

# Improving Novice Radiology Trainees' Perception Using Fine Art

Thomas Rob Goodman, MB BChir, Michael Kelleher, MD

## Abstract

**Purpose:** To determine if fine art perception training improved performance in novice radiology trainees.

**Methods:** On the first day of their residency, 15 radiology residents underwent a basic radiology perception test in which they were shown 15 different radiographs that each had a significant abnormality. This was followed by a focused session of interpretation training at a local art gallery where art experts taught the trainees how to thoroughly analyze a painting. After this fine art session, the residents were once again shown 15 different radiographs and asked, in the same manner as before, to identify the location of the abnormality. The results of both radiograph assessments were then compared.

**Results:** The 15 residents correctly identified the areas of abnormality on 35 of 225 cases pre-art training with a mean score of 2.33 and a SD of 1.4. After art training, the figure for correctly identifying the area of abnormality rose to 94 of 225 cases with a mean score of 6.27 and a SD of 1.79 ( $P < .0001$ ).

**Conclusion:** The implementation of a focused teaching session on perception improved first-year residents' ability to localize imaging abnormalities. This improvement was significant ( $P < .0001$ ). Most errors in radiology occur due to failures of perception rather than failures to correctly interpret a finding and, as such, it behooves the profession to ensure that perception training is adequately addressed as part of a radiology training curriculum. Using an art gallery may be a novel, effective transitional starting point for novice radiology trainees.

**Key Words:** Perception, training, art, trainee, resident

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## INTRODUCTION

The skills required to be an effective diagnostic radiologist include both perception and interpretation abilities. Although interpretive skills develop over time with learning and an improved knowledge base, powers of perception are less well understood. It is known that abilities in perception improve earlier and develop faster than interpretation skills and are of critical importance in diagnostic radiology [1]. In the field of radiology training, how can the powers of perception best be honed quickly and effectively to focus more on the cognitive, iterative diagnostic process during the limited time available in a residency program?

Several studies have shown that exposing medical students to sessions focused on the description and analysis of fine art paintings improved their communication skills and augmented their ability to perform the history and physical components of their training [2]. The analogies of analyzing a painting in the same way radiologists interrogate a diagnostic image are obvious. Can training in perception and interpretation in art galleries improve the skill set of novice radiology trainees?

## METHODS

At Yale University, several studies have taken place in collaboration with the School of Medicine and the Yale Center for British Art involving art interpretation to augment conventional observational and visual diagnostic skills [2-4]. To test the hypothesis that this might also have advantages among radiologists, we formulated a training scheme using art appreciation for our first-year radiology residents.

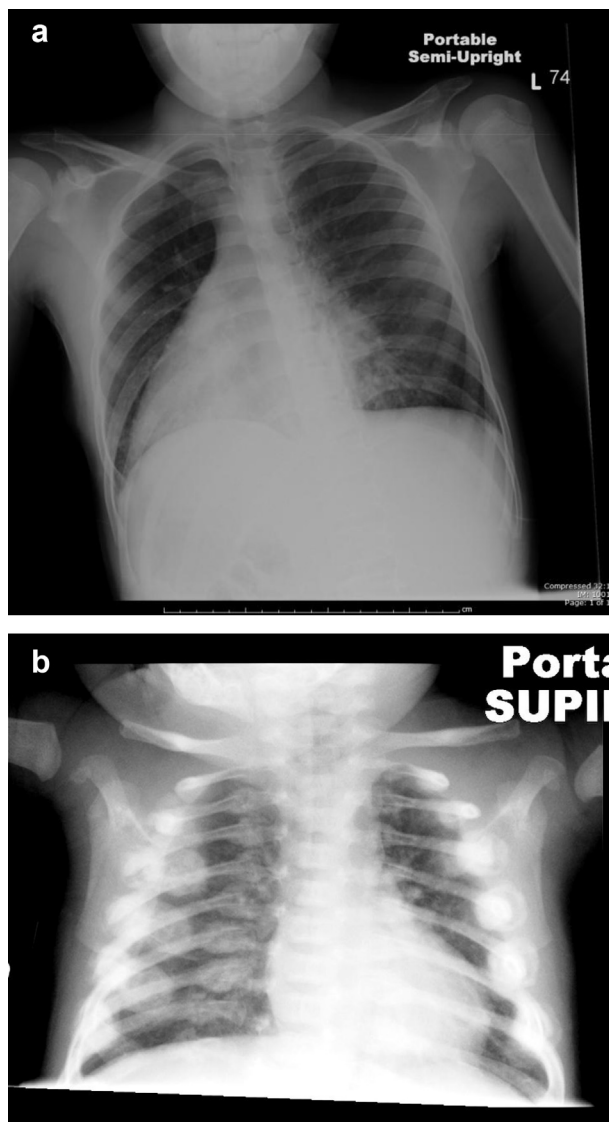
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Department of Radiology and Biomedical Imaging, Yale University School of Medicine, New Haven, Connecticut.

Corresponding author and reprints: Thomas Rob Goodman, MB BChir, Department of Radiology and Biomedical Imaging, Yale University School of Medicine, 333 Cedar Street, New Haven, CT 06520; e-mail: [rob.goodman@yale.edu](mailto:rob.goodman@yale.edu).

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On the first day of their residency, 15 radiology residents underwent a basic radiology perception test where they were shown 15 different radiographs that each had a significant abnormality (Fig. 1). High-quality DICOM images were transferred into a PowerPoint (Microsoft, Redmond, Washington, USA) presentation and displayed via a projector onto a high-resolution large-screen display. Each abnormality was conspicuous and of a low level of difficulty, appropriate for a first-year radiology resident. Both pre- and posttest cases were randomly selected by our institution's chief of radiology. The trainees were not expected to make a diagnosis but were simply asked to identify where, in their view, the



**Fig 1.** Example of a typical radiograph case. Trainees were deemed correct if they identified the heart as the area of abnormality in this case of dextrocardia (a) or ribs in this case of nonaccidental injury (b).

abnormality was located in the image (right lung, left lung, mediastinum, bones, etc).

This was followed by a focused session of art interpretation training at Yale Center for British Art. This was performed by university employees who were affiliated with the museum and who were experienced in teaching fine art perception. During this session, the trainees were briefed in a museum classroom as to the structure of the session before each was allocated a carefully selected painting (Fig. 2) from the gallery's collection. Trainees were asked to analyze this painting for 15 minutes independently and in silence. During this analysis, they were instructed to write down everything they could see in the painting from a purely perceptual viewpoint. No elements of interpretation or analysis were allowed at this stage. After the 15-minute session, a museum teacher then asked them to explain verbally what they could describe after this period of pure perception. Any attempts at interpreting the findings or trying to tie findings together were not allowed at this stage. The teacher then showed the students how to expand and enlarge on their powers of description by helping them extract additional items contained within the content of the painting that they had not already perceived, and the teacher worked with them to further elicit powers of description. Once the teacher was satisfied that a comprehensive analysis of the contents of the painting had been undertaken and that these had been described fully, the trainee was then asked to interpret the findings and give some thought as to the meaning or message in the picture. After this art gallery session, the residents were shown a different set of 15 radiographs



**Fig 2.** Example of a typical artwork. *The Death of Chatterton* by Henry Wallis (1830-1916). Only some trainees pretraining perceived the smoke from the extinguished candle.

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