

CUMILLA MEDICAL COLLEGE

Competency-Based MBBS Lesson Plan: Spondylolisthesis

Aligned with BMDC, BMEAC & WFME Standards | Phase IV (5th Year MBBS)

1. CURRICULUM ALIGNMENT & GENERAL INFO	
Dept & Subject:	Neurosurgery (Spine Surgery / Surgery & Allied) Duration: 60 Mins
Topic:	Spondylolisthesis: Clinical Evaluation, Grading, and Management
Competency:	Describe etiology, Wiltse classification, Meyerding grading, clinical features, imaging, and treatment protocols.
Domains & Integration:	Cognitive (C1-C3), Affective Vert: Anatomy, Physio, Patho Horiz: Ortho, Rehab, Radiology
Clinical Relevance:	Leading cause of low back pain & neurogenic claudication. Early detection prevents permanent motor disability (e.g., foot drop, cauda equina syndrome).

2. LEARNING OBJECTIVES	
1. Define spondylolisthesis, spondylolysis, and spondylosis, distinguishing clinical differences [C1]	
2. Classify using Wiltse classification (Dysplastic, Isthmic, Degenerative, Traumatic, Pathological, Iatrogenic) [C2]	
3. Grade slippage via Meyerding scale (Grade I: <25%, II: 25-50%, III: 50-75%, IV: 75-100%, V: >100%) [C2]	
4. Differentiate neurogenic from vascular claudication based on history and physical exam [C3]	
5. Formulate diagnostic and management plan, identifying red flags for neurosurgical referral [C3]	

3. LESSON PLAN TABLE (60 MINS)				
Time	Teacher Activities	Student Activities	Method & Resource	Assessment
00–05 min	Introduces topic with clinical photo (lordosis, step-off sign). Outlines SMART objectives.	Listen, observe features, note session outline.	Direct Instruction / Projector	Orientation check (Visual attention)
05–10 min	Recalls lumbar spine anatomy: pars interarticularis, facet joints, L5-S1 biomechanics.	Describe anatomy; identify "Scotty dog" on oblique X-ray.	Brainstorming / Spine model	Oral questioning (Random sampling)
10–30 min	- Explains Wiltse classification (Isthmic vs. Degenerative). - Demonstrates Meyerding grading (Grades I–V). - Explains L5 vs L4 nerve root entrapment mechanisms.	Take notes, draw Meyerding diagrams, answer spot checks.	Interactive Lecture / X-ray & MRI slides	Spot questioning / Diagram accuracy check
30–45 min	Presents case: 52F with back pain & walking leg heaviness relieved by sitting forward. Guides claudication contrast.	Small group case analysis (bicycle test, posture, pulse exam).	CBL / Case Scenario Handout	Group representative report check
45–55 min	Outlines workup (dynamic X-rays, MRI) & management (physiotherapy, NSAIDs vs. decompression + fusion).	Ask clarifying questions on surgical indications.	Radiological Demo / X-rays & MRI	Verbal check-in on surgical criteria
55–60 min	Summarizes takeaways. Administers 2 Single Best Answer (SBA) questions. Explains answers.	Solve SBAs individually, participate in discussion.	Formative SBA / Quiz Slides	Instant response tally & verbal feedback

4. FORMATIVE ASSESSMENT (SAMPLE SBA)

Scenario: A 48-year-old male construction worker presents with chronic low back pain and left L5 radiculopathy. Lateral standing X-ray reveals 35% anterior displacement of L5 on S1 with a defect in the pars interarticularis. What is the correct diagnosis and Meyerding grade?

- A) Degenerative Spondylolisthesis, Grade I
- B) Isthmic Spondylolisthesis, Grade II (Correct)**
- C) Dysplastic Spondylolisthesis, Grade III
- D) Traumatic Spondylolisthesis, Grade II

Feedback: Pars interarticularis defect = Isthmic etiology; 35% slippage = Grade II (25–50%).

5. CLAUDICATION COMPARISON (CLINICAL HIGHLIGHT)

Feature	Neurogenic Claudication	Vascular Claudication
Primary Cause	Lumbar spinal stenosis / Spondylolisthesis	Peripheral arterial disease (PAD)
Relieving Posture	Spine flexion (Sitting, bending forward / "Shopping cart")	Standing still / Rest (Posture independent)
Bicycle Test	No pain while cycling (spine flexed)	Pain induced while cycling (muscle ischemia)
Pedal Pulses	Normal / Present	Diminished or Absent

6. TAKE-HOME MESSAGES

- Spondylolysis** = defect in pars interarticularis; **Spondylolisthesis** = forward translation of vertebral body.
- Isthmic** type occurs at L5-S1 in younger adults; **Degenerative** type occurs at L4-L5 in older females.
- Neurogenic Claudication** improves with lumbar flexion ("shopping cart sign"), contrasting vascular claudication.
- Dynamic (standing flexion-extension) radiographs are essential to evaluate subtle mechanical instability.
- Surgery (decompression ± fusion) is reserved for progressive neuro deficits, cauda equina syndrome, or failed conservative care (3–6 mos).

7. SELF-DIRECTED LEARNING & REFERENCES

Self-Directed Learning Tasks:

- **Textbook Reading:** *Bailey & Love's Short Practice of Surgery* (Spine section); *Greenberg's Handbook of Neurosurgery*.
- **Clinical Exam:** Perform lower limb motor (L4, L5, S1), sensory, and reflex exams on 3 spine ward patients.
- **Radiology:** Review 5 lumbar MRIs to differentiate central vs. neural foramen stenosis.

Key References:

1. BMDC Curriculum for Undergraduate MBBS Course in Bangladesh.
2. WFME Global Standards for Basic Medical Education.
3. Wiltse LL, et al. *Classification of spondylolysis and spondylolisthesis*. Clin Orthop Relat Res, 1976.

COMILLA MEDICAL COLLEGE

Lesson Plan: Spinal Tumours

Neurosurgery Module — 5th Year MBBS (Surgery Department)

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
1. GENERAL OVERVIEW	Target Audience	5th Year MBBS Students	Duration	60 Minutes
	Department / Module	Surgery (Neurosurgery Unit)	Mode	Interactive Lecture, Radiological MRI Interpretations & Case Study
2. RATIONALE & CONTEXT	Spinal tumours often present insidiously with back pain, slowly mimicking benign degenerative disease, before progressing to irreversible paraplegia or quadriplegia. For final-phase MBBS students, early recognition of spinal cord compression, locating lesions anatomically relative to the dura and spinal cord, ordering gold-standard contrast MRI scans, and initiating emergency steroid decompression represent crucial clinical skills required for final professional exams and early medical practice.			
3. LEARNING OBJECTIVES	By the end of this 60-minute session, the medical student must be able to: • Classify spinal tumours anatomically into extradural, intradural-extramedullary, and intramedullary spaces. • Recognize clinical syndromes associated with cord compression, including upper motor neuron (UMN) vs. lower motor neuron (LMN) signs. • Identify the gold standard diagnostic investigation (MRI with Contrast) and describe key tumor features. • Detail emergency stabilization for acute spinal cord compression and understand indications for surgical decompression.			
4. TEACHING AIDS & MEDIA	• Projector with high-yield clinical contrast MRI slides demonstrating extradural, intradural-extramedullary, and intramedullary neoplasms. • Whiteboard for drawing transverse spinal cord cross-sections and anatomical compartments relative to the dura mater.			
5. LESSON TIMELINE & BREAKDOWN	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
	00 - 05 min	Clinical Hook & Intro	Case Scenario	A 62-year-old male presenting with a history of prostate cancer complains of progressive thoracic back pain, severe when lying flat, and recent-onset leg weakness.
	05 - 20 min	Anatomical Compartments	Interactive Lecture	Three-tier classification: Extradural, Intradural-Extramedullary, and Intramedullary. Common pathological types in each zone.

