Short Term Orthodontics
- An Overview

Author_Biju Krishnan

**Short term orthodontics** or cosmetically focussed orthodontics can be defined as Orthodontic treatment that focuses on the alignment of teeth in the aesthetic zone, has no detrimental effect on the occlusion and can be completed in less than nine months.

As this paper aims to demonstrate, cosmetically focussed orthodontics is a very powerful tool that does everything good cosmetic dentistry should – it’s conservative, it’s quick, it’s predictable, it’s lasting and it’s relatively inexpensive when compared to alternative restorative procedures. As dentists we need to be aware of what it is, advise our patients accordingly, and if possible offer it as an alternative or adjunct to conventional restorative and cosmetic procedures as part of our obligations regarding informed consent.

We also need to understand that cosmetically focussed orthodontics is a philosophy of treatment that can be delivered in several ways. Once we understand the principles we can then decide on the modality best suited to deliver the result we are aiming for. This paper shows how treatment can be carried out using a fixed appliance but also be aware that removable spring appliances, as well as clear tray systems can also be used.

**Case Presentation**

Patient CR came to see me for what I believe was a fourth opinion regarding her “very crossed teeth” and after a fairly convoluted history ended with the all too common, “and by the way I’m getting married in ...”, which in this case was 10 months.

So far the options she had been given included:
• Conventional orthodontics with removal of two upper premolars and a treatment length of around 24 months with a fixed upper and lower appliance.
• Treatment of the upper arch only with 10 veneers – which most likely would have meant the devitalisation of at least two teeth.
• Accept the existing situation

After discussing again with her the possible options, which also included the ones she had already been given, we decided that we could attempt to gain as much of an improvement as possible with short term orthodontics possibly followed by more conservative restorative treatment if orthodontic treatment alone could not provide a satisfactory outcome.

We opted for a fixed appliance and CR was fitted with this in July 2010.

She attended monthly thereafter for a period of six months during which time minimal interproximal reduction was carried out and arch wires changed accordingly. At the end of this period we arrived at a position where the patient decided she was happy enough with the appearance and wished to conclude treatment. It was suggested that there was still room for further improvement if the appliance was left in place for around two more months, however this was not possible due to the impending wedding.

Once the appliance was removed we carried out a chairside tooth whitening procedure followed by composite bonding to even out some differential tooth wear. The patient did not feel the need for any further cosmetic treatment and was happy to finish treatment at this stage.

Discussion

The most obvious question when looking at cases such as these is how space is created in what appears to be a moderately severely crowded arch without the removal of any teeth. Knowing the answer still does not cease to amaze. Looking back at this case, and other such cases that we've since completed, calculating how much space is required, predicting how much space is available and how to gain this space is one of the keys to understanding short-term orthodontics.

In short term orthodontics, space is gained in mainly two ways:

• Interproximal reduction
• The arch rounding out

(Upper arch expansion can also be used but brings with it additional complexities and considerations which for the purposes of this overview I will not be discussing.)
Interproximal Reduction

Interproximal reduction, also known as Interdental Stripping, Reproximation and Tooth Slenderising is the careful removal of a defined amount of enamel from the proximal surface of a tooth.

Studies show that enamel reduction does not appear to expose the enamel to pathological changes that could lead to caries and interdental stripping can be considered a reasonable therapeutic technique, especially if care is taken to avoid abrasion in more gingivally located enamel.


The maximum space gained in this way in a complete dentition between the mesial surface of the first premolar to the mesial surface of the adjacent first premolar, is around four mm.

In the vast majority of crowded cases we treat, the amount of space that can be gained by IPR alone is more than adequate to give a considerable improvement in aesthetics. However in conjunction with the arch rounding out we often do not have to remove the full 4mm of enamel.

Rounding out the arch

As arches round out we can gain a significant amount of space. To understand this more fully we need to go back to our geometry lessons. Let’s think of our arch as an arc or part of the circumference of a circle. The relationship between the diameter and circumference of a circle can be defined as pi or 3.14. Hence if we have a circle that has a diameter of 1cm its circumference is 3.14cm. Or put more simply - the circumference of a circle is roughly three times that of its diameter. Hence for every 1 unit increase in diameter we get three times the increase in circumference.

Now going back to the case in question. When we look again at the upper arch we can see on diagram below, the black line shows simplistically how "flat" the anterior incisors are. The blue curve indicates the likely end position of the teeth where the arch-wire of the fixed appliance naturally wants to take them. It is this "rounding out", in effect increasing the diameter of the arc or circle that gives us quite a significant amount of space circumferentially.

This principle is usually very dramatic in class 2 div 2.

On first glance this appears to be a very crowded case. However, after just one month of treatment and no IPR it becomes a very spaced case. This can now be quite simply treated.

Space Calculation

There are three main ways to calculate how much space is required in the crowded dentition:
1. Guesstimate based on clinical examination, models and pictures
2. Measurement using Vernier Gauge
3. Ask the laboratory to assist

By far the most common way used is Option 1 and with experience is very reliable. However the most accurate method is by measuring the mesial to distal width of each individual tooth from canine to canine, giving us the required space, and then to measure the length of span of the teeth in the final position – the available space. Subtraction of one from the other determines how much space is required using IPR. However it is possible that no IPR at all is required.

