

FACIAL ANATOMY

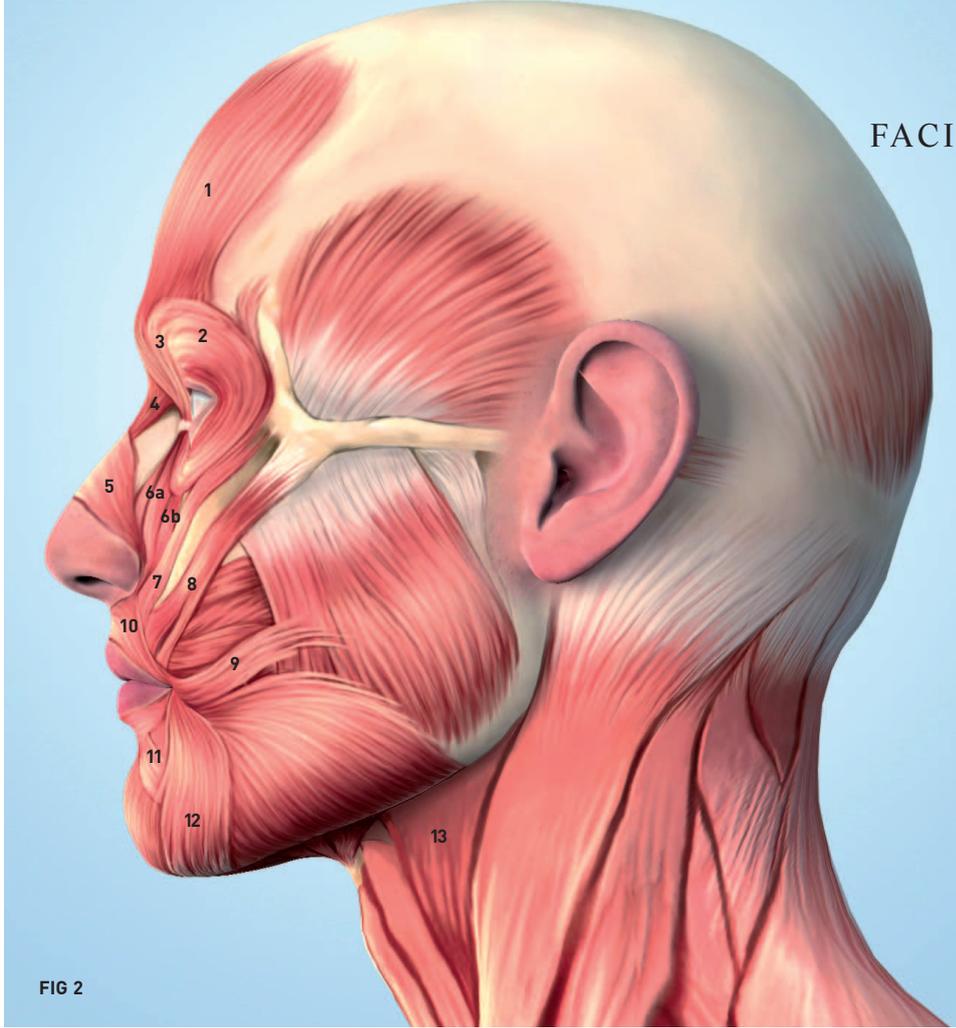


FIG 2

FIG 2: MUSCULAR SYSTEM OF THE HEAD

- 1 FRONTALIS
- 2 ORBICULARIS OCULI
- 3 DEPRESSOR SUPERCILII
- 4 PROCERUS
- 5 NASALIS
- 6A LEVATOR LABII SUPERIORIS ALAEQUE NASI
- 6B LEVATOR LABII SUPERIORIS
- 7 ZYGOMATICUS MINOR
- 8 ZYGOMATICUS MAJOR
- 9 RISORIIUS
- 10 ORBICULARIS ORIS
- 11 DEPRESSOR LABII INFERIORIS
- 12 DEPRESSOR ANGULI ORIS
- 13 PLATYSMA

BACK TO BASICS

DR CHARLES FERBER ON FACIAL ANATOMY

When we look at a person's face we see many features but what we really see is the skin. I would like to take you beneath the skin and explore in-depth the muscles of facial expressions.

It is essential for clinicians to be familiar with underlying facial muscle anatomy in order to obtain optimal results and avoid unnecessary complications. Thus, an anatomic approach to the ageing face is essential and will allow the

clinician to rationally select the optimal therapeutic tool from a variety of therapeutic options.

