Fact and Fantasy in Orthodontics


FYI...We had an insert in our JCDA from British Dental Journal, Volume 196, Number 3, Feb. 14, 2004.

Highlights:

Ortho and TMD
1. TMJ problems are not caused or cured by orthodontic treatment.
2. Extractions do not cause a posteriorly repositioned condyle.

Extraction vs. Non-Extraction Debate
1. Always controversial and has fallen in and out of favor historically.
2. Arch expansion shows worst levels of relapse.
3. Extracting teeth does not guarantee future stability.

Does Extracting Teeth Damage Faces?
1. No evidence of extractions causing “dished-in” faces.
2. Lay opinion (i.e. general population) finds both extraction and non-extraction treatment equally pleasing. That is to say, the average person cannot perceive significant profile changes after appropriate ortho tx which may or may not involved extractions.

Second Molar Extraction Therapy
1. Many of the claimed advantages are unsubstantiated.
2. An indication suggested by evidence is relief of molar and premolar crowding.
3. Third molar development is “predictably unpredictable” and may need further tx to upright them.

Summary of Correct Evidence on “Orthopaedic Effect”
1. Ortho tx cannot influence growth in the long term.
2. Any gain is small, but is often lost in the long term.
3. Majority of the orthopaedic effect is dento-alveolar tipping of teeth.

Vince, many topics put forth by the cited article. I would have a comment to make on some according to my personal clinical experience that I have fully documented.

Ortho and TMD
1. “TMJ problems are not caused or cured by orthodontic treatment.” I strongly disagree with that statement. Poor management of incisor torque (fixed appliance diagnosis), deep bite, and “random” molar anchorage can and will force the mandible back into the fossa, limiting mandibular movement. Clinically, this looks like loss of molar anchorage, most presuming that the upper molar moved forward, while the mandible was forced back. Our patients often tolerate this error, which is very fortunate, but there is always the occasional patient who does not. Want to cause TMJ problems? Just do the following:
   a. Use expanded archwires.
   b. Use Roth torque brackets on all cases that need Class II mechanics (yes, even Class II elastics).
   c. Use chain to keep spaces closed in the upper arch (many of these are caused by advancing lower incisors as the crowding aligns...think I saw a case here that was headed for this if recommendations were followed).
   d. Use round wire in the brackets for your mechanics (worst is during Class II elastic use).
   e. Use chain on round wire in the upper arch of Class I or mild Class II cases (incisors detorque). This to name a few of the common errors made in diagnosis and appliance application.

Orthodontics CAN relieve symptoms related to TMD problems, and has for many, many of my patients over the years. Does this mean the jaw problems are “cured”? Doubt that statement. Free to lead a normal life again, yes. If you line up 100 TMD patients against the wall defined as having consistent symptoms, and they cannot function normally in their life, then you will see one or more of the following in almost all cases:

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a. Asymmetry right vs. left (Class II more on one side than the other).
b. Loss of posterior teeth and drifting. (Anyone for molar up-righting?)
c. Tight incisors with an inter-incisal angle that is obtuse (e.g. 140).
d. Posterior crossbite.
e. Lots of restorative (physical strain to get the work done and loss of vertical dimension as a result).

Notice that I did NOT list occlusal schemes of any kind and did NOT list vertical dimension (open the bite with a splint and restore to this new vertical). Correct with orthodontics those in the first four categories and you will have a high percentage of success. Do not forget to set the expectations of the patient and treating doctor with a splint to see what symptoms may be reversible—this being the only use of a splint in my book—diagnosis only.

2. “Extractions do NOT cause a posterior repositioned mandible.” True, IF (and I mean IF) good orthodontics is done. The most critical is the incisor torque diagnosis and application. The archwire diagnosis works with or against this bracket torque. For Class II mechanics, the worst you can use is Roth bracket torque with a 19 x 25 archwire (spin is 10 degrees of lost torque) that is expanded relative to the original archform. BEST is to use brackets with more lingual root torque and a tapered archwire in the upper “relative” to the lower. This maintains the anterior overjet and prevents “jamming” the mandible, losing freedom of movement.

Deep-bite must be controlled, as this is another cause of “premature loss of anterior overjet” in extraction (and non-extraction) mechanics, leading to the mandible “jam.”

Extraction vs. Non-Extraction Debate

1. Has always been “controversial, and has fallen in and out of favor historically.” TRUE. Controversial, especially between dentists and orthodontists with varying understanding of diagnosis and various abilities. Controversial, especially between dentists and orthodontists that have differing treatment objectives for their cases, or may have no treatment objective at all, what I call “random” orthodontic diagnosis. Set your treatment objectives at the start of the case and there is a diagnostic answer—many times this involves extraction. If you do not like extraction, it is probably because you do not understand it and/or do not have a goal in mind when you start a case. Too much non-extraction treatment leads to “protrusive finishes,” periodontal compromise, instability, incomplete correction of Class II or III, and open bites.

