

IT'S A THIN LINE

A GUIDE TO ADVANCED IMAGING OF PHYSEAL STRESS INJURY OF THE WRIST

Laura S. Kox, MD*[§], Aart J. Nederveen, PhD[§], Valentina Mazzoli, MSc[§], Jos Oudeman, MD[§], Rick L. van Steenkiste, MD[§], Mario Maas, MD, PhD[§]

[§]Academic Medical Center – University of Amsterdam, Department of Radiology
Meibergdreef 9
1105 AZ Amsterdam
Email: l.s.kox@amc.uva.nl

ABSTRACT

Background

Physeal stress injuries of the wrist can have severe long-term consequences but are difficult to detect at an early stage.[1] New MRI sequences can improve this process.[2]

Teaching points

The major teaching points of this exhibit are: 1) Knowledge of the appearance of the healthy physis is essential. 2) Radiographs are often unable to identify subtle physeal changes. 3) The presence of bone marrow edema is highly relevant in suspected physeal injury. 4) Cartilage- and fluid-sensitive MRI sequences can aid to identify early-stage physeal injury. 5) Quantitative methods for determining injury severity such as 3D physeal reconstruction and Dixon-based water fraction can provide prognostic information.

Outline

We will share our experience with an innovative approach to early diagnosis of radial physeal stress injury. We focus on wrist imaging but the protocol could be applied to other physes. The method is illustrated by case-based material on healthy and injured physes, derived from our currently running study on growth plate injuries in young gymnasts and non-gymnast controls. The outline is: 1) Review imaging aspects of healthy wrist physes. 2) Introduce an easy to implement and broadly applicable MRI protocol for physeal imaging on 3T. 3) Discuss imaging characteristics of physeal stress injury of the wrist on radiographs and MRI using sample cases. 4) Present 3D reconstruction of the physis and MRI mapping methods for quantifying physeal stress injury to aid in prognosis.

REFERENCES

1. Davis KW. Imaging pediatric sports injuries: upper extremity. *Radiol. Clin. North Am.* 2010;**48**(6):1199-211 doi: 10.1016/j.rcl.2010.07.020.
2. Ecklund K, Jaramillo D. Imaging of growth disturbance in children. *Radiol. Clin. North Am.* 2001;**39**(4):823-41.