In 1897 Mark Twain said: "wrinkles should merely indicate where smiles have been". To appreciate facial symmetry and balance, it is helpful to divide the face horizontally into thirds; upper, middle and lower third. The upper third ranges from the trichion to the glabella, the middle third from the glabella to the subnasale and the lower third from the subnasale to the menton (Fig 1).

Facial muscle anatomy is complex and requires a thorough understanding of both agonist and antagonist muscles, whose relationship to one another must be appreciated prior to any treatment (Fig 2 and 3). Dr Bob Khanna explains, in his seminars and lectures on facial aesthetics, that we can view muscle actions as a 'tug of war' between elevator and depressor muscles (agonist and antagonist).

ANATOMY THE UPPER THIRD

The influence of the eyebrows is crucial in establishing appearance, mood and facial expression. The eyebrows provide a foundation of support for the eyelids and represent an area



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qualified in 1976 at the Royal London Hospital Dental College and has been in private practice in Wimpole Street for more than 25 years. He has maintained a special interest in aesthetic and restorative dentistry and in 1999 was the co-author of a published article on reconstruction of severe cases with implant restorations in The International Journal of Periodontics and Restorative Dentistry. He is a founder member of the Society of Dental Studies and a member of the Alpha Omega Study Club, the Association of Dental Implantology and the International Academy of Advanced Facial Aesthetics (IAAFA)

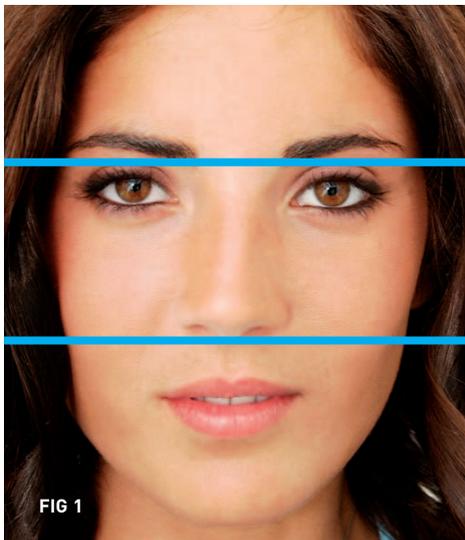


FIG 1

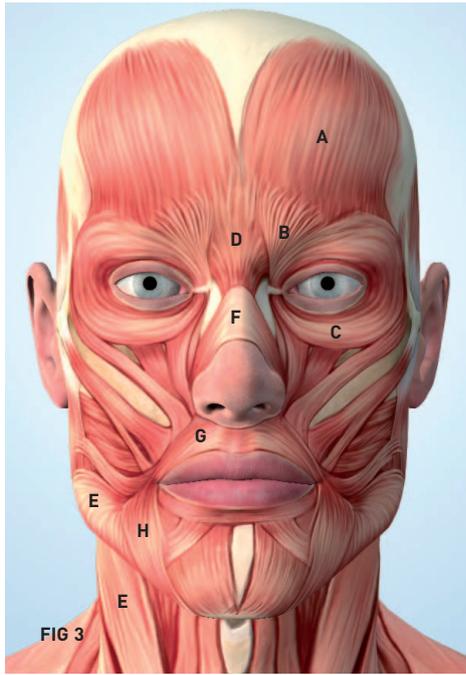


FIG 3: THE PRIMARY MUSCLES OF FACIAL EXPRESSION
A FRONTALIS
B CORRUGATOR AND DEPRESSOR SUPERCILLI
C ORBICULARIS OCULI
D PROCERUS
E PLATYSMA
F NASALIS
G ORBICULARIS ORIS
H DEPRESSOR ANGULI ORIS

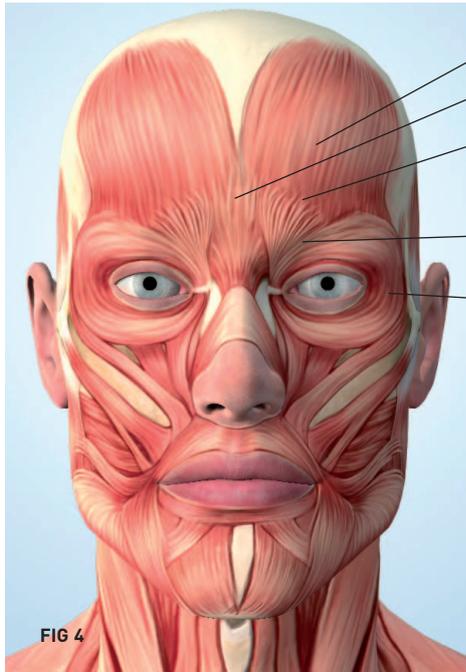


FIG 4: RELEVANT MUSCULATURE OF THE UPPER FACE

in which the frontalis and orbicularis muscles interdigitate.

