

Review the Distraction Osteogenesis in Craniofacial Anomalies

Ellen Wen-Ching Ko

*Department of Craniofacial Orthodontics, Chang Gung Memorial Hospital
Graduate Institute of Dental and Craniofacial Science, Chang Gung University*

Distraction osteogenesis (DO) has been widely applied in the craniofacial field since the lengthening of human mandible reported by McCarthy in 1992. The long-term result of facial growth after distraction were reported with various outcomes due to different observation tools, methods of measurement and duration of changes. The long-term facial growth of patients with craniofacial microsomia (CFM) after early mandible distraction osteogenesis (DO) were compared with the patients without early DO by observing the adult 3D craniofacial features. Longitudinal radiographs were measured for the growth changes in patients with DO. The patients with early DO presented 8–9 mm forward and downward maxillary growth and 4.6 mm limited forward and 17.3 mm substantial downward mandibular growth. The ramus length ratio (affected/nonaffected) was 90.8% at DO completion and decreased to 69.5% at growth completion during 13 years of follow-up. Both groups showed obvious craniofacial asymmetry, as indicated by occlusal plane canting, chin deviation, transverse and vertical condyle positions, and mandibular contours. Early mandible distraction could not alter the inherent facial growth pattern in patients with grade II CFM. Limited changes are derived for definitive facial correction with early DO.

The advantages of midface DO over conventional surgery in patients with syndromic craniosynostosis include greater amount of advancement, lower rate of complications and morbidity, less blood loss, less operative time and limited amount of frontal dead space. The outcome from the series of patients indicated 15.3 mm advancement in supraorbital region, 17.7 mm, 22.1 mm and 23.1 mm forward at orbitale, anterior nasal spine and A point, respectively. The downward movement was 2–3 mm at maxillary level. The intracranial volume increased 11%; the upper airway volume increased 85% on average. Globe protrusion reduced 3.7 mm on average, which was 20% of underlying skeletal movement. Facial growth demonstrated forward remodeling of the supraorbital region, mild downward but no further forward growth of the midface. Monobloc distraction is effective for relieving related symptoms and signs through differential external distraction at different vertical levels of the face.