More comfort, less invasion

New expansion techniques mean dentists can offer the patient more comfortable therapies. Dr Derek Mahony looks at the history of these kinds of treatments and how they’ve evolved.
hubris from a young upstart. But as Samuelson, the MIT econo-
mist, once noted: ‘Science pro-
gresses slowly – funeral by fu-
neral.’ And so it was and is in orthodontics.

Non-extraction philosophy

Aside from the edgewise bracket and the classification
system, Angle’s most enduring legacy has been his belief in
non-extraction therapy. Angle had unsuccessfully experi-
tenced with premolar extrac-
tions while using his ribbon-
arch appliance, but he never
solved the problem of parallel-
ing the roots to prevent the ex-
traction 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 ac-
commodate all of the teeth.

This dogma stayed domi-
nant for several decades until
Tweed advocated the extraction of premolars based on his diag-
nostic triangle, which was the
first systematic treatment plan-
ing strategy orthodontists
had. Tweed received corrobora-
tion simultaneously from an-
other former Angle protégé in
Australia, Raymond Begg, who
had studied aborigines and con-
cluded that nature intended for
enamel to wear. He decided that
orthodontists could mimic na-
ture by extracting teeth prior to
orthodontic therapy. The Tweed
and Begg Extraction Philoso-
phies eventually prevailed and
remained uncontested for some
time.

Several years past before
Holdaway published his arti-
cles that suggested the soft tissue
as the determining feature of di-
agnosis. This disputed Tweed’s
narrow diagnostic regimen that
focused on the mandibular inci-
sor and totally neglected the soft
tissue. Tweed’s triangle set in
motion a trend that emphasised
more prudence in the extraction
of teeth. Soon others added their
discoveries regarding soft tissue
and the maxillary incisors as
main determinants of diagnosis
and treatment planning.

Keeping a record

From the inception of this spe-
cialty, with Dr Angle, diagnosis
never had too much importance
because everyone received the
same non-extraction treatment
with the same expansive appli-
ance. The marvel of it all is that
the collection of orthodontic
records never became important.
A few months ago, an orthodon-
tist boasted that since invoking a
different treatment regimen, he
was treating 98 per cent of his pa-
tient’s non-extraction. 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 treat-
ment plans are essentially the same. One doesn’t need orthodontic records to come to such a preconceived conclusion.

Obviously, this one-size-fits-all philosophy had a benefit patients a hundred years ago, and it doesn’t in our own age. But such simplicity continues to be a tenet of orthodontics. Orthodontists pride themselves in being scientific and work with patients to provide the best care, yet without doubt they receive good training in the scientific method; but it takes very little anecdotal information to claim the superiority of many in the profession to another. Even orthodontists may be led to believe that a tooth is probably more right than he knew when he said, “The brain is not an organ of thinking but an organ of survival like a claw and Fang. It is made in such a way as to make us accept as truth that we are right without the need of thinking.”

No matter how spectaculatively orthodontic therapy changes, it will benefit our patients minimally if we do not have a commitment to the advancement 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

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).

This arrangement gave only tipping control, in one dimension, and was not adequate for controlling rotations. In 1887, Angle introduced the E-arch, a simple, expansion arch that used a laval wire supported by clamp bands on the molar teeth which ligated to the other teeth (Figure 2).

Metallurgical developments by the early 20th century allowed clinicians to enlace all of the teeth with bands and solder attachments. Many orthodontists, orthodontists who practiced orthodontics, then unaccompanied by equally sophisticated diagnostic knowledge, suspiciously, patients who have already received far too much orthodontic treatment and far too little diagnosis.

Light brackets that essentially form a tube developed several decades ago and are known as Damon brackets (Figure 8) because they achieve.

Trial and error

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 distraction of molars, extractions (excluding those needed to reduce bimaxillary protrusions) and rapid palatal expansion. He offers compelling clinical evidence of doing this with consistency.

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 slot and .014 or smaller diameter, low-stress 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 most logical questions readers could propose would be why 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. Mollenhauer\(^2\) has suggested as much with his appeal for light forces. Even though Angle used a ribbon arch, (which suggests a thin, delicately wire) the actual size of the wire had the dimension of .036 x .022 inches. Ligating to this wire would overwhelm the periodontium and prevent the development of biocompatible orthodontics. 4. Holdaway, R.H., A soft tissue cephalometric analysis and its use in orthodontic treatment planning, Part I. Am. J. Orthod., 1985. 84(1): p. 1-28.

The most important caveat Damons 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. Damons advice, I started seeing phenomenal changes. The following patient illustrates typical responses to the biomechanics offered by the Damon System (see patient case).

What it all means

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 obtaining 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 force systems.

References

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