ECR TODAY 2017

EUROPEAN CONGRESS OF RADIOLOGY

DAILY NEWS FROM EUROPE'S LEADING IMAGING MEETING | WEDNESDAY, MARCH 1, 2017

BY PAUL M. PARIZEL, ESR PRESIDENT

Welcome to Vienna. Welcome to the flower gardens of radiology. Welcome to ECR 2017.

ESR President Prof. Paul M. Parizel is chairman of Antwerp University Hospital's department of radiology and full professor of radiology at the University of Antwerp's faculty of medicine.

Welcome to the European Congress of Radiology (ECR), the flagship scientific meeting of the European Society of Radiology (ESR).

With your help, we shall make this ECR 2017 a memorable and unparalleled event, a supreme achievement in the annals of European radiology, with the support of all national, subspecialty and allied sciences societies.

For the organisation of ECR 2017, I was lucky to get off to a flying start, surfing on a wave of positive energy, generated by a string of successful meetings. Our congress boasts a long tradition of delivering scientific and educational excellence. ECR can be truly proud of an unmatched track record and look to the future with confidence. The growing impact of our society (ESR) and our congress (ECR) is internationally recognised, in Europe and around the globe, and our strong commitment to delivering excellence has earned us a reputation for quality and innovation. At ECR, we continue to explore the world of radiology with determination, confidence and ambition, and we do so with style and elegance, in a uniquely European tradition.

As President of this meeting, it is my pleasure to announce that ECR 2017 offers a very ambitious and challenging agenda. I invite you to explore the fascinating world of medical imaging and image-guided interventions, and to discover the exciting opportunities that lie ahead. The ECR attracts the best and the brightest, from students to professors, and offers them the ultimate in education and science, as well as the opportunity to build a network of professional relationships.

But there is more … ECR 2017 will have a unique twist compared with previous editions, because our meeting is specifically dedicated to YOUTH, die Jugend, de jeugd, la jeunesse, la giovinezza, la juventud, молодежь. During ECR 2017, I extend an open invitation to all and sundry to take a stroll in 'the flower gardens of radiology'. Radiology is a beautiful, fragrant, sweet-smelling flower garden, and this is the message I want to bring to young radiologists, throughout Europe and across the globe. Our scientific programme for ECR 2017 reflects this focus on a new generation of radiologists, who demand high-quality education, delivered in an efficient, understandable, and customer-friendly way. To accommodate these young colleagues, there will be more interactive sessions, a more prominent role for social media, and we shall have topics that are of interest to young people, because they are the future of our profession. The broad consensus among the members of the Programme Planning Committee demonstrates our shared ambition for ECR 2017 to bring this message of hope to a new generation of radiologists.

As President of ECR 2017, I am extremely happy and proud that this new generation in radiology has heeded my call. We received an all-time record of submitted abstracts, which proves that this army of young, smart, ambitious, driven young professionals have entered our garden, ready and willing to plant new seeds and prepare new flowerbeds. Abstract submission for ECR 2017 closed with a record 6,757 abstracts submitted, representing a 22.8% increase on the previous year's figure. The new record includes abstracts submitted for both scientific papers and oral presentations (+18%), and electronic posters for the ECR's EPOS™ exhibition (+27%). The boost in submissions for EPOS™ reflects the overwhelming success of the Voice of EPOS sessions, introduced at ECR 2016, which give poster authors the opportunity to present their work in person at the congress.

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15 ESR and UEMS team up to impact on EU issues facing radiology

BY FRANCES RYLANDS-MONK

Age assessments based on bone maturation raise complex scientific and ethical issues

Mass migration triggered by the unfolding crisis in Syria has heightened interest in radiology's role in the protection of children. For young unaccompanied persons arriving in Europe without documentation, imaging can be used to determine age and as a result, their refugee status, having a direct impact on the aid they receive and where they can live.

At the other end of the spectrum of its uses, bone assessment is also a means to gauge the skeletal age of football players in tournaments such as the under-17 and under-20 world cups. This need arises when personal documents are lacking for players who come from countries with no official birth registration systems and when there is a suspicion that an older player is being included in a younger age category.

"This misclassification entails not only physical risk of exposing weaker players to injuries caused by older players but also undermines the system of recognition or economic reward, which may be considerable in some cases," said Dr. Sandra Diaz Ruiz, PhD, paediatric radiologist at the Astrid Lindgren Children's Hospital, part of the Karolinska University Hospital, Stockholm.

Part of the appeal of MRI in young footballers is its lack of ionising radiation, and the modality has been used in wrist assessments by the International Federation of Association Football (FIFA) since 2003.

MRI is not currently used to assess bone age in routine practice, but Diaz believes that it could be standardised to become an option both in clinical diagnosis of special syndromes and in forensic work, the latter being the main focus of her presentation today. As an adjunct to other methods, MRI yields accurate results to specific questions, but there are pitfalls, and problems can arise from the absence of standards to ensure that the age established by the scientific evidence is correct. Moreover, the fact that research predominantly pertains to males and Caucasians means that it cannot be used as a general reference.

"There are not enough studies that represent the entire population. Instead small studies aim to answer specific questions," she told *ECR Today*. "Furthermore, some involve several grade scales of the same body part examined with different MR field strengths. The interpretation of these grade scales may be confusing to inexperienced radiologists."

She pointed to other studies which found that because MRI is a lengthy process and sensitive to body movement, this is a significant limitation of its use children.

Other factors in bone age estimation remain controversial: gender, ethnicity, nutrition, physical activity, geographical location, other socioeconomic factors, and exposure to the sun as an acceleration factor in maturation should all be considered. Widening study cohorts to include a range of different groups of subjects could also be looked at, and would constitute a way of reaching consensus on protocols and grade scales. These studies must be wide, multicentre, and guarantee the inclusion of these different factors, according to Diaz.