Discussion

Although the vast majority of cases that are treated this way tend to be of minor crowding, minor spacing or misalignments, the case of patient CR does demonstrate that with the proper understanding we can also treat more dramatic situations that would otherwise necessitate significant destruction of healthy tooth tissue, or even require extractions. In summary short term orthodontics has roles to play in:

• Rounding out arches
• Leveling and aligning the anterior teeth
• Correcting simple to moderate crowding
• Correcting simple to moderate spacing
• Rotations
• Aligning gingival margins and improving emergence profiles
• Uprighting teeth that are flared or tipped
• Pre-restorative treatment alignment

• Avoiding elective endodontics

Looking at the above list gives us an idea of how valuable a tool short term orthodontics can be in the provision of cosmetic dentistry.

The Occlusion

In each case we need to also understand that we do not intend to change the posterior occlusion permanently or at the very least detrimentally. Invariably changes in occlusion will occur during treatment as quite often the bite will be propped open on the anterior teeth leading to mainly Dahl type movements posteriorly. However, going back to our definition of short term orthodontics, the appliances are rarely worn for more than six months and any movement posteriorly will either completely settle or not pose any long term problems, as reported by N.J. Poyser et al; The Dahl Concept: past, present and future. British Dental Journal 198, 669 - 676 (2005), “The development of adverse events is very rare. If they do occur they tend to be minor in nature and transient with no long-term adverse sequelae.”

With further regard to the occlusion, it is also critical that when we come to retain the anterior teeth in their final position, we do not interfere with the posterior occlusion settling. We need to ensure that patients fully understand the role of long-term fixed and removable retention and we need to provide retainers that hold the anterior teeth in place while allowing the posterior occlusion to readjust. Provision of conventional removable retainers such as an Essix retainer is not good enough and could potentially lead to further problems, and fixed retention alone can be insufficient.

This concept is quite different from conventional orthodontics where it is the intention to retain the whole arch in the occlusion that the orthodontist has determined. As such we have had to develop new concepts of retention to deal with the unique challenges posed by short term orthodontics, rather than
When is treatment complete?

In conventional orthodontics the end point is achieved when we have positioned the teeth in, or as close as possible to, a class 1 occlusion. This is a very accurately clinically defined position. In short-term orthodontics there is not a simple way to measure clinically when treatment is complete. The end of treatment is subjective and based on:

1. When the clinician feels that no more aesthetic improvement can be gained
2. The patients is happy with the appearance
3. Time – treatment should not progress beyond six- nine months or we are in the realms of conventional orthodontics.

Due to this subjective nature, it is very important to define, before treatment commences, what the expectations are of the patient and what we can deliver as clinicians within an acceptable time-frame. It is important to have this discussion with patients using study models and photographs, noting in particular what the main concerns are of the patient and highlighting any areas where there may be compromises in achieving the desired outcome.

For example in one case, there is a missing lower incisor. As such we will most likely be left with residual spacing distal to the canines or even between the incisors. This should still deal with the patient’s main concern of significant anterior spacing but we have to let her know of this potential negative scenario and offer the option of conventional orthodontics or make her aware that further treatment may be required if she feels that residual spacing is still not acceptable.

Similarly with a crowded lower arch, we have to accept that we will not be able to move the premolars into an ideal position, giving a fuller smile, without changing the occlusion significantly. Again discussion with the patient regarding a compromised outcome needs to take place prior to treatment commencing, stressing our focus on the anterior teeth only.

However, quite often in cases such as these, it is important to remember that what we see as potential aesthetic compromises are something patients are not concerned about as their main focus tends to be on the anterior six teeth. In this case the patient was indeed more than satisfied with the outcome when the arch was rounded out giving the anterior six teeth a more ideal symmetry and proportion.

As is common with many of our short term orthodontic cases, further, simple cosmetic treatments will serve to enhance the above appearance.

Post Orthodontic Cosmetic treatment
Whitening . . .

- Maximum results with combined InSurgery 6% HP & Home 16% CP
- With Desensitiser
- Use with light or without light

Kits comply to UK/EU allowed limits for teeth whitening

... and more

- Night time - 10% carbamide
- Night/Daytime - 16% carbamide
- Daytime - 6% hydrogen peroxide
- 3cc large syringes with re-seal tips with built-in desensitiser

3.5w Laser  Cordless Laser  8w Laser  IntraOral Cameras

Laser & Whitening Specialists since 1992
Made in Great Britain

Call now for offers Tel. 01227 780009
and visit our website: www.quicklase.com
info@quicklase.com

20th Anniversary 1992 - 2012
Unlike the situation with children, in the majority of adult patients, we find that immediately following a course of short-term orthodontic treatment there will invariably be some degree of differential tooth wear or unaesthetic “black-triangle” formation which may necessitate further cosmetic treatments. This is usually very simply dealt with by composite bonding with or without prior tooth whitening, but the patient must be warned of the potential for further cosmetic work at the outset.

In the case of patient CR it is very noticeable that the incisal edges are uneven and there is a “black triangle” between the central incisors. With “black triangles” it is not uncommon for papillary growth in this region to continue for some period so it may be advisable to wait and see how much regrowth takes place prior to further cosmetic work.

**Conclusion**

Although I feel it is still somewhat in its pioneering stages, there is no escaping the fact that short term orthodontics is here to stay. We have to be able to offer this option to our patients as part of informed consent when undertaking any cosmetic procedure that would otherwise lead to significant tooth surface loss to achieve the desired cosmetic result.

There needs to be continued education and discussion to demystify some of the myths and scaremongering regarding occlusion and short term orthodontics, and we need to be able to have an educated discussion with our patients regarding this as an option for treatment. We also still need to treat conventional orthodontics with respect and work within very defined parameters in delivering this very cosmetically focussed treatment option.

However, echoing my earlier sentiments, this type of cosmetic treatment encompasses everything that good cosmetic treatment should do, and with the right training, we should all be capable of providing this treatment in one form or another to our patients.