Facial Ageing, Anatomy and EMFACE: An Evidence-Based Educational Overview

1. Overview

Noticing heavier upper lids, flatter cheeks or a softer jawline is very common. For most people, these features reflect normal facial ageing or natural variation in anatomy rather than anything "wrong" with their skin or lifestyle.

This document is designed for people who are starting to notice changes around three key areas:

• Eye area – feeling more tired or heavy through the upper lids and brows.

• Cheeks / midface – less lift or definition, more heaviness toward the mouth.

• Under-chin / submentum – fullness under the jawline.

The aims are to:
• Normalise these changes as part of facial ageing and anatomy.
• Explain how the skin and muscle layers contribute to these changes.
• Introduce EMFACE as one non-invasive option that may be considered for suitable patients, not as a "fix all" or replacement for other treatments.

Key Messages

• Facial ageing is a multi-layer process involving skin, fat, ligaments, muscle and bone – not just wrinkles on the surface.

• Changes around the eyes, midface and under-chin are expected patterns of ageing and are heavily influenced by genetics and lifestyle.

• Both skin quality (collagen, elastin) and muscle tone (especially elevator muscles) shape how "tired" or "lifted" the face appears at rest.

• EMFACE combines radiofrequency (RF) and high-intensity facial electrical stimulation (HIFES) to target skin and key facial muscles simultaneously.

• High-quality anatomical reviews and systematic reviews of RF support the concepts of three-dimensional facial ageing and RF-induced neocollagenesis and skin tightening.

• EMFACE-specific evidence currently consists of prospective clinical studies and imaging/histology work, but no meta-analyses; results are generally modest and best framed as supportive, not transformative.

• EMFACE can be considered from early adulthood onwards in selected individuals, particularly as part of a broader, layered treatment plan rather than a stand-alone solution.

2. Facial Anatomy and How It Ages

Modern anatomical work shows that the face ages as a three-dimensional structure, with changes occurring in skin, fat, ligaments, muscle and bone rather than just the surface layer (Cotofana et al., 2016; Rohrich & Pessa, 2007; Shaw et al., 2011).

Key structural layers include:

• Skin – epidermis and dermis containing collagen, elastin and ground substance.

• Subcutaneous fat – organised into superficial and deep fat compartments.

• SMAS and facial muscles – the fascial layer and muscles of facial expression.

• Retaining ligaments – fascial condensations that tether soft tissue to the skeleton (Rohrich et al., 2008).

• Bone – the facial skeleton (orbits, maxilla, mandible, zygoma and nasal structures).

Ageing changes in these layers have been described in histologic, radiologic and anatomical studies (Cotofana et al., 2016; Fisher et al., 2002; Mendelson & Wong, 2012; Shaw et al., 2011; Shin et al., 2019).

Major age-related mechanisms include:

• Dermal remodelling – reduced collagen I and III, elastin fragmentation and accumulation of damaged matrix lead to reduced firmness, fine wrinkling and laxity (Fisher et al., 2002; Shin et al., 2019).

• Fat pad descent and remodelling – discrete fat compartments lose volume or shift relative to one another, contributing to hollows in some areas and apparent heaviness in others (Rohrich & Pessa, 2007; Rohrich et al., 2008).

• Ligament and septal laxity – retaining ligaments such as the orbitomalar and zygomatic ligaments may lengthen, allowing soft tissue to descend (Cotofana et al., 2016; Rohrich et al., 2008).

• Muscle balance changes – over time, the dynamic balance between elevator muscles (e.g., frontalis, zygomaticus) and depressor muscles (e.g., orbicularis oculi, depressor anguli oris) can shift, affecting resting facial expression (Freytag et al., 2022).

• Skeletal remodelling – CT-based analyses show age-related resorption of the maxilla, orbit and mandible, reducing structural support for overlying soft tissue (Mendelson & Wong, 2012; Shaw et al., 2011; Wong, 2015).

3. Eye Area – Tired Upper Lids and Heavier Brows

Common concerns in the upper face include a feeling of heavier or more hooded upper eyelids, subtle brow descent, more visible under-eye hollows or bags, and fine lines at the outer corners. Longitudinal photographic studies confirm that these are typical features of periorbital ageing (Lambros, 2007; Ko et al., 2017).

Key contributors include:

• Skin: The thin lateral periocular skin shows early fine wrinkling and photodamage, with reduced dermal collagen and elastin (Fisher et al., 2002; Rabe et al., 2006).

• Fat: Lower eyelid fat compartments can pseudo-herniate, creating "bags", while relative deflation of adjacent midface compartments enhances the tear trough (Lambros, 2007; Cotofana et al., 2016).

• Ligaments: The orbitomalar ligament and related septa become more apparent as soft tissue above and below them moves at different rates, deepening the lid–cheek junction (Cotofana et al., 2016).

