Seminar 4: Expectations of the seminar
McGann answers

Diagnosis

1. How to determine maxillary constriction from model measuring measurements and the calculations tab, including how much over-correction to add
   The first ‘screening’ is to see if the molar widths of the upper (16/26C mesial buccal cusp tips) are wider than the lower molar widths (36/46B, buccal pits). If the upper is LESS than the lower, then the numbers are manually transferred to the ‘black’ calculations tab for maxillary constriction. The program calculates the maxillary constriction, with the researched amount of +1.5mm more on the upper automatically added to the calculation.
   The treating dentist is asked to determine the amount of over-correction, if any, to be added to the specific case under consideration. General rules,
   a) +2mm (1mm per side) for cases with mild maxillary constriction or posterior crossbite at a young age.
   b) +3mm (1.5mm per side) for cases with moderate posterior crossbite and older (adolescent or adult)
   c) +4mm (2mm per side) for cases where the crossbite is key to the successful treatment of the case. For example, dental open bite cases will relapse if the maxillary constriction relapses.
   The lower expansion should remain at ZERO, since if the lower is expanded, you need more maxillary expansion, which is unstable.

2. How to identify a functional shift of the mandible (to the side) and what to do when you find one.
   Here are some signs that there may be a functional shift (suspected)
   a) Unilateral crossbite with the lower midline to the side of the crossbite
   b) Dental midlines ‘off” (no posterior crossbite) and symmetrical arches upper and lower documented in model measuring
   c) More class II on one side than the other. 4mm difference is where we enable the asymmetry ‘system’ to diagnose asymmetry.
   d) Offset of the lower 6 and 7 on one side.
   e) Frontal ceph with menton not coincident with the sagittal plane
   Once a functional shift is suspected, then ‘corrected records’ may be taken to confirm the presence of a ‘bad bite’. Methods to disclude the teeth for at least one month include,
   a) Upper or lower flat plane splint
   b) Bonded rapid palatal expander (RPE)
   c) Bonded composite to the lower or upper molars
   d) Leaf gauge (you need to be old to know about this method!)

3. How incisor inclination effects smile esthetics, and how the facial surface of the upper incisor relates to the face, and how your bracket torque diagnosis and treatment changes the inclination
“Retroclined” upper incisors, defined by upper 1 to SN less than 100 degrees, give a less pretty appearance, and patients may complain of “dished-in” incisors, or a feeling that they look older. “proclined” upper incisors, defined by the upper 1 to SN being 110 degrees or greater, will give the feeling of the incisors ‘sticking out’.

The “Roth ideal inclination” seems to be accepted as excellent esthetics in all populations.

The facial surface of the upper central incisor, when the plane points anterior to nasion or glabella (soft tissue prominence between eyebrows), results in the same feeling of a retroclined incisor, regardless of what the upper 1 to SN measurement is.

Whenever the starting incisor position is ‘outside’ the retraction limit of the bracket/archwire combination, then the tooth will be ‘proclined’ to that retraction limit, given enough time with the combination to act. If the incisor is ‘outside’ the advancing limit, then the tooth will be retroclined to the advancing limit. 19x25 Li has the Roth ideal inclination as the retraction limit, so is applied especially to cases with retroclined upper incisors. 19x25La has the Roth ideal inclination as the advancing limit, so is applied especially to cases with proclined incisors.

4. What needs to be done to make an esthetic smile when upper 3s are used in the lateral incisor position
   a) Tissue height upper “3-2-1” needs to be adjusted so the ‘lateral’ incisor has a shorter clinical crown than the central incisor. This is done by placing the bracket on the cuspid more gingival to extrude it, bringing the gingival tissue with it, as you level the cusp tip to an incisal edge.
   b) Reduce mesial-distal width to be more consistent with a lateral incisor. This is not essential since the bicuspid in the position of the cuspid is smaller than the cuspid.
   c) Level the cusp tip to an incisal edge
   d) If extruding the cuspid, or if in contact with the lower incisors, then ‘thin’ the lingual surface.
   e) Flatten the facial surface to accept a lateral incisor bracket (flat pad)

**method 1 for ordering: “X” out the upper 3s, placing a lateral incisor bracket on the cuspid in lateral position and first bicuspid gets a first bicuspid bracket. McGann suggestion.

**Method 2 for ordering: “X” out the upper 5s, now lateral bracket on cuspid, cuspid bracket on the 4s, first bicuspid bracket on the 5s. Only difference...cuspid bracket has more distal root tip and less ‘compensation’ which makes it more prominent. Not sure this is the best on the bicuspid.

5. What a ‘one-wire’ technique is, and when you can use it
   When only 18x25N archwire is used for the entire treatment (except 012N for initial alignment and adjustment to the appliances by the patient). You can use this in NON extraction, class I cases, where you do NOT need to prevent excess
proclination (crowding aligned is not severe), retroclination (spaces are not severe), and the starting incisors are in a good inclination.

When referencing range of bracket torque templates, the tooth movement is likely to be in the round wire range of most brackets, near the Roth ideal inclination.

6. What the variables are in “protrusion” and how to determine this from your dental vto predictions and the clinical evaluation data

Protrusion is an abstract concept, where one person feels the teeth are too protrusive, and another may feel the teeth are not protrusive. It has to do with the personal perception of beauty.

If a patient feels their teeth are protrusive, then they ARE!
If the treating dentist feels the teeth are protrusive, then they ARE!
Each must be satisfied at the end of treatment.

During the initial clinical exam, the patient is asked to describe their feeling of protrusion, IF they have an opinion. In most class II cases with excess overjet, the patient will state that the upper teeth are protrusive, when in reality, the lower teeth may be ‘retrusive’ with the upper incisors in a normal position. The patients feelings are documented and taken into consideration at the diagnosis.

When reviewing lateral cephalometric x-rays, the interincisal angle may give you the impression of protrusion.

On the dental VTO, the treating dentist looks at the ‘picture’, evaluating if the incisor relations are in balance with the face.

7. How to determine the years until full eruption [and the start of phase 2?] in a mixed dentition case

On the panoramic x-ray, look at the root formation of the lower 5s
a) Crown only = 4 years
b) ¼ root = 3 years
c) ½ root = 2 years
d) ¾ root = 1 year

When teeth break through the tissue (alveolar emergence), it usually takes 6 months until ‘full’ eruption.
If the lower 5s are missing, apply to the upper 5s. If all 5s are missing, apply to the 4s.

Skeletal resistance

8. How to determine in advance of placing the first bracket if you can expect skeletal resistance to your tooth movement

By using range of bracket torque templates on the treatment decision dental VTO, you can see if the intended tooth movement goes beyond the advancing or retraction limits of the bracket/archwire combination. If so, then you will have skeletal resistance as the incisor must bodily move into cortical bone.
Reference the incisal edge of the final incisor position and occlusal plane. Review how much cortical bone is in the way of getting the tooth to the final position and inclination.

9. When you must document the range of bracket torque skeletal resistance
Skeletal resistance should be documented (by screenshot of what you see in all templates powerpoint) on all cases. Where the intended tooth movement is in the round wire range, no skeletal resistance, then I also show this, stating ‘none’ next to the skeletal resistance category in the treatment plan.

10. What is the Round wire range
The tooth movement where the rectangular archwire is NOT engaging the sides of the bracket slot. The tooth can ‘tip’. This is represented on the range of bracket torque templates by the movement between the solid black lines.

