**Point-counterpoint session focused on expansion with self ligation brackets**

Risk and benefit of arch expansion in growing and non-growing patients.

Self-ligation, the claims and the evidence

**Martyn Cobourne, Nigel Harradine, Birte Melsen.**

**B.Melsen**

When the self-ligating brackets were introduced the scope was first and foremost to facilitate the daily work for the orthodontist and their staff members. The development within fixed appliances had focused on other aspect of the facilitation by the introduction of prescription brackets making first, second and third order bend superfluous and although there was a pronounced difference between what the individual clinician considered the optimal prescription it was still only a help to reach what was considered an optimal treatment goal. However, orthodontics has, over the past decennia, been dominated by outsourcing and delegating all or parts of treatment and orthodontists are no more considered as wirer benders. The role of the orthodontist in relation to the fast food orthodontist has decreased. With the introduction of the Damon bracket the brackets were no longer just handles used for the application of the force systems but "sold " as an important component of a special philosophy supported by a number of claims regarding not only chair time and treatment time but also the biological reaction to the wire bracket combination recommended, the latter leading to a dramatic drop in the number of extractions. Unfortunately the claims remained claims for a long period but now after 15 years the time to test the validity of these claims has come. It is obvious that the number of extractions has been reduced, but to what degree can the specific Brackets be held responsible. The intention with this point/counterpoint session is to illustrate the impact of these new brackets on the orthodontic profession and the reaction of the clinician to the gradually appearing evidence supporting or rejecting the claims. The type of marketing seem to be more relevant than the product - “Event economy”-. Do we have to belong to a special club when choosing our treatment approach? We have to be aware of the influence of marketing strategy. Is it focused on the patient or the doctor? It is crucial for the orthodontist to have a critical attitude both to marketing material and the design of the orthodontic research reported in the literature.

What was the impact of the Damon brackets on the clinical routine in a big practice in England.

We want to ask Dr Harradine: Has the self ligation brackets changed the number of extraction cases in your clinical practice?"

**N. Harradine**

Proffit has thoughtfully considered the categories of reason for changes in extraction pattern and these categories remain a useful structure for addressing this question. There are two potential reasons why self-ligation might reduce the percentage of extraction cases in a clinician’s practice. The first arises from the combination of secure archwire control and lower
resistance to sliding. These are both desirable characteristics of a bracket and both have worthwhile - but inevitably incomplete - evidence to support them which will be briefly summarised in this section of the presentation. It is a tenable hypothesis that this combination would facilitate tooth alignment with less need for the adjacent space which is provided by extractions, if the clinician is happy with the consequences in terms of arch expansion in one or more dimensions. In terms of the various reasons given by Proffit for a change in extraction, this comes in the category of appliances biomechanically facilitating a change of extraction planning i.e. an appliance may make non-extraction mechanically easier.

The second proposed reason for a potential reduction in extractions is the suggestion that this reduced resistance to sliding alters the distribution of forces around an arch to an extent which produces a qualitatively different pattern of tooth alignment. Specifically, it has been proposed that a reduced resistance to sliding may reduce undesirable incisor proclination in some situations and hence lower the extraction rate. The evidence for this idea is as yet less compelling, but some conscientious and skillful research does provide supportive data and should not be dismissed out of hand at this stage. I will summarize how these potential factors have influenced my extraction planning.

B Melsen:

When the industry introduces a new product accompanied by certain claim it is the obligation of the university world to design and perform research that can either corroborate or falsify the claims.

Martyn Cobourne a representative from King’s College London has taken this challenge:

Self-ligating bracket systems have enjoyed increasing popularity amongst orthodontists from both sides of the Atlantic over the last decade. This almost certainly reflects improved reliability and usability of current appliance systems but may also be associated with large-scale marketing strategies by the manufacturers. One consistent feature of this marketing is the claim that the physical properties associated with these brackets provide the clinician with more scope to carry out treatment on a non-extraction basis. For the first of my presentations to this point-counterpoint debate I will outline this philosophy and focus on whether there is any evidence to suggest that these appliances influence archform in a quantitatively or qualitatively different manner to conventional brackets. In particular, I will discuss whether current clinical evidence backs up the often-quoted idea that using self-ligating brackets means less need for extraction.

Birte Melsen

Also at the university of Aarhus a long series of studies tested the claims forwarded by Damon but also evaluation of whether the passive self ligation generate different results than the active brackets represented by In-Ovation. On CBCT images and virtual study casts the displacement of both the lateral and the anterior teeth were studied and it was demonstrated that mode of expansion was different, when using a passive self ligation bracket compared to using an active bracket. The difference was ascribed mainly to the arch form recommended by two companies
and the Damon group thus had more posterior expansions. The distribution between sagittal and transversal expansion could not be predicted in any of the systems. The CBCT analysis demonstrated clearly that the expansion was the result of a tipping and in the Damon group there was a significant bone loss. Due to the large play of the slot the distribution of the incisor roots of the incisors were significantly larger than could be predicted based on the bracket and wire dimensions. The tendency towards less extraction could thus not be supported by the existence of a “Biozone” but rather by an acceptance of more proclined incisors and buccally tipped lateral teeth.

The use of a new product runs through several phases before stabilizing. Dr Haradine did the use of Damon brackets change over time as a result of published research or your own experience?

Damon brackets are one of fifteen types of self-ligating brackets which I have used and are my currently preferred type. This question is addressed to me personally, but does raise useful generalizable questions about how we should assess our own reasons for changing – or not changing – our practice. In this section, I shall outline my suggested basis for assessing the influences of evidence and experience in relation to my use of self-ligation. It is my conclusion that I have paid maximum attention and objective scrutiny to the increasing available evidence, but to date, the evidence from for example random clinical trials, has not changed my practice significantly. It is perhaps of more general interest that several of the most noticeable changes in my treatment planning and biomechanics over the 31 years I have been using self-ligation have yet to be rigorously tested by clinical trials and at this stage remain based on first principles about factors influencing tooth control and movement and on good quality laboratory data.

Harradine NWT (2013) Point: Self-ligating brackets increase treatment efficiency
American Journal of Orthodontics and Dentofacial Orthopaedics 143:10

Proffit WR (1994). Forty-year view of extraction frequencies at University orthodontic department
Angle Orthodontist 64:407-413

Now! Dr Cobourne. Is there any clinical evidence that self-ligating brackets perform differently to conventional brackets?

Perhaps as a result of some of the claims that have been made about the efficiency of self-ligating brackets, these appliances have now become some of the most robustly studied, with a number of randomized controlled trials having been published globally comparing their efficiency with conventional brackets. For my second presentation I will focus on the Damon appliance system and review how these brackets actually perform in the clinic when compared to conventional. This presentation will extend the discussion to cover all the main claims associated with the efficiency of these brackets and use the highest levels of prospective evidence that are currently available. Indeed, there is now evidence from an RCT comparing Damon and conventional brackets that has reported to completion of treatment.


Birte Melsen

I believe that must acknowledge that the impact of research has a limited impact on the clinicians' selection and that may be the companies should before going on the market perform at least some laboratory tests. I hope that you will enjoy the debate we have planned and would like to participate.
