

# **SURGICAL PATHOLOGY**

**TEACHER BOOK SENIOR 5  
ASSOCIATE NURSING PROGRAM**

**First Edition**

© 2024 Rwanda Basic Education Board

*All rights reserved.*

*This Teacher's Guide is the property of Rwanda Education Board  
Credit should be given to REB when the source of this book is quoted.*

# FOREWORD

## Dear Teacher,

The Rwanda Basic Education Board is pleased to present this Teacher's Guide for the Associate Nursing Program. This guide is designed to support competence-based teaching and ensure consistency in delivering the Surgical Pathology subject. The Rwandan educational philosophy aims to help student-associate nurses achieve their full potential, preparing them to address community health needs and pursue career opportunities.

To enhance education quality, the government of Rwanda emphasizes the alignment of teaching materials with the syllabus. Effective teaching relies on the relevance of content, pedagogical approaches, assessment strategies, and instructional materials. The guide focuses on activities that promote learning, allowing students to develop ideas and make discoveries.

In a competence-based curriculum, learning involves actively building knowledge and skills through activities, scenarios, and real-life applications. Your role as a teacher includes:

- Planning lessons and preparing teaching materials.
- Organizing group discussions and collaborative learning.
- Engaging students through active learning methods such as inquiry, research, and group work.
- Supporting and facilitating the learning process by valuing student contributions and guiding them towards integrating their findings.

This guide is divided into three parts:

1. Explains the book's structure and provides methodological guidance.
2. Offers sample lesson plans for reference.
3. Provides detailed teaching guidance for each concept in the student book.

Although the guide includes answers to student book activities, please review each question and activity before assessing student responses.

I extend my gratitude to everyone involved in developing this guide, including the Ministry of Health, University of Rwanda, and other institutions. Special thanks go to faculty members, nurses, midwives, teachers, illustrators, designers, Health Workforce development staff/MoH, and REB staff for their dedicated work.

**Dr. MBARUSHIMANA Nelson**

**Director General, REB**

## **ACKNOWLEDGEMENT**

I would like to express my deep gratitude to everyone who contributed to the development of this teacher's guide. The project would not have succeeded without the support of numerous stakeholders. I extend special thanks to the Ministry of Health for leading the development process. My appreciation also goes to the Health Workforce development staff/MoH, REB staff, University of Rwanda, College of Medicine and Health Sciences, Staff from Health Private training institutions, Teaching hospitals, Level Two Teaching hospitals, district hospitals, National Council of Nurses and Midwives (NCNM), Rwanda Nurses and Midwives Union (RNMU) and Secondary schools having Associate Nursing program. Additional thanks are due to the Ministry of Health, the Ministry of Education, and the Clinton Health Access Initiative (CHAI) for their financial support.

**Ms. MURUNGI Joan**

**Head of Curriculum, Teaching, and Learning Resources  
Department / REB**

# Contents

<b>FOREWORD</b> .....	<b>iii</b>
<b>ACKNOWLEDGEMENT</b> .....	<b>iv</b>
<b>PART 1 GENERAL INTRODUCTION</b> .....	<b>1</b>
1.1. The structure of the guide .....	1
1.2. Methodological guidance .....	3
<b>PART 2: SAMPLE LESSON PLAN</b> .....	<b>13</b>
<b>PART 3: UNIT DEVELOPMENT</b> .....	<b>18</b>
<b>UNIT 1: ABCESS AND PHLEGMON</b> .....	<b>19</b>
1.1. Key Unit competence .....	19
1.2. Prerequisites .....	19
1.3. Cross-cutting issues to be addressed.....	19
1.4. Guidance on the introductory activity.....	19
1.5. List of lessons .....	20
1.6. Summary of the unit.....	24
1.7. Additional information.....	24
1.8. End unit assessment.....	25
1.9. Additional activities .....	25
<b>UNIT 1: SKIN ULCERS AND STOMIES</b> .....	<b>28</b>
2.1. Key Unit competence .....	28
2.2. Prerequisites .....	28
2.3. Cross-cutting issues to be addressed.....	28
2.4. Guidance on the introductory activity.....	28
2.5. List of lessons .....	29
2.6. Summary of the unit.....	39
2.7. Additional information.....	40
2.8. End unit assessment.....	41
2.9. Additional activities .....	42

<b>UNIT 1: CONTUSIONS, SPRAINS AND STRAINS</b> .....	<b>45</b>
3.1. Key Unit competence .....	45
3.2. Prerequisites .....	45
3.3. Cross-cutting issues to be addressed.....	45
3.4. Guidance on the introductory activity.....	45
3.5. List of lessons .....	46
3.6. Summary of the unit.....	48
3.7. Additional information.....	49
3.8. End unit assessment.....	49
3.9. Additional activities .....	50
<b>UNIT 1: DISLOCATION AND FRACTURE</b> .....	<b>52</b>
4.1. Key Unit competence.....	52
4.2. Prerequisites .....	52
4.3. Cross-cutting issues to be addressed.....	52
4.4. Guidance on the introductory activity.....	53
4.5. List of lessons .....	54
4.6. Summary of the unit .....	60
4.7. Additional information.....	60
4.8. End of unit assessment .....	61
4.9. Additional activities.....	62
<b>UNIT 5: BURN CONDITIONS</b> .....	<b>66</b>
5.1. Key Unit competence.....	66
5.2 Prerequisites .....	66
5.3. Cross-cutting issues to be addressed.....	66
5.4. Guidance on the introductory activity.....	66
5.5. List of lessons .....	67
5.6. Summary of the unit.....	74
5.7. Additional information.....	74
5.8. End unit assessment.....	76
5.9. Additional activities .....	77
<b>REFERENCES</b> .....	<b>79</b>

# PART 1 GENERAL INTRODUCTION

This book is a teacher's guide for Surgical Pathology subject, for senior five in Associate Nursing program. It is designed to accompany student book and intends to help teachers in the implementation of competence based curriculum specifically Surgical Pathology syllabus.

As the name says, it is a guide that teachers can refer to when preparing their lessons. Teachers may prefer to adopt the guidance provided but they are also expected to be more creative and consider their specific classes' contexts and prepare accordingly.

## 1.1. The structure of the guide

This section presents the overall structure, the unit and sub-heading structure to help teachers to understand the different sections of this guide and what they will find in each section.

### Overall structure

The whole guide has three main parts as follows:

#### ◆ Part I: General Introduction.

This part provides general guidance on how to develop the generic competences, how to integrate cross cutting issues, how to cater for students with special educational needs, active methods and techniques of Surgical Pathology and guidance on assessment.

#### ◆ Part II: Sample lesson plan

This part provides a sample lesson plan, developed and designed to help the teacher develop their own lesson plans.

#### ◆ Part III: Unit development

This is the core part of the guide. Each unit is developed following the structure below. The guide ends with references.

Each unit is made of the following sections:

- **Unit title:** from the syllabus
- **Key unit competence:** from the syllabus
- **Prerequisites** (knowledge, skills, attitudes and values)

This section indicates knowledge, skills and attitudes required for the success of the unit. The competence-based approach calls for connections between units/

topics within a subject and interconnections between different subjects. The teacher will find an indication of those prerequisites and guidance on how to establish connections.

### – **Cross-cutting issues to be addressed**

This section suggests cross cutting issues that can be addressed depending on the unit content. It provides guidance on how to come up with the integration of the issue. Note that the issue indicated is a suggestion; teachers are free to take another cross-cutting issue taking into consideration the learning environment.

### – **Guidance on the introductory activity**

Each unit starts with an introductory activity in the student's book. This section of the teacher's guide provides guidance on how to conduct this activity and related answers. Note that students may not be able to find the right solution but they are invited to predict possible solutions or answers. Solutions are provided by students gradually through discovery activities organized at the beginning of lessons or during the lesson.

### – **List of lessons/sub-heading**

This section presents in a table suggestion on the list of lessons, lesson objectives copied or adapted from the syllabus and duration for each lesson. Each lesson / subheading is then developed.

### – **End of each unit**

At the end of each unit the teacher provides the following sections:

- Summary of the unit which provides the key points of content developed in the teacher's book.
- Additional information which provides additional content compared to the student book for the teacher to have a deeper understanding of the topic.
- End unit assessment which provides answers to questions of the end unit assessment in the teacher's book and suggests additional questions and related answers to assess the key unit competence.
- Additional activities (remedial, consolidation and extended activities): The purpose of these activities is to accommodate each student (slow, average and gifted) based on the end of unit assessment results.



## Structure of each sub heading

**Each lesson/sub-heading is made of the following sections:**

– **Lesson /Sub heading title 1: .....**

- Prerequisites/Revision/Introduction:

This section gives a clear instruction to teacher on how to start the lesson.

◆ **Teaching resources**

This section suggests the teaching aids or other resources needed in line with the activities to achieve the learning objectives. Teachers are encouraged to replace the suggested teaching aids by the available ones in their respective schools and based on learning environment.

◆ **Learning activities**

This section provides a short description of the methodology and any important aspect to consider. It provides also answers to learning activities with cross reference to student's book.

◆ **Exercises/application activities**

This provides answers to exercises/ application activities.

## 1.2. Methodological guidance

### 1.2.1. Developing competences

Since 2015 Rwanda shifted from a knowledge based to a competence based curriculum for pre-primary, primary and general secondary education. For Teachers Training Centers (TTCs), it is in 2019 that the competence based curriculum was embraced. This called for changing the way of learning by shifting from teacher centered to a learner centered approach. Teachers are not only responsible for knowledge transfer but also for fostering teacher's learning achievement, and creating safe and supportive learning environment. It implies also that a student has to demonstrate what he/she is able to do using the knowledge, skills, values and attitude acquired in a new or different or given situation.

The competence-based curriculum employs an approach of teaching and learning based on discrete skills rather than dwelling on only knowledge or the cognitive domain of learning. It focuses on what learner can do rather than what learners know. Students develop basic competences through specific subject unit competences

with specific learning objectives broken down into knowledge, skills and attitudes. These competences are developed through learning activities disseminated in learner-centered rather than the traditional didactic approach. The students are evaluated against set standards to achieve before moving on.

In addition to specific subject competences, students also develop generic competences which are transferable throughout a range of learning areas and situations in life. Below are examples of how generic competences can be developed in Surgical Pathology:

Generic competence	Examples of activities that develop generic competences
Critical thinking	<ul style="list-style-type: none"> <li>• Describe the relationship and interdependence of sciences</li> <li>• Observe, record, interpret data recorded during case studies and clinical settings.</li> <li>• Identify and use the applications of Surgical Pathology concepts to take decision on patient conditions</li> </ul>
Research and Problem solving	<ul style="list-style-type: none"> <li>• Research using internet or books from the library</li> <li>• Design a questionnaire for data collection during field visit</li> </ul>
Innovation and creativity	<ul style="list-style-type: none"> <li>• Develop a graph to illustrate information</li> <li>• Design a data collection survey/questionnaire</li> <li>• Identify local problems and ways to resolve them</li> </ul>
Cooperation, Personal and Interpersonal management and life skills	<ul style="list-style-type: none"> <li>• Work in Pairs</li> <li>• Small group work</li> <li>• Large group work</li> </ul>
Communication	<ul style="list-style-type: none"> <li>• Organise and present in writing and verbally a complete and clear case study.</li> <li>• Observe, record, interpret the results of patient's examination.</li> <li>• Select and use appropriate formats and presentations, such as tables, graphs and diagrams.</li> </ul>
Lifelong learning	<ul style="list-style-type: none"> <li>• Exploit all opportunities available to improve on knowledge and skills. Reading scientific journals to keep updated.</li> </ul>

### 1.2.2. Addressing cross cutting issues

Among the changes in the competence based curriculum is the integration of cross cutting issues as an integral part of the teaching learning process-as they relate to and must be considered within all subjects to be appropriately addressed. The eight cross cutting issues identified in the national curriculum framework are: genocide

studies, environment and sustainability, gender, Comprehensive Sexuality Education (CSE), Peace and Values Education, Financial Education, Standardization Culture and Inclusive Education.

Some cross cutting issues may seem specific to particular learning areas or subjects but the teacher needs to address all of them whenever an opportunity arises. In addition, student should always be given an opportunity during the learning process to address these cross cutting issues both within and out of the classroom so as to progressively develop related attitudes and values.

Below are examples on how crosscutting issues can be addressed in Surgical Pathology:

Cross-cutting issues	Examples on how to integrate the cross-cutting issues
Inclusive education	Involve all students in all activities without any bias. Eg: Allow a student with physical disability to take notes or lead the team during an experiment.
Gender	Involve both girls and boys in all activities: No activity is reserved only to girls or boys. Teacher should ensure equal participation of both girls and boys during experiments as well as during cleaning and tidying up related activities after experiments.
Peace and Values Education	During group activities, debates and presentations, the teacher will encourage students to help each other and to respect opinions of colleagues.
Standardization culture	<ul style="list-style-type: none"> <li>Medical science keeps changing with new medications and treatments being developed. Instruction should be clear for students to always check if they are not using outdated medications and treatments.</li> <li>When students are assessing patients they have to record data accurately.</li> </ul>

### 1.2.3. Attention to special educational needs specific to each subject

In the classroom, students learn in different way depending to their learning pace, needs or any other special problem they might have. However, the teacher has the responsibility to know how to adopt his/her methodologies and approaches in order to meet the learning needs of each student in the classroom. Also teacher must understand that students with special needs need to be taught differently or need some accommodations to enhance the learning environment. This will be done depending on the subject and the nature of the lesson.

In order to create a well-rounded learning atmosphere, teacher needs to:

- Remember that students learn in different ways so they have to offer a variety of activities (e.g. role-play, simulations, case studies, and outdoor activities).
- Maintain an organized classroom and limits distraction. This will help students with special needs to stay on track during lesson and follow instruction easily.
- Vary the pace of teaching to meet the needs of each student-teacher. Some students process information and learn more slowly than others.
- Break down instructions into smaller, manageable tasks. Students with special needs often have difficulty understanding long-winded or several instructions at once. It is better to use simple, concrete sentences in order to facilitate them understand what you are asking.
- Use clear consistent language to explain the meaning (and demonstrate or show pictures) if you introduce new words or concepts.
- Make full use of facial expressions, gestures and body language.
- Pair a student who has a disability with a friend. Let them do things together and learn from each other. Make sure the friend is not over protective and does not do everything for the student-teacher. Both students will benefit from this strategy
- Use multi-sensory strategies. As all students learn in different ways, it is important to make every lesson as multi-sensory as possible. Students with learning disabilities might have difficulty in one area, while they might excel in another. For example, use both visual and auditory cues.

