

## Supplementary article data

# Prevalence and clinical significance of occult fractures in children with radiograph-negative acute ankle injury

## A meta-analysis

Abolfazl Najaf-Zadeh<sup>1,2,3\*</sup>, Eric Nectoux<sup>1,4,5\*</sup>, François Dubos<sup>1,3,5</sup>, Laurent Happiette<sup>1,3</sup>, Xavier Demondion<sup>1,6</sup>, Magloire Gnansounou<sup>2</sup>, Bernard Herbaux<sup>1,4</sup>, and Alain Martinot<sup>1,3,5</sup>

<sup>1</sup>Univ. Lille Nord-de-France, UDSL, Lille; <sup>2</sup>Department of Pediatrics, CH Sambre-Avesnois, Maubeuge; <sup>3</sup>Pediatric Emergency and Infectious Diseases Unit, CHU Lille; <sup>4</sup>Department of Pediatric Surgery and Orthopedics, CHU Lille; <sup>5</sup>Public Health, Epidemiology and Quality of Care, Lille; <sup>6</sup>Department of Musculoskeletal Radiology, CHU Lille, Lille, France.

\*These authors contributed equally to this work.

Correspondence: eric.nectoux@chru-lille.fr

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### Appendix. Detailed search strategy for MEDLINE via PUBMED

1. ((“ankle injuries”[MeSH Terms] OR (“ankle”[All Fields] AND “injuries”[All Fields]) OR “ankle injuries”[All Fields] OR (“ankle”[All Fields] AND “injury”[All Fields]) OR “ankle injury”[All Fields]) AND (“fractures, bone”[MeSH Terms] OR (“fractures”[All Fields] AND “bone”[All Fields]) OR “bone fractures”[All Fields] OR “fracture”[All Fields])) AND ((“0001/01/01”[PDAT] : “2013/03/30”[PDAT]) AND (Dutch[lang] OR English[lang] OR French[lang] OR . “[All Fields]”)) AND ((“0001/01/01”[PDAT] : “2013/03/30”[PDAT]) AND (Dutch[lang] OR English[lang] OR French[lang] OR Spanish[lang]) AND (“infant”[MeSH Terms] OR “child”[MeSH Terms] OR “adolescent”[MeSH Terms])):

2. ((“ankle”[MeSH Terms] OR “ankle”[All Fields] OR “ankle joint”[MeSH Terms] OR (“ankle”[All Fields] AND “joint”[All Fields]) OR “ankle joint”[All Fields]) AND (“growth plate”[MeSH Terms] OR (“growth”[All Fields] AND “plate”[All Fields]) OR “growth plate”[All Fields] OR “epiphyses”[MeSH Terms] OR “epiphyses”[All Fields] OR (“growth”[All Fields] AND “plate”[All Fields])) AND (“fractures, bone”[MeSH Terms] OR (“fractures”[All Fields] AND “bone”[All Fields]) OR “bone fractures”[All Fields] OR “fracture”[All Fields])) AND ((“0001/01/01”[PDAT] : “2013/03/30”[PDAT]) AND (Dutch[lang] OR English[lang] OR French[lang] OR Spanish[lang]) AND (“infant”[MeSH Terms] OR “child”[MeSH Terms] OR “adolescent”[MeSH Terms])):

3. ((“ankle”[MeSH Terms] OR “ankle”[All Fields] OR “ankle joint”[MeSH Terms] OR (“ankle”[All Fields] AND “joint”[All Fields]) OR “ankle joint”[All Fields]) AND (“growth plate”[MeSH Terms] OR (“growth”[All Fields] AND “plate”[All Fields]) OR “growth plate”[All Fields] OR “physis”[All Fields]) AND (“fractures, bone”[MeSH Terms] OR (“fractures”[All Fields] AND “bone”[All Fields]) OR “bone fractures”[All Fields] OR “fracture”[All Fields])) AND ((“0001/01/01”[PDAT] : “2013/03/30”[PDAT]) AND (Dutch[lang] OR English[lang] OR French[lang] OR Spanish[lang]) AND (“infant”[MeSH Terms] OR “child”[MeSH Terms] OR “adolescent”[MeSH Terms])):