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
	20 - 35 min	Clinical Assessment	Case-Driven Discussion	Symptoms: Radicular pain vs. localized bone pain. Signs: Bilateral motor weakness, hyperreflexia, extensor plantar (Babinski), sensory level, bladder/bowel dysfunction.
	35 - 45 min	Radiology & Diagnosis	MRI Slide Reading	Contrast MRI signatures. Detecting vertebral collapse, dural displacement, and intrinsic cord signal changes.
	45 - 55 min	Management Pathways	Step-by-Step Flow	Emergency medical: High-dose Dexamethasone (minimizes cord edema). Definitive: Surgical decompression and stabilization, radiotherapy, or chemotherapy.
	55 - 60 min	Evaluation & Wrap-up	Q&A Session	Summarizing high-yield Short Answer Questions (SAQs) and OSCE board slides.
6. CORE HIGH-YIELD MEDICAL CONCEPTS				
	ANATOMICAL SPACE	COMMON PATHOLOGICAL ETIOLOGIES	PATHOPHYSIOLOGY & RADIOLOGIC SIGNS	
	Extradural (~80-85% of cases)	Metastatic disease (Breast, Prostate, Lung, Kidney, Myeloma), Primary vertebral bone tumors.	Bony destruction, collapse, and direct compression of the cord from outside the dural sac. MRI: Vertebral body destruction with a mass invading the spinal canal.	
	Intradural-Extramedullary (~10-15% of cases)	Meningiomas, Schwannomas, Neurofibromas.	Arise from meninges or nerve roots inside the dura but outside the spinal cord itself. Push the cord to the opposite side. MRI: Well-demarcated intradural mass with cord displacement ("cap sign" or "dural tail").	
	Intramedullary (~5% of cases)	Ependymomas (most common in adults), Astrocytomas (most common in pediatric populations).	Arise directly from glial cells inside the spinal cord parenchyma, causing focal swelling and expansion of the cord itself. MRI: Symmetrical widening and expansion of the spinal cord with variable enhancement.	
7. ASSESSMENT & EXAM PREP (SAQ / OSCE)				

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS	
	OSCE CLINICAL SPOTTER PRACTICE	WRITTEN SHORT ANSWER QUESTION (SAQ) PREP
	Case Study: A 54-year-old female presents with mid-back pain radiating along her 8th rib, progressive stiffness in both legs, hyperactive knee reflexes, and bilateral extensor plantar responses. Questions: 1. Are these findings indicative of upper or lower motor neuron disease? (Upper Motor Neuron - UMN). 2. What is the next most appropriate imaging modality? (Emergency MRI of the thoracic spine with contrast). 3. If acute spinal cord compression is confirmed, what medication should be given immediately? (High-dose IV Dexamethasone).	SAQ Prompt: Define and classify spinal cord tumors. Detail the clinical presentation of metastatic spinal cord compression (MSCC). Model Answer Outline: - Classification: Extradural vs. Intradural-Extramedullary vs. Intramedullary. - Symptoms: Progressive, localized back pain (worse at night/lying flat), radicular pain radiating along dermatomes, motor weakness, paresthesias. - Signs: Spastic paraparesis, hyperreflexia, ankle clonus, positive Babinski sign, definite sensory level, bladder/bowel incontinence (late sign).
8. TAKE-HOME CLINICAL MAXIM	<i>"Unexplained, progressive back pain that worsens when lying flat is a spinal tumor until proven otherwise. Do not wait for urinary retention or paraplegia to develop before ordering a contrast MRI; by then, the opportunity for cord preservation is lost."</i>	

COMILLA MEDICAL COLLEGE
Lesson Plan: Spinal Cord Injury (SCI)
Neurosurgery Module — 5th Year MBBS (Surgery Department)

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
1. GENERAL OVERVIEW	Target Audience	5th Year MBBS Students	Duration	60 Minutes
	Department / Module	Surgery (Neurosurgery Unit)	Mode	Interactive Lecture, Clinical Diagnostic Assessment & Case-Based Discussion
2. RATIONALE & CONTEXT	Spinal Cord Injury (SCI) represents a major surgical and rehabilitation emergency with devastating neurological consequences. Comilla Medical College serves high-volume casualty traffic from the Dhaka-Chittagong highway. Rapid recognition of spinal injury patterns, rigid immobilization protocols, emergency pharmacological stabilization, and differential assessment of incomplete cord syndromes are mandatory skills for 5th-year students prior to graduation and internship placement.			
3. LEARNING OBJECTIVES	By the end of this 60-minute session, the medical student must be able to: • Apply immediate emergency immobilization protocols (hard cervical collar, log-rolling, long spine board) at trauma scenes and triage beds. • Differentiate clinically between neurogenic shock and spinal shock. • Classify spinal cord injury into complete and incomplete syndromes (Brown-Séquard, Anterior Cord, Central Cord, and Posterior Cord). • Outline the primary diagnostic investigations (X-ray, CT, MRI) and summarize pharmacological/surgical indications for decompression.			
4. TEACHING AIDS & MEDIA	• Projector with clinical imaging slides (X-ray and MRI of spinal fractures, subluxations, and cord contusions). • Whiteboard for drawing transverse spinal cord anatomy, tract cross-sections, and explaining dermatomal sensory levels.			
5. LESSON TIMELINE & BREAKDOWN	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
	00 - 05 min	Introduction & Hook	Case Presentation	A 30-year-old construction worker falls from a height. He is awake but complains of inability to move his legs or feel touch below his chest.
	05 - 15 min	Triage & Mobilization	Interactive Walkthrough	Cervical spine protection. The triple airway maneuver. Log-rolling protocols to prevent compounding mechanical column damage.
	15 - 30 min	Shock States in SCI	Clinical Comparison	Differentiating Spinal Shock (loss of reflexes/flaccidity) from Neurogenic Shock

