Orthopedic Trauma Detection in Simulated On-Call Radiology: Highlighting Observational Errors Among Residents

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Introduction

This study evaluates the ability of radiology residents to accurately identify three specific types of orthopedic trauma using radiographic imaging within a simulated on-call environment.

Methods

We utilized the Wisdom in Diagnostic Imaging Emergent/Critical Care Radiology Simulation (WIDI SIM) – a proven computer-aided emergency imaging simulator – to gauge residents' preparedness for independent radiology calls. This simulation incorporated 65 diverse cases, among which, at least one centered on orthopedic trauma identification. Faculty members manually graded residents' textual responses using a standardized rubric, and any errors were categorized accordingly. Errors were categorized as either *observational* or *interpretive.* Observational errors are unrecognized or missed imaging findings. Interpretive errors are misdiagnosing or incorrectly staging imaging findings.

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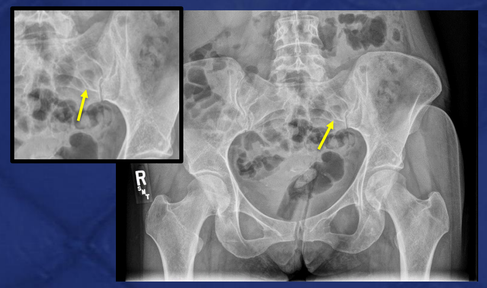
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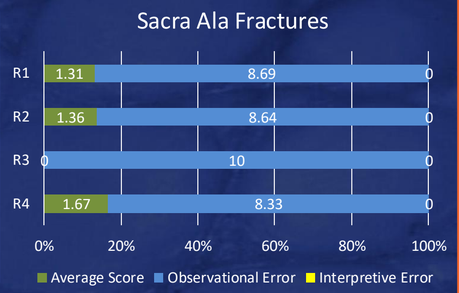
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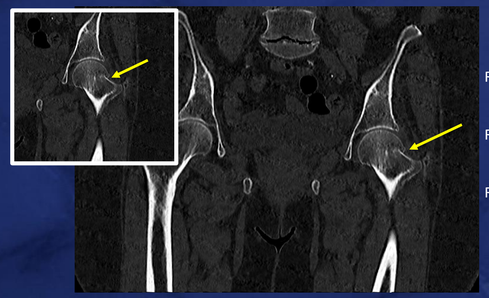
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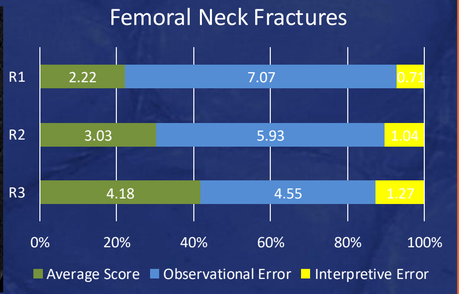
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Results



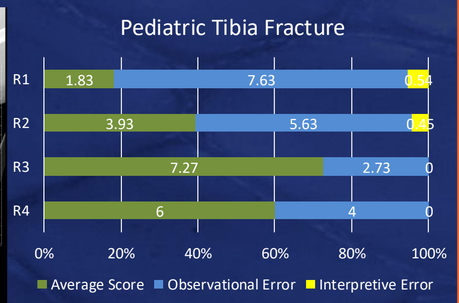












Results

Sacral Ala Fracture

321 radiology residents encountered x-ray images of sacral ala fracture. This fracture was underdiagnosed across all years of training. 6% of residents generated effective reports (score > 6). 80% of residents generated reports with critical errors (score < 3).

Femoral Neck Fracture

316 radiology residents encountered CT images of a femoral neck fracture. This fracture was consistently underdiagnosed across all years of training. 25% of residents generated effective reports. 66% of residents generated reports with critical errors.

Pediatric Tibia Fracture

197 radiology residents encountered x-ray images of pediatric tibia fracture. This fracture was consistently underdiagnosed across all years of training. 29% of residents generated effective reports. 71% of residents generated reports with critical errors.

Discussion

Observational errors were the primary contributor to missed diagnoses among radiology residents. These findings highlight the need for targeted education focused on the accurate identification of sacral ala fractures, femoral neck fractures, and pediatric tibial fractures. Instruction should emphasize recognition of subtle radiographic findings and reinforce key imaging patterns through case-based learning and structured feedback.