How We Got from There to Here and Back

Edward H. Angle dominated orthodontic armamentarium, diagnosis and treatment planning for almost a half century until Charles Tweed successfully challenged his mentor’s non-extraction mantra. The ensuing diagnostic regimen used by Tweed, however, proved to have serious limitations and clearly resulted in the extraction of too many teeth. This caused a subsequent deterioration of soft tissue appearances of patients that neither they nor their doctors liked. This article will describe and illustrate how new extraction techniques differ qualitatively from those of Angle, and how these techniques offer patients and doctors less invasive and more comfortable therapies which do not jeopardize facial appearances.

Introduction
For the first third of this past century, orthodontics found itself dominated by one man, Edward H. Angle, with the resultant intellectual stagnation that arises from such monomanical control. This recognition in endodontics – notably his clear and simple classification system along with the edgewise bracket. Both of these inventions have endured for a century, and that is no mean achievement in any scientific discipline. Nevertheless, orthodontists’ unquestioning acceptance of his limited diagnostic and treatment planning regimens hindered the advancement of this discipline more than it helped, and the last half of this past century was spent trying to overcome the stuper of the first half. Angle’s influence continued until an apostate student of his, Charles H. Tweed,1 had enough courage and objectivity to challenge Angle’s non-extraction scheme. It wasn’t a tremendous leap of intellectual power. Tweed simply and honestly recognized that when 100% of your patients relapsed, there might be something wrong with the diagnosis and/or treatment planning.

Tweed acted appropriately in the face of this challenge - quite unlike the ancient dentist who chided a young colleague who was describing his meticulous technique of endodontic filling to the monthly assembly of dentists. The old man explained his own technique that used a simple mattock sharpened with a pocketknife and then jammed into the canal. When the young dentist asked if a lot of these root canal fillings didn’t subsequently fail, the older man replied, “Every damn time!” Dr. Tweed tired of those orthodontic abscesses and, unlike his peers, sought to correct the deficiencies he saw in Angle’s philosophy. Some would say that he overcorrected, but that said, we must pay homage to anyone who has the skill and tenacity to successfully challenge a mentor and his minions. Tweed’s success brings to mind the remark of C.S. Lewis, who said, “No genius is so fortunate as he who has the skill and ability to do well that which others have been doing poorly.”

Nevertheless, I don’t think that Tweed would have ever been able to deliver his paper describing his extraction technique had Dr. Angle still been alive. Angles influence over the society that bore his name was too immense to permit such hubris from a young upstart. But as Samuelson, the MIT economist, once noted: “Science progresses slowly – funeral by funeral.” And so it was and is in orthodontics.

Nonextraction Philosophy
Aside from the edgewise bracket and the classification system, Angle’s most enduring legacy has been his belief in nonextraction therapy. Angle had unsuccessfully experimented with premolar extractions while using his ribbon arch appliance, but he never solved the problem of parallelizing the roots to prevent the extraction spaces from opening. If he couldn’t do it, then, ergo, no one else could, and this resulted in a virulent opposition to any extractions and an insistence upon enlarging the arches to accommodate all of the teeth. This dogma stayed dominant for several decades until Tweed advocated the extraction of premolars based on his diagnostic triangle, which was the first systematic treatment planning strategem orthodontists had. Tweed received corroboration simultaneously from another former Angle protégé in Australia, Raymond Begg,2 who had studied aborigines and concluded that nature intended for enamel to wear. He decided that orthodontists could mimic nature by extracting teeth prior to orthodontic therapy. The Tweed and Begg Extrac- tion Philosophies eventually prevailed and remained uncontested for some time. Several years past before Holdaway3 published his articles that suggested the soft tissue as the determining feature of diagnosis. This disputed Tweed’s narrow diagnostic regimen that focused on the mandibular incisor and totally neglected the soft tissue. Tweed’s triangle set in motion a trend that emphasized more prudence in the extraction of malaligned teeth. Pierre Fauchard of France developed the precursor of the modern appliance – expansion arch (Figure 1). From the inception of this specialty, with Dr. Angle, diagnosis never had too much importance because everyone received the same nonextraction treatment with the same expansive appliance. The marvel of it all is that the collection of orthodontic records never became important. A few months ago an orthodontist boasted that since invoking a different treatment regimen, he was treating 98% of his patient’s nonextraction. One was tempted to ask if he still took records because with diagnostic certainty such as that, records are clearly redundant. Orthodontists shouldn’t waste patients’ time and money taking impressions, cephalometric X-rays or doing treatment simulations if all treatment plans are essentially the same. One doesn’t need orthodontic records to come to such a preconceived conclusion.

