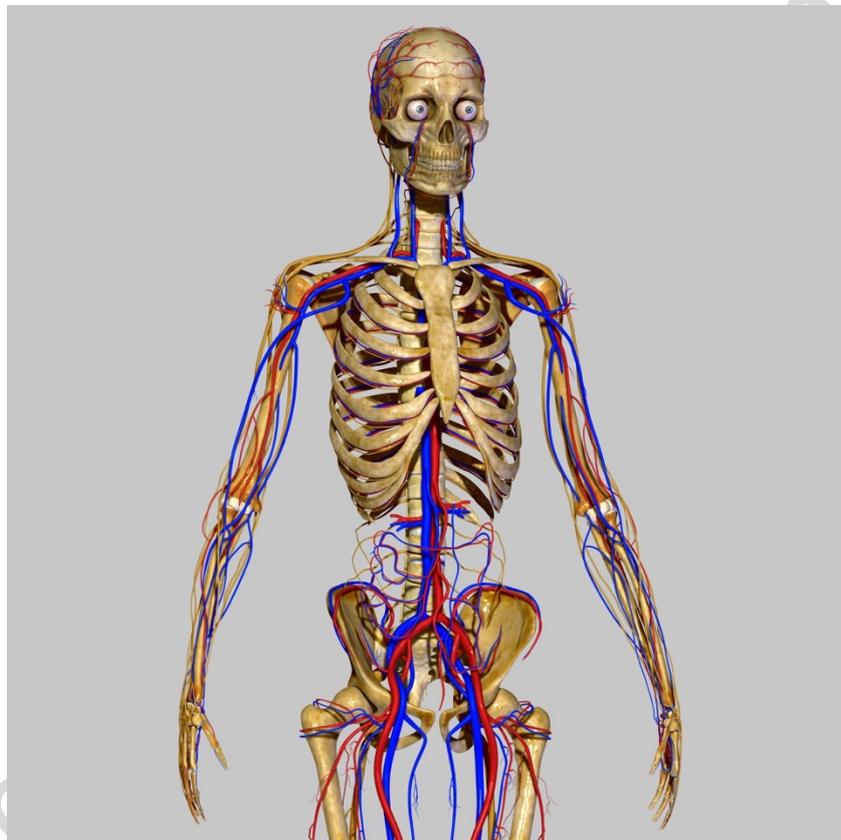




Anatomy & Physiology and Pathology For Holistic Facial Practitioners



Written & Published by Anna Joti Low

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Anatomy and Physiology

As providers of Beauty treatments it is important to have an understanding of how the human body works, and most importantly, how our treatments and any products used in those treatments, can affect the body.

This section of the manual will address those areas of anatomy and physiology particularly pertinent to the provision of Facial treatments and is intended only to provide an introduction to the subject. It is recommended that students should carry out their own research; there are many excellent books available that provide broader and deeper information on the subject.

Areas covered are:

- Structure and function of the skin
- Bones of the head, face, neck and shoulder
- Muscles of the head, face, and shoulder area
- Blood

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Structure and Function of the Skin

The Skin holds the contents of the body together and is the largest organ of the human body, typically accounting for 15% of an adults total body weight and has a surface area measuring 1.5-2.0 square meters (Richardson, 2003).

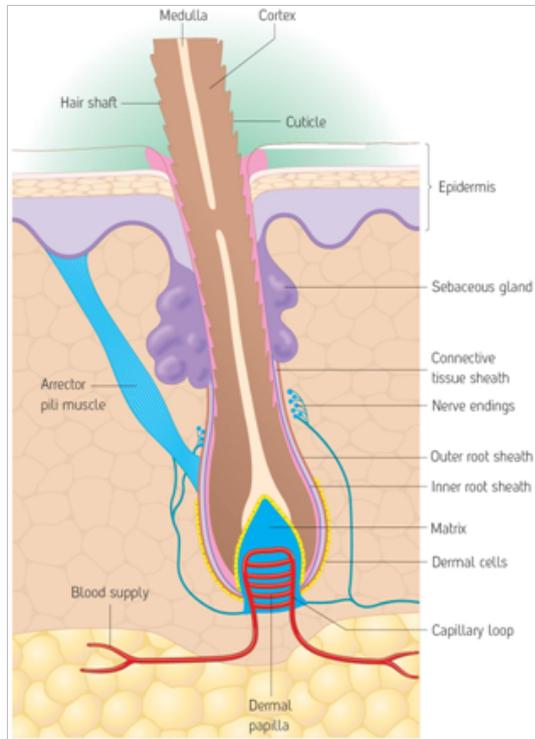


Figure 1 – The Three Layers of the Human Skin (Hiscock, et al., 2010)