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
				(hemodynamic collapse due to loss of sympathetic tone).
	30 - 45 min	Incomplete Cord Syndromes	Anatomical Mapping	Functional anatomy of Corticospinal, Spinothalamic, and Posterior column tracts. Mapping Brown-Séquard, Central, and Anterior syndromes.
	45 - 55 min	Diagnostics & Care	Group Discussion	Imaging rules (NEXUS criteria). Pharmacological decompression considerations, mean arterial pressure targets, and indications for surgical decompression.
	55 - 60 min	Evaluation & Wrap-up	Q&A & Review	Summary checklist of Final Prof SAQ trends and surgical OSCE spotters.
6. CORE HIGH-YIELD MEDICAL CONCEPTS	INCOMPLETE SYNDROME	DAMAGED ANATOMICAL PATHWAYS	KEY CLINICAL FINDINGS	
	Brown-Séquard Syndrome	Hemi-section of the spinal cord (usually from penetrating trauma).	- Ipsilateral motor loss (Corticospinal tract). - Ipsilateral loss of proprioception/vibration (Posterior Column). - Contralateral loss of pain/temperature 1-2 levels below injury (Spinothalamic tract).	
	Anterior Cord Syndrome	Damage to anterior 2/3 of spinal cord (anterior spinal artery occlusion, hyperflexion trauma).	- Bilateral motor loss below injury level. - Bilateral loss of pain and temperature. - Preserved proprioception, vibration, and deep touch (intact dorsal columns).	
	Central Cord Syndrome	Injury to the central gray matter (hyperextension injuries in patients with cervical spondylosis).	- Motor deficits disproportionately more severe in the upper limbs compared to the lower limbs. - Variable sensory loss below the level of injury.	
	NEUROGENIC SHOCK (HEMODYNAMIC COLLAPSE)		SPINAL SHOCK (PHYSIOLOGICAL CONCUSSION)	
	- Loss of vasomotor/sympathetic tone (typically seen in injuries at or above T6). - Characterized by the clinical combination of Hypotension and Bradycardia (warm, dry extremities due to vasodilation).		- Temporary loss of all neurological activity, reflex function, and motor/sensory activity below the injury level. - Characterized by flaccidity and loss of tendon reflexes (including the bulbo-	

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS	
	NEUROGENIC SHOCK (HEMODYNAMIC COLLAPSE)	SPINAL SHOCK (PHYSIOLOGICAL CONCUSSION)
	- Treated with IV fluids, vasopressors, and atropine.	cavernosus reflex). - Gradually resolves over days to weeks (marked by reflex return).
7. ASSESSMENT & EXAM PREP (SAQ / OSCE)	OSCE CLINICAL SIMULATION SPOTTER	WRITTEN SHORT ANSWER QUESTION (SAQ) PREP
	Scenario: A 25-year-old male stabbed in the back presents with motor paralysis of the right lower limb, loss of vibration sensation on the right side, and loss of pain and temperature sensation on the left side. Questions: 1. What is the name of this spinal cord syndrome? (Brown-Séquard Syndrome) 2. Why is pain loss contralateral? (Spinothalamic fibers cross/decussate at the spinal level within 1-2 segments of entry). 3. What imaging is the gold standard for soft tissue/cord assessment? (MRI Spine).	SAQ Prompt: Outline the clear differences between spinal shock and neurogenic shock. State the clinically significant reflex used to confirm the resolution of spinal shock. Model Answer Outline: - Neurogenic Shock: True hemodynamic shock. Sympathetic tone loss. Present with hypotension + bradycardia. Warm extremities. - Spinal Shock: Electrical concussion. Reflexes, motor, and sensation absent below injury. Normal hemodynamics. - Resolution marker: Return of the bulbocavernosus reflex (squeezing glans penis or pulling Foley catheter leads to anal sphincter contraction) signals the end of spinal shock.
8. TAKE-HOME CLINICAL MAXIM	<i>"In spinal trauma, any movement can transform a stable bone column injury into permanent neurological cord disaster. Immobilize immediately, protect the airway without tilting the neck, and remember: warm hypotension with bradycardia means neurogenic shock."</i>	

COMILLA MEDICAL COLLEGE

Lesson Plan: Pott's Disease (Tuberculous Spondylitis)

Neurosurgery / Spinal Surgery Module — 5th Year MBBS (Surgery Department)

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
1. GENERAL OVERVIEW	Target Audience	5th Year MBBS Students	Duration	60 Minutes
	Department / Module	Surgery (Neurosurgery Unit)	Mode	Interactive Lecture, X-ray/MRI Clinical Spotting & Case Study
2. RATIONALE & CONTEXT	Tuberculosis remains a major public health challenge in Bangladesh, with extrapulmonary manifestations like Pott's Disease (Spinal TB) representing a significant cause of bone destruction, spinal deformity (gibbus), and neurological paralysis (Pott's Paraplegia). Medical students must be equipped to diagnose the disease in its early inflammatory phase, order critical imaging and microbiological tests (GeneXpert/ Biopsy), initiate long-term multi-drug Anti-Tubercular Therapy (ATT), and identify red-flag surgical indications.			
3. LEARNING OBJECTIVES	By the end of this 60-minute session, the medical student must be able to: • Explain the pathophysiology of Mycobacterium tuberculosis hematogenous seeding in the paradiscal space of the spine. • Recognize key clinical features, including chronic localized back pain, constitutional symptoms, "cold abscess" formation, kyphosis (gibbus), and progressive motor deficits. • Differentiate between Pott's Paraplegia of Early Onset and Late Onset and define their prognostic values. • Outline standard pharmacological therapy (ATT), monitor its compliance/side effects, and list the definite indications for surgical spinal stabilization/ decompression.			
4. TEACHING AIDS & MEDIA	• Projector displaying spinal X-rays showing vertebral body wedging, reduced disc space, and MRI scans with clear paravertebral "cold abscesses". • Whiteboard for illustrating the anterior column destruction pathway, development of kyphosis, and spinal cord compression.			
5. LESSON TIMELINE & BREAKDOWN	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
	00 - 05 min	Introduction & Hook	Clinical Case presentation	A 34-year-old female presents with a 6-month history of localized thoracic back pain, low-grade evening fever, night sweats, significant weight loss, and progressive stiffness in both legs.
	05 - 20 min	Pathophysiology & Seeding	Interactive Lecture	Hematogenous spread via Batson's venous plexus. Paradiscal pattern (anterior column). Ischemia of