Below are general strategies related to each main category of disabilities and how to deal with every situation that may arise in the classroom. However, the list is not exhaustive because each student is unique with different needs and that should be handled differently.

### **Strategy to help students with developmental impairment:**

- Use simple words and sentences when giving instructions.
- Use real objects that the student can feel and handle, rather than just working abstractly with pen and paper.
- Break a task down into small steps or learning objectives. The student should start with an activity that s/he can do already before moving on to something that is more difficult.
- Gradually give the student less help.
- Let the student work in the same group with those without disability.

### **Strategy to help students with visual impairment:**

- Help students to use their other senses (hearing, touch, smell and taste) to play and carry out activities that will promote their learning and development.
- Use simple, clear and consistent language.
- Use tactile objects to help explain a concept.
- If the students have some sight, ask them what they can see. Get information from parents/caregivers on how the student manages their remaining sight at home.
- Make sure the student has a group of friends who are helpful and who allow the students to be as independent as possible.
- Plan activities so that students work in pairs or groups whenever possible.

### **Strategy to help students with hearing impairment:**

- Strategies to help students with hearing disabilities or communication difficulties
- Always get the students attention before you begin to speak.
- Encourage the student to look at your face.
- Use gestures, body language and facial expressions.
- Use pictures and objects as much as possible.
- Ask the parents/caregivers to show you the signs they use at home for communication use the same signs yourself and encourage other students to also use them.
- Keep background noise to a minimum.

### **Strategies to help children with physical disabilities or mobility difficulties:**

- Adapt activities so that student who use wheelchairs or other mobility aids, or other students who have difficulty moving, can participate.
- Ask parents/caregivers to assist with adapting furniture e.g. The height of a table may need to be changed to make it easier for a student to reach it or fit their legs or wheelchair under.
- Encourage peer support friends can help friends.
- Get advice from parents or a health professional about assistive devices.

#### **1.2.4. Guidance on assessment**

Each unit in the teacher's guide provides additional activities to help students achieve the key unit competence. Results from assessment inform the teacher which student needs remedial, consolidation or extension activities. These activities

are designed to cater for the needs of all categories of learners; slow, average and gifted learners respectively.

Assessment is an integral part of teaching and learning process. The main purpose of assessment is for improvement. Assessment for learning/ Continuous/ formative assessment intends to improve student-teachers' learning and teacher's teaching whereas assessment of learning/summative assessment intends to improve the entire school's performance and education system in general.

### **Continuous/ formative assessment**

It is an ongoing process that arises out of interaction during teaching and learning process. It includes lesson evaluation and end of sub unit assessment. This formative assessment plays a big role in teaching and learning process. The teacher should encourage individual, peer and group evaluation of the work done in the classroom and uses appropriate competence-based assessment approaches and methods.

In student textbook, formative assessment principle is applied through learning, self-assessment and application activities that are planned in each lesson to ensure that lesson objectives are achieved before moving on. At the end of each unit, the end unit assessment is formative when it is done to give information on the progress of students and from there decide what adjustments need to be done. Assessment standards are taken into consideration when setting tasks.

### **Summative assessment**

The assessment done at the end of the term, end of year, is considered as summative. The teacher, school and parents are informed on the achievement of educational objectives and think of improvement strategies. There is also end of level/ cycle assessment in form of national examinations.

## **1.2.5. Student teachers' learning styles and strategies to conduct teaching and learning process**

There are different teaching styles and techniques that should be catered for. The selection of teaching method should be done with the greatest care and some of the factors to be considered are: the uniqueness of subjects, the type of lessons, the particular learning objectives to be achieved, the allocated time to achieve the objective, instructional available materials, the physical/sitting arrangement of the classroom, individual student teachers' needs, abilities and learning styles.

There are mainly four different learning styles as explained below:

### **a) Active and reflective learners**

Active learners tend to retain and understand information best by doing something active with it, discussing or applying it or explaining it to others. Reflective learners prefer to think about it quietly first.

## **b) Sensing and intuitive learners**

Sensing learners tend to like learning facts while intuitive learners often prefer discovering possibilities and relationships. Sensors often like solving problems by well-established methods and dislike complications and surprises; intuitive learners like innovation and dislike repetition.

## **c) Visual and verbal learners**

Visual learners remember best what they see (pictures, diagrams, flow charts, time lines, films, demonstrations, etc.); verbal learners get more out of words (written and spoken explanations).

## **d) Sequential and global learners**

Sequential learners tend to gain understanding in linear steps, with each step following logically from the previous one. Global learners tend to learn in large jumps, absorbing material almost randomly without seeing connections, and then suddenly “getting it.”

### **1.2.6. Teaching methods and techniques that promote the active learning**

The different student learning styles mentioned above can be catered for, if the teacher uses active learning whereby students are really engaged in the learning process.

#### **What is Active learning?**

Active learning is a pedagogical approach that engages students in doing things and thinking about the things they are doing. In active learning, learners are encouraged to bring their own experience and knowledge into the learning process.

#### **The role of the teacher in active learning**

- The teacher engages students through active learning methods such as inquiry methods, group discussions, research, investigative activities and group and individual work activities.
- He/she encourages individual, peer and group evaluation of the work done in the classroom and uses appropriate competence-based assessment approaches and methods.
- He provides supervised opportunities for students to develop different competences by giving tasks which enhance critical thinking, problem solving, research, creativity and innovation, communication and cooperation.
- Teacher supports and facilitates the learning process by valuing student-teachers' contributions in the class activities.

## **The role of learners in active learning**

Learners are key in the active learning process. They are not empty vessels to fill but people with ideas, capacity and skills to build on for effective learning. A learner engaged in active learning:

- Communicates and shares relevant information with other learners through presentations, discussions, group work and other learner-centred activities (role play, case studies, project work, research and investigation)
- Actively participates and takes responsibility for their own learning
- Develops knowledge and skills in active ways
- Carries out research/investigation by consulting print/online documents and resourceful people, and presents their findings
- Ensures the effective contribution of each group member in assigned tasks through clear explanation and arguments, critical thinking, responsibility and confidence in public speaking
- Draws conclusions based on the findings from the learning activities.

## **Some active techniques that can be used in Surgical Pathology**

The teaching methods strongly emphasised in the competence Based Curriculum (CBC) are active:

### **Case studies**

The case study methodology is rich in detail which allows the apprentices learn not only theoretical concepts but practical concepts in different disease conditions. The advantage of the case study method is that learners must actively and openly discuss the principals of the study. This helps develop their skills in problem solving, analysis, decision making and in dealing with ambiguities.

### **Teaching the case study**

In a classroom setting, a case study is presented and can be either written, oral or in an audio-visual form. Teachers generally start by having students read the case or watch a video that summarizes the case. Students then work in small groups or individually to solve the case study. Teachers set milestones defining what students should accomplish to help them manage their time.

### **Research work**

Students are requested to gather information related to the surgical conditions from online published works and available books/journals in the library then the results are presented in verbal or written form and discussed in class.



## **Skills lab and clinical settings**

One of the main aims of teaching surgical pathology is to allow learners to be able to take decisions on surgical conditions depending on their scope of practice. Skills lab can be used for simulation (using simulated patients or advanced mannequins) and clinical settings can be used to allow students to be in contact with real patients presenting the surgical conditions.

## **Group work and discussions**

Small group work will help learners to be active and engage in their learning. Groups have more information than a single individual. They stimulate creativity, foster learning and comprehension as learners tend to remember what have been discussed in group.

The teacher must help the group to succeed by defining and assigning roles, such as the note take or the group leader. The teacher also monitors the progress of the work and facilitates the presentations for synthesis and harmonization.

The teacher can review each group's written plan of action or meet with each group individually and discuss their plan.

## **Main steps for a lesson in active learning approach**

All the principles and characteristics of the active learning process highlighted above are reflected in steps of a lesson as displayed below. Generally, the lesson is divided into three main parts whereby each one is divided into smaller steps to make sure that students are involved in the learning process. Below are those main parts and their small steps:

### **1) Introduction**

Introduction is a part where the teacher makes connection between the current and previous lesson through appropriate technique. The teacher opens short discussions to encourage students to think about the previous learning experience and connect it with the current instructional objective. The teacher reviews the prior knowledge, skills and attitudes which have a link with the new concepts to create good foundation and logical sequencings.

### **2) Development of the new lesson**

The development of a lesson that introduces a new concept will go through the following small steps: discovery activities, presentation of student-teachers' findings, exploitation, synthesis/summary and exercises/application activities, explained below:

## ◆ Discovery activity

### Step 1

- The teacher discusses convincingly with students to take responsibility of their learning
- He/she distributes the task/activity and gives instructions related to the tasks (working in groups, pairs, or individual to instigate collaborative learning, to discover knowledge to be learned)

### Step 2

- The teacher let the students work collaboratively on the task.
- During this period the teacher refrains to intervene directly on the knowledge
- He/she then monitors how the students are progressing towards the knowledge to be learned and boost those who are still behind (but without communicating to them the knowledge).

## ◆ Presentation of student-teachers' productions

- In this episode, the teacher invites representatives of groups to present the student-teachers' productions/findings.
- After three/four or an acceptable number of presentations, the teacher decides to engage the class into exploitation of the student-teachers' productions.

## ◆ Exploitation of student-teachers's productions

- The teacher asks the students to evaluate the productions: which ones are correct, incomplete or false
- Then the teacher judges the logic of the student-teachers' products, corrects those which are false, completes those which are incomplete, and confirms those which correct.

## ◆ Institutionalization (summary/conclusion/ and examples)

- The teacher summarises the learned knowledge and gives examples which illustrate the learned content.

## ◆ Exercises/Application activities

- Exercises of applying processes and products/objects related to learned unit/sub-unit
- Exercises in real life contexts

- Teacher guides students to make the connection of what they learnt to real life situations. At this level, the role of teacher is to monitor the fixation of process and product/object being learned.

### 3) Assessment

In this step the teacher asks some questions to assess achievement of instructional objective. During assessment activity, students work individually on the task/activity. The teacher avoids intervening directly. In fact, results from this assessment inform the teacher on next steps for the whole class and individuals. In some cases, the teacher can end with a homework assignment.

## PART 2: SAMPLE LESSON PLAN

**Subject: Surgical pathology**

**School Name:**

**Teacher's name:**

Term	Date	Subject	Class	Unit N°	Lesson N°	Duration	Class size
1	To be determined	Surgical pathology	S5	1	2	80mins	To be determined
Type of Special Educational Needs to be catered for in this lesson and number of learners in each category				To be determined depending on the individual case			
Unit title		Abscess and Phlegmon					
Key Competence		Unit Take appropriate decision on abscess and Phlegmon conditions					
Title of the lesson		Description of abscess and Phlegmon <ul style="list-style-type: none"> <li>• Definition</li> <li>• Causes and pathophysiology</li> <li>• Signs and symptoms</li> <li>• Diagnostic measures</li> </ul>					
Instructional Objective		Using the charts/diagrams and case study of abscess and phlegmon, learners should be able to explain correctly the causes, pathophysiology, signs and symptoms and diagnostic measures of abscess and phlegmon in their own words.					
Plan for this Class (location: in / outside)		Inside the classroom.					

Learning Materials (for all learners)	Papers, books, papers, pens, flip charts, charts or diagrams, videos, laptop and projectors and other teaching aids such as chalks, markers and boards (black and white).
References	<ol style="list-style-type: none"> <li>Rwanda Education Board. (2021). Senior 5 teacher book of Surgical pathology.</li> <li>Rwanda Education Board. (2021). Senior 5 student book of Surgical pathology.</li> <li>Lewis, S. L., Dirksen, S. R., Heitkemer, M. M., &amp; Linda Bucher. (2014). MEDICAL-SURGICAL NURSING Assessment and mManagement of clinical problems (NINTH). Canada: ELSEVIER MOSBY.</li> <li>Williams, L. S., &amp; Hopper, P. D. (2015). Understanding Medical Surgical Nursing (Fifth edit). Philadelphia: F.A. Davis Company.</li> <li>Hinkle, J. L., &amp; Cheever, K. H. (2018). Brunner and Suddarth's textbook of medical-surgical nursing. Wolters kluwer india Pvt Ltd.</li> <li>Winkelman, C. (2016). Medical-surgical nursing: Patient-centered collaborative care. Elsevier</li> </ol>

Timing for each step	Description of teaching and learning activity		Generic competences and Cross cutting issues to be addressed + a short explanation
	Teacher activities	Learner activities	
1.Introduction 10 Minutes	<ul style="list-style-type: none"> <li>As this lesson starts the unit, the teacher starts with the introductory activity questions 1.0</li> </ul>	<ul style="list-style-type: none"> <li>Give answers.</li> <li>Listening how teacher relate the images and answers with abscess and phlegmon</li> </ul>	Competences <ul style="list-style-type: none"> <li>Communication is improved through answering to the questions</li> <li>Critical thinking is improved through discovering how the questions are taking them to the new lesson</li> </ul>
Development of the lesson: 45 minutes			

<p>1.1. Discovering activity</p>	<ul style="list-style-type: none"> <li>- The teacher splits students into small working groups and distributes the handouts of the learning activity 1.1 (case study).</li> <li>- Invites learners to read, discuss the learning activity 1.1 (case study) and respond to questions number 1 to question number 5.</li> <li>- Moves around to help those who are having difficulties to understand the case study and guides them in finding abscess and phlegmon definitions, signs and symptoms, causes, evolution and complications as well as its diagnostic measures</li> </ul>	<ul style="list-style-type: none"> <li>- The learners sit in groups and receive the handouts of the learning activity 1.1 (case study).</li> <li>- Using the case, study the learners brainstorm on: <ul style="list-style-type: none"> <li>- Patient biography</li> <li>- Definitions</li> <li>- Causes</li> <li>- Pathophysiology</li> <li>- Signs and symptoms</li> <li>- Diagnostic measures</li> </ul> </li> </ul>	<p><b>Competences</b></p> <ul style="list-style-type: none"> <li>- Cooperation is improved through small group discussions (team spirit).</li> <li>- Communication skills are developed through small group discussions.</li> <li>- Collaboration is developed by accommodating individual idea</li> <li>- Critical thinking and problem solving are developed through analysis of the case study.</li> <li>- Cross cutting issues</li> <li>- Peace and value developed by learning to work together</li> <li>- Gender is respected while giving equal chance to participate in discussion</li> </ul>
----------------------------------	--	---	---