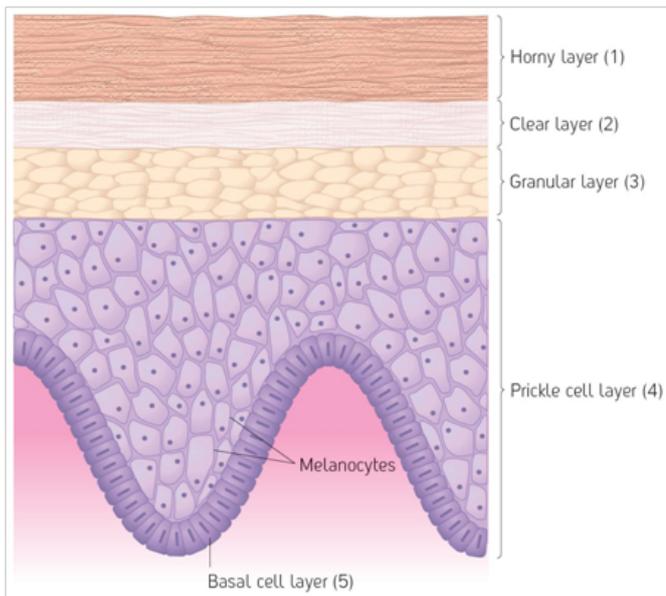
Skin is divided into three layers as depicted in Figure 1 adjacent; the outer layer of the skin, the *Epidermis*, shown purple in the diagram; the *Dermis*, shown brown and finally; the *Subcutaneous Layer*, shown yellow.

A brief description of each of these three layers follows.

Epidermis

The epidermis is the outermost elastic layer of the skin and is itself sub-divided in to five separate layers; the *Horney*, *Clear*, *Granular*, *Prickle Cell* and *Basel Cell* layers. The first of the three sub-layers are protective layers which are continually worn away or shed, however, the Prickle Cell and Basel Cell layers are living, as the cells contain a nucleus and can reproduce (skin renews itself every 28 days).

Each of these sub-layers can be clearly seen in the diagram shown in **Error! Reference source not found..**



Horny Layer: made up of flattened dead skin cells which contain keratin (a fibrous protein that forms in the body and is found in the skin, hair and nails) and is the final (top) layer of the skin. These cells are shed continuously allowing the new cells through.

Clear Layer: three to four rows thick, of dead, flattened cells. Found above the granular layer on skin that is exposed to friction such as skin on the palms of hands and soles of feet.

Granular Layer: the middle layer, two to four layers thick; the cells here start to die and flatten. Waste and other substances from the cell are squashed together and harden.

Prickle Cell Layer: this layer sits on top of the basal layer and is ten to twenty cells thick, with spines that connect with other cells. Cells called melanocytes (cells which contain the pigment melanin which provide the different colours of the skin) start to harden and produce keratin.

Basal Cell Layer: this is the deepest layer of the skin, and is made up of a single layer of column-shaped cells. New cells are continuously being produced.

The Dermis

The dermis, or inner layer, forms an elastic bed of connective tissue that nourishes, provides strength and supports the epidermis and the hair, sweat glands, nerve endings, blood vessels and lymph glands within it. The dermis consists of two distinct layers; the *Papillary Layer*, next to the epidermis, and the deeper *Reticular Layer*, separated by a membrane (Richardson, 2003).

Papillary Layer: joins the dermis to the epidermis and is made up of undulating wavy tissue, rich in blood, lymph vessels and nerve endings.

Reticular Layer: a dense and fibrous layer, located beneath the papillary layer containing the main components of the dermis. It also protects and repairs injured tissue and contains *collagen* (a protein found in white, fibrous connective tissue, which provides the skin's strength and resilience), *elastin* (a protein that allows the skin to stretch easily, and then regain its original shape) and *reticulin* (cross linked fibres which act as a supporting mesh in soft tissues such as the lymphatic system).

Subcutaneous Layer

The subcutaneous tissue is a fatty layer of the skin located beneath the dermis which is formed from the production of lipids from cells called lipocytes.