Obviously, this one-size-fits-all treatment planning didn’t benefit patients a hundred years ago, and it doesn’t in our own age. But such simplicity continues to hold enormous appeal for many orthodontists. Orthodontists pride themselves in being scientists, and without doubt they receive good training in the scientific method; but it takes very little anecdotal information to eclipse the scientific judgment of many in the profession. Albert Szent-Györgyi was probably more right than he knew when he said, “The brain is not an organ of thinking but an organ of survi- val like a claw and fang. It is made is such a way as to make us accept as truth that which is only advantage.”

No matter how spectacularly orthodontic therapy changes, it will benefit our patients minimally if we do not have a concomitant improvement in our diagnostic and prognostic knowledge. This remains the number one imperative for those who practice orthodontics. Orthodontists should view any new therapy unaccompanied by equally sophisticated diagnostic knowledge suspiciously. Patients have already received far too much orthodontic treatment and far too little diagnosis.

Instrumentation
The first attempts to correct malocclusions used simple large arch wires ligated to the malposed teeth. Pierre Fauchard of France developed the precursor of the modern appliance – expansion arch (Figure 1). When Angle launched the ribbon arch bracket, he had already started work on the edgewise bracket primarily as a supplement to his ribbon arch appliance. Nevertheless, the edgewise bracket did not suddenly spring full-grown from Angle’s fertile mind, but slowly evolved with several iterations (Figure 5). When Angle realized that this bracket could deliver three-dimensional control of the teeth with horizontal, one directional placement and simultaneous engagement of all the teeth, he changed the bracket several times until he achieved the #447 (Figure 6) in 1928. It received early and enthusiastic endorsement.

Figure 1: Fauchard’s expansion arch

Figure 2: Angle’s E-Arch

Figure 3: Pin and tube appliance

Figure 4: Ribbon arch

Figure 5: Progression from Angle’s E Arch to the Angle Bracket

Figure 6: Angle Bracket

Aim
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from dental clinicians throughout the United States and eventually eclipsed other useful orthodontic appliances such as the McCoy open tube appliance, the Atkinson universal appliance and the Johnson twin wire attachment.

The universal application and durability of the edgewise bracket confirmed Angle’s most modest claim that it offered the “latest and best in orthodontic mechanisms.”1,2 Innovators have added minor but practical trimmings such as rotating wings, twin brackets, different dimensions, preadjusted appliances, lingual applications, etc., but the edgewise bracket remained unchanged. For any instrument, particularly in the health sciences, to remain virtually unchanged (and almost as useful for close to a century) approaches unbelievability. In the automobile industry, this would be equivalent to the Model T Ford remaining as the epitome of motoring sophistication.

Other than adding wings and doubling the bracket to make the popular twin edgewise bracket, Angle’s invention has remained basically unchanged. Holdaway3 suggests angulations for brackets to help set anchorages, parallel roots and artistically positioned angulations for brackets to help set an Straight Wire Appliance.1,12

Low-force titanium coil expanders have shown their ability to develop arches laterally, and recently Damon4 has suggested that low arch wires, coupled with a passive tube and a small wire-to-lumen ratio, enable teeth and their accompanying dentotaxic roots to expand in all planes of space. Damon feels that using small, low-force wires such as those of Copper Ni-Ti5 (Ormco Corporation, Orange, CA) achieves the ideal biological forces proposed long ago by several investigators.6,7,8

Self-ligating brackets that essentially form a tube developed several decades ago with the Ormco Edgelok6 being the first, closely followed by the Speed bracket7. Both of these early self-ligating systems suffered from the fact that the Straight-Wire Appliance phenomenon debated at the approximate same time, plus a lack of appreciation for what the newer titanium wires could achieve.