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
				intervertebral disc. Caseous necrosis and anterior collapse.
	20 - 35 min	Clinical Presentation	Case-Driven Discussion	Localized pain/tenderness. Cold abscess (psoas, paravertebral). Deformity (Gibbus). Pott's Paraplegia: Early onset (active disease inflammation) vs. Late onset (fibrous deformity/bony ridge).
	35 - 45 min	Diagnostic Imaging	Radiology Slide Spotting	Plain X-ray changes (takes weeks; shows paradiscal narrowing, osteopenia, wedging). Contrast MRI (gold standard: displays paravertebral/subligamentous fluid, epidural extension, cord compression). GeneXpert and CT-guided biopsy.
	45 - 55 min	Therapeutic Protocols	Management Flowchart	Standard ATT regimen (usually 12-18 months: Intensive phase with HRZE, maintenance phase with HR). Absolute indications for surgery (progressive neurological deficit, mechanical spinal instability, non-compliance/failure of medical therapy).
	55 - 60 min	Evaluation & Summary	Q&A Session	Recapping high-yield written Short Answer Questions (SAQs) and OSCE board slides.
6. CORE HIGH-YIELD MEDICAL CONCEPTS	CLINICAL PHENOMENON	ANATOMICAL & PATHOLOGICAL BASIS	DIAGNOSTIC FINDINGS & CLINICAL ACTION	
	Paradiscal Destruction	Seeding begins in the anterior subchondral bone of the vertebral body, cutting off the blood supply to the intervertebral disc (which relies on diffusion). Leads to disc space narrowing and anterior wedge collapse.	X-ray: Diminished disc space and anterior wedging of adjacent vertebral bodies, resulting in a localized kyphotic angular deformity (Gibbus).	
	Cold Abscess	Caseous necrotic debris tracks along anatomical tissue planes (under the anterior longitudinal ligament or into the psoas fascia)	Psoas Abscess: May present as a groin lump or flexion deformity of the hip. Action: Drainage (CT-guided or open surgical) if causing severe	

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS		
	CLINICAL PHENOMENON	ANATOMICAL & PATHOLOGICAL BASIS	DIAGNOSTIC FINDINGS & CLINICAL ACTION
		without signs of classic acute, warm pyogenic inflammation.	pressure or failing to resolve under ATT.
	Pott's Paraplegia	Early Onset: Caused by active inflammatory elements (edema, granulation tissue, cold abscess). Good prognosis. Late Onset: Caused by stretching of the cord over a sharp bony ridge or internal pachymeningitis in a healed, severely deformed spine. Poor prognosis.	Presents as progressive spastic paraplegia (hyperreflexia, clonus, sensory level, bladder retention). Action: Progressive motor deficits under ATT require urgent anterior debridement, decompression, and spinal stabilization.
7. ASSESSMENT & EXAM PREP (SAQ / OSCE)	OSCE CLINICAL SPOTTER PRACTICE		WRITTEN SHORT ANSWER QUESTION (SAQ) PREP
	Case Study: A 28-year-old male presenting with a 3-month history of lower thoracic spine pain, progressive leg weakness, hyperactive knee reflexes, and bilateral extensor plantars. Spine X-ray reveals narrowed T10-T11 disc space with collapse of the T11 vertebral body. Chest X-ray shows old apical scarring. Questions: 1. What is the most likely diagnosis? (Pott's Disease / Spinal Tuberculosis). 2. What is the name of the angular spinal deformity expected in this patient? (Gibbus Deformity). 3. What is the gold-standard imaging modality for detailed evaluation of the cord and surrounding soft tissues? (Contrast-enhanced MRI).		SAQ Prompt: Explain the pathophysiology of Pott's disease. State three absolute indications for surgical intervention in a patient with spinal tuberculosis. Model Answer Outline: - Pathophysiology: Mycobacterium tuberculosis hematogenously seeds the vertebral body (often paradiscal). Lack of disc vascularity leads to ischemic collapse of adjacent vertebrae, anterior wedging, cold abscess tracking, and spinal cord compression. - Surgical Indications: 1. Progressive neurological deficit (Pott's paraplegia) despite active ATT. 2. Mechanical instability or severe, worsening kyphosis/deformity. 3. Persistent pain or non-healing lesion with cold abscess failure to resolve with medical therapy.
8. TAKE-HOME CLINICAL MAXIM	<i>"Pott's disease is a medical disease treated medically, but a surgical disease treated surgically. Do not delay starting multi-drug ATT, but remember: the onset of progressive motor weakness is an emergency requiring immediate neurosurgical assessment for decompression."</i>		

COMILLA MEDICAL COLLEGE

Lesson Plan: Prolapsed Lumbar Intervertebral Disc (PLID) & Spinal Stenosis

Neurosurgery / Degenerative Spinal Disorders Module — 5th Year MBBS (Surgery Department)

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
1. GENERAL OVERVIEW	Target Audience	5th Year MBBS Students	Duration	60 Minutes
	Department / Module	Surgery (Neurosurgery Unit)	Mode	Interactive Lecture, MRI Structural Diagnosis & Case-Based Comparison
2. RATIONALE & CONTEXT	Degenerative lumbar spine diseases are among the most common causes of chronic back pain and functional disability presenting to surgical outpatient departments (SOPD) in Bangladesh. Final-phase MBBS students must clearly differentiate between the acute radiculopathy of PLID and the progressive mechanical restrictions of Lumbar Spinal Stenosis (LSS). Differentiating vascular vs. neurogenic claudication and identifying emergency neurosurgical conditions like Cauda Equina Syndrome are paramount competencies for their final professional board exams and medical internships.			
3. LEARNING OBJECTIVES	By the end of this 60-minute session, the medical student must be able to: • Explain the mechanical and structural pathophysiology of anulus fibrosus herniation (PLID) and progressive bony/ligamentous hypertrophy (Spinal Stenosis). • Differentiate clinically between radicular pain (sciatica) and neurogenic claudication. • Elicit and interpret key neurological signs on physical examination (SLR test, femoral stretch test, dermatomal sensory mapping, specific motor weakness like foot drop). • Identify gold-standard radiological features on MRI and detail the conservative medical treatments versus absolute neurosurgical operating criteria (e.g., Cauda Equina Syndrome).			
4. TEACHING AIDS & MEDIA	• Projector with high-yield lumbar spine MRI slides showing disc sequestrations, canal cross-sections, ligamentum flavum thickening, and lateral recess stenosis. • Whiteboard for drawing a normal lumbar cross-section versus disc herniation impinging on a nerve root, and modeling neurogenic claudication mechanics.			
5. LESSON TIMELINE & BREAKDOWN	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
	00 - 05 min	Introduction & Hook	Dual Case Comparison	Case A: A 32-year-old male who lifted a heavy object and developed sudden right leg shock-like pain. Case B: A 65-year-old male who can only walk 100 meters before developing severe bilateral