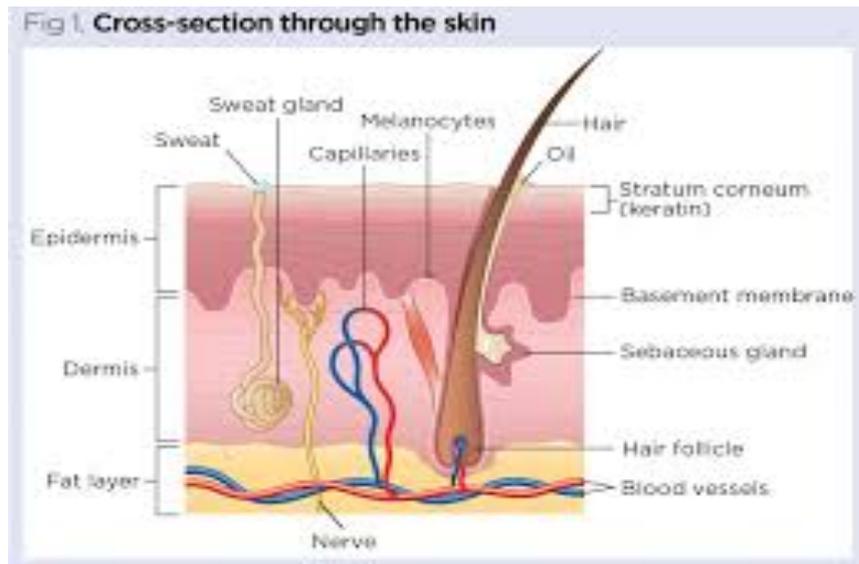
The function of the subcutaneous tissue is to:

- Give protection to muscles, bones and internal organs.
- Provide insulation against the cold and provide a source of energy if needed

Functions of the Skin

The primary functions of the skin, as defined by (Health and Safety Executive) are as follows:

1. Provides a **protective** barrier against mechanical, thermal and physical injury and hazardous substances
2. **Absorption** of topical creams and oils
3. **Secretes** sebum
4. Acts as a **sensory** organ (touch, detects temperature)
5. Helps **regulate the body's temperature**
6. **Eliminates** Sweat
7. Production of vitamin D
8. Melanin Production



Bones of the head, face and neck

The skull (cranium)

The skull or cranium is a very hard structure and is made up of 22 separate bones that are fused together by ridges joints called *sutures*.

In the skull there are many openings that allow blood vessels and nerves to enter and leave. Of these the largest is called the *foramen magnum*, which allows the spinal cord and blood vessels to pass to and from the brain.

The *vertebral column* attaches the skull to the body, and enables the head to tilt and turn. The neck and shoulder bones and muscles support the weight of the head.

- Bones of the skull

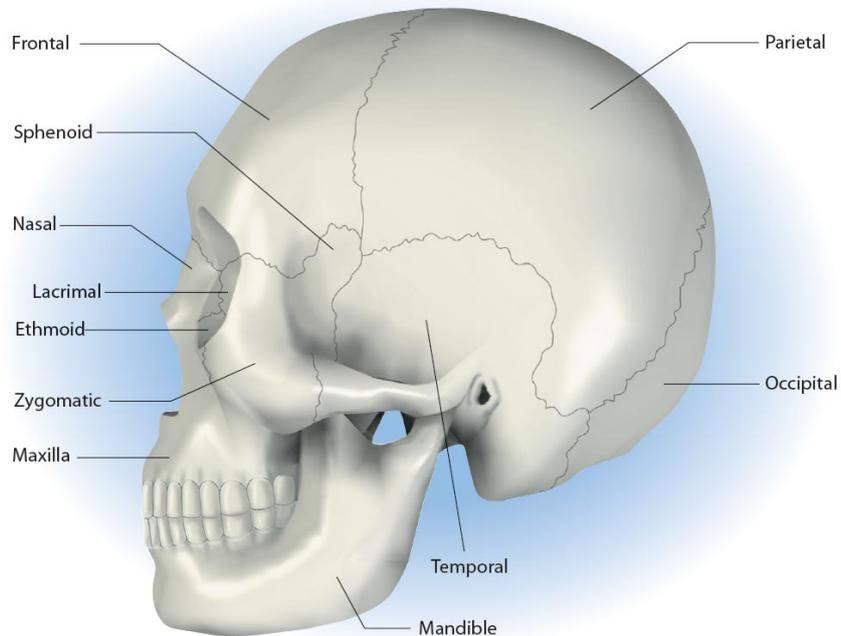


Figure 3- Bones of the skull (Hiscock, et al., 2010)

Skull and face

Bone	No. of bones	Position
Occipital	1	At the back of the skull
Temporal	2	At the side, around the ears
Sphenoid	1	At the base of the skull, wing shaped, forms the temple
Lacrimal	2	One in each eye orbit
Parietal	2	Positioned at the back of the head and forms the roof of the skull
Maxilla	2	These form the upper jaw, most of the side wall of the nose and the front part of the soft palate
Vomer	1	This forms part of the nasal septum (which divides the nose into two sides)
Zygomatic	2	These form the cheek bones
Turbinate	2	The bones inside the nose
Mandible	1	This is the lower jaw and is the only moving bone in the face, allowing movement of the mouth for chewing and talking

Bones & position (Hiscock, et al., 2010)

Muscles

There are 600 voluntary muscles that make up the body, and they contract which allows the body to move, large movements like running to small movements such as a smile.

