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**PURPOSE:** Virtual surgical planning (VSP) is the gold standard for preoperative treatment planning for orthognathic surgery. Prior to the implementation of VSP, traditional orthognathic preoperative preparation required hours of labor and utilization of a dental laboratory. This often limited orthognathic surgery to providers with dental training. The combination of VSP and 3-dimensional printing has allowed orthognathic surgeons the ability to more accurately and efficiently create treatment plans for these cases. This technology has also allowed practitioners such as plastic surgeons to begin to perform orthognathic procedures. This review serves to illustrate how plastic surgeons use VSP and highlight its impact on surgical outcomes and research output within orthognathic surgery.

**METHODS:** A literature search was conducted in the PubMed database to identify all articles published before January 2020 that report perioperative use of VSP technology in orthognathic surgeries. Only articles that were written in English, involved operations on live human patients, and used VSP to plan or assist with orthognathic surgery were included in the analysis. All articles that fit inclusion criteria were reviewed to determine the year of publication, type of orthognathic surgery performed, how VSP was used, and the primary outcomes measured.

**RESULTS:** A total of 419 publications regarding VSP in orthognathic surgery resulted from initial search. Of them, 244 publications were authored by oral and maxillofacial surgeons, 28 publications by plastic surgeons, and 34 by surgeons with training in both fields.

**TEMPORAL TREND OF PUBLICATIONS:** Prior to the late 1990s, VSP in orthognathic surgery publications was primarily authored by oral and maxillofacial surgeons. Plastic surgeons first began publishing on VSP technology for orthognathic surgery in 1998. Since then, there has been a rising trend in plastic surgery usage of VSP paralleled by increasing VSP publications in the field, with 2 publications before the year 2010 (7.2%), 9 from 2010 to 2015 (32%), and 18 between 2015 and 2019 (64%).

**CATEGORIES OF PUBLICATIONS:** Most publications from oral and maxillofacial trained surgeons highlight optimal positioning of craniofacial bones, anticipated stability and functionality of occlusion, and the interplay between orthodontic treatments and orthognathic surgery. In contrast, plastic surgeon authored papers often discuss postoperative facial aesthetics by ensuring facial symmetry and treatment especially in the cases of congenital craniofacial abnormalities like cleft lip/palate, Treacher-Collins, and hemifacial microsomia.

**CONCLUSIONS:** VSP is an increasingly utilized tool that reduces the workflow without compromising accuracy and outcomes in orthognathic surgery. This is the first paper to create a temporal relationship between a new technology and the emergence of plastic surgeons into a field typically predominated by oral and maxillofacial surgeons. As plastic surgeons become more familiar with this technology, they have produced literature that provides alternative perspectives on orthognathic surgery that will push the field forward.

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**Measuring Facial Landmarks of Attractive People Around the World: A Scoping Review**

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**PURPOSE:** The ideal outcome of any craniofacial surgery requires consideration of balance with the patient’s whole face. Detailed cephalometric measurement of the face plays an essential role in planning these surgical procedures. “Attractive” facial measurements and proportions vary widely across different racial groups. To our knowledge, the variation in facial beauty standards around the world has not yet been reviewed. This scoping review aims to summarize how racial groups are delineated, identify
methodologies used for cephalometric analysis of attractive adults, and summarize findings in the existing literature.

METHODS: A scoping review was conducted using the Arksey and O’Malley methodological framework. Five bibliographic databases were queried for studies using keywords relevant to cephalometric analysis, photogrammetry, and race or ethnicity. Two independent reviewers completed abstract and full-text screening to identify original studies with measurements soft tissue facial landmarks in attractive adults of a specified race. Differences were resolved by consensus. Data on subject characteristics, cephalometric analysis methodology, and linear and angular craniofacial measurements were collected.

RESULTS: The search yielded 1,058 unique articles, of which 186 were selected for full-text screening and 19 were included. Overall, cephalometric analysis was conducted on 1,107 attractive adults. One thousand two (90.5%) of these subjects were female and 105 (9.5%) were male. Six hundred twenty-four (56.4%) were white, 462 (41.7%) were Asian, and 21 (1.9%) were black. Among Asian groups, racial categories tended to be more granular; frequently both countries of descent and nationality were specified (eg, Korean-American), whereas often only the region or country were specified for white and black groups. Methodologies either utilized 3-dimensional scanners (n = 4), 2-dimensional cameras (n = 8), or photos from the internet (n = 6). While studies tracked similar facial landmarks, calculated linear and angular measurements varied. Studies comparing attractive women from different racial groups did not yield significant differences, although Asian models had more acute angles compared to white models at the alar curvature point and labiale inferius. Studies comparing attractive white models to normal white women concluded that attractive women have more “juvenile” characteristics, including a wider soft tissue orbital area.

CONCLUSIONS: These aesthetic facial measurements should be taken into consideration during preoperative planning to accommodate patients’ cultural backgrounds. Although existing studies adequately characterize attractiveness in European and Asian countries, it remains challenging to evaluate transcultural beauty standards for people of mixed race and people in ethnically diverse countries, where perceptions of attractiveness are shaped both by their own racial features as well as prevailing norms. There is also a paucity of studies examining attractive males, as well as attractive people from non-white and Asian backgrounds. Cephalometric analyses of attractive adults have been performed mostly using 2-dimensional scanning systems or photographs; future analyses should be conducted using 3-dimensional scanning systems now that this technology is available.

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Long-term Outcomes After Facial Allotransplantation: Systematic Review of the Literature

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BACKGROUND: Facial vascularized composite allotransplantation (fVCA) is a solution for patients with severe facial disfigurement for whom conventional reconstructive techniques do not suffice. However, most evidence about the outcomes of fVCA is derived from single centers, reporting on short-term results or technical feasibility. To better understand the risks and benefits of fVCA, it is imperative to pool data from different medical institutions. The aim of this study is to comprehensively synthesize long-term outcomes after fVCA from the available scientific literature.

METHODS: Following the PRISMA guidelines, we conducted a systematic review analyzing publications in the PubMed/MEDLINE database. Full-text review articles were included if they provided original data on fVCA with at least 1 outcome measure with 3 or more years of follow-up.

RESULTS: The literature search retrieved 1,812 articles, from which 28 met the inclusion criteria. Thirty different outcome measures on 23 patients from 6 different medical institutions were identified. The mean follow-up was 5.3 ± 1.9 years and the most common mechanism of injury was ballistic trauma (43.5%), followed by burns (30.4%). After