• Muscles: Reduced tonic activity of the frontalis (a principal elevator) relative to brow depressors can contribute to a lower resting brow position, particularly laterally (Freytag et al., 2022).

Genetic factors strongly influence baseline upper-lid and brow anatomy, so some individuals display these features early in life, while others show minimal change until later decades.

4. Cheeks and Midface – Less Lift, More Heaviness Toward the Mouth

Patients commonly describe the midface as looking flatter or "deflated", with more pronounced folds from the nose to the mouth and a general sense that tissue is sliding downward and inward. Three-dimensional studies and cadaver dissections have clarified the role of discrete fat pads and ligaments in these changes (Rohrich & Pessa, 2007; Cotofana et al., 2016; Stuzin, 2019).

Key processes include:

• Descent of the malar and medial cheek fat pads, influenced by gravity, ligament elasticity and changes in deep fat volume (Rohrich & Pessa, 2007; Cotofana et al., 2016).

• Apparent deepening of the nasolabial fold, largely because the tissue superior to the fold thickens and descends, rather than the crease itself simply deepening (Rohrich & Pessa, 2007).

• Dynamic activity of muscles such as zygomaticus major/minor and levator labii superioris continuing over less elastic skin, contributing over time to perioral lines.

• Subtle retrusion of the maxilla and periorbital skeleton, which reduces anterior projection of the midface and accentuates folds (Shaw et al., 2011; Mendelson & Wong, 2012; Wong, 2015).

5. Under-Chin / Submental Area – Softness and Loss of Jawline Definition

Fullness or laxity under the chin is another frequent concern, especially in profile photographs or during video calls. Submental changes are often a combination of age-related processes and inherent skeletal anatomy (Mendelson & Wong, 2012; Wong, 2015).

Key contributors include:

• Submental fat: Both superficial and deep fat compartments may hypertrophy or appear more prominent as surrounding structures change.

• Skin laxity: Reduced collagen and elastin reduce the ability of the skin to conform closely to the mandibular border (Fisher et al., 2002; Shin et al., 2019).

• Platysma changes: Separation and banding of the platysma can blunt the cervicomental angle and make the jaw–neck transition less distinct.

• Skeletal factors: A relatively short mandible, retruded chin or dental–occlusal considerations can make even small volumes of submental soft tissue more obvious (Shaw et al., 2011; Mendelson & Wong, 2012; Wong, 2015).

6. Why Both Skin and Muscle Matter

In all three regions, what we see on the surface is the visible result of two major support systems:

• The skin and connective-tissue matrix (collagen, elastin, ground substance).

• The facial elevator muscles and SMAS layer (e.g., frontalis, zygomaticus muscles).

If the dermal matrix is compromised but muscle tone is preserved, the face may still appear lax and less defined. Conversely, good skin quality with diminished elevator muscle function can contribute to a tired or heavy appearance at rest. This dual-layer perspective underpins technologies that address both skin and muscle, such as EMFACE (Cotofana et al., 2016; Freytag et al., 2022).

7. EMFACE: Mechanism of Action and Evidence Base

EMFACE is a non-invasive device combining synchronous radiofrequency (RF) with high-intensity facial electrical stimulation (HIFES).

Two core technologies act together:

• Radiofrequency (RF): Heats the dermis to a controlled temperature range that stimulates neocollagenesis and neoelastogenesis, similar to other RF skin-tightening platforms (Austin et al., 2022; Vassão et al., 2022; Fawzy, 2023).

• HIFES: Delivers focused high-intensity electrical stimulation to targeted facial muscles, producing supramaximal contractions that act as a form of "workout" for elevator muscles such as the frontalis and zygomaticus (Kinney et al., 2023; Cohen et al., 2025).

Systematic reviews and meta-analyses of RF-based facial rejuvenation demonstrate that RF can safely improve skin laxity, elasticity and global aesthetic scores in appropriately selected patients, with histologic evidence of dermal remodelling (Austin et al., 2022; Vassão et al., 2022; el-Domyati et al., 2011). These reviews are not specific to EMFACE but support the underlying RF mechanism.

EMFACE-specific evidence currently consists of device-sponsored but peer-reviewed clinical and preclinical studies. Key findings include:

• Prospective clinical series showing statistically significant reductions in facial wrinkle scores and improvements in periorbital rhytids after four EMFACE sessions (Goldberg et al., 2024; Halaas et al., 2025).

• A randomized or controlled upper-face study demonstrating reduced frontal and lateral canthal rhytids and measurable eyebrow elevation with synchronized RF and HIFES (Frank et al., 2025).