Muscles can shorten themselves but they do not lengthen themselves, so muscles work in pairs, which are known as *flexors* and *extensors*.

- Flexors- shorten the muscle
- Extensors- straightens muscle out

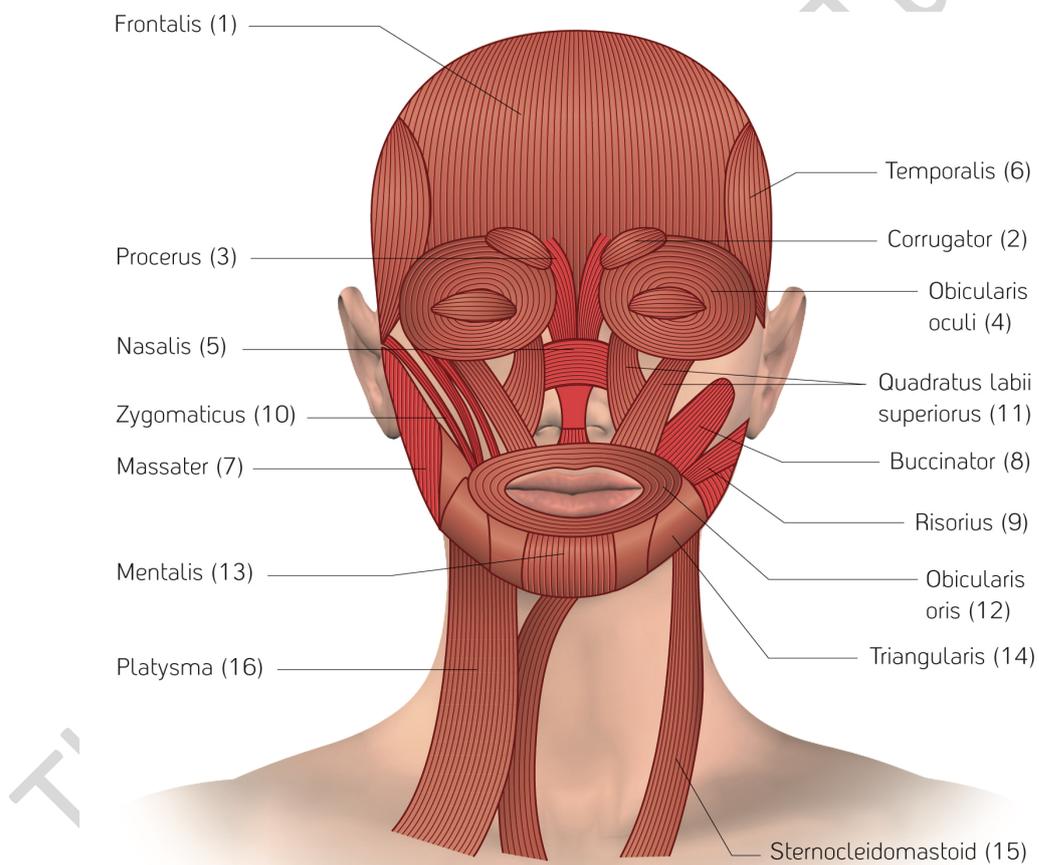


Figure 4- Facial muscles (Hiscock, et al., 2010)

Muscle	Position	Action
Frontalis	Upper part of cranium, extends over forehead	Moves scalp forward and raises eyebrows
Corrugator	Inner corners of the eyebrows	Draws eyebrows together – as in frowning
Procerus	Top of nose between eyebrows	Depresses the eyebrows, forming wrinkles over the bridge of the nose
Temporalis	Runs down side of face towards upper jaw	Aids chewing and closing the mouth
Orbicularis oculi	Surrounds the eye	Closes the eye – as in blinking
Levators of the upper lip (Quadratus labii superiorus)	Runs upward from the upper lip	Lifts the upper lip and helps open the mouth
Orbicularis oris	Surrounds the lips and forms the mouth	Closes the mouth and pushes the lips forward – as in a pout. Pulls the corner of the chin down
Depressors of the lower lip (Quadratus labii inferioris)	A small muscle below the lower lip	Pulls the lower lip downwards and slightly outwards
Nasalis	Over the front of the nose	Compresses the nose, causing wrinkles