Damon has persisted since 1995 with his version of a self-ligating bracket (Figure 8) and has fundamentally changed the types of arch wires and the sequence in which clinicians use them. His experience has shown that with many patients he can often eliminate distalization of molars, extractions (excluding those needed to reduce bimaxillary protrusions) and rapid palatal expansion. He offers compelling clinical evidence of doing this with consistency.9

The Damon bracket is essentially a tube designed with the right dimensions to foster sliding mechanics where needed and enough play in the system for torque and rotational control using the larger cross section wires. Damon starts cases with a large lumen arch wire and .014 or .018 smaller diameter bi-technology arch wires. Starting cases with a large dimension passive arch wire slot and small diameter wires diminishes the divergence of the angles of the slots. This lowers the applied force and binding friction. (Figure 7)

The architecture of alveolar bone appears to remain basically unchanged. Although mandibular canines offer significant resistance to expansion, mandibular premolars and first molars often demonstrate substantial and stable expansion. Brader3 hinted at this with his work on the tri-focal ellipse arch form, but he didn’t follow through about how this might give wider and more accommodating arch forms.

The most logical questions readers could propose would be, who has Damon shown successful expansion whereas Angle did not? The quantity of expansion probably differs little, but the quality of expansion offers a quantum change. Mollenbauer10 has suggested as much with his appeal for light forces. Even though Angle used a ribbed arch, (which suggests a thin, delicate wire) the actual size of the wire had the dimension of .016 x .022 inches. Ligating to this wire would overwhelm the periodontium and prevent the development of a supporting dentotaxic root. Rather than forming new bone, the supporting dentotaxic root would simply bend and upon completion of treatment quickly return. Astute clinicians often see this with molar distalization from headgear use and over treat such movement in order to compensate for this regressive bone bending.

Schwartz stated that it takes 20 to 26 g/cm² of force to collapse the capillaries in the Periodontal Ligament. With RPEs and headgear this force sometimes exceeds 10 pounds! Prefet11 states that the optimal force levels for orthodontic tooth movement should be just high enough to stimulate cellular activity without completely occluding blood vessels in the periodontal ligament.

True biomechanics is staying in the Optimal Force Zone i.e. keeping forces below capillary blood pressure. Conventional ties (o-rings and stainless steel ligatures and spring clips) make staying in the Optimal Force Zone nearly impossible due to the increased binding and friction. The most important caveat Damon offers clinicians is not to use their ordinary mechanics with his system, and I could not agree more. When I first began to use the Damon system, I continued to use the regular sequence of arch wires and saw little advantage to these new, more expensive brackets. Nevertheless, as I began to use the brackets according to Dr. Damon’s advice, I started seeing phenomenal changes.

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And Back Again

The publication of Frankel’s work with functional appliances illustrated significant enlargement of dental arches and reawakened an interest in nonextraction therapy. Nevertheless, Frankel mechanics required enlargement of dental arches and reawakened an interest in nonextraction therapy. Nevertheless, Frankel mechanics required enlargement of dental arches and reawakened interest in nonextraction therapy. Nevertheless, Frankel mechanics required enlargement of dental arches and reawakened interest in nonextraction therapy. Nevertheless, Frankel mechanics required enlargement of dental arches and reawakened interest in nonextraction therapy.

Profitt29 states that that optimal force levels for orthodontic tooth movement should be just high enough to stimulate cellular activity without completely occluding blood vessels in the periodontal ligament. The paradigm shift in our current thought processes is the belief that alveolar bone can be altered and re-shaped with low clinical forces. Using low force, low friction orthodontics, the alveolar bone allows the bodily movement of teeth in all directions. The architecture of alveolar bone appears to improve over time following low force orthodontics so clinicians should be very creative on how to maintain the appropriate biologic forces during all phases of treatment.

Orthodontists are currently witnessing an interest in qualitatively different expansive biomechanics that offer patients the possibility of obviating the use of distalizers, rapid palatal expanders and many needless extractions. The bracket systems that make this possible should command the utmost respect and clinicians should use them as recommended with light forces.

