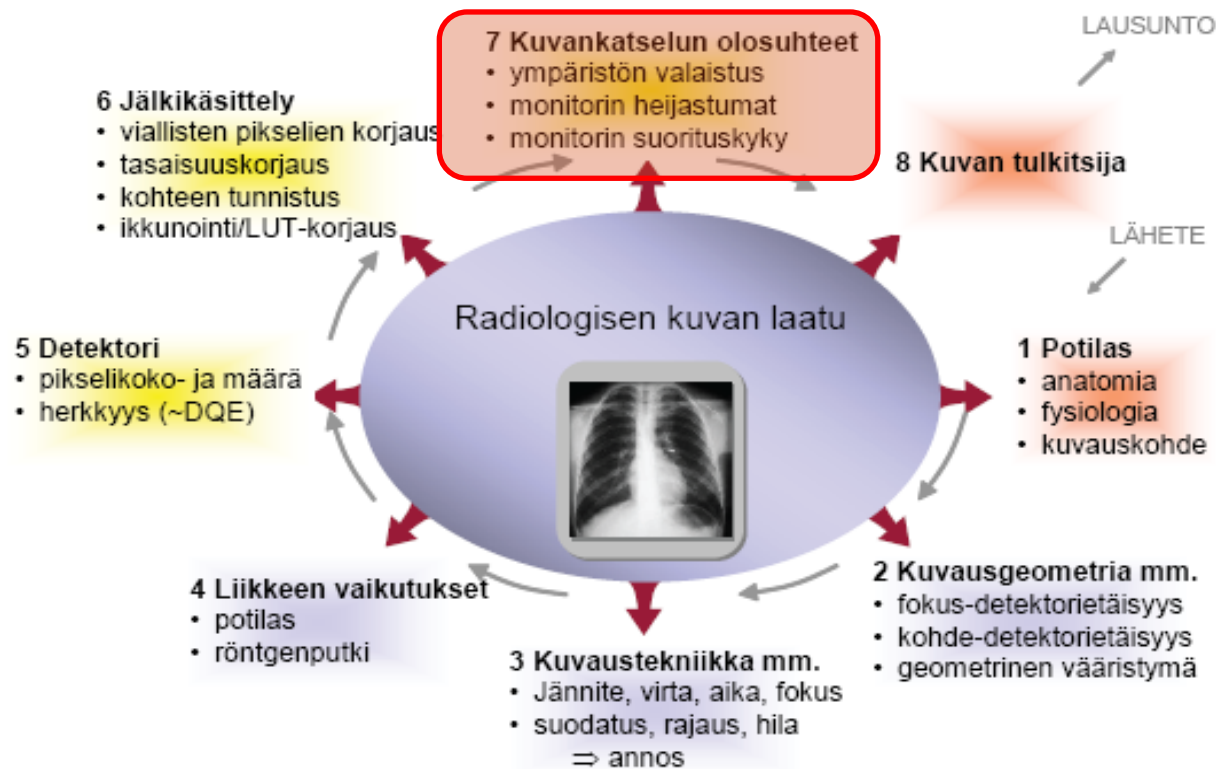


Miksi diagnostiset näytöt?

Diagnostisen näytön ja perusnäytön erot
radiologisten kuvien katselussa

Radiologinen kuvantamisketju



Kuva:
STUK

Suosituksset



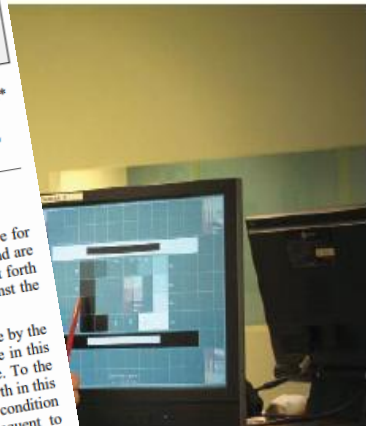
AA The American College of Radiology, with more than 30,000 members, is the principal organization of radiologists, radiation oncologists, and clinical medical physicists in the United States. The College is a nonprofit professional society whose primary purposes are to advance the science of radiology, improve radiologic services to the patient, study the socioeconomic aspects of the practice of radiology, and encourage continuing education for radiologists, radiation oncologists, medical physicists, and persons practicing in allied professional fields.