Muscle	Position	Action
Buccinator	Forms most of the cheek and gives it shape	Puffs out the cheeks when blowing, keeps food in the mouth when chewing
Risorius	In the lower cheek, joins to the corner of the mouth	Pulls back angles of the mouth – as in smiling and grimacing
Mentalis	Forms the chin	Lifts the chin and pushes the bottom lip outwards
Triangularis	Corner of the lower lip, extends over the chin	Pulls the corner of the chin down
Zygomaticus	Runs down the cheek towards the corner of the mouth	Pulls the corner of the mouth upwards and sideways
Masseter	Runs down and back from the cheek to the angle of the jaw	Lifts the jaw and gives the teeth strength for biting
Sternocleidomastoid	Runs either side of the neck	Pulls the head down to the shoulders, rotates the head to the side and pulls the chin onto the chest
Platysma	Front of the throat, covers the neck	Pulls down the lower jaw and the angles of the mouth
Trapezius	Kite-shaped muscle in the upper back and sides of the neck	Rotates the shoulders, draws back the scapula, pulls the head back, assists in rotation of head

Muscle	Position	Action
Pectoralis	Front of chest, under the breast	Pulls the arm forwards and assists the rotation of the arm
Deltoid	Caps the shoulder	Raises arm from the side and pulls it back and forward
Occipitalis	At the back of the skull	Helps with the movement of the head

Anatomy & Physiology –muscles of head, face, neck and shoulders (Hiscock, et al., 2010)

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Blood

The transport system of the body is blood; it delivers nutrients and removes waste products. The heart pumps the blood around the body, and blood is transported around the body vessels called *Arteries*, *Veins* and *Capillaries*.

Arteries – carry **oxygenated** blood, from the heart to the rest of the body (except the pulmonary artery)

Veins – carry **deoxygenated** blood back to heart from the body (except the pulmonary vein)

Capillaries – smallest vessels that carry both oxygenated and deoxygenated blood

Functions of blood

There are 4 main functions of blood:

1. Transportation- blood transports:
 - red blood cells carry **Oxygen** *erythrocytes*
 - carbon dioxide
 - nutrients
 - hormones
 - waste products
2. Defence -
 - white blood cells fight against disease and destroy bacteria
 - specialised white blood cells called *lymphocytes* produce anti-bodies which give the body resistance to re-infection
3. Regulation – by absorbing heat from the liver and muscles and transporting it around the body blood is able to regulate body heat.
4. Clotting-
 - where blood loss has occurred *platelets* will clot the damaged area
 - clotting prevents excess blood loss and protects against infection

Composition of blood- blood is made up of 45% *plasma* and 55% *cells*.

Plasma- is straw coloured and consists of 90% water and 10% blood proteins, mineral salts, hormones, food substances, anti- bodies, gases and enzymes.

Cells – there are 3 main types:

1. red blood cells- which contain haemoglobin that carry oxygen
2. white blood cells- which protect against infection
3. platelets- which join together to form a clot that heals a wound

Lymph

Lymph is closely related to blood and is also known as the secondary circulatory system. It is a drainage system that drains excess tissue fluid and then transports it back to the blood supply.

Function of lymph

- drains excess fluid and waste away from tissues and transports it back, with proteins, to the blood supply
- produces lymphocytes which protect the body from infection
- transports absorbed fat from the intestine to the liver

Lymphatic system is consists of:

- Lymph capillaries- smallest vessels which collect excess tissue fluid from surrounding cells
- Lymph vessels- these are formed from capillaries into larger vessels which transport lymph back to the venous system of the blood supply
- Lymph nodes- a small group of cells that filter the lymph of any infection or toxins, if they are fighting infection they swell (swollen glands)
- Lymph ducts- these two ducts are situated in the chest, they drain lymph back to the venous system.

An efficient blood and lymph supply are effective at improving the condition of skin and muscles. By completing a facial treatment you improve these systems, as you encourage them to work more effectively.

Effects on the skin are:

- Removal of waste products by the lymph prevents the skin from looking puffy
- Increased blood supply brings fresh nutrients and oxygen to the skin, which helps cells to reproduce
- Carbon dioxide and waste are removed easily so cells do not become poisoned

- Skin has a healthy glow due to increased cell renewal and improved colour due to increased blood supply

Effects on the muscles are:

- Removal of waste products by the lymph helps to improve their efficiency
- Increased blood supply brings fresh nutrients and oxygen to the muscle cells which help them to reproduce
- Carbon dioxide and waste are removed easily so muscle cells do not become poisoned
- Muscles can look more toned due to the removal of waste products

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Client Consultation

Before you start a facial you must always complete a client consultation, this includes completing a client consultation sheet/card. You can design your own or buy pre-designed ones from most beauty wholesalers.