• Volumetric imaging studies showing increased volume in the zygomatic (midface) region with relative reduction along the mandibular border, consistent with an "upward and outward" shift (Cohen et al., 2025; Frank et al., 2025; DiBernardo et al., 2025).

• A prospective Asian cohort study reporting improvement in skin laxity and quality with good safety profile in Fitzpatrick III–IV skin (Manuskiatti et al., 2025).

• Preclinical histologic work in animal models demonstrating increased dermal collagen and elastin, as well as increased muscle fibre size and myonuclei count after synchronized RF and HIFES protocols (Kinney et al., 2023; Kent et al., 2024).

Across these studies, adverse events have largely been limited to transient erythema or warmth, with no serious device-related complications reported. Long-term durability beyond 12 months and independent, non–industry-sponsored trials remain areas for further research (Austin et al., 2022; Cohen et al., 2025).

8. How EMFACE Relates to the Three Concern Areas

8.1 Eye Area, Brow and Upper Lids

By stimulating the frontalis muscle and heating the overlying forehead and periorbital skin, EMFACE aims to improve resting elevator function and dermal support. Clinical imaging studies report modest average improvements in eyebrow elevation, periorbital wrinkle scores and upper face lift after a standard series of sessions (Frank et al., 2025; Goldberg et al., 2024; Halaas et al., 2025). These effects are not equivalent to surgical blepharoplasty or brow lift and should be described as subtle, non-surgical enhancement.

8.2 Cheeks and Midface

Cheek applicators target zygomaticus and related elevator muscles while delivering RF into the midface dermis. Emerging data suggest increases in zygomatic volume and improvements in perceived midface lift, with reductions in the apparent depth of nasolabial folds in some cohorts (Cohen et al., 2025; Frank et al., 2025; DiBernardo et al., 2025). These outcomes are consistent with improved soft-tissue support rather than addition of volume, and they do not replace the role of fillers or surgery where true volumetric or structural changes are required.

8.3 Under-Chin / Submental Region

Where a submental applicator is available, EMFACE is intended to improve the appearance of mild laxity and soft-tissue descent under the jawline by combining RF-induced dermal tightening with HIFES-mediated muscle stimulation in the lower face and upper neck (DiBernardo et al., 2025; Manuskiatti et al., 2025).

Current evidence suggests that EMFACE is best suited to mild to moderate soft-tissue laxity or contour change. Significant submental fullness dominated by deeper fat volume, marked skin redundancy or pronounced platysma banding is still more appropriately addressed with options such as injectable lipolysis, liposuction or neck lift procedures, guided by individual assessment (Austin et al., 2022; Mendelson & Wong, 2012).

9. From What Age Can EMFACE Help, and What About Non–Age-Related Anatomy?

EMFACE is not limited to a specific chronological age. Its mechanisms—supporting collagen–elastin in the dermis and conditioning elevator muscles—are relevant wherever reduced tissue support or muscle tone contributes to appearance changes. Examples include:

• 20s–30s ("prejuvenation"): In individuals with a genetic tendency to low lateral brows, flatter midface projection or early dermal change from UV exposure, EMFACE may be used as part of a preventive or maintenance strategy alongside skincare and sun protection (Fisher et al., 2002; Shin et al., 2019).

• 30s–40s: As early midface descent, slight brow heaviness and mild submental softening become apparent, EMFACE may offer subtle lifting and support without downtime, for patients who either do not yet need or do not wish to consider surgery (Cotofana et al., 2016; Austin et al., 2022).

• 40s–60s: In the context of mild to moderate laxity and muscle tone reduction, EMFACE can be one component of a broader plan that may also include injectables, lasers or, in some cases, surgical options.

In addition to chronological ageing, EMFACE may be considered where facial anatomy alone contributes to concerns, for example:

• Congenitally low brow position with relatively weak frontalis tone.

• Naturally flatter midface projection where stronger elevator muscle tone could enhance cheek contour.

• Mandibular shape or projection that accentuates submental convexity despite normal body weight (Mendelson & Wong, 2012; Shaw et al., 2011).

In all cases, the decision to use EMFACE should follow a full assessment of skin quality, fat distribution, muscle function and skeletal proportions, rather than age alone.

10. How EMFACE Fits Into a Broader Treatment Plan

Evidence to date supports EMFACE as a non-invasive technology that favourably influences both the dermal matrix and facial elevator muscles. It should be presented as one component of a holistic strategy rather than a stand-alone cure for all signs of ageing.

A balanced treatment plan may include:

• Daily photoprotection and medical-grade skincare.

• Lifestyle strategies that support skin health (sleep, nutrition, smoking cessation).

• Energy-based treatments for specific concerns such as pigment or textural change (e.g., lasers, IPL, RF).

• Injectable neuromodulators, fillers or biostimulators where structure or volume require direct support.

