

NORDICFORUM www.nordictraumarad.com
TRAUMA & EMERGENCY RADIOLOGY

Session 4: Imaging of Abuse

Elder Abuse

Nordter, Aarhus (DK)

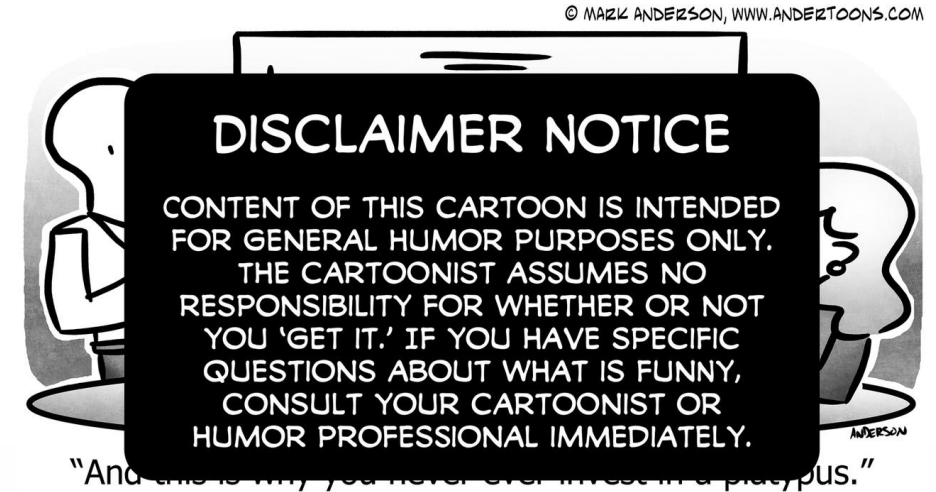
May 8th 2023



Disclosure

Consultant & Speaker - GE Healthcare

Disclaimer



All radiographic images are images of patients from our institute, except 1

None of them have been proven to be the result of elder abuse, none of them have been proven not to be the result of elder abuse

We recognize the lack of attention to the prevention of elder abuse among our physicians and radiologists

Elder abuse: Learning objectives

- 1) Raising awareness of the realities surrounding elder abuse
- 2) Addressing possible clinical and radiological signs
- 3) Diagnostic limitations and opportunities in the suspicion of elder abuse

Raising awareness of the realities surrounding elder abuse



Raising awareness

Elder abuse: “an intentional act, failure to act, by a caregiver or another person in relationship involving an expectation trust that causes or creates a risk of harm to an older adult, defined as someone aged 60 or older”