A thorough client consultation is very important as it helps you the therapist provide the correct facial treatment for your client. Ask as many questions as you feel you need so you have an understanding of your client & write down all relevant information.

If you design your own you should include:

The clients –

Name

Address

Date of Birth

Medical History

Allergies

Any previous treatments

Skin Analysis

Contra-indications

Contra-actions

Signed declaration

Example of a Client Consultation Form

Name:

Gender:

Address:

D.O.B:

E-mail address:

Telephone Number: Home:

Work:

Mobile:

Doctors Name, Address & Telephone number:

General Health:

Medical History:

Medication:

Smoker (yes/no):

Hobbies:

Skin Type:

Oily

Sensitive

Dry

Mature

Combination

Daily skin care routine- products normally used:

Cleanser

Toner

Moisturiser

Exfoliator

Mask

Other, e.g. eye cream, serum etc:

Skin conditions-

Eczema

Dermatitis

Psoriasis

Acne

Cuts/ abrasions/broken skin

Bruising or Swelling

Recent scar tissue

Skin Tags

Milia

Other

Contra-indications:

Skin allergies:

Skin infections:

Conditions that may restrict treatments:

Treatment Plan:

Products Used:

Contra-actions:

Aftercare:

I confirm that the above information is correct & understand that it is my responsibility to notify the therapist any changes in the above information.

Clients Signature:

Date:

Contra-indications

A contra- indication is something which prevents or restricts the treatment.

It is important that you recognise a contra-indication thus preventing any harm or discomfort to your client, also preventing cross-infection either to your client or yourself.

General list of facial contra-indications:

- Any bacterial, viral, fungal and parasitic infections
- Scar tissue less than 6 months old
- Recent sunburn
- Recent facial hair removal e.g. waxing, electrolysis etc
- Any known allergy to products being used
- Cuts and abrasions of skin's surface
- Undiagnosed lumps or swelling
- Severe eye infections
- Loss of sensation in the face, dropped muscle contour.

Contra-indications that prevent a facial treatment & may need medical referral are:

Bacterial infections-

Impetigo

This is highly contagious most common among pre-school children.

People who play close contact sports are also susceptible, regardless of age. Impetigo is not as common in adults. It is also known as school sores.

It starts with small red spots, which then break open & form blisters. The most common areas it is found is around mouth & nose.

Boils

This is an infection of the hair follicle. Boils are bumpy red, pus filled lumps around a hair follicle. They are tender, warm & painful. Pus may be present.

Conjunctivitis

This is inflammation of the conjunctiva (the outer most layer of the eye & the inner surface of the eyelids)

Eye lids are sore, red & itchy. Commonly caused by a infection either bacterial or viral or can be an allergic reaction.

Stye

Is an infection/boil at the base of the eyelashes.

It may start as a small lump with a yellowish spot at the centre. This develops as the pus expands. It is raised red & sore.

Viral infections-

Common cold

Common symptoms are streaming eyes and nose, sneezing and coughing, very infectious.

Cold sores

This is an infection of the lip by the herpes simplex virus. Can be found on the lips, cheeks and nose.

Can start with a tingling sensation then blisters form which become open and weepy (this is the most contagious stage) then crusts form.

Warts (Verruca Vulgaris)

This is a raised wart with roughened surface, most common on hands, but can grow anywhere on the body, can be found on the face and neck.

Fungal

Ringworm

This is a fungal infection of the skin. Symptoms are red raised rings followed by scales and pustules. It is highly contagious and can spread on to the face from anywhere on the body. Can be passed on to humans by contact with domestic animals.

Blepharitis

This is a chronic infection of the eyelid causing inflammation of the eyelid.

Symptoms are red, sore eyelids and sometimes flaky skin on the lid.

Parasitic infestation

Pediculosis (lice)

This can be on the body but is more commonly head lice. Lice are parasites that puncture the skin then suck out the blood causing itching. Lice then lay eggs (shiny pearl coloured oval shaped) on hairs close to the skin, nits is the name given to un-hatched eggs.

This is highly contagious and prevents a facial treatment.

Scabies

This is a skin infection caused by a parasite, commonly known as the itch mite. This itch mite burrows under the skin causing allergic itching, redness and swelling. Burrowing mites show as s-shaped tracks in the skin often accompanied by what appear as small pimple-like insect bites.

This is highly contagious and prevents a facial treatment. GP referral is recommended.

Severe skin conditions

Severe Eczema-

This is an inflammation of the skin, characteristics are: very dry skin, often flaky and scaly sometimes very itchy.