I am witnessing shorter treatment in most of my Damon cases with less discomfort to my patients. The playing field seems to be leveled between adults and children. These changes I am seeing are more than enough reasons for me to question my previous treatment systems.

Contact Information

Dr. Derek Mahony – Specialist Orthodontist
49 Botany Street, Randwick NSW 2031 Australia
7th Saudi International Orthodontic Conference

The conference itself started on the 19 Feb, with the opening ceremony where Prof Suliman Alomara, Head of SOS welcomed the distinguish guest, delegates, speaker and society members to this year’s meeting. He also summarized the achievements of the SOS Board through the last 3 years. This year is the last year of the board and handing of responsibility will be given to the newly elected board at the end of the meeting. The opening ceremony was followed by an important lecture titled “Critical evaluation in orthodontic appliance” by Prof. W. Profitt where he gave a summary of his 50 years experience with fixed appliance and what are the changes that the orthodontists could expect in the coming years.

This was followed by an interesting lecture of “Overview of CLII treatment” which was given by Dr. Tamer Buayshkhaz where he presented the clinically proven technique for treating CLII cased backed by number of cases that he treated himself for ranging from children all the way to adulthood and which technique has shorter time than the other. Since the temporary anchorage device is to get much attention these days, Prof W. Profitt later on the day presented a lecture on “UNC experience with screw and mini plate”, thus giving the pros and cons of them with keys of success illustrated by multiple cases showing perfect results and decreasing the need for surgical intervention with Orthodontic.

The first day was wrapped up by Dr. Robert Boyd lecturing on “Orthodontic and Esthetic consideration in planning and placement of Restorative Implants” where he stressed on the more demanding of esthetics by patients since Orthodontics by itself could not fulfill all patient demands such as having a brighter and wider smile, he showed several cases with restorative treatment giving the final touches to a good Orthodontic treatment.

He also compared between cases treated by Orthodontics alone and one treated by multi approach of Ortho-Resto-Perio which really made a bigger difference in those patients smiles.

On the second day of the conference Prof. William Clark who is the inventor and developer of the famous twin block functional appliance which is the most used one to correct CLII skeletal discrepancy in growing individuals. In his lecture Prof Clark took the audience through the different steps of diagnosis and treatment utilizing twin blocks with minimal and/or no need for fixed appliance.

He stressed the importance of patient selection, motivation and instruction to the success of treatment with such devices. The audience interacted with this lecture since some of them had there doubts about this method but Prof Clark explained to them the keys for success using this method.

Dr. Robert Boyd concluded the morning session with a talk on “How can aligners be used for complex Orthodontic cases” ranging from extraction cases to correcting of much hard vertical cases in adults with good prognosis and lasting stability.

The afternoon session was dedicated to future promising subjects in Orthodontics such as distraction cheliplasty where Dr. Abdullah Aliaidi spoke from his surgical background as a Craniofacial Surgeon how this minimal procedure could improve the smile dramatically without the need to more complex Orthognathic surgery involving cutting of bone or augmentation. The audience listened with attention on how to select cases for such a procedure and how the procedure is done in a very short time under one hour in some cases. Later that day Dr. Sarah Aliaqeq spoke on “Constraints on tooth growth by developing alveolar bone” where she pointed the causes of such problem, which used to be thought that the main cause behind is it primary teeth. Then Dr. Nadhwa Moawad took the stage to speak on “Genetic in Orthodontic” and how the advancement in this field could lead to prediction and reducing malocclusion.

The 2nd day of the conference concluded by a lecture Given by Prof Clark where he spoke on “New horizons in Orthodontic and Dentofacial Orthopedics”, he highlight the latest development in Orthodontic thus his talk raised lots of questions from the audience about the technique presented and how to use them for the best benefit for the patient and practitioner. This led to the time scheduled for the lecture to extend to more than ½ hour then the scheduled time. The conference was followed by a post conference with the title of “The Forces System: Advance in fixed appliance technique. New technique for lingual arch developing” where Prof Clark spoke for over 6 hours over the whole day on his new invention Forces System which make correct transverse problems and CLII easier than utilizing the lingual arch developing technique which gives faster and more repayable results as was explain by Prof Clark in comprising to fixed appliances placed from the buccal side. Accompanying the 7th conference was an exhibition dedicated for Orthodontic products and new advancements in this field with over 14 local and international companies which captured the interest of all 500 participants who attended the conference. Overall the 7th Saudi Orthodontic conference was up to the level of expectation and gain satisfaction on venue, speakers, and overall organization which showed clearly from the feedback of the attendees. With warm smiles the participants said farewell to each other hoping to see one another around the same time next year at the 2014 annual meeting.

