UBT446

Enhance appearance using scalp micropigmentation techniques

ASSIGNMENT 4

Skin response, wound healing, PIH and UV protection

Student name	
Tutor	
Date issued	
Date completed	

Aim
To demonstrate knowledge of skin response, wound healing, melanogenesis, post-inflammatory hyperpigmentation, melanogenesis-modulating ingredients and ultraviolet protection, and to apply this knowledge when planning scalp micropigmentation.

Instructions
Complete all sections. Task 1 requires one number for each term. Task 2 requires clear professional explanations. Task 3 requires one answer for each question.

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Date	

Task 1 - Match the terms with the descriptions

1. Skin response

Match each term with the correct description. Write the correct number in the answer column.

Term	Answer
A. Erythema	____
B. Oedema	____
C. Pinpoint bleeding	____
D. Serous exudate or tissue fluid (lymph or weeping in ITEC terminology)	____
E. Tenderness	____
F. Inflammation	____
G. Heat	____

Descriptions

1. A temporary increase in local temperature associated with increased blood flow and inflammation.
2. Mild sensitivity or discomfort in recently treated tissue.
3. Small points of bleeding caused by disruption of superficial blood vessels.
4. Redness caused by increased blood flow within the treated area.
5. Clear or pale plasma-derived tissue fluid that may appear at the treated surface following controlled skin injury.
6. The local biological response initiated following tissue injury.
7. Localised swelling caused by fluid accumulation in the tissues.

Task 1 - Match the terms with the descriptions

2. Wound-healing phases

Match each term with the correct description. Write the correct number in the answer column.

Term	Answer
A. Haemostasis	____
B. Inflammatory phase	____
C. Proliferative phase	____
D. Remodelling phase	____
E. Clot formation	____
F. Re-epithelialisation	____
G. Collagen remodelling	____

Descriptions

1. Movement and growth of epidermal cells to restore the surface barrier.
2. The longer-term reorganisation and maturation of newly formed connective tissue.
3. The stage involving immune activity and removal of damaged material.
4. Reorganisation of collagen as healing tissue matures.
5. The initial process that limits blood loss following tissue injury.
6. A temporary structure formed from blood components that helps control bleeding.
7. The stage involving tissue repair, new matrix production and restoration of the epithelial surface.

Task 1 - Match the terms with the descriptions

3. Cells and components involved in healing

Match each term with the correct description. Write the correct number in the answer column.

Term	Answer
A. Platelets	____
B. Neutrophils	____
C. Macrophages	____
D. Fibroblasts	____
E. Keratinocytes	____
F. Endothelial cells	____
G. Collagen	____

Descriptions

1. Cells involved in producing collagen and other connective-tissue components.
2. A structural protein that contributes tensile strength to connective tissue.
3. Blood components that contribute to haemostasis and clot formation.
4. Cells involved in the formation and repair of blood vessels.
5. Immune cells involved in clearing debris and coordinating later repair.
6. Cells that migrate across the wound surface during re-epithelialisation.
7. Cells involved in early defence and removal of microorganisms and damaged material.

Task 1 - Match the terms with the descriptions

4. Expected and abnormal healing responses

Match each term with the correct description. Write the correct number in the answer column.

Term	Answer
A. Temporary erythema	____
B. Mild oedema	____
C. Surface crusting	____
D. Dryness and flaking	____
E. Settling	____
F. Prolonged inflammation	____
G. Delayed healing	____

Descriptions

1. A response that persists beyond the expected short-term inflammatory period and requires reassessment.
2. Temporary shedding of dry superficial epidermal material during recovery.
3. A small amount of temporary swelling after controlled tissue injury.
4. Gradual reduction of post-treatment redness, swelling and visual intensity.
5. Formation of superficial dried material during early healing.
6. Healing that takes longer than expected and may require medical assessment or referral.
7. A short-term red appearance that normally reduces as inflammation settles.

Task 1 - Match the terms with the descriptions

5. Melanogenesis and pigmentation

Match each term with the correct description. Write the correct number in the answer column.

