Each puzzle is a clinical scenario (no multiple-choice or crossword) that requires the team to analyze, apply, or evaluate information. Puzzles are deliberately tied to Bloom's taxonomy: for example, some demand application of knowledge (e.g. diagnosing an injury from symptoms), while others target analysis or creation (e.g. designing a rehab plan). Involving students at higher cognitive levels (analyze, evaluate, create) boosts engagement and retentio The puzzles also use storytelling and realistic context (e.g. patient backstories or role-play) to make learning immersive. As one review states, the learning process is facilitated when material is presented in an entertaining way For all puzzles, clear rules are given (time limit of ~20 min per puzzle, use only provided materials, all team members participate, etc.), and after solving each case students report their answers. A simple scoring rubric (below) rewards correct diagnosis, sound justification, effective management planning, and teamwork. Altogether, these 10 case-based "games" make learning about soft-tissue injuries active, social, and fun.

Team Organization

Groups: Split the class of 99 into 10 teams (9 teams of 10 + 1 team of 9). Mix skill levels so each team has diverse knowledge.
Roles: Within each team, members may assign roles (e.g. "recorder," "spokesperson," "timekeeper") to structure collaboration.
Format: All teams work in parallel on their puzzle; after ~20 minutes each team presents their findings or solution. Teams are encouraged to discuss openly like a medical team solving a case.
Rationale: Small groups foster peer teaching and accountabilityUsing a Harvard-style case method, each team analyzes a realistic clinical vignette and applies physiotherapy concepts to solve it. Interacting with peers mirrors clinical teamwork, reinforcing learning through social interaction

Puzzle Design Principles

Case-Based Narrative: Each puzzle is a scenario ("patient X with symptoms Y") that the team must solve. This mirrors real clinical reasoning and situates learning in context. Story elements (e.g. patient age, history) and props (charts, diagrams) make puzzles engaging.
Cognitive Level (Bloom's): Puzzles are designed for specific cognitive tasks. For example, diagnostic puzzles target the Apply level, analysis puzzles (e.g. comparing injuries) target Analyze, and rehab-design puzzles target Create/Evaluate. Research shows that engaging higher Bloom levels enhances student interest and retention

No MCQs/Crosswords: All puzzles require open-ended problem-solving (short answers, discussions, matching, or ordering tasks). For instance, teams might match case-clues to diagnoses or sequence treatment steps, instead of filling blanks or selecting from choices. This keeps the activity interactive and discussion-driven.

Interactive Elements: Some puzzles use hands-on or role-play components to make them fun. For example, one puzzle has a student role-play a patient while teammates interview them. Such active tasks leverage games' strength in reasoning and logic and reinforce knowledge through doing

Time & Feedback: Each puzzle is timed (~20 min). The facilitator provides immediate feedback or the answer key after time's up, reinforcing correct reasoning. This rapid cycle of challenge and feedback (a key game element) boosts focus and learning.Below are 10 puzzle scenarios, one per team. Each description includes a brief case, the team's task, the targeted Bloom's level, and any special rules.

Puzzle 1: **"Ankle Sprain Diagnosis"**

A patient twisted their ankle during basketball practice. The team is given a case note: "Athlete with acute lateral ankle pain and swelling after inversion injury. No fracture on X-ray; point tenderness over ATFL ligament; mild ecchymosis." Teams must **diagnose the injury and classify it** (e.g. Grade I–III sprain) and propose immediate management (e.g. RICE, support).

Bloom's Level: Apply (apply anatomy/physio knowledge to a case)

Domain: Cognitive (physiologic and biomechanical reasoning)

Rules:

Time limit: 20 minutes.

Use supplied anatomy charts and grading criteria. No internet or notes.

Team must present the ligament(s) involved, sprain grade, and 2–3 initial treatment steps.

All members contribute to diagnosis and plan.

Scoring: Points for correct identification of ligament(s), accurate grade, logical rationale, and a safe management plan.

Puzzle 2: **"Hamstring Strain Scenario"**

A sprinter reports a sharp "pop" in the back of the thigh during a race. The case sheet reads: "Rapid-onset posterior thigh pain. Bruising appears next day. Muscle strength (knee flexion) is weak, resisted pain in mid-thigh muscle belly."
Teams must **confirm a muscle strain** and decide its severity (mild, moderate, severe) and suggest 1–2 rehab recommendations.