11. What is the problem with skeletal resistance to tooth movement and how you can overcome this (when you know it is there)
Cortical bone has been known to be the limit to tooth movement, due to its less vascular, more dense character that is resistant to apposition and resorption. If you know there is skeletal resistance, cortical bone, in the way of your tooth movement, then you can use ‘low’ force to remodel the cortex.

Growth

12. What does the growth curve represent?
This curve is the mean changes in height vs. chronological age. Height Velocity (rate of growth) is really what is being plotted. Height changes very much correlate to skeletal growth.

13. What differential growth of the maxilla vs. mandible is and how this may effect the dental occlusion
Differential growth is the difference in the magnitude and rate of growth between the upper and lower jaws, typically in a downward and forward direction, with more growth of the mandible being the norm. The dental occlusion is effected by the horizontal component in the Antero-posterior direction (class II to class I) and can also be changed in the vertical by the vertical component of differential growth, but this is less obvious.

The focus in the McGann growth system is the differential horizontal growth of the maxilla vs. mandible. A positive number of millimeters will be the mandible growing forward (pogonion) than the maxilla (A point). Zero is the maxilla growing forward the same amount as the mandible. A negative number is when the maxilla grows more forward than the mandible.

14. How to make a growth adjusted ceph
Move the mandible, lower incisor, symphysis, lower molar, and lower profile forward the amount of added growth. The added growth in the estimated system is,
Class I: +3mm girls, +5mm boys
Class II: +2mm girls, +4mm boys (intentional under-estimate)
Class III: (wits < -5) +5mm girls, +8mm boys (intentional over-estimate)

15. How to change your non-growing model measuring to account for the growth added to the cep.
   Move 16/26M points forward the amount of added DHG to the mandible. The upper teeth follow the extra growth of the mandible.

Appliance diagnosis

16. Why you want to use a “Ne” bracket in non-extraction lower arches and how to get this bracket variation into your patient appliance
   The Ne (non-extraction) bracket is specially designed for the non extraction lower arch cuspid, unlike the Roth Rx, which was designed for first bicuspid extraction cases. There is ‘less’ distal root tip, as we do not have to compensate for crown tipping into the extraction space in a non extraction case. There is also NO distal rotation, since you do not have to compensate for the disto-lingual rotation of the cuspid as it is retracted in a non extraction case. There is also more lingual root torque in Ne than Roth, keeping the crown more upright. This is to get a better occlusion with the upper cuspid and to compensate for the use of vertical elastics (which tend to tip the crown lingual).
   You get the Ne bracket by ‘customizing’, or selecting the bracket from the list of possible bracket designs for the 33 and 43. (there is no question with Ne)

17. When to use cleats bonded to the lingual of incisors
   Bonded cleats are used to ‘remind’ the patient to not push their tongue against the incisors. A myofunctional training technique. Usually we place the cleats on the lingual of the upper incisors (only), although if you suspect a low tongue thrust, then the lower incisors may be more appropriate in that case.

18. What is the expected response to a retroclined upper incisor when the inclination starts outside the retraction limit of the chosen bracket and rectangular archwire
   A) Crown moves forward in response to the twist, often making spaces between the incisors. Labial crown torque
   B) If the crown is prevented from moving forward, then the root may move back, if not resisted by the palatal cortical plate. Lingual root torque.
   C) A combination of the above, often a rotation around the point of contact of the tooth with the cortex.

19. Why you might use Li upper, La or SLa lower for class II correction
   To maintain the anterior overjet consistent with the class II dental to be corrected in the posterior. Li upper (retraction limit) will reduce or prevent tipping of the upper incisor back, losing overjet. SLa or La (advancing limits) will reduce or prevent tipping of the lower incisor forward. This only works when you are using a rectangular archwire of sufficient size to engage the sides of the bracket slot in the intended tooth movement.
20. Why you might use La upper, La lower in crowded non-extraction cases
   To reduce excess proclination as crowding is unraveled, tipping the incisors forward. The advancing limit stops the tipping, and now the tooth must move forward bodily, resisted by the labial cortical bone.

21. How to diagnose and use IP ceramic rotation brackets
   Patients that want a better look during the orthodontic treatment period may request ceramic brackets (or invisalign which may not be appropriate for their case). An extra fee should be charged for the use of ceramic (instead of metal) brackets. This is to account for breakage and the extra difficulty experienced in treatment due to less accurate manufacturing.
   After it is decided to use ceramic brackets, check the appropriate brackets in the IP appliance tab, question 3. Beware of using LOWER ceramic in deep bite cases, since ceramic can wear the enamel edges from the upper incisors.
   Bonding ceramic should be done with ‘indirect’ bonding with “custom pads” made from transbond xt when placing the brackets on the model. Then the problem of excess bond strength between the ceramic and enamel is eliminated.
   Repositioning of ceramic is NOT done, a new bracket being used when a bracket breaks or is placed on the tooth in the wrong place.
   Rotations in IP ceramic are created by placing a ‘wedge’ into the slot of a special cut rotation bracket. The ‘end’ of the wedge points in the direction (mesial or distal) of the rotation classification.

22. How to bond, rebond, and reposition IP ceramic brackets
   Bonding ceramic should be done with ‘indirect’ bonding with “custom pads” made from transbond xt when placing the brackets on the model. Then the problem of excess bond strength between the ceramic and enamel is eliminated.
   Rebonding and Repositioning of ceramic is NOT done, a new bracket being used when a bracket breaks or is placed on the tooth in the wrong place. Since you do not have custom pads on a new bracket, a no-mix adhesive should be used (less bond strength). Do NOT use transbond XT or you may be grinding the bracket off the tooth surface at the end, or worse, fracturing the enamel!

23. What is a custom pad and how is this different than using the manufactured bracket pad
   A custom pad is a composite layer bonded to the manufactured bracket pad when placing the brackets on the model at indirect bonding. The brackets are placed on the model (separating medium first) in the best position, using transbond XT as the adhesive (some used to use sugar daddy candy bar). After placement, the new ‘custom pad’ is light cured on the model. A transfer tray is then used to remove the brackets as a group from the study model (after soaking in water to dissolve the water soluble separating medium), custom pads cleaned and then bonded to the patient’s teeth all at the same time, cured transbond xt custom pad bonded to the etched and primed enamel.
With ceramic, the difference is then the surfaces bonded. Without a custom pad, you are bonding ceramic to etched enamel. The bond strength between the adhesive and ceramic is stronger than adhesive-enamel, so enamel fractures have been known. Custom pads make the bond strength similar to metal on enamel.

24. How to manage ceramic bracket breakage

The only way to reduce ceramic bracket breakage is to use nitie rectangular wires to prepare the arch before placing 19x25ss. This may mean first using 18x25N, then 19x25N, then 19x25ss...an extra wire change.

When a bracket breaks, you must remove the bracket and bond a new one.

25. How bonding and debonding of ceramic brackets is different than metal

Bonding of ceramic should be done indirect, where metal you have the option of direct or indirect. Direct bonding of ceramic is not good from a bond strength perspective, with enamel fracture possible on debonding, but also from a bracket repositioning viewpoint. Ceramic cannot be repositioned without getting a new bracket.

Debonding of metal and ceramic is essentially the SAME if the ceramic was bonded with custom pads and sondhi rapid set (3M). BUT, you may have used new brackets during treatment that do not have custom pads, and these brackets may need to be removed with a diamond bur in a high speed handpiece. When removing brackets, especially ceramic, you should have the patient bite on a cotton roll to stabilize the teeth (that are mobile from tooth movement) before removing the bracket with the bracket removal pliers.

