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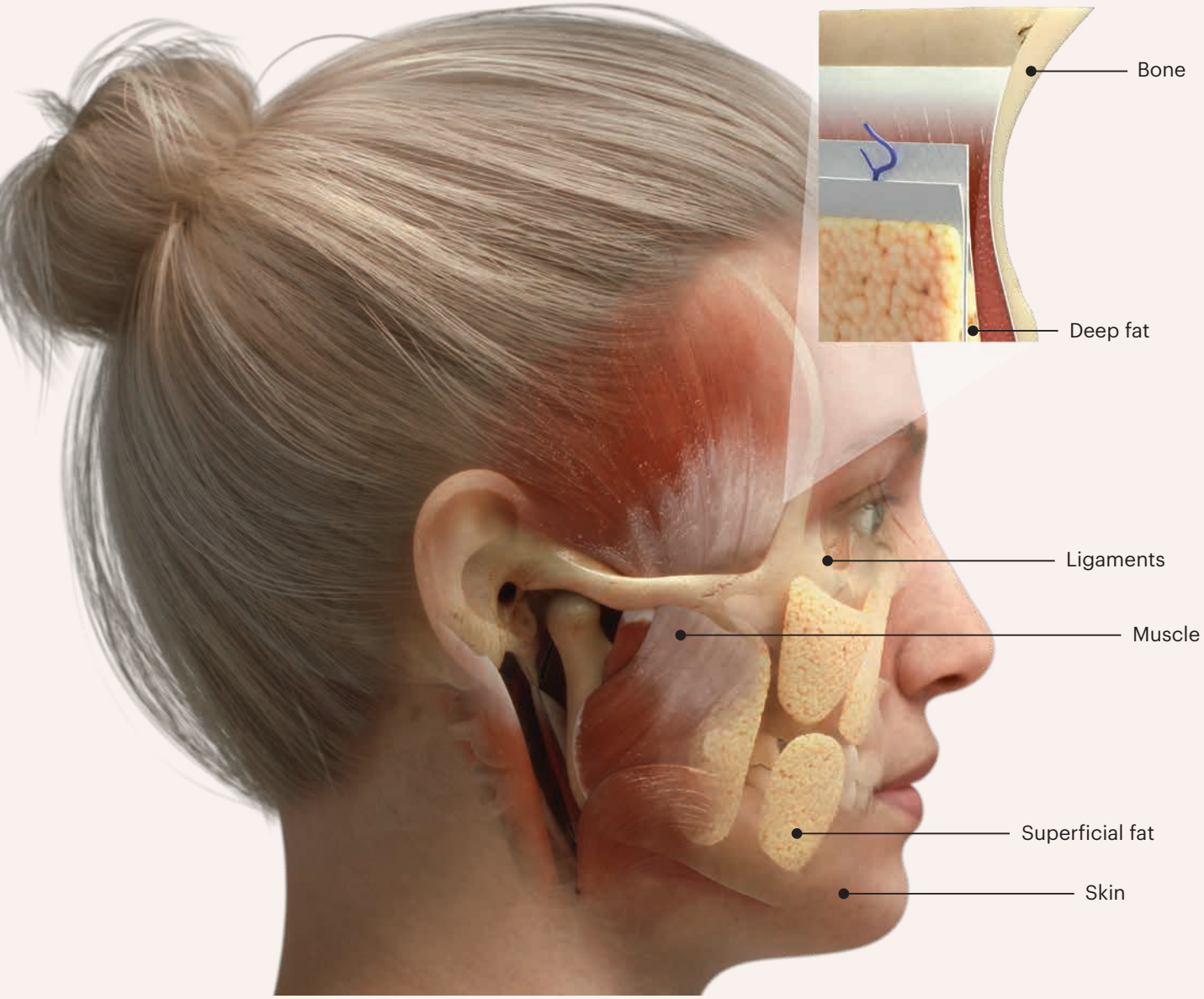
Anatomical Aging and Aesthetics