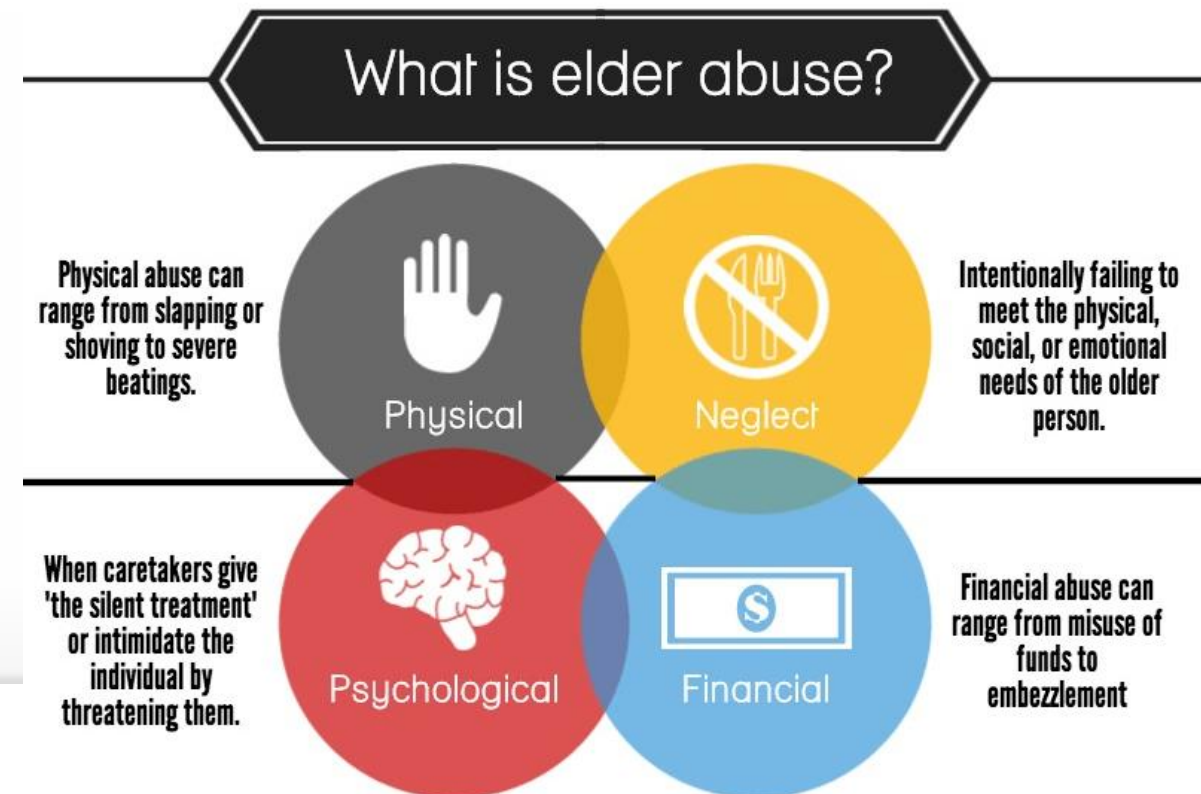
Physical

Verbal / psychological

Sexual

Financial exploitation

Neglect



Raising awareness

Victims:

worsened quality of life

higher mortality

higher incidence of chronic conditions (depression, dementia)



Raising awareness

Prevalence

~10% of community-dwelling older adults

higher in institutional environments

underdetection + under-reporting

2 – 18,4% reported in ED, depending on country

underestimation in cognitively impaired patients

Raising awareness

Risk-factors: familial culture of violence

social isolation

dementia

depression

dependence on caregiver

shared living arrangements

financial stress

abusers with mental health issues / drugs abuse / dependence on victim



Raising awareness

Underreporting:

<1 in 24 cases is detected and reported

lack of disclosure by victims:

cognitive or sensory impairment

fear of isolation from caregiver

personal / familial shame

reprisal fear

stoicism

being perceived as ungrateful

Raising awareness

Healthcare practitioner: victims only contact outside caregiving environment

most US States and Canada have mandatory reporting obligations

But underreporting due to: ageism

lack of training in geriatric health

lack of systematic screening practices

lack of knowledge of reporting mandates

fear of straining the patient-physician relationship

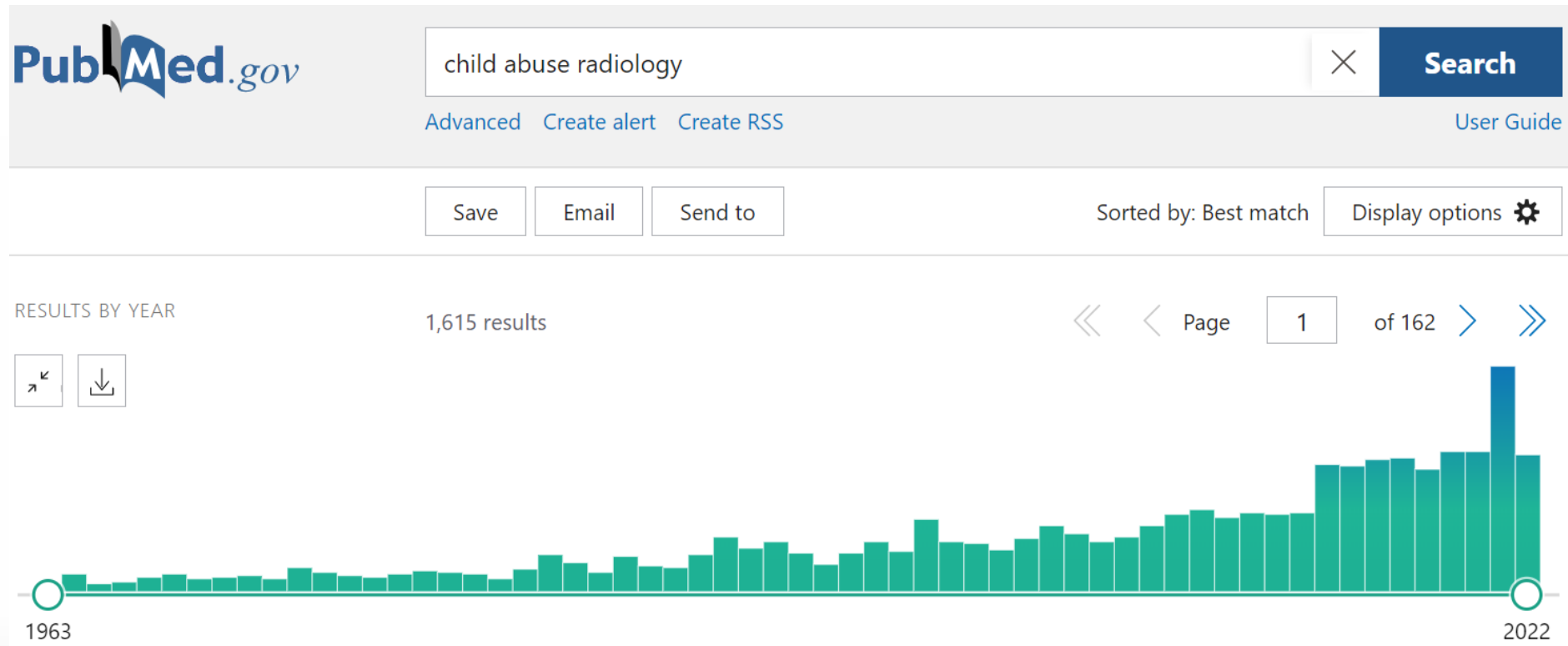
time limitations

uncertainty of diagnostic validity



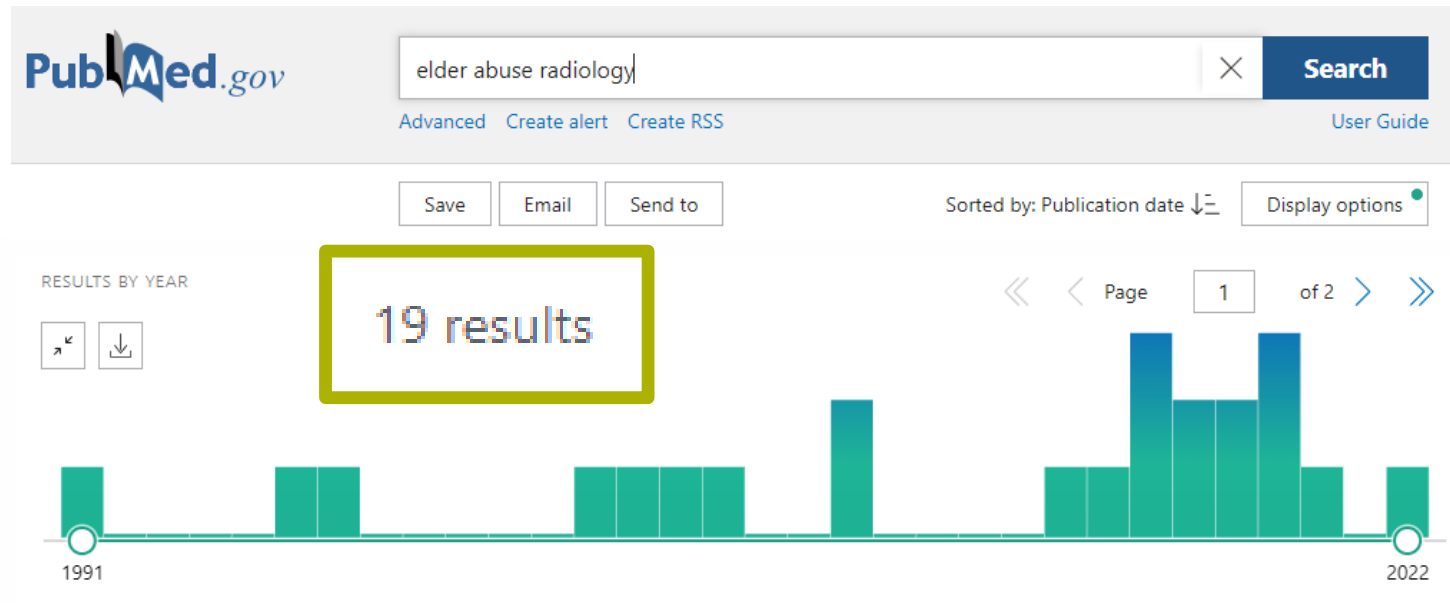
Raising awareness

Only first described in the '70's (long after child abuse and IPV)



Raising awareness

Only first described in the '70's (long after child abuse and IPV)



1° Radiological appearance: Murphy et al. 2013 (!): Large gap identifying and reporting elder abuse

Most recent: "Nonaccidental Injury in the Elderly: What Radiologists need to know" Radiographics 2022

Literature:

Elder Abuse.

A literature review of findings in physical elder abuse.

Imaging of violence against the elderly and the women.

Radiologists' training, experience, and attitudes about elder abuse detection.

Imaging findings in Elder Abuse: A role for radiologists in detection.