Beyond determining age in football and forensic medicine, a key application of bone age assessment is the evaluation of growth and puberty disorders. Dr. Fabrice Dedouit, PhD, head of the Imaging and Forensic Anthropology Unit of the University Center of Legal Medicine, Lausanne-Geneva, Switzerland, thinks such evaluation is fundamental to determining patient management and choice of therapy.

"In patient follow-up it is critical to continue using the same method and not change to a different means of assessment," he said.

The two most widely used systems are the Greulich & Pyle Atlas (GP) and the Tanner Whitehouse (TW) methods. Published in 1959, GP is the most widely used. It is based on hand x-rays from 1,000 Americans of northern European descent living in Ohio, aged between 0 years and 18 years, which were taken from the Brush Foundation longitudinal study between 1931 and 1942 and compiled into an atlas. To help determine bone age, plain x-rays of the left hand and wrist can be compared with reference atlas images for each age category and for both sexes.

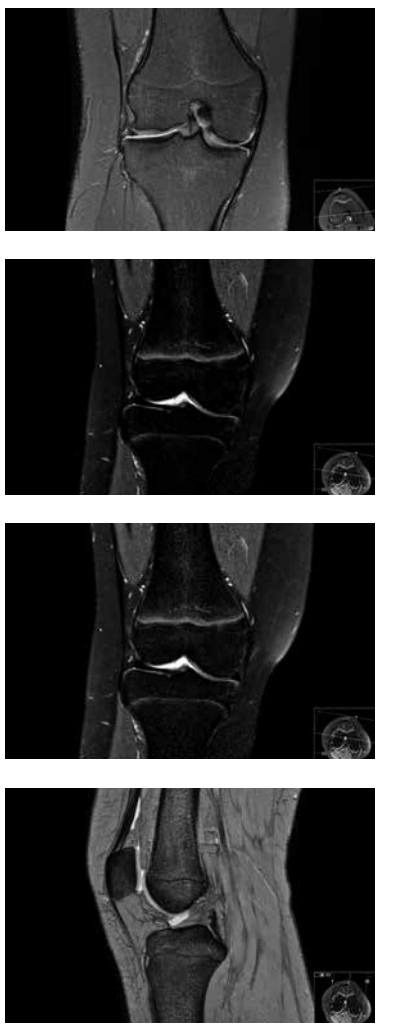
Evaluation is based on the existence and morphology of the epiphyses of the metacarpals and the phalanges and their fusion, the carpal bones, and the inferior epiphyseal points of the ulna and radius. While it is simple, with low inter and intra-observer differences, critics state that the method is based on an old study and is not representative of modern, multi-ethnic, taller, and heavier populations from various socioeconomic backgrounds.

TW, based on data compiled in 1962 from British children born between 1940 and 1955, involves the assignment of a score to each of the ossification centres, involving 20 bones, visible in the x-ray. The development of each bone within the hand/wrist complex is divided into a series of stages from A (initial radiological aspect) to H (final mature radiological aspect), when the bone has achieved full adult morphology. Each bone is assessed individually for stage, with each stage assigned a numeric score. All numeric scores are then added together to achieve a cumulative score, which is then related to a chronological age.

The method was updated with data from Scotland in 1975 (TW2) and then again in 2001 (TW3) with data from Europe, Argentina, Japan, and the U.S. However, it is time-consuming, difficult to learn, involves arbitrary assignment of scores to the degrees of maturity, and only gives a rough staging of ossification of the ulna and radius, according to Dedouit.

Bone age assessment has a key role in the confirmation of normal variants of growth, interpretation of hormone blood levels in children during puberty, and diagnosis of precocious puberty and hyperandrogenism, such as congenital adrenal hyperplasia characterised by advanced bone age. Assessment is also pivotal in the decision to treat or not to treat children with precocious puberty and congenital adrenal hyperplasia, in monitoring skeletal response to the treatment, and also defining the right moment to start replacement treatment in children with hypogonadism. Evaluating children with growth retardation and advanced or delayed puberty and monitoring paediatric patients being treated with growth hormone replacement therapy are two other areas that rely on bone age assessment.

"Radiological results of bone age must always be combined with clinical evaluation and paraclinic results – hormonological if necessary – to explore and assess the pathologies or to help determine chronological age," he noted.



Measurements taken from knee MRI can help determine age, but protocols and grade scales must be standardised for routine practice in bone maturation assessment. (Provided by Dr. Sandra Diaz Ruiz, PhD).

A: Clinical x-ray of a young male with a chronological age of 16 years and 4 months.

B: The closest image in the Greulich & Pyle Atlas is the male standard number 28 corresponding to a skeletal age of 16 years old. A limitation of bone maturation assessment using GP atlas images is that similarity can only help determine skeletal age, not chronological age. (Provided by Dr. Fabrice Dedouit, PhD)

Special Focus Session

Wednesday, March 1, 08:30–10:00, Room O

SF 1 Assessing age, based on bone maturation: scientific and ethical aspects

- **Chairman's introduction**
  K. Rosendahl; Bergen/NO
- **Bone age assessment: indications and methods**
  F. Dedouit; Lausanne/CH
- **Precision and accuracy of an automated radiographic method**
  H.H. Thodberg; Holte/DK
- **Precision and accuracy of MRI**
  S. Diaz; Stockholm/SE
- **Ethical and legal aspects of using bone age to determine age**
  K. Chaumoitre; Marseille/FR
- **Panel discussion: Should bone age be used to estimate chronological age – alone or in combination with additional methods?**