

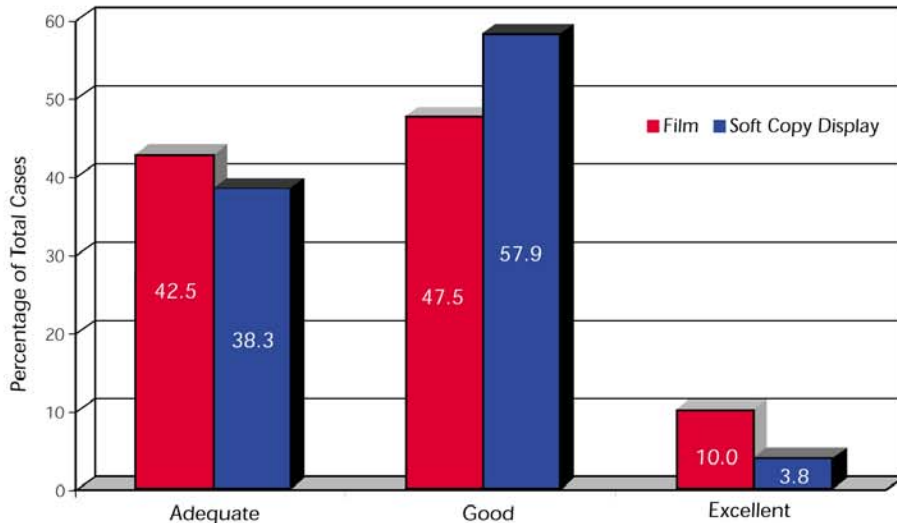
Interpretation Accuracy of Digitized Films

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In radiology, the confidence of readers in their interpretation of an examination is influenced by their perception of the quality of the examinations. In this study, four readers interpreted 60 film examinations and 60 soft copy display examinations, and they assigned each examination a quality rating of "adequate," "good,"

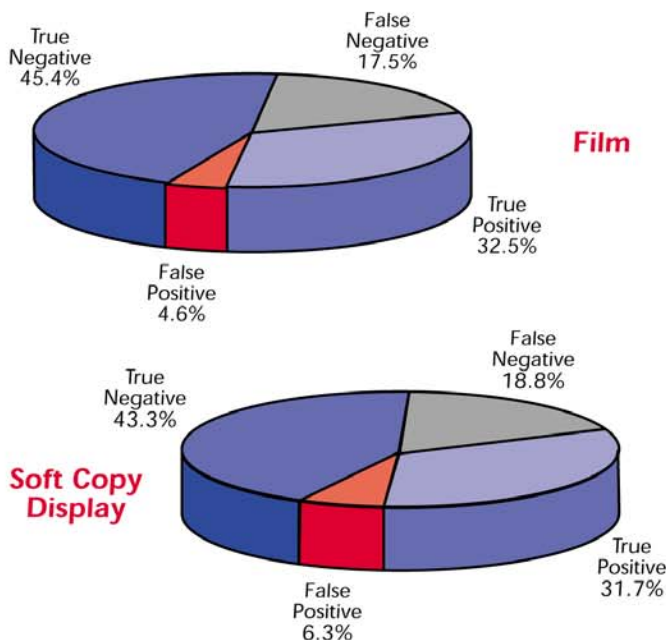
or "excellent" based on their perceptions. Results indicated that there is no significant difference between the accuracy of film reading and the interpretations of the digitized images on a soft copy display. Readers also found no significant difference in image quality.

Readers' Perception of Image Quality by Display Mode



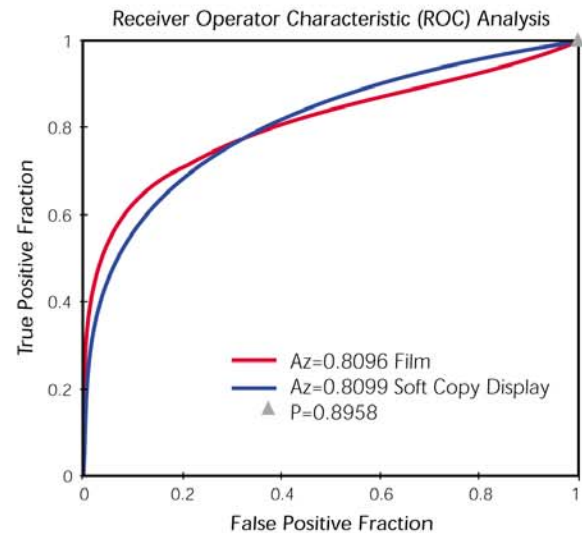
The rating most frequently used was "good," with 47.5% for film exams and 57.9% for images viewed on the soft copy display. Percentages for "good" soft copy display exams were significantly greater than "good" film exams ($p = 0.0220$). The "adequate" ratings assigned by the readers were 42.5% for film exams and 38.3% for images viewed on the soft copy display. "Excellent" ratings were assigned to 10.0% of film exams and 3.8% of images viewed on the display. This difference also was significant ($p = 0.0068$).