The American College of Radiology will periodically define new practice parameters and technical standards for radiologic practice to help advance the science of radiology and to improve the quality of service to patients throughout the United States. Existing practice parameters and technical standards will be reviewed for revision or renewal, as appropriate, on their fifth anniversary or sooner, if indicated.

Each practice parameter and technical standard, representing a policy statement by the College, has undergone a thorough consensus process in which it has been subjected to extensive review and approval. The practice parameters and technical standards recognize that the safe and effective use of diagnostic and therapeutic radiology requires specific training, skills, and techniques, as described in each document. Reproduction or modification of the published practice parameter and technical standard by those entities not providing these services is not authorized.

Amended 2014 (Resolution 39)*

STUK TIEDOTTA 2/2008



ASSESSMENT OF DISPLAY PERFORMANCE OF MEDICAL IMAGING SYSTEMS

ACR–AAPM–SIIM TECHNICAL STANDARD FOR ELECTRONIC PRACTICE OF MEDICAL IMAGING

PREAMBLE

This document is an educational tool designed to assist practitioners in providing appropriate radiologic care for patients. Practice Parameters and Technical Standards are not inflexible rules or requirements of practice and are not intended, nor should they be used, to establish a legal standard of care¹. For these reasons and those set forth below, the American College of Radiology and our collaborating medical specialty societies caution against the use of these documents in litigation in which the clinical decisions of a practitioner are called into question.

The ultimate judgment regarding the propriety of any specific procedure or course of action must be made by the practitioner in light of all the circumstances presented. Thus, an approach that differs from the guidance in this document, standing alone, does not necessarily imply that the approach was below the standard of care. To the contrary, a conscientious practitioner may responsibly adopt a course of action different from that set forth in this document when, in the reasonable judgment of the practitioner, such course of action is indicated by the condition of the patient, limitations of available resources, or advances in knowledge or technology subsequent to publication of this document. However, a practitioner who employs an approach substantially different from the guidance in this document is advised to document in the patient record information sufficient to explain the approach taken.

The practice of medicine involves not only the science, but also the art of dealing with the prevention, diagnosis, alleviation, and treatment of disease. The variety and complexity of human conditions make it impossible to always reach the most appropriate diagnosis or to predict with certainty a particular response to treatment. Therefore, it should be recognized that adherence to the guidance in this document will not assure an accurate diagnosis or a successful outcome. All that should be expected is that the practitioner will follow a reasonable course of action based on current knowledge, available resources, and the needs of the patient to deliver effective and safe medical care. The sole purpose of this document is to assist practitioners in achieving this objective.

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The AAPM does not endorse any products, manufacturers, or suppliers. Nothing in this publication should be interpreted as implying such endorsement.

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¹ Iowa Medical Society and Iowa Society of Anesthesiologists v. Iowa Board of Nursing, ___ N.W.2d ___ (Iowa 2013) Iowa Supreme Court refuses to find that the ACR Technical Standard for Management of the Use of Radiation in Fluoroscopic Procedures (Revised 2008) sets a national standard for who may perform fluoroscopic procedures in light of the standard's stated purpose that ACR standards are educational tools and not intended to establish a legal standard of care. See also, Stanley v. McCarty, 63 P.3d 1076 (Ariz. App. 2005) where in a concurring opinion the Court stated that "published standards or guidelines of specialty medical organizations are useful in determining the duty owed or the standard of care applicable in a given situation" even though ACR standards themselves do not establish the standard of care.