1.2. Presentation	<ul style="list-style-type: none"> <li>- Ask the group to choose the reporter</li> <li>- invite learner to present their findings</li> </ul>	<ul style="list-style-type: none"> <li>- Group representatives present findings from groups and other learners participate actively in the presentation by comments or by asking questions.</li> <li>- The learners respond to the questions asked by the teacher.</li> </ul>	<ul style="list-style-type: none"> <li>- Competences</li> <li>- Communication skills are developed through presentation</li> <li>- Cross cutting issues</li> <li>- Gender is respected in choosing the group representatives</li> </ul>
1.1. Exploitation	<p>From the presentation of each group,</p> <ul style="list-style-type: none"> <li>- Choose the definitions, signs and symptoms, causes, evolution and complications as well as diagnostic measures of abscess and phlegmon</li> <li>- Present the findings in a six column table.</li> <li>- Ask the learners their inputs or additions from the presentations</li> </ul>	<ul style="list-style-type: none"> <li>- The learners compare the summary from the groups presentation to the content within the learner's book</li> </ul>	<p>Competences</p> <ul style="list-style-type: none"> <li>- Critical thinking is developed by comparing the group presentation and the content within learner's book.</li> </ul>

1.2. Synthesis	<ul style="list-style-type: none"> <li>- Ask the learners to compare the summary from the groups presentation to the content within the learner's book highlights the definitions, signs and symptoms, causes, evolution and complications as well as diagnostic measures of abscess and phlegmon</li> </ul>	<ul style="list-style-type: none"> <li>- The learners take note of key elements highlighted</li> </ul>	<p>Competences</p> <ul style="list-style-type: none"> <li>- The critical thinking through choosing the correct elements to be compared</li> </ul>
1.3. Conclusion	<ul style="list-style-type: none"> <li>- Highlight/ask the usefulness of the acquired knowledge in the care of patients with abscess and phlegmon .</li> </ul>	<ul style="list-style-type: none"> <li>- Learners highlight the key message taken from the lesson</li> <li>- Take note on the summary content</li> </ul>	<ul style="list-style-type: none"> <li>- Listening skills</li> <li>- Writing skills</li> </ul>
1. Assessment	<ul style="list-style-type: none"> <li>- -Ask the learners the questions in self-assessment 1.1</li> <li>- -Asks learners to define gastro-duodenal ulcer using illustration of abscess and phlegmon diagrams.</li> </ul>	<ul style="list-style-type: none"> <li>- Learner respond to the questions in self-assessment 1.1</li> <li>- Learners define abscess and phlegmon using illustration of Gastro-duodenal ulcer abscess and phlegmon diagrams.</li> </ul>	<ul style="list-style-type: none"> <li>- Learners develop critical thinking and reasoning skills while answering questions</li> </ul>
Teacher self-evaluation	To be completed after feed-back from the learners or after the lesson delivery.		

## **PART 3: UNIT DEVELOPMENT**



## 1.1. Key Unit competence

Take appropriate decision on abscess and phlegmon conditions.

## 1.2. Prerequisites

Before you teach this lesson ensure that the learner have mastered the normal structure of the skin layers, the inflammatory and healing process, basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

## 1.3. Cross-cutting issues to be addressed

### 1.3.1. Gender education

During teaching and learning activities, ensure that both boys and girls take responsibility of group leadership and participate equally.

### 1.3.2. Peace and values

During group activities, the teacher emphasizes the importance of respecting each learner ideas and encourages everyone to feel free to provide their inputs in a respectful manner.

## 1.4. Guidance on the introductory activity

### Teacher's activity

- Avail any visual aid that display the figures in the introductory activity 1.0 student's book.
- Computer and a projector to display the figures
- A print out of the same colored figures.
- Avail other material depending on the context and teaching environment (white board, flip chat and markers, blackboard and chalks)
- Allow students to observe and reflect on the figures
- Allocate time to questions. Use an interactive brainstorm and let the students answer to the questions
- Learners may not be able to find the correct answers, but they are invited to predict
- Summarise the answers for the purpose of orientation to the new unit topic

◆ **Expected answers for the introductory activity**

1. Figure A.
2. The abnormal structures of the skin are B and C. In B there is whitish and confined spot (pus) accumulated in the layers of the skin, the surface of the skin is swollen. In C the skin surface is swollen, very reddish, presence of a non-confined (diffuse) white spot (pus) surrounded by different zones of different colors (from dark red to light red)
3. These anomalies can be caused by bacteria infection invading the skin layers. The bacteria entry point may be a scratch, injury, excessive sweat and insect bite. The most often group A streptococcus or Staphylococcus aureus
4. Swelling, pain, warm to touch, redness and compressible mass. The difference between figure B and C will be found when a health provider touches the mass and a diffuse mass can be felt in the figure C.
5. By sight or by touching
6. To remove the collection of pus

## 1.5. List of lessons

	Lesson title	Learning objectives	Numbers of periods
1	Description of abscess and phlegmon <ul style="list-style-type: none"> <li>• Definition</li> <li>• Causes and pathophysiology</li> <li>• Signs and Symptoms</li> <li>• Diagnostic measures</li> </ul>	<ul style="list-style-type: none"> <li>• Define abscess and phlegmon</li> <li>• Explain the causes and pathophysiology of abscess and phlegmon</li> <li>• Describe the signs and symptoms of abscess and phlegmon</li> <li>• List the diagnostic measures for abscess and phlegmon</li> </ul>	3
2	Management of abscess and phlegmon <ul style="list-style-type: none"> <li>• Treatment plan</li> <li>• Complications</li> <li>• Evolution of abscess and phlegmon</li> </ul>	<ul style="list-style-type: none"> <li>• Develop a treatment plan abscess and phlegmon</li> <li>• Explain the evolution and complications of abscess and phlegmon</li> <li>• Describe the evolution and complications of abscess and phlegmon</li> </ul>	2

3	Assessment	<ul style="list-style-type: none"> <li>• Take appropriate decision on abscess and phlegmon conditions</li> </ul>	1
---	------------	--	---

## Lesson 1: Description of abscess and phlegmon

### a) Learning objectives

At the end of this lesson the learner will be able to:

- Define abscess and phlegmon
- Explain the causes and pathophysiology of abscess and phlegmon
- Describe the signs and symptoms of abscess and phlegmon
- List the diagnostic measures for abscess and phlegmon

### b) Prerequisites

Learners have covered the normal structure of the skin layers and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### c) Teaching resources

You can use visual (charts) to display figures of in student's book page (...). Depending on the available resources you can also use the Laptop and projectors to visualise the same figures. Other resources include chalks boards (white or black), markers, flash cards, papers, pens, books.

### d) Learning activities

Discuss the cases study related to abscess, and phlegmon to understand their definitions, their causes, signs and symptoms as well as their pathophysiology of their occurrence. In addition to that diagnostic measures will be discussed.

### e) Teacher's activity

- Print the handout of the learning activity 1.1 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 1.1 (case study).
- Invite learners to read, discuss the learning activity 1.1 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.

- Help learners to summarize what they have learnt and highlight definition, causes and pathophysiology signs and symptoms (of each disease) and diagnostic measures.

#### ◆ Answers for learning activity 1.1

1. The risk factors associated with abscess and phlegmon include injury, bites, excess sweat and compromised immune system
2. Bacteria (A streptococcus or Staphylococcus aureus invade the skin (injury, bites, excess sweat), inflammatory response
3. Signs and symptoms of abscess and phlegmon: Local signs: swelling, heat (warm), tenderness. Systematic signs: increased WBC, Fever
4. The difference between the abscess and phlegmon is that in the palpation the mass of abscess is bounded (confined) but the mass of phlegmon is diffuse (spreading).

#### ◆ Answers for self-assessment 1.1

Diseases	Causes	Risk factors
Phlegmon	A streptococcus or Staphylococcus aureus	injury, bite, scratch, excessive sweat, low immune system
Abscess	A streptococcus or Staphylococcus aureus	injury, bite, scratch, excessive sweat, low immune system

## Lesson 2: Management of abscess and phlegmon

### a) Learning objectives

At the end of this lesson the learner will be able to:

- Develop a treatment plan abscess and phlegmon
- Explain the evolution and complications of abscess and phlegmon
- Describe the evolution and complications of abscess and phlegmon

### b) Prerequisites

Learners have covered the normal structure of the skin layers and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### c) Teaching resources

Resources include computer and projector, chalks boards (white or black), markers, flash cards, papers, pens, books.

### d) Learning activities

Discuss the cases study learning activity 1.3 related to abscess and phlegmon to understand the management, evolution and complications of abscess and phlegmon.

### e) Teacher's activity

- Print the handout of the learning activity 1.1 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 1.1 (case study).
- Invite learners to read, discuss the learning activity 1.1 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight definition, causes and pathophysiology signs and symptoms (of each disease) and diagnostic measures.

### ◆ Answers for learning activity 1.2

#### 1. Surgical treatment:

- Perform abscess incision and drainage of pus and debris
- Perform the wound dressing
- Provide antibiotics and analgesics

#### 2. Medical treatment

- Provide Antibiotic: Penicillin group (example Cloxacilline)
- Provide painkiller: Paracetamol

### ◆ Answers for self-assessment 1.2

1. No, antibiotics are only provided in people with high risk of reinfection eg: people with deficient immune system (people living with chronic non communicable disease, malnutrition, HIV AIDS). Antibiotics are also provided to people living in poor hygenic condition. The location and size of the abscess guide the choice of antibiotics
2. The external abscess and phlegmon are diagnosed by inspection and physical examination such as light palpation.

## 1.6. Summary of the unit

Both abscess and phlegmon are inflammation related to a bacterial *infection*. The difference between phlegmon and abscess is that phlegmon is unbounded and can keep spreading out along connective tissue and muscle fiber. An abscess is walled in and confined to the area of infection. Sometimes phlegmon occurs when infected material inside an abscess ruptures and spreads.

The signs and symptoms of abscess and phlegmon are heat, redness, sore, swollen and pain. A patient may also have systemic signs of a bacterial infection, such as: swollen lymph glands, fatigue, fever and headache. Abscess and phlegmon are mainly diagnosed through physical examination. The best treatment is incision and drainage but some small abscess and phlegmon can be treated by antibiotics or get drained by themselves.

## 1.7. Additional information

Abscess and phlegmon can affect the internal organs such as appendix, mouth floor, pancreas, and intestinal tract. In this case the surgery treatment is the best options unlike there is a contraindication such as pregnancy. The **prevention of abscess and phlegmon** is the prevention of injuries and damage to the skin, timely treatment of wounds, treatment of such potential sources of infection as caries, pustular skin problems and others.

For patients who are at high risk of an adverse outcome if infective endocarditis (eg, individuals with prior infective endocarditis, prosthetic heart material, unrepaired congenital heart defect, and valvular dysfunction in a transplanted heart) antibiotics should be administered 60 minutes prior to the incision.

A recurrent abscess at a site of previous infection should prompt consideration of additional causes.

## 1.8. End unit assessment

### ◆ Answers for end unit assessment

- 1) The most common site of external abscess and phlegmon include inguinal and axillary areas, anus, vaginal (Bartholin gland) and neck.
- 2) C
- 3) The final structure of the abscess consists of the central cavity with pus and a surrounding wall, which is the pyogenic membrane. If the natural and acquired resistance of the host is adequate, the pyogenic membrane is rapidly replaced by granulation tissue which prevents the systemic invasion of bacteria. The pus that may contain the bacteria and when it is encapsulated it becomes inaccessible to antibodies and antibiotics, hence very difficult to treat with antibiotics. A surgical incision becomes necessary to drain and eliminate the pus.
- 4)
  - a. Ask further questions related to antecedents to rule out certain risk factors of abscess and phlegmon such as: Have you had an injury before? Do you experience excessive sweat? Have you been bitten by an insect? Do you have any chronic disease? (to rule out the deficient immune system)
  - b. The disturbed needs
    - Skin integrity
    - Move and maintain desirable posture
    - Sleep and rest
  - c. Maintain body hygiene to prevent the reinfection of the wound
    - Eat a balanced diet to boost immune system
    - Adhere to prescribed medications

## 1.9. Additional activities

### 1.9.1. Remedial activities

1. What are the first signs of an abscess?
2. What are the most preferable site of the abscess development?

### ◆ Answers for remedial activities

1. A build-up of white or yellow pus, which you can see, Pain and tenderness or warmth in the affected area. Swelling under the skin, which may be hard or firm and high temperature (fever) may be associated.
2. Abscesses can develop in many places but preferably on the skin, inside organs (internal abscess) and between organs.

### 1.9.2. Consolidations activities

1. Can an abscess go away without draining?
2. Is an abscess dangerous?

### ◆ Answer for consolidations activities

- 1) Small skin abscesses may recover on their own without treatment. Larger skin abscesses, if not drained, may grow quite large and painful before bursting. If this happens, the infection can spread. An internal abscess is usually serious and can make the patient ill if left untreated, so it usually needs draining.
- 2) If left untreated, an abscess can be dangerous and lead to serious complications, especially an internal abscess. There is a risk of the infection spreading to other parts of the body. It is also possible to develop sepsis, which is a life-threatening response to an infection.

### 1.9.3. Extended activities

1. Find signs and symptoms of internal abscess and phlegmon on these organs: pancreas, appendix and tonsils
2. Internal abscess and phlegmon are more difficult to diagnose. What are the diagnostic measures that can help to diagnose internal abscess and phlegmon?
  1. What are the causes of a recurrent abscess?
  2. How does a recurrent abscess get treated?



### ◆ Answers for extended activities

1. Signs and symptoms on internal abscess and phlegmon: appendix pancreas and tonsils:

#### Appendix

- pain
- fever
- vomiting
- diarrhea
- intestinal blockage

#### Pancreas

- Fever
- Increase in white blood cells (leukocytosis)
- Increased blood levels of amylase (a pancreatic enzyme)
- Severe stomach pain
- Nausea and vomiting

#### Tonsils

- Fever
- Sore throat
- Difficulty speaking
- Hoarseness

2. The diagnostic measures that can help to diagnose internal abscess:

- Complete blood count;
- Ultrasound;
- X-ray;
- MRI, CT - in severe cases

3. The recurrent infection can be caused by same *S. aureus* other causes also have to be identified such as foreign body

4. The best option is to identify the cause and treat it, but if it is not identified, surgical exploration, debridement and antibiotics are important.