Alignment stage

26. What is the purpose of ‘round’ nickel-titanium alignment wires

The first alignment wire (012N or 014N) are used to start the correction of rotations, AND to make an easy, painless transition into tooth movement. Activation of these smaller round nitie wires will not generate as much force as the larger diameter wires, ‘gently’ compressing the periodontal ligament.

27. Which nitie alignment wires are ordered for each patient and which ones are kept in your inventory (and why)

Single patient order is only 016N, 18x25N, 19x25N. These will change the archform, and therefore should only be used in the diagnosed shape and size for the individual patient.

Inventory of 012N and 014N (bags of 10 wires) are kept in each practice, since these wires will NOT change the archform during the short time they are in the mouth. Because of this, the shape and size of the wire is NOT important, an “upper” can be used on the “lower” and vice versa.

012N reverse curve is also an inventory wire, kept in the practice in bags of 10 for use in deep bite cases to get intrusion of incisors upper and/or lower as you are aligning teeth.

28. How and why you use “mesial line angle” positioning of upper incisor brackets
On ‘tapered’ incisors, referencing the mesial line angle to the vertical references of the bracket will make for more distal root tip, closing the spaces at the incisal. On tapered teeth, if you reference the center of the tooth, then the spaces may be closed at the gingival, but not at the incisal, a triangular space is visible.

29. When an arch is ready for 18x25N and what the purpose of this wire is

After 2-4 months of 012N or 014N, the periodontal ligaments are more prepared to accept a heavier force (18x25N) without pain and excess force that slows tooth movement. This is especially important in adult patients. In young patients, with already widened PDL, 18x25N may be used as the first archwire without pain.

The teeth do NOT have to be fully aligned, since 18x25N can also rotate teeth by the cool and retie method of activation (deflection of the wire into the bracket). Severe rotations are best ‘mostly’ corrected with a small round wire 012N or 014N first.

18x25N will
a) Finish alignment
b) Help establish bracket torque (in cases where the archwire engages the sides of the bracket)
c) Level the curve of spee
d) Establish the diagnosed archform
e) Upright molars
f) Can support chain to close spaces in the anterior
g) Can support vertical elastics to start closing open bite or make minor corrections to class II or III (do NOT attach elastics to the molars)
h) Eliminate the need for a ‘wire progression’ transition (014ss, 016ss, 020ss) to engage the stiffer 19x25ss ‘working’ archwire. For this, 18x25N should be in the arch for at least 6 months, even if the teeth are fully rotated and the wire is passive in the slots at an earlier month.

30. When to engage 18x25N into an upper lateral incisor blocked to the lingual

As soon as possible, to move the root forward with the crown. Pictured below is the maximum activation. Before this time, use an 012N or 014N alignment wire.
31. How to manage rotation correction of two lower 1s, rotated mesial and why the inter-bracket distance is an issue.

The most important concept is that the force increases as the interbracket distance is less (brackets closer together). Teeth rotate the best with ‘light’ forces, so when the interbracket distance is near zero (brackets touching on mesial rotated 31/41), the smallest alignment wire needs to be used (012N), to keep the forces as low as possible.

The single tie-wing “tie” bracket may be used to make more interbracket distance, and then the final 31/41M (mesial rotation) brackets bonded when the teeth have been rotated to a reasonable position.

32. Why and when stainless steel closed coils are placed on an alignment wire in the extraction space.

When the model measuring shows moderate-maximum anchorage (e.g. dots removing 75-80% of the bicuspid) and/OR when the patient is skeletal open bite. The coil serves the same purpose of not extracting the teeth, keeping the molars from drifting mesial, prematurely closing the extraction space.

The alignment wires that can support the coils are 18x25N or 016N. During 012N, it may be best to delay extractions in a critical case.

The upper coil can also delay or prevent the use of a TPA to prevent mesial molar drifting during the alignment stage.

33. When ligature wire lacing is used (instead of single tie wing ties)

Ligature wire lacing, either ‘figure 8’ or ‘twists between the brackets’ is used to prevent or maintain previously closed spaces from opening. When there are changes in tooth angulation with the brackets, the crown will move before the roots, often opening a space that later must be closed. Single bracket ties will not prevent the spaces from opening.

A common ‘false’ teaching is that ligature wire lacing will increase the anchorage value of the laced teeth….not accepted as true by McGann
Anchorage planning:

34. How to use model measuring of your treatment decision to plan your mechanics (and anchorage), and what this means

The treatment decision is represented and supported by a line drawing dental VTO. The model measuring that made the acceptable “picture” (dental vto) is then studied to determine where the dots were moved (from simple alignment), and this determines the ‘mechanics’ used to get the picture. Here are common dots and what they mean,

a) 36/46M dots moved forward (non extraction) and maybe 16/26M dots moved slightly back in the presence of a mesial-palatal rotated upper 6. Class II elastics

b) 16/26M dots moved forward (non extraction). Compensation for differential horizontal growth, class III elastics, or Reverse headgear.

c) 16/26M dots moved back (non extraction “distalization”). Indicates the need for cervical headgear, open coils to distalize (with or without extraction of upper 7s), skeletal anchorage to distalize, extraction of upper 6s (open space mesial of the moved mesial dot is for the anterior teeth, line distal of the moved dot is for second molar movement forward).

d) 36/46M dots moved back (non extraction “distalization”). Not likely this is possible without skeletal anchorage to move the entire lower arch back!

e) 50:50 Mesial dots moved in extraction space: (moderate anchorage). Use nitie closed coils from 6s (can be Roth on molars, tipD on upper 6s) to Keyhole loops, activated step 3 force.

f) 75:25 mesial dots moved back in extraction space: (mod-max anchorage). Use nitie closed coils from 6s (tipD, CIIE, UP variations), activated step 2. If moderate skeletal resistance to incisor retraction to your intended final position, place stainless steel closed coil in the extraction space on 016N or 18x25N, delay extractions until this closed coil can be placed, and place TPA for mechanics.

g) 100% mesial dots moved back in extraction space: (maximum anchorage). Need skeletal anchorage to pull the anterior segment back, do NOT apply force to the molars.

h) 100% minimum anchorage (mesial dots the same place as if a tooth was there) in an extraction case: Select bracket torque with retraction limit where you want to keep the incisors, then apply force 6-KH, activated step 3 or 4, for anterior cortical anchorage, molars move forward. **note, you may not be able to get 100% minimum anchorage without skeletal anchorage in the anterior to pull the molars forward (not applying force to the anterior segment of teeth).

35. What “anchorage planning by the dots” means

Determine the mechanics to be used in a case by the movement of the ‘dots’ in model measuring to make the acceptable treatment decision picture (dental vto)

36. When you “cut distal ends” from behind the molar bracket at an adjustment visit, what does this mean and which teeth may be moving.
If it is a non extraction arch, then the archwire may have slid to one side, the extra wire protruding out of the distal end. If this is cut, then the [nitie] archwire is now too short. Before cutting, be sure to center the archwire.

If it is an extraction arch, then the distal end represents the extraction space closed during that time period. In a typical 8-week appointment interval, 2mm of distal end is expected in most cases. When using step 3 coil force in sliding mechanics, the molar is moving forward and the incisors are moving back, at least until the incisor inclination reaches the ‘retraction limit’, and then the incisor stops tipping and must move bodily. The cortical bone is engaged and resists this bodily movement at this force level (200+ grams per side). When this happens, you may only clip 1mm of distal end, the molar being the only ‘side’ moving.

If step 2 coils are being used, then the molar is more stable, so only 1 side is moving, the anterior segment. This can move at a good rate (2mm per 8 week interval) when the incisor is in the round wire range and tipping, but when bone remodeling is taking place (moving bodily), the rate can change to only 1mm per 8 week interval. Extraction spaces with bone remodeling in the anterior can take up to 1 year to close.

