

# Integumentary System

## Case Study

**PLANNING NOTES:** (1) **Teams:** 4 students; (2) **Length:** Approx. 3 classes (Day 1: Subjective & Objective; Day 2: Pre-Assess questions; Assessment & Plan; Day 3: Informal Presentations); (3) **Resources Needed:** Audio projection; Computers (Day 2, optional Day 1); Copies of student workbook

### Tanya's Case: Deadly Flames

#### OVERVIEW:

Tanya, an 8-year-old Hispanic female, is in transport by an ambulance to the emergency room (ER) after being rescued from her burning house. She was asleep at night when a spark from a cigarette started a fire, leaving her trapped in her bedroom. By the time the fire rescue squad arrived and got her out, she had suffered severe injuries.

#### GOALS:

**SOAP Note:** If students have NOT done modules/case studies using the SOAP method, some prep is required (suggestion: 2-3 class periods. See SOAP resource lessons).

1. Identify **subjective** and **objective** data in a complex scenario.
2. Create an aligned, thoughtful, and evidence-based **plan**.

#### ROLE:

You are the trauma team in the burn unit at the regional hospital. Your team is composed of a variety of healthcare providers including an **ER technician** who is interested in the prevention of infection, a **paramedic** who has lots of experience with patients going into shock, an **emergency medicine physician** who specializes in burns, and an **ER nurse** who has years of experience helping in pain management for children.

**Groups:** Consider assigning groups randomly for this case study & varying them randomly for future case studies. Students need to practice teamwork with a diverse range of individuals.

#### OBJECTIVE:

**Obj. 14.1:** Identify the structures, functions, and pathophysiology of the integumentary system.

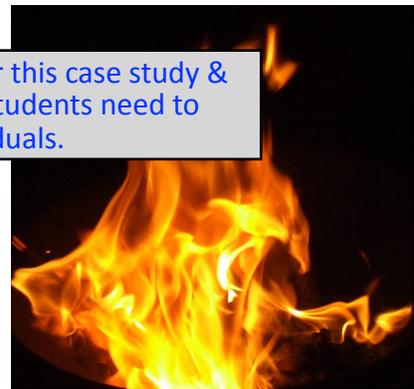
#### DELIVERABLE:

- 1) SOAP Note with Pre-Assessment Guiding Questions
- 2) Informal Presentation

#### ASSESSMENT CRITERIA:

**Subjective & Objective Sections:** 1) organized & recorded clearly & accurately; 2) info is aligned with appropriate section and question; 3) key points summarized

**Plan Sections:** 1) comprehensive (includes physical, social & mental health); 2) aligned to facts of the case; 3) evidence-based; 4) addresses short- & long-term



**Note on use of case studies:** These case studies are designed to be used as an introduction to a body system in an A&P course OR as a supplement &/or authentic assessment tool to the middle or end of unit. The case studies are compatible with any other A&P curricula & reference online resources so that no formal text or other curricular source is required. They can also be used in a shorter "survey"/case-based course of A&P to give students a preview of applications for A&P, while engaging & "hooking" them on A&P! :)

Health Care Provider Roles:

Determine the role of each team member. Then share at least one other interest related to health and/or this particular case scenario.

Team Member	Role	Specialty...	Also interested in...
	<b>ER technician</b>	Prevention of infection	
	<b>Paramedic</b>	Treatment of Shock	
	<b>Emergency Medicine Physician</b>	Treatment of burns	
	<b>ER nurse</b>	Pain management for children	

**Roles:** If a 5th team member is present, challenge students to come up with an additional role based on what types of other they would expect to be present in this environment (there are many options: social worker, CNA, respiratory therapist, child life specialist, grief counselor, burn specialist, etc.

### Case Study Steps:

**Steps:** This checklist will help orient students, encourage them to manage their time and tasks, and help them process the flow of the case.

\_\_\_\_\_ 1. Review the coversheet information carefully. Ask questions to clarify your challenge.

\_\_\_\_\_ 2. Assign team roles. Discuss what how you will carry out these roles to make an effective team.

\_\_\_\_\_ 3. Listen to Clip 1, recording all information into the **Subjective** & **Objective** sections; repeat for Clip 2.

\_\_\_\_\_ 4. Complete the *Pre-Assessment Guiding Questions*.

\_\_\_\_\_ 5. Write out your SOAP **Assessment**, including an estimate of the extent and severity of Tanya's burns.

\_\_\_\_\_ 6. Research information on the care and treatment of severe burns and associated health issues.