## **2.1. Key Unit competence**

Take appropriate decision on skin and stomies conditions.

## **2.2. Prerequisites**

Before you teach this lesson ensure that the learner have mastered the anatomy and normal structure of the skin layers gastro intestinal system, respiratory system, the inflammatory and healing process, physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

## **2.3. Cross-cutting issues to be addressed**

### **2.3.1. Gender education**

During teaching and learning activities, ensure that both boys and girls take responsibility of group leadership and participate equally.

### **2.3.2. Peace and values**

During group activities, the teacher emphasizes the importance of respecting each learner ideas and encourages everyone to feel free to provide their inputs in a respectful manner.

## **2.4. Guidance on the introductory activity**

### **Teacher's activity**

Avail any visual aid that display the figures in the introductory activity 2.1 student's book.

- Computer and a projector to display the figures
- A print out of the same colored figures.
- Avail other material depending on the context and teaching environment (white board, flip chat and markers, blackboard and chalks)
- Allow students to observe and reflect on the figures
- Allocate time to questions. Use an interactive brainstorm and let the students answer to the questions

- Learners may not be able to find the correct answers, but they are invited to predict
- Summarize the answers for the purpose of orientation to the new unit topic

♦ **Answers for the introductory activity**

1. Organ of human body displayed by images in box A is showing skin and integumentary system and in box B is showing the gastro intestinal system?
2. The characteristics/elements that would indicate the abnormalities in the structure of the affected organ, in box A redness of the skin, and in box B, different stomies are demonstrated on this figure.
3. The abnormalities that observed are skin destruction in A and stomies in GIT (Gastro Intestinal Tract).
4. The causes the abnormalities observed could be infection, traumatism, and blood circulation problems.
5. The manifestations of the observed abnormalities in the human body are wound on the skin, redness, opening on the gastrointestinal tube.
6. Health personnel identify these abnormalities through history taking and clinical examination.
7. These abnormal structures can be collected by promotion of hygiene and nutrition, promotion of blood supply and prevention of infection.

## 2.5. List of lessons

	Lesson title	Learning objectives	Numbers of periods
1	Description of Skin ulcer conditions. <ul style="list-style-type: none"> <li>• Definition</li> <li>• Types and symptoms of skin ulcer.</li> </ul>	<ul style="list-style-type: none"> <li>• Define skin ulcer</li> <li>• Describe the types of skin ulcers</li> <li>• Explain the signs and symptoms</li> </ul>	2
2	Description of Skin ulcer conditions,(cont.) <ul style="list-style-type: none"> <li>• Causes and Risks factors.</li> <li>• Overview of pathophysiology.</li> <li>• Adequate diagnosis.</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the causes and risks factors.</li> <li>• Explain the pathophysiology of skin ulcers</li> <li>• Description of the different stages of burn</li> <li>• Explain adequate diagnosis of skin ulcers.</li> </ul>	1

3	<ul style="list-style-type: none"> <li>• Management/treatment of skin ulcers</li> <li>• Complications of skin ulcers.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop a treatment plan of patient with skin ulcers.</li> <li>• Identify the complications of skin ulcers.</li> </ul>	2
4	Description of stomies. <ul style="list-style-type: none"> <li>• Definition of stomy</li> <li>• Types of stomy</li> </ul>	<ul style="list-style-type: none"> <li>• Define the term stomy/ostomy</li> <li>• Describe the different types of stomies.</li> </ul>	2
5	<ul style="list-style-type: none"> <li>• Management of stomies</li> <li>• Complications of stomies</li> </ul>	<ul style="list-style-type: none"> <li>• Explain the management of stomies</li> <li>• List and explain the complication of stomies</li> </ul>	2
6	Assessment	<ul style="list-style-type: none"> <li>• Take appropriate decision on skin ulcers and stomies.</li> </ul>	1

## Lesson 1: Description of Skin ulcer conditions

### a) Learning objectives

At the end of this lesson the learner will be able to:

- Define skin ulcer
- Describe the types of skin ulcers
- Explain the signs and symptoms

### b) Prerequisites

Learners have covered the normal structure of the skin layers and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### c) Teaching resources

You can use visual (charts) to display figures of skin in student's book page (...). Depending on the available resources you can also use the Laptop and projectors to visualise the same figures. Other resources include chalks boards (white or black), markers, flash cards, papers, pens, books.

### d) Learning activities

- Discuss the cases study related to skin ulcers condition to understand the types of skin ulcers and different signs and symptoms.

## Teacher's activity

- Print the handout of the learning activity 2.1 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 2.1 (case study).
- Invite learners to read, discuss the learning activity 2.1 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight definition, the types of skin ulcers and different signs and symptoms.

### ◆ Answers for learning activity 2.1

1. A pressure injury is defined as sores /ulcers that happen on areas of the skin that are under pressure. The pressure can come from lying in bed, sitting in a wheelchair, or wearing a cast for a long time. Pressure injuries are also called bedsores, pressure sores, or decubitus ulcers.
2. Mrs. M. E's pressure ulcer is on stage II because redness and blisters formation on the sacrum were found.
3. The risk factors that can be associated with Mrs. ME's. Skin ulcers /Pressure injury are: a history of diabetes, and hypertension, inability to move /prolonged bed rest due traumatic injury of the hip, age, obesity.

### ◆ Answers for self-assessment 2.1

Signs, symptoms	Types	Risk factors	Stages of pressure injuries	Most affect area
Pain, Redness Round open sore with thick and raised outer border Tenderness around the sore Itchiness, Skin discoloration , Swelling	Venous skin ulcers Decubitus ulcers Neuropathic skin ulcers	Older age, Poor blood supply, Poor blood flow Peripheral vascular disease. Poor blood flow,	Non-blanchable erythema of intact skin, Partial thickness skin loss with exposed dermis	Ankles, Heels Back of The head(occiput) and ears, hips, Buttocks elbow, shoulders

## **Lesson 2: Description of Skin ulcer conditions, (cont)**

### **a) Learning objectives**

At the end of this lesson the learner will be able to:

- Describe the causes and risks factors.
- Explain the pathophysiology of skin ulcers
- Explain adequate diagnosis of skin ulcers.

### **b) Prerequisites**

Learners have covered the normal structure of the skin layers and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### **c) Teaching resources**

Resources include computer and projector, chalks boards (white or black), markers, flash cards, papers, pens, books.

### **d) Learning activities**

Discuss the cases study learning activity 2.2 related to skin ulcers to understand the signs and symptoms and pressure ulcer .

### **e) Teacher's activity**

- Print the handout of the learning activity 2.2 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 2.2 (case study).
- Invite learners to read, discuss the learning activity 2.2 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learned and highlight the causes and risk factors, pathophysiology of skin ulcers, different stages of pressure ulcer, adequate diagnosis of skin ulcers..

### ◆ Answers for learning activity 2.2

1. The risk factors associated with Mrs. ME's deteriorated health status are anaemia and low immunity with poor eating. The underlying cause of her hyperthermia and leucocytosis is infection of skin scores as by revealed a dirty dressing with foul smelling and pus discharge.
2. The pressure injury is at stage 3 because only adipose fat tissue is visible.

### ◆ Answers for self assessment 2.2

1. Diabetic patient are more likely to develop pressure injury due to the fact: high blood sugar lead to nerve damage, a situation called peripheral neuropathy. This lead to decrease or loss of sensitivity including in feet and legs. Unfelt pressure and pain will lead to unrecognized injury in feet or legs. Untreated injuries can easily turn into skin ulcers, and high blood sugar slows down the wound healing.
2. Specific microbes which are more likely to cause the infection of pressure injuries are Staphylococcus aureus, Pseudomonas aeruginosa, Proteus mirabilis, and Enterococcus faecalis.
3. The Skin ulcers are usually clinically diagnosed, but others investigation will be done medical history, physical exam, blood test, tissue or fluid culture and Imaging tests.
4. Obesity increase the risk of developing pressure injuries because it raises the risk for diabetes, atherosclerosis, and increased pressure in leg veins.

## Lesson 3: Management and complications of skin ulcers.

### a) Learning objectives

At the end of this lesson the learner will be able to:

- Develop a treatment plan of patient with skin ulcers.
- Identify the complications of skin ulcers.

### b) Prerequisites

Learners have covered the normal structure of the skin layers and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### c) Teaching resources

You can use visual (charts) to display figures of skin ulcers in student's book page (...). Depending on the available resources you can also use the Laptop and projectors to visualise the same figures. Other resources include chalks boards (white or black), markers, flash cards, papers, pens, books.

### d) Learning activities

Discuss the cases study related to skin ulcer to understand the treatment plan offered to patient with skin ulcers and their complications.

#### Teacher's activity

- Print the handout of the learning activity in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 2.3 (case study).
- Invite learners to read, discuss the learning activity 2.3 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight management and treatment plan for skin ulcers and complications of skin ulcers.

#### ◆ Answers for learning activity 2.3

1. The goal of skin ulcer treatment and management is to heal the wound, reduce pain, and treat any infection.
2. The surgical treatment plan adopted by the physician for Mrs. ME is daily wound cleaning twice/day with normal saline 0.9% and wet dressing.
3. Antibiotics: Group of drug that inhibit or destroy the microbe's causative of infection. Example Ceftriaxone/Cefotaxime

Analgesic and painkiller/: A drug that relieve pain by different mechanism such as inhibition of the prostaglandins or enhancement of endorphins. Paracetamol, Diclofenac, Ibuprofen, Morphine.

4. The specific supportive management needed for Mrs. ME: Keeping the skin clean and well hydrated to prevent skin erosions and lacerations. The received twice daily wound cleaning with normal saline 0.9% and wet dressing.



5. The patient and care giver teaching plan prior discharge will include the following keys information:
- Elevation the affected leg to improve blood flow. the leg is kept above the heart level, and cushions or pillows can be used for this purpose
  - Use compressing socks to reduce leg swelling by improving blood flow back up to the heart.
  - Apply high quality honey to a dressing, then apply the dressing on the skin. Honey has anti-inflammatory and antimicrobial benefits

◆ **Answers for self-assessment 2.3**

1. a. The existing tools serving for risk assessment for pressure ulcer are: Braden scale, Norton scale, Gosnell scale, the Knoll scale and the Water low scale.  
b. The mostly and widely used is the Braden Scale for predicting injury developed by Barbara Braden and Nancy Bergstrom in 1988  
c. The criteria based on to evaluate/score the patient's risk of developing pressure injury/ulcer are:
  - Sensory Perception: ability to respond meaningfully to pressure related discomfort (1–4)
  - Moisture: degree to which skin is exposed to moisture (1–4)
  - Activity: degree of physical activity (1–4)
  - Mobility: ability to change and control body position (1–4)
  - Nutrition: usual food intake pattern (1–4)
  - Friction and Shear
2. The most used cleansing solution to clean pressure injuries is normal saline 0.9%.
3. The most important preventive measure of skin ulcers is early screening of patient at risk and improve hygiene and blood supply with nutrition support. Frequently repositioning the patient to avoid stress on the skin. Other strategies include taking good care of skin, maintaining good nutrition and fluid intake, quitting smoking, managing stress, and exercising daily.
4. The complication of untreated skin ulcers are: cellulitis, bone and joint infections, cancer and sepsis.

## **Lesson 4: Description of stomies**

### **a) Learning objectives**

At the end of this lesson the learner will be able to:

- Define the term stomy/ostomy
- Describe the different types of stomies.

### **b) Prerequisites**

Learners have covered the normal structure of the skin layers and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### **c) Teaching resources**

You can use visual (charts) to display figures of stomies in student's book page (...). Depending on the available resources you can also use the Laptop and projectors to visualise the same figures. Other resources include chalks boards (white or black), markers, flash cards, papers, pens, books.

### **d) Learning activities**

Discuss the case study related to stomies to understand the complication of stomies and how can be prevented.

### **Teacher's activity**

- Print the handout of the learning activity 2.4 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 2.4 (case study).
- Invite learners to read, discuss the learning activity 2.4 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight definition the term stomy/ostomy and description of the different types of stomies.

◆ **Answers for learning activity 2.4**

1. Ileostomy is defined as a stoma constructed by bringing the end or loop of small intestine out onto the surface of the skin, or the surgical procedure which creates this opening. Intestinal waste passes out of the ileostomy and is collected in an external ostomy system which is placed next to the opening.
2. The characteristics of a normal stomy/ostomy are: pinkish-red and moist. It slightly sticks out from the skin, and it is normal to see a little mucus. Spots of bloodish mucus on stoma/ostomy is also normal.
3. The types of stomies are: tracheostomy, oesophagostomy, gastrostomy and ileostomy etc.
4. The difference between ileostomy and colostomy: Ileostomy is an ostomy made at the level of ileum .Output from an ileostomy has not entered the colon and thus is liquid. The ileostomy drains continuously, and the patient must constantly wear a bag to collect the drainage. In contrast, output from a sigmoid colostomy resembles normal formed stool, and some patients are able to regulate emptying time so they do not need to wear a collection bag.

◆ **Answers for self-assessment 2.4**

From your readings, please use the provided words to fill out the table below:

“injured colon, surgically produced opening into a specified part of the body, Esophagostomy, moist, familial polyposis, Presence of little mucus, Ileostomy, pinkish-red, Urostomy, slightly stick out from the skin, Tracheostomy, Spots of bloodish mucus, Ulcerative colitis, Crohn’s disease, trauma, cancer, Perforating diverticulum in lower colon”

Definition	Signs, symptoms/ Characteristics	Types	Common indication	Most affect area
surgically produced opening into a specified part of the body	moist, Presence of little mucus pinkish-red slightly stick out from the skin spots of bloodish mucus	Esophagostomy, Ileostomy, Urostomy, Tracheostomy	injured colon, Ulcerative colitis, Crohn’s disease, trauma, cancer, Perforating diverticulum in lower colon, familial polyposis	

## **Lesson 5: Management of stomies and Complications of stomies**

### **a) Learning objectives**

At the end of this lesson the learner will be able to:

- Explain the management of stomies
- List and explain the complication of stomies

### **b) Prerequisites**

Learners have covered the normal structure of the skin layers and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### **c) Teaching resources**

You can use visual (charts) to display figures of in student's book page (...). Depending on the available resources you can also use the Laptop and projectors to visualise the same figures. Other resources include chalks boards (white or black), markers, flash cards, papers, pens, books.

### **d) Learning activities**

Discuss the cases study related to stomies to understand the management and complication of stomies and how can be prevented.