The frontalis muscle is the sole elevator of the eyebrow. There are four eyebrow depressor muscles: procerus, corrugator supercillii, depressor supercillii, and orbiculari oculi (Fig 4).

THE FRONTALIS MUSCLE

The contraction of this muscle group is responsible for the elevation of the brow, which may induce horizontal or transverse wrinkles across the forehead. It is worth noting that there are two variations found; one being the frontalis

having two distinct and separate bellies, and the other, possibly more predominant, of a single, broad expanse of muscle.

This results in two functional muscle patterns seen clinically; the more common reveals single transverse forehead lines and the less common shows two broad bands of frontalis muscle with a central separation.

Entire Frontalis – contraction draws the eyebrows and skin of the forehead upwards and forms horizontal wrinkles running across the forehead

Inner Part (Medial) only – contraction raises the medial part of the brow and eyebrows, forming slanted wrinkles in the forehead and creating a slant up towards the centre in the eyebrows

Outer Part (Lateral) only – contraction raises the lateral (outer) part of the eyebrow forming wrinkles in the lateral part of the forehead and an arched shape to the eyebrows

PRACTICAL APPLICATION FOR ADMINISTRATION OF BOTULINUM TOXIN TYPE A

Inactivation of the entire frontalis muscle will result in significant brow ptosis due to the unopposed action of the brow depressors (procerus, corrugator, supercillii and orbiculari oculi). For this reason, it is important to discuss the agonist/antagonist relationship between the two muscle groups with patients who are interested in having their transverse brow lines treated, but who do not desire treatment of their brow depressors.

Optimal results, with respect to brow height and contour, are usually obtained with either low dose treatment of the frontalis muscle or co-administration of botulinum toxin to both the frontalis muscle and brow depressors in order to equally weaken both muscle groups.

The temporalis muscle originates in the scalp above the temporal region and inserts into the upper part of the jaw. It acts to elevate the jaw and clench the teeth. This must be avoided when injecting the frontalis muscle.

THE BROW DEPRESSORS

CORRUGATOR SUPERCILLII MUSCLE

Contraction of this muscle slightly depresses the eyebrow, moving it downwards and medially. Repetitive contractions produce the vertical or oblique glabellar creases/lines (frown lines).

On dissection, there are two distinct muscle patterns. The first pattern shows a short, narrow pyramidal muscle located at the medial end of the supraorbital ridge. The second pattern has a long, narrow straight muscle extending along the

supraorbital ridge, to or beyond the mid-brow position. Clinically this may produce varying wrinkles and even dimples. Hence, proper injection sites will vary accordingly (Fig 5a-b)

DEPRESSOR SUPERCILII MUSCLE

Along with the corrugator muscle, the depressor supercillii muscle is responsible for the vertical glabellar furrows or frown lines. It can be considered as a single functional entity. It should be noted that both the supra-trochlear, as well as the supra-orbital neurovascular bundles emanate from the superomedial aspect of the orbit to provide sensation and a blood supply to the forehead and brow area. For this reason, it is important to palpate the supra-orbital rim prior to treatment with botulinum toxin injection to appreciate the location of the supra-orbital notch and thereby avoid injecting directly into the supra-orbital bundle, which may injure the associated artery and nerves, resulting in pain and bruising.

PROCERUS

Contraction of this muscle draws the medial aspect of the eyebrows down producing transverse (horizontal) wrinkles over the nasal bridge (Fig 6).

ORBICULARIS OCULI

This muscle is a ring-like striated muscle sheet that lies just below the skin. It is divided into pre-orbital, preseptal and pretarsal portions based on both function and anatomy.