\_\_\_\_\_ 7. Create a **Plan** for Tanya's treatment addressing the care she will receive within: (1) 1 hr; (b) 24 hrs; (c) 1 wk

\_\_\_\_\_ 8. Prepare an informal presentation of Tanya's Assessment & Plan to present during "Rounds."

## Paramedic Calls Transcript:

**AUDIO:** Play the audio file that accompanies case resources if audio projection is available.

### Clip 1:

*Paramedic:* This is Unit 701. We have an 8-year-old female who has suffered from severe burns to her lower extremities, hands, and abdomen and minor flash burns to the face following a house fire. Burns appear gray-white with red, blistered borders. Patient just regained consciousness, but disoriented and verbally unresponsive. Vitals are unstable with blood pressure = 60 / 40; heart rate = 165 [beats / min].; and respiratory rate = 35 [breaths / min]. Medications and allergies are unknown. Medical history also unknown. Parents are in transit to the hospital, but no family members were present upon our arrival. Estimated arrival at UIC Burn Unit in 10 minutes.

**AUDIO:** Play the audio file that accompanies case resources if audio projection is available. Encourage student to just listen while the audio plays, then use the transcript below to take the notes in the SOAP Note.

**Clip 2:**

<i>Paramedic</i>	<i>Tanya</i>
"How are you feeling now?"	"It hurts."
"Can you tell me your name?"	"Tanya."
"Tanya, do you know where you are?"	"On an ambulance?"
"Do you know what day it is?"	"I don't remember"
"Tanya, do you remember what happened?"	"There was a big fire and I couldn't get out"
<i>Patient is alert &amp; oriented (Person, Place, Time &amp; Event) so paramedic moves on to SAMPLE history.</i>	
"Tanya, my name is Mike and I'm going to help you while we go to the hospitals so the doctors can take care of you. That means I'm going to have to ask you some more questions and continue to check that you're doing ok by taking your blood pressure and pulse rate every few minutes. Is that ok?"	"Yea."
<div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p><b>THOROUGHNESS:</b> Remind students to be thorough when documenting the details in the SOAP note. Even if a detail seems irrelevant, it may be important later. Simultaneously, encourage them to be succinct &amp; concise in their notes.</p> </div>	
"Tanya, do you know if you are allergic to anything, like any medicines?"	"I don't know"
"Ok. Do you take any medicines?"	"No, only when I had an ear infection, but that was a long time ago."
"Do you remember the last time you ate something?"	"I had macaroni and cheese for dinner."
"Do you remember what happened before you were in the ambulance?"	"I was sleeping and I woke up very hot and sweaty and it was all smoky. I tried to run out of my room to find my brother and the fire was really hot and I got burned, so I went back to my room and hid in the closet. But then I don't remember."
<i>The paramedic has obtained the SAMPLE history and now moves on to an evaluation of the pain from Tanya's burns using the FARCOLDER method of interviewing.</i>	
"Tanya, I'd like you to tell me how you're feeling now. First, can you tell me where it hurts?"	"It hurts the most on my hands, but my tummy hurts too and different parts of my legs."
"Can you describe what the burn on your right hand feels like?"	"I can't feel it in the middle, but it stings around the outside, by my wrist."
"Tanya, does anything else bother you right now besides the pain from where the fire touched you?"	"It's just a little hard to breath."
"Thanks Tanya. You're a really brave girl and we're going to make sure you get all better, ok? Just hang in there we're almost there."	"Ok."
<i>Note: The paramedic skipped some of the categories that did not apply to the burn situation, including Frequency, Radiation, Onset, Duration, Exacerbating and Relieving factors)</i>	

**SOAP Note – TANYA CASE KEY!**

**Subjective:**

Signs & Symptoms*	Severe burns to face, abdomen, limbs, with pain; <u>uncounscious</u> for short time, possible circulatory shock risk
Allergies	Unknown
Medications	Unknown, <u>possible</u> past medication use for ear infection
Past medical history Social: <u>alcohol, smoke, drug use, marital status, children, occupation, sexual history, living situation, etc.</u> Family: <u>conditions &amp; diseases run in the family</u>	- <u>Pilsen</u> resident -Med history unknown, <u>except</u> possible ear infection -Parents meeting at hospital
Last oral intake	Macaroni & cheese, dinner
Events leading to injury or illness	House fire, cigarette, awoken from sleep & trapped in closet in room, parents not home at time of fire, Pt. was running through house in smoke searching for brother, status of brother unknown
*Frequency	n/a
*Associated Symptoms	Difficulty breathing
*Radiation	n/a
*Character	Painful hands, stomach and legs, lack of feeling in center of burns, stinging on borders, esp. near wrists
*Onset	n/a
*Location	Hands, stomach, legs, wrists
*Duration	n/a
*Exacerbating Factors	n/a
*Relieving Factors	n/a

**Objective:**

Measurements	8 yr old, Hispanic female
Vital Signs	BP = 60/40, <u>HR</u> = 165, RR = 35 Regained consciousness during transport, verbally unresponsive, disoriented
Physical Exam Results	Severe burns: lower limbs, hands, abdomen; <u>Flash</u> burns: face Gray-white with red-blistered borders
Lab Results	n/a

**PURPOSE:** These questions will help learners connect the case study patient scenario with the structure, function & pathophysiology of the skin system.