### **Teacher's activity**

- Print the handout of the learning activity 2.5 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 2.5 (case study).
- Invite learners to read, discuss the learning activity 2.5 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight the management of stomies and the complication of stomies.

### ◆ Answers for learning activity 2.5

1. The Irritation of peristomal mucosal can be caused by digestive enzymes in the small intestine. If leaved untreated peristomal skin can become so damaged that the skin barrier will not adhere.
2. The best management /treat this problem: Re-evaluate pouching system, selecting accessories such as barrier rings that can improve seal. Crusting: Pectin-based stoma powder and skin barrier wipe
3. The complications of stoma may be classified as Early and late complication. Early stomal complications occur within 30 days of surgery, and include: mucocutaneous separation, stoma necrosis, and stoma retraction while late complications include stomal stenosis, stomal prolapsed, stomal trauma, and parastomal hernia. The goals to prevent or decrease the incidence of stoma complications include weight reduction, promoting a healthy lifestyle, and proper ostomy management pre- and postoperatively.

## 2.6. Summary of the unit

Skin ulcer is an open sore in the skin caused by poor blood flow. Skin ulcers mostly affect the legs, and can also show up on the feet, back, and hips. They are more common in older people and patients with peripheral vascular disease like those with diabetes. Pressure ulcers or injuries are example of most commonly occurring skin ulcers among hospitalized patients. Pathophysiologically, skin ulcers develop when there is a lack or reduced blood circulation. Four types of skin ulcers exist. Each one has a different cause and slightly different symptoms.

It include venous skin ulcers, arterial skin ulcers, neuropathic skin ulcers and decubitus (pressure) ulcers. Pressure ulcers is the most predominant skin ulcers in clinical settings and is presented in 4 stages which are stage1 (non-blanchable erythema of intact skin), stage 2(Partial-thickness skin loss with exposed dermis) stage 3 (Full-thickness skin loss) and stage 4 (Full-thickness loss of skin and tissue).

Clinical symptoms depend on the types and the severity of the skin ulcer. A skin ulcer generally, looks like a round open sore in the skin. Skin ulcers are usually clinically diagnosed, however, a series of lab test can be performed to assist in the diagnostic process. The goal of skin ulcer treatment is to heal the wound, reduce pain, and treat any infection. In absence of a good treatment, a skin ulcer may become infected, and the healing process will be prolonged. The infection can also spread to deeper tissue, bones, joints, and blood.

The term stomy and ostomy are used interchangeably, is a surgical procedure that allows intestinal contents to pass from the bowel through an opening in the skin on the abdomen. They are many types of stomies described and named according

to the part of the body where it is produced and according to the type. It may be temporary or permanent. For example, the person with a draining fistula may need a temporary ostomy to prevent stool from reaching the diseased area. The management of peristomal skin problems depends on their contributing factors and consists of regular cleaning, changing the pouching bag, and or dressing where necessary. In case of deep infection, systemic antibiotics will be prescribed. Complication of ostomy be classified as early and late complication.

## 2.7. Additional information

Pressure injuries: also called Bed sores is the commonest ulcer that happen on areas of the skin that are under pressure. The pressure can come from lying in bed, sitting in a wheelchair, or wearing a cast for a long time. Pressure injuries are also called bedsores, pressure sores, or decubitus ulcers.

The risk factors for pressure ulcer include the following but not exhaustive list:

- Immobility which might be due to poor health, spinal cord injury and other causes,
- Incontinence: Skin becomes more vulnerable with extended exposure to urine and stool.
- Lack of sensory perception.
- Poor nutrition and hydration.
- Medical conditions affecting blood flow.

Three potential causes of pressure ulcers are loss of movement, failure of reactive hyperaemia and loss of sensation. The creation of a pressure ulcer can involve one, or a combination of these factors. Impaired mobility is probably the most common reason why patients are exposed to the prolonged uninterrupted pressure that causes pressure injuries. This situation may be present in patients who are neurologically impaired, heavily sedated or anesthetized, restrained, demented, or recovering from a traumatic injury. Pathophysiologically, pressure occurs when soft tissues are compressed for prolonged periods between bony prominences and external hard surfaces then microvascular occlusion with tissue ischemia and hypoxia occurs.

Clinically, discoloration of an area of the skin is the early indicator of pressure/bed sore and is presented in different stages:

- Stage 1: ulcers have not yet broken through the skin.
- Stage 2: ulcers have a break in the top two layers of skin.
- Stage 3: ulcers affect the top two layers of skin, as well as fatty tissue.
- Stage 4: ulcers are deep wounds that may impact muscle, tendons, ligaments, and bone.

Treatments for pressure ulcers (sores) include regularly changing position, using special mattresses to reduce or relieve pressure, and dressings to help heal the ulcer. Surgery may sometimes be needed.

Probably the most serious complication is sepsis. When a pressure ulcer is present and there is aerobic or anaerobic bacteremia, or both, the pressure ulcer is most often the primary source of the infection. Additional complications of pressure ulcers include localized infection, cellulitis, and osteomyelitis.

## 2.8. End unit assessment

### ◆ Answers for end unit assessment

- 1) C
- 2) C
- 3) D
- 4) C
- 5) A, B, C
- 6) A
- 7) Tracheostomy is defined as is a surgically created stoma in the trachea to establish an airway. It is used to clear upper airway (bypass obstruction), facilitate removal of secretions, and allow long-term mechanical ventilation.
- 8) The common sites of skin ulcers and ostomies are heels, ankles, hips and tailbone.
- 9) The risk factors that can be associated with pressure injury development are
  - Immobility which might be due to poor health, spinal cord injury and other causes,
  - Incontinence: Skin becomes more vulnerable with extended exposure to urine and stool.
  - Lack of sensory perception.
  - Poor nutrition and hydration.
  - Medical conditions affecting blood flow.
- 10) The pathophysiological mechanisms behind development of Pressure injury: pressure occurs when soft tissues are compressed for prolonged periods between bony prominences and external hard surfaces then microvascular occlusion with tissue ischemia and hypoxia occurs.

## 2.9. Additional activities

### 2.9.1. Remedial activities

1. List the 4 stages of pressure ulcer
2. List 3 complications of ostomies

#### ◆ Answers for remedial activities

1. The 4 stages of pressure ulcer are:
  - Stage 1: ulcers have not yet broken through the skin.
  - Stage 2: ulcers have a break in the top two layers of skin.
  - Stage 3: ulcers affect the top two layers of skin, as well as fatty tissue.
  - Stage 4: ulcers are deep wounds that may impact muscle, tendons, ligaments, and bone.
2. The 3 complications of ostomies are include stomal stenosis, stomal prolapsed, stomal trauma, and parastomal hernia.

### 2.9.2. Consolidations activities

1. Describe the different types of skin ulcers depending to their cause and risk factors.

#### ◆ Answer for consolidations activities

The different types of skin ulcers depending to their cause and risk factors are:

- **Venous skin ulcers:** Venous skin ulcers are caused by poor blood circulation in the leg veins. They usually affect the leg between the knee and ankle. Leg ulcers are mostly venous ulcers (80-90%).
- **Arterial skin ulcers:** Arterial ulcers, or ischemic ulcers, happen when blocked arteries cause poor blood flow. These ulcers commonly form on the lower leg, feet, heels, toes, outer side of ankles. Arterial ulcers are usually very painful. Pain might get worse at night or when the legs aren't moving.
- **Neuropathic skin ulcers:** Neuropathic ulcers are caused by nerve damage and narrow arteries. They're also called diabetic foot ulcers. These ulcers typically occur on the pressure points of the foot. This includes: heels, toes, and bottom of feet. Neuropathic foot ulcers affect about 15 percent of people with diabetes.
- **Decubitus (pressure) ulcers:** Decubitus ulcer, pressure sore, pressure ulcer, pressure injury, bed sore, are the term used interchangeably.



### 2.9.3. Extended activities

1. One of the most important ways to prevent pressure ulcers is to:
  - a. Do regular skin assessments
  - b. Provide support surfaces for all
  - c. Identify at-risk individuals
  - d. Do regular repositioning
2. If a patient or resident is found to be at low risk for a pressure ulcer, further reassessment is not necessary.
  - a. True
  - b. False
3. All at-risk patients should be assessed for pressure ulcers (Select all that apply)
  - a. At time of admission
  - b. At regular intervals
  - c. At any significant change of health condition
  - d. Upon discharge
4. The classic signs of infection apply to pressure ulcer wound infections.
  - a. True
  - b. False
3. When doing a skin assessment, which of the following should you check for?
  - a. Bogginess
  - b. Induration
  - c. Non-blanchable erythema
  - d. Edema
4. In acute care, reassessment for pressure ulcers should occur how often?
  - a. Every 24 to 48 hours
  - b. Weekly initially, then monthly
  - c. Every shift
  - d. After the patient dies
5. Pain is relatively minor in most pressure ulcer cases.
  - a. True
  - b. False

6. In home care, reassessment for pressure ulcers should occur how often?
- Every 24 to 48 hours
  - Weekly initially, then monthly
  - Every nurse visit
  - Every fourth nurse visit
7. Periwound skin refers to the tissue inside the pressure ulcer wound.
- True
  - False
8. When doing regular patient skin assessments, where is it important to check?
- Elbows
  - Under special garments and protective wear
  - Areas that lack sensation to pain
  - All of the above

◆ **Answers for extended activities**

- C.
- False
- A, B, C.
- False
- A, B, C. D
- A, B
- False
- C.
- False
- D

### **3.1. Key Unit competence**

Take appropriate decision on contusions, sprains and strains.

### **3.2. Prerequisites**

Before you teach this lesson ensure that the learner have mastered the normal structure of the skin layers, the inflammatory and healing process, joints and ligaments, bones, physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### **3.3. Cross-cutting issues to be addressed**

#### **3.3.1. Gender education**

During teaching and learning activities, ensure that both boys and girls take responsibility of group leadership and participate equally.

#### **3.3.2. Peace and values**

During group activities, the teacher emphasizes the importance of respecting each learner ideas and encourages everyone to feel free to provide their inputs in a respectful manner.

### **3.4. Guidance on the introductory activity**

Teacher's activity

- Avail any visual aid that display the figures in the introductory activity 3.0 student's book.
- Computer and a projector to display the figures
- A print out of the same colored figures.
- Avail other material depending on the context and teaching environment (white board, flip chart and markers, blackboard and chalks)
- Allow students to observe and reflect on the figures
- Allocate time to questions. Use an interactive brainstorm and let the students answer to the questions
- Learners may not be able to find the correct answers, but they are invited to predict
- Summarize the answers for the purpose of orientation to the new unit topic

◆ **Answers for the introductory activity**

1. The normal structures is the leg in the middle in images A and right leg in image B
2. The possible causes may be physical trauma, accident, falling down and inappropriate shoes.
3. The clinical manifestations may be pain, swelling, bruising, limited ability to move the affected joint and hearing or feeling a “pop” in the joint at the time of injury.
4. The health personnel will identify this abnormality by physical examination and some Para -clinical tests like X-ray and CT scan.
5. Treatment for a sprains depends on the severity of the injury. The treatment goals are to reduce pain and swelling, promote healing of the ligament, and restore function of the joint while contusions of bones, muscles, skin, and cartilage will not need medical treatment. Instead, using the RICE method at home can help with pain and swelling, as well as speed up recovery. Organ contusions may require more intensive treatment, surgery to repair an injury or stop the bleeding.

### 3.5. List of lessons

	<b>Lesson title</b>	<b>Learning objectives</b>	<b>Numbers of periods</b>
1	<p>Sprains, Contusion and Strains</p> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Causes and pathophysiology</li> <li>• Signs and Symptoms</li> <li>• Diagnostic measures</li> <li>• Management of sprains</li> <li>• Treatment plan</li> <li>• Complications and Preventions</li> </ul>	<ul style="list-style-type: none"> <li>• Define contusion, sprains and strains</li> <li>• Explain the causes and pathophysiology of contusion, sprains and strains</li> <li>• Describe the signs and symptoms of contusion, sprains and strains.</li> <li>• List the diagnostic measures for contusion, sprains and strains</li> <li>• Develop a treatment plan of contusions</li> <li>• Explain the evolution and complications of contusions</li> <li>• Identify the preventive measures of contusions</li> </ul>	1
2	Assessment	<ul style="list-style-type: none"> <li>• Take appropriate decision on contusion, sprains and strains</li> </ul>	1

## **Lesson 1: Description of sprains, contusion and strains**

### **a) Learning objectives**

At the end of this lesson the learner will be able to:

- Define contusion, sprain and strain
- Explain the causes and pathophysiology of contusion, sprain and strain
- Describe the signs and symptoms of contusion, sprain and strain
- List the diagnostic measures for contusion, sprain and strain

### **b) Prerequisites**

Learners have covered the normal structure of the muscle skeletal and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### **c) Teaching resources**

You can use visual (charts) to display figures of in student's book page (...). Depending on the available resources you can also use the Laptop and projectors to visualise the same figures. Other resources include chalks boards (white or black), markers, flash cards, papers, pens, books.

### **d) Learning activities**

Discuss the cases study related to contusion, and sprain to understand their definition, their causes, signs and symptoms as well as their pathophysiology of their occurrence. In addition to that diagnostic measures will be discussed.

### **e) Teacher's activity**

- Print the handout of the learning activity 3.1 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 3.1 (case study).
- Invite learners to read, discuss the learning activity 3.1 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight definition, causes and pathophysiology signs and symptoms (of each disease) and diagnostic measures.

### ◆ Answers for learning activity 3.1

1. A sprain is a stretching or tearing of ligaments, the tough bands of fibrous tissue that connect two bones together in the joints. The most common location for a sprain is in the ankle while contusion is an injury that causes bleeding and tissue damage underneath the skin, usually without breaking the skin.
2. The health personnel prescribed anti-inflammatory drugs and RICE (rest, ice, compression, elevate the area) methods.
3. She was told that it would take like 4-6 weeks and she was told to consult after 2 weeks.
4. She will resume her sport after 4 to 6 weeks.