Percent Distribution of Readers' Interpretation Ratings by Display Mode



Percent distributions of ratings for each display mode shown on the chart are quite similar, with no significant differences noted between any of the ratings. The accuracy (True Negative + True Positive) of film readings was 77.9% compared to 75.0% for soft copy display interpretations. The difference was not statistically significant.

Comparison of Readers' Accuracy Noted in the Film vs. Soft Copy Display Study



An ROC analysis was performed, and results indicated that there was no difference noted in reader accuracy and interpretation of film versus soft copy display images.

Observer Study Involving Laser- Versus CCD-Digitized Images

Mallinckrodt Institute of Radiology Study Summary

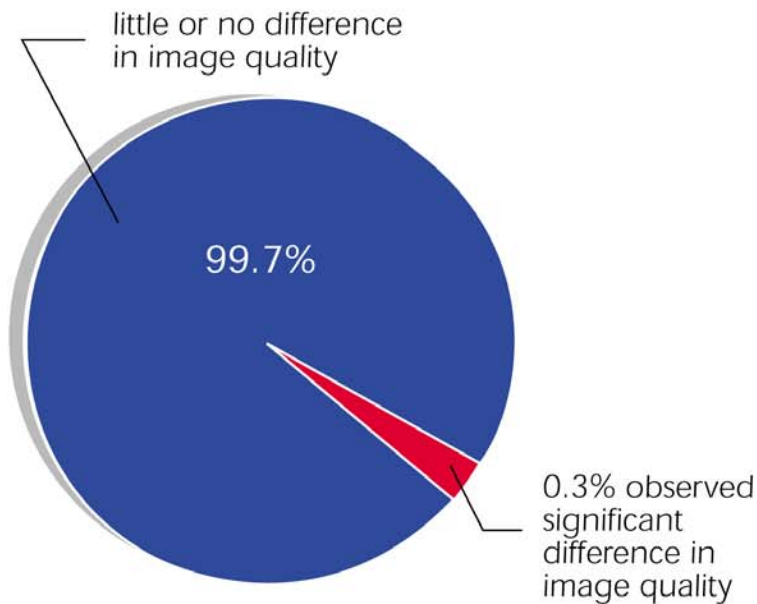
High quality, diagnostically accurate images are essential for teleradiology. Improvements in CCD technology have reached a diagnostically acceptable level of image quality, making them a consideration for potential purchasers in lieu of more-expensive laser digitizers. This study tested the hypothesis that radiological films digitized on both CCD- and laser-based digitizers yield diagnostically acceptable and equivalent images.

In this blinded study, six radiologist observers independently viewed 10 patient studies in each of three anatomical subsets (ankle, cervical spine, and shoulder) and 20 patient studies in a chest subset. Each patient study included one film digitized on a laser digitizer (Kodak LS75®) and one film digitized on a less-expensive CCD system (SIERRA™ plus, VIDAR Systems Corporation). Image

pairs were viewed on high-resolution workstations, and readers determined whether the two images looked essentially the same or whether the left or right image appeared somewhat or significantly better. Of more than 7,000 responses, 77.8% of radiologists stated that there was "no difference" between images digitized on CCD and laser systems, and 21.9% of readers rated images as only "slightly different." Thus, 99.7% of readers saw "little or no difference," between the quality of images digitized on the two systems.

The investigators concluded that the image quality of more-expensive laser digitizers is not significantly better than the image quality of less-expensive CCD digitizers. As a result, potential purchasers should consider other factors such as throughput requirements, price, availability, ease of use, and service.

Readers' Perception of Image Quality of Laser- Versus CCD-Digitized Images



Of more than 7,000 responses, 99.7% of radiologists perceived little or no difference in image quality between CCD- and laser-digitized images.