Acknowledgment:
Sincere gratitude is paid to Dr. Abdulaziz Alkhunain and Dr. Mohamad Alharbi for their most valuable effort in preparation of this report.

Contact Information
Dr. Khaled Abouseada, BDS, MS, Orthodontics cert., is consultant orthodontic who is involved in private practice in Saudi Arabia, Bahrain and Egypt plus teaching orthodontics in BMC and SAMAT. He graduated from Alexandria University in 1993, Fellow of the World Federation of orthodontics and member in multiple regional and international orthodontic associations. Dr. Khaled has to his credit, various publications in national and international journals. He has lectured at many international and national dental and orthodontic forums. Winner of I LOVE MY DENTISTRY AWARD 2010 and 2011, short listed winner of best orthodontic case award in MENA area 2010 and 2011. Being the proud holder of 4 international certifications in different CAD CAM aligners systems and also practicing CAD CAM lingual and labial orthodontics, he is also a certified trainer for CAD CAM aligners, those years of practice make him one of the most experienced doctors in the continent to have practiced orthodontic CAD/CAM therapy. Alkhunain Dental Clinic
Jeddah, Saudi Arabia.
khaledseada@yahoo.com
Remarkable moments with unrepeatable celebrity

by Dr. Khaled Abouseada, BDS, MS, Ortho-cert.

I am constantly striving to implement the critical initiatives required to meet and exceed my reader’s expectations. I am driven, with my burning desire to be influential in introducing scientific excellence embodied in a prominent professor who is aiming to create a superior university, not by his words but by his deeds. I honor to introduce with grace and respect Prof. Dr. Abbas Zaher, a celebrity who is4 acclaimed to worldwide attention.

I will definitely focus in my valuable inter- view on the professional artist who with his tremendous knowledge and vast experience is well known for creating natural and flawless smiles on peoples faces after reshaping their dental flaws bringing the face into better proportion with his talented excellence thus leaving not just their teeth but their whole being. But I will also stress on his remarkable prominent role as a proudly regarded leader in the Faculty of Dentistry, Alexandria University. I was blessed to be one of his students in Alexandria who learned from his endless priceless wisdom and tenacious updates about new launches, his ethics in orthodontic principles of medical practices thus setting an unrepeatable example for highest standards of performance and commitment. I cannot disregard mentioning his extreme graciousness and friendliness extended to all his students allowing them to reach continuous learning without any limits, motivation, awareness and appreciation of the value of orthodontics and its welfare in Alexandria and the whole region.

You have definitely thought of other career paths before considering orthodontics, would you talk to us about them?

This is a story, I always like to tell! When I was in high school, I was dreaming of a career in hotels and restaurants management. I like domain of customer’s services and I had a lot of hobby related to exercise. I guess my fate directed me to the Faculty of Medicine for one year and later on to the Faculty of Dentistry. Exercising dentist first was not my wish but I made my dream to satisfy my patients’ (customers) main concern. I think it is very important to customize your treatment plan to cater to the patient’s needs rather than only what you see as necessary treatment.

Were there any teachers or other people who stand out in your mind as encouraging you to pursue this career?