### ◆ Answers for self-assessment 3.1

1. The difference between a sprain, strain and contusion is that sprain is a stretching or tearing of ligaments, the tough bands of fibrous tissue that connect two bones together in the joints while contusion is an injury that causes bleeding and tissue damage underneath the skin the common factors associated with sprain in, usually without breaking the skin.
2. The common factors associated with sprain physical exercise like excessive sports, jumping, and accident.
3. The signs and symptoms of a contusions/sprain will vary, depending on the severity of the injury, and may include; pain, swelling, bruising, limited ability to move the affected joint and hearing or feeling a “pop” in the joint at the time of injury.
4. The types of contusions are: Subcutaneous contusion, Muscle contusion, Bone contusion, Eye contusion, Cartilage contusion, Organ contusion

## 3.6. Summary of the unit

Both sprain and contusion are mostly traumatic conditions of the muscle skeletal system resulting from several traumatic events. Sprain occurs when there is an overextension or tear of a ligament while severely stressing a joint while contusion happens when small blood vessels get torn and leak blood under the skin. The signs and symptoms of sprain and contusion have pain in common. The best treatment for sprains and contusion depends on the severity of the injury and the treatment goals are to reduce pain and swelling, promote healing of the ligament, and restore function of the joint.

### 3.7. Additional information

A pulmonary contusion is an injury to the lung parenchyma in the absence of laceration to lung tissue or any vascular structures. It usually results from blunt chest trauma, shock waves associated with penetrating chest injury, or explosion injuries. These injuries can lead to pulmonary failure and death.

Pulmonary contusion occurs by rapid deceleration when the moving chest strikes a fixed object and occurs in 25-35% of all blunt chest trauma. Lung tissue is crushed when the chest wall bends inward on impact but other causes are falls, assaults and sports injuries.

Most pulmonary contusions require supportive therapy until the contusion heals. Because contusions can gradually evolve over the first 24-48 hours after trauma, close monitoring is required. The goal of therapy is to prevent respiratory insufficiency, failure, and complications.

### 3.8. End unit assessment

#### ◆ Answers for end unit assessment

1. True
2. False
3. True
4. Contusions are caused by blunt trauma to the outer aspect of the muscle, resulting in tissue and cellular damage and bleeding deep within the muscle and between the muscle planes
5. Eversion ankle sprains occurs when the ankle rolls outward and tears the deltoid ligaments while inversion ankle sprains occurs when foot twist upward and the ankle rolls inward.
6. Diagnostic measures of sprains include physical exam to check for swelling and points of tenderness in affected limb. The location and intensity of pain can help determine the extent and nature of the damage. X-rays can help rule out a fracture or other bone injury as the source of the problem.
7. For self-care of an ankle sprain and contusion , R.I.C.E. approach is used for the first two or three days:
  - **Rest.** Avoid activities that cause pain, swelling or discomfort.
  - **Ice.** Use an ice pack or ice slush bath immediately for 15 to 20 minutes and repeat every two to three hours while. If a patient has vascular disease, diabetes or decreased sensation, she/he has to talk with the doctor before applying ice.

- **Compression.** To help stop swelling, compress the ankle with an elastic bandage until the swelling stops. Don't hinder circulation by wrapping too tightly. Begin wrapping at the end farthest from your heart
- **Elevation.** To reduce swelling, it is recommended to elevate the joint above the level of the heart, especially at night. Gravity helps reduce swelling by draining excess fluid.

8. Functional classifications of sprain differ in different grades:

**Grade I injury:** the patient is able to fully weight bear and walk

**Grade II injury:** the patient walks with a noticeable limp

**Grade III:** the patient is unable to walk

### 3.9. Additional activities

#### 3.9.1 Remedial activities

1. What are the common signs of sprain and contusion?
2. What are the most preferable sit for sprain?

#### ◆ Answers for remedial activities

1. A deformity of limb and presence of severe pain may an indicative
2. The most preferable sit for sprain is ankle.

#### 3.9.2 Consolidations activities

1. Is it possible that a sprain heal without treatment?
2. When physiotherapy will be advised as treatment for sprain?

#### ◆ Answer for consolidations activities

1. Yes, sprain can heal spontaneously by self-care approach like RICE.
2. Physiotherapy will be advised once the swelling and pain is lessened enough to resume movement. A series of exercises to restore the range of motion, strength, flexibility and stability may be recommended



### 3.9.3 Extended activities

1. List and describe different types of contusion.

#### ◆ Answers for extended activities

The different types of contusion include:

- Hematoma: Trauma, such as a car accident or major fall, can cause severe bruising and skin and tissue damage. A hematoma is a collection of blood outside the blood vessels that causes pain and swelling..
- Purpura: This type of bruising typically involves small bleeding that occurs under the skin.
- Petechiae: These are pinpoint areas (less than 2 mm) of reddish dots on the skin that do not turn white after applying gentle pressure.
- Senile purpura: According to age, skin becomes thinner, dryer and more prone to tearing but also it bruises more easily. This condition is known as senile purpura.
- Black eye: A blow to the head can cause a black eye Blood and fluids pool under the eye. This condition causes swelling and a bruise, or discolored ring, to form around the eye. A black eye can sometimes indicate a more serious eye injury, such as bleeding in the eye or a facial fracture

### **4.1. Key Unit competence**

Take appropriate decision on dislocation and fracture.

### **4.2. Prerequisites**

Before teaching this lesson ensure that the learners have mastered the anatomy and physiology of skeletal system, physical assessment of the patient, range of motion (ROM), ligaments, joints, first aid, communication and collaboration skills and ethical principles in nursing.

### **4.3. Cross-cutting issues to be addressed**

#### **4.3.1. Gender education**

During teaching and learning activities, ensure that both boys and girls take equal chance of group leadership and participation.

#### **4.3.2. Peace and values**

During group activities, the teacher focuses on the importance of respecting each learner ideas and encourages everyone to feel free to provide their inputs in a respectful manner.

#### **4.3.3. Inclusive education**

All students have equal opportunities to participate in all activities without discrimination of a student with any disability. This may be challenging to students with special educational needs especially those with disabilities, slow learners, those with low self-esteem, etc. However, the teacher can make some arrangements like:

- Grouping students: Students with special educational needs are grouped with others and assigned roles basing on individual student's abilities. Providing procedure/checklists or protocols earlier before the practical work so that students get familiar with them. They can be written on the chalkboard or printed depending on available resources. If you have students with low vision remember to print in appropriate fonts. Also you are supposed to pay attention to all categories of learners.
- Every important point is written and spoken. The written points help students with hearing impairment and speaking aloud helps students with visual impairment.

## 4.4. Guidance on the introductory activity

### Teacher's activity

- Avail any visual aid that display the figures in the introductory activity 4.0 student's book.
- Computer and a projector to display the figures
- Avail other material depending on the context and teaching environment (white board, whiteboard markers, blackboard and chinks, chart on dislocation and fracture, videos on dislocation and fracture, speakers; text books)
- Allow students to observe and reflect on the figures
- Allocate time to questions. Use open discussion and let the students answer to the questions
- Learners may not be able to find the correct answers, but they are invited to predict
- Summarize the answers for the purpose of orientation to the new unit topic

### Student's activity

- Form group and participate in the group work
- To read carefully the case study and answer the indicated
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

#### ◆ Expected answers to the introductory activity 4.0

1. Normal structure of bone: image A and E
2. Broken bone
3. Moto vehicle accident
4. F: Partial displacement of bone; F: Complete displacement of bone
5. E: Bone is intact in its joint surface; G: Bone separated from its joint surface

## 4.5. List of lessons

	Lesson title	Learning objectives	Numbers of periods
1	Description of dislocation (Definition, causes and risk factors, signs and symptoms, diagnostic tests)	<ul style="list-style-type: none"> <li>• Define dislocation</li> <li>• Explain the causes of dislocation</li> <li>• Describe the signs and symptoms of dislocation</li> <li>• List the adequate surgical diagnosis of dislocation</li> </ul>	2
2	Management, complications and evolution of dislocation	<ul style="list-style-type: none"> <li>• Develop treatment plan of dislocation.</li> <li>• Explain the evolution and complications of dislocation</li> </ul>	1
3	Description of fracture (Definition, classification of fracture, causes and risk factors, signs and symptoms, stages of bone healing, surgical diagnosis)	<ul style="list-style-type: none"> <li>• Define fracture</li> <li>• Explain the classification of fracture</li> <li>• Explain the causes of fracture</li> <li>• Describe the signs and symptoms of fracture</li> <li>• Describe the stages of bone healing</li> <li>• List the adequate surgical diagnosis of fracture</li> </ul>	2
4	Management, complications and evolution of fracture	<ul style="list-style-type: none"> <li>• Develop treatment plan of fracture</li> <li>• Explain the evolution and complications of fracture</li> </ul>	1
5	End unit assessment	<ul style="list-style-type: none"> <li>• Evaluate the level of understanding of learners about dislocation and fracture</li> </ul>	1

### Lesson 1: Description of dislocation

This is the first lesson of unit four of surgical pathology which deals with definition, causes, signs and symptoms, and adequate surgical diagnosis of dislocation

#### a) Learning objectives

At the end of this lesson the learner will be able to:

- Define dislocation
- Explain the causes of dislocation

- Describe the signs and symptoms of dislocation
- List the adequate surgical diagnosis of dislocation

### **b) Prerequisites**

Learners have covered the normal structure of skeletal in the anatomy and physiology. Basic knowledge regarding physical assessment of the patient, communication and collaboration skills, the ethical principles.

### **c) Teaching resources**

To teach this lesson, teacher will use different aids and methods in order to achieve learning objectives, these aids and teaching methods include: teaching materials (white board, whiteboard markers, pens, blackboard and chinks, chart on dislocation and fracture, videos on dislocation and fracture, speakers, text books, mannequin) teaching methods (lecture, brainstorming, course work, small group discussion). Other resources may include computer lab, Nursing skills lab and Library.

### **d) Learning activities**

Learning activities will be directly related to the learning objectives of the course, and provide knowledge and skills that will empower students to be involved in practice and receive feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, watch the video and summarize the content, engagement in debate and other clinical learning activities such as case study discussion.

### **e) Teacher's activity**

- Print the handouts of the learning activity 4.1 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 4.1 (case study).
- Invite learners to read carefully and discuss the learning activity 4.1 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight definition, causes, signs and symptoms as well as diagnostic measures.

#### ◆ Answers for learning activity 4.1

1. Two risk factors associated with dislocation are: Fall and previous history of shoulder dislocation.
2. Signs and symptoms of dislocation highlighted in the case study are: severe right shoulder pain, right shoulder swelling, inability to move the right arm.
3. Diagnostic measures used to confirm shoulder dislocation: x-ray and physical examination.

#### ◆ Answers for self-assessment 4.1

1. Difference between dislocation and subluxation: Dislocation is complete displacement of bone while subluxation is partial or incomplete displacement of bone.
2. Four signs and symptoms of dislocation include: Deformity of affected part, pain and tenderness, swelling of joint, loss of function of affected joint.
3. Causes and risk factors: Accident, fall, history of dislocation and strenuous physical activity.

## Lesson 2: Management, complications and evolution of dislocation

This is the second lesson of unit four of surgical pathology which deals with treatment plan, evolution and complications of dislocation

### a) Learning objectives

At the end of this lesson the learner will be able to:

- Develop treatment plan of dislocation
- Explain the evolution and complications of dislocation

### b) Prerequisites

Learners have covered the normal structure of skeletal in the anatomy and physiology. Basic knowledge regarding physical assessment of the patient, communication and collaboration skills, the ethical principles.

### c) Teaching resources

To teach this lesson, teacher will use different aids and methods in order to achieve learning objectives, these aids and teaching methods include: teaching materials (white board, whiteboard markers, pens, blackboard and chalks, chart on dislocation and fracture, videos on dislocation and fracture, speakers, text books, mannequin) teaching methods (lecture, brainstorming, course work, small group discussion). Other resources may include computer lab, Nursing skills lab and Library.

### d) Learning activities

Discuss the cases study of learning activity 4.1 related to dislocation to better understand the management, evolution and complications of dislocation.

Discuss the answer of all questions in self-assessment related to management, evolution and complications of dislocation.

### e) Teacher's activity

- Print the handout of the learning activity 4.1 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 4.1 (case study).
- Invite learners to read, discuss the learning activity 4.1 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight the management, evolution and complications of dislocation.

#### ◆ Answers for learning activity (Cont) 4.2

4. Surgical management done for this patient is close reduction
5. The outcome: The shoulder was reduced successfully

#### ◆ Answers for self-assessment 4.2

1. Key components of dislocation management:
  - Pain relief
  - Treatment of serious complications
  - PRICE: Protection, rest, ice, compression and elevation
  - Reduction
  - Immobilization
  - Surgery
2. Four complications of dislocation: Fracture, bleeding, blood vessel and nerve damage, ligaments tear.

### Lesson 3: Description of fracture

This is the third lesson of unit four of surgical pathology which deals with definition, classification, causes, signs and symptoms, stages of bone healing and adequate surgical diagnosis of fracture.

### **a) Learning objectives**

At the end of this lesson the learner will be able to:

- Define fracture
- To explain the classification of fracture
- Explain the causes of fracture
- Describe the signs and symptoms of fracture
- Explain the stages of bone healing
- Identify the adequate surgical diagnosis of fracture measures of

### **b) Prerequisites**

Learners have covered the normal structure of skeletal in the anatomy and physiology. Basic knowledge regarding physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles.

### **c) Teaching resources**

To teach this lesson, teacher will use different aids and methods in order to achieve learning objectives, these aids and teaching methods include: teaching materials (white board, whiteboard markers, pens, blackboard and chalks, chart on fracture, videos on fracture, speakers, text books, mannequin) teaching methods (lecture, brainstorming, course work, small group discussion). Other resources may include computer lab, Nursing skills lab and Library.

### **d) Learning activities**

Learning activities will be directly related to the learning objectives of the course, and provide knowledge and skills that will empower students to be involved in practice and receive feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, watch the video and summarize the content, engagement in debate and other clinical learning activities such as case study discussion.

### **e) Teacher's activity**

- Print the handouts of the learning activity 4.2 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 4.2 (case study).
- Invite learners to read carefully and discuss the learning activity 4.2 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.



- Help learners to summarize what they have learnt and highlight definition, classification, causes, signs and symptoms, stages of bone healing and adequate surgical diagnosis of fracture.

#### ◆ Answers for learning activity 4.2

1. Three signs and symptoms presented by patient: Right thigh deformity, severe pain, bleeding.
2. Type of fracture of the patient: right femur open fracture.
3. The diagnostic test done is radiographic imaging :X-ray
4. The management for this patient was the performance of immediate compressive dressing and pain killers. Wound cleaning and dressing was also provided. Finally cast was e used to immobilize the bone while waiting for open reduction and external fixation as final management.