37. What your expectations are for cutting distal ends during sliding mechanics and why.

2mm distal ends cut at each 8 week interval is the expectation when using step 3 coils, the molar and anterior segment are both moving. 1mm distal ends cut each 8 week interval with step 2 force and bone remodeling in the anterior.

38. What “step 2” nitie coil activation is, how to make this activation, and what the tooth movement is for this activation.

Step 2 activation was invented by McGann when I standardized the coil activations. Forces were made for specific jobs. 150 grams initial activation or Step 2 on the activation ruler (2nd vertical notch where the coil ends) was originally designed to retract one cuspid on a rectangular wire with Li torque to keep the root away from the buccal cortical plate. The molars remained stable (class I) as the cuspid was retracted. To say this another way, the molar did not move at this force.

Then, through documentation of mistakes and reactivation differences, it became apparent that there was different tooth movement between step 2 and step 3, and that sliding mechanics was possible with ‘only’ this force of 150 grams per side, contradicting studies on friction and root surface area.

When using sliding mechanics after bicuspid extraction, step 2 force will keep the molar stable (well move forward maybe 1mm) and the incisors will retract most of the extraction space. Moderate-maximum anchorage. Bone remodeling, remodeling of the lingual or palatal cortical bone is another effect of 150 grams initial force and LESS...even movement can be detected at 50 grams to zero! This fact extends tooth movement to locations previously thought impossible without corticotomy.
To make the step 2 activation, first select the appropriate side of the activation ruler, 9mm or 12mm, then slip the vertical leg of the activation ruler against the molar tube and make a mark on the archwire at the 2nd vertical notch. Stretch the coil with a ligature wire to the keyhole loop (or other location) until the coil ends at the mark (or 2nd vertical notch).

39. What “step 3” nitie coil activation is, how to make this activation, and what the tooth movement is for this activation

210 grams, or step 3 activation on the activation ruler, is used to create a standardized activation of the PDS (only) nitie closed coils. After selecting the side of the ruler matching the coil length (9mm or 12mm), put the vertical end of the ruler against the molar tube and make a mark on the archwire at the 3rd vertical notch. Using a ligature wire, extend the coil until the end of the spring is at the mark or 3rd vertical notch, ligating at this activation to the keyhole loop or cuspid.

This initial force and less (4mm of coil shortening changes to step 2 on a 12mm coil), results in 50:50 space closure, the molars moving forward the same as the incisors, UNTIL the incisors tip back to the retraction limit of the archwire/bracket combination, at which time the tooth movement changes to nearly 100% molar advancement as the incisors engage the lingual or palatal cortical bone.
40. What minimum, moderate, moderate-maximum, maximum anchorage terms mean and how these are planned using model measuring

Minimum anchorage: molars moving forward 100% of the extraction space. Dots on model measuring of the treatment decision look like there is NOT a tooth extracted. Can also refer to moving an entire arch forward (non extraction), where Dots may show as 36/46M moving forward (or 16/26M) in the non extraction arch.

Moderate-maximum anchorage: The molar moving forward 20-25% of the extraction space, the remaining space used by the anterior segment for unraveling of crowding and retraction. For example, 14/24M dots are moved back 75-80% of the bicuspid extraction space.

Maximum anchorage: The molar is stable, with 100% of the extraction space closed by anterior tooth alignment and retraction. The mesial dots (eg. 14/24M) are placed on top of the distal dots (14/24D)

41. What a “2-step” retraction is and why it may be used in treatment

2-step is when cuspids are retracted first into a [extraction] space, the first step, followed by retracting the incisors, usually by T loop activation. The advantage of 2 step retraction is that you focus ONLY on getting the cuspid class I, and then in the 2nd step, focus on the incisor retraction. The overall treatment time, however, may be longer than 1-step space closure.

2-step retraction yields a moderate-maximum anchorage space closure.

Mechanics stage:

42. What the forces are when activating a T loop and how this “closing loop” is activated

T loops are machine made, so that the activation from one doctor to the other, one patient to the other will be consistent. Unfortunately, we do not have an exact indicator of how much the vertical legs are activated in the mouth, the standard being “1mm”. In some cases, the periodontal ligament compresses significantly during the activation process, so the doctor keeps thinking the loop is not activated, the cinchback (method of activation) distal to the molar must have ’slipped’. The rule is to activate ONLY 1 time, do not reactivate even if you think it slipped.

The forces of the standard 1mm activation of the T loop at the vertical legs starts at about 250 grams. 1/2mm is about 150 grams, 2mm is about 300 grams.
43. How T loop forces are different than step 2/3 nitie closed coil forces
The initial force of the standard 1mm activation at the vertical leg is slightly more than step 3 coil activation, so tooth movement would be similar. But then at 1/2mm activation, the 2nd half of a 1mm standard activation, the tooth movement changes to be similar to step 2 activation.
With nitie closed coils, a 12mm step 3 activation has a “range of activation” of 4mm before the force decays to step 2. A 12mm step 2 coil activation (+5mm) has about 4mm of range before tooth movement stops.

44. How to make intrusion bends in T loops
Outside the mouth before inserting the archwire, an intrusion bend can be made simply by squeezing the mesial of the loop, and then checking torque to see if it changed.
Intra-oral intrusion 2-2 by squeezing the mesial of the T loop results in some incisor detorquing. For this reason, the “snoopy” bend is used, which does not change the torque.
The snoopy bend is done intra-oral by using a tweed loop forming plier on the horizontal part of the loop. The first bend ‘opens’ the vertical legs, the plier is then flipped and the 2nd bend, adjacent to the first bend, closes the loops. A step is noted between 2-3.

45. How to bend keyhole and T loops to avoid tissue irritation and which pliers can be used
BEFORE installing the archwire into the brackets, a Howe plier is used on the vertical legs to bend the loop towards the tissue/teeth, reducing irritation of the lips.
AFTER the looped archwire has been installed, it is NOT recommended to try making this bend at the vertical legs, as brackets often fall off and the torque may be changed. If you MUST, then use a 3 prong pliers, 2 prongs labial to the loop, and 1 prong between the loop and gingival tissue.

46. How to check for torque changes on a rectangular looped archwire after making changes to the loops
   Using a light wire plier, grab each of the 3 segments on either side of the loop (2-2, 3-7, 3-7) and look down the beaks to see if the planes are correct with the other parts of the archwire. If not, adjust to all be ‘flat’.

47. What the problems are when using expanded archwires and why arch coordination upper and lower is important.
   When using expanded archwires, the upper arch with less dense and less thick cortical bone, may expand more than the lower arch, where you have more dense and thick cortical bone. The result is called “arch coordination problems” with the upper being larger than the lower (usually most noticeable in the horizontal overjet of the 3s upper vs. lower). The lower simply did not expand to the shape and size of the archwire, even though a force was applied through the archwire to the teeth.
   The problems are:
   a) Loss of anterior overjet as wider arches (upper) result in more upper incisor detorquing
   b) Inability to correct class II since not enough anterior overjet
   c) Cortical bone fills-in on the palatal of the over-expanded archform, and recovery by constricting the upper archwire may take up to 1 year, some cases not at all.
   This problem is a VERY common problem in the practices of orthodontists throughout the world. I personally had this problem in my practice, since we all want to treat more cases non extraction, and expanded archwires is one way to attain this. The side problems are so severe, that I call this “expanded archwire disease” in a practice.