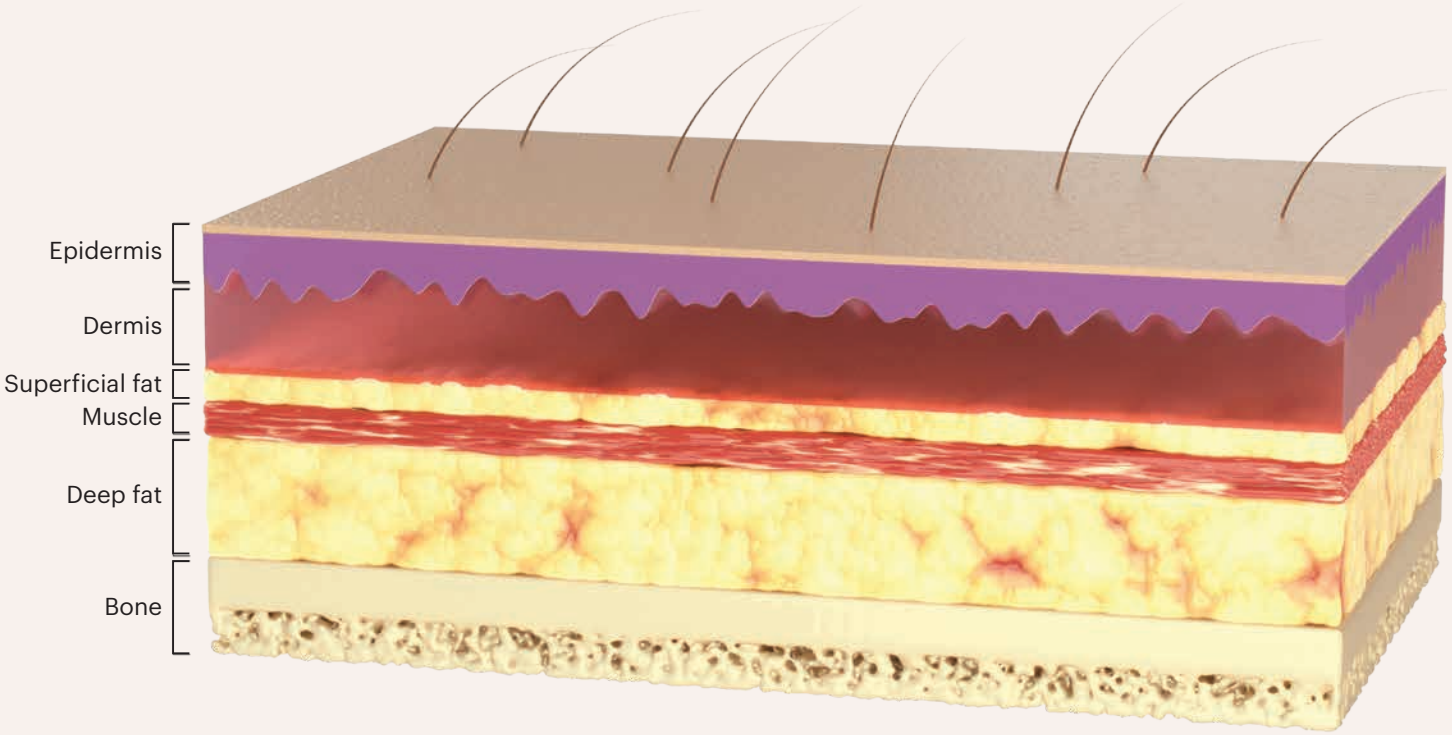
How changes over time impact bone and soft-tissue dynamics

As we age, each layer changes and impacts overall appearance[1,2]



It's critical to understand the nuances of the changes occurring in each anatomical layer and how they independently and collectively play an instrumental role during facial assessment.[1]

The skin layer changes over time and impacts overall youthful appearance[1]



- As time passes, elasticity and hydration in the skin decrease. Visible manifestations in aging skin include changes in color, texture, and wrinkle formation.[1-3]
- Intrinsic factors, such as natural loss of elasticity, and extrinsic factors, like air pollution, sun exposure, and smoking, contribute to the appearance of aged skin.[3]

