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A useful method to correct early unilateral posterior crossbite

KEYWORDS
Posterior crossbite (PC);
Prefabricated myofunctional device (PMD);
Facial asymmetry;
Functional appliance;
Myofunctional exercise

Posterior crossbite (PC) is a frequently-occurred malocclusion in deciduous and mixed dentition, with a prevalence being between 7% and 23%. The etiology of the crossbite consisted of heredity, sucking habits and impaired nasal breathing. If the PC is left untreated, it will cause lateral mandibular shift, asymmetrical condylar movement pattern, asymmetrical mandibular growth, and temporomandibular joint disorders in the future.[1] Therefore, it is recommended to correct PC as early as possible. Conservatively, the split-plate type of removable functional appliance, W-arch, and quadhelix appliances are used to expand the maxillary arch to correct unilateral posterior crossbite. In the present case report, a patient with a unilateral PC in the deciduous dentition was treated with the aid of a prefabricated myofunctional device (PMD), myofunctional exercise, and grinding. Her malocclusion was corrected with satisfactory results.

A 5-year-old female reported to the hospital for chin deviation. Extraorally, her chin point was shifted to the right side. Intraorally, 2.0 mm mesial step in the deciduous dentition was noted. Unilateral lingual crossbite was found from the right primary lateral incisor to the right second primary molar. Lower dental midline shifted to right by 2 mm. Posteroanterior cephalometric radiograph showed that the mandibular shift angle (the angle formed by the median-ANS and the ANS-Me line) was 2°. The cephalometric film revealed a skeletal Class I pattern with a high mandible angle. The panoramic radiograph exhibited the presence of all permanent successor teeth and no pathology (Fig. 1A–J). Concomitantly, the tongue was in the low positioning at rest and upon swallowing, and exhibited a lack of thrust on the palate.

The PMD, Myobrace® (i-3N, Myofunctional Research Company, Gold coast, Australia) is a three-stage appliance system used for Class III malocclusion in the deciduous and mixed dentition. The patient had to perform myofunctional exercise (such as nasal-breathing and tongue-lifting) with the appliance for 1 h daily. She also had to wear the appliance nocturnally. After 6 months, the right PC had improved. The maxillary arch dimension was adequate but occlusal interference was noted. Therefore, grinding was performed on the right primary maxillary canine. After 17 months, the unilateral PC and dental midline deviation had been corrected (Fig. 1K–T). The postero-anterior cephalometric radiograph showed that her mandibular shift angle decreased to 0° (Fig. 1 U). Superimposition of cephalometric tracing was shown in Fig. 1 V.

According to Tsarapatsani,[2] mouth breathing, breathing obstacles and snoring have significant links with recurrence of unilateral PC. In addition to effective maxillary arch development, Myobrace® can guide the tooth eruption and alignment by correcting tongue position. Certain drawbacks of functional appliances, such as the appliance bulkiness, inflexible material construction, extra need for impression

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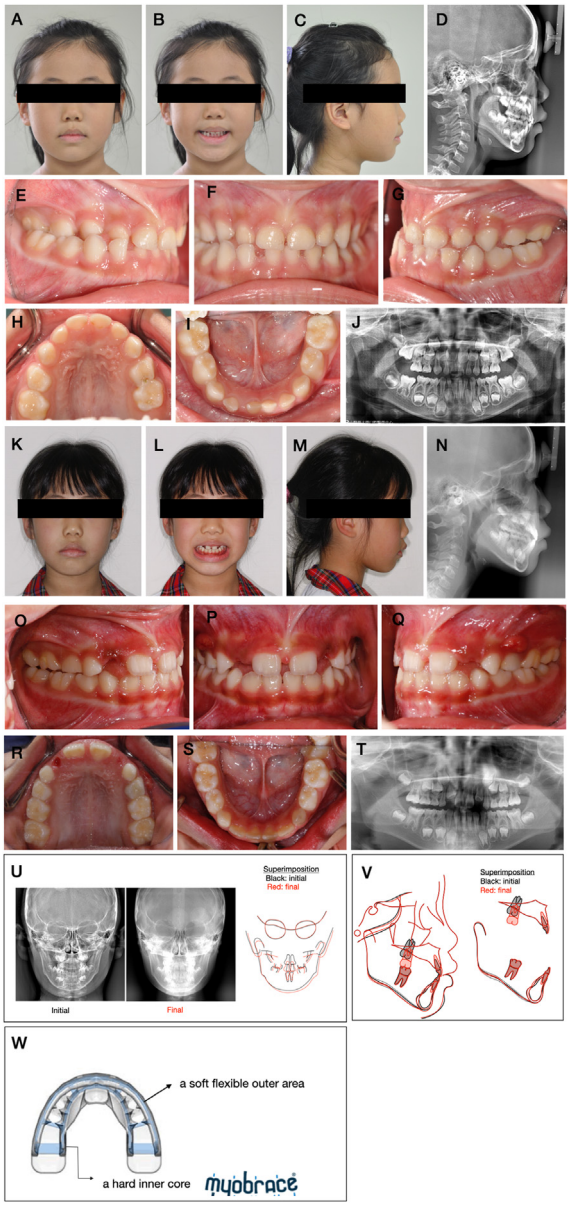

Figure 1 Clinical extraoral and intraoral photographs and radiographs of the case. (A, B, and C) Initial extraoral photographs showed that the chin deviated to the right side in Fig. 1A. (D) Initial lateral cephalometric radiograph. (E, F, G, H, and I) Initial intraoral photos illustrated that the right unilateral posterior crossbite was noted in Fig. 1E and the tapered maxillary arch form was observed in Fig. 1H. (J) Initial panoramic radiograph. (K, L, and M) Final extraoral photographs showed that the chin deviation was improved in Fig. 1K. (N) Final lateral cephalometric radiograph. (O, P, Q, R, and S) Final intraoral photos: the right unilateral posterior crossbite was corrected in Fig. 1O. The ovoid maxillary arch was observed in Fig. 1R. (T) Final panoramic radiograph. (U) Initial and final posteroanterior (PA) cephalometric film and superimposition of radiograph tracings: the mandibular shift angle was decreased from 2° to 0°. Compared with the PA cephalometric film of pre-treatment, the post-treatment facial asymmetry was improved. (V) Superimposition of initial and final lateral cephalometric tracings. (W) The soft flexible outer area of the Myobrace® limits unexpected buccal expansion on the normal side.

taking and laboratory work lead to the development of the pre-orthodontic trainer.[3] Moreover, using Myobrace® to correct PC, the soft flexible outer area of the Myobrace® limits unexpected buccal expansion on the normal side (Fig. 1W). Therefore, it facilitates symmetrical expansion with proper relative bucco-lingual relationships. Based on the above-mentioned advantages, the PMD is an advisable appliance for treating children with unilateral posterior crossbite.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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