**USE OF THESE QUESTIONS:** The amount of time students need to research answers to these questions will depend on the concurrent or previous level of instruction/pre-reading about the skin system.

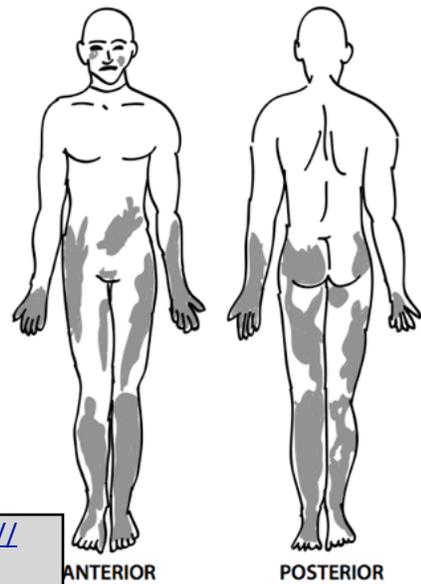
*Pre-Assessment Guiding Questions:*

1. Describe the difference between 1st, 2nd, & 3rd degree burns & explain the importance of the "Rule of Nines."

Source suggestion: MedLine Plus "Burns"  
<http://www.nlm.nih.gov/medlineplus/ency/article/000030.htm>

2. As you examine Tanya, her burns follow the pattern in the diagram. Gray areas represent the burns. A detailed estimate of the qualitative and quantitative characteristics of her burns is necessary for your **Assessment**. Estimate the **severity** (1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup> degree) and **extent** (using Rule of Nines).

Source suggestion: Wikipedia: "Total body surface area" <[http://en.wikipedia.org/wiki/Total\\_body\\_surface\\_area](http://en.wikipedia.org/wiki/Total_body_surface_area)> - student answers will vary, but should be within a realistic range (~33%)



3. What are the main functions of the integumentary system?

Skin prevents us from desiccation (drying out), protects us from bacterial invaders (along with mechanical, chemical, UV, and thermal damage), helps in temperature regulation, aids in excretion of urea and uric acid, synthesizes vitamin D, and helps us sense touch, pressure, temperature and pain.

4. Given what you know about Tanya's burns, which **2-3 functions of the skin** are most in danger?

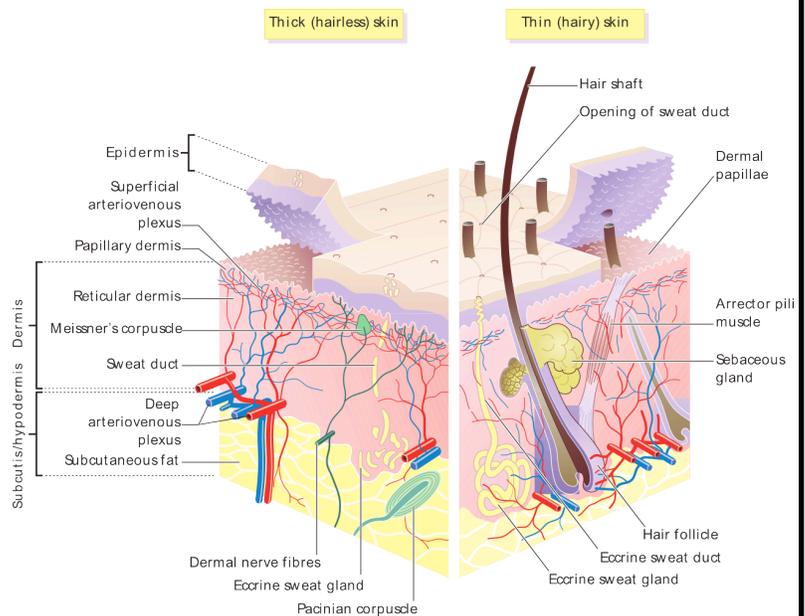
When the skin is burned the barrier that protects the inside of our bodies is broken, causing dehydration, electrolyte imbalance, and severe infection, and even death in the most serious cases.