Over time, subcutaneous fat pads lose volume and deflate[1,4]

a Superficial nasolabial fat compartment

b Superficial medial cheek fat compartment

c Jowls fat compartment

d Superficial middle cheek fat compartment

e Superficial lateral cheek fat compartment

f Superficial superior temporal fat compartment

g Superficial inferior temporal fat compartment

h Superficial lateral fat compartment of the forehead

i Superficial central fat compartment of the forehead

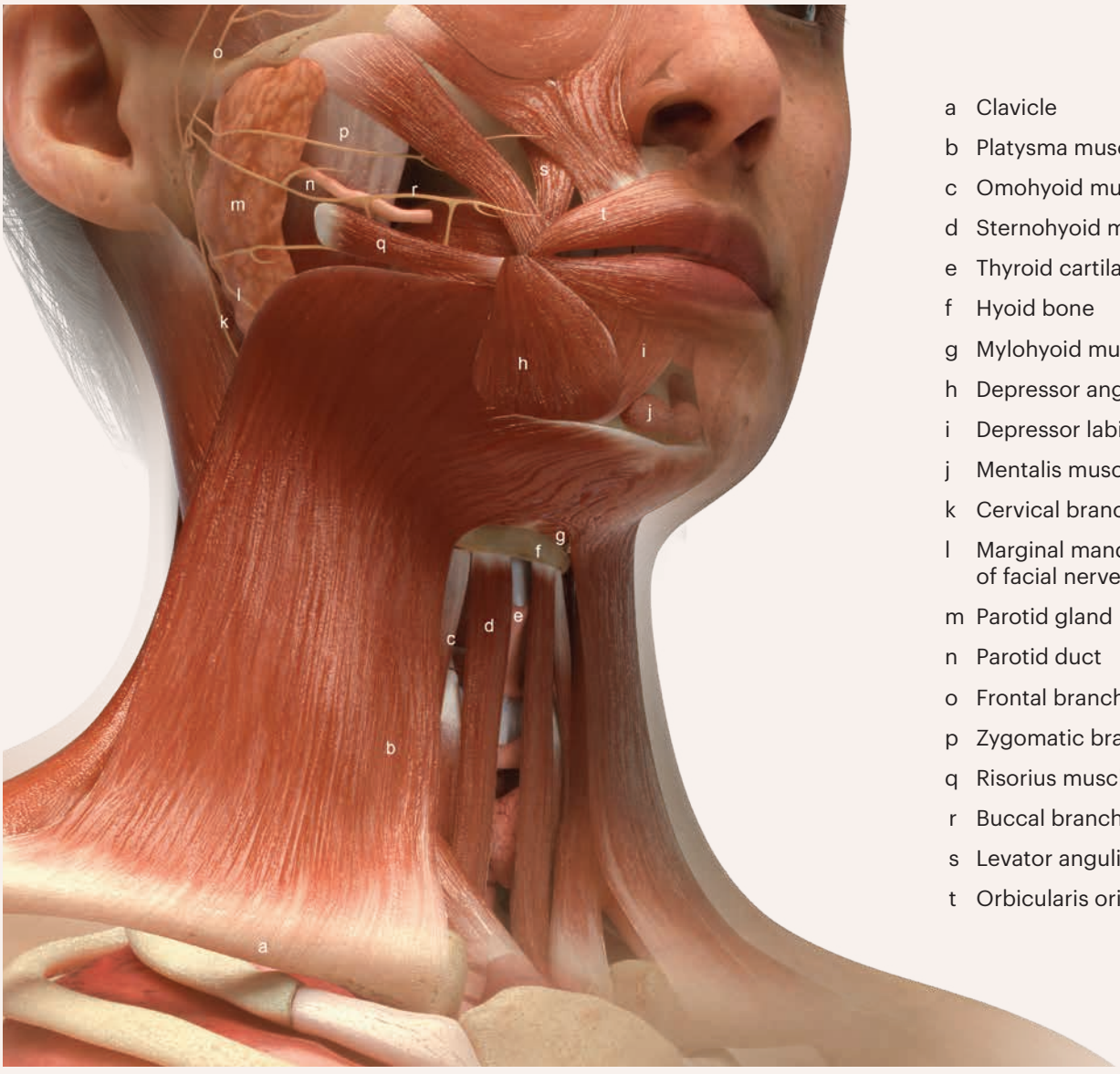
Aging and regional metabolic differences cause volume loss and deflation in subcutaneous fat compartments, which changes the shape and contours of the face.[1]

