Orthodontic treatment and follow-up of a patient with cerebral palsy and spastic quadriplegia

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Introduction: This report describes the clinical orthodontic management of a patient with spastic quadriplegia and cerebral palsy. Guidelines to overcome difficulties encountered during the treatment period are suggested. **Methods:** A 13-year-old boy with cerebral palsy and spastic quadriplegia complained of an undesirable oral appearance because of his malocclusion. He had a Class II molar relationship, with severe maxillary and moderate mandibular anterior crowding. Enamel hypoplasia was apparent on all teeth. He had losses of body function and upper extremity function of 70% and 39%, respectively. His physical limitations necessitated a treatment approach that did not rely on patient-dependent appliances. The treatment plan called for maxillary first premolar extractions, mandibular incisor protrusion, and air rotor stripping. **Results:** The patient's oral function and esthetic appearance were significantly improved. Aligned dental arches with good occlusion were obtained. The patient's self-confidence improved during the treatment period. **Conclusions:** Physical appearance can influence personality and social acceptability. Corrective orthodontic treatment for patients with physical handicaps can improve not only oral function, but also self-confidence and self-esteem. (Am J Orthod Dentofacial Orthop 2016;150:670-8)

Cerebral palsy (CP) is a general term for a group of developmental disorders affecting movement and posture. CP is frequently accompanied by mental retardation and altered sensation, perception, and communication abilities.[1-3] The exact prevalence of CP is unknown; however, the reported rate is 2 to 3 per 1000 live births; this increases to 40 to 100 per 1000 births among preterm or low-birth-weight children.[4,5] CP can be attributed to nonprogressive neurologic disturbances that affect the fetal or infant brain and result in varying disabilities.[2]

Movement impairments in people with CP can be classified as spastic, ataxic, athetoid, or mixed. The most common form is spastic CP, which is predominantly characterized by elevated muscular tonus resulting from deficits in the motor cortex or corticospinal tract. In ataxic CP, the cerebellum is affected, resulting in losses of coordination and balance. Patients with athetoid CP exhibit mixed muscle tone and involuntary movements caused by basal ganglia dysfunction. Mixed CP involves more than one form of CP.[2,6,7]

In CP, motor dysfunction and alterations in muscle tone and function frequently lead to deviations in facial growth and dental occlusal development. Patients with CP with spastic quadriplegia mostly have a Class II growth pattern with malocclusion. The most common orofacial abnormalities associated with CP are increased overjet, lip incompetence (often accompanied by drooling), missing teeth, greater prevalence of periodontal disease, and enamel defects. In terms of overbite relationship, conflicting studies show both increases and decreases in overbite.[1,3,7-10] Most orofacial abnormalities are more prevalent in persons with CP who also have severe mental retardation.[9-11] Although the orthodontic literature contains some articles regarding the clinical management of children with handicaps, reports specific to children with CP are few.[12-14] We describe the orthodontic treatment of a CP patient with spastic quadriplegia, emphasizing the guidelines to overcome difficulties encountered during the treatment period.

ETIOLOGY AND DIAGNOSIS

A 13-year-old boy with CP and spastic quadriplegia was referred to our clinic because of his undesirable oral appearance caused by malocclusion (Fig 1). The