If the eczema covers a large area and is inflamed with broken skin then this would prevent a facial treatment and GP referral is recommended.

Severe Psoriasis

This is a chronic autoimmune disease that appears on the skin. Characteristics are raised areas of inflamed skin covered with silvery white scaly skin. Most commonly found on the scalp and joints but can be anywhere on the body.

If psoriasis is on the face or neck, open and bleeding this would prevent a facial treatment and GP referral is recommended.

Acne vulgaris

This is characterised by open pores, pustules in varying degrees of congestion, inflamed whiteheads and blackheads (scarring is possible).

Most common in adolescence but can carry on into adulthood, mostly caused by hormones.

If the acne is infected and inflamed or cysts are present then this would prevent a facial treatment and GP referral is recommended.

*You may be able to complete a facial treatment once medical approval has been obtained

Acne rosacea

This is common later in life or those who had acne vulgaris in youth.

Its characteristics are inflamed skin over forehead, nose and cheeks. Papules, pustules, open pores and greasy skin can be present due to over stimulated sebaceous glands.

Depending on how infected the skin is, this condition may prevent a facial treatment.

N.B. If you think your client has a contra-indication, you must not complete the treatment; always explain to your client why you are unable to give them the treatment. Never diagnose the contra-indication, as you are not a Doctor and you are not qualified to make a diagnosis. Just explain that they may have a condition that prevents you from carrying out a facial treatment.

Skin Conditions that RESTRICT a facial treatment.

Cuts/ abrasions/ broken skin:

If they are recent avoid area altogether especially if there is any swelling or is tender. If area is healed over and you have the clients signed consent then gentle application may be used. Hygiene must be considered, as you do not want to cause an infection.

Bruises or Swelling

Bruises are easily recognised; avoid area if recent or painful. But always get signed consent from you client. If swelling is red or inflamed then avoid treatment.

Recent scar tissue

If scar is less than 6 months old, over a large area, raised or inflamed then avoid area altogether. If you are unsure then advise the client to get written consent from their GP to check it is safe for them to receive a facial treatment.

Mild Eczema & Psoriasis

If eczema or psoriasis is mild, only in a small area and not infected then you may carry out a facial treatment. But always check the clients skin sensitivity and un-perfumed, hypo-allergenic products are recommended.

Dermatitis

There are many forms of Dermatitis but the most common is contact dermatitis, which is an allergy to something the skin has come in contact to.

Always check what the client is allergic to, as this product may be present in the products that you use.

It looks similar to eczema; dry, itchy, red skin. Unless the skin is infected then a facial treatment can be carried out. But always check the clients skin sensitivity and un-perfumed, hypo-allergenic products are recommended.

Dermatitis can be a contra-action, as your client may have an allergy (unknown to her) to something in the products you are using. This is covered in more detail on pages .

Other skin conditions

Keloid scar

This is a scar that has an overgrowth of tissue at the site of an injury. It is usually firm, shiny, raised, thickened mass of fibrous tissue. A keloid scar is benign (non-malignant) and is not contagious.

They occur more commonly on people with highly pigmented skin.

In growing hair

This is a hair that grows under the skin. Common causes are waxing or tweezing but some people are prone to them. If the hair continues to grow under the skin then an infection may occur.

Papule and Pustule

A papule is a red spot caused by inflammation of the sebaceous gland. They can be large or small and sore.

A pustule is a papule with an infection present. Most commonly found in oily or combination skin types.

However either may occur on other skin types due to hormone imbalances.

E.g.: menstrual cycle, menopause, stress

Seborrhoea

This is too much sebum being produced due to an over active sebaceous gland. Giving the skin a greasy shine, this normally is a sign of an oily or combination skin.

Comedones

This is technical term for a blackhead. Which is caused by a over production of sebum that blocks a pore, when this is exposed to the air it darkens the sebum turning it into a black dot. Most commonly found in oily or combination skin types. But all skin types can sometimes get them. Blackheads/comedone can be extracted by a comedone extractor or gently squeezed out between two fingers (wrapped in tissues).

Milia

This is another name for milk spots; they are small white pearls under the skin. They are mainly caused by a build up of sebum or dry skin cells blocking a sebaceous gland. They are not contagious. Exfoliation and massage may help to loosen them.

Open pores

This is when pores are enlarged, most commonly found in oily or combination skin types. Once a pore is enlarged it does not return to a normal size. Do not assume a skin is oily if it has open pores as you will often see open pores on a mature skin that may be dry now, but have previously been oily.