Term	Answer
A. Melanocyte	____
B. Melanin	____
C. Melanogenesis	____
D. Tyrosinase	____
E. Melanosome	____
F. Hyperpigmentation	____
G. Hypopigmentation	____

Descriptions

1. Reduced pigmentation causing an area to appear lighter than surrounding skin.
2. The biological process through which melanin is produced.
3. A specialised cell responsible for producing melanin.
4. Increased pigmentation causing an area to appear darker than surrounding skin.
5. An enzyme with a central role in the melanin-production pathway.
6. A pigment contributing to visible skin and hair colour.
7. A cellular organelle in which melanin is produced and stored before transfer.

Task 1 - Match the terms with the descriptions

6. PIH risk and melanogenesis-modulating ingredients

Match each term with the correct description. Write the correct number in the answer column.

Term	Answer
A. Post-inflammatory hyperpigmentation (post-inflammatory pigmentation in ITEC terminology)	____
B. Fitzpatrick phototypes IV-VI (Fitzpatrick 4+ in ITEC terminology)	____
C. Previous PIH	____
D. Tyrosinase inhibitor	____
E. Melanogenesis-modulating ingredient (melanin suppressor in ITEC terminology)	____
F. Hydroquinone	____
G. Medical referral	____

Descriptions

1. An ingredient intended to reduce or influence melanin production through one or more biological pathways.
2. An ingredient that reduces the activity or expression of the enzyme tyrosinase.
3. A depigmenting medicine named in the ITEC specification that requires appropriate medical oversight and is not for routine SMP practitioner recommendation.
4. Darkening that develops following inflammation or tissue injury.
5. Phototypes with a higher recognised risk of PIH, although PIH can occur in any phototype.
6. Appropriate action when pigmentation is unexplained, persistent, changing or outside professional scope.
7. A history that may indicate increased susceptibility to pigmentation after inflammation.

Task 1 - Match the terms with the descriptions

7. Ultraviolet radiation and protection

Match each term with the correct description. Write the correct number in the answer column.

Term	Answer
A. UVA	____
B. UVB	____
C. SPF	____
D. UVA rating or UVA symbol (UVA-specific sun protector in ITEC terminology)	____
E. Broad-spectrum protection	____
F. Mineral or inorganic UV filters (physical sunscreen in ITEC terminology)	____
G. Organic UV filters (chemical sunscreen in ITEC terminology)	____

Descriptions

1. A measure primarily relating to protection against UVB-induced erythema when used correctly.
2. Filters that absorb UV radiation and convert the energy mainly into small amounts of heat.
3. Radiation that penetrates more deeply than UVB and contributes significantly to photoageing.
4. Protection intended to cover both UVA and UVB wavelengths.
5. Radiation strongly associated with sunburn and epidermal injury.
6. The Boots UVA star rating indicates the balance of UVA protection relative to UVB protection; the UVA symbol in a circle indicates that UVA protection is at least one-third of the labelled SPF.
7. Filters such as zinc oxide or titanium dioxide; modern formulations work mainly by absorbing UV, with some scattering and reflection.

Task 1 - Match the terms with the descriptions

8. Healing risks and treatment decisions

Match each term with the correct description. Write the correct number in the answer column.

Term	Answer
A. Suspected infection	____
B. Excessive trauma	____
C. Overworking	____
D. Treatment postponement	____
E. Referral	____
F. Healing review	____
G. UV protection	____

Descriptions

1. A decision to delay SMP when the scalp is inflamed, infected, sunburnt or incompletely healed.
2. Assessment of recovery, skin response and pigment retention before further treatment.
3. Microbial infection requiring treatment to stop or be postponed, documentation and prompt medical assessment.
4. Tissue injury greater than necessary for controlled pigment implantation.
5. Direction to an appropriate healthcare professional when medical assessment is required.
6. Repeated or excessive implantation within an area, increasing unnecessary tissue injury.
7. Use of shade, suitable headwear and, once appropriate for the healed surface, correctly applied broad-spectrum sunscreen.

Task 2 - Answer the questions

Skin response, wound healing, PIH and UV protection

1. Describe the normal immediate skin responses that may occur during and shortly after SMP treatment.

2. Explain the purpose of haemostasis and what occurs during the early inflammatory phase of wound healing.

3. Describe the main events of the proliferative phase, including the roles of keratinocytes and fibroblasts.

Task 2 - Answer the questions

Skin response, wound healing, PIH and UV protection

4. What occurs during the remodelling phase, why can tissue continue to change after the surface appears healed, and how do the healing phases overlap?