• Surgical options when structural repositioning or skin excision is clearly indicated.

Within this context, EMFACE can be framed as a way to optimise background skin quality and elevator muscle tone, particularly for individuals seeking non-surgical options with minimal downtime. The current evidence base is encouraging but still evolving; setting realistic expectations about subtle, cumulative improvements is critical (Austin et al., 2022; Cohen et al., 2025; Vassão et al., 2022).

Clinician One-Pager: Ethical Communication About EMFACE

This section provides clinicians with an AHPRA-aligned, ethically conservative communication framework for discussing EMFACE. It focuses on evidence-based indications, appropriate patient selection, treatment limitations, safety considerations and compliant language.

1. Ethical Principles (Aligned with AHPRA/TGA Expectations)

• Avoid exaggeration, absolute claims, or language implying guaranteed results.

• Do not frame EMFACE as reversing ageing, replacing surgery, or providing permanent results.

• Use non-promotional, informational language focusing on mechanisms, eligibility and limitations.

• Do not use before/after images in a way that suggests universal outcomes or minimises risks.

• Avoid emotive or appearance-shaming statements (e.g., 'fixing', 'correcting flaws').

• Ensure all explanations emphasise variability of results and the need for personalised assessment.

2. Indications (Evidence-Supported)

Current peer-reviewed studies support EMFACE for:

• Mild–moderate facial skin laxity.

• Reduced tone of elevator muscles (frontalis, zygomaticus) contributing to a 'tired' or 'heavy' appearance.

• Early signs of midface descent without significant volume loss.

• Periorbital fine lines and early brow descent (non-surgical enhancement only).

• Patients seeking non-invasive, no-downtime treatments to support dermal and muscular function.

• Prejuvenation in younger adults with genetically low brow position, flatter midface contours or early dermal changes.

3. Limitations (What EMFACE Cannot Do)

Clinicians should clearly explain that EMFACE is NOT suitable for:

• Significant skin redundancy requiring surgical lifting.

• Pronounced submental fat volume requiring liposuction or injectable lipolysis.

• Marked midface volume loss that typically benefits from fillers or fat grafting.

• Pronounced eyelid hooding or dermatochalasis requiring blepharoplasty.

• Deep static wrinkles caused by structural volume loss.

• Muscle hyperactivity conditions that respond better to neuromodulators.

• Patients expecting large, dramatic or surgical-level changes.

4. Red Flags for Referral or Alternative Management

Clinical red flags that warrant further assessment or alternative treatments include:

• Suspicion of underlying pathology (thyroid orbitopathy, facial nerve weakness, trauma).

• Asymmetry with sudden onset or progressive neurological signs.

• Large, discrete submental fat deposits not responsive to lifestyle factors.

• Severe photodamage or elastosis requiring laser resurfacing rather than RF alone.

• Unrealistic expectations or belief that non-surgical devices can replace surgery.

• Body dysmorphic symptoms, distress disproportionate to clinical findings (consider psychologist review).

5. Compliant Language Examples

Recommended phrases (aligned with AHPRA expectations):

• "EMFACE may help improve muscle tone and support the overlying skin in selected patients."

• "Results vary between individuals and tend to be subtle and progressive over several sessions."

• "This is not a replacement for surgical lifting or treatments designed to remove fat."

• "We will assess your anatomy to determine whether this modality is appropriate or whether another treatment would give more meaningful benefit."

• "This technology supports dermal and muscular function; it does not add volume or remove tissue."

Avoid:

• "Fixes sagging"

• "Reverses ageing"

• "Non-surgical facelift" (high-risk AHPRA language)

6. Discussion Framework for Consultations

Use this structured flow to maintain compliance and support informed decision-making:

1. Identify the patient's concern in their own words.

2. Provide normalising education about facial ageing and anatomy.

3. Explain EMFACE mechanisms factually, without promotional tone.

4. Discuss expected outcomes (subtle, cumulative, variable).

5. Outline alternative or adjunctive options (e.g., skincare, neuromodulators, fillers, lasers, surgery).

6. Confirm understanding and allow sufficient time for questions.

7. Document the discussion thoroughly, including limitations described.

7. Safety & Contraindications

Contraindications include (based on device IFU and common RF/HIFES precautions):

• Active implants (pacemakers, defibrillators, neurostimulators).

• Pregnancy or breastfeeding (precautionary).

• Active infection, open wounds or inflammatory skin disease in the treatment area.

• Metal implants in the treatment region.

• Seizure disorders (relative contraindication for electrical stimulation).

Safety considerations:

• Ensure patients are clinically stable and have realistic expectations.

• Provide written information about possible transient effects (erythema, warmth, temporary tightness).

• Monitor for rare adverse effects and document any unexpected responses.

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