Bloom's Level: Apply/Analyze (analyze exam clues to gauge severity)
Domain: Cognitive
Rules:
Time limit: 20 minutes.
Reference the Hamstring injury classification handout provided.
Explain why it is a muscle strain (not a tear or nerve injury) and recommend rest vs. movement.
Outline one gentle exercise or precaution appropriate for the injury's grade.

Puzzle 3: **"Frozen Shoulder (Adhesive Capsulitis) Case"**

A middle-aged diabetic patient has gradually worsening shoulder pain and stiffness. Details: "6-month history of dull shoulder pain, night pain, and loss of external rotation and abduction. Passive and active range both limited."
Teams must **diagnose adhesive capsulitis**, state its likely stage (freezing, frozen, thawing) and propose a physiotherapy intervention plan.

Bloom's Level: Analyze/Evaluate (differentiate capsulitis from other shoulder disorders)

Domain: Cognitive
Rules:
Time limit: 20 minutes.
No external references; rely on known pathophysiology.
Justify how the presentation fits "frozen shoulder."
Recommend either gentle mobilizations or pain control techniques, and explain the choice.

Puzzle 4: **"Shoulder Bursitis vs. Tendonitis"**

An office worker complains of shoulder pain. The data: "Pain at deltoid insertion; painful arc from 90–120°; tenderness over supraspinatus tendon; no

pain with passive movement; overuse of overhead keyboard work."
Teams must **distinguish subacromial bursitis from rotator-cuff tendonitis** in this scenario, and outline a management strategy.

Bloom's Level: Apply/Analyze (apply exam findings to pick correct diagnosis)
Domain: Cognitive
Rules:
Time limit: 20 minutes.
Perform a mock "Painful Arc" test (simulated) to guide decision.
Decide which structure is inflamed and suggest two rehab actions (e.g. rest posture vs. specific exercises).
Clarify why it is not another condition (e.g. no glenohumeral arthritis).

Puzzle 5: **"Wrist Tenosynovitis (De Quervain's) Challenge"**

A new mother has wrist pain. The clue: "Sharp pain at the thumb-side wrist, aggravated by lifting her baby and by ulnar deviation. Positive Finkelstein's test (pain when making a fist with thumb inside)."
Teams must **identify de Quervain's tenosynovitis**, explain which tendons are involved, and propose a basic therapy (splint or exercises).

Bloom's Level: Apply (use clinical tests and anatomy)
Domain: Cognitive
Rules:
Time limit: 20 minutes.
Describe the Finkelstein test and interpret its result.
Name the affected tendons (APL, EPB) and suggest a short-term intervention (e.g. thumb spica splint, gentle mobilization).
All group members should participate in explaining the test or treatment demonstration.

Puzzle 6: **"Plantar Fasciitis Puzzle"**

A runner complains of heel pain. The case: "Wakes with heel pain on first steps, which eases after walking. Palpation pain at medial calcaneus. Tight Achilles on exam. No nerve symptoms."
Teams must **confirm plantar fasciitis**, mention contributing factors, and suggest stretching or footwear advice.

Bloom's Level: Comprehend/Apply (connect history and exam to common foot injury)
Domain: Cognitive

Rules:
Time limit: 20 minutes.
Use the foot model to point out the plantar fascia origin.
List two risk factors (e.g. overuse, tight Achilles) and two management tips (e.g. heel cup, calf stretches).
Explain how the diagnosis differs from, say, a nerve entrapment (no tingling).

Puzzle 7: **"Jumper's Knee (Patellar Tendonitis) Strategy"**

A volleyball player has knee pain. Information given: "Pain just below kneecap, worst when jumping and squatting. Mild swelling, pain on resisted knee extension."
Teams must **recognize patellar tendonitis**, rate its severity, and propose graded return-to-sport exercises.

Bloom's Level: Apply (apply sport injury knowledge)
Domain: Cognitive
Rules:
Time limit: 20 minutes.
Identify the tendon involved (patellar tendon) and why it hurts.
Suggest modifying volleyball drills (e.g. reduce jumps) and introduce a strengthening exercise (e.g. eccentric squats).
Team lists two precautions to prevent worsening.

Puzzle 8: **"Diagnosis Match-Up Card Game"**

Teams receive a shuffled deck of 6 "case cards" (brief symptoms) and 6 diagnosis cards (one condition on each: Sprain, Strain, Capsulitis, Bursitis, Tenosynovitis, Tendonitis). Each team's task is to **match each case to the correct injury** by arranging the cards in front of them. For example, a card reading "heel pain with morning stiffness" matches "Plantar Fasciitis."