Contraction of the lateral portions of the preseptal and pre-orbital muscles causes the formation of the crows feet or smile lines. These lines can be inactivated by injecting botulinum toxin into the pre-orbital orbicularis oculi muscle in the area just lateral to the orbital rim. Care should be taken to avoid injecting within the orbital rim as this may cause diffusion of the toxin behind the septum, which may induce an ectropian of the lower eyelid or upper eyelid ptosis.

MID-FACE ANATOMY (MIDDLE 1/3)

The muscular structure of the mid-face is complex and variable. The actions of individual muscles are never in isolation as each muscle has an agonist/antagonist relationship with surrounding muscles (Fig 7).

NASALIS MUSCLE

The nasalis muscle expands over the bridge of the nose and joins the procerus muscle. Contraction of the nasalis creates ridges of the nasal bridge that have been referred to as 'bunny-lines'.

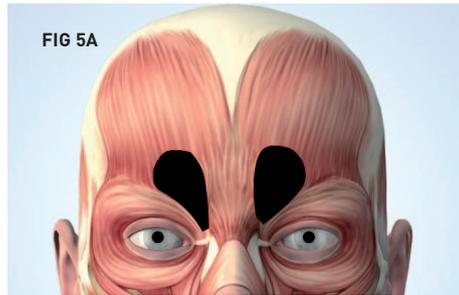


FIG 5A: SHORT, SQUARE CORRUGATOR PATTERN



FIG 5B: BROAD, FLAT CORRUGATOR PATTERN



FIG 6: THE PROCERUS

ZYGOMATICUS MAJOR AND MINOR

Contraction of this muscle complex draws the angle of the mouth backward and upward, as in laughing.

LEVATOR LABII SUPERIOUS

This muscle interdigitates with the medial orbicularis oris and elevates the upper lip. Contraction also contributes to the mid-portion of the nasolabial fold. The other muscles such as anguli oris and depressor septi contribute to various facial expressions.

BUCCINATOR MUSCLE

The buccinator muscle acts to compress the cheeks tight to the teeth and tighten and pull the lip corners inwards and laterally, often dimpling the cheeks. Its functions include keeping food in the

FACIAL ANATOMY

mouth where it can be masticated by the teeth. Because of its importance in expelling air through pursed lips, blow-pipes or wind instruments, it has been called the 'trumpet muscle'.

LOWER THIRD AND NECK (FIG 8A-B)

ORBICULARIS ORIS

The orbicularis oris consists of numerous layers of muscle fibres surrounding the opening of the mouth that are orientated in many different directions. The orbicularis oris in its ordinary action affects the direct closure of the lips, but assisted by deep and oblique fibres, it closely applies the lips to the alveolar arch. This is very important in keeping the lips in the proper position during mastication and pronunciation of words.

The superficial portion of the fibres brings the lips together and also protrudes them forward in a 'kissing' action. This pursing action of the superficial muscle fibres is what contributes to the formation of perioral rhytids or 'smokers lines'. Hence, it is important that only small doses of botulinum toxin are administered to these superficial fibres in order to avoid problems with mastication and pronunciation the may occur if deeper fibres are inactivated.

DEPRESSOR ANGULI ORIS

Contraction of this muscle occurs with frowning and turns down the corner of the mouth. Over time this results in melomental folds or 'marionette lines' which may be treated with dermal fillers or softened by injecting botulinum toxin directly into the muscle at one location.

DEPRESSOR LABII INFERIORIS

The depressor labii inferioris is the main depressor of the central lip. It must be avoided during botulinum toxin injections as inadvertent treatment of this muscle causes a distorted smile, with a high position of the lower lip and difficulty with food trapping.

MENTALIS

Mentalis is a depressor of the central chin. Contraction also creates a unique 'pebbly' texture to the overlying skin. It becomes more apparent with the subcutaneous atrophy of ageing. A relatively small dose of botulinum toxin in the chin provides effective smoothing.

PLATYSMA

Platysma is a broad, flat band of muscle with complex actions and considerable natural variations. With ageing, the cervical neck skin loses its elasticity and the anterior portion of the

