

**International Day of Radiology 2015**  
**Interview on paediatric imaging**  
**Bosnia & Herzegovina /**  
**Dr. Amela Mornjaković-Franca**



**INTERNATIONAL  
DAY OF  
RADIOLOGY**  
AN INITIATIVE OF THE ESR, ACR AND RSNA

**Paediatric radiology in Bosnia & Herzegovina**

**An interview with Amela Mornjaković-Franca, a paediatric radiologist with her own private practice in Sarajevo, Bosnia & Herzegovina, and an assistant professor at the faculty of health studies at the University of Sarajevo**

**European Society of Radiology: What is paediatric imaging? What age are the patients, and how is it different from regular imaging?**

**Amela Mornjaković-Franca:** Paediatric imaging is the branch of medical imaging that involves newborns, infants, children and adolescents up to 18 years old. It has assumed an increasingly important role in the evaluation, diagnosis, understanding and follow-up of different paediatric diseases and abnormalities. The newer diagnostic imaging techniques have increased our ability to identify abnormalities, stage diseases and monitor therapy. To minimise risks and maximise benefits from any imaging examination, the procedure must be tailored to the specific clinical problem. This approach is especially important in paediatric radiology because of radiation considerations.

**ESR: Since when has paediatric imaging been a speciality in its own right?**

**AMF:** In early 1998, at the initiative of Professor Faruk Dalagija, then the Head of the Clinic for Radiology, and Professor Džemila Čatić, the former director of diagnostic disciplines of the University Clinic Centre in Sarajevo (UCCS), activities relating to the formation of the first department of paediatric radiology in Bosnia and Herzegovina intensified. March 28, 1998, is considered to be the foundation date of the first – and, to date, the only – department of paediatric radiology in our country, with the establishment of regular advisory cooperation between the clinic for child surgery, the paediatric clinic and the department of child orthopaedic surgery. To begin with, all activities were performed by two paediatric radiologists, and since 2010 there are four of them.

**ESR: Which imaging modalities are usually used to examine paediatric patients? Does this change depending on the age of the patient?**

**AMF:** A paediatric radiologist knows and uses the entire range of radiological diagnostic techniques, knows the principles of all methods, and is able to select algorithms or techniques based on clinical information and assessment of the advantages and disadvantages of various imaging methods in each individual case. Ultrasound and magnetic resonance imaging (MRI) are the methods which are most commonly used in examining paediatric patients, irrespective of their age. Although ultrasound is regularly used in evaluation of thoracic organs and musculoskeletal diseases, it is sometimes inevitable that x-ray imaging and computed tomography (CT) are also used.

**ESR: Some imaging techniques, like x-ray and CT, use ionising radiation. What risk does this radiation pose to paediatric patients? What kind of safety measures are in place to protect children?**

**AMF:** As we know, the risk from ionising radiation is mainly dependent upon the age at which the radiological examination (x-ray or CT) was performed. Exposure to radiation during the first decade of life represents 4–7 times higher risk for the entire lifespan of that person than if the exposure happened at an elderly age. Radiation risks from diagnostic radiology in the paediatric patient are either

deterministic or stochastic in nature. The probability of harm is proportional to the dose, but the severity of the harm is independent of dose. Dose may be decreased by only performing examinations that are clinically indicated, tailoring the examination, using correct exposure techniques, preventing the need to repeat exposure due to motion by using proper immobilisation, and continuing education of physicians and technologists on the use of low-dose digital radiography or non-ionising radiation techniques whenever feasible. During the examination, it is essential to protect not only the gonads but also other parts of body in the vicinity of the primary beam of radiation.

**ESR: Do general radiologists always use lower radiation doses when imaging children; are there any guidelines to follow?**

**AMF:** General radiologists are educated about the necessity and methods of lowering the radiation dose when imaging children. The fundamentals of radiobiology, medical physics, and radiation protection as they relate to the children should be reviewed during the radiology training experience.

**ESR: How aware are parents and relatives of the risks of radiation exposure? How do you address the issue with them?**

**AMF:** Before carrying out methods that use ionising radiation, the parents and relatives of sick children are always informed about the advantages and necessities of the application of these methods, about the risks of radiation exposures, and the methods of protection for the sake of lowering the risks.

**ESR: Undergoing an imaging examination, especially a long procedure like MRI, can be an uncomfortable and sometimes frightening experience for some children. How can it be made more bearable?**

**AMF:** In the case of the need to perform MRI, the parents are introduced to the main aspects of this method in order for them to understand the need for sedation of their child. The paediatric radiologist must also be instructed in the risks and benefits of paediatric sedation. This includes an understanding of the physician's role in the monitoring and management of paediatric patients during and after sedation for diagnostic procedures. With older children, we attempt prefer to perform imaging without sedation.

**ESR: How many imaging exams are performed on paediatric patients in Bosnia & Herzegovina each year?**

**AMF:** The department for paediatric radiology at UCCS makes imaging exams for around 5,000 to 6,000 children between 0 and 15 each year. This includes all radiological imaging of children except in the domain of neuroimaging, which is treated by the department for neuroradiology, and cardiac and brain ultrasound, which is traditionally carried out by paediatricians in our country. Naturally, the paediatric radiologists have a basic understanding of common diseases of the paediatric central nervous system and cardiovascular system and their characteristics and techniques.

**ESR: Access to modern imaging equipment is important for paediatric imaging. Are hospitals in your country equipped to provide the necessary exams?**

**AMF:** Fortunately, a great majority of clinics and cantonal (community) hospitals in Bosnia and Herzegovina (Sarajevo, Banjaluka, Tuzla, Mostar, Bihać) possess modern CT equipment that contains software programmes for children and low-dose digital radiography equipment, as well as trained engineers of medical radiology who accurately control the settings used in x-ray imaging of children.