2. “Arch expansion shows worst levels of relapse.” YES, this is well documented in the literature.
3. “Extracting teeth does not guarantee future stability.” YES, this has been proven in the University of Washington sample, which is weighted to Tweed orthodontics. For the record, the most stable position of the incisors is where you start. Keep them there if you can, and the esthetics are good (as in do not advance or retract). Many times we need to violate this, as the goals of the case require a reduction in protrusion, or the prevention of protrusion. There are many reasons to extract. Each case should be diagnosed thoroughly, with the most information available, and the best understanding to make good treatment decisions. This is the challenge and the fun of orthodontics. If you like puzzles, you will like ortho.

Does extracting teeth damage faces?
1. “No evidence of extractions causing ‘dished-in’ faces.” I AGREE. 2-3 mm of tooth retraction is needed to retract the upper lip 1 mm. Doubt many will notice 1 mm. The “dished-in” face is usually the result of a finish with retro-clined incisors (the facial surface of the upper incisor pointing forward of nasion, credit this to Andrews). Finishing with retro-clined incisors can be prevented by the diagnosis of skeletal resistance and the diagnosis of variable torque brackets and archwire shapes.
2. “Lay opinion (i.e. general population) finds both extraction and non-extraction treatment equally pleasing.”...I AGREE. The “good look” to a patient is a more generalized concept than ours.

Second Molar Extraction Therapy
1. “Many of the claimed advantages are unsubstantiated.” True, except for extraction of upper second molars to assist in the correction of Class II. That has been substantiated for many years, starting with Graber in the 1950s. Lower second molar extraction with the purpose to relieve crowding is NOT sound reasoning and should be done ONLY after considering all the other possibilities and making a treatment decision based on reason.
2. “An indication suggested by evidence is relief of molar and premolar crowding.” Not sure I understand this one, but relief of molar crowding is sound in the upper arch, NOT the lower, except under unusual circumstances when the lower second molar is in a very poor position. Relief of premolar crowding? Doubt this.
3. “Third molar development is ‘predictably unpredictable’ and may need further tx to upright them.” Upper third molars erupt very predictably when done before the age of 30. I found NO reports of any cases in my literature review and NONE in my own cases in the upper arch. Lower third molars will predictably erupt into a less than ideal position, often needing, but do not get, further treatment. You can expect 70% of the lower third molars to erupt into an unfavorable position, reported in the literature by those who have studied this more than me.

Summary of correct evidence on “orthopaedic effect”
1. “Ortho tx cannot influence growth in the long term.” By “ortho,” I assume this means “orthodontic,” as in tooth movement, not “orthopedic?” Current evidence would support this, BUT there are several studies going on now that are trying to document that early correction of malocclusion leads to a more favorable growth pattern. One is at UCLA with Class III cases. Patrick Turley (chairman of pediatric dentistry, and also an orthodontist) has seen the same that I have. Correct Class III skeletal and dental early (age seven/eight) with protraction headgear in as little as six months, and you do not need to resume the appliance again (not logical). Same with early correction with cervical headgear of Class II cases—never seem to need the appliance again after making an early correction (not logical).
2. “Any gain is small but is often lost in the long term.” Retention seems to be the comment here. Often lost has been the history of orthodontics, but is no reason to stop. Keep working for more quality results and stability may be right around the corner. For example, “fully” correct rotations in the first few months of treatment, instead of waiting until the end with wire bending, and the case may be more stable. Guaranteed formula for instability—short treatment, incomplete correction.
3. “Majority of the orthopaedic effect is dento-alveolar tipping of teeth.” YES, I have found this true with the “orthopaedic” appliances used to correct Class II (Bionator, Twin Block, Herbst, etc.). The literature is definite as of 1991 with about 20 studies finding the same thing. Mandibles cannot be influenced to be larger than normal growth by ANY appliance that holds the mandible in a forward position. Want to see study 21? Not me. Thank you to any “thinker” that read all of my opinions.

[In response to dmcgann on 5/27/2005 7:50:25 PM:] “Arch expansion shows worst levels of relapse.” YES, this is well documented in the literature.”
Yes, but nothing yet has been published on the long-term stability of expansion performed with self-ligating brackets and super-elastic NiTi wires. This is an area of great interest to me, as my clinical experience in my adult ortho practice using this new technology shows no more relapse potential than “traditional” treatments.
Extraction treatment doesn’t necessarily result in dished faces. Misdiagnosis and/or poor mechanics cause dished faces.

Anything that causes interference between the teeth fitting together at the same time as when the jaws are centered, introduces an imbalance. In some susceptible patients, this will lead to tooth clenching and grinding, head, neck, or facial pain, and damage into the joint; whether it is a filling, a crown, a bridge or orthodontic tooth movement.

