

Review Article

How to Teach Our Medical Students to Develop Metacognitive Skills? Practical Example Based on Teaching Management of Major Burns

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Abstract

Metacognitive skills are imperative for enhancing students' learning capacity in health professions education (HPE). To develop competent, self-regulated learners, metacognition is receiving increasing recognition and importance in HPE. What is metacognition? It refers to meaningful thinking about one's own thinking processes. Mindful learners possess metacognitive skills and habits, which are essential for healthcare professionals. Medical teachers should have mastery of these skills and strive to inculcate them in their students. Explicit teaching of metacognitive skills supports the process of self-regulated learning. Medical teachers should integrate metacognition into their daily teaching routines and classroom discussions. This, in turn, will create a learning environment that significantly enhances students' learning. The current review article has been written to comprehensively address the important aspects of teaching HPE students how to develop metacognitive skills and enhance mindfulness in learning.¹⁻³

Key words: Health professions education. Metacognition. Metacognitive skills.

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1. Introduction of Major Burns as the Topic for Teaching Metacognition Strategies

Burns are endemic in the developing world including our country. They may result from exposure to fire flames, hot liquids, electric current, chemicals, or radiation insults. When the affected body surface area exceeds 20%, these are termed as major burns. Locally, the burn wound is characterized by three distinct zones of tissue insult. i.e., zones of coagulation, stasis and hyperemia. Systemically, the major burns are characterized by four major phases. These include the emergent phase, fluid shift phase (also called Burn shock), hypermetabolic phase and resolution phase.⁴⁻⁶

Etiologically, the common types of burns include:1) flame burns (secondary to fire/ flames), 2) scalds

(secondary to contact with hot liquids), and 3) electrical burns (secondary to contact with electrical current).⁷

The most crucial factors in the initial assessment of these patients include determination of the extent (i.e., total body surface area affected) and the degree (i.e., depth) of burns and ruling out any associated inhalation injury.⁴

All patients with major burns need hospitalization. Their management entails the standard ABCs of trauma care, treatment of the burn wound, intravenous fluids, tetanus prophylaxis, analgesia, antibiotics and nutritional care. The surgical interventions that may be

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needed include emergency escharotomies, fasciotomies, debridement, amputations and early excision and skin grafting for the deep wounds.⁸⁻¹¹

2. Planned Teaching Sessions Will Include

- I. Lecture on Burns
- II. Supervised performance of endotracheal intubation, Passing
- III. intravenous line and Foley's catheterization.
- IV. Supervised performance of history taking and Counseling.

EXAMLE(LECTURE):

Photographs will be presented to the students to indirectly help them point out the causes of commonly encountered burns. (Figures 1-6)

A) Figures 1 through 6: Cues for pointing out the causes of commonly encountered burn injuries.

The questions are:

1. Flame burns are caused by-----
2. Scald burns are caused by-----
3. Electrical burns are caused by-----



Figure 1: (Flame burns)



Figure 2: (Scald burns)



Figure 3: (Electrical burns)

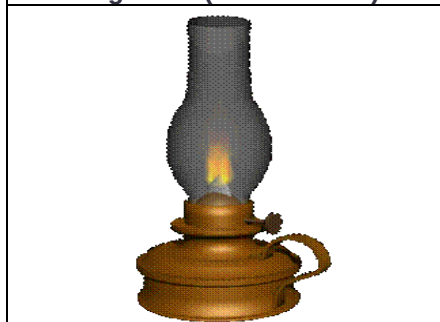


Figure 4: (Fire flames causing flame burns)



Figure 5: (Hot liquids and beverages causing scalds)



Figure 6: (Electrical insults causing electrical burns)

3. Strategies to Enhance Metacognition of the Students

Metacognition is a person's conscious awareness of and understanding of his own thought processes. It is commonly defined as thinking about thinking, cognition about cognition or knowing about knowing. The process of metacognition consists of metacognitive knowledge and metacognitive regulation.¹²⁻¹⁵

1) CUES:

Cue is a hint which alerts the student where to focus or respond.¹²

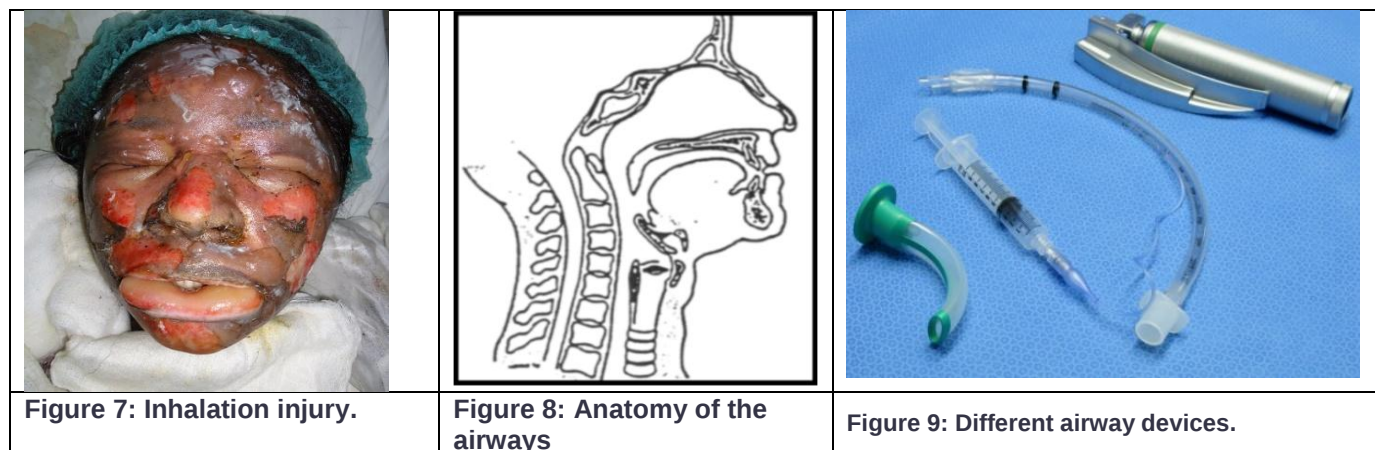
EXAMLE (WARD):

In case of inhalation burn injury, one key step in the management is to secure the definitive airway with endotracheal intubation. During the ward sessions, the students will perform endotracheal intubation under supervision. Photographs will be presented to them to indirectly help them answer the question: What is the most crucial step in managing a patient with inhalation injury? (Figures 7-9)

2) PROPTS:

Prompt is a type of scaffolding wherein a step-by-step guidance is provided that will pull the student through the task till its completion.^{12, 15}

B) Figures 7 through 9: Cues for performing endotracheal intubation in inhalation burn injury patients.

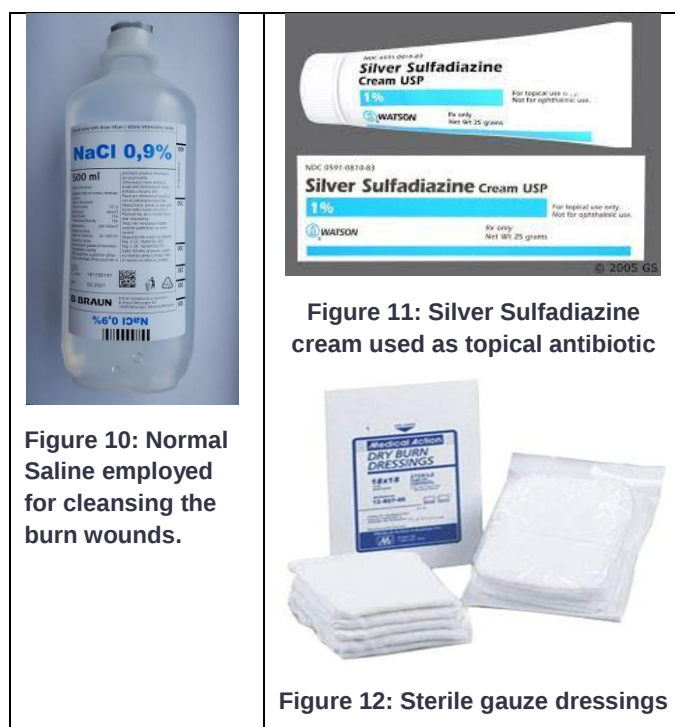


EXAMPLE (LECTURE): Photographs will provide guidance for the student to show concept about wound dressing. (Figures 10-19)

C) Figure 10 through 19: Prompts to show concept about wound dressing.

The steps will be:

1. Collect the items needed for cleansing and dressing a burn wound.
2. Collect the Personal protection equipment.
3. Identify the required supporting staff.



EXAMPLE (WARD): Photographs will provide guidance for Foley's catheterization. (Figures 20-31)

D) Figures 20 through 31: Prompts for Foley's catheterization.

The steps will be:

1. Take consent
2. Sterile precautions
3. Identify the equipment needed
4. Identify the supporting staff needed
5. Carry out the procedure



Figure 20: Taking consent for the procedure.



Figure 21: Foley's catheter



Figure 22: Xylocaine gel for Foley's catheter.



Figure 23: Distilled water Foley's catheter.



Figure 26: Sterile gauzes for cleansing the area.



Figure 24: Disposable syringe for Foley's catheter



Figure 25: Pyodine used as antibacterial material for cleansing the surgical/procedural field.



Figure 27: Gloves



Figure 28: Gowns



Figure 29: Surgical masks



Figure 30: Surgical caps



Figure 31: Auxiliary/ Nursing staff.

