CHAPTER 7

Flexible fixed functional appliances

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The most popular functional appliance in the United States is the Herbst appliance (crown type), used by 19.2% of orthodontists, followed by the Forsus at 17.4%.[1] However, preferences vary between countries, with a British survey[2] and an Australian survey[3] indicating that the Twin Block is the most commonly used functional appliance. In Australia the Twin Block is currently used by 70% of orthodontists, with spring type correctors (which include the Forsus, Jasper Jumper etc.) being the next most popular at 61%.

Fixed or non-compliance Class II correctors can be grouped into two categories:

- 'Rigid' fixed functional appliances (e.g. Herbst, MARA), meaning those that posture the mandible into one fixed position without any flexibility in the system, often but not exclusively used prior to comprehensive pre-adjusted Edgewise appliances in a two-phase approach. These have been discussed in Chapter 6.
- 'Flexible' fixed functional appliances (e.g. Forsus FRD, Jasper Jumper), encompassing those that have a component such as a spring allowing some give in the system when posturing the mandible forward, usually used concomitantly with fixed pre-adjusted Edgewise appliances in one comprehensive phase of treatment.

With prospective clinical trials of removable functional appliances finding no long-term benefit in terms of the final clinical result and longer treatment times with two-phase or a single comprehensive phase of treatment,[4, 5] there is an argument for comprehensive pre-adjusted Edgewise appliances in parallel with the functional phase to improve efficiency in the majority of cases. Consequently, the alignment and the molar correction can be addressed simultaneously. Obviously there are exceptions where psychosocial or other reasons may prevail, indicating an early phase of treatment. However, when employing a single comprehensive phase of treatment, molar and overjet correction can be undertaken in a variety of ways, ranging from use of elastics and headgear to some form of flexible fixed functional appliance, or indeed a combination of these approaches.

Jasper Jumper

The eponymous Jasper Jumper was developed in 1987 by J.J. Jasper and was popularized thereafter.[6] It was the first flexible fixed functional appliance to apply a distal and intrusive force to the maxillary molars along with a mesial and intrusive force on the lower incisors. It consists of vinyl-coated springs attached to the maxillary molar headgear tubes and attached either directly to the lower archwire just distal to the canines, or to a sectional bypass wire from an auxiliary tube on the lower molar to just distal to the lower canine. As it applies a mesial force to the lower anteriors, it is essential that the lower wire is cinched or tied back to prevent excessive proclination of the lower incisors. There has also been a recommendation to use or add lingual root torque in the lower anteriors to enhance anchorage and reduce flaring, although the effect of this approach has not been assessed in a clinical trial.

In a study comparing the Jasper Jumper with the Herren activator and a headgear–activator combination, the Jasper Jumper consistently resulted in correction of the occlusion, while activator use resulted in a Class I occlusion in 43% of cases. However, as this was a non-randomized study, subjects were not matched for occlusion type or stage of dental development at the outset. The Jasper Jumper led to the greatest skeletal contribution to overjet correction (48%) but the least skeletal contribution to molar correction (38%).[7] As a proportion of the overall change, the amount of dental molar correction was lower with the Jasper Jumper but the magnitude was slightly (0.3 mm) greater in the Jasper Jumper group, as the appliance resulted in a bigger overall change. However, the difference was not found to be clinically significant. The Jasper Jumper subjects also demonstrated a marked intrusion of the lower incisors. As no brackets were placed on the lower canines and premolars, the 0.017 inch × 0.025 inch stainless steel archwires (0.018 inch slot brackets) effectively acted as utility arches or 2 × 4 appliances, potentially leading to a greater intrusive effect on the lower incisors than would have been the case with a fully bonded arch.

Orthodontic Functional Appliances: Theory and Practice, First Edition. Padhraig Fleming and Robert Lee.