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Manson's point: A facial landmark to identify the facial artery☆

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Summary *Introduction:* The anatomy of the facial artery, its tortuosity, and branch patterns are well documented. To date, a reliable method of identifying the facial artery, based on surface landmarks, has not been described. The purpose of this study is to characterize the relationship of the facial artery with several facial topographic landmarks, and to identify a location where the facial artery could predictably be identified.
Methods: Following institutional review board approval, 20 hemifacial dissections on 10 cadaveric heads were performed. Distances from the facial artery to the oral commissure, mandibular angle, lateral canthus, and Manson's point were measured. Distances were measured and confirmed clinically using Doppler examination in 20 hemifaces of 10 healthy volunteers.
Results: Manson's point identifies the facial artery with 100% accuracy and precision, within a 3 mm radius in both cadaveric specimens and living human subjects. Cadaveric measurements demonstrated that the facial artery is located 19 mm ± 5.5 from the oral commissure, 31 mm ± 6.8 from the mandibular angle, 92 mm ± 8.0 from the lateral canthus. Doppler examination on healthy volunteers (5 male, 5 female) demonstrated measurements of 18 mm ± 4.0, 50 mm ± 6.4, and 79 mm ± 8.2, respectively.

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Conclusions: The identification of the facial artery is critical for the craniofacial surgeon in order to avoid inadvertent injury, plan for local flaps, and in preparation of a recipient vessel for free tissue microvascular reconstruction. Manson's point can aid the surgeon in consistently indentifying the facial artery.

Introduction

Surface anatomy is typically used to aid identification of deeper structures in all surgical disciplines. Understanding the relevant anatomy is crucial in obtaining predictable and satisfactory results. In craniomaxillofacial surgery, a predictable topographic method of identifying the facial artery based upon regional surface anatomy may prevent inadvertent arterial injury, allow for easier dissection when elevating flaps (free flaps and local flaps), and decrease operative time.[1] Developing a precise and reliable method of identifying the facial artery can impact the practice of all physicians performing procedures on the craniofacial region.

The tortuous, variable course, and the vascular territories of the facial artery are well documented.[2–4] However, a reliable method of identifying the facial artery based on facial surface anatomical structures is lacking. The use of topographic and anatomic landmarks have a long history in facial plastic surgery including the tragal pointer of Conley[5] to identify the facial nerve trunk, Zuker's point[6] to identify the middle division of the facial nerve, and Pitanguy's line[7] to identify the frontal branch of the facial nerve. Although the topographical relationship of the facial artery to the zygomaticus major has been described,[8] no surface anatomical landmarks to reliably identify the facial artery have been reported. Nagase et al., attempted to assess the diameter of the facial artery at the oral commissure using color Doppler ultrasonography, but failed to describe a reliable method of identifying the facial artery based on anatomic landmarks, and in one patient was unable to identify the artery.[9] An anatomical relationship contingent upon surface landmarks to identify the facial artery is especially valuable in the presence of hypotension, when the handheld Doppler is less useful. To our knowledge, no study in the current plastic surgery literature describes the facial artery and its relationship with surface facial landmarks. The purpose of this study is to characterize the relationship of the facial artery with several facial topographic landmarks, and to validate our hypothesis that the facial artery can be reliably and consistently identified in proximity to well known topographical facial landmarks.

Methods

Following institutional review board approval, a total of 20 hemifacial dissections from 10 human cadaveric heads (5 white males and 5 white females) with a mean age of 81.2 years (range: 66—99) were performed at the Maryland State Anatomy Board (Baltimore, MD). Four lines were drawn and measured prior to any hemifacial dissection (Figure 1) to identify Manson's point. Manson's point lies at an intersection point from the lateral canthus to the midpoint of a line from angle to menton and at a height that intersects a line from the base of the lobule to the lateral commissure. This can be simplified by mapping 3 vectors: line A from the mandibular angle to the menton (Figure 1a), line B from the lateral canthus to the mid-point of line A (Figure 1b), and line C from the root of the lobule to the menton (Figure 1c). A 23-gauge needle was inserted at the intersection of lines B and C representing Manson's point (Figure 2).

Cadaveric dissections were performed via a preauricular facelift-type incision, and a supra-superficial musculoaponeurotic system (SMAS) dissection was performed to the lateral canthus and the oral commissure. As the approach neared the 23-gauge needle it was gently withdrawn from deep to superficial skin within the same vector and held in place by an assistant to allow for complete elevation of skin to identify the course of the facial artery. As soon as adequate skin exposure was achieved, the initial needle was removed and replaced with another 23-gauge needle denoting the previously measured Manson's point. Dissection continued from the lower mandibular border to identify the facial artery and its course to the anterior surface. The dissection was carried distally until the superior labial and angular arteries were identified. The zygomaticus major muscle was preserved, as well as orbicularis oris muscle so as not to disrupt its true course.

The shortest distance from Manson's point (needle insertion site) to the facial artery was measured. Measurements were obtained from other specific anatomical landmarks including the lateral canthus, oral commissure, mandibular angle, and the intraoral opening of Stensen's duct to the facial artery, based upon predetermined vectors (Figure 3). To confirm our proposed hypothesis of Manson's point and other topographic measurements were evaluated in 20 hemifaces of 10 healthy volunteers (5 males, and 5 females). Manson's point was evaluated with Doppler examination to confirm accuracy of the landmark for clinical purposes. Univariate statistical analysis was performed on all measurements.

Results

The mean age of cadavers was 81.6 years ± 11.3 (range: 66—99) and living subjects were 35.2 years ± 8.2 (range: