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Delineation of facial archetype by three-dimensional averaging

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Abstract: The objective of this study was to investigate the feasibility of creating archetypal 3D faces through computerized 3D facial averaging. A 3D surface scanner Fiore and its software were used to acquire the 3D scans of the faces while 3D Rugle3 and locally-developed software generated the holistic facial averages. 3D facial averages were created from two ethnic groups; European and Japanese and from children with three previous genetic disorders; Williams syndrome, achondroplasia and Sotos syndrome as well as the normal control group. The method included averaging the corresponding depth (z) coordinates of the 3D facial scans. Compared with other face averaging techniques there was not any warping or filling in the spaces by interpolation; however, this facial average lacked colour information. The results showed that as few as 14 faces were sufficient to create an archetypal facial average. In turn this would make it practical to use face averaging as an identification tool in cases where it would be difficult to recruit a larger number of participants. In generating the average, correcting for size differences among faces was shown to adjust the average outlines of the facial features. It is assumed that 3D facial averaging would help in the identification of the ethnic status of persons whose identity may not be known with certainty. In clinical medicine, it would have a great potential for the diagnosis of syndromes with distinctive facial features. The system would also assist in the education of clinicians in the recognition and identification of such syndromes