Bloom's Level: Analyze (classify and match symptoms to diagnoses)

Domain: Cognitive

Rules:

Time limit: 20 minutes to match all correctly.

Teams may flip the cards over only once all guesses are placed.
No two symptoms can match one diagnosis; it's a one-to-one matching.
Use logic and the information learned from previous puzzles.

Fun Element: This game-like matching exercise encourages teamwork and reinforces recognition of each condition's key features.

Puzzle 9: **"Recovery Sequence Puzzle"**

A list of 6 treatment steps for a muscle strain is jumbled. Teams must **put the steps in the correct order** (e.g. Ice, Rest, Gentle Stretch, Strengthen, Return-to-Activity). They receive cards labeled Step 1…Step 6 and a worksheet of descriptions; the team's job is to arrange them sequentially and justify the sequence.

Bloom's Level: Apply/Analyze (organize knowledge into a logical progression)
Domain: Cognitive
Rules:
Time limit: 20 minutes.
Each team decides together the correct sequence and writes a brief justification for each step.
Clues or hints are not given; teams rely on their understanding of tissue healing.
Award points for correct order and clear reasoning (e.g. "Why do we stretch after resting?").
Learning Goal: This puzzle reinforces understanding of rehabilitation phases (rest vs. rehab timing) in a fun, hands-on way.

Puzzle 10: **"Mock Patient Interview Role-Play"**

One student in the team is given a "patient card" (e.g. a man with chronic lateral knee pain) and must role-play as the patient. The rest of the team conducts a mini history and exam based on clues. The goal is to **extract key information and propose a diagnosis**. For instance, if the patient says "I run marathons and my knee hurts on the outside," the team should consider IT-band syndrome or similar.

Bloom's Level: Evaluate/Create (evaluate the information gathered to reach a conclusion)
Domain: Cognitive/Interpersonal
Rules:
Time limit: 20 minutes (about 5 min history-taking + 15 min discussion).
The "patient" follows the backstory strictly and only reveals information when asked.
Team members take turns asking questions (history or exam).
At the end, the team states the most likely diagnosis and a brief treatment idea.
Scoring: Points for asking relevant questions, correctly interpreting the answers, and arriving at a reasonable clinical decision.

Rules and Regulations for All Puzzles

Time Management: Each puzzle must be completed within ~20 minutes. A timer will be used. Teams must stop when time is called.
Collaboration: All members should participate; excessive dominance by one person is discouraged. Teams may allocate roles to ensure balanced involvement.
Resources Allowed: Teams get only the materials provided (case sheets, charts, cards). No phones or outside help. However, whiteboards or paper for notes are allowed if handed out.
Instructions: Read each case carefully. Use evidence-based reasoning. Teams should document answers clearly.
Rotation (Optional): If desired, teams could rotate puzzles after each 20-min period (with solutions checked at each station) to allow every group to experience multiple cases. Otherwise, each team stays with one puzzle and then shares with the class.
Fair Play: No peeking at others' papers or interfering with other teams. Treat the activity as you would a real clinical exercise: professionally and respectfully.

Scoring and Feedback

Each puzzle can be scored out of 100 points (or a simpler scale) using a rubric. For example:

Diagnostic Accuracy (≈20 pts): Correctly identifying the injury or picking the right symptoms.
Clinical Reasoning (≈30 pts): Quality of explanation/justification (e.g. use of anatomy, test rationale).
Treatment/Management Plan (≈20 pts): Appropriateness of the proposed interventions or plan.
Use of Key Concepts (≈10 pts): Correct medical terminology and concepts (e.g. "tendinitis," "capsular stretch," etc.).
Creativity & Engagement (≈10 pts): Originality in approach and enthusiasm (e.g. creative role-play, neat presentation of answers).
Teamwork (≈10 pts): Equal participation, communication, and respect within the group.

Teams receive their scores and brief feedback on strengths and areas to improve. Because puzzles are collaborative, the emphasis is on learning and discussion rather than high-stakes testing.

Summary: These ten puzzle games – each a case-based challenge on sprains, strains, bursitis, tenosynovitis, fasciitis, tendonitis, etc. – combine fun and rigor. By working in Harvard-style discussion groups and tackling these scenarios, students apply Bloom's higher-order thinking (analysis, evaluation, creation) in a safe, engaging environment This active, game-like approach has been shown to increase student interest and solidify clinical concepts in physiotherapy education