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
				calf cramps that settle when bending forward.
	05 - 20 min	Pathology & Anatomy	Interactive Lecture	<i>PLID</i> : Nucleus pulposus herniation through anulus fibrosus; posterolateral vulnerability. <i>Stenosis</i> : Osteophytes, facet hypertrophy, and ligamentum flavum thickening leading to space reduction.
	20 - 35 min	Clinical Distinctions	Board Mapping & Demo	Sciatica vs. Claudication. Eliciting the Straight Leg Raise (SLR) test (L4-S1) and femoral stretch test (L2-L4). Defining neurogenic vs. vascular claudication.
	35 - 45 min	MRI Signs & Mapping	Radiology Slide Show	Sagittal and axial T2-weighted MRI windows. Identifying disc bulging, extrusion, central canal dimensions, and structural compression signatures.
	45 - 55 min	Management Pathways	Therapeutic Matrix	Conservative strategies (NSAIDs, short bed rest, core physical therapy). Indications for elective surgery (Microdiscectomy, Laminectomy). Emergency surgery criteria: Cauda Equina Syndrome .
	55 - 60 min	Evaluation & Wrap-up	Q&A Session	Summary checklist of Final Prof SAQ trends, clinical sheet components, and OSCE spotters.
6. CORE HIGH-YIELD MEDICAL CONCEPTS	2			
	CLINICAL METRIC	PROLAPSED LUMBAR DISC (PLID)	LUMBAR SPINAL STENOSIS (LSS)	
	Primary Pathomechanics	Acute focal herniation of nucleus pulposus through a torn anulus fibrosus. Most common at L4-L5 and L5-S1 . Compression of a single nerve root.	Chronic, generalized narrowing of the central canal/lateral recesses due to facet joint hypertrophy, osteophyte formations, and ligamentum flavum hypertrophy . Multi-level involvement.	
	Clinical Hallmark	Radicular Pain (Sciatica) : Sharp, electric shock-like pain radiating down the dermatomal distribution of the compressed	Neurogenic Claudication : Progressive ache, heaviness, or cramping in both lower limbs brought on by walking or	

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS		
	CLINICAL METRIC	PROLAPSED LUMBAR DISC (PLID)	LUMBAR SPINAL STENOSIS (LSS)
		nerve. Worse with coughing, sneezing, and sitting.	prolonged standing. Relieved completely by sitting or bending forward (shopping cart sign).
	Physical Examination	Positive Straight Leg Raise (SLR) test between 30° and 70° (indicates L5/S1 root tension). Focal neurological deficit (e.g., L5 compression = weak big toe extension, foot drop).	SLR test is typically negative. Neurological signs are often minimal at rest but appear or worsen immediately after walking a specific distance (claudication distance).
	SYMPTOM PARAMETER	NEUROGENIC CLAUDICATION (SPINAL STENOSIS)	VASCULAR CLAUDICATION (PERIPHERAL ARTERY DISEASE)
	Relieving Factor	Sitting down, bending forward, or flexing the lumbar spine (widens canal space).	Simply standing still/stopping walking (reduces muscular oxygen demand).
	Bicycle Test	No pain (spine is flexed during cycling, keeping canal open).	Pain develops rapidly due to continuous lower limb muscular exertion.
	Peripheral Pulses	Normal, bounding Dorsalis Pedis and Posterior Tibial pulses.	Diminished or absent lower limb arterial pulses; skin changes (hair loss, shininess).
7. ASSESSMENT & EXAM PREP (SAQ / OSCE)			
	OSCE CLINICAL SPOTTER PRACTICE	WRITTEN SHORT ANSWER QUESTION (SAQ) PREP	
	Case Scenario: A 40-year-old male presents with acute lower back pain tracking into his left leg. He reports progressive numbness in his groin ("saddle anesthesia") and noticed he passed urine involuntarily this morning. Questions: 1. What critical syndrome has developed? (Cauda Equina Syndrome). 2. What mechanical signs confirm this on exam? (Saddle anesthesia, loss of anal tone, lax anal sphincter, urinary retention/overflow). 3. What is the immediate timeline for management? (Emergency lumbar MRI followed by urgent surgical decompression/discectomy within 24–48 hours to prevent permanent paraplegia and bladder death).	SAQ Prompt: Define neurogenic claudication. Outline the clear diagnostic criteria used to differentiate neurogenic claudication from vascular claudication. Model Answer Outline: - Definition: Leg pain, numbness, or weakness induced by walking/standing, caused by mechanical or ischemic compression of the cauda equina roots inside a narrowed lumbar canal. - Differentiating Points: Neurogenic is relieved by lumbar flexion/sitting, has a normal bicycle test, and normal peripheral pulses. Vascular is relieved strictly by resting upright, has a positive bicycle test, and features absent/reduced foot pulses with associated trophic skin changes.	

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS
8. TAKE-HOME CLINICAL MAXIM	<i>"90% of PLID cases resolve with time and conservative management. However, the development of saddle anesthesia, bilateral foot drop, or bowel/bladder disturbance constitutes Cauda Equina Syndrome—a surgical emergency where hours dictate whether a patient walks or spends life with an indwelling catheter."</i>

COMILLA MEDICAL COLLEGE

Lesson Plan: Intracranial Haemorrhage (ICH)

Trauma & Neurosurgery Module — 5th Year MBBS (Surgery Department)

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
1. GENERAL OVERVIEW	Target Audience	5th Year MBBS Students	Duration	60 Minutes
	Department / Module	Surgery (Neurosurgery Unit)	Mode	Interactive Lecture, Clinical CT Scan Interpretation & Case Study
2. RATIONALE & CONTEXT	Intracranial Haemorrhage (ICH) is a neurosurgical emergency with high morbidity and mortality. As prospective interns, 5th-year students must immediately differentiate types of bleed based on clinical presentation and CT imaging, stabilize the patient, control intracranial pressure (ICP), and identify surgical candidates.			
3. LEARNING OBJECTIVES	By the end of this 60-minute session, the medical student must be able to: - Classify intracranial haemorrhages anatomically (Extradural, Subdural, Subarachnoid, and Intracerebral). - Identify the distinct clinical presentations (e.g., Lucid interval, "Worst headache of life", Focal deficits). - Accurately recognize each type of haemorrhage on a non-contrast brain CT scan. - Detail the initial medical stabilization steps (ICP control, BP management) and neurosurgical indications (evacuation vs. conservative management).			
4. TEACHING AIDS & MEDIA	- Projector with high-resolution CT Scan slides demonstrating EDH, SDH, SAH, and ICH. - Whiteboard for drawing anatomical meningeal layers (Dura, Arachnoid, Pia mater) and vascular relationships. - Laminated CT scan challenge cards for interactive small-group matching.			
5. LESSON TIMELINE & BREAKDOWN	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
	00 - 05 min	Introduction & Hook	Clinical Case Narrative	A 60-year-old hypertensive female suddenly collapses with severe headache and vomiting, progressing to a rapid drop in GCS.
	05 - 15 min	Anatomical Classification	Chalk-and-Board Draw	Meningeal layers. Defining potential and real spaces where haemorrhages accumulate. Identifying source vessels (arteries vs. veins).
	15 - 35 min	Clinical & CT Distinction	Comparative Slide Show	Extradural (EDH), Subdural (SDH), Subarachnoid (SAH), and Intracerebral (IPH)