5. Explain the difference between an expected short-term inflammatory response and signs that may indicate abnormal or delayed healing.

6. What is melanogenesis, and what roles do melanocytes, melanosomes, melanin and tyrosinase have in this process?

Task 2 - Answer the questions

Skin response, wound healing, PIH and UV protection

7. What is post-inflammatory hyperpigmentation, and why can controlled skin injury during SMP trigger it in susceptible clients?

8. Which factors should be considered when assessing a client's risk of unwanted pigmentary change, including Fitzpatrick phototype and previous PIH?

9. Explain how tyrosinase inhibitors and other melanogenesis-modulating ingredients may influence pigmentation. Give examples and explain their limitations and professional boundaries.

Task 2 - Answer the questions

Skin response, wound healing, PIH and UV protection

10. Explain the difference between UVA and UVB and why ultraviolet exposure is relevant to SMP healing and long-term appearance.

11. What do SPF and UVA ratings indicate, which current and ITEC terms describe the two main UV-filter categories, and why should protection not rely on sunscreen alone?

12. Explain how appropriate treatment technique, healing management, UV protection, review and referral can support predictable SMP results.

Task 3 - Multiple-choice knowledge test

Select one answer for each question.

1. Which response describes redness caused by increased local blood flow?
A. Erythema
B. Oedema
C. Hypopigmentation
D. Crusting
Answer: _____

2. What is oedema?
A. Loss of melanin
B. Localised tissue swelling
C. Pigment migration
D. Epidermal renewal
Answer: _____

3. Which response may occur when small superficial blood vessels are disrupted?
A. Scar maturation
B. Hair miniaturisation
C. Pinpoint bleeding
D. Hypopigmentation
Answer: _____

4. Which description is most accurate for the clear or pale fluid sometimes seen after controlled SMP injury?
A. Pure lymph confirmed by visual inspection
B. Implanted pigment carrier only
C. Sebum released from every follicle
D. Serous exudate or tissue fluid, referred to as lymph or weeping in some ITEC material
Answer: _____

5. Which response should normally reduce as the skin settles?
A. Temporary erythema
B. Progressive necrosis
C. Permanent ulceration
D. Expanding infection
Answer: _____

Task 3 - Multiple-choice knowledge test

Select one answer for each question.

6. Which phase of wound healing begins immediately after tissue injury?
A. Remodelling
B. Haemostasis
C. Pigmentation
D. Proliferation
Answer: _____

7. What is the main purpose of haemostasis?
A. To increase pigmentation
B. To remove the epidermis
C. To limit blood loss
D. To increase UV sensitivity
Answer: _____

8. Which blood components contribute to clot formation?
A. Melanocytes
B. Fibroblasts
C. Keratinocytes
D. Platelets
Answer: _____

9. Which phase follows haemostasis and involves immune activity?
A. Inflammatory phase
B. Hair-growth phase
C. Pigment-selection phase
D. Photoageing phase
Answer: _____

10. What is one function of neutrophils during early healing?
A. Produce hair shafts
B. Contribute to defence and removal of damaged material
C. Produce implanted pigment
D. Determine skin type
Answer: _____

Task 3 - Multiple-choice knowledge test

Select one answer for each question.

11. Which cells help clear debris and coordinate later repair?
A. Melanocytes
B. Sebocytes
C. Macrophages
D. Hair matrix cells
Answer: _____

12. Which statement about wound-healing phases is correct?
A. Each phase finishes completely before the next begins
B. Only the epidermis participates in healing
C. Remodelling is complete as soon as erythema resolves
D. The phases overlap while haemostasis, inflammation, proliferation and remodelling progress
Answer: _____

13. Which cells principally produce collagen during repair?
A. Fibroblasts
B. Melanocytes
C. Platelets
D. Sebocytes
Answer: _____

14. Which cells contribute directly to restoration of the epidermal surface?
A. Erythrocytes
B. Keratinocytes
C. Adipocytes
D. Osteocytes
Answer: _____

15. What is re-epithelialisation?
A. Permanent darkening
B. Destruction of dermal collagen
C. Restoration of the epidermal surface across an injured area
D. Formation of hair pigment
Answer: _____

Task 3 - Multiple-choice knowledge test

Select one answer for each question.