4. ((“ankle”[MeSH Terms] OR “ankle”[All Fields] OR “ankle joint”[MeSH Terms] OR (“ankle”[All Fields] AND “joint”[All Fields]) OR “ankle joint”[All Fields]) AND (“epiphyses”[MeSH Terms] OR “epiphyses”[All Fields] OR “epiphysis”[All Fields]) AND (“fractures, bone”[MeSH Terms] OR (“fractures”[All Fields] AND “bone”[All Fields]) OR “bone fractures”[All Fields] OR “fracture”[All Fields])) AND ((“0001/01/01”[PDAT] : “2013/03/30”[PDAT]) AND (Dutch[lang] OR English[lang] OR French[lang] OR Spanish[lang]) AND (“infant”[MeSH Terms] OR “child”[MeSH Terms] OR “adolescent”[MeSH Terms])):

5. ((“ankle”[MeSH Terms] OR “ankle”[All Fields] OR “ankle joint”[MeSH Terms] OR (“ankle”[All Fields] AND “joint”[All Fields]) OR “ankle joint”[All Fields]) AND

((“sprains and strains”[MeSH Terms] OR (“sprains”[All Fields] AND “strains”[All Fields]) OR “sprains and strains”[All Fields] OR “sprain”[All Fields]) AND (“magnetic resonance imaging”[MeSH Terms] OR (“magnetic”[All Fields] AND “resonance”[All Fields] AND “imaging”[All Fields]) OR “magnetic resonance imaging”[All Fields])) AND (“0001/01/01”[PDAT] : “2013/03/30”[PDAT]) AND (Dutch[lang] OR English[lang] OR French[lang] OR Spanish[lang]) AND (“infant”[MeSH Terms] OR “child”[MeSH Terms] OR “adolescent”[MeSH Terms]))

6. ((“ankle”[MeSH Terms] OR “ankle”[All Fields] OR “ankle joint”[MeSH Terms] OR (“ankle”[All Fields] AND “joint”[All Fields]) OR “ankle joint”[All Fields]) AND (“sprains and strains”[MeSH Terms] OR (“sprains”[All Fields] AND “strains”[All Fields]) OR “sprains and strains”[All Fields] OR “sprain”[All Fields]) AND (“tomography, x-ray computed”[MeSH Terms] OR (“tomography”[All Fields] AND “x-ray”[All Fields] AND “computed”[All Fields]) OR “x-ray computed tomography”[All Fields] OR (“computed”[All Fields] AND “tomography”[All Fields]) OR “computed tomography”[All Fields])) AND (“0001/01/01”[PDAT] : “2013/03/30”[PDAT]) AND (Dutch[lang] OR English[lang] OR French[lang] OR Spanish[lang]) AND (“infant”[MeSH Terms] OR “child”[MeSH Terms] OR “adolescent”[MeSH Terms]))

7. ((“ankle”[MeSH Terms] OR “ankle”[All Fields] OR “ankle joint”[MeSH Terms] OR (“ankle”[All Fields] AND “joint”[All Fields]) OR “ankle joint”[All Fields]) AND (“sprains and strains”[MeSH Terms] OR (“sprains”[All Fields] AND “strains”[All Fields]) OR “sprains and strains”[All Fields] OR “sprain”[All Fields]) AND (“ultrasonography”[MeSH Terms] OR “ultrasonography”[All Fields] OR “sonography”[All Fields])) AND (“0001/01/01”[PDAT] : “2013/03/30”[PDAT]) AND (Dutch[lang] OR English[lang] OR French[lang] OR Spanish[lang]) AND (“infant”[MeSH Terms] OR “child”[MeSH Terms] OR “adolescent”[MeSH Terms]))