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
				characteristics on clinical exams and CT imaging.
	35 - 45 min	Emergency Management	Interactive Discussion	The first 30 minutes of management: Airway preservation, osmotic therapy (Mannitol/Hypertonic saline), blood pressure targets, reversal of coagulopathy.
	45 - 55 min	Active CT Reading Challenge	Small Group Vignettes	Distributing CT images to student groups. Groups must diagnosis the lesion, identify the bleeding vessel, and propose immediate management.
	55 - 60 min	Formative Wrap-up	Q&A & Quick Quiz	Review of core high-yield exam points for Final Prof SAQ and OSCE.
6. CORE HIGH-YIELD MEDICAL CONCEPTS	TYPE	VESSEL INVOLVED	CLINICAL HALLMARK	CT SCAN APPEARANCE
	Extradural (EDH)	Middle Meningeal Artery (MMA)	Lucid interval; ipsilateral pupillary dilation with contralateral hemiparesis.	Biconvex, lens-shaped, hyperdense lesion. Limited by skull sutures.
	Subdural (SDH)	Bridging Cortical Veins	Gradual onset; occurs in elderly/ alcoholics after minor trauma or falls.	Crescent-shaped, hyperdense (acute) or hypodense (chronic) lesion. Crosses suture lines.
	Subarachnoid (SAH)	Ruptured Berry Aneurysm / AVM	"Worst headache of my life" (Thunderclap), meningism (neck stiffness, photophobia).	Hyperdensity filling the basal cisterns and sulci ("star sign").
	Intracerebral (ICH)	Charcot-Bouchard Aneurysms	Sudden focal neurological deficits associated with severe uncontrolled hypertension.	Hyperdense area within the brain parenchyma, often with surrounding hypodense edema.
7. ASSESSMENT & EXAM PREP (SAQ / OSCE)	OSCE CLINICAL SPOTTER PRACTICE		WRITTEN SHORT ANSWER QUESTION (SAQ) PREP	
	Scenario: 22-year-old male was hit on the temple by a cricket ball. He lost		SAQ Prompt: Outline the immediate emergency medical management of a	

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS	
	OSCE CLINICAL SPOTTER PRACTICE	WRITTEN SHORT ANSWER QUESTION (SAQ) PREP
	consciousness briefly, woke up completely fine, but collapsed 3 hours later with a GCS of 7 and a blown right pupil. Spotter Questions: 1. What is the diagnosis? (Extradural Haemorrhage) 2. Which vessel is injured? (Middle Meningeal Artery) 3. What is the classic CT shape? (Biconvex / Lens-shaped)	patient presenting with high intracranial pressure (ICP) secondary to acute intracranial hemorrhage. Model Answer Outline: - Securing Airway with hyperventilation control (PaCO₂ target: 30-35 mmHg). - Osmotic Therapy: IV Mannitol (20%) or Hypertonic Saline. - Position: Elevate head-end of bed by 30 degrees. - Blood Pressure control to prevent hematoma expansion. - Immediate Neurosurgical consultation for surgical evacuation.
8. TAKE-HOME CLINICAL MAXIM	<i>"In acute intracranial haemorrhage, time is brain. Rapid identification of the bleed type on a non-contrast CT head scan is the single most critical bridge between emergency medical stabilization and definitive neurosurgical decompression."</i>	

COMILLA MEDICAL COLLEGE

Lesson Plan: Hydrocephalus

Neurosurgery Module — 5th Year MBBS (Surgery Department)

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
1. GENERAL OVERVIEW	Target Audience	5th Year MBBS Students	Duration	60 Minutes
	Department / Module	Surgery (Neurosurgery Unit)	Mode	Interactive Lecture, CSF Dynamics Mapping & Case Study
2. RATIONALE & CONTEXT	Hydrocephalus is an active distension of the ventricular system resulting from an imbalance between Cerebrospinal Fluid (CSF) production and absorption. It is a fundamental neurosurgical topic frequently encountered in pediatric presentations, post-infectious (tuberculous/bacterial meningitis) sequelae, and adult normal pressure variants in Bangladesh. Final-year MBBS students must master CSF pathways, recognize typical infantile vs. adult features, accurately differentiate communicating from non-communicating types, and outline definitive shunt and neuroendoscopic treatments.			
3. LEARNING OBJECTIVES	By the end of this 60-minute session, the medical student must be able to: • Map out normal CSF physiology (site of secretion, ventricular transit loop, and venous arachnoid absorption points). • Classify hydrocephalus into obstructive (non-communicating) and non-obstructive (communicating) subtypes with precise structural examples. • Differentiate the clinical presentations of hydrocephalus in infants (distensible skulls) vs. adults (fixed skull vaults). • Interpret core diagnostic features on CT/MRI and detail definitive operative interventions (VP Shunt, Endoscopic Third Ventriculostomy).			
4. TEACHING AIDS & MEDIA	• Projector with high-yield clinical imaging slides (brain CT/MRI showing ventricular dilation, transependymal edema, and aqueductal blocks). • Whiteboard for tracing step-by-step ventricular connection anatomy and illustrating ventriculoperitoneal shunt trajectories.			
5. LESSON TIMELINE & BREAKDOWN	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
	00 - 05 min	Introduction & Hook	Clinical Scenario Presentation	A mother brings her 3-month-old infant to the CoMC surgical outpatient clinic due to rapid, abnormal head enlargement, feeding difficulties, and downwards-deviated gaze.
	05 - 20 min	CSF Flow Dynamics	Whiteboard Anatomy Trace	Production by Choroid Plexus in lateral ventricles → Foramen of Monro → 3rd Ventricle → Aqueduct of Sylvius → 4th Ventricle → Foramina of Luschka/

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
				Magendie → Subarachnoid space → Arachnoid villi venous absorption.
	20 - 35 min	Classification & Signatures	Interactive Lecture	Non-communicating (Obstructive): Block within ventricles (e.g., aqueductal stenosis). Communicating: Extra-ventricular block / absorption failure (e.g., post-meningitis fibrosis). Infantile vs. adult presentation dynamics.
	35 - 45 min	Radiology Identification	CT/MRI Interpretation	Identifying temporal horn dilation, ballooning of the third ventricle, evagination of the frontal horns, and transependymal CSF migration (periventricular lucency on CT).
	45 - 55 min	Surgical Interventions	Treatment Mapping	Mechanics of Ventriculoperitoneal (VP) Shunting and its common complications (blockage, infection). Principles of Endoscopic Third Ventriculostomy (ETV) as an alternative for obstructive types.
	55 - 60 min	Evaluation & Wrap-up	Q&A & Exam Strategy	Recapping high-yield written Short Answer Questions (SAQs) and common clinical OSCE viva cards.
6. CORE HIGH-YIELD MEDICAL CONCEPTS	PATIENT COHORT	PATHOPHYSIOLOGICAL MECHANICS	KEY CLINICAL PRESENTATION SIGNS	
	Infants (Open Sutures)	The skull bones are un-united. Excess CSF volume causes the head to physically expand, temporarily buffering severe rises in intracranial pressure.	- Rapidly increasing head circumference across percentiles. - Bulging, tense, non-pulsatile anterior fontanelle. - Shiny scalp with dilated, engorged veins. - Setting-sun eye sign (pressure on upward gaze centers). - Macewen's "cracked-pot" sound on percussion.	
	Adults (Fused Sutures)	The rigid skull cannot expand. Intracranial pressure rises quickly, directly compressing brain structures.	- Classical triad of acute raised ICP: Progressive headache (worse in the morning), projectile vomiting, and papilledema.	