A new role for imaging in the diagnosis of physical elder abuse: results of a qualitative study with radiologists and frontline providers.

Can diagnostic imaging help improve elder abuse detection?

Nonaccidental Injury in the Elderly: What Radiologists need to know

Lachs and Pillemer.

Murphy, Waa, Chan et al.

Russo, Reginelli, Giovine et al.

Rosen, Bloemen, Lachs et al.

Wong, Rosen, Lachs et al.

Lee, Rosen, Sagar et al.

Rohringer, Rosen, Murphy et al.

Badawy, Solomon, Elsayes et al.

N Engl J Med, 2015;373:1947-56

Can Ass Radiol J, 2013;64:10-14

Semin Ultrasound CT MRI, 2018;40:18-24

AJR, 2016;207:2010-14

Can Assoc Radiol, J 2017;68(1):16-20

J Elder Abuse Negl, 2019;31(2):163-80

BJR, 2020;93(1110)

Radiographics **(2022)**



Gerrit Dou
Old Woman Reading a Book ~1660

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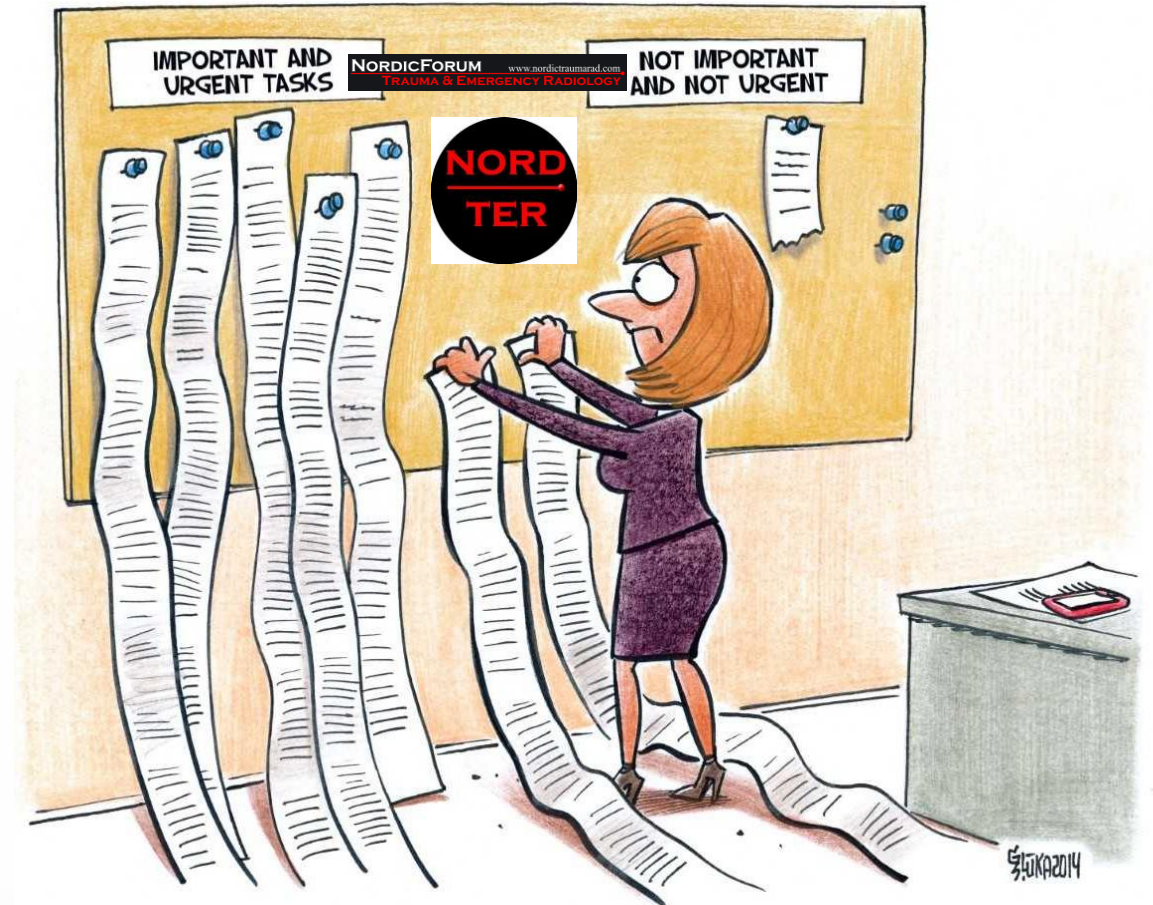
Raising awareness

Radiologists: limited contribution!

Lack of training