8. ((“ankle”[MeSH Terms] OR “ankle”[All Fields] OR “ankle joint”[MeSH Terms] OR (“ankle”[All Fields] AND “joint”[All Fields]) OR “ankle joint”[All Fields]) AND (“sprains and strains”[MeSH Terms] OR (“sprains”[All Fields] AND “strains”[All Fields]) OR “sprains and strains”[All Fields] OR “sprain”[All Fields]) AND (“radiography”[Subheading] OR “radiography”[All Fields] OR “radiography”[MeSH Terms])) AND (“0001/01/01”[PDAT] : “2013/03/30”[PDAT]) AND (Dutch[lang] OR English[lang] OR French[lang] OR Spanish[lang]) AND (“infant”[MeSH Terms] OR “child”[MeSH Terms] OR “adolescent”[MeSH Terms]))

9. ((((((#1)OR#2)OR#3)OR#4)OR#5)OR#6)OR#7)OR#8)OR#9

Table 3. Quality indicators of the studies included

Reference	Study design	Participants	Criteria for positivity of reference standard	% outcome determined by reference standard
Gufler et al. 2013 <sup>a</sup>	P	3–15 y with initial radiography-negative acute ankle injury, open physis, tenderness and swelling over the joint, and refusal to move the joint actively or passively	Distinct line crossing the cortex and/or trabecula on MRI image	100
Endele et al. 2012 <sup>b</sup>	P, C	7–15 y with initial 2-view radiography-negative acute ankle-twisting injury within 48 h of presentation, open physis, swelling over the joint, and refusal to walk; without history of ankle sprain	Ns	100
Boutis et al. 2011	P, C	5–12 y with initial 3-view radiography-negative acute ankle inversion injury within 72 h of presentation, open physis, tenderness and swelling over distal fibula, and limited weight bearing; without pathological fractures or multi-limb trauma	Distinct line crossing the cortex and/or trabecula on MRI image	100
Launay et al. 2008 <sup>c</sup>	P, C	8–15 y with initial 2-view radiography-negative acute ankle-twisting injury within 48 h of presentation, tenderness and swelling over the joint, and inability to weight bear; without history of ankle injury or known osteoarticular disease	Ns	100
Stuart et al. 1998	P, C	≥ 6 y with initial radiography-negative acute ankle inversion injury, open physis, and tenderness and swelling over distal fibula	Ns	100
Simanovsky et al. 2009 <sup>d</sup>	P, C	2–16 y with initial 3-view radiography-negative acute ankle injury within 72 h of presentation, bony tenderness, and inability to weight bear	Periosteal new bone formation	100
Simanovsky et al. 2005	P, C	5–13 y with initial 3-view radiography-negative acute ankle injury within 72 h of presentation and clinical suspicion of fracture	Periosteal new bone formation	100
Kan et al. 2009 <sup>e</sup>	R, C	1–18 y with initial radiography-negative acute ankle injury and focal bony tenderness and/or clinical evidence of joint effusion; without osteoarticular disease or multiple injuries	Ns	100
Sankar et al. 2008	R, C	1–15 y with initial 3-view radiography-negative acute ankle injury, open physis, and bony tenderness over distal fibula	Periosteal new bone formation	100

Study design: P: prospective, R: retrospective, C: consecutive

Ns: not specified.

<sup>a</sup> Of the patients with radiograph-negative acute joint injury included in the study (n=24), only those with acute ankle injury (n=10) were included in the review.

<sup>b</sup> Of the patients with radiograph-negative acute ankle injury included in the study (n=30), only those with clinical suspicion of fracture (n=20) were included in the review.

<sup>c</sup> Of the patients with radiograph-negative acute ankle injury included in the study (n=102), only those with acute ankle injury (n=10) were included in the review.

<sup>d</sup> Of the patients with radiograph-negative acute wrist or ankle injury included in the study (n=58), only those with acute ankle injury (n=41) were included in the review.

<sup>e</sup> Of the patients with radiograph-negative appendicular trauma included in the study (n=204), only those with acute ankle injury (n=21) were included in the review.