TECHNICAL STANDARD

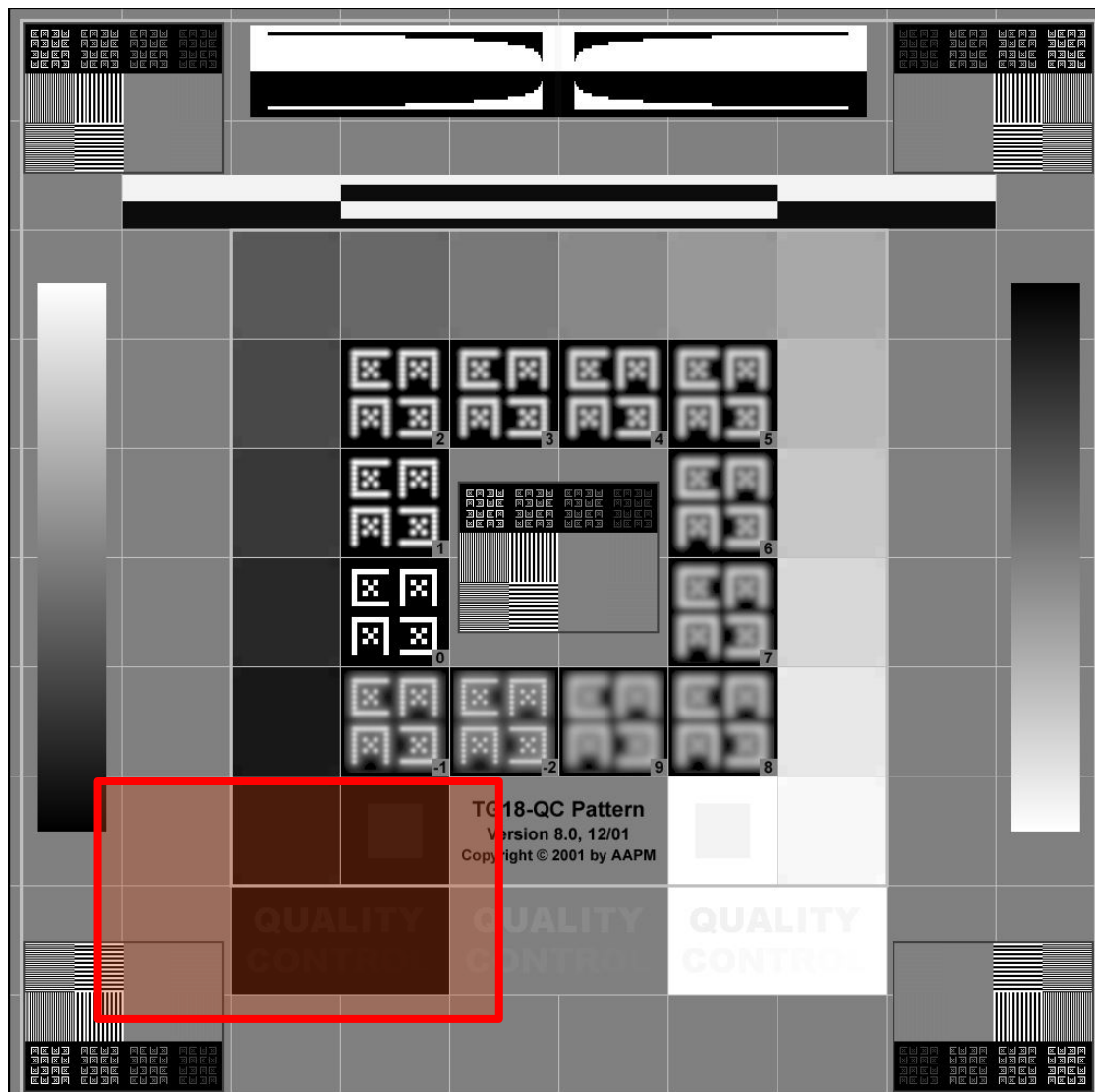
Electronic Practice / 1

Stukinvalvokunta
Strålnsäkerhetscentralen
Finnish and Nuclear Safety Authority

Tekniset erot

Ominaisuus	Perusnäyttö	Diagnostinen näyttö (EIZO RadiForce RX660)	Suositus (ACR-AAPM-SIIM, 2014)
Kirkkaus, cd/m ² (kalib.)	300 (300)	1000 (500)	350
Harmaasävyjen määrä	Alle 256 (<8 bit)	256 tai enemmän (≥8bit)	256 tai enemmän (≥8bit)
Matriisikoko, MP	2,1	6,7	2x3 tai 6
Pixel pitch, mm	0.3114	0,1968	0,210
Laadunvalvonta	Ei/manuaalinen	Kyllä/automaattinen	Kyllä/automaattinen
Käyttöikä (arvio)	4 v	7-10 v	-