3) QUESTIONS

Well-designed questions serve several objectives. They stimulate knowledge-seeking, prompt comprehension, generate discussion and promote critical thinking. Hence the student is actively engaged in deep learning. The students should be taught to develop the art of self-questioning.¹⁶⁻²¹

EXAMPLE (LECTURE):

The students should phrase self-questions about the lecture in order to promote their deep learning:

1. What are my objectives for this lecture?
2. How can I achieve these?
3. What do I already know about burns?
4. What do I need to know about burns?
5. How can I better avail this learning opportunity by avoiding mistakes I committed in previous such lectures?

EXAMPLE (WARD):

The students would phrase self-questions about the ward round:

1. What are my learning objectives for the ward round?
2. How can I achieve learning?

4) SCAFFOLDING:

It is a temporary support which may be given in the form of elaboration of meaning or concept, procedural guidance, use of tools, prompts, helping with strategy development and expert modeling or advice. There are four main types of scaffolds. i.e. conceptual, metacognitive, procedural, and strategic.²²⁻²⁵

EXAMPLE (LECTURE):

The students will be provided with scaffolding for taking history from a patient.

EXAMPLE (WARD):

The students will be provided with procedural scaffolding to perform intravenous cannulation.¹

5) SCHEMA DEVELOPMENT:

For schema development, first relevant prior knowledge of the student is activated and then new information is layered upon it.²⁶

EXAMPLE (LECTURE):

Photograph of normal skin structure will be displayed and the skin histology will be highlighted to activate prior knowledge. Further discussion will build a scenario to understand the structural and functional consequences of skin damage secondary to burn injuries. This will help to develop schema regarding burns. (Figure 32; APPENDIX-5)²

1. What are the learning objectives?
2. What is my prior knowledge about burns?
3. What unresolved queries I have in my mind about burns?
4. How can I best benefit from this lecture?

EXAMPLE (WARD): (Counseling)

The prior knowledge of students regarding counseling will be first activated and then schema development regarding counseling the attendants of a major burn patient will be done. Emphasis will be on explaining the extent of burn injury, management plan, prognosis and documenting this communication.

6) PLANNING:

During planning we think about "how" to proceed to accomplish the task. Strategies, tools and techniques that help with the process are decided. Also, conscious attention is paid not to repeat past mistakes.^{15, 27}

EXAMPLE (LECTURE):

Students will be instructed to plan ahead for the lecture and brainstorm with the questions:

EXAMPLE (WARD):

Students will ponder with the following questions:

1. How my planning for the today's round will help me learn more about managing these patients?
2. Have I allotted enough time to prepare for the round?
3. Have I searched the literature to know the guidelines applicable to the management of these patients?

7) REGULATION:

Students benefit from regulating their understanding throughout their learning activities. This keeps them mindful of their learning process and goal achievement. They can ensure regulation by noting key concepts and writing self-questions during their learning activity.^{15, 27-31}

EXAMPLE (LECTURE):

Following are the self-questions to promote student's self-regulation about learning:

1. Can I differentiate key information from details on burns? If not, how will I do this?
2. What insights am I gaining as I experience this lecture on burns?
3. What questions are arising in my mind during the lecture on burns?

E) Figure 32: Schema development regarding skin damage by burns.

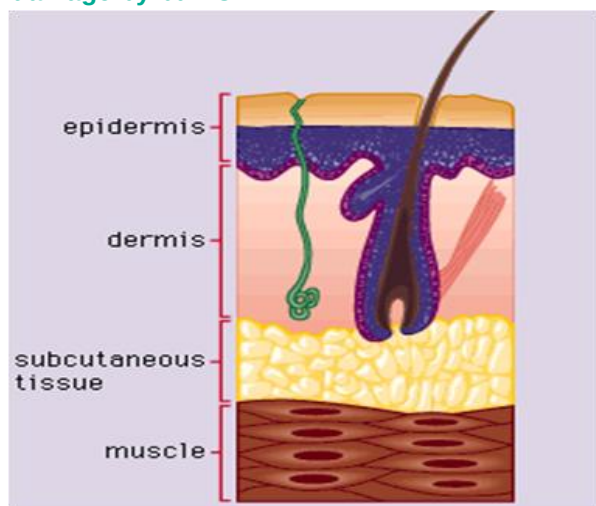


Figure 32: Normal structure of the skin.

EXAMPLE (WARD):

Self-questions to promote student regulation about learning:

1. Am I able to correctly manage the patient as per standard guidelines?
2. Am I able to document my clinical notes on patient's file? Does this reflect a professional approach?
3. Am I able to make correct clinical decisions? Do I have a sound knowledge or I am making assumptions?

8) EVALUATION:

By evaluation, students become more self-aware of their progress and learning. ^{15, 27, 32}

EXAMPLE (LECTURE):

The following questions students should ask themselves:

1. What was today's lecture about?
2. What were the most interesting aspect and the muddiest part?
3. What are my unresolved questions? How and where I can find the answers?

EXAMPLE (WARD):

The following questions students should ask themselves:

1. How well I connect my theoretical knowledge of burns to practice? What should I do to improve this further?
2. Am I allocating enough time for preparation for the ward rounds and patient's management?
3. Am I well-integrated with the interprofessional health care team?

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