Introduction: The aim of this controlled study was to analyze the degree and localization of 3-dimensional (3D) facial asymmetry in adult patients with cleft lip and palate (CLP) compared with a control group and its impact on the visual perception of faces.

Methods: The degree of 3D asymmetry was analyzed with a novel method without landmarks in 18 adults with complete unilateral CLP and 18 adults without congenital anomalies. Furthermore, the CLP and control faces were rated for appearance, symmetry, and facial expression by 30 participants.

Results: The results showed that adults with CLP had significantly greater asymmetry in their facial soft tissues compared with the control group. Moreover, the lower face, and particularly the midface, had greater asymmetry in the CLP patients. The perceptual ratings showed that adults with CLP were judged much more negatively than those in the control group.

Conclusions: With sophisticated 3D analysis, the real morphology of a face can be calculated and asymmetric regions precisely identified. The greatest asymmetry in CLP patients is in the midface. These results underline the importance of symmetry in the perception of faces. In general, the greater the facial asymmetry near the midline of the face, the more negative the evaluation of the face in direct face-to-face interactions.

Read the full text online at: www.ajodo.org, pages 168.e1-168.e8.
Q & A

Turpin: Were you comfortable with the methods used to identify facial asymmetry?

Meyer-Marcotty: Yes, because this 3D approach has proven to be a simple, fast, and precise diagnostic instrument for analysis of the facial soft tissues and determination of facial asymmetry. Additionally, the standardized computer-based procedure does not require manual definition of the landmarks for analyzing facial asymmetry, resulting in independence of interobserver differences. Our quantification of asymmetry rested on 10,000 to 20,000 point pairs for each face. This procedure prevents inaccuracies when only individual landmarks are used, because the landmarks are frequently located in asymmetric regions. Therefore, a global landmark independent acquisition of the facial surface, as used in this study, is prerequisite for a precise digital reconstruction of the real morphology.

Turpin: Do you plan to change the design of this study in the future to accurately identify soft-tissue differences?

Meyer-Marcotty: This 3D facial soft-tissue analysis is a standardized procedure in our department, especially for CLP and orthognathic patients. To provide more information about the 3D analysis of facial asymmetry and its impact in visual perception, the 3D technology must be tested in a large, homogeneous group of patients. Therefore, in future studies, the analysis of 3D facial asymmetry will be performed with CLP patients separated into groups by cleft type and in orthognathic patients separated into groups by skeletal class.

Turpin: Will this technology help the orthodontist to become a more effective member of the CLP team?

Meyer-Marcotty: The orthodontist as a member of the interdisciplinary team for CLP patients should also be intimately familiar with the elements of the cleft deformity in adulthood and the impact of facial asymmetry on how people with CLP are perceived. The treatment of CLP starts at birth and continues into adulthood. Over this long period of time, it is not unusual for the orthodontist to be the first contact for patients for correcting any residual asymmetries. Therefore, with sophisticated 3D analysis, the real morphology of a face can be calculated, and asymmetric regions can be precisely identified. This would give the clinician an objective tool for evaluating the therapeutic rehabilitation of a CLP patient. The improvement of soft-tissue diagnostics might result in differentiated therapeutic decisions related to surgical and orthodontic interventions.

Fig 3. A, 3D surface scan of a patient as in Fig 1; B, mirrored data of the 3D surface scan; C, registration of the original and mirrored data. The symmetry plane and the distances between both data sets were computed by means of corresponding points.