**ESR: What has changed in paediatric radiology during your lifetime?**

**AMF:** Quite a lot. Generally, we have better equipment. Nowadays, one can perform more precise, easier and quicker examinations with ultrasound and MRI, which is especially important in paediatric radiology. The training programme in the subspecialty of paediatric radiology involves supervised

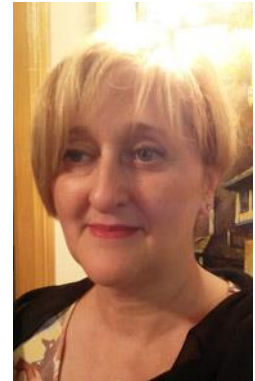
experience in the paediatric application of imaging and interpretation of all forms of diagnostic imaging of the unique clinical problems of children.

**ESR: Where do you see the next developments in your field?**

**AMF:** I would like to see the formation of new departments of paediatric radiology in other clinical centres and community hospitals, in order to achieve efficient health protection of children outside single specialised centres in Bosnia and Herzegovina, and in order to reduce unnecessary radiological exams to a minimum. An important factor for the improvement of health protection is an increase in the number of general and paediatric radiologists, which requires changes in health policy through official boards and organisations.

***Amela Mornjaković-Franca** is a paediatric radiologist with her own private practice in Sarajevo, Bosnia & Herzegovina, and an assistant professor at the faculty of health studies at the University of Sarajevo. She graduated from the Faculty of Medicine of the University of Sarajevo in 1988 and completed her postgraduate studies in experimental medicine in 1995, her master's degree in 2002 and her PhD in 2009.*

*She began specialising in radiodiagnostics at the Institute for Radiology at the UMC (presently University Clinical Center Sarajevo) in October 1992. On the initiative of the clinic's teaching staff, the Department for Paediatric Radiology was founded in 1998. In 2004, she became the first specialist paediatric radiologist in Bosnia & Herzegovina and during the period 2005–2011 she worked as the chief of the department. In 2011, she established her own practice and has been working there for the last four years.*



Radiologic findings in a 5-year-old girl with Sanfilippo syndrome (MPS type III)

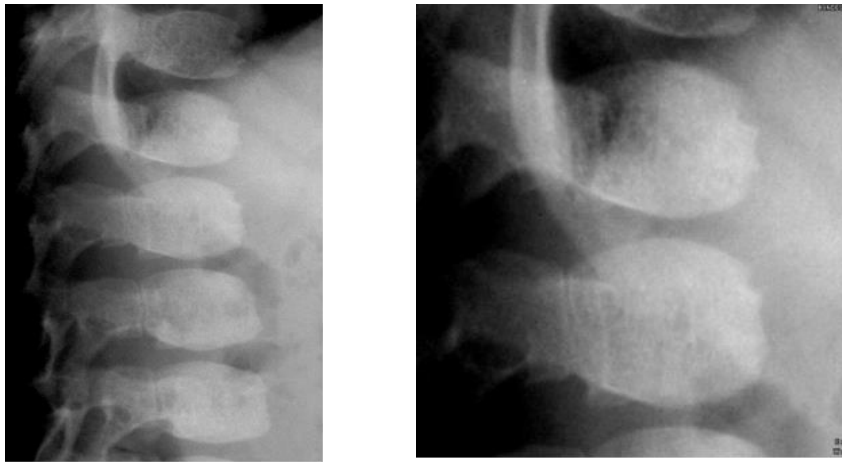


Figure 1: Lateral x-ray of the lumbar spine showing slight hypoplasia of the body of T12 and L1 with their slight dislocation dorsal and breaking of their anterior margins.

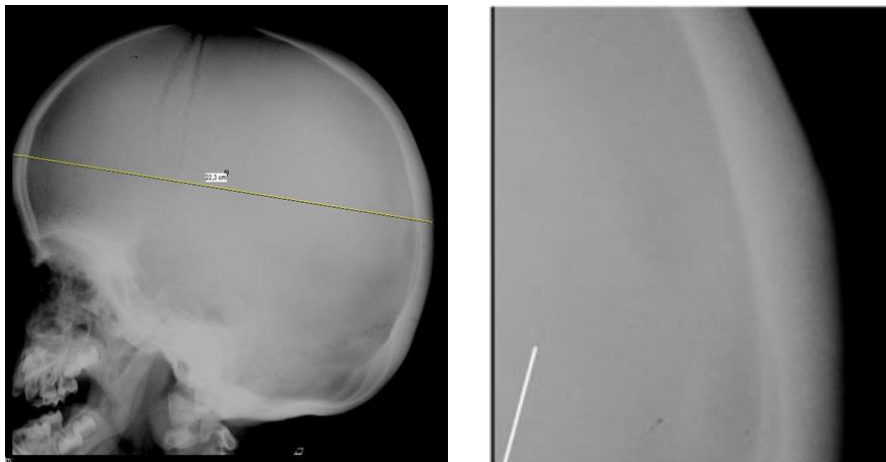


Figure 2: Lateral x-ray of the skull showing enlarged neurocranium in ap diameter (22.3 cm) with thick calvarium especially of the posterior two-thirds of the skull vault (short arrow). Pituitary fossa (long arrow) is elongated ventrodorsally into an omega-shape due to long recesses under the anterior clinoid processes. Underdevelopment of the paranasal sinuses and progenia due to the enlarged mandible and square condyles are present.