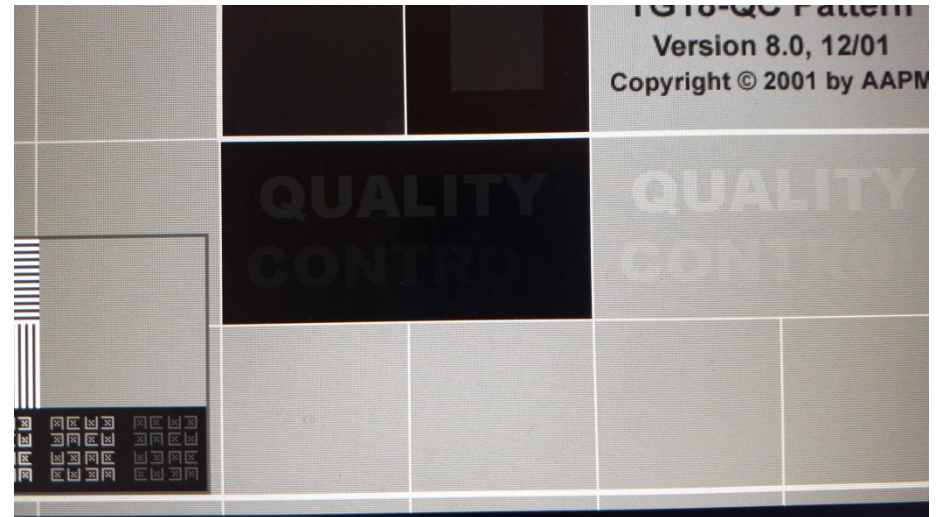
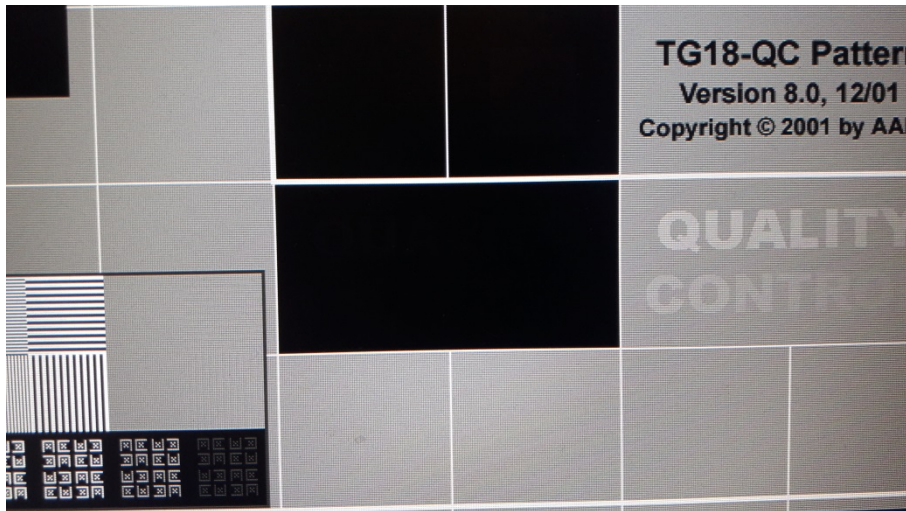
Testikuva: AAPM TG18-QC



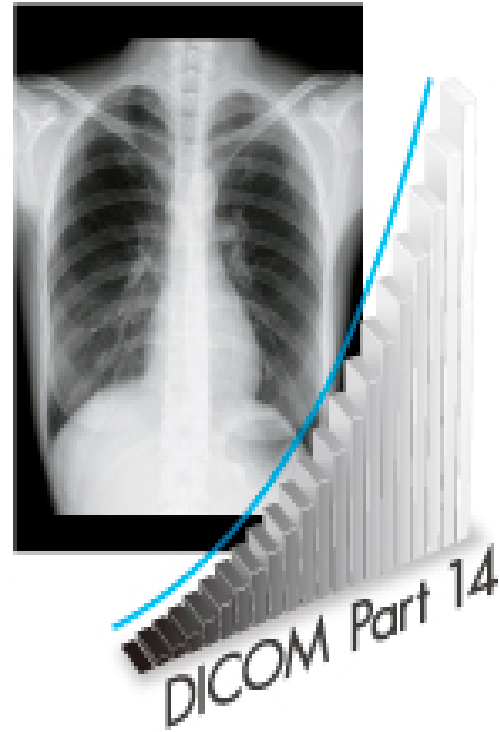
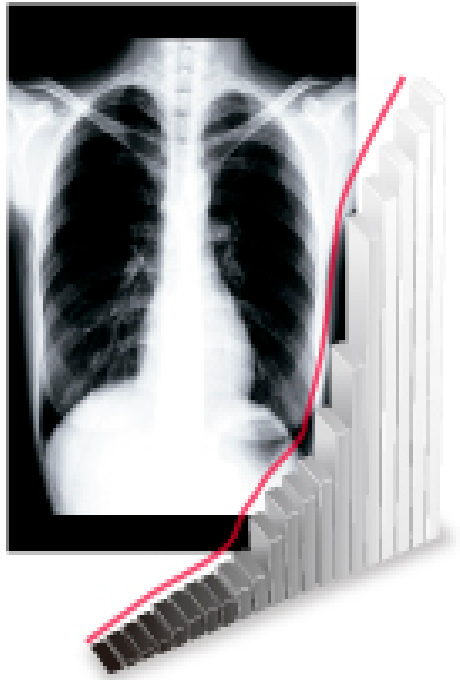
Visuaaliset erot testikuvassa