48. Which elastics are used in the POS system and when they are applied (Eagles 4oz ¼”, sea lions 6oz ¼”, gorilla 4oz 3/16”)
   Eagles (4oz ¼ “): Anterior cross elastic, class III elastic, class II elastic on a sensitive patient.
   Sea Lions (6oz ¼ “): Class II elastic, Posterior cross elastic, class III elastic only after the patient can tolerate Eagles.
   Gorilla (4oz 3/16 “): vertical elastics up to 2 per side, short class II or III.
Rhino (6oz 3/8"): Reverse headgear, the elastic being attached to the molars

49. How incisor tooth movement is different when the incisor is at the Retraction or advancing limit of your bracket and archwire combination
The tooth must now move bodily (no tipping), and is resisted by the cortical plate of bone. This plate of bone resists tooth movement, especially when the forces are heavy (above 200 grams per side), but can be remodeled when lighter forces are applied (150 grams per side and less).

50. What the Roth ideal inclination is, how you find it, and why this is desirable
This is the incisor inclination where the Roth torque (12 degrees upper central incisor, zero degrees lower incisor) is fully expressed by an archwire in the slot without any wire spin (slop). This inclination has been defined by McGann when making the range of bracket torque templates for incisor torque diagnosis, and is indicated by a dotted line reference.
The Roth ideal inclination is found using range of bracket torque templates (McGann) on the dental vto or a lateral ceph of the patient.
This inclination is good for esthetics and mechanics.

51. Why the Roth 19x25 retraction limit causes problems during mechanics and why this inclination is not as esthetic
Ron Roth used 21x25 stainless steel wires with his bracket torque, but this wire is not easy to work with and patients have a lot of pain from the heavy forces.
Ron Roth even made finishing bends in this heavy wire! So the rest of the profession either used 19x25 or even 18x25 archwires in the .022 slot, and experienced problems of,
a) Detorquing of the incisors more than is desired for optimum esthetics and mechanics. Resulting from the 19x25 retraction limit, were edge-to-edge incisors, inability to correct class II, and open bite in the bicuspids in the finishing stages.
b) Over-retraction of incisors and deep bite. The retraction limits were too retroclined and retruded with this archwire bracket combination, and worse for 18x25 or a self ligating bracket.
c) Bite opening and no control of incisor advancement with non extraction diagnosis. The Roth advancing limit is very proclined.

Preformed nitie closed coils
52. When would you use a 9mm vs. 12mm nitie closed coils? Why?
12mm nitie closed coils have a longer range of activation (more tooth movement per activation) than do 9mm coils, so should be used whenever there is space to do so.
For example, a 12mm coil step 3 is activated +9mm and changes to step 2 after 4mm of tooth movement (coil shortening). A 9mm coil activated step 3 is +5mm and only has 2mm of tooth movement before step 2 and a change in which teeth move.
53. How do you make different activations of the closed coil when the coil is placed 6 to keyhole loop?

Different activations are made according to how far the closed coil is ‘stretched’. The further the stretch, the more the force. These forces have been standardized for the coils sold at PDS and these activations should only be used on those coils.

You can use an ‘activation’ ruler, or you can activate from the passive position using a millimeter amount of activation (still needs a ruler).

12mm coil:
Step 2 = +5mm
Step 3 = +9mm
Step 4 = +11mm

9mm closed coil
Step 2 = +3mm
Step 3 = +6mm
Step 4 = +8mm

54. Why is it important that you use the PDS activation ruler with PDS nitie closed coils? Describe the ‘step’ activations and when these are used, and specifically how to make these activations in the mouth.

The activation ruler is a convenient way for a dental assistant to make the doctor prescribed activations, and then to make the reactivations (without replacing the ligature to reactivate millimeters from passive).

**Already answered same question #38 and #39 above**

**It is also important that you use ONLY the nitie closed coils sold by PDS when using this activation ruler or the mm activations. There are many different nickel-titanium products, all with different properties. If you take two different brands of nitie closed coils, activated the same amount, you will surely get different forces!!

Finishing stage:
55. How to determine which finishing wire to use, 018ss or 18x25N, and how each is used.

If you want to make wire bends to compensate for bracket error and anatomy differences, then 018ss is the best wire to make those bends. If you prefer NOT wire bending (most), then 18x25N with bracket repositioning is the best finishing wire for you.

If a case has been more torque critical, and you do not want to let the incisors ‘float’, then 18x25N is the best finishing wire, maintaining most of the incisor torque after removing 19x25ss.

If chain or vertical elastics are planned in finishing, then 18x25N is the better wire since it prevents detorquing from these methods.

56. How to make step bends with the intra-oral finishing pliers
First decide what needs to be adjusted in the finishing appointment, making a list. You then have a choice of bracket repositioning or making a finishing bend. Step up or down can be done with intra-oral finishing pliers on 018ss or 18x25N. In and out step bends are best done on 018ss wire, since 18x25N will result in an incomplete bend in the 025 direction. 2nd order bends (angulation changes) should NOT be made with the finishing pliers, but by removing the archwire from the mouth and bending with a light wire plier.

Position the plier between the brackets where you wish to make the bend, keeping the plier perpendicular to the occlusal plane. Next confirm the bend by looking at the jaws of the plier as seen below. If confirmed, push the plier towards the tooth since the weakest part of the plier is the tip, and squeeze all the way down to form the bend. Flip to the other side of the bracket and repeat.

Initial bends between lower incisors should be 1/4mm ONLY, or you will have frequent bracket debonding. 1/2mm initial bends are made between all the other teeth. 3/4mm plier should only be used for the initial bend between molars where the interbracket distance is larger.

57. How and why you may choose to do a “progressive deband”, and what it is

When there are multiple bands in the same space, or even when only one band in a space in an adult patient, it is best to close the band space before debanding. This habit results from fielding the complaints of adult patients after ortho packing food in the band space, sometimes needing to replace a filling (or a crown!) to solve the complaint.

Remove as many bands as possible, and even consider removing all bands and bond a bracket on the last tooth banded. Then place chain, activated “passive +1 module”. See the patient 2 weeks later for debanding and debonding of the remaining brackets and bands.

58. How to determine if tooth rotations have been fully corrected, under-corrected, or over-corrected and why this is important

Visually compare the start models with the current condition of the teeth. This is done tooth by tooth, changing vision from the model where a rotation can be seen, then to the mouth to see if the tooth is still turned the same way (under-correction), fully straight, or the opposite way (over-correction). If an under-correction is seen, bracket position and prescription should be evaluated to correct this before debanding for the best retention experience.
Under-correction of rotations is one of the main reasons for recrowding in retention.

59. What a ‘gable up” finishing bend is, when to use it, and how to make it

A gable ‘up’ bend is when you make a bend between two teeth to bring the roots apart in the upper (close triangular space between tapered teeth, or move the contact point inferior) or together in the lower (eg. Parallel roots in extraction space). This can be done on 018ss wire, but is not as precise on 18x25N.

The gable bend should not be made in the mouth, but instead you should remove the archwire to make the bends. Some try to make a gable finishing bend with a tweed plier, but you do not know how much a gable is made, and you cannot make the bends on the other side of the brackets to return the other teeth to the same plane.

Mark the archwire with a white marking pencil or sharpe marker, remove the wire, and with a light wire plier, create the amount of gable you desire. Then make the bends on the other side of the 2 brackets to return to the starting plane.

If bringing the roots together, don’t forget to lace the teeth (bracket bases) so the crowns do not move apart, creating a space.

60. when and why vertical elastics should be during finishing and when short class II or III elastics are used.

