> “Once it became clear where improvement was needed, Agfa HealthCare invested a great deal of time, effort, and dedication to make things happen. Non-university institutions like ours don’t always find manufacturers to be such good listeners. This is an excellent result!”

PRIM. DR. HANS PETER SOCHOR
Chief Radiologist at Landesklinikum Hollabrunn and Medical Director at Diagnosticum Gersthof, Vienna, Austria

When every detail matters

Differential diagnosis for small extremities: MUSICA in practice

AGFA HealthCare

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Interview with PRIM. DR. HANS PETER SOCHOR, Chief Radiologist at Landesklinikum Hollabrunn and Medical Director at Diagnosticum Gersthof, Vienna, Austria

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MUSICA, the next generation of Agfa HealthCare’s ‘gold standard’ in digital image processing, uses a new process called Fractional Multiscale Processing (FMP) to show a previously unknown level of detail in digital radiographs. Sophisticated algorithms break the image down into different frequency ranges, each of which is then optimized. Hans Peter Sochor, chief radiologist at Landesklinikum Hollabrunn and medical director at Diagnosticum Gersthof, provided vital input for the development process.

Wide-ranging capacity

The radiology department headed by Dr. Sochor in Gersthof, Vienna brings together a range of imaging procedures in a state-of-the-art diagnostic center, Diagnosticum Gersthof. The department carries out 60,000 conventional X-ray examinations every year in addition to magnetic resonance imaging and computerized tomography.

“Our work is about 60% skeletal, 30% mammography, and 10% thoracic,” says Dr. Sochor. “In skeletal diagnostics, our activities range from collaborations with leading Austrian sports traumatologists in disciplines like skiing, ice hockey and handball to long-term monitoring of patients with knee and hip prostheses, and rheumatology.”

Only the best will do

Obviously, this focus on skeletal diagnostics places special demands on diagnostic image quality: “There is a whole range of metabolic diseases that manifest primarily or otherwise in the bone, but the associated changes are usually very subtle,” explains Dr. Sochor. “To distinguish Reiter’s syndrome from rheumatism, for example, you need to look very closely. Details like bone trabeculae, hairline fractures, and the alimentary canal are crucial in differential diagnosis.”

Diagnosing patients with a prosthesis also has its difficulties: “In this case it’s the boundary zone around the implant that matters. Resorption edges and any loosening can only be reliably detected when this zone is depicted clearly, in other words with minimum artificiality.”

A DR system from Agfa HealthCare acquired in 2012 – a DX-D 300 with an older generation of the MUSICA image processing software – did not appear to meet expectations in these areas.

Patience and persistence…

Was it due to the settings, device optimization or even a defect in the unit? Product specialists in Austria and Germany ruled out all three possibilities, and even a detector with higher Detective Quantum Efficiency (DQE) failed to provide the hoped-for breakthrough. It finally came when Dr. Piet Vuylsteke, head of image processing software development at Agfa HealthCare’s Belgian headquarters, stepped in.

Months of collaboration followed. “We looked at the images together and I explained what was missing and what I needed in the relevant places to reach a given diagnosis with more confidence,” recalls Dr. Sochor. “It’s not always easy to find a common language between the medical and the technical side, but we felt our way forward one point at a time.”

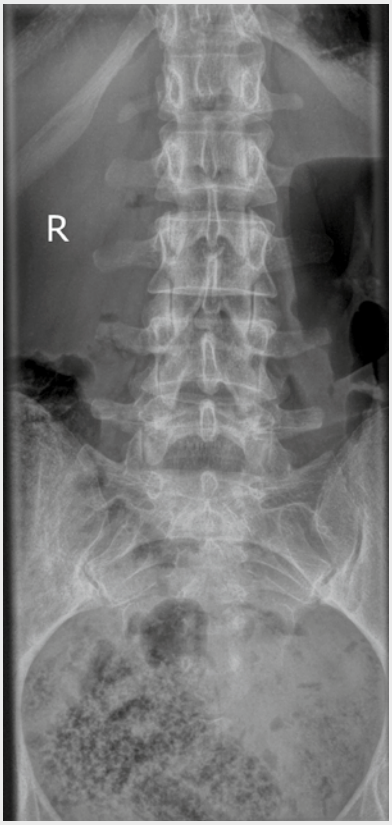
The reward for their hard work was version 3 of MUSICA, a test version of which has been on trial in Dr. Sochor’s department for around one year. Following a successful final validation it is now available as an option with all CR and DR systems from Agfa HealthCare.

