

Understanding and dealing with the complexities of craniofacial growth

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When planning treatment for an adult patient with moderate to severe crowding and a good skeletal pattern, how often are you asked to avoid extractions? When this happens to me, I am likely to digitize the records and morph the predicted soft tissue change. With fairly sophisticated software I can move the teeth to reflect anchorage requirements, tooth-size problems, and the anteroposterior relationship of the teeth. This visual information makes it easier to discuss the patient's concerns about facial changes. But how accurate are these soft tissue predictions, and do lay people view them the same as professionals?

These questions are addressed in a long-awaited paper by Le, Sameshima, Grubb, and Sinclair from the University of Southern California. In their study the upper lip showed a relatively consistent 58% hard-to-soft-tissue retraction ratio, similar to other studies. Lay people thought the video images were very representative of the actual outcomes and rated them good to excellent, while orthodontists judged the predicted images fair to good.

Sample, Sadowsky, and Bradley at the University of Alabama evaluated the reliability of manual and computer-generated visual treatment objectives (VTOs) and found only slight differences between methods, with the computer being slightly more accurate with soft tissue predictions. Overall, prediction tracings were accurate to only a moderate degree, with marked individual variation throughout.

When asked by parents about the heritability of dental characteristics, I usually respond with the unscientific statement that "Kids seem to inherit about 70% of everything from their parents." After reading a paper by Cassidy, Harris, Tolley, and Keim from the University of Tennessee, I find I couldn't be more wrong. In a study of the genetic influence on dental arch form, the authors conclude that while there are significant familial similarities in arch size, at least half the phenotypic variation in their sample was due to environmental differences. Most aberrations of tooth position (e.g., rotations, displacements) are due to environmentally induced factors.

Adding to this finding of genetic influence is report by Peck, Peck, and Kataja on the relatively rare disturbance of mandibular lateral incisor-canine transposition. They studied a sample of 60 and identified two age-related phenotypes of the anomaly: early-stage (9 years) and mature-stage (12 years). Significant associations were found between Mn.I2.C transposition and the increased frequency of tooth agenesis and peg-shaped maxillary lateral incisors. The results of this study, when combined with the analysis of 50 previously published cases, provide evidence that transposition is a disturbance of tooth order and eruptive position, probably caused by genetic influences. Be sure to read the appendix, which describes the clinical management of transposed teeth based on the age of interception.

Enjoy reading and let me know what you think of these research findings.

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