Broken capillaries

These are red/pink threads under the surface, commonly found on the nose and cheeks. This is caused by capillary walls quickly narrowing then widening causing muscle in the walls to tear. This results in blood seeping out, thus the capillaries are broken.

Common causes are:

- Pressure on skin e.g. squeezing spots or glasses pressing on face.
- Extreme temperature changes
- Hot conditions
- Sunburn
- Cold wind blowing on the face.

If you want to avoid broken capillaries then this can be achieved by avoiding all of the above. There are many treatments on the market, from creams to laser.

Hyper pigmentation

This is the darkening of an area of skin caused by an increase in melanin. It is common in pregnant women due to hormonal influences. Also in old age as you develop liver spots. Use of sun block can prevent pigmented patches occurring and concealer can be used to cover dark patches.

Hypo pigmentation

This is the loss of skin colour, which is caused by melanin depletion. Vitiligo is a skin condition that has patches of paler skin. Concealer can be used to cover lighter areas of skin. Sun block is also recommended to prevent burning.

Vitiligo

This is a chronic disorder that causes depigmentation of patches of skin. It occurs when cells responsible for skin pigmentation die or are unable to function. People have dark patches/areas of skin and very light patches of skin. The cause is unknown. Corrective make-up can even out the skin colour.

Skin Types

The four main skin types: Although Age, Hormones, Environmental, Dietary and Lifestyle choices play a huge part in the presentation of skin, so there is no hard and fast rule here...

1. Normal
2. Oily
Dry
3. Combination

Descriptions of main skin types

Normal

This is a perfect skin type and is quite rare. There is a correct balance moisture content and oil thus keeping skin soft and supple. It is recognised by:

- No visible pores
- Good skin tone and texture
- Even colour

Oily

This skin types is caused by an over production of sebum from the sebaceous gland. It is most common in teenagers, but can be found on all ages. It is recognised by:

- Open pores-all over the face
- Comedones/blackheads
- Papules and pustules
- Shiny skin- seborrhoea
- May have scarring if acne is present
- Skin may be thicker in consistency, sallow and coarse.

Often over use of harsh products to dry out the skin may cause dry flaky patches. Explain to your client that use of harsh products only makes the skin secret more oil eventually to compensate.

Dry

This skin type is caused by under-active sebaceous glands, s thus not producing enough sebum. Is associated with mature skin types but any age can have dry skin. It is recognised by:

- Fine skin texture
- Dry flaky patches
- Tight pores

- Dilated capillaries in cheek area
- Slightly dull with a matt finish
- Lacks suppleness

Often this skin type can be deceiving, as a client may have only developed dry skin due to illness, poor diet, an allergic reaction to or incorrect use of products.

Combination

This skin type is a combination of two skin types; most common is an oily T-zone, along forehead and down the nose, with dry/combination on the cheeks. You need to treat each skin type separately sometimes even applying two different moisturisers and masks.

Skin Conditions

In addition to the four basic skin types, a client's skin can be divided into different skin conditions. Your client may have one or more of these conditions.

Mature skin

All skin ages and there is two types of aging:

1. Intrinsic-this is when your genetics determines how fast you age.
2. Extrinsic-this is when external factors affect the aging of your skin. E.g. smoking, free radicals, UV light exposure, severe weather.

Sensitive skin

This skin type can be over sensitive to certain ingredients with in beauty products. It is often linked with pale skin or a very dry skin, but any body's skin can be sensitive or allergic to certain products. It is getting more common for clients to develop skin sensitivity and allergic reactions, not only those found in beauty products, but cleaning products, jewellery and food intolerances.

Dehydrated skin

This is when the skin feels tight, may be flaky, due to loss of moisture on the surface of the skin. All skin types can be dehydrated, which may be due to use of products too harsh for the skin, exposure to harsh temperatures, central heating, air-conditioning, diet.

The most common reason is: not drinking enough water, also people drink too many caffeinated drinks which are dehydrating as well as too much alcohol. All of this can cause a dehydrated skin.

Congested skin

Any skin type can become congested; sometimes it is only in certain areas, such as nose, forehead or chin (T-zone). Congestion can take place when pores become blocked with sebum, blackheads (comedones) and whiteheads build up, and the skin may appear lumpy. A greasy skin type tends to get congested the most due to excessive sebum production, but in-correct removal of make-up and excess sweat can also contribute.

Comedones

This is another name for a blackhead, it forms when a follicle or pore becomes blocked with sebum; this blocked pore mixes with oxygen in the air and turns black. They are not infectious and can be anywhere on the skin, but numerous comedones can be found in clusters on the chin nose and forehead (T-zone).

Comedones can become infected and turn into a pustule (spot).

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