Cone Beam CT Presents Serious Limitations for Small Animal Veterinarians

Flat Panel Hybrids Raise Concerns

Cleveland, OH (PRWEB) February 12, 2015 -- Plexar Associates, Inc. announces the completion and peer review submittal of a detailed compilation report: Comparison of Cone Beam CT (CBCT) versus Multiple Detector CT (MDCT).

The recent introduction of cone beam CT scanners and stylized flat panel hybrids are a cause for concern to many veterinarians. Robust claims of superior performance made specifically to veterinarians with little or no scientific support, no peer reviewed papers, or independent testing only adds to the confusion. The absence of the need for FDA approval, strong legal accountability for imaging mistakes, and using boutique company names have created a market for many vendors. These devices are typically not found in whole-body human diagnostic imaging, as the standards for performance and certification are difficult to meet.

This report is the first in a series that will focus on the emerging CBCT technology. The report documents the reasons that CBCT is NOT the standard of use for the diagnostic CT industry, both for human and veterinary applications.

Future articles in the series will address (1) recent advances in CBCT, (2) phantom based comparisons of CBCT and MDCT, (3) emerging applications of CBCT, (4) limitations of hybrid panel scanners, and (5) significant financial losses incurred by veterinarians.

The report does an in-depth analysis of CBCT and MDCT in three (3) sections: (1) Physical Principles, (2) Characteristics and Performance and (3) Comparisons. The Characteristics and Performance of the two technologies are supported by the detailed presentation of the Physical Principles. In the Comparisons section, three examples are presented:

- The clinical superiority of MDCT is illustrated for a clinical protocol requiring good low contrast resolution.
- The value of CBCT for an interventional application is presented.
- Equal dose phantom scans demonstrate superior contrast resolution for MDCT.

As an overall summary, the report states: “CBCT is appropriate for high-contrast dental and maxillofacial applications and interventional applications. Only MDCT is appropriate for general diagnostic applications, especially those requiring good low-contrast resolution. Also, for large object scanning, only MDCT is appropriate.”

According to Plexar’s principal, David Rohler, Ph.D., “The study demonstrates that MDCT is the modality of choice for diagnostic imaging for humans and animals that fit inside the CT gantry. Even though CBCT flat panel detector (FPD) technology has been available for the last 15 years, the major CT vendors have continued to use MDCT technology as the core of their diagnostic CT product development.”

Some specific comparison points discussed in detail within the report:

- For large objects, the scatter-to-primary ratio for MDCT is typically 0.2 whereas the scatter-to-primary
ratio for CBCT is typically >3, more than 10 times greater than MDCT.
- MDCT ceramic scintillation detectors typically support a much larger dynamic range (e.g. 100 times larger) than the CBCT amorphous silicon flat panel detector.
- MDCT supports full body scanning for larger objects. CBCT detectors are not large enough in the axial direction to support large body scanning.
- Because acquisition times are longer for CBCT than for MDCT, image blur due to patient motion is accentuated with CBCT.
- Image artifacts are significantly more pronounced in CBCT than in MDCT because of (1) reduced temporal resolution, (2) reduced dynamic range of the FPDs, (3) variability of the x-ray tube focal spot size and increased x-ray scatter that is patient-dependent.
- MDCT delivers better low contrast resolution than CBCT because, with CBCT, x-ray scatter is increased, dynamic range and temporal resolution are reduced.

About David Rohler, Ph.D.
David Rohler, Ph.D. has over 30 years of experience with imaging development for medical devices and instrumentation products. Combining a strong theoretical background with a well-developed instrumentation capability, he has led efforts to design state-of-art medical imaging devices and managed key product development efforts. Since he founded Plexar Associates, Inc. in 1987, Dr. Rohler has guided Plexar’s involvement with a wide range of clients and projects, providing high-level consulting services for the medical and industrial imaging communities. Dr. Rohler received his Ph.D. from Case Western Reserve University in 1983.

About Plexar Associates, Inc.
Plexar Associates, Inc. designs and develops algorithms and software products for biomedical companies. Plexar's capabilities include image quality assessment, algorithm development and software development for medical imaging systems, process monitoring and non-destructive testing. Plexar has deep expertise and significant experience with CT technology. For more information, visit: www.Plexar.com

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