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS		
	PATIENT COHORT	PATHOPHYSIOLOGICAL MECHANICS	KEY CLINICAL PRESENTATION SIGNS
			- Altered consciousness, bradyphrenia, or diplopia (6th cranial nerve palsy).
	Normal Pressure Hydrocephalus (NPH)	Chronic communicating variant seen in the elderly. Ventricles are dilated, but resting lumbar puncture CSF opening pressure remains intermittently normal.	Classic clinical triad (Hakim's Triad / The 3 W's): 1. Wobbly : Gait ataxia (magnetic/ apraxic gait). 2. Wacky : Cognitive decline / dementia. 3. Wet : Urinary urgency / incontinence.
7. ASSESSMENT & EXAM PREP (SAQ / OSCE)	OSCE CLINICAL SPOTTER PRACTICE		WRITTEN SHORT ANSWER QUESTION (SAQ) PREP
	Case Scenario: An 11-month-old child presents with a disproportionately large head and downward-deviated eyes. Percussion of the skull yields a clear resonant, cracked-pot sound. A brain CT confirms massive dilation of both lateral ventricles and the third ventricle, with a narrow, normal-sized fourth ventricle. Questions: - What is the precise structural diagnosis? (Obstructive/Non-communicating hydrocephalus secondary to Aqueductal Stenosis). - What is the eponym for the percussion sign described? (Macewen's Sign). - Name two definitive surgical management paths. (Ventriculoperitoneal Shunt or Endoscopic Third Ventriculostomy).		SAQ Prompt: Define hydrocephalus. Tabulate the differences between communicating and non-communicating hydrocephalus, providing examples of each. List four clinical signs of hydrocephalus in an infant. Model Answer Outline: - Definition: Active distension of the brain's ventricular system due to an imbalance between CSF production and absorption. - Communicating vs Non-communicating: Communicating has free flow across all ventricles but impaired extraventricular absorption (Example: Post-meningitic adhesions). Non-communicating has a focal mechanical blockade within the ventricular pathway (Example: Aqueductal stenosis or a posterior fossa tumor closing the 4th ventricle). - Infantile Signs: Sunset eye sign, bulging/ tense anterior fontanelle, separated skull sutures, and splayed/distended scalp veins.
8. TAKE-HOME CLINICAL MAXIM	<i>"Hydrocephalus is a mechanical plumbing problem that demands a mechanical solution. Do not delay surgical intervention in a child with expanding head circumference—irreversible cortical thinning occurs long before the un-united skull stops stretching."</i>		

COMILLA MEDICAL COLLEGE

Lesson Plan: Introduction to Head Injury

Traumatic Brain Injury (TBI) Module — 5th Year MBBS (Surgery Department)

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
1. GENERAL OVERVIEW	Target Audience	5th Year MBBS Students	Duration	60 Minutes
	Department / Module	Surgery (Neurosurgery Unit)	Mode	Interactive Lecture & Case-Based Learning
2. RATIONALE & CONTEXT	Essential core topic for Final Professional Examination preparation and upcoming internship training. Given Comilla Medical College's location serving traffic from the high-accident Dhaka-Chittagong highway corridor, rapid diagnostic triage, initial stabilization, and systematic management of head trauma are high-yield clinical skills.			
3. LEARNING OBJECTIVES	By the end of this 60-minute session, the medical student must be able to: - Define and classify head injuries based on mechanism, morphological patterns, and GCS clinical severity. - Differentiate between primary and secondary brain injury mechanics and translate this to preventive care. - Systematically evaluate acute head trauma patients following standard ATLS protocols (ABCDE). - Identify red-flag clinical criteria that require immediate emergency head CT neuroimaging.			
4. TEACHING AIDS & MEDIA	- Multimedia projector setup with definitive high-resolution clinical CT scan slides. - Standard whiteboard for active calculation of clinical Glasgow Coma Scale (GCS) variants. - Printed clinical case vignettes distributed to student cohorts for localized small-group review.			
5. LESSON TIMELINE & BREAKDOWN	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
	00 - 05 min	Clinical Hook & Intro	Case Presentation	25-year-old male post-RTA on Dhaka-Chittagong highway presenting to the CoMC ED.
	05 - 15 min	Classification & Pathology	Interactive Lecture	GCS Severity Triage (Mild 13-15, Mod 9-12, Severe ≤8). Primary vs. Secondary injury pathophysiology.
	15 - 30 min	Assessment & GCS	Active Practice	ATLS sequence (ABCDE with C-spine stabilization). Detailed step-by-step scoring of Eye, Verbal, and Motor parameters.
	30 - 45 min	Morphological Lesions	Visual Slide Review	Skull fractures (vault/basilar). Hematomas: EDH (lucid

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
				interval, biconvex CT) vs. SDH (crescent CT).
	45 - 55 min	Case-Based Decisions	Small Group Work	Student groups apply Canadian CT Head Rules to determine urgent imaging clinical indicators.
	55 - 60 min	Wrap-up & Evaluation	Q&A Session	Core summary checklist, clarifying student queries, introduction to immediate surgical indications.
6. CORE HIGH-YIELD MEDICAL CONCEPTS	Primary vs. Secondary Injury		Primary: Immediate physical trauma (contusions, lacerations). Irreversible. Secondary: Post-impact physiological deterioration (hypoxia, hypotension, edema). *Target of emergency medicine.*	
	Intracranial Hemorrhages		EDH: Middle meningeal artery tear; classic lucid interval; lens-shaped (biconvex) CT hyperdensity. SDH: Bridging vein tears; gradual onset; crescent-shaped CT hyperdensity tracking brain contours.	
	Basilar Skull Fracture		Diagnosed clinically. Key indicators: Raccoon eyes (periorbital ecchymosis), Battle's sign (mastoid ecchymosis), and CSF rhinorrhea/otorrhea. Absolute Contraindication: Never pack the nasal cavity or ears due to ascending meningitis risk.	
7. ASSESSMENT & EXAM PREP (SAQ / OSCE)	OSCE CLINICAL SIMULATION MATRIX		WRITTEN SHORT ANSWER QUESTION (SAQ) TARGET	
	Scenario: RTA victim opens eyes to pain, utters inappropriate words, localizes pain. Task: Compute absolute GCS and severity triage. Answer: E2 + V3 + M5 = Total GCS 10. Categorized as a Moderate Head Injury.		Question: List four key physical signs of a basilar skull fracture and define the twin systemic physiological insults driving secondary brain death. Answer: Raccoon eyes, Battle's sign, CSF rhinorrhea, hemotympanum. The twin lethal insults are Hypoxia and Hypotension.	
8. TAKE-HOME CLINICAL MAXIM	<i>"Assume and secure the cervical spine in every head injury patient until proven otherwise. Optimize oxygenation and mean arterial pressure rigorously; hypoxia and hypotension are the twin catalysts of secondary brain death."</i>			