Perusnäyttö

Diagnostinen näyttö



Visuaaliset erot



Visuaaliset erot, opg-kuva

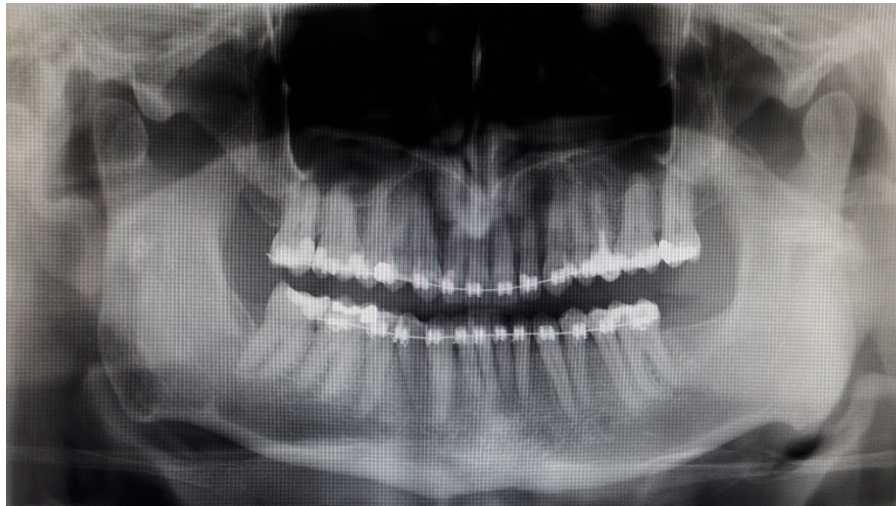
Perusnäyttö

Diagnostinen näyttö

