One Year Clinical Experience with the Integral Quality Monitor

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Integral Quality Monitor

Single ionization chamber

Online transmission detector

Real time plan verification
Integral Quality Monitor

Simple & robust verification

Safe patient treatment

Fully automated workflow
Integral Quality Monitor

Simple & robust verification  Safe patient treatment  Fully automated workflow

Error detection capability
Detector robustness
Wrong plan/patient/MU

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Integral Quality Monitor

Simple & robust verification  Safe patient treatment  Fully automated workflow

Systematic MLC shift

IQM

\[ \Delta_{signal} = -5.27\% \]

2D - array

\[ \gamma_{mean} = 0.78 \]

\[ \gamma_{pass\ rate} = 67.9\% \]
Integral Quality Monitor

Simple & robust verification   Safe patient treatment   Fully automated workflow

Error detection capability of a novel transmission detector: a validation study for online VMAT monitoring; Phys Med Biol. 2017

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Error detection capability of a novel transmission detector: a validation study for online VMAT monitoring; Phys Med Biol. 2017
**Integral Quality Monitor**

- **Simple & robust verification**
- **Safe patient treatment**
- **Fully automated workflow**

**Random MLC shift**

- Error CP
- Orig CP

**IQM**

**2D - array**

- Y pass rate (1%/1mm) [%]
  - +2mm
  - +3mm
  - +4mm
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Incorrect plan data:

• Number of monitor units
• Photon beam energy
• Gantry angle
• Collimator angle
Error detection capability of a novel transmission detector: a validation study for online VMAT monitoring; Phys Med Biol. 2017
Integral Quality Monitor

Simple & robust verification     Safe patient treatment     Fully automated workflow

Long term stability

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Characterization and evaluation of an integrated quality monitoring system for online quality assurance of external beam radiation therapy.


Error detection capability of a novel transmission detector: a validation study for online VMAT monitoring.

Marrazzo L, et al; Strahlenther Onkol 2018
Real-time beam monitoring for error detection in IMRT plans and impact on dose-volume histograms.

https://www.youtube.com/embed/x_iKnFmtZ10

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Treatment monitoring of a head & neck VMAT plan

Plan export  Plan verification  Treatment monitoring
**Integral Quality Monitor**

Simple & robust verification  
Safe patient treatment  
**Fully automated workflow**

Treatment plan verification

<table>
<thead>
<tr>
<th></th>
<th>IQM</th>
<th>2D Array</th>
</tr>
</thead>
<tbody>
<tr>
<td>QA plan preparation</td>
<td>1 click</td>
<td>4:30 min</td>
</tr>
<tr>
<td>QA report evaluation</td>
<td>30 s / * no interaction</td>
<td>3:30 min</td>
</tr>
</tbody>
</table>

21:30 min

Per day

Per patient
Integral Quality Monitor

Simple & robust verification  Safe patient treatment  Fully automated workflow

Measurement of our daily QA beam

IQM Workstation
**Integral Quality Monitor**

Simple & robust verification  Safe patient treatment  **Fully automated workflow**

Treatment plan verification

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</tr>
<tr>
<td>Detector preparation</td>
<td>1:30 min</td>
<td>3 min</td>
</tr>
<tr>
<td>Detector setup/removing</td>
<td>10 s</td>
<td>3 +3 min</td>
</tr>
<tr>
<td>Measurement</td>
<td>* Fully automated</td>
<td>4:30 min</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2:30 min</strong></td>
<td><strong>21:30 min</strong></td>
</tr>
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</table>
Integral Quality Monitor

Simple & robust verification  Safe patient treatment  Fully automated workflow

QA evaluation

Patient information

Statistics

Graphs

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Simple & robust verification
Safe patient treatment
Fully automated workflow
1 YEAR IQM ANNIVERSARY

Thank you iRT!

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