Vertical elastics are used in finishing to ‘settle’ the occlusion and to make a ‘tighter’ bite, closing any open bite. If the teeth are in a class I position, then up to 2 elastics per side are placed straight up and down, usually to ball hooks, but can be to kobyashi hooks. Short class II or III elastics are used when the occlusion is slightly class II or III, but needs settling.

Vertical elastics are needed in more skeletal open bite cases with weak muscles and are rarely needed in skeletal closed bite, tight muscle patients (they hold their teeth together for you!)

61. How and why inter-proximal stripping is used on incisors

Stripping of incisors is NOT used in POS to create space for alignment. ONLY after the teeth are fully aligned is stripping considered to:

a) Reduce the inter-canine tooth mass
b) Flatten the contacts so they cannot slip in retention.  
It is common to strip incisors in retention if you see slight recrowding on a 
retention visit for the same reasons.  
Lower incisors can be stripped with a double sided disc on both sides, 
triangular incisors are the best for stripping.  Upper incisors should ONLY be 
stripped on the mesial so as to not lose the distal curvatures that make the 
tooth look good.

62. What the protocol is for cases with decalcification during and after treatment

**During treatment decalcification:** Document poor hygiene each visit and what 
was done to correct the problem.  (eg. Hygiene instructions given, recommended 
water irrigation device, made mother aware of the problem).  Inform the mother 
or father that YOU will have to clean their teeth, at a fee, if they do not.  Inform 
the parents that if this continues, you may have to remove the brackets to prevent 
the teeth from decaying.  **brackets that are repositioned or rebonded, etch and 
paint primer+light cure the entire tooth surface to protect it from plaque.**

**After treatment:** Minimize the cosmetic distraction of the white spots and lines 
with various dental products on the market.

**Note:** you are professionally obligated to REMOVE brackets before the ortho is 
finished if the hygiene does not improve and the damage is significant.

Overlays

63. Why ceph superimpositions (overlays) are used in orthodontics and how to do 
these using screenhunter and MS word programs

Overlays are used to document what happened in a case between the time two x-
rays being compared were taken.  This may include:
1. Changes in the bones of the head: (SN overlay, A point overlay, Condylion 
   overlay)
2. Differential horizontal growth: A point overlay
3. Forward growth of the upper and lower: Condylion overlay
4. Movement of the upper molar and incisor: maxillary overlay
5. Movement of the lower molar and incisor: mandibular overlay
6. Changes in the lips relative to the nose: nose overlay

From a Dentalcad lateral ceph tracing, the x-ray+vectors are turned off from the 
earliest x-ray being compared, and a screenshot is made.  Open MS word and 
paste this screenshot to a new page.  Text wrap.  Return to dentalcad and open 
the ‘later’ date lateral ceph, turn off x-ray and vectors, screenshot, return to 
Word, paste.  Text wrap and transparency to remove the background on the 
second ceph.  Draw lines (SN) as needed, Adjust the top x-ray using up/down 
keys, rotation green dot top middle, and ‘alt+drag” to position the x-rays to the 
structure that is to be overlayed. Make a screenshot of the results and transfer to 
the treatment plan or picture tab (additional page)
64. Why McGann may use a hand method of creating overlays when he has the digital method available.

   *I can more accurately trace structures, and can trace MORE structures that may be unique to that patient to enable a better comparison when doing cephal overlays.*

65. How VTO predictions relate to the actual overlays and why this is important

   *VTO predictions MUST predict the actual dental overlays OR ELSE you cannot base your treatment decision on them!!*

66. What the various overlays are and how to make them (skeletal, maxillary, mandibular, A point, condylion)

   **Skeletal overlay:** overlay SN line at S. reference changes of the upper and lower jaws and soft tissue.

   **Maxillary overlay:** best fit of maxilla. Reference changes of the upper and lower incisor

   **Mandibular overlay:** best fit of the mandible at the lingual symphysis. Reference changes of the upper and lower incisor

   **A point overlay:** Best fit of the maxilla at A point (parallel palatal plane). Reference horizontal and vertical change at Pogonion and menton.

   **Condylion overlay:** Overlay condyion point and the continued direction of change at A point and gnathion. Reference the horizontal change at A point and Pogonion.

**Rapid palatal expansion:**

67. When to use Rapid palatal expansion and how to document what you do

   *We use rapid expansion to correct posterior crossbite or maxillary constriction (relative to the lower teeth). Rapid expansion is NOT used to correct crowding non extraction since the lower crowding cannot be significantly influenced by expansion.*

   The amount of expansion is determined by the calculations tab (maxillary constriction), transferring the numbers of upper molar width and lower molar width to the tab from model measuring and adding extra for over-correction.

   The size of the expansion screw ordered should be at least 2mm more than the expansion, prefer 4mm if possible (7,9,11,13mm screws available). Document expansion by,

   a) **Viewing the starting screw to see if the two sides are touching or not, then viewing on future adjustment visits. Write down in the chart what expansion progress has been reported and viewed on the screw at 1 week, 4 weeks.**

   b) **Have the patient document the amount of turns they successfully completed.**

68. At what age you can change the sutures during rapid expansion and what happens when the patient gets “too old”
Sutural expansion is not only the midpalatal suture but all the sutures of the maxilla to adjacent bones. The most noticeable is the midpalatal suture, and even spaces upper 1-1. This can reliably be done up to age 16 according to the studies, and after that a certain number of cases may have resistance to expansion. The resistance will be shown as “persistent pain”. I have had some teenagers (5) that had persistent pain, and all of them had a previous slow expansion attempt with a removable expansion plate (calcifies prematurely?).

69. What the rate of activation for different ages for rapid expansion and why.
Age 16 and less: ¼ turn per day. (1/4mm = one crank).
Age 17-20: ¼ turn every 2 days. Slower expansion to prevent excess buildup of force in resistant maxilla.
Age 21-25: ¼ turn every 3 days. Slower expansion to prevent excess buildup of force in a resistant maxilla, and to allow time for the force to dissipate before adding more.
Over age 25: consider surgical assisted expansion, extraction in the lower arch ‘only’ to constrict the lower, dento-alveolar expansion.

70. Why you should over-correct the expansion, and how to determine the amount of expansion needed in an individual case
Maxillary expansion is known to be unstable, relapsing quickly if not retained. For this reason, we routinely over-correct. The standard in the specialty is to expand rapidly to get more sutural expansion, less dental tipping that will relapse. The rate of expansion is typically 2 turns per day (1/2mm), one in morning and one at night, and expand until the palatal cusps are at the lower buccal cusps. This McGann feels is too rapid and expansion, and that the amount of [undesirable] dental tipping is more dependent on how rigid the appliance is and the age of the patient, not the rate of expansion. The amount of over-expansion is more dependent on the type of case, age of the patient, and how important the expansion is to the overall success of the case.

The diagnosis of how much over-expansion is a case-by-case decision. Here are some examples,
2mm over-expansion (1mm per side), young patient, mild maxillary constriction or crossbite.
3mm over-expansion (1.5mm per side). Adolescent patient, moderate posterior crossbite. Adult patient with mild maxillary constriction
4mm over-expansion (2mm per side). Dental open bite case where relapse of the dental open bite will happen if the expansion relapses. OR a case with a major posterior crossbite.

71. How to retain a rapid expansion and why
Rigid retention (TPA) is the ONLY method that was reported as successful in the literature when I did the study on this topic. I also agree with this from personal experience. If you retain with a Hawley retainer, they will return saying the retainer does not fit anymore....what happened is that they did not fully seat the appliance and even though it was being worn, the expansion relapsed until the
retainer did not fit at all. Then you must expand again...hmmm, maybe calcification is more now, the maxilla more rigid.

