension from the circumferential fibers.

108. Explain when you should consider ‘extraction space’ fiberotomy and how is this done?
Inverse bevel incisions, keeping the papilla on the buccal and lingual/palatal. Do not reflect the papillas, but simply curette out the interproximal tissue, and do NOT suture the papillas closed. This should be done when there is obvious tissue buildup between the teeth in the extraction space.

Overlays

109. What is an SN overlay and what does it show? Maxillary overlay? Mandibular overlay?
SN overlay: relative to the SN line (cranial base), where the soft tissue, maxilla, and mandible change between two time periods.
Maxillary overlay: relative to the maxillary bone, what happened with the upper 6s and 1s between the two time periods
Mandibular overlay: relative to the lingual symphysis and body of the mandible, what happened to the lower 6s and 1s between the two time periods.

110. What is a Nose Overlay and what does this show?
Relative to the nose, how did the lips and chin change.

111. What is an A point overlay and what does this show?
Relative to A point (palatal plane is also parallel), what change was there in the mandible and occlusal plane. This is used to define differential horizontal growth.

112. What is a condylion overlay and what does this show?
Relative to condylion, how did the maxilla and mandible change in the horizontal direction. Represents total forward growth of the upper and lower jaws.