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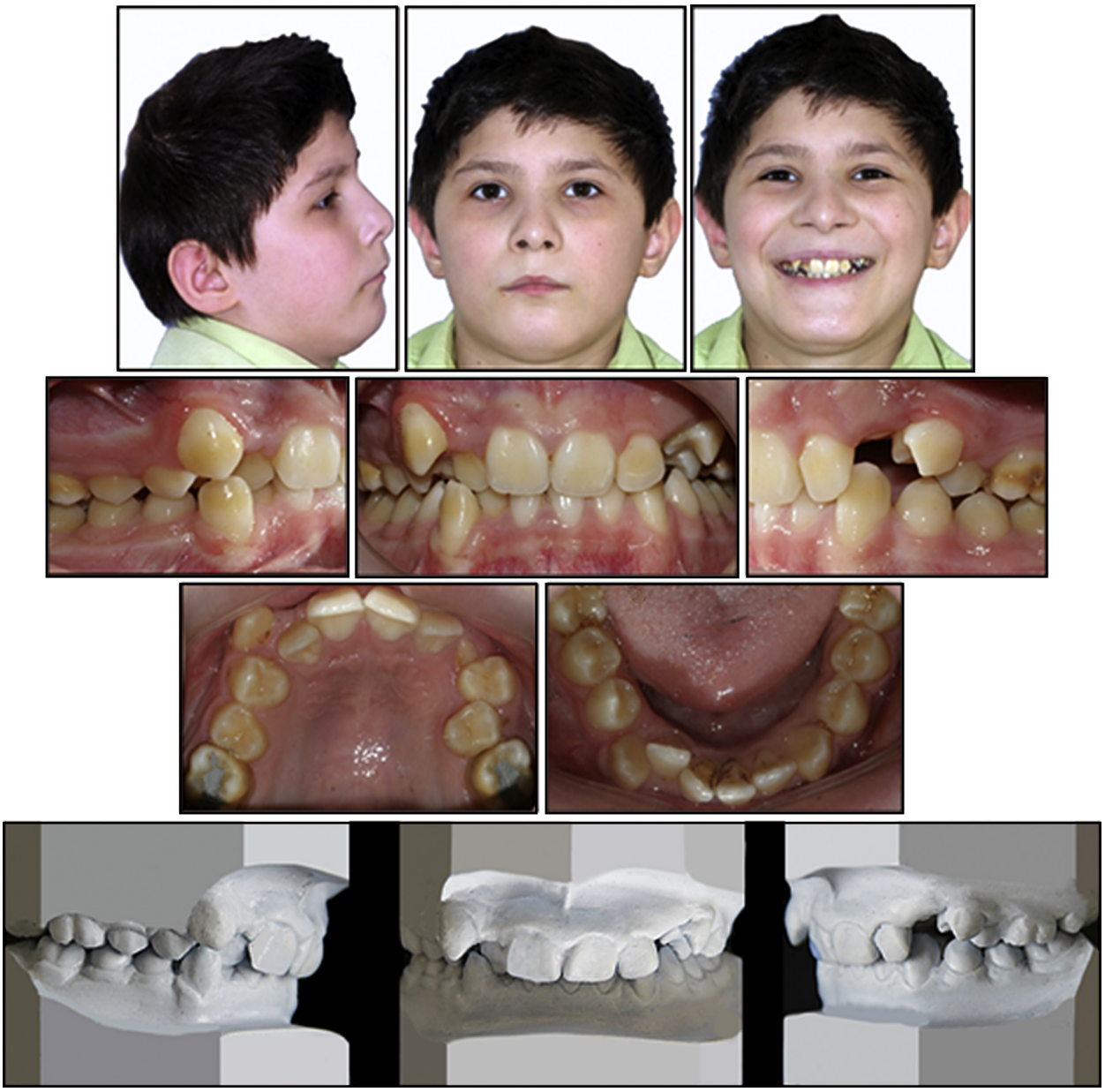

Fig 1. Pretreatment photographs and dental casts.

cause of CP was diagnosed as a maternal urinary tract infection.[15] His loss of total body function was 70%, and his loss of upper extremity function was 39%. He needed assistance to walk and eat. In addition to motor dysfunctions, mild mental retardation was also present (IQ, 56). Prominent neck flexion was apparent due to increased muscular tonus. Enamel hypoplasia affected all teeth, a common finding in patients with CP.

The cephalometric evaluation showed a convex profile, a protrusive maxilla, and a relatively normal mandible with a high-angle growth pattern (Table). In terms of vertical growth, his articular, gonial, and mandibular plane angles were all increased. In the transversal direction, no crossbites were observed. He was skeletally Class I with an ANB angle of 4°, a Class II dental relationship with severe maxillary (11 mm) and moderate mandibular (4 mm) crowding. Because of a severe lack of maxillary space, his maxillary left canine was unerupted, and the right canine was infrapositioned in the vestibule. Despite his high-angle growth pattern, he had an increased overbite (75%) with retroclined maxillary incisors. His overjet was 2 mm.