

How CT / MSCT works

Imageaquisition:

How CT / MSCT works

Gerätetechnik: Generationen

Single vs Multirow

Multirow Detector CT:


Fixed Matrix Detektor

Multirow detector CT:

Adaptive Array Detektor

Multirow detector CT:

Adaptive Array Detector



Data Acquisition System

- 8mm DAS
- 8mm DAS
- 8mm DAS
- 8mm DAS

Single Detector CT

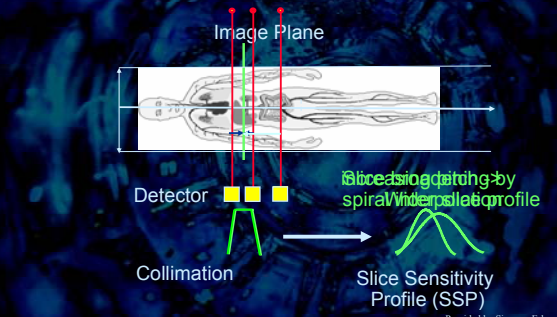


Image Plane

Detector

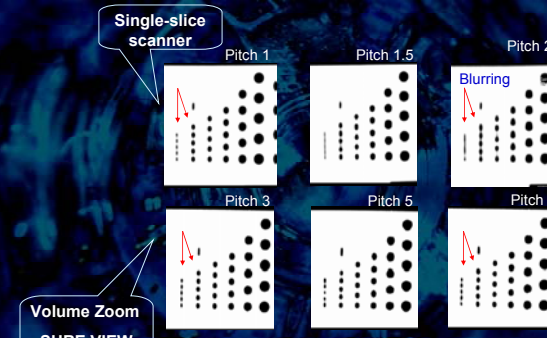
Collimation

Slice Sensitivity Profile (SSP)

Increasing collimation by spiral widening results in a wider SSP profile

Provided by Siemens Erlangen

Single vs Multirow



Single-slice scanner

Volume Zoom SURE VIEW

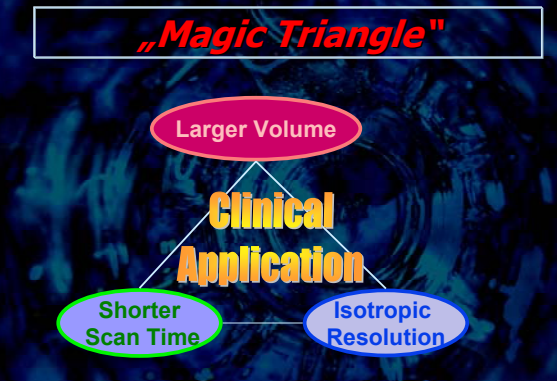
Pitch 1 Pitch 1.5 Pitch 2

Pitch 3 Pitch 5 Pitch 7

Blurring

Provided by Siemens Erlangen

„Magic Triangle“



Clinical Application

Larger Volume

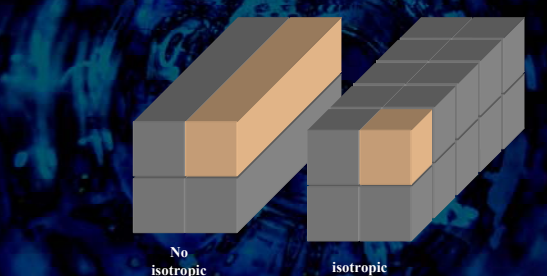
Shorter Scan Time

Isotropic Resolution

Provided by Siemens Erlangen

Resolution

Isotropic Imaging



No isotropic voxels

isotropic voxel

Speed

- 64 slices / rotation
- Rotation times < 0.5s possible
- Dynamic studies



CT -- Benchmarking

- ☑ **Geometric Resolution:**
 - xy: 0.3-0.5mm
 - z: 0.6mm
- ☑ **Radiometric Resolution:**
 - 12bit data = 4096 shades of gray
 - Hounsfield Units (HU):
 - Minimum: -1024 HU = air
 - Zeropoint: 0 HU = water
 - Fat: -120 – 80 HU
 - Bones: > 200 HU

CT -- Benchmarking

- ☑ **Time Resolution:**
 - Standard: 0.5s
 - Cardiac Mode: 0.33s
- ☑ **Maximal Scanlength:**
 - ca. 150cm

Resolution

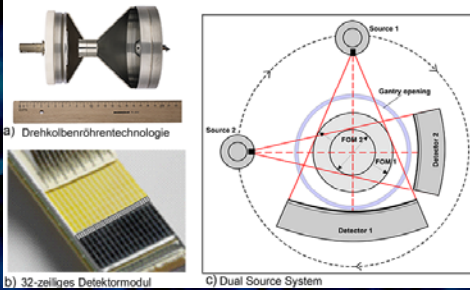
Resolution

DINO'S CT SCAN

at the
Dep. of Radiology Graz

dino_ct_movie.avi

CT – New: Dual Source CT



CT & Radiaten

- ☑ CT ~ 10% of Xray Examinations
- ☑ CT → source of ~50% medical related radiation
- ☑ Increases stochastic risk for cancer development:
 - 1mSv Totalbody irradiation → risk for lethal cancer is increased by 5%
 - USA: maybe about 500 children dying a year by cancer due to CT