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The ideal male jaw angle – An Internet survey

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ABSTRACT

Background: The ideal male jaw angle has not been established. With the advent of additive manufacturing, precise customized shaping is a reality. This study aimed to define the ideal masculine mandibular angle as an aid for 3-dimensional (3D) design.
Methods: An Internet survey was conducted using black/white photographs of celebrities and non-celebrities. Preferences regarding gonial angle (profile and frontal views), intergonial width and vertical jaw angle position (face frontal view), and angle curvature and definition in oblique views were obtained using simplified, unbalanced Likert scales. Constructs were defined for planning 3D implant designs.
Results: The preferred jaw angle had these characteristics: 130° in face profile view, intergonial width similar to facial width, vertical position in frontal view at the oral commissure or at least not below the lower lip, jawline slope in the face frontal view nearly parallel to (with a maximum 15° downward deviation from) a line extending from the lateral canthus to the alare, ascending ramus slope 65°–75° to the Frankfort horizontal, and curvature in the oblique view visible from earlobe to chin and not pointy.
Conclusions: Photogrammetric analysis of panel preferences lead to constructs with values useful for the design of 3D printed jaw angles.

1. Introduction

Batides and Zide wrote in 2014, "Esthetically, a fuller, augmented gonial angle portrays a look of masculinity, and a 'stronger' jaw is often desired." To underscore their statement, the authors referred to articles published at least 12 years earlier (Whitaker, 1989; Aiache, 1992). Indeed, no reports regarding the aesthetic appraisal of the male jaw angle have been published since 1994 (Ousterhout, 1991; Whitaker, 1991; Taylor and Teenier, 1994). The sparse articles published more recently regarding jaw angle augmentation have emphasised implant shape (Terino, 1994; Ramirez, 2000) and surgical complications (Semergidis et al., 1996; Thomas and Yaremchuk, 2009).

The emergence of 3-dimensional (3D) printing based on computed tomography (CT) and cone-beam CT segmentation allows the design of patient-specific implants, but specifications regarding the ideal jaw shape are clearly lacking. As noted by Adrien Aiache in 1992, no cephalometric standards are available, so surgeons must depend on the "ideal concept." The ideal concept according to Aiache (1992) is a jaw angle "well below the ear …, long and low in profile and less than 105° when measuring the slope of the lower border and the ascending process. In front view, the bigonial distance should be as wide as the bitemporal distance … usually less than or equal to 10% less than the bizygomatic distance …" These guidelines are rather vague for use with contemporary computer-aided designs, which have a precision of 0.1 mm.

The aim of this study was to determine specifications that can assist in designing ideal jaw angle patient-specific implants for men. We performed a contemporary appraisal of the aesthetically ideal male jaw angle and created constructs for use when guiding the planning of implants.

2. Methods

An Internet survey was established at www.netq.nl to reach a database of 770 consenting people. The database was based on the author's professional and personal list of contacts. Study participants were recruited by email with a request to assist in completing a survey regarding facial contours and definition. The survey was

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available online during the entire month of May 2015. After informed consent was obtained, the survey began with questions about the participants' age, sex, and occupation (facial surgeon or non-facial surgeon). These personal data remained anonymous.

In addition to the participants' personal data, the survey contained nine questions, each based on a set of facial pictures. All pictures used in the survey were non-copyrighted images obtained from the Internet. They were modified (mainly cropped and converted to black and white), and the eyes were covered when necessary to reduce the likelihood of confounding relationships between other facial features than aimed for. Many of the pictures were images of celebrities, as they were the most readily available pictures that demonstrated features appropriate for this study. The pictures of celebrities were interspersed with pictures of non-celebrities. The celebrities were Ben Affleck, Brad Pitt, Colin O'Donoghue, Colton Haynes, Dean Winchester, Hrithik Roshan, Jensen Ackles, Liam Hemsworth, Matthew Bomer, Michael Fassbinder, Richard Armitage, Tahmoh Penikett, and Tom Hiddleston. Some individuals were included in more than one question (using the same or another image) to distract the study participants.