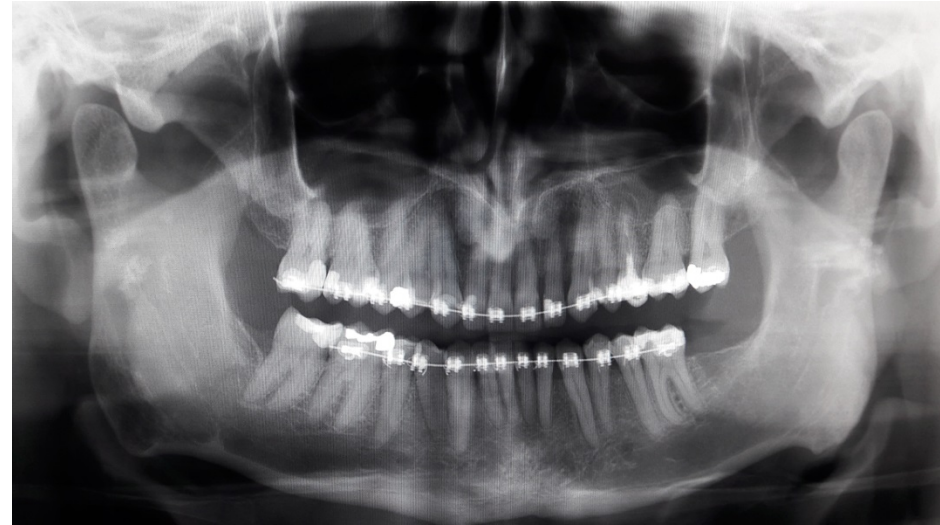


Visuaaliset erot, opg-kuva

Perusnäyttö



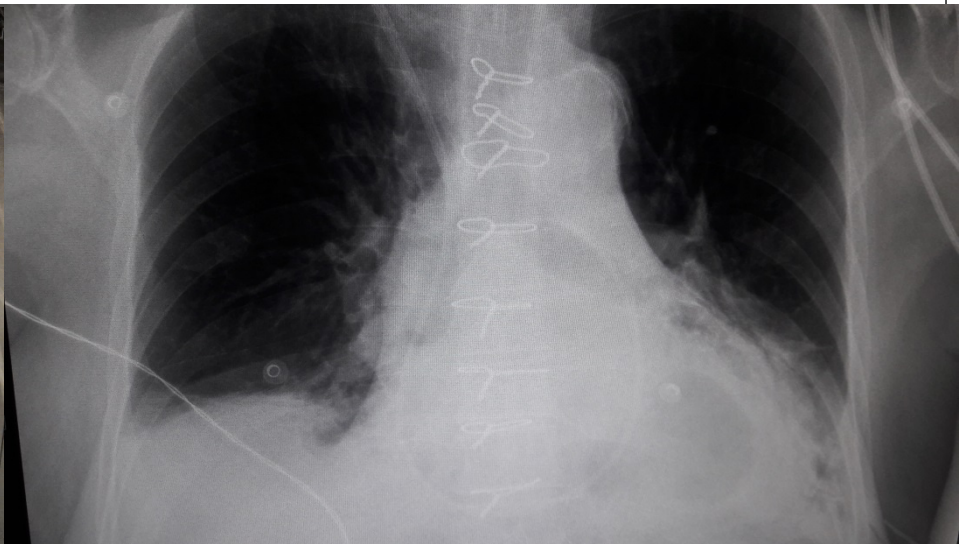
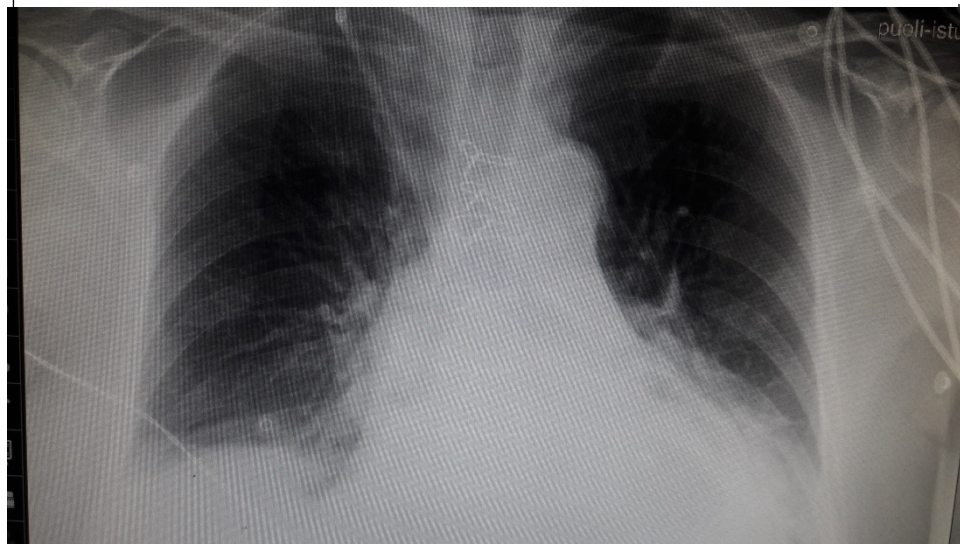
Diagnostinen näyttö



