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Anatomy of lower eyelid and eyelid—cheek junction

Anatomie de la paupière inférieure et de la jonction palpébrojugale

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KEYWORDS
Lower eyelid;
Facial fat compartments;
Aging;
Subcutaneous fat;
Soft tissue fillers;
Eyelid anatomy

Summary
Background. — Understanding the anatomy of the lower eyelid and the lid—cheek junction is important for surgical and non-surgical approaches. It is important to understand the correlation between the clinical presentation and the individual anatomy to direct an adequate treatment.
Methods. — A review of the literature based on the authors experience combined with anatomical dissections was conducted to reveal the current concepts of the surgical and non-surgical anatomy. The various anatomical structures important for the understanding of the symptoms and the proposed treatment are described in this article.
Results. — The anatomy of the lower eyelid and the lid—cheek junction has to be understood as a unit. Structures are continuous from the eyelid to the cheek influencing each other during aging. The concept of superficial, i.e. superficial to the orbicularis oculi muscle and deep facial fat compartments, i.e. deep to the orbicularis oculi muscle has to be applied in order to understand the relevant anatomy regarding the ligaments, fat compartments, muscular and tarsal structures and the vascularization.
Conclusion. — The understanding of the layered arrangement of the lower eyelid and eyelid-cheek junction anatomy enables practitioners to perform safe and effective surgical and non-surgical procedures.

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Résumé
Introduction. — La compréhension de l'anatomie de la paupière inférieure et de la jonction palpébrojugale est importante pour les approches chirurgicales et non chirurgicales. Il est important de faire la corrélation entre la sémiologie, très variable selon l'individu et la structure anatomique pour proposer un traitement adéquat. Nous présentons ici les structures anatomiques présentées dans la littérature ainsi que des travaux originaux de dissection.
Matériel et méthodes. — Une revue de la littérature centrée sur les travaux de dissections anatomiques a été menée afin de révéler les concepts actuels de l'anatomie chirurgicale et non chirurgicale. Les différentes structures anatomiques importantes pour la compréhension des symptômes et le traitement proposé sont décrites dans cet article.
Résultats. — L'anatomie de la paupière inférieure et de la jonction palpébrojugale doit être comprise comme une unité. Les structures sont en continuité entre la joue et la paupière et sont fortement influencées par le vieillissement. Le concept de compartiment superficiel, c'est-à-dire superficiel au muscle orbiculaire-oculi et compartiments profonds, c'est-à-dire profondément au muscle orbiculaire, sera décrit ainsi que l'anatomie pertinente concernant les ligaments, les compartiments graisseux, les structures musculaire et tarsienne ainsi que la vascularisation.
Conclusion. — La connaissance et le respect de l'agencement de l'anatomie du visage en structures anatomiques indépendantes permet aux praticiens d'effectuer des procédures chirurgicales et non chirurgicales sûres et efficaces.

Introduction

Fighting the signs of facial aging using surgical or non-surgical approaches has become a popular and widely accepted method in today's society. As the eyes are the central component of the face and the first aspect when focusing someone's face the appearance of the eyes and their surroundings are the key target of most interventions.

The surrounding structures of the eye influence likewise the appearance, i.e. ''the look'' of the eye and have to thus be treated with greatest care including the forehead, the position of the eyebrows, the wrinkles of the glabellar area and the upper and the lower eyelid.

The lower eyelid however is of great importance as therapeutic options influence the appearance of the upper cheek and the eyelid cheek junction and should thus be considered as a unit when treating this area. Different lower eyelid and tear trough deformities can occur depending on the anatomical disposition of underlying structures from lower eyelid hollowness or dark circle to tear trough depression with or without fat herniation and skin excess (Fig. 1a—e).

As the underlying anatomy cannot be separated between the eyelid and the lid—cheek junction, it will be described in the following as a unit to provide a comprehensive understanding of this delicate anatomical region.

Anatomy of the lower eyelid

The lower eyelid can be separated into an anterior lamella containing the skin and the preseptal and pretarsal parts of the orbicularis oculi muscle and into a posterior lamella containing the tarsus, the orbital septum, the inferior tarsal muscle and the capsulo-palpaebral fascia (Fig. 2).

Skin

The skin of the lower eyelid can be regarded as one of the thinnest in the human body measuring in mean 0.82 ± 0.21 mm [1]. In the lateral lower eyelid portion, a thin layer of subcutaneous fat can be observed, which is absent in the medial part of the lower eye lid, i.e. the tear trough. Here the eyelid skin overlying the orbicularis oculi muscle is almost translucent and some authors attribute the resulting Tyndall-effect as the cause for the blueish appearance of the tear trough, which can also be observed on the lateral nasal wall medially to this area (Figs. 3a, b). The skin overlying the upper cheek (malar fat pad) is thicker than the skin of the lower eyelid and a substantial amount of subcutaneous fate can be identified here. The difference between these two types of skin (eyelid versus upper cheek) accentuates the eyelid—cheek junction deformity. During aging, however, the subcutaneous fat is likewise absent in the lateral part of the lower eyelid which can increase the palpaebromalar groove deformity and lead to the impression of a sunken eye and a skeletonized face.

When inspecting the lower eye-lid and the lid—cheek junction three creases can be observed (Fig. 1a—e). The most superior is the inferior palpaebral crease which is in general covered by the lower lid lashes and is regarded as the location where the inferior margin of the tarsus meets with the retractor muscles. The other two creases are medially the nasojugal crease (also termed fold, sulcus or groove) which is located at the inferior end of the tear through and represents the location of the angular vein. Laterally, a sulcus is visible, representing the end of the orbit and the lower eye lid and the beginning of the zygomatic bone (also termed here malar bone) (Figs. 1a—e). Another term for this visible depression is orbitomalar groove (or hollow), palpaebromalar sulcus (or groove or depression) or simply eyelid—cheek junction. However, the correct anatomical term according to the *nomina anatomica* [2] is *Sulcus infrapalpaebralis* which was interestingly not adopted by the last facial nomenclature consensus paper published in 1993 by George et al. [3].

Orbicularis oculi muscle

The orbicularis oculi is a thin muscle consisting of concentrically arranged muscles fibres encircling the orbit and can