How to avoid extractions when treating malocclusions using MRC’s Bent Wire System and Trainer System for arch development

Abstract
Maxillary and mandibular expansion has been developed by Myofunctional Research Search Co. (MRC), Queensland, Australia, as a simpler method of phase one expansion, which may produce improved stability because of simultaneous habit correction in selected cases. Two cases treated with the Farrell Bent Wire System (BWS) and the trainer system are described and the advantage of this method of treatment is discussed.

Introduction
Expansion of the jaws has been increasingly performed in orthodontics to achieve better occlusion and maxillary and mandibular expansion has been proposed since Edward Angle to avoid extractions (Dewel, 1964). This paper presents a novel method to produce dental arch development in the maxilla and the mandible with the inter-maxillary relationship maintained by a spontaneous mandibular manual proclination or a Class I molar relationship. The aim of this report is to describe a case report of two cases treated with the Farrell Bent Wire System (BWS) (BWS) and the trainer in combination with the inter-maxillary relationship maintained by a spontaneous mandibular proclination and to show the advantages of the BWS and the trainer in combination with the inter-maxillary relationship maintained by a spontaneous mandibular proclination.

The BWS Orthodontic System
The BWS Orthodontic System is a method to produce dental arch development using mrc’s bent wire system and trainer system. The system has been entirely constructed “in office,” which means no laboratory involvement, and the BWS can be entirely constructed “in office.” The wire component is 0.7 mm spring wire and is fabricated to the arch form of the starting models either by the laboratory or the orthodontist. The complete nature of the BWS makes it possible to assemble in-house, to avoid the fees that accompanies laboratory-constructed appliance.

An advantage of this system is that it does not involve using acrylic in the palatal vault. A functional appliance designed with acrylic on the palate and that is not properly built may lower the tongue, encouraging tongue thrusting, and, thus, either worsening the malocclusion or producing a relapse (Fig. 1). The Trainer is a self-ligating appliance designed with acrylic and it does not occupy the palate. It allows the tongue to position correctly and the patient to speak normally. The BWS is also suitable for use in the lower arch. Typical treatment tends to use only upper expansion for three to four months, after which time the wire component of the BWS is removed (the bands are kept for later use of the BWS). The i-2 Trainer (with the inner-cage that produces arch expansion) is then used to maintain the initial arch expansion gained using the BWS. Lower alignment is re-evaluated throughout this stage of treatment (Fig. 2).

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Case No. 1
This 10-year-old female patient...
continued use of the i-2 trainer, the case is further improved by lower BWS. The midlines were also increased — an effect thought to be due to the use of the i-2 trainer — “n” for no core wires fixed appliances. This case also illustrates the stability achieved in the lower dentition as no retainers were used apart from night use of the Trainer. Once again, spontaneous alignment of the lower anterior dentition has occurred without the need for any additions to the BWS Orthodontic System. This case was finalized with the use of the Trainer for three months (as mentioned earlier) and minimal retention (Fig. 9).

Conclusions
Maxillary and mandibular expansion has been shown to be an excellent alternative to increase the arch perimeter and, thus, to improve the need for extractions to properly align teeth. This paper has presented two cases treated using the BWS Orthodontic System, which involves the combination of two appliance systems: the Trainer, a pre-fabricated functional appliance, and the BWS, both appliances, Trainer and BWS, have to be used in order to get the results reported in this paper. The BWS Orthodontic System showed in these two cases and in many cases treated by the authors is an excellent means to produce arch development in both upper and lower dental arches in a short time. The effect of the BWS Orthodontic System on arch development does not change the inter-maxillary relationship when a Class I occlusion exists at the beginning of treatment. However, when a Class II malocclusion associated to a crowded dentition is present the BWS Orthodontic System produces arch development and, at the same time, the mandibular relocation of the erupting canines, but also achieve lower anterior alignment with minimal intervention and minimal retention (Fig. 9).

This case was a more extreme example that orthodontists will face in the future as more parents demand the non-extraction option with minimal use of multi-bracket systems.

Case no. 2
This 12-year-old female patient consulted because of very underdeveloped maxillary arch form and ectopic eruption canines (Fig. 8). This is far from an ideal age to consider the non-extraction treatment; however, the parent insisted that the case was attempted non-extraction. The lower anterior teeth were also considerably crowded, and if it would regularly be justified in extracting the first four premolars and going into upper and lower straight wire fixed appliances. It could be argued that treating non-extraction will prolong the treatment and certainly incur greater expense on the parent. However, there is a growing debate among orthodontists who have had extraction orthodontics in the past to avoid this approach for their children. Therefore, the BWS Orthodontic System can be a beneficial technique that the orthodontist can use in these exceptional cases. Treatment was similar to case 1. An upper BWS was fitted and combined with the use of the i-2 Trainer for the initial four months, after which time the BWS was removed, leaving the nodar bands in place. The i-2 Trainer was introduced at this stage for a further three months to maintain the expansion prior to a second phase of treatment using the BWS and i-2 Trainer for three months (as mentioned earlier) and minimal retention.

This allows the dentition to “catch up” and prevents excessive tooth mobility. It is thought that much of the expansion achieved by this system is dentulous rather than sutureal, with a rapid maxillary expander and other acrylic expanders. Also, there is more development occurring in the lower arch development, which is an effect previously found in the research on the Trainer (Ramirez-Yañez, 2005b). The difficulty in cases like this, requiring large amounts of expansion to achieve a non-extraction result, is a tendency to create an open bite. Although this occurs to some extent, the BWS Orthodontic System does not open the bite as much as more conventional techniques because the tongue position is favorably altered by use of the Trainer. This conjecture may require further investigation to clarify.

Once again, spontaneous alignment of the lower anterior dentition has occurred without the need for any additions to the BWS for the lower arch. This effect is not just restricted to these two cases but is a routine observation of the BWS Orthodontic System. This case also illustrates the stability achieved in the lower dentition as no retainers were used apart from night use of the Trainer.

Although this patient is not at the ideal age, the pictures show that it was possible to obtain space for all permanent canines, without extractions and with good stability. The bite opening is minimal and tends to decrease with further dental development. Although this case was finalized with the Myobrace Regular™ from MBC, the i-2 Trainer and observation, along with the i-2 Trainer for 12 months after treatment, the BWS produced enough upper arch development to not only accommodate the erupting canines, but also
effect is produced by the Trainer (Usamez, 2004; Ramirez-Yañez, 2003a; Quadrelli, 2002), which treats the distal position of the mandible.

Additionally, the BWS Orthodontic System has shown to improve the overjet and overbite but to maintain them when they are correct at the beginning of treatment. This system treats muscular dysfunctions that may be the cause of crowding and malocclusion and may cause relapse after treatment is finished. Thus, the BWS Orthodontic System may be proposed as an excellent alternative form of treatment in those cases where arch development is required to align teeth, patients want to minimize or even avoid brackets and extractions, the mandible needs to be relocated, soft tissue dysfunction is present and treatment needs to be performed in a reasonable period of time.

References

About the Authors
Chris Farrell, DDS, graduated from Sydney University in 1971 with a comprehensive knowledge of traditional orthodontics using the Begg technique. Through clinical experience, he took an interest in TMJ/TMD disorder and, after further research, Farrell discovered that the etiology of malocclusion and TMJ disorder was myofunctional, contradicting the current views of his profession. Farrell founded Myofunctional Research Co. (MRC) in 1989 and has become the leading developer of intra-oral appliances for orthodontics, TMJ and sports mouthguards.

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