Facial aging can cause declining muscle mass and strength[1,4]

a Frontalis muscle
b Temporalis muscle
c Depressor supercilii muscle
d Procerus muscle
e Orbicularis oculi muscle
f Levator labii superioris alaeque nasi muscle
g Zygomaticus minor muscle
h Zygomaticus major muscle
i Masseter muscle
j Orbicularis oris muscle
k Risorius muscle
l Depressor anguli oris muscle
m Depressor labii inferioris muscle
n Mentalis muscle
o Platysma muscle

- Mimetic muscles relate to facial movement and play a role in maintaining soft-tissue support. Over time, they appear to tighten in the face and neck, which leads to visible signs of aging.[1,2,4]
- Over time, masticatory structures, such as the temporalis and masseter muscles, tend to hypertrophy, which may greatly affect facial shape.[1,2]

Over time, some muscles in the lower face and neck lose tone while others can hypertrophy[1,2,4]



a Clavicle
b Platysma muscle
c Omohyoid muscle
d Sternohyoid muscle
e Thyroid cartilage
f Hyoid bone
g Mylohyoid muscle
h Depressor anguli oris muscle
i Depressor labii inferioris muscle
j Mentalis muscle
k Cervical branch of facial nerve
l Marginal mandibular branch of facial nerve
m Parotid gland
n Parotid duct
o Frontal branch of facial nerve
p Zygomatic branch of facial nerve
q Risorius muscle
r Buccal branch of facial nerve
s Levator anguli oris muscle
t Orbicularis oris muscle

→ Increased activity of the platysma muscle and repeated muscle contractions over time result in vertical neck bands (“platysma banding” or “platysma prominence”) and blunting of the jawline.[1,3]

Over time, ligaments lose strength and integrity[1,3,4]

a Superior temporal septum

b Temporal ligamentous adhesion

c Supraorbital ligamentous adhesion

d Inferior temporal septum

e Orbicularis retaining ligament

f Zygomatic retaining ligament

g McGregor's patch

h Zygomatico-cutaneous ligament

i Mandibular ligament

As the volume of the face deflates with time, aging and weakened ligaments define most of the shadows, which contributes to the formation of grooves, tear troughs, and eye bags.[1-4]

With time, deep fat compartments deflate, causing the aged face to look less round and youthful[1-4]

a Retro-orbicularis oculi fat

b Buccal fat pad of Bichat

c Sub-orbicularis oculi fat (lateral part)

d Sub-orbicularis oculi fat (medial part)