Professor Mahmoud El Hadary, the Dean of the Faculty of Dentistry and later the President of Alexandria University, was instrumental in guiding me to exercise dentistry as a career and throughout my studies in the Faculty. He encouraged me to be involved in the students’ activities and other related activities. His supportive advice in choosing to study orthodontics put me on the first steps in my current path. Professor Samir Aboul Azm, the Head of the department of Orthodontics in Alexandria University, at that time, influenced my early years in the department. He has a vision for the specialty and was instrumental in creating the service of the profession and the specialists. Since then I have assumed a role in the Egyptian Orthodontic Society board of directors. The one person, who had great im- pact on my professional attitude and perception, was Professor Samir Bishara. He was the top of his 1981 orthodontics PhD studies at the University of Iowa in the USA. He implanted the scientific seed in my way of thinking in orthodontics and in developing my characteristics. He was one of the most influential potentials in diverse areas, had a golden chance to meet with colleagues from almost every corner of the world. This also was an opportunity to extend help and assistance in the formation of first time specialty organization in many parts of the world. Now, I have traveled to all continents and a major part of the globe. I can say that I have developed friendships in almost every corner of the world. And that is the most benefit I received from my service on the WFO board for 10 years and I treasure it tremendously.

Please identify your goals and ambitions for the next 2 years and your plans to achieve them and cultivate your profound knowledge in implementing them?

My goals for the Egyptian Orthodontic Society include: establishing the already agreed upon Egyptian Board of Orthodontics, in addition, to devise a awareness plan for the general public about the benefits of orthodontics, treatment of the treatment and the training and studies in order to become specialized in orthodontics. These two ambitious goals are only possible in the presence of your members and large amount of funds. There are conflicting studies that were rarely clear-cut, would you like to talk about any of them?

What contemporary scientific issue are you most concerned about now?

I am most concerned with scientific re- search that will directly apply to our clinic. Some of the interesting topics I am interested in is the enamel conservation and during and after orthodontic treat- ment. My studies include, prevention of de- calcification, treatment of early enamel de- calcification, bacterial growth and control during treatment, enamel color change af- ter treatment and what would influence it, 3D imaging and its application, orthogna- thic surgery and finally multidisciplinary treatment. What is the most important part of your work you do that gives you the most satisfaction? Conversely what is the downside of your work?

I enjoy tremendously my clinical work. Dealing with patients and changing their lives is my passion. I am lucky to have my work as my hobby. Teaching is another passion of mine. It is a pleasure to inter- act with the residents; they are always ani- mated and keep me motivated. On the oth- er hand, I don’t like the administrative part of working at the faculty. I dislike reports and completing forms.

Do you know where your strength lies?

My strength in orthodontics lies in being critical and observational. As I say in my lectures: "Orthodontics is the art of seeing". I can see the problem then you can solve it and treat it in order to deliver the level of the service of Orthodontics for the Egyptian patients.

Would you talk to us about your experi- ence as being vice president of the World Federation of Orthodontics?

It was most enriching experience. Besides being involved in the governance of one of the largest specialty organization, I had the privilege of being associated with a board of trustees made of a dedicated and tal- ented group of individuals. Each and all of them had an impact on my professional- al development. It was an opportunity to join in the establishment of two very im- portant documents by the World Federa- tion of Orthodontists; the international board of orthodontics and the guidelines for orthodontic education. In addition, I had the chance to meet with board of trustees made of a dedicated and tal- ented group of individuals. Each and all of them had an impact on my professional- al development.

If you were to define orthodontics, how would you complete this sentence: “Ortho-dontics is the science that allow the prac- titioner to improve the patient’s smile and hence his/her self-esteem as well as the function, health and longevity of the denti- tion”?

Every person faces profitable productive moments. Would you like to talk to us about the most rewarding incident you had and the greatest achievement you have reached?

I am proud of my achievement as profes- sor; it was a long and strenuous path. One of the most rewarding moments was when I finished my PhD; at that date I earned the title “Doctor” which is my favorite designation.

Conclusion:

With objective assurance and consulting activities, he definitely added value to the title “Professor” which is interchangeable with the name of Dr. Abbas Zaher who is considered an eminent Orthodontist in Alex- andria in particular and worldwide in general.

I am always trying to approach my mission from the broadest perspective by consis- tently exceeding expectations and setting standards for excellence in proving services to my readers. I favor introducing cele- brities and ideas with a global or regional impact fueled by people committed to delivering exceptional results and creat- ing extraordinary brands. I will try to re- main tightly focused on continuously adding value by providing objective and inno- vative ideas. All of our strategies and ac- tions will be molded by a set of core val- ues that are shared by each and every asso- ciate. Perfection and capturing our reader’s attention has always been our desired des- tination in this section.