72. How to make a bonded RPE
Take an [alginate] impression of upper and lower (lower so they can mount the case on an articulator) with a [wax] bite made with the teeth 2mm open in the posterior. This allows the lab to grind in the acrylic, so you have less to do at delivery.

On the lab slip, specify what size expansion screw you want (7,9,11,13mm) and which teeth you want the acrylic pads to cover. You may want to draw the expander on the lab slip?

If you want any extra things added, then please specify. Some options include,
a) Hook soldered to buccal wire to attach elastic for reverse headgear
b) Line drawn down the central groove of the teeth to reference expansion relative to the lower.
c) 022x025 ‘tube’ to attach the ends of an archwire (eg. 3x3 archwire engaged into the tube at the 4s on the expander)
d) Screw in the acrylic pads to remove the expander when you are done...screw pushes against the tooth to release....I do not know where to get these, but I know they are made.

Bionator
73. When a bionator appliance is used in POS and why
Bionators are used for myofunctional training, primarily in cases with anterior open bite, and only in young patients in the first phase (follow up with full band and bond, not the last appliance). They are very good at retraining the tongue to push ‘up’ as this is what they must do to keep the appliance in their mouth and to reseat the appliance. Stops the anterior tongue thruster, at the same time enabling the eruption of the unerupted incisors.

74. Why a bionator is NOT used to correct class II
Considerable research in the 1980s, finally put to rest in 1991, it was shown that the bionator (or any other device that holds the mandible in a forward position) does NOT enlarge a mandible more than what would normally be expected by growth alone. The headgear effect on the upper arch also does not work as presented.

This said, a bionator COULD allow differential horizontal growth to take place, correcting class II, by discluding the posterior teeth and uncoupling the anterior teeth. The only problem with this concept, as with all removable appliances, is that the patient removes the appliance to eat. It is my belief that the eating time is when the message is sent to the upper teeth from the growing lower teeth (and
jaw) that they must follow the extra differential growth of the mandible. If this was not the case, then cases where we debanded before growth was completed and gave clear overlay retainers, would all change to a class III occlusion. The patient also takes out the clear retainers to eat.

LLA

75. When to use a Lower Lingual Arch (LLA) in the mixed dentition
   A) The LLA (6-6) can be used as a space maintainer after a lower E is lost prematurely.
   B) It is also the appliance to maintain lower molar position, preventing the shift forward into the E space.
   C) After premature loss of lower C(s), the LLA can be used to maintain the lower incisors in a forward position (they want to drift distal)
   D) LLA can be used to maintain or constrict lower molar width in cases with posterior crossbite where you are trying to constrict the lower arch. This is useful in the permanent dentition when aligning mesial rotated bicuspids to prevent the molar from expanding.
   E) LLA can be used in any lower arch to prevent the natural loss of archlength (the molar moving forward more than the lower incisors).

76. How to make a LLA
   Fit bands to the lower 6s (after separating), then take an [alginate] impression over the top. Remove the bands and position them into the impression. Send to the lab to solder a lingual bar (036) to the bands. You may want to draw the arch with a U loop to adjust the bar against the lower incisor cinculums prior to cementing, and a lingual offset distal to the cuspid to allow the lower 4s to erupt without being trapped under the lingual bar. Other less common features could be a soldered ‘finger’ to the distal of the lateral incisor when a lower C was lost unilateral to prevent shifting of the midline to that side.
   The bands could be,
   a) Simple fitting bands
   b) Bands with the molar buccal tubes you want later for treatment.

77. What does a LLA do to the teeth and your overall diagnosis?
   Maintains the lower molar in its current position, the same as you see in a mixed dentition dental vto. Overall, there is a gain in archlength to help make a lower arch non extraction (reduce lower incisor advancement).

Reverse headgear

78. When to use a Reverse [protraction] Headgear and why
   The typical use is in class III cases where you want the upper teeth and jaw to move forward. This can be to move teeth out of anterior crossbite, or to reduce the skeletal class III (reduces dental compensations), or to keep up with expected differential horizontal growth (16/26M dots forward).
By moving the maxilla forward, the teeth are less proclined than if you use other appliances (including brackets and finger springs) to push the upper incisors forward.

It is debatable if the tooth movement is really the maxilla moving forward or the dento-alveolar complex moving forward. In young patients, this force I believe can move the maxilla forward, reducing the differential horizontal growth number. This appliance has made the class III growth numbers unreliable for DHG in the growth sample. As a patient becomes older, say late teens, the appliance likely changes to a more dento-alveolar mover.

79. What is the line of force when using RHg and why

The line of force is typically “forward and down” when applied to the molar bands, rotating the maxilla down in the posterior, opening the bite as the maxilla comes forward. Some class III cases are dental open bite to start, and on these we would want to apply the force straight forward to the occlusal plane.

80. At what age can you use a Reverse headgear and why there may be different treatment responses at different ages

The best age is age 7-8 and this is actually in agreement with the specialty thinking in the literature. This is the age that you will get the best treatment response, likely because this is when you can have a dramatic impact by moving the maxilla (with the teeth) forward.

As a patient gets older, the sutures get more rigid, so there is less skeletal movement and more dento-alveolar movement.

81. How much force to apply at which ages. Which elastic is used and where are they attached

Age 10 or less: 1 Rhino elastic per side, attached to the molar bands on the upper 6s or Es or a rapid palatal expander.

Age 11-16: 2 Rhino elastics per side, attached to the 6 bands or rapid palatal expander. The larger force is an attempt to move the maxilla forward, having sutural effect, not just dento-alveolar. The RPE + RHg has been shown to give a better treatment effect at this age since the sutures are disrupted by the rapid expansion.

Age 17 and older: 1 Rhino elastic per side, attached to the 6 bands or rapid palatal expander. Forces are lighter since the movement is expected to be dento-alveolar.

82. How to select and adjust the facemask

The facemask is usually a ‘one size fits all’, but you can buy smaller facemasks for use on the very small patients. The adjustment is by an allen wrench, loosening screws to allow the vertical parts of the facemask to be made longer or shorter. The center bar where the elastics are attached should also be adjusted by these screw adjustments. Final adjustments can be made with a 3-prong headgear plier. Simply adjust the facemask to be comfortable for the patient and to hold the elastic force in the direction you want.
83. What is the wear-time for the typical RHg treatment?
   *Night time only. For severe cases and highly motivated patients, full time wear on weekends can be suggested. Do not have them wear the appliance to school.*

84. Why might you apply Reverse headgear to a rapid palatal expander and how you do this
   *For a better skeletal treatment effect, moving the maxilla forward. This becomes important after age 10 when the sutures are more rigid, but not yet calcified. Ask for a hook to be soldered to the bonded RPE to attach the elastic. The hook is usually at the primary molars or bicuspid area for convenience in placement for the patient. This is then continued after the RPE appliance is removed, attaching to the 6 bands with a TPA retainer for the expansion.*

**Cervical Headgear**

85. How do I determine the size of the inner bow of the facebow?
   *Use a millimeter ruler from the mesial of the molar to the upper midline, then double it.*

86. How is the facebow adjusted to fit the patient?
   *The inner bow is adjusted first,
   a) so it does NOT touch the incisor or bicuspid teeth
   b) With some expansion so the patient must squeeze the inner bow when inserting. Insert one side in first, then the other side is adjusted to the 045 wire is just outside the molar tube.
   c) Between the lips so it is comfortable
   The outer bow is then adjusted so the line of force, represented by the string coming out of the module, if extended would pass through the center of rotation of the upper molar. This is found by marking where the molar tube is located on the outer bow with a arch marking pencil, then making a dot on the face 10mm up and 1mm back from this mark on the outer bow. Next adjust the outer bow (usually 'up') with a 3-prong headgear plier until the string would pass through the dot on the face.
   When the adjustment is completed, the anterior part of the facebow, as it is at the central incisor, should have a slight force “up”*
87. How do I place the modules on the neckstrap? 
   Slide the force module ‘clip’ onto the straps as seen in the picture above.