e Deep lateral cheek fat compartment

f Deep medial cheek fat compartment

g Deep nasolabial fat compartment

h Deep pyriform space

i Deep labiomandibular fat compartment

j Deep mental fat pad

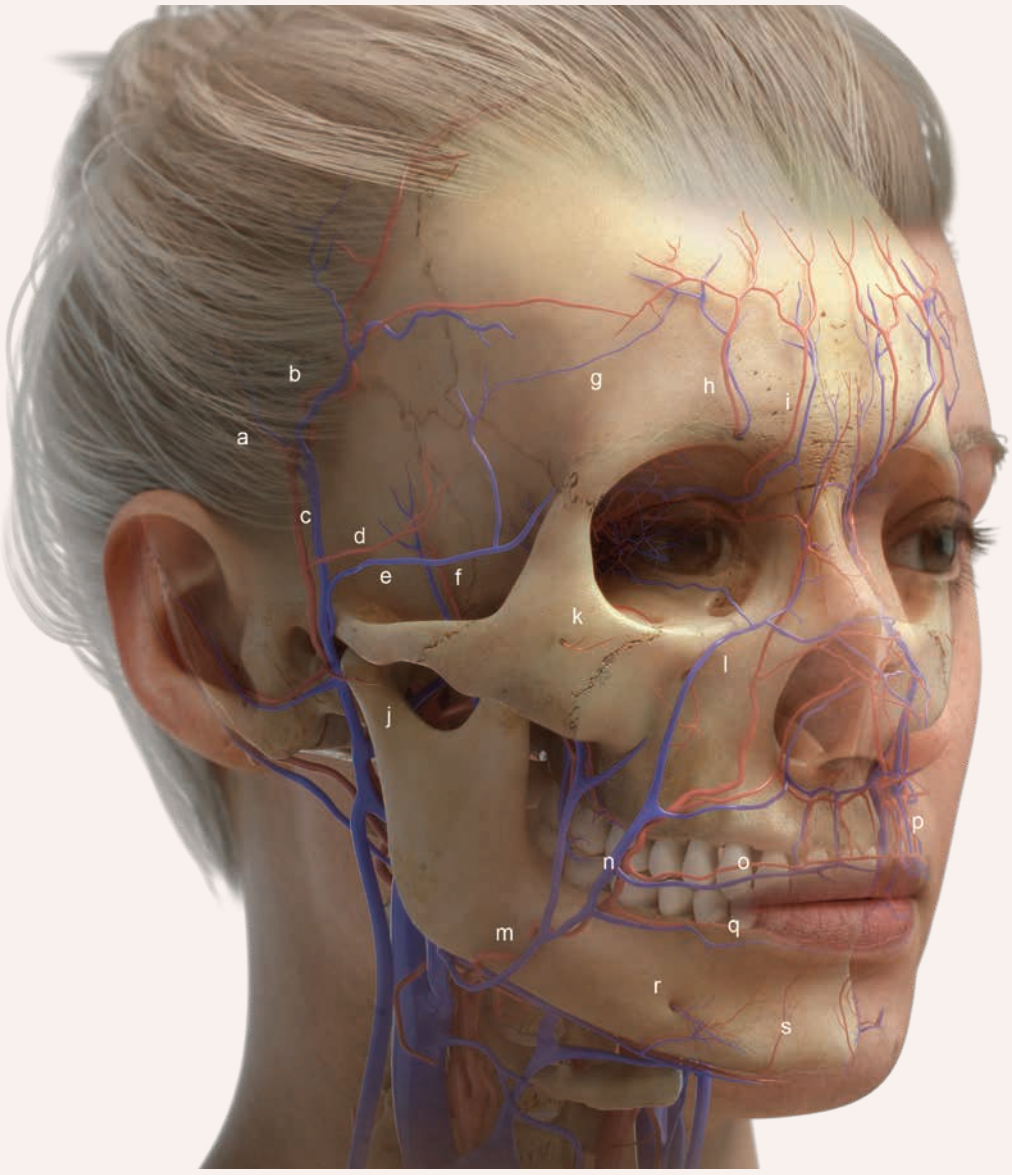
With age, deep fat pads get thinner, become displaced, and experience volume loss. There's a decline in structural support in the cheeks, undereye area, and temples, which in turn manifests as hollowing of the face and sagging. As a result, the aged face won't look as round and firm as the youthful face.[1-4]

The facial skeleton continuously undergoes both growth and selective resorption[1]

a Parietal bone
b Coronal suture
c Frontal bone
d Supraorbital foramen
e Supraorbital notch
f Temporal bone
g Sphenoid bone
h Nasal bone
i Zygomatic arch
j Zygomatic bone
k Zygomaticofacial foramen
l Infraorbital foramen
m Maxilla
n Coronoid process
o Ramus of mandible
p Body of mandible
q Mental foramen