… lead to convincing results

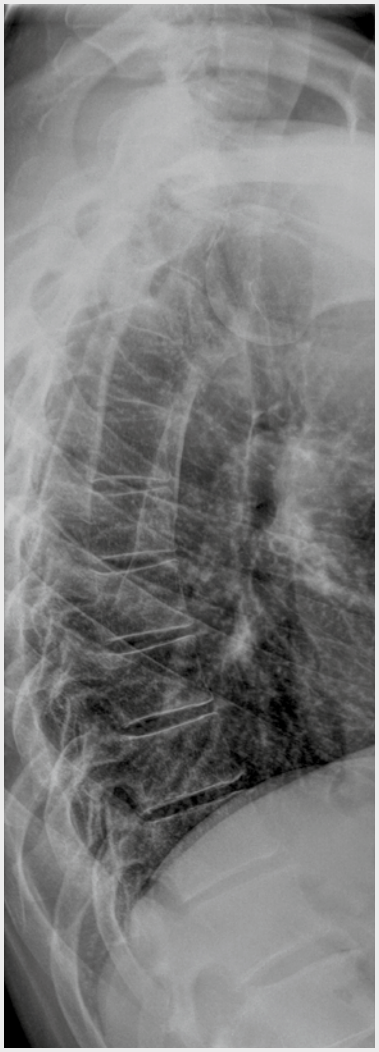
“With some examinations it’s simply not enough to apply a single image processing algorithm to all areas of an image,” says Dr. Sochor, “for example small joints as opposed to large bones. The FMP process addresses this very problem. The before and after images speak for themselves.”

MUSICA from Agfa HealthCare

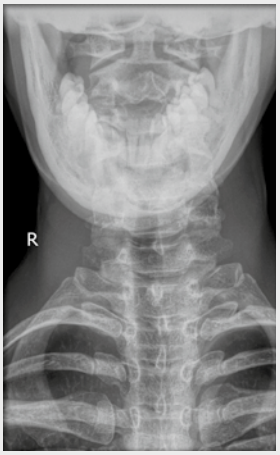
- Consistently high image quality regardless of body size and constitution
- Better visualization of all image details
- Excellent contrast resolution
- Detailed representation of the finest structures



32-year-old woman, DX-D 300, 85 kV, 15 mAs, MUSICA 3



58-year-old man, DX-D 300, 77 kV, 51 mAs, MUSICA 3



32-year-old woman, DX-D 300, 66 kV, 10 mAs, MUSICA 3

32-year-old woman, DX-D 300, 66 kV, 10 mAs, MUSICA 3

59-year-old woman, DX-D 300, 46 kV, 4 mAs, MUSICA 3

> “With some examinations it’s simply not enough to apply a single reconstruction algorithm to all areas of an image [...]. The FMP process addresses this very problem.”
>
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When every detail matters

Another main aim during the development phase was to minimize the amount of postprocessing required in the diagnostic center. “For me this is another crucial aspect,” says Dr. Sochor. “I diagnose around 100 to 150 patients a day in skeletal diagnosis alone. It all adds up: If I spend an extra 30 seconds on postprocessing for each patient, I’ve soon lost a whole hour.” MUSICA 3 comes to the rescue: “With lungs I still tend toward a flatter grading, but for the skeleton I don’t normally have to do anything at all.”

And the dose? “One thing is certain: Dose reduction is only in the patient’s interest if reliable diagnosis can still be ensured. In this dilemma, sophisticated image processing algorithms like those in MUSICA 3 open up new possibilities. For small extremities, where exposure times are short anyway, it’s less crucial – but with a lung, or pediatric radiology in general, it’s very important.”

Benefit for both sides

“Dr. Sochor has started a small revolution at Agfa HealthCare with some entirely justified criticism,” sums up Bernd Hoberg, Product Manager for Germany, Austria and Switzerland at Agfa HealthCare. “This has triggered a valuable learning process.”

In the words of Dr. Sochor: “Once it became clear where improvement was needed, Agfa HealthCare invested a great deal of time, effort, and dedication to make things happen. Non-university institutions like ours don’t always find manufacturers to be such good listeners. This is an excellent result!”

> “Dr. Sochor has started a small revolution at Agfa HealthCare with some entirely justified criticism.”

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Product Manager DACH, Agfa HealthCare

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