5. Given the major threats to the body upon severe burning, list the **top 2-3 concerns** you have for Tanya.

Shock, infection, dehydration/electrolyte imbalance.

6. Given the **severity** of Tanya's burns, label or note which structures of the skin may be damaged.

Both epidermal and dermal structures.



Credit: Wikimedia Commons (User: Madhero88)

<b>Assessment:</b>	
Summary	An 8 year old, Hispanic female with severe burns to the legs, hands, and abdomen and flash burns to the face with vital signs showing risk of circulatory shock, has recently gained consciousness and is disoriented with trouble breathing.
Differential Diagnosis List	
Diagnosis	Burns covering 33% of body with third-degree burns on legs and hands, second-degree on abdomen and parts of limbs, first degree on face. Vitals show circulatory shock risk with low BP and high HR/RR.

**Plan:**

Plan steps	<p><b>1 hour (Immediately):</b></p> <ul style="list-style-type: none"> <li>Aggressive IV fluids until vitals <u>stabalize</u>; keep in pediatric intensive care unit until transfer to burn unit is possible</li> <li>Broad-spectrum antibiotic</li> </ul> <p><b>24 hours:</b></p> <ul style="list-style-type: none"> <li>Debridement of burns</li> <li>Application of a broad-spectrum, topical antibiotic</li> <li>Plastic epidermal graft applied over burned areas</li> <li>Social work and therapist support with visits to Tanya 2x/day for the first few days to help her process the events</li> </ul> <p><b>1 week:</b></p> <ul style="list-style-type: none"> <li>Change position in bed every 2 hours to prevent the formation of <u>decubitus</u> ulcers (i.e. bedsores)</li> <li><u>Nasogastric</u> tube feeding of 5000 calories ("Kcals") per day</li> <li>After 9 weeks, graft sheets of cultured epidermal cells to her regenerating dermal layer</li> <li>By the 15th week of hospitalization, her epidermal graft will be complete, and she should be back on solid foods, her antibiotics were discontinued, and <u>discharged</u> from the hospital with a rehabilitation plan for both physical and occupational therapy at home, as well as twice-weekly visits by a nurse and once-weekly visits with social worker and psychologist.</li> </ul>
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**PLAN:** Before students complete the plan, remind them to go to the following page (research graphic organizer table) and split up to do background research so that their plan is evidence-based, well-researched, & understood by all team members.

Research:

Team Member	Research Focus	Notes from Team Member

**RESEARCH:** Have students complete this before writing her final plan. Before students decide what they will focus on for research, remind them to think about their interest/areas of expertise as well as the key issues in Tanya’s management that must be addressed in her plan (i.e. preventing infection; maintaining hydration; preventing shock, etc.). Once research is complete have them return to teams and share information, noting the key points from one another’s reports. Remind them to ask questions and write any follow-up questions or points of confusion or clarification they need to look up prior to deciding on the plan.

**ROUNDS: Informal Patient Presentation**

Tanya is transferred to the pediatric intensive care burn unit. The healthcare team completes “rounds” for each patient in this unit each morning. This process involves a verbal report of the patients status, treatment plan, and progress, followed by a team discussion of what adjustments to the course of treatment or next steps of the plan should be made. It is an interactive dialogue, involving doctors, nurses, social workers, dietitians, specialists, and sometimes even other health care professionals. The parents are often present as well for part or all of the meeting.

It is the morning after Tanya was brought in. Prepare for a brief summary of Tanya’s condition, current treatment plan, and progress. You may decide how her case is progressing and determine all relevant details. Be sure each team member completes a portion of the patient presentation and be ready to share with the class!

Team Member	Focus Area	Presentation Notes
<p><b>INFORMAL PRESENTATIONS:</b></p> <p>Suggestions:</p> <ol style="list-style-type: none"> <li>1) Stage a bed with a fellow classmate volunteering to be Tanya and others posing as her parents. “Rounds” are sometimes conducted in the patient’s room, at bedside, and other times are conducted in the hallways around the rooms or in a conference room or other private location, if needed. The teams presenting should be standing.</li> <li>2) Give students a maximum of 4 minutes to present information; then allow the parents or audience members (posing as other healthcare team members) to ask questions or “push back.” The idea of disagreement and discussion to be sure the BEST possible plan and conclusions are reached is essential to good team outcomes and a functional, highly effective healthcare team.</li> <li>3) Since the presentations are informal, as is the case in the authentic scenario (“on rounds”), have students self-evaluate their performance. Discuss as a class what factors were positive and could be improved about presentations as a whole.</li> </ol>		