Aging of the facial skeleton includes bone resorption and selective remodeling at specific sites. Changes in bony structures affect soft-tissue position, which in turn contribute to the appearance of excess skin, a primary indicator of age.[1]

Areas of caution: arteries and veins[4,5]



a Posterior branch of the superficial temporal artery

b Anterior branch of the superficial temporal artery

c Superficial temporal artery and vein

d Zygomatico-orbital artery

e Middle temporal vein

f Posterior deep temporal artery

g Sentinel vein

h Supraorbital artery

i Supratrochlear artery

j Transverse facial artery

k Zygomaticofacial artery

l Angular vein

m Facial artery

n Facial vein

o Superior labial artery

p Columellar artery

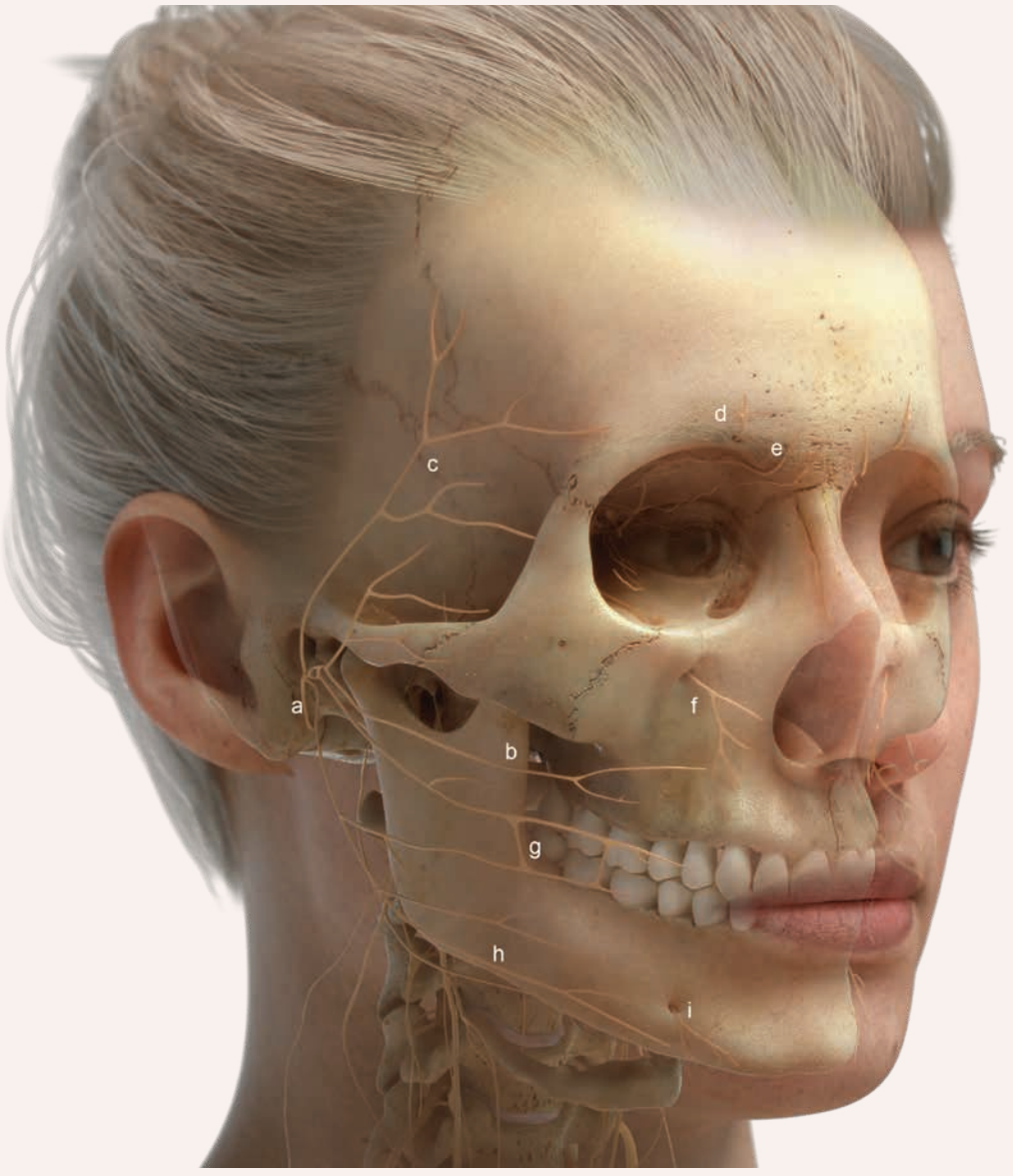
q Inferior labial artery

r Mental artery and vein

s Ascending mental artery

⚠ Knowing the location and depth of anatomy in the area of injection is paramount for safe technique. The location, size, and origin of the major arteries and veins may vary between individuals. With aging, changes can occur in individual vessels, including increased diameter and decreased elasticity.[1,5-7]

Areas of caution: nerves[4,5]