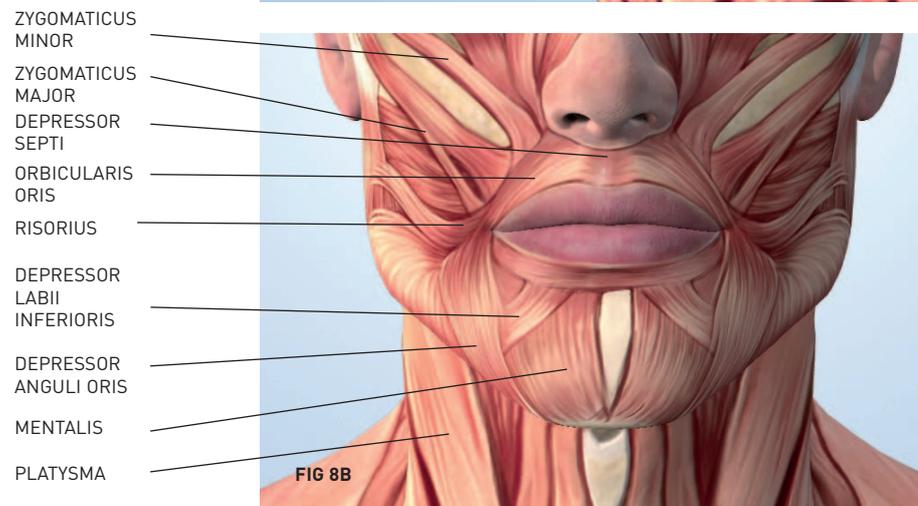
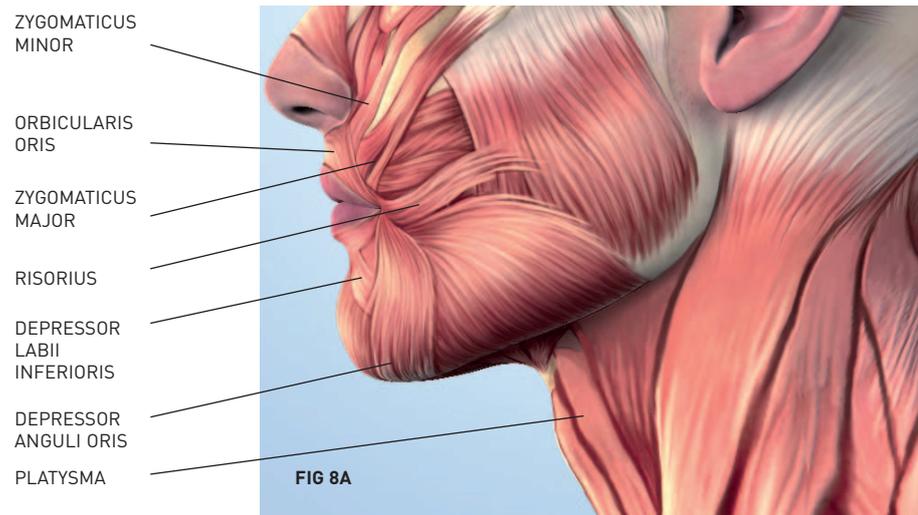
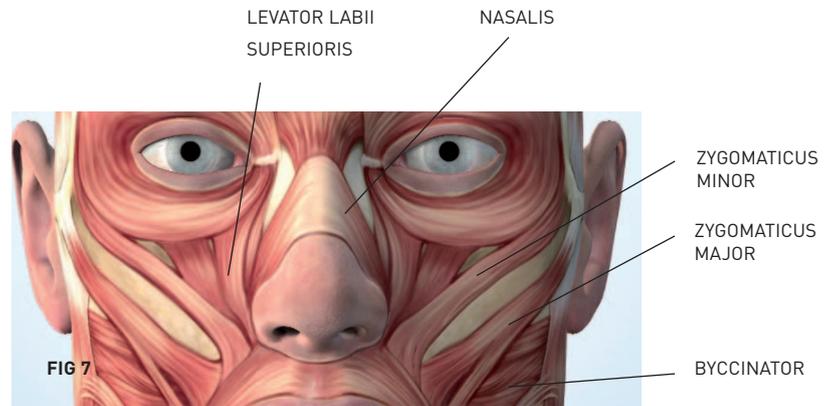


FIG 8A AND 8B:
MUSCLE STRUCTURE
OF THE LOWER FACE
AND NECK

platysmal muscle separates to form two diverging vertical bands.

When the neck is animated, these bands contract and become more visible. The most dramatic neck ageing can lead to what has been described as 'turkey neck'. Botulinum toxin may be directly injected into these bands to reduce their appearance by weakening the force of contraction.

By approaching a patient seeking facial cosmetic improvement of the signs of ageing from an anatomical standpoint, we can provide the best possible treatment and have higher levels of patient satisfaction. [AM](#)