16. What mainly occurs during the remodelling phase?
A. Inflammation begins for the first time
B. The epidermis is permanently removed
C. Melanocytes disappear
D. Collagen and connective tissue reorganise and mature
Answer: _____

17. Why can tissue continue changing after the surface looks healed?
A. Remodelling continues beneath the surface
B. Healing stops when redness disappears
C. Pigment becomes epidermal
D. UV is required
Answer: _____

18. Which is an expected short-term response after controlled SMP?
A. Progressive ulceration
B. Mild tenderness
C. Spreading pustules
D. Increasing severe pain
Answer: _____

19. Which finding is more concerning than normal early healing?
A. Temporary mild erythema
B. Mild short-term tenderness
C. Increasing redness, pain or swelling
D. Gradual settling
Answer: _____

20. What does overworking mean in SMP?
A. Allowing healing time
B. Taking photographs
C. Recording a batch
D. Repeated or excessive treatment causing unnecessary trauma
Answer: _____

Task 3 - Multiple-choice knowledge test

Select one answer for each question.

21. Why should excessive tissue trauma be avoided?
A. It may increase inflammation and interfere with healing
B. It guarantees retention
C. It prevents pigmentary change
D. It removes need for aftercare
Answer: _____

22. What is melanogenesis?
A. Production of collagen
B. Production of melanin
C. Breakdown of keratin
D. Formation of blood vessels
Answer: _____

23. Which cell produces melanin?
A. Fibroblast
B. Platelet
C. Melanocyte
D. Neutrophil
Answer: _____

24. What is melanin?
A. A type of collagen
B. A clotting protein
C. A dilutant
D. A pigment contributing to skin and hair colour
Answer: _____

25. Which enzyme has a central role in melanin synthesis?
A. Tyrosinase
B. Collagenase
C. Lipase
D. Amylase
Answer: _____

Task 3 - Multiple-choice knowledge test

Select one answer for each question.

26. Where is melanin produced and stored before transfer?
A. Platelets
B. Melanosomes
C. Sebaceous glands
D. Fibroblasts
Answer: _____

27. What does hyperpigmentation mean?
A. Complete absence of blood flow
B. Reduced pigmentation
C. An area appears darker due to increased pigmentation
D. Loss of epidermal thickness
Answer: _____

28. What does hypopigmentation mean?
A. Increased redness
B. Increased collagen
C. Increased hair density
D. Reduced pigmentation causing a lighter area
Answer: _____

29. What is post-inflammatory hyperpigmentation?
A. Darkening following inflammation or injury
B. An SMP pigment mixture
C. Permanent erythema
D. Loss of all melanocytes
Answer: _____

30. Why can SMP trigger PIH in a susceptible client?
A. SMP stops melanogenesis
B. Controlled skin injury and inflammation can stimulate melanogenesis
C. Needles remove melanin
D. SMP prevents inflammation
Answer: _____

Task 3 - Multiple-choice knowledge test

Select one answer for each question.

31. Which client history may indicate increased PIH risk?
A. A recent haircut without scalp injury
B. Naturally straight hair
C. Previous darkening after skin injury or inflammation
D. Routine clinical photography
Answer: _____

32. Which Fitzpatrick phototypes are recognised as having a higher PIH risk, although PIH can occur in any phototype?
A. I-II only
B. II-III only
C. Fitzpatrick phototype does not contribute to risk assessment
D. IV-VI (Fitzpatrick 4+ in ITEC terminology)
Answer: _____

33. What is the intended action of a tyrosinase inhibitor?
A. To reduce the activity or expression of tyrosinase and thereby influence melanogenesis
B. To increase collagen breakdown
C. To dissolve implanted SMP pigment
D. To guarantee that PIH cannot occur
Answer: _____

34. Which ingredients can influence melanogenesis?
A. Glycerine, saline, petrolatum and water
B. Azelaic acid, kojic acid, niacinamide and L-arbutin
C. Lidocaine, adrenaline, alcohol and chlorhexidine.
D. Collagen, keratin, elastin and fibrin
Answer: _____

35. Which statement about melanogenesis-modulating ingredients is safest?
A. They guarantee prevention of PIH in Fitzpatrick IV-VI
B. Hydroquinone can be routinely prescribed by any SMP practitioner
C. They may irritate the skin and must be considered according to the complete product, current skin condition and professional scope
D. They should be applied to freshly broken SMP skin
Answer: _____

Task 3 - Multiple-choice knowledge test

Select one answer for each question.