Visuaaliset erot, thorax

Perusnäyttö

Diagnostinen näyttö



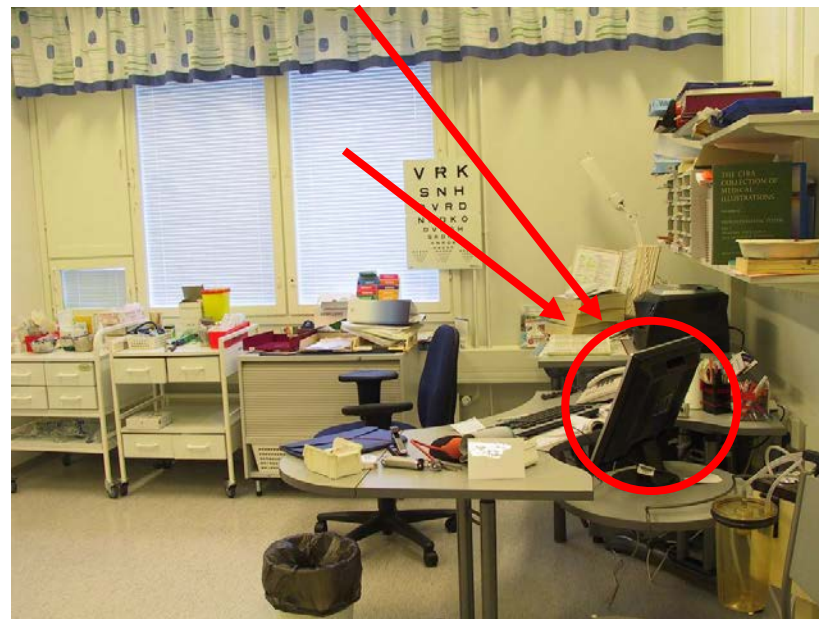
Kuvankatseluolosuhteet

Radiologisen yksikön työtila



n. 20 luksia

Terveyskeskuksen työtila



n. 500 luksia

Tutkimukset

Useissa tutkimuksissa on todettu, että näyttöjen diagnostinen tarkkuus ei merkittävästi poikkeava perusnäytön ja medikaalinäytön välillä. Medikaalinäytön edut ovat muualla kuin suoraan “taudin” löytämisessä:

- Increased maximum luminance level and a decreased pixel pitch of medical-grade display improve the accuracy of detecting both chest lesions and bone fractures. *Different pixel pitch and maximum luminance of medical grade displays may result in different evaluations of digital radiography images.* [Laffranchi, A et al 2018](#))
- A consumer-grade display with or without DICOM-GSDF calibration or a tablet device is not suitable for reading digital chest radiographs in bright lighting. *Effect of display type and room illuminance in chest radiographs.* [Liukkonen, E et al 2016](#)).
- No significant differences were found between medical-grade and calibrated consumer-grade displays with regard to their diagnostic performance in assessing subtle bone fissures. Calibrated consumer-grade displays may be sufficient for most radiological examinations. *Comparison of medical-grade and calibrated consumer-grade displays for diagnosis of subtle bone fissures.* By: [dos Santos, DP et al, 2017](#).
- DICOM calibration may improve observer performance in panoramic radiography in different lighting conditions. Therefore, a DICOM-calibrated consumer grade display can be used instead of a medical display in dental practice without compromising the diagnostic quality. *Comparison between DICOM-calibrated and uncalibrated consumer grade and 6-MP displays under different lighting conditions in panoramic radiography.* [Kallio-Pulkinen, S et al, 2015](#).
- Evaluations of similar lesions were not significantly different among the 3 types of displays. However, the autocalibrating medical-grade monitors performed better when incipient and recurrent lesions were compared. *Performance of 5 different displays in the detection of artificial incipient and recurrent caries-like lesions.* By: [Countryman, SC, 2018](#).

Tutkimukset

- MacEntee et al concluded that, for the task of identifying pulmonary nodules, the use of tablet device does not significantly change performance in a DICOM-GSDF calibrated off-the-shelf LCD. *Mc Entee MF et al (2012) iPads and LCDs show similar performance in the detection of pulmonary nodules. In: Abbey CM, CR (ed) Proceedings of SPIE*
- Salazar et al compared a medical-grade grayscale display and two consumer grade colour displays with respect to accuracy performance with and without DICOM-GSDF calibration. For the chest conditions (interstitial opacities, pneumothorax, and nodules) and selected observers included in their study, no significant differences were observed". *Salazar AJ et al (2013) Effects of the DICOM grayscale standard display function on the accuracy of medical-grade grayscale and consumer-grade color displays for telemammography screening.*
- Yin et al concluded that the observers' performances in detecting pulmonary nodules by radiologists were comparable between 2MP, 3MP and 5MP medical-grade displays. *Yin J et al (2012) Effect of greyscale liquid crystal displays of different resolutions on observer performance during detection of small solitary pulmonary nodules.*
- Abboud et al reported that there is no difference in optimal lighting conditions between a consumer grade display and a tablet device (second-generation iPad) in the reader's decision in the task of tuberculosis diagnosis from digital chest radiographs; however, reading on the tablet device (a second-generation iPad) was slower. *Abboud S et al (2013) TB or not TB: Interreader and intrareader variability in screening diagnosis on an iPad versus a traditional display.*

