

OTIMIZING MULTISLICE CT

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Since the introduction of Computed Tomography (CT) in the early 1970s there has been a remarkable increase in use of CT. From the beginning, CT was largely dedicated to brain imaging but new innovations like the Spiral CT, introduced late 1980s gave enhanced diagnostic capability in many body tissues. Surveys performed in the United States reveal that the annual number of CT examinations did increase almost a 10-fold from 3.6 million in 1980 to 33 million in 1998 (Manudeep et al 2004).

Since the commercial launch of Multi Slice CT (MSCT) in 1998 we have seen an explosion in the evolution of CT scanner technology and its applications. The benefits from the new technology such as reduced examination time, routine thin slice acquisition, virtual no tube cooling and longer helical scans offers enhanced clinical capability especially for angio, 3-D imaging and trauma.

With CT today we see continuous advances in clinical applications and a significant growth of data-intensive procedures. Many applications benefit from thin slice images that significantly increase the data generated. Although e.g. peripheral CT angio still represents a relatively small proportion of the total exams, the growth rate is really significant. “Core” procedures of head/neck, abdomen, pelvis and chest imaging are growing between 7% and 27% annually; whereas emerging applications such as vascular CT are growing significantly faster, at >200%. (Arlington Medical Resources (AMR))

The broadened use of CT in clinical practice has raised concerns about mounting radiation exposure. The contribution of CT to the collective dose is inspected and reported around the world. One common conclusion in these reports is that the dose from medical exposure and the number of CT examinations is increasing (Mannudeep et al 2004, Leitz W et al 2001&2002, Brugmans MJ et al 2002)

Based on this background a quick overview of MSCT technology, factors influencing dose and image quality will be discussed together with definitions and measurements of radiation dose. Also some of the technologies/solutions used in the CT system to optimize the dose and image quality. Methods like mA modulation, Z-axis tracking and different types of filtering will be discussed.