Molar Extraction and Utility Arches

by Dr. Philip J. Pistolas

The use of molar extraction should only be used/considered in the rarest of occasions. Maxillary molars will slide easily into place with simple mechanics. But mandibular molar bodily movement is far more difficult. However, it is not impossible. This can be done with the use of extra-ordinary anchorage. Care should be used in case selection. The level of patient cooperation should be excellent and some level of orthodontic experience must be established beforehand.

This case began as a new patient examination. I was presented with a healthy 15-year-old male whose dental history was not the best. There had been an attempt to maintain checkups however the dental work needed was not. Upon panoramic and bitewing examination it was found that one of the permanent first molars was missing and the other three were in bad repair. Root canal therapy would be necessary as well as prosthodontics. The case was extremely crowded and four healthy well-oriented third molars were developing in the bone. I decided to take on the case, after taking the necessary orthodontic records and having a lengthy parental consultation. I was fully aware of the severe difficulty of the case and made a point to stress this to both the parent and patient. I would only proceed with complete cooperation from both parties. My past experience involved the extraction of an occasional first permanent maxillary molar however what I was undertaking I knew was an entirely different matter. I was extremely excited when both parent and patient expressed their cooperation and understanding of the situation. This case would be difficult but extremely gratifying. It was a challenge, not a run of the mill orthodontic case. The patient would have most of his past dental problems eliminated and would be left with a new healthy dentition. I would be saving the patient a long history of dental procedures as well as thousands of dollars. I would also limit the need of future replacement of his dental work. I couldn’t wait to get started.

I began with the extraction of the remaining first permanent molars. These were easy extractions with the use of forceps. The long-standing infections that were present had caused root resorption. Root canal therapy would have been difficult to maintain. Soft tissue growths were
present at the apices. Apicoectomies may have been necessary. These facts only added to my conviction that I had made the correct decision. After proper healing and the placement of some sealants and small restorations, I was left with a new set of dentition and the patient was ecstatic. It had been a long time since he had felt no pain in his teeth. Now he wanted to have his brackets placed.

The case you will notice had a bilateral posterior crossbite and severe anterior crowding. You will notice as the case progresses, that the maxilla will expand without the use of any fixed expansion appliance as I progress through the wires.

On 2-24-03, I placed the brackets on the teeth and bands on the second molars. I use bands on all of my molars on a standard basis. I like the stability and would rather re-examine than re-bracket. They are also the treatment of choice when bodily movement is necessary. For the first few months I practiced an orthodontic technique known as float-o-dontics. I let the case “settle” with the use of .016 nitinol wires in a pro-arch
design. The teeth began to level and align simply due to the light forces generated from the wires. Nitinol wires were used for their flexibility and low coefficient of friction. I start all of my cases with them. The brackets were standard mini .022 slot. Why do I use stainless steel mini brackets? I find that the hygiene level can easily be maintained and more importantly I can control the tip and torque properly. I cannot do this with plastic or porcelain brackets. Even if those brackets have a metal slot insert. The tip and torque that is built into all brackets are a matter of choice. I find that they improve the case and the final results. They are also extremely important to the final stability of the case. It is well known and documented that you very rarely achieve the designed tip and torque in the bracket. But the best results are with stainless steel brackets and stainless steel rectangular wires. The worst are found with the use of porcelain or plastic brackets.
I continued to use nitinol wires moving to a 016X016 rectangular to start to get some of the proper tip and torque.

Once I had decent alignment of my anterior and premolar segments, I had to start my molar space closure. I needed the alignment and interproximal contact for proper support of my auxiliary anchorage. I knew that I needed to use great force to move the molars properly through bone. The use of utility arches provided the needed anchorage as well as preventing slippage. These are not standard items that are available in orthodontic supplies. I had to come up with the design myself. I took models of both arches and went to my lab. I used .036 straight wire for its rigidity and strength. I believe .028 would not have worked as well. I formed them from the second premolars to second premolars in the mandible. In the maxilla, I used a combination of arches. I used a lingual arch from canine to canine and formed a trans-palatal arch (TPA) from the interproximals of the premolars on the right to the same on left. This provided me the support I needed to maintain the arch form of the maxilla. The TPA also prevented the lingual or palatal roll of the second premolars. This would have occurred due to the force of the closing springs. These utility arches were bonded into place with dental composite to the premolars as well as all of the anterior teeth. You may think this was overkill or unnecessary but you would not believe the breakage that occurred. Had I not covered myself, the case would have collapsed and become even more difficult.

I used 9mm Ni-Ti closing springs attached to the second molars and the second premolars. I was instructed long ago to simply attach them to the hooks of the brackets and the molar bands. In concept, this may work but not in real life. You can use the molar hooks but I find it necessary to tie the closing springs to the premolars with .010 wire ligatures. It is easy to weave the ligature wire through the lumen of the closing spring after it is on the hook and around the bracket. This provides incredible stability and prevents slippage or loss during mastication.

It took several months for the molars to close. The wires used during this phase were stainless steel .018. The frictional coefficient is the best on stainless steel and the .018 is best for movement when utilizing a...
.022 slot. I was always taught to move teeth on a .018 wire. I know that some people prefer to teach the movement of teeth on rectangular stainless steel, however, I find better results when the slot and wire have some space or give between them. I cinched these wires distal to the molar bands to prevent wire slippage. This is simply a gingival bend of the excess wire distal to the bracket. I use this commonly during treatment to control archform and prevent cheek damage and phone calls in the middle of the night.

I knew that the maxillary molars would move the quickest due to the nature of the alveolar bone in the maxilla. The TPA held the arch form nicely and prevented the premolar palatal roll.

The movement of the mandibular molars is another story. There we are faced with basal bone, which is extremely dense. In fact, I was taught long ago that you could not move mandibular molars. They would only tip in the bone. That of course is not the case. That fallacy goes the same way as the philosophy that tells us we cannot move mandibles. Anyway I love to be told that I can’t do something. That just makes the challenge more exciting. You can move mandibular molars. However you better buck yourself up with great anchorage. They are undoubtedly the hardest teeth to move properly. I was very impressed with the force provided by the closing springs. Some might ask why I didn’t use elastics. I imagine that I could have but it would have taken forever.

The case is not complete yet. But now it looks like a simple orthodontic case and its completion is not difficult. Most readers at this point could easily finish the case.

As the molars closed, I was able to remove the utility arches. I progressed to a 16x22 SS and will finish both arches with a 19x25 SS. The little spacing left will be closed with long elastic chain. The small overjet will be corrected with class II 5/16 medium elastics. The case is now 11 months old. The case will be complete shortly, probably within 3 months. At that point I will take a full set of records again to document the case and impressions will be done for the retainers.

The third molars will be allowed to erupt and if any assistance is needed, I will provide it.

I found this case extremely exciting because it was so unusual. I had to do a lot of case planning and design unique utilities to aid in the case completion. I do not suggest that we all run out and extract first permanent molars however if you are confronted with a similar situation I hope that my experience in some way aids you in the completion of the case successfully.

The objectives of the case were met: I planned to eliminate the existing dental problems; align the teeth to provide better function and aesthetics; close all spacing and provide the patient with a new problem free dentition.

The case could have been treated differently. I could have done root canals, cores and crowns. I could have used implants and crowns. However, I didn’t feel this would be fair for a young man in his teens. I could have even used fixed expansion for the maxilla instead of the TPA. These are extremely bulky but I still would have needed something for the mandible.

I have given the patient a new lease on his dental life and he and his father are very happy with the decision and the result.