COMILLA MEDICAL COLLEGE

Lesson Plan: Intracranial Tumours (Brain Tumors)

Neurosurgery Module — 5th Year MBBS (Surgery Department)

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
1. GENERAL OVERVIEW	Target Audience	5th Year MBBS Students	Duration	60 Minutes
	Department / Module	Surgery (Neurosurgery Unit)	Mode	Interactive Lecture, MRI Slide Interpretations & Case Study
2. RATIONALE & CONTEXT	Intracranial neoplasms present with a broad spectrum of clinical features, ranging from chronic headaches to acute focal neurological deficits or seizures. As prospective general practitioners and interns, 5th-year MBBS students must be capable of distinguishing benign from malignant lesions, recognizing the clinical signs of raised Intracranial Pressure (ICP), ordering appropriate imaging modalities (contrast-enhanced MRI), and understanding the fundamental pathways of multi-disciplinary neurosurgical management.			
3. LEARNING OBJECTIVES	By the end of this 60-minute session, the medical student must be able to: • Classify brain tumors into primary vs. secondary (metastatic), and intra-axial vs. extra-axial categories. • Explain the pathophysiological mechanisms of clinical presentation (direct parenchymal invasion, vasogenic edema, and mass effect/herniation). • Recognize the key clinical features of raised ICP (headache, vomiting, papilledema) and specific focal/lobar syndromes. • Identify the gold standard diagnostic imaging (MRI with gadolinium) and outline management options (steroids, surgical resection, radiotherapy, chemotherapy).			
4. TEACHING AIDS & MEDIA	• Projector with clinical slides showing high-yield diagnostic MRI images of key brain tumors (Gliomas, Meningiomas, Metastases). • Whiteboard to map the anatomical boundaries of the skull, Monroe-Kellie doctrine, and tentorial herniation pathways.			
5. LESSON TIMELINE & BREAKDOWN	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
	00 - 05 min	Introduction & Hook	Clinical Case Scenario	A 42-year-old female presents with progressive early morning headaches, occasional projectile vomiting, and left-sided motor weakness.
	05 - 20 min	Classification & Pathology	Interactive Lecture	Anatomical classifications (Extra-axial vs. Intra-axial). Grading according to WHO classification. Primary (Gliomas, Meningiomas) vs. Metastatic lesions.

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS			
	TIME	TOPIC / ACTIVITY	METHODOLOGY	KEY CONTENT FOCUS
	20 - 35 min	Clinical Presentation	Case-Driven Discussion	Triad of raised ICP. Lobar syndromes (Frontal, Temporal, Parietal, Occipital). Cerebellar-pontine angle (CPA) syndrome markers.
	35 - 45 min	Diagnostics & Imaging	MRI Slide Reading	Why Contrast MRI is preferred over CT scan. Key radiological signs: Ring-enhancement (Glioblastoma, Metastasis), dural tail sign (Meningioma).
	45 - 55 min	Treatment Principles	Step-by-Step Flow	Symptom management: Dexamethasone (for vasogenic edema) and anti-epileptics. Definitive care: Surgical debulking/resection, radiotherapy, and chemotherapy.
	55 - 60 min	Evaluation & Wrap-up	Q&A Session	Recapping high-yield written SAQs, and preparing for OSCE clinical cases.
6. CORE HIGH-YIELD MEDICAL CONCEPTS	TUMOUR CATEGORY		ANATOMICAL & HISTOLOGICAL FEATURES	KEY CLINICAL & MRI DIAGNOSTIC SIGNATURES
	Glioblastoma (GBM)		Intra-axial. High-grade malignant astrocytoma (WHO Grade IV). Rapid growth, necrotic center with microvascular proliferation.	Presents with rapid neurological decline, focal deficits, and seizures. MRI: Irregular, thick ring-enhancing mass crossing the midline corpus callosum ("butterfly glioma").
	Meningioma		Extra-axial. Benign tumor arising from arachnoid cap cells. Slow-growing, compresses but does not invade the brain parenchyma.	Often asymptomatic, found incidentally, or presents with focal seizures or progressive localized cranial nerve deficits. MRI: Well-demarcated, dural-based extra-axial mass showing intense homogeneous contrast enhancement with a "dural tail".
	Brain Metastases		Intra-axial. Most common intracranial tumors in adults. Disseminate hematogenously. Common primary sources: Lung, Breast, Melanoma, Renal cell, Colon.	Multiple lesions, often at the grey-white matter junction, surrounded by disproportionately extensive vasogenic edema. MRI: Multiple well-defined spherical lesions with ring enhancement.

LESSON PARAMETERS	DETAILS & IMPLEMENTATION SPECIFICATIONS	
7. ASSESSMENT & EXAM PREP (SAQ / OSCE)	OSCE CLINICAL SPOTTER PRACTICE	WRITTEN SHORT ANSWER QUESTION (SAQ) PREP
	Case Study: A 55-year-old male smoker presents with progressive headache, clumsy gait, and confusion. Contrast-enhanced MRI reveals three separate, ring-enhancing lesions located at the grey-white matter junction of both hemispheres, with massive surrounding edema. Questions: 1. What is the most likely diagnosis? (Brain Metastases) 2. What is the preferred primary diagnostic screening tool? (Chest X-ray / CT Chest-Abdomen-Pelvis to identify primary carcinoma) 3. What immediate pharmacological drug should be administered to reduce mass effect? (Dexamethasone/IV Corticosteroids).	SAQ Prompt: List the classical symptoms and signs of raised Intracranial Pressure (ICP) due to space-occupying lesions. State the anatomical basis and significance of Cushing's Triad. Model Answer Outline: - Symptoms of Raised ICP: Progressive morning headache, projectile vomiting, blurring of vision. - Signs of Raised ICP: Papilledema, lateral rectus palsy (6th Cranial nerve palsy). - Cushing's Triad: Hypertension (widening pulse pressure), Bradycardia, and irregular respiration. It represents a late pre-terminal sign of brainstem compression/herniation indicating urgent decompression is required.
8. TAKE-HOME CLINICAL MAXIM	<i>"For any patient presenting with progressive headache and new-onset seizures, always rule out an intracranial space-occupying lesion. Treat brain edema promptly with steroids, but remember: definitive diagnosis and grade classification always require histological tissue evaluation."</i>	