88. When do I move the modules more to the center of the strap? 
   There are multiple locations that the force module can be placed on the 
   neckstrap. Clip the module more to the center of the strap for smaller heads, 
   allowing for at least 1cm of string to pull out of the force module.

89. When do I use 12 oz modules and when do I use 24 oz modules? 
   12 oz modules are used in skeletal class I cases (dental class II) defined by ANB 
   less than +4.5 degrees. 12 oz is also used on children age 10 or less and adults 
   over the age of 16. 
   24 oz modules are used in skeletal class II cases (dental class II) defined by ANB 
   5 or greater. 12 oz should still be used for children age 10 or less and adults.

90. How equa-pull headgear modules work for constant force application and how 
   this helps at the adjustment visits. 
   This product, which may not be here forever and is not currently available in all 
   countries we service (eg. China), gives a constant force at any extension of the 
   string from the force module. The module has also been shown to deliver the 
   same force a year later. This means that you do NOT need to adjust the headgear 
   force at each adjustment visit as you would for other products that the extension 
   of the spring or elastic is different for each amount of extension.

91. How do I determine the line of force for a cervical headgear and how do I make 
   this adjustment? 
   (Same as in question 86 answer above)
The outer bow is then adjusted so the line of force, represented by the string coming out of the module, if extended would pass through the center of rotation of the upper molar. This is found by marking where the molar tube is located on the outer bow with a arch marking pencil, then making a dot on the face 10mm up and 1mm back from this mark on the outer bow. Next adjust the outer bow (usually ‘up’) with a 3-prong headgear plier until the string would pass through the dot on the face.

When the adjustment is completed, the anterior part of the facebow, as it is at the central incisor, should have a slight force “up” (Photos above in question 86)

92. What do I do when a first molar band keeps falling off when headgear is being used?
Cement the band to the tooth with composite, after first etching the tooth. And give the patient a pat on the back for wearing the headgear. Bands do not fall off by themselves. You should also observe the patient inserting and removing the facebow. If they do not squeeze the inner bow or aggressively place it, bands can fail.

Transpalatal bar
93. How is a preformed palatal bar different than a lab manufactured palatal bar
   a) The metal in the preformed palatal bar is specifically designed to allow intra-oral activation. The lab made palatal bar will be made from a more rigid stainless steel allow that cannot be activated intra-oral.
   b) The U loop is standard size and shape and therefore can be activated intra-oral and can be visualized to see if it has been activated.
   c) The preformed palatal bar has a machine made double back bend that fits precisely into the goshgarian sheath welded to the band. With this double back bend, you can remove the palatal bar and make adjustments for torque and toe-in. Lab made are typically soldered to the bands, but if they have a double back bend, it is hand made and less precise. Lab palatal bars often need to be removed (bands removed with the bar), adjusted, and then recemented...not really practical.

94. How do I determine the size of the preformed palatal bar before contouring to the patient?
Place the straight bar from the package on the occlusal surface of the 6s and select the size that is at the central grooves. Look at the depth of the palate, and for high palatal vaults, choose one size larger.

95. What is the gauge of wire used for palatal bars and what is the size of the Goshgarian sheath?
The sheath is .036x.072 and the archwire is .036. you can see by these numbers that the double back bend must be very precise!
96. Where is the locking dimple on the sheath? How do you secure the double-back bend into the sheath?

The locking dimple is on the distal of the sheath, near the ball hook.

The double back bend is LOCKED into the sheath with the end of the double back bend visible out the distal of the sheath when it is locked. A ligature tie (steel or elastomeric) is also placed from the ball hook to the ‘hook’ of the preformed palatal bar for extra security.

97. How do I remove the palatal bar to check activation or remove it from the mouth?

Using a angle how plier squeezing from the distal of the sheath with one side of the plier to the mesial of the molar band on the other side to unlock, OR squeezing a weingardt plier from the distal of the sheath of one side and the hole in the middle of the sheath on the other side.

98. How do I check activation of a TPA?

When checking activation, only one side is removed, visualizing if the bar has expansion, torque (up or down on the free side of the bar), or toe-in (forward or back on the free side)

99. What are the intra-oral activations made on the palatal bar and what instrument(s) are used?

The instrument is an angle how plier with a LARGE paddle. For expansion, the U loop is squeezed at the center of the loop PLUS each of the corners to flatten the loop. For mesial-buccal rotation of the molars the U loop is squeezed ONLY at the center of the loop.

To move the U loop away or towards the palate, a 3-prong plier is squeezed on the vertical sides of the palatal bar, between the U loop and the double back bends.

100. Why do TPAs often imbed into the tissue of the palate and how can this be avoided?

The teeth move (expansion) but the palatal bone and tissue does not. To avoid this, make an offset bend adjacent to the double back bend when contouring the preformed palatal bar so the lateral sides of the bar are away from the tissue.

Practice Management:

101. Why Doctor time is the most important factor to evaluate when determining clinical efficiency

The Doctor is the required component needed to create the practice income, and his/her time is limited to the number of days and hours that can be worked in a year. Managing this time is the one essential part of managing the practice. More dental assistant support and training of these assistants can make the limited doctor time treat more patients, more efficiently.

102. Why it is important to identify clinical inefficiencies in case treatment
So that we can focus on creating methods and systems to minimize these inefficiencies, resulting in a more efficient treatment.

103. Why every patient should have an ortho screening evaluation as part of their new patient (or recall) exam.

This policy is simply better treatment offered to your patients. Each patient should receive a screening for ortho to identify if they do NOT need ortho for their overall dental health, or if ortho is recommended for optimal dental health and the best appearance.

If the patient can benefit from orthodontic services, they should be informed, otherwise they may think they do not need ortho if you say nothing about it. It is then the patient that must decide if they are interested in that service or not. The screening dentist serves in an advisory role. On growing patients, timing is critical in certain types of malocclusions to receive the best treatment, and this should be stated in those types of cases.

Some patients may immediately express interest in these services, and others may take years to decide on this treatment possibility. The business offering this service will receive some of these patients and some may seek services from another practice or specialty clinic. It is in the best interest to all to identify the patients that are in need.

104. What appointment intervals should be used for each treatment stage and how this impacts the practice

During the alignment stage, appointments should be 8-10 weeks in IP orthodontics instead of the typical ‘monthly’ visits. This means that the practice has half the volume of patients to see each month, which has efficiencies in patient capacity, days per month the doctor must work, and costs borne by the practice to service a patient visit.

During the mechanics stage, appointments should be 8 weeks in IP orthodontics instead of the typical ‘monthly visits’. Payment financing schedule should be made independent of the appointment intervals.

During the finishing stage, appointment should be every 4 weeks.

105. When a growing patient should start treatment and why.

Growing patients, approximately age 9-13 girls and 11-15 boys should start orthodontic treatment to manage their growth during this time period, the best time can only be determined by study of their growth stage by x-rays and an interview by the dentist. Effective growth management can change the diagnosis from extraction to non extraction and can improve the final facial and smile esthetics.