36. Which statement best distinguishes UVA from UVB?
A. UVA affects only hair and UVB affects only nails
B. UVB penetrates more deeply than all UVA wavelengths
C. UVA and UVB have identical biological effects
D. UVA generally penetrates more deeply and contributes strongly to photoageing; UVB is strongly associated with erythema and sunburn
Answer: _____

37. What minimum SPF is specified in UBT446 for post-treatment sun protection?
A. SPF 30
B. SPF 10
C. SPF 15
D. SPF 20
Answer: _____

38. What does SPF primarily indicate?
A. Protection against visible light
B. Protection mainly relating to UVB-induced erythema when correctly applied
C. Exact protection against every UVA wavelength
D. The amount of melanin in the client's scalp
Answer: _____

39. Which UK label indicates appropriate UVA protection alongside SPF 30 or higher?
A. A 1-star UVA rating only
B. A fragrance-free statement
C. At least 4-star UVA protection or the UVA symbol in a circle
D. The word waterproof without any rating
Answer: _____

40. What does broad-spectrum sun protection mean?
A. Protection against infrared radiation only
B. One application provides permanent protection
C. The product is suitable for open wounds
D. Protection intended to cover both UVA and UVB
Answer: _____

Task 3 - Multiple-choice knowledge test

Select one answer for each question.

41. Which current term corresponds most closely to physical sunscreen in ITEC terminology?
A. Mineral or inorganic UV filters
B. Organic UV filters
C. Tyrosinase inhibitors
D. Chemical exfoliants
Answer: _____

42. Which current term corresponds most closely to chemical sunscreen in ITEC terminology?
A. Mineral pigment implants
B. Organic UV filters
C. Physical barriers only
D. Melanin suppressors
Answer: _____

43. When is sunscreen appropriate after SMP?
A. It should always be rubbed into actively bleeding skin
B. Only after 12 months
C. According to product and aftercare guidance once the surface is sufficiently healed; use shade and suitable headwear earlier
D. It replaces all other aftercare
Answer: _____

44. Why must sunscreen be applied and reapplied according to product instructions?
A. Reapplication permanently increases the client's Fitzpatrick type
B. A thin application provides the labelled SPF indefinitely
C. Application method has no effect on protection
D. Stated protection depends on sufficient, even application and appropriate reapplication
Answer: _____

45. Which combination provides the most complete UV-protection approach for a healed exposed scalp?
A. Broad-spectrum SPF 30+, adequate UVA rating, shade and suitable protective headwear
B. SPF alone, regardless of application
C. Pigment dilution and clinical photography
D. A darker SMP pigment instead of sunscreen
Answer: _____

Task 3 - Multiple-choice knowledge test

Select one answer for each question.

46. What should a practitioner do if healing is significantly delayed?
A. Implant more pigment
B. Reassess and refer appropriately when required
C. Increase depth
D. Ignore it
Answer: _____

47. Why should SMP not be performed over active infection?
A. Infection improves retention
B. Pigment sterilises tissue
C. Treatment could further disrupt tissue and increase risk
D. Infection has no effect
Answer: _____

48. What is the safest response to persistent or worsening inflammation?
A. Continue treatment
B. Increase density
C. Apply darker pigment
D. Stop or postpone and arrange appropriate assessment
Answer: _____

49. Why assess the healed result before further SMP?
A. To evaluate recovery, retention and skin response before adding treatment
B. Fresh appearance is always final
C. Healing does not affect appearance
D. Every session must be identical
Answer: _____

50. What is the safest overall principle for skin response and healing in SMP?
A. Use the same technique and schedule for everyone
B. Assess response, allow healing, minimise trauma and adapt or refer if abnormal
C. Continue whenever redness is present
D. Use maximum density first
Answer: _____