Two initial questions were asked to sensitize the participants to subsequent questions focussing on the mandible (questions 1 and 2). Further questions were posed to retrieve information about the ideal intergonial width (question 3), ideal inclination of the jawline in the face frontal view (question 4) and face profile view (question 6), ideal vertical position of the gonial angle in the face frontal view (question 5), relationship between the inclination of the forehead and inclination of the posterior border of the mandible (question 7), opinion regarding the angle and posterior border of the jaw when the forehead is taken into account (question 8), and shape of the mandible angle in the face oblique view (question 91a–f). The responses for questions 3 to 8 were rated on a 3-item Likert scale,

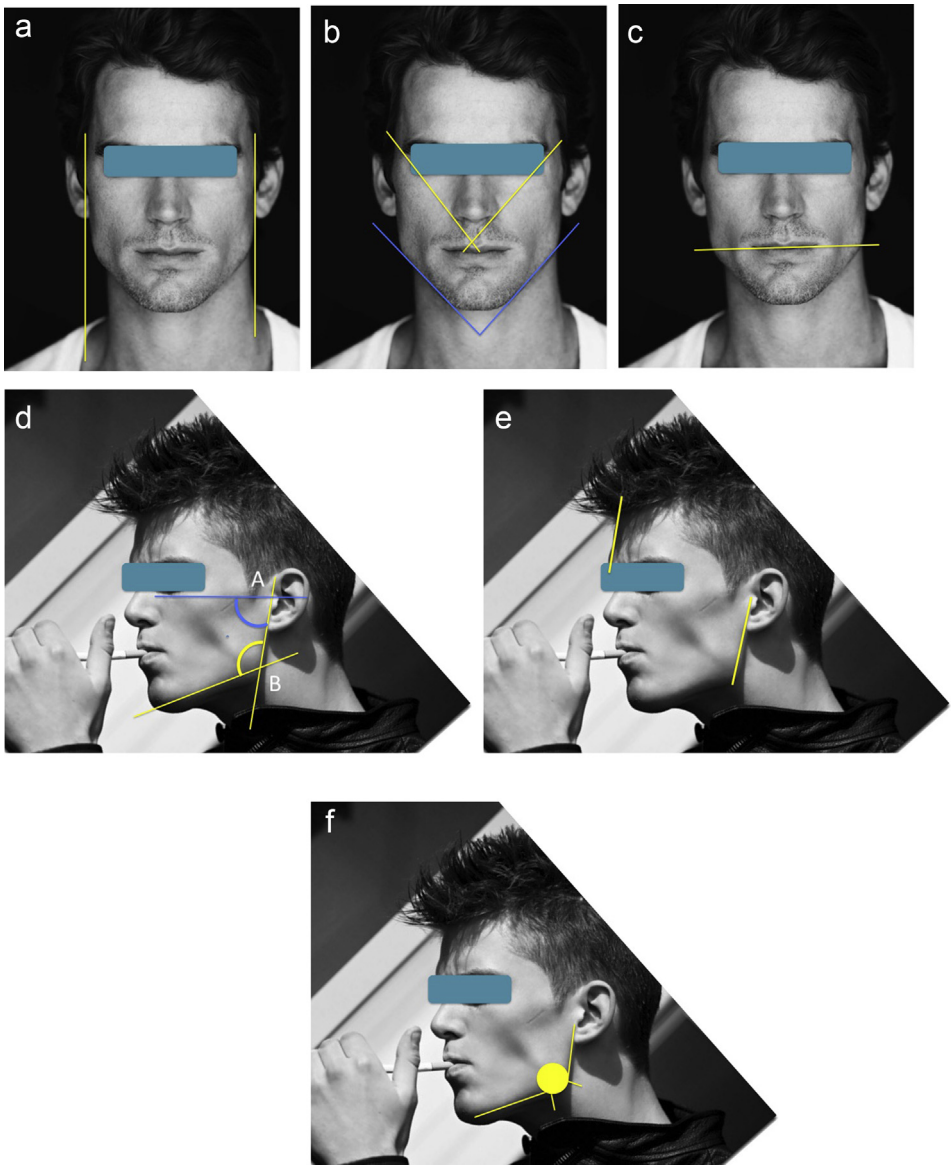

Fig. 1. Constructs used in the study. a. Construct showing the intergonial width vs interzygomatic width. b. Construct showing the angle between the lower mandibular border and a line connecting the lateral canthus with the ipsilateral alare. c. Construct showing the level of bigonial plane in relation to the lips. d. Construct A shows the angle between the posterior border of the mandible and the Frankfort horizontal plane. Construct B shows the gonial angle, between the posterior and lower borders of the mandible. e. Relationship between the slope of the posterior border of the mandible and the slope of the forehead. f. Pointiness of the jaw angle, whether judged using the radius of a circle segment or the distance between the posterior end of the lower straight mandibular border contour and the lower end of the straight posterior border contour.