a Facial nerve

b Zygomatic branch of facial nerve

c Temporal branch of facial nerve

d Supraorbital nerve

e Supratrochlear nerve

f Infraorbital nerve

g Buccal branches of facial nerve

h Marginal mandibular branch of facial nerve

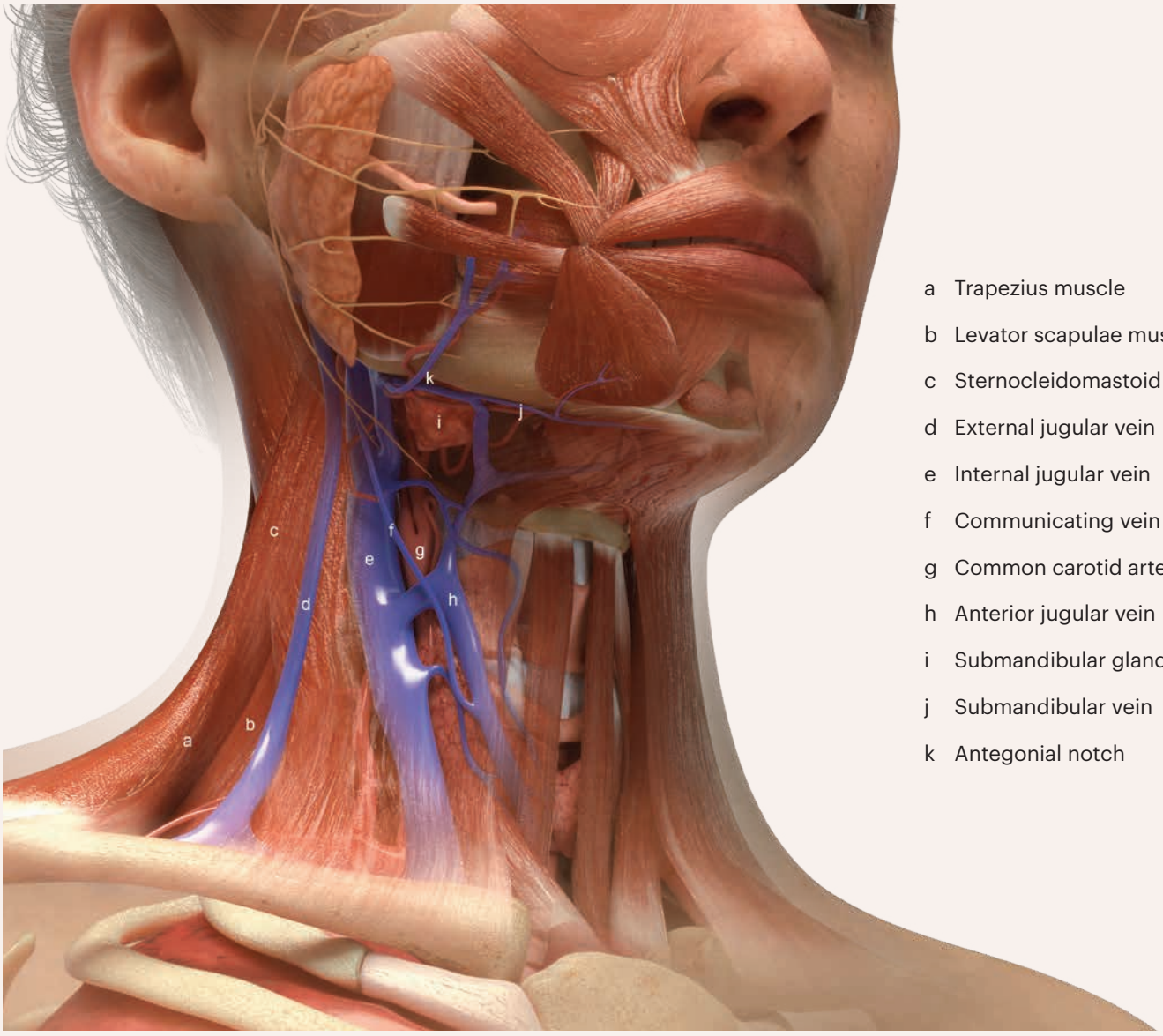
i Mental nerve

⚠ It is critical to know nerve placement. Locate the marginal mandibular nerve, which is a branch of the facial nerve located between the masseter muscle and the parotideomasseteric fascia.[8]

Areas of caution: lymphatics[1,5]

Knowledge of the location of lymph-collecting vessels in the face is critical. Because lymphatics are so fragile and compressible, they can easily be occluded, leading to lymphedema in the tissue they drain.[1,2,5,9]

Areas of caution: lower face and neck[4,10]



a Trapezius muscle
b Levator scapulae muscle
c Sternocleidomastoid muscle
d External jugular vein
e Internal jugular vein
f Communicating vein
g Common carotid artery
h Anterior jugular vein
i Submandibular gland
j Submandibular vein
k Antegonial notch

⚠ Inadvertent injection of underlying nerves or muscles in the jaw, chin, or neck could lead to undesirable or unintended outcomes like a lopsided or asymmetrical smile, speaking difficulties, and trouble swallowing.[10]

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Anatomy placement and associated labels verified for accuracy by Dr. Cotofana.

