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**Interview on Sports Imaging**
**Sweden / Dr. Mats Geijer**

**Knowledge and experience gained in elite sports medicine centres can be used for the general populace at more traditional imaging centres, says Dr. Mats Geijer.**

***European Society of Radiology:*** *Sports imaging is the main theme of IDoR 2019. In most countries, this is not a specialty in itself, but a focus within musculoskeletal radiology. In your country, is there a special focus on sports imaging within radiology training or special courses for interested radiologists?*
**Mats Geijer:** Sports imaging is a wide topic, encompassing elite athlete imaging to imaging injuries sustained in the everyday athletic pursuits of the general populace. Thus, the border between sports imaging and ordinary musculoskeletal (MSK) imaging is not clear-cut. In Sweden, sports imaging is not a specialty, but rather incorporated mostly within MSK imaging. Injuries in other organ systems are handled by their respective subspecialty. Just as the elite athletes in the national teams of various sports have their specialised physicians, these physicians usually have developed special relations with certain radiologists and radiology departments; at times for expertise and ease of access. Sports imaging does not have any specially focused national training or special courses, and sports imaging is covered in the available MSK courses.

***ESR:*** *Please describe your regular working environment (hospital, private practice). Does sports-related imaging take up all, most, or only part of your regular work schedule?*
**MG:** I work in a University Hospital with a large musculoskeletal imaging section. The MSK section handles all types of patients, with a large proportion made up of age-related injuries but also sports-related injuries from the general population.

***ESR:*** *Based on your experience, which sports produce the most injuries that require medical imaging? Have you seen any changes in this regard during your career? What areas/types of injuries provide the greatest challenge to radiologists?*
**MG:** Sports-related injuries are very seasonally distributed. Knee and wrist injuries can be found in winter from downhill skiing accidents. In warmer seasons, football injuries, mostly knee injuries, are common as are scaphoid injuries, mostly from bicycle falls. With an increased interest in downhill skiing in addition to an improved economic situation in society allowing for more expensive sports, skiing injuries have become more common over the last decades. Better equipment with faster bikes and a larger number of bicyclists in the cities has likely led to an increase in the number of biking injuries.

***ESR:*** *Please give a detailed overview of the sports injuries with which you are most familiar and their respective modalities.*
**MG:** The most common sports injuries that we see are knee injuries from various sports, imaged with conventional 1.5 Tesla or 3 Tesla MR scanners. Scaphoid injuries

are commonly imaged with radiography in Sweden. If negative, this is supplemented with a quick wrist MRI consisting of coronal T1-weighted and STIR sequences. Depending on availability, dedicated cone beam CT can replace radiography and most MRI examinations.

***ESR:*** *What diseases associated with sporting activity can be detected with imaging? Can you provide examples?*
**MG:** The most common findings apart from fractures are stress related injuries, both seen as incomplete stress fractures and as bone marrow oedema.

***ESR:*** *Radiologists are part of a team; for sports imaging this likely consists of surgeons, orthopaedists, cardiologists and/or neurologists. How would you define the role of the radiologist within this team, and how would you describe the cooperation between radiologists, surgeons, and other physicians?*
**MG:** In taking care of an elite athlete, the radiologist's role is both that of a diagnostician and as a consultant, interpreting the findings and putting them in relation to the clinical findings and patient history. In more advanced imaging settings, it is important, as in other similar situations, to work as a team and have close, immediate contact with the patient's physician and other imaging colleagues.

***ESR:*** *The role of the radiologist in determining diagnoses with sports imaging is obvious; how much involvement is there regarding treatment and follow-up?*
**MG:** When imaging general sports injuries, the role of the radiologist is similar whether making a primary diagnosis or following up on the patient. In imaging elite athletes, radiologists should cooperate closely with the treating physician when evaluating treatment results and following up on the patient.

***ESR:*** *Radiology is effective in identifying and treating sports-related injuries and diseases, but can it also be used to prevent them? Can the information provided by medical imaging be used to enhance the performance of athletes?*
**MG:** Imaging can help to evaluate the extent and degree of an injury, both in acute and in overuse injuries, to better predict when an athlete can resume training or competition after an injury.

***ESR:*** *Many elite sports centres use cutting-edge medical imaging equipment and attract talented radiologists to operate it. Are you involved with such centres? How can the knowledge acquired in this setting be used to benefit all patients?*
**MG:** Imaging centres in Sweden with a focus on sports injuries have the same cutting-edge equipment as general radiology departments. The expert knowledge gained in those more specialised institutions might be used to benefit all patients by spreading knowledge, i.e. teaching.

***ESR:*** *The demand for imaging studies has been rising steadily over the past decades, placing strain on healthcare budgets. Has the demand also increased in sports medicine? What can be done to better justify imaging requests and make the most of available resources?*
**MG:** With increased participation in sports by the general population, the frequency of sports injuries has probably increased. Regarding healthcare spending on imaging, it is always important to prioritise the right patients and use the most cost-effective imaging modality. More research is needed on this, and we need to improve the use of our resources by removing unnecessary imaging from the process.

***ESR:*** *Athletes are more prone to injuries that require medical imaging. How much greater is their risk of developing diseases related to frequent exposure to radiation, and what can be done to limit the negative impacts from overexposure?*
**MG:** Elite athletes are probably imaged more than the general population of the same age. A lot of that imaging is done by MRI or ultrasound (US) without radiation exposure. Radiography of the extremities carries no great risk of radiation-induced disease. Repeated abdominal or spine CT as well as head CT may be of concern. In this case optimal protocols should be used, in elite athletes as well as every patient.

**Dr. Mats Geijer** is Professor of Radiology at the University of Gothenburg in Sweden, and chief consultant radiologist at the Sahlgrenska University Hospital. He is a long-time musculoskeletal radiologist, specialising in arthritis imaging, trauma imaging and musculoskeletal tumours. His main research interests are in scaphoid imaging, spondyloarthritis, hip fracture and wrist fracture surgery. He has authored and co-authored 84 peer-reviewed publications, several book chapters and numerous congress abstracts. He has started and been on the faculty of three different annual musculoskeletal Swedish courses and has given numerous invited lectures, tutorials and refresher courses at national and international meetings. He helped found the Swedish Society of Musculoskeletal Radiology of which he is currently secretary, previously president. He is also a board member of the Swedish Society of Radiology.