Variant muscle fibers connecting the orbicularis oculi to the orbicularis oris: case report

Norio Kitagawa1,2,*, Joe Iwanaga2,3,4,5,6,*, R.Shane Tubbs3,4,7,8,9, Hongtae Kim10, Yong-Suk Moon10, Mi-Sun Hur10
1Oral Medicine Research Center, Fukuoka Gakuen, Fukuoka, Japan, 2Department of Oral and Maxillofacial Anatomy, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University, Tokyo, Japan, 3Department of Neurosurgery, Tulane Center for Clinical Neurosciences, Tulane University School of Medicine, New Orleans, LA, 4Department of Neurology, Tulane Center for Clinical Neurosciences, Tulane University School of Medicine, New Orleans, LA, USA, 5Dental and Oral Medical Center, Kurume University School of Medicine, Kurume, Fukuoka, Japan, 6Department of Oral and Maxillofacial Anatomy, Kurume University School of Medicine, Kurume, Fukuoka, Japan, 7Department of Anatomical Sciences, St. George’s University, St. George’s, Grenada, West Indies, 8Department of Structural & Cellular Biology, Tulane University School of Medicine, New Orleans, LA, 9Department of Surgery, Tulane University School of Medicine, New Orleans, LA, USA, 10Department of Anatomy, Daegu Catholic University School of Medicine, Daegu, Korea

Abstract: The orbicularis oculi (OOc) is a sphincteric muscle of the eyelids, whereas contraction of the orbicularis oris (OOr), another sphincteric muscle, causes narrowing of the lips. Facial muscle fibers normally blend with adjacent muscles. However, muscle fibers connecting the various facial muscles that have different actions and that are located at distant sites, such as the OOc and the OOr have been rarely reported. Herein, we report a rare case of connecting fibers between the inferior margin of the OOc and the OOr. These connecting fibers were blended with the OOr between the inserting fibers of the levator labii superioris and levator anguli oris. Contraction of such variant muscles might affect typical facial expressions.

Key words: Orbicularis oculi, Orbicularis oris, Connecting fibers, Anatomical variations, Cadaver

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Introduction

Between the inferior margin of the orbicularis oculi (OOc) and orbicularis oris (OOr) muscles, the zygomaticus major (Zmj), zygomaticus minor (Zmi), levator anguli oris (LAO), levator labii superioris (LLS), and levator labii superioris alaeque nasi (LLSAN) muscles are found [1]. In general, the OOr and OOc are considered independent muscles that work separately. However, variations have been reported in this area, e.g., different insertion patterns of Zmi [2, 3] and Zmj [4]. However, to our knowledge, variant muscle fibers connecting the inferior margin of the OOc to the OOr have not been reported. Here, we report such an anatomical variation.

Case Report

During routine dissection of the face, connecting fibers between the inferior margin of the OOc and the OOr were found in a cadaver of a 56-year-old at death male (Fig. 1). The skin just lateral to the nasolabial fold was removed to reveal the connecting fibers and the adjacent facial muscles passing beneath the nasolabial fold. The remaining skin was reflected to observe the course and attachments of the connecting fibers and facial muscles (Fig. 1A). Next, the remaining skin was removed to expose the entire muscles of the face (Fig. 1B). The inferior margin of the OOc was reflected superiorly to observe the course and attachment of the connecting fibers (Fig. 1C).

At the middle of the inferior margin of the OOc, some
extending fibers of the OOc descended perpendicularly and passed beneath the site between the middle and the lower thirds of the nasolabial fold. Adjacent to the connecting fibers, there were several fibers from the OOc attaching along the nasolabial fold. These several fibers that extended from the OOc were attached to the dermis of the middle of the nasolabial fold or the site between the middle and lower thirds of the nasolabial fold. The connecting fibers coursed deep or superficial to these several fibers from the OOc and coursed superficial to the angular vein (Fig. 1A). The connecting fibers blended with the OOr between the inserting fibers of the LLS and LAO. The several fibers (arrows) from the OOc were toward the LLSAN, LLS, and Zmi. The remaining skin was removed to expose the entire muscles in the face. (C) The extending fibers of the OOc that divided the connecting fibers (arrowheads) were attached to the maxilla just above the origin site of the LLS. The inferior margin of the OOc were reflected superiorly to reveal the course and attachment of the connecting fibers. AV, angular vein; LAO, levator anguli oris; LLS, levator labii superioris; LLSAN, levator labii superioris alaeque nasi; OOc, orbicularis oculi; OOr, orbicularis oris; Zmi, zygomaticus minor; Zmj, zygomaticus major.

Discussion

The connecting fibers and their adjacent muscle fibers were attached along the nasolabial fold in the present study. The muscles of facial expression are often interdigitated with adjacent muscles [1, 6-8]. Additionally, peripheral fibers of the OOc overlie and occasionally blend with the muscles arising from the bones of the orbital rim [9].

The facial muscles responsible for producing the nasolabial fold have been discussed by several authors [4, 10-12]. Most authors have reported that the LLSAN inserted into the medial nasolabial fold, the LLS inserted into the middle third of the nasolabial fold, the Zmj inserted into the lateral nasolabial fold. Hur et al. [3] concluded that fibers extending from the OOc to the Zmi assist in deepening and elevating the nasolabial fold. In the present case, the connecting fibers passed deep to the site between the middle and lower thirds of the nasolabial fold, and their adjacent fibers that extended from the OOc were attached to the middle of the nasolabial fold or the site between the middle and lower thirds of the nasolabial fold. Contraction of the connecting fibers and adjacent muscle fibers extending from the OOc might also assist in deepening the nasolabial fold. In addition, the connecting fibers blended with the upper OOr where the LAO inserted at the corner of the mouth. Contraction of the con-
Connecting fibers might raise the corner of the mouth via contraction of the OOc.

The lower half of the orbital portion of the OOc raises the skin of the cheek, causing the wrinkles seen to radiate from the corner of the eye [13]. Thus, the connecting fibers and extending fibers from the OOc to the upper lip might assist in elevating the OOr. The OOc and OOr have different actions and distant sites. The OOc is a sphincteric muscle of the eyelids and plays an important role in facial expression, whereas contraction of the OOr causes narrowing of the mouth [1, 14]. The connecting fibers between the inferior margin of the OOc and OOr seen in the present case might assist in simultaneous movements of the eye and mouth.

Connecting fibers between the inferior margin of the OOc and OOr is a rare anatomical variation. Such a variant muscle of the face could possibly affect facial expression and when found unilaterally, this could result in asymmetry of facial expression.

ORCID
Norio Kitagawa: https://orcid.org/0000-0001-5565-4210
Joe Iwanaga: https://orcid.org/0000-0002-8502-7952
R. Shane Tubbs: https://orcid.org/0000-0003-1317-1047
Hongtae Kim: https://orcid.org/0000-0001-6701-8481
Yong Suk Moon: https://orcid.org/0000-0001-5405-8919
Mi-Sun Hur: https://orcid.org/0000-0002-1482-1657

Author Contributions

Conceptualization: MSH. Data acquisition: MSH. Data analysis or interpretation: NK, JI, RST, HK, YSM, MSH. Drafting of the manuscript: NK, JI, RST, HK, YSM, MSH. Critical revision of the manuscript: NK, JI, RST, HK, YSM, MSH. Approval of the final version of the manuscript: all authors.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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