The SoonChunHyang University Hospital in Cheonan, Korea, uses the unique 3D plan verification system COMPASS to verify their Novalis Tx treatments

The SoonChunHyang University Hospital took its first footstep as the only general hospital in Chungcheonnamdo in 1982. The hospital currently operates 24 departments and 1000 beds with a crew of more than 1,300 people and 130 faculty members.

The Radiation Oncology Department started in 2000 and is equipped with the latest medical facilities such as Novalis Tx treatment machines, Philips Big Bore CT and PET-CT. Eighty patients are treated with two LINACs per day. COMPASS is used specifically for the Eclipse TPS for the Novalis Tx machine verification.

"COMPASS is the only system that can double check the beam data collection, TPS beam modeling, dose calculation and also machine related errors.

COMPASS allows us to compare the 2D fluence segment by segment with more detailed MLC movement information.

COMPASS checks accurately complicated plans for SRS, SBRT, IMRT and VMAT patients at the Novalis Tx machine.

COMPASS is able to verify the QA result on real 3D patient CT images. It is visual and uses DVH, 3D Gamma index, dose difference etc.

We are able to compare the discrepancies for different algorithm results in the inhomogeneity area.

No need to calculate the phantom plan so we save a lot of time. We are able to measure 10 patients during lunch time and do the reconstruction calculation when we have time."
Medanta – the Medicity, Haryana, India, replaced 2D patient plan verification by COMPASS 3D dosimetry for IMRT and VMAT

Medanta – the Medicity was set up as a health care establishment in November, 2009. The Division of Radiation Oncology became clinical in February 2010 and has established cutting edge technology with two Linear accelerators, an Integrated Brachytherapy unit, CT, MR and PET-CT simulation. The advanced techniques of radiation delivery, Volumetric Modulated Arc therapy, 6-D correction with HEXA-POD, Monte Carlo calculation dose engine in Monaco, COMPASS as a QA tool are a few of the highlights that have been applied to daily clinical practice.

"We have commissioned COMPASS 3D dosimetry for Elekta INFINITY and Synergy S Beam Modulator Linac. We have replaced 2D verification with COMPASS 3D dosimetry using combination of MatriXX ion chamber array detector. Our observations on clinical commissioning and use are as follows.

- We have used COMPASS for various sites such as head & neck, prostate, esophagus, and breast for IMRT and volumetric modulated arc therapy. We found that the results are well within limit and good agreement between TPS & measured.
- COMPASS is a robust and precise tool for pre-treatment and plan verification of IMRT and volumetric modulated arc therapy.
- COMPASS allows Radiation Oncologist and Physicist to do the IMRT and VMAT plan verification on real patient’s anatomy with tissue inhomogeneity correction and dose volume statistics.
- COMPASS reduced our medical physicist and treatment planning system time in generating QA plans (as it does not need any QA plans on phantom), increased flexibility to verify accurately and decreased time for more complex treatment modalities of IMRT and VMAT.
- There is no tool to check the accuracy of TPS calculated dose and its algorithm so far. Only COMPASS verification software allows to cross check whether the TPS calculated dose is correct or not before delivery to patient.
- COMPASS has an advanced dose calculation engine "collapsed cone convolution" that enabled us to independently verify the beam model commissioning of different treatment planning systems.
- COMPASS is a fast and reliable 3D dosimetry verification system using with ion chamber array detector."

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"At the Radiotherapy Department of the University Medical Center Groningen we replaced film dosimetry by COMPASS software with MatriXX detector for pre-treatment verification in February 2009. We used the unique COMPASS solution for verification of over 900 patient plans in the 36 months after introduction. COMPASS was used for QA of IMRT treatment plans for H&N, lung and prostate but also in cases like sarcomas and cervix cancer. COMPASS is our standard QA tool for VMAT prostate plans as well.

All QA results were within clinical criteria which shows that we have a stable linear accelerator, a reliable and well configured TPS and a stable QA system. With COMPASS it was possible to avoid false non passing verifications which appeared in some cases using film and which caused time consuming final verification.

By irradiating QA plans on a regular basis and analyzing them with COMPASS we were able to improve the control of critical IMRT parameters, mainly the MLC calibration. This enables us to apply COMPASS as a pure calculational verification for some routine cases, thus again reducing the time needed for a single patient. An important reason to introduce the calculational verification is to shorten the time until the start of treatment. Moreover, the application of COMPASS measurement based verification for sample patients at various moments in time allows us to further control stability of delivery.

With the increased flexibility in allocation of our physicist’s time, we are now in the process of commissioning the new rotational modality VMAT which will enable us to increase the number of patients treated with modulated modality. We expect COMPASS to play a decisive role in the optimization and verification of VMAT as well.”
The Clinical Center Bayreuth, Germany, has been using COMPASS clinically for all VMAT pre-treatment patient plan verifications since mid 2010

The Clinical Center Bayreuth GmbH is the only hospital with maximum medical care in the Upper Franconian region. The clinic of radiation therapy is one of the most effective and modern radiation therapy centers in Germany. Radiation therapy treatments with modern high precision treatment machines allow for a maximum of patient safety. The team of seven physicians, five experts in medical physics, nine medical technical assistants as well as nursing staff, medical secretaries and secretaries ensure highest level patient-centered care.

“After initial installation of COMPASS in our department, we have been using the system in a research phase for verification against our 2D plan verification solution. Since mid 2010 we have been using COMPASS clinically for all our VMAT pre-treatment patient plan verifications. We especially appreciate that COMPASS allows us to analyze the accuracy of the plan delivery based on patient specific anatomy in 3D. Knowing dose errors related to the patient anatomy is the basis to determine the clinical relevance of any discrepancies in the plan verification.

COMPASS’ sophisticated dose calculation routine follows the proven approach implemented in all treatment planning systems: Collapsed Cone calculations utilizing the patient specific CT guarantee a very precise calculation of the delivered dose in 3D which is then verified against the imported 3D dose from the TPS.

Beyond the routine plan verification COMPASS allows detection of spontaneous malfunction of radiation delivery equipment as documented in a separate case study.”
"Yashoda Hospitals being a leader in introducing high end technology is really proud to be the first COMPASS user in India. Since March 2010 we have been using the COMPASS to check all our IMRT & RapidArc plans. With 100 RapidArc patients being treated every day we found COMPASS as a comprehensive 3D QA tool because of the following reasons:

– Ability to independently check the accuracy of treatment plans from TPS

– Verification of individual arc segments precisely per rotation in timely sequence

– Accurate insight information about the treatment delivery, with delivered dose distribution on planning CT to determine the clinical relevance of dose discrepancies with enhanced visuals

– Analysis of 3D gamma & dose difference on patient anatomy

Above all we could easily discuss our QA results with the Radiation Oncologists as the results directly address the clinical consequences of delivery."