Adults don’t have facial growth, it’s doubtful that mechanical expansion, short of palatal widening (that probably would require orthognathic treatment to perform) would hold once the appliances are removed. This is a different situation in a growing patient. Consider the eruption of the teeth, which erupt to their complete size, and that eruption is not in synchronization with facial growth. Lining upper and lower incisors, then waiting for facial growth to “catch up” can result in very nice facial development.

As for “dished-in” faces, considering the upper incisors can only go distally as far as the lower incisors, it is a good idea to keep the lower arch non-extraction, even if maxillary first bicuspids need to be removed to correct an anterior protrusion. But, check the ANB angle, because there are many Class II, Division I cases that are not skeletal. As for treating a Class II, Division I case that is skeletal; if there is facial growth remaining, that can be a big help, in a non-growing patient, compromises are sometimes in order because many parents are reluctant to commit to an orthognathic surgical correction in a 14-year-old, male or female.

Dr. McGann: I am an orthodontic novice (GP) and I was wondering if you could explain to me, as I am also a bit slow, exactly how you can maintain incisors in the correct position after extraction of bicuspids. Surely some arch length has to be lost somewhere, as the spaces are filled and this is either due to retracting the incisors or driving the posterior teeth forward and burning anchorage. Surely the position of the condyle is affected by both these methods? I’m having a hard time getting my head around this. I would really appreciate it if you would elaborate.

Ydriller: I could not have replied better to the variables of archform shape, size, and bracket design to control the final position of the incisors (and all the teeth in the arch) following extraction ortho treatment.

To put it simply, as you asked:

1. In the hole made by the extraction, let’s say the first bicuspid, the anterior crowding can be aligned, consuming some of this space, as the
incisor stays in the starting position. The more crowded the anterior teeth at the start, the less extraction space remains after alignment.

2. The remaining extraction space may be closed by one of three possible “anchorage” actions, each being a different manipulation of the appliance.
   a) Hold the molar in the starting position and retract the anterior teeth fully into the extraction space (maximum anchorage).
   b) Put an equal force between equal root surface areas and have the molars move forward 50% and anterior teeth retract 50% into the residual space (moderate anchorage).
   c) Allow the molars to move 100% into the extraction space, leaving the incisors in their starting position. This is done by using lingual root torque brackets 3-3 with a rectangular archwire, engaging the lingual cortical plate for additional anterior anchorage. There are other ways to do this, but that is how I do it (minimum anchorage).

*In reality, the alignment of the anterior teeth makes them move forward and then you move these teeth back into the extraction space, so the above is a simplistic version.

3. If inter-arch elastics (lower to the upper arch) are used to correct Class II or III cuspids, this will also consume extraction space that otherwise might be used in the anchorage planning listed above. Lower molars moving forward in the more common Class II elastics, consume some of the extraction space. Extraction is one method used to make Class II or III corrections.

4. If the molars and anterior teeth are not allowed to tip into the extraction space, the bite does not open or close and the temporal mandibular joint will remain unchanged.

Which anchorage set-up you choose for any given case is dependent on your treatment goals for the case (where you want the final position of the teeth to be) and predictions on how best to reach that goal. One of the most common treatment goals is to leave the incisors near the starting position (even though we extract) since this is the most stable position established naturally.


This article has some important points that are hard to ignore. The stripping maintains intercanine distance. Aasen TO, Espeland L. An approach to maintain orthodontic alignment of lower incisors without the use of retainers. Eur J Orthod. 2005 Jun;27(3):209-14.


… Frank: NOT just “stripping to maintain the intercanine distance.” Read more carefully. The protocol what was successful was:

1. Over-correction of rotations early in treatment (one of main reasons why I use IP rotation brackets; getting full alignment with some over-correction in the first alignment wires, with no wire bending).
2. Maintain dental arch form. This to me, means shape and size, as in archwire diagnosis (not using expanded archwires on every case). This would imply that the intercanine width was not expanded in the first place. Stripping was used as a method during treatment to fit the incisors between the canines (speculation without reading the full article).
3. Do not advance (procline) the lower incisors. As in the use of labial root torque in mild crowded cases or bicuspid extraction, in cases with too much crowding to strip. If the canines are not expanded, then the tooth mass must go somewhere, and that is forward if you do not strip out the amount of extra tooth mass.

Very similar to the approach of Lee Boese, of Merced, CA, who has been letting patients go without lower retainers for twenty plus years. He does all the above.

1. Over-correction of rotation—wire bending every wire
2. Maintain dental archform and intercanine width (reshape archwires)
3. Stripping
   In addition, Lee does:
4. Fiberotomy
5. Over-correction of single tooth torque with rectangular NiTi and torquing keys. (I do this in IP with using variable torque brackets on single teeth and no wire bending).

Find it online

This is just a sample of the Dentaltown.com message boards. To read the whole thread go online to: http://www.dentaltown.com/idealbb/view.asp?topicID=36262