References: 1. Pirayesh A, Bertossi D, Heydenrych I, eds. *Aesthetic Facial Anatomy: Essentials for Injections.* Taylor & Francis Group; 2020. 2. Fitzgerald R, Carqueville J, Yang PT. An approach to structural facial rejuvenation with fillers in women. *Int J Womens Dermatol.* 2018;5(1):52-67. 3. Swift A, Liew S, Weinkle S, Garcia JK, Silberberg MB. The facial aging process from the "inside out." *Aesthet Surg J.* 2021;41(10):1107-1119. 4. Prendergast PM. Anatomy of the face and neck. In: Shiffman MA, Di Giuseppe A, eds. *Cosmetic Surgery.* Springer-Verlag; 2012:29-45. 5. Lamb JP, Surek CC. *Facial Volumization: An Anatomic Approach*. Thieme Publishers; 2018. 6. Koziej M, Polak J, Hołda J, et al. The arteries of the central forehead: implications for facial plastic surgery. *Aesthet Surg J*. 2020;40(10):1043-1050. 7. von Arx T, Tamura K, Oba Y, Lozanoff S. The face—a vascular perspective: a literature review. *Swiss Dent J*. 2018;128(5):382-392. 8. Vazirnia A, Braz A, Fabi SG. Nonsurgical jawline rejuvenation using injectable fillers. *J Cosmet Dermatol*. 2020;19(8):1940-1947. 9. Pan WR, Le Roux CM, Briggs CA. Variations in the lymphatic drainage pattern of the head and neck: further anatomic studies and clinical implications. *Plast Reconstr Surg*. 2011;127(2):611-620. 10. Trévidic P, Sykes J, Criollo-Lamilla G. Anatomy of the lower face and botulinum toxin injections. *Plast Reconstr Surg*. 2015;136(5 Suppl):84S-91S.

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