### Lesson 4: Management, complications and evolution of fracture

This is the fourth lesson of unit four of surgical pathology which deals with treatment plan, evolution and complications of fracture.

#### a) Learning objectives

At the end of this course the learners will be able to:

- Develop treatment plan of fracture
- Explain the evolution and complications of fracture

#### b) Prerequisites

Learners have covered lesson three of unit four of surgical pathology. The learners have covered the normal structure of skeletal in the anatomy and physiology.

Basic knowledge regarding physical assessment of the patient, communication and collaboration skills, the ethical principles.

#### c) Teaching resources

To teach this lesson, teacher will use different aids and methods in order to achieve learning objectives, these aids and teaching methods include: teaching materials (white board, whiteboard markers, pens, blackboard and chinks, chart on fracture, videos on fracture, speakers, text books, mannequin) teaching methods (lecture, brainstorming, course work, small group discussion). Other resources may include computer lab, Nursing skills lab and Library.

#### d) Learning activities

Discuss the cases study of learning activity 4.2 related to fracture to better understand the management, evolution and complications of fracture.

Discuss the answer of all questions in self-assessment related to management, evolution and complications of fracture.

### **e) Teacher's activity**

- Print the handout of the learning activity 4.2 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 4.2 (case study).
- Invite learners to read, discuss the learning activity 4.2 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight the management, evolution and complications of fracture.

## **4.6. Summary of the unit**

Dislocation and fracture affect skeletal system. Dislocation is defined as separation of bone from its joint surface and is associated with traumatic injuries. Clinical features of dislocation include: Deformity of affected joint, local pain, tenderness, loss of function of injured part, swelling in the joint tissues, bruising, and instability of the joint. Dislocation is diagnosed clinically and through x ray studies. Key components of dislocation management are: pain relief, reduction and immobilization, PRICE (protection, rest, ice, compression and elevation).

It can be complicated into vessel and nerve damage, fracture, infection and ligaments tear. On the other hand, fracture is defined as a break in the continuity of the structure of the bone. Fractures are classified as open and closed fracture, transverse, greenstick, oblique and comminuted fracture. It is mostly caused by accident and fall. Signs and symptoms of fracture are: swelling, deformity, pain, crepitation and muscle spasms. Physical examination and x ray are the diagnostic measures for bone fracture. The treatment modalities of fracture include reduction and casts application. Infection, malunion, delayed union are the complications of fracture.

## **4.7. Additional information**

There is another type of fracture called Colles fracture. It is a fracture which involve the wrist. A Colles fracture is a very painful and serious injury. People of all ages may get a Colles fracture not only from a fall but also from trauma sustained from a car crash, skiing, skating, horseback riding, bike riding or contact sports. Take some precautions to protect your wrists, such as wearing a wrist guard.

## Complications of a Colles fracture

Wrist stiffness is the most common complication. It should get better after your cast has been off for one to two months. Other complications include:

Compartment syndrome is a painful condition where there's too much pressure in and around your muscles.

Carpal tunnel syndrome, which is a compression of the nerves in your wrist. Symptoms include pain, numbness and weakness in your wrist and hand.

Reflex sympathetic dystrophy causes burning pain in your arms, legs, hands or feet.

Secondary osteoarthritis might develop in your wrist. Symptoms include pain and swelling of a deformed joint.

A Colles fracture can't heal correctly without treatment. The bones need realigned and immobilized in order to heal properly. See a healthcare provider if you suspect that your wrist is broken.

## Pathological fracture

A pathologic fracture is a break in a bone that is caused by an underlying disease. For the most part, bones need a reason to break for example, a significant trauma. However, some pathologies (diseases) weaken the bones and once a minor trauma occurs, can cause a fracture in the diseased bone. Pathologic fractures are also frequently caused by osteoporosis. Osteoporosis is a condition of weak and brittle bones that is most common in older women. Other conditions that may weaken the vertebrae include infection, osteomalacia (a condition in which the bones become soft due to a vitamin D deficiency).

## 4.8. End unit assessment

At the end of the unit four of surgical pathology, the teacher will provide the assessment to the learners summarizing the whole unit.

### ◆ Answers for end unit assessment 4

1. False
2. True
3. Transverse, oblique, greenstick, comminuted
4. Four stages of bone healing: hematoma formation, callus formation, ossification, remodeling
5. Fracture is diagnosed using x ray

6. Two modalities of fracture management
  - A) Casts application
  - B) Reduction (external and internal fixation)
7. Six complications of bone healing fracture
  - Infection
  - Malunion
  - Non-union
  - Angulation
  - Refracture
  - Pseudoarthrosis
8. A) Open/compound fracture
  - B) Stop bleeding with compressive dressing

## 4.9. Additional activities

### 4.9.1. Remedial activities

1. The first goal of dislocation management is:
  - a. Pain relief
  - b. Realignment of dislocated portion of joint on its original anatomic position
  - c. Neurovascular assessment
  - d. Monitoring of vital signs
2. The time injury (dislocation) takes to heal depends on the following factors Except:
  - a. Type of injury
  - b. Location of injury
  - c. Person's age
  - d. Disorders which do not impairs blood circulation
3. Which of the following is not a complications of bone healing fracture?
  - a. Non-union
  - b. Malunion
  - c. Angulation
  - d. Neurovascular injury

◆ **Answers for remedial activities**

1=b

2=d

3=d

**4.9.2. Consolidations activities**

1. What is known as a fracture with bending and splintering?
  - a. Complete fracture
  - b. Comminuted fracture
  - c. Greenstick fracture
  - d. Pott's fracture
2. What is the other name of hairline fracture?
  - a. Comminuted fracture
  - b. Pathological fracture
  - c. Oblique fracture
  - d. Stress fracture
3. The following things affect bone healing after fracture except?
  - a. Age of the person
  - b. Underlying bone pathology
  - c. Bone type
  - d. Arthroscopy
4. Goals of fracture reduction include all of the following EXCEPT:
  - a. Restore length
  - b. Restore marrow integrity
  - c. Restore rotation
  - d. Restore angulation
5. A patient is seen at the urgent care center after falling on the right arm and shoulder. It will be most important for the nurse to determine?
  - a. Whether there is bruising at the shoulder area.
  - b. Whether the right arm is shorter than the left.
  - c. The amount of pain the patient is experiencing.
  - d. How much range of motion (ROM) is present.

6. Shoulder dislocations are frequently associated with all of the following EXCEPT:
- Injuries to labrum
  - Humeral head fractures
  - Seizures
  - Axillary vasculature disruptions

◆ **Answers for consolidation activities**

1=c

2=d

3=d

4=b

5=b

6=d

### **4.9.3. Extended activities**

- State differential diagnosis of pathological fracture.
- Name three conditions associated with pathological fracture.
- What are differential diagnosis of colles fracture?
- What does ORIF stands for?
- What is its role in orthopaedics?
- What are the possible complications of ORIF?
- Dislocation is a complete displacement of bone from its original anatomic position in a joint. List the six common joints that are more likely involved in dislocation.
- You are invited to deliver a talk regarding preventive measures of dislocation, what are three elements to be emphasized on while delivering this talk?

### ◆ Answers for extended activities

1. Differential diagnosis for pathological fracture
  - Stress fracture
  - Benign fracture
  - Paget's disease
  - Avascular necrosis
2. Three conditions associated with pathological fracture are:
  - Osteoporosis
  - Osteomalacia
  - Infection
3. Differential diagnosis colles' fracture are:
  - Scapholunate ligament tear
  - Median nerve injury
  - Carpal ligament injury
  - Tendon injury
  - Compartment syndrome
4. ORIF: stands for Open Reduction and Internal Fixation
5. The role of ORIF is to fix severely broken bones. It's only used for serious fractures that can't be treated with a cast or splint.
6. The possible complications of ORIF are:
  - Stroke Nerves, blood vessels, ligaments, muscles, and bones may be damaged
  - Stiffness, numbness and weakness in treated joints
  - Pain
  - Movement problems
  - Blood clots
7. Six common joints affected by dislocation are:
  - Finger
  - Shoulder
  - Elbow
  - Hip
  - Knee
  - Jaw
8. Preventive measures of dislocation are:
  - Take care to avoid falls
  - Wear protective gear when you play contact sports
  - Exercise regularly to maintain strength and flexibility in your joints and muscles

### **5.1. Key Unit competence**

Take appropriate decision on Burn conditions.

### **5.2 Prerequisites**

Before you teach this lesson ensure that the learner have mastered the normal structure of the skin layers, the inflammatory and healing process, physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### **5.3. Cross-cutting issues to be addressed**

#### **5.3.1. Gender education**

During teaching and learning activities, ensure that both boys and girls take responsibility of group leadership and participate equally.

#### **5.3.2. Peace and values**

During group activities, the teacher emphasizes the importance of respecting each learner ideas and encourages everyone to feel free to provide their inputs in a respectful manner.

### **5.4. Guidance on the introductory activity**

#### **Teacher's activity**

- Avail any visual aid that display the figures in the introductory activity 5.1 student's book.
- Computer and a projector to display the figures
- A print out of the same colored figures.
- Avail other material depending on the context and teaching environment (white board, flip chat and markers, blackboard and chalks)
- Allow students to observe and reflect on the figures
- Allocate time to questions. Use an interactive brainstorm and let the students answer to the questions
- Learners may not be able to find the correct answers, but they are invited to predict
- Summarize the answers for the purpose of orientation to the new unit topic



◆ **Answers for the introductory activity**

1. On figure A, this person (baby) is seems to have a burn condition.
2. The condition on image A is called burn injury
3. The possible causes and risks factors that may contribute to this condition as shown in image B: hazards actions caused by fire from cooking gas and image C: thermal, chemical, electrical and radiation agents may be involved in burn condition.
4. The image D is showing some health care personnel provide wound care to the victims (wound care and wound dressing).
5. The possible complications that resulting from the condition in image A are cardiovascular complications like shock and heart problems, renal complications like renal failure, infection, skin problems like contractures. pain and disturbance of body image.

## 5.5. List of lessons

	Lesson title	Learning objectives	Numbers of periods
1	Description of Burn Injury <ul style="list-style-type: none"> <li>• Definition</li> <li>• Causes and risks factors</li> <li>• Pathophysiology</li> <li>• Types of burn</li> </ul>	<ul style="list-style-type: none"> <li>• Define burn</li> <li>• Explain the causes and risks of burn</li> <li>• Describe brief pathophysiology of sprains</li> <li>• Describe the different types of burn according to their causes</li> </ul>	2
2	Description of Burn Injury(cont) <ul style="list-style-type: none"> <li>• Signs and Symptoms</li> <li>• Diagnostic measures</li> <li>• Classification of burn including staging and determination of severity of burn</li> <li>• Calculation of TBSA</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the signs and symptoms burn</li> <li>• Identify the diagnostic measures for burn</li> <li>• Explain the factors influencing the severity of burn</li> <li>• Description of the different stages of burn</li> <li>• Explain the calculation of TBSA by using Rule of Nine and Lund-Browder</li> </ul>	2

3	<p><b>Management of burn:</b></p> <ul style="list-style-type: none"> <li>• Goal and phase of burn management</li> <li>• Calculation of fluid replacement for patient with burn.</li> <li>• Treatment plan for burn</li> </ul>	<ul style="list-style-type: none"> <li>• Explain the goal and phases of burn management.</li> <li>• Describe the The Parkland formula for fluid replacement as the most common formula used.</li> <li>• Develop a treatment plan of patient with burn including: airway management fluid therapy, wound care, pain management, prevention of infection and rehabilitation therapy.</li> </ul>	2
4	<ul style="list-style-type: none"> <li>• Complications of burn and their prevention measures</li> </ul>	<ul style="list-style-type: none"> <li>• Identification of complications related to burn injury</li> <li>• Explain what can be done to minimize complications</li> </ul>	1
5	Assessment	<ul style="list-style-type: none"> <li>• Take appropriate decision on burn condition</li> </ul>	1

## Lesson 1: Description of burn injury

### a) Learning objectives

At the end of this lesson the learner will be able to:

- Define burn injury
- Explain the causes and risks factors of burn
- Explain briefly the pathophysiology of burn
- Describe the different types of burn injury respective to their causes

### b) Prerequisites

Learners have covered the normal structure of the skin layers and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### c) Teaching resources

You can use visual (charts) to display figures in student's book page (...). Depending on the available resources you can also use the Laptop and projectors to visualise the same figures. Other resources include chalks boards (white or black), markers, flash cards, papers, pens, books.

### d) Learning activities

Discuss the cases study related to burn injury to understand its causes and risk factors and pathophysiological process of its occurrence.

#### Teacher's activity

- Print the handout of the learning activity 5.1 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 5.1 (case study).
- Invite learners to read, discuss the learning activity 5.1 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight definition, causes/risk factors and pathophysiology process of burn.

#### ◆ Answers for learning activity 5.1

1. According to the case study, the risks factors associated to burn injury are pre-existence condition like epilepsy, fire but several risk factors associated with burn include dry heat, moist heat, cold injury, chemical agent, electrical current, ionizing radiation and friction.
2. The pathophysiological mechanisms behind blisters formation direct related to vascular changes like capillary permeability is increased, leading to loss of intravascular proteins and fluids into the interstitial tissue and accumulation of fluid will occur as blisters.
3. Signs and symptoms described in the case are: was found to have stage 2 burn wounds on his anterior part of the chest and entire right arm with stage 2 burn and a difficulty in breathing with tachypnea.
4. Judy is classified as stage 2 burn because of blisters formation without involvement of muscle.
5. The treatment offered to Judy before being transferred to District Hospital is local wound care with normal saline and aseptic dressing with Vaseline gauze application.

### ◆ Answers for self-assessment 5.1

1. In regards to pathophysiological changes in case of burn, the three zones of local response according to Jackson in 1947 are: Zone of coagulation: Zone of stasis and Zone of hyperemia.
2. The different category of causes for burn injury are: thermal cause, chemical cause, electrical cause, and radiation cause and smoke and inhalation causes
3. Hypovolemic shock is common seen for patient greater than 30% of TBSA. The release of cytokines and other inflammatory mediators at the site of injury in this category of patient has a systemic effect like increased in capillary permeability, leading to loss of intravascular proteins and fluids into the interstitial compartment (edema) and subsequently decreased intravascular fluid. Finally, a drop of blood pressure will cause a decrease of tissue perfusion and shock.

## Lesson 2: Description of burn injury (continuation)

### a) Learning objectives

At the end of this lesson the learner will be able to:

- Describe the signs and symptoms of burn
- Identify the diagnostic modalities for burn injury
- Explain the factors influencing the severity of burn
- Describe the different stages of burn
- Explain the calculation of TBSA by using Rule of Nine and Lund-Browder

### b) Prerequisites

Learners have covered the normal structure of the skin layers and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### c) Teaching resources

Resources include computer and projector, chalks boards (white or black), markers, flash cards, papers, pens, books.

### d) Learning activities

Discuss the cases study learning activity 5.1 related to burn injury to understand the signs and symptoms and classification of burn.

### e) Teacher's activity

- Print the handout of the learning activity 5.1 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 5.1 (case study).
- Invite learners to read, discuss the learning activity 5.1 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight Signs and Symptoms, diagnostic measures, classification of burn including staging and determination of severity of burn, and how to calculation of TBSA.

#### ◆ Answers for self-assessment activity 5.2

1. Signs and symptoms range from a feeling of minor discomfort to a life-threatening emergency, depending on the size and depth (degree) of the burn. Clinically symptoms may differ also depending on the causative agent .The patient will experience pain, blisters formation, hypersensitivity to air and loss of sensation in severe and full thickness burn.
2. The common and easiest clinical guides for calculating TBSA in burned patient is the rule of nine or Wallace rule.

## Lesson 3: Management of burn conditions

### a) Learning objectives

At the end of this lesson the learner will be able to:

- List and explain the goal and phases of burn management
- Describe Parkland formula for fluid replacement calculation
- Explain a treatment plan of patient with burn including: airway management, fluid therapy, wound care, pain management, prevention of infection and rehabilitation therapy

### b) Prerequisites

Learners have covered the normal structure of the skin layers and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### c) Teaching resources

You can use visual (charts) to display figures of in student's book page (...). Depending on the available resources you can also use the Laptop and projectors to visualise the same figures. Other resources include chalks boards (white or black), markers, flash cards, papers, pens, books.

### d) Learning activities

Discuss the cases study related to burn injury to understand the treatment plan offered to a burned patient.

#### Teacher's activity

- Print the handout of the learning activity 5.1 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 5.1 (case study).
- Invite learners to read, discuss the learning activity 5.1 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight goal and phases of burn management, calculation of fluid replacement for patient with burn ,Treatment plan for burn

#### ◆ Answers for self-assessment 5.3

1. The four major goals of burn management are (1) Prevention measures, (2) life-saving measures for the severely burned person (3) prevention of disability and disfigurement and (4) rehabilitation.
2. The components of nursing and collaborative emergence management of burn are: airway management, fluid therapy, wound care, drug therapy involving pain management and antibiotic therapy, nutritional therapy
3. The calculation of fluid replacement for a patient with burn is done by using Parkland (Baxter) formula =  $4\text{ML} \times \% \text{BSA} \times \text{Weight (KG)}$
4. Total fluid for replacement will provided to patient as follow:  $\frac{1}{2}$  of fluid requirements is administered in first 8 hours, then second half of fluid requirements will be administered over the next 16 hours.

Example of application: a person weighing 75 kg with burns to 20% of his or her body surface area would require  $4 \times 75 \times 20 = 6,000$  mL of fluid replacement within 24 hours. The first half of this amount is delivered within 8 hours from the burn incident, and the remaining fluid is delivered in the next 16 hours. Meaning that

3000ml of fluid will be given during the first 8 hours, and then the remained 3000ml will be given in second 16hours.

## **Lesson 4: Complications of burn and prevention of complication**

### **a) Learning objectives**

At the end of this lesson the learner will be able to:

- Identify the complications related to burn injury
- Develop the plan to minimize complications of burn

### **b) Prerequisites**

Learners have covered the normal structure of the skin layers and the inflammatory and healing process in the anatomy and physiology. Basic of hematological tests (Full Blood Count), physical assessment of the patient, wound dressing technique, communication and collaboration skills, the ethical principles (patient autonomy, beneficence, non-maleficence and justice).

### **c) Teaching resources**

You can use visual (charts) to display figures of in student's book page (...). Depending on the available resources you can also use the Laptop and projectors to visualise the same figures. Other resources include chalks boards (white or black), markers, flash cards, papers, pens, books.

### **d) Learning activities**

Discuss the cases study related to burn injury to understand the complication of burn and how can be prevented.

Teacher's activity

- Print the handout of the learning activity 5.1 in the student's book
- Split learners into small working groups and distribute the handouts of the learning activity 5.1 (case study).
- Invite learners to read, discuss the learning activity 5.1 (case study).
- Give the learners' opportunity to work in their respective groups and at the same time supervise how work is being conducted.
- Ask the group to choose the reporter and ask them to present their respective findings.
- Help learners to summarize what they have learnt and highlight complications of burn/how to prevent them.

## 5.6. Summary of the unit

Burn is a tissue injury that results from thermal application (hot/ cold) and from application of physical or chemical energy that disrupt the skin, which leads to increased fluid loss; infection; hypothermia; scarring; compromised immunity; and changes in body function, appearance, and body image. Burn injuries can have devastating sequelae that can cause long term morbidity. Specific types of burn include thermal /cold injury, chemical burns, electrical burns, and radiation.

The signs and symptoms of burn may range from local redness to full thickness muscle destruction and subsequent systemic and lethal complications like hypovolemic and renal failure. The severity of burn is determined by several factors like deepness of burn, extent of burned surface area, patient factors and location of the burn. The effective calculation of the TBSA is the key in the management of burn and is achieved by using the clinical guides such Rule of nines (Wallace Rule) and Lund-Browder chart.

The best treatment is basically depending on the patient situation. It will include airway management, fluid management, wound care and pain management. But some patient will need to be treated by antibiotics in case of sepsis or complication and rehabilitation may be also needed to restore normal body function in case of complication like skin and muscle contractures. Complications following burns can be either local and systemic. The goals of rehabilitation and reconstruction are prevention of complications, rehabilitation, and reconstruction.

## 5.7. Additional information

Burn injuries can have devastating sequelae that can cause long term morbidity, even when the initial challenges have been overcome. The best way to minimise complications is to manage burns in a dedicated burns Centre with immediate full multi-disciplinary involvement. However, despite advances in treatment, local and systemic complications following burns are still common. Complications can be early or long-term, and local or systemic. Gastro intestinal system is prone to systematic complication like paralytic ileus, Curling's ulcer, and bacterial translocation. Early enteral feeding often mitigates complications, aiming to maintain body weight and endocrine homeostasis.

**Curling's Ulcer:** is a gastric ulcer that can occur following severe burns. The significant reduction in plasma volume following the injury can lead to gastric mucosa ischemia, leading to ulcer formation. Patients admitted with severe burns who subsequently develop features of upper GI bleeding or perforation should be suspected to have a Curling's ulcer. Indeed, any patient with significant burn injury should be started on PPI (Proton Pump Inhibitor) therapy at admission to reduce this risk.



**Paralytic ileus:** Paralytic ileus commonly called functional bowel obstruction is the interruption of the normal passage of bowel contents due to reduced peristalsis in the absence of a mechanical obstruction and it is often transient. Postoperative ileus is one of the most common causes of paralytic ileus. Other etiologies include large burn conditions, inflammation of abdominal, pelvic, or retroperitoneal viscera, metabolic disturbances, certain medications, and mesenteric ischemia. Paralytic ileus typically manifests with nausea, vomiting, abdominal pain, abdominal distention, and constipation; bowel sounds are often absent on auscultation. Bowel distention, if present, leads to third-space volume loss, resulting in dehydration and electrolyte abnormalities. Ileus is generally a clinical diagnosis. Imaging may be required to evaluate for the underlying diagnosis and to rule out complications.

The management is basing on treating the underlying cause with few specific treatment measures for paralytic electrolyte repletion, and bowel rest. Surgical intervention is only indicated if necessary for the underlying cause like acute complicated appendicitis.

### **Circumferential burns and compartment syndrome**

Compartment syndrome is a serious complication of high voltage electrical burns, limb carbonization and deep circular burns with delayed escharotomy. Without treatment, ischemic tissue damage leads to irreversible necrosis. Treatment is emergency surgical decompression. Circumferential full-thickness burns with resultant loss of skin elasticity can produce a tourniquet effect on limbs and trunk, which can lead to compromised distal perfusion, airway obstruction, and poor respiratory effort. The risks factors like age (the condition is most common in male and female athletes under age 30), type of exercise, and overtraining and repetitive impact activity such as running increases the risk of developing the condition. Common Signs and Symptoms is described by the “5 P’s” oftentimes associated with compartment syndrome: pain, pallor, paresthesia, pulselessness and paralysis and Poikilothermia. The earliest indicator of developing acute compartment syndrome (ACS) is severe pain. Pulselessness, paresthesia, and complete paralysis are found in the late stage of ACS.

Acute compartment syndrome must be treated in hospital using a surgical procedure called an emergency fasciotomy which consists of an incision to cut and open the skin and fascia surrounding the muscles to immediately relieve the pressure inside the muscle compartment. Without treatment, acute compartment syndrome can permanently damage muscles. It can also lead to disability, paralysis or even death. Chronic compartment syndrome usually isn’t an emergency because it is often caused by physical exertion, such as intense exercise.

The prognosis after treatment of compartment syndrome depends mainly on how quickly the condition is diagnosed and treated. When fasciotomy is done within 6 hours, there is almost 100% recovery of limb function. After 6 hours, there may be residual nerve damage.

## 5.8. End unit assessment

### ◆ Answers for end unit assessment

1. a
2. d
3. c
4. b
5. d
6. c
7. The 4 common factors determining the severity of burn are: deepness of burn, extent of burned surface area, location of the burn and patients predisposing factors.
8. Circumferential burn is defining as burns to the extremities which cause circulation problems distal to the burn, with possible nerve damage to the affected extremity. Patients may also develop compartment syndrome from direct heat damage to the muscles, swelling, and/or pre-burn vascular problems.
9. By using Parkland formula, fluid replacement= $4\text{ML} \times 32 \times 75\text{kg} = 9600\text{ML}$
10. The 5 complications related to burn injury are: Hypovolemic shock, pulmonary complications due to inhalation injury, acute renal failure, Infections and sepsis, curling's ulcer in case of larger burn (TBSA) more than 30%, Extensive and disabling scarring, Psychological Trauma.

## 5.9. Additional activities

### 5.9.1 Remedial activities

1. List the 4 types of burn and their respective causes
2. List the 3 activities for maintaining Normal Body Temperature in case of burn?

#### ◆ Answers for remedial activities

1. The 4 types of burn and their respective causes are:
  - Thermal Burns: caused by excessive heat, from contact with hot surfaces, hot liquids, steam, or flame.
  - Chemical Burns : caused by strong acids, alkalins, and organic compound.
  - Electrical: result from the conversion of electrical energy into heat.
  - Radiation: result from radiant energy being transferred to the body resulting in production of cellular toxins.
2. The 3 activities for maintaining Normal Body Temperature in case of burn are:
  - Provide warm environment: use heat shield, space blanket, heat lights, or blankets.
  - Assess body temperature frequently.
  - Work quickly when dressing wounds to minimize heat loss from the wound.

### 5.9.2. Consolidations activities

1. Between burn affecting neck and burn affecting the back of the body, which one is more dangerous?
2. Can burn resulting in severe sepsis?

#### ◆ Answer for consolidations activities

1. Burn affecting neck is more serious and dangerous than burn affecting the back of the body because it constitute a type of circumferential burn and there is potential complication to compartment syndrome.
2. Yes, burn can resulting in severe sepsis if asepsis during wound care is not properly taken into consideration . This is justified by the fact that the body's first line of defense, the skin, is destroyed by a burn injury. Then burn wound is now colonized with the person's own organisms that were on the skin before the burn. Localized inflammation, induration, and sometimes suppuration can be seen at the burn wound margins.

### 5.8.3. Extended activities

1. Find out the 3 gastro intestinal system complications in case of burn condition and how can you prevent them?
2. Explain the pathophysiology process of Curling's Ulcer in case of burn and how can be prevented?
3. Briefly discuss the pathogenesis of compartment syndrome related to burn condition and it's the clinical symptomatology.

#### ◆ Answers for extended activities

1.

- The 3 gastro intestinal system complications in case of burn condition are: paralytic ileus, curling's ulcer, and bacterial translocation.
- The way to prevent these complication is to initiate an early enteral feeding to mitigate this complications by maintaining body weight and endocrine homeostasis.
- Enteral nutrition will help to maintain gastric mucosa function in a normal way and reduce the potential for increased gastric juice acidity, will prevent the translocation of normal flora, finally will increase the motility and transit movement (peristalsis) of intestine.

2. Curling's Ulcer in case of burn is resulting from the significant reduction in plasma volume following the injury lead to gastric mucosa ischemia and subsequently gastric ulcer formation.

- It can prevented by early screening of all patients admitted with severe burns for any features of upper GI bleeding or perforation should be suspected to have a Curling's ulcer. Besides that, any patient with significant burn injury should be started on gastric anti-secretory like PPI therapy at admission to reduce this risk.

3.

- Compartment syndrome is a painful and dangerous condition caused by pressure build-up from internal bleeding or swelling of tissues. In case of burn is a serious complication of high voltage electrical burns, limb carbonization and deep circular burns with delayed escharotomy. The pressure decreases blood flow that depriving muscles and nerves of required nourishment. Without treatment, ischemic tissue damage leads to irreversible necrosis.
- The clinical symptomatology of compartment syndrome is described by the "5 P's" oftentimes associated with compartment syndrome: pain, pallor, paresthesia, pulselessness, paralysis and Poikilothermia. The earliest indicator of developing acute compartment syndrome (ACS) is severe pain. Pulselessness, paresthesia, and complete paralysis are found in the late stage of ACS.

## REFERENCES

1. Lewis, S. L., Dirksen, S. R., Heitkemer, M. M., & Linda Bucher. (2014). MEDICAL-SURGICAL NURSING Assessment and mManagement of clinical problems (NINTH). Canada: ELSEVIER MOSBY.
2. Williams, L. S., & Hopper, P. D. (2015). Understanding Medical Surgical Nursing (Fifth edit). Philadelphia: F.A. Davis Company.
3. Hinkle, J. L., & Cheever, K. H. (2018). Brunner and Suddarth's textbook of medical-surgical nursing. Wolters kluwer india Pvt Ltd.
4. Winkelman, C. (2016). Medical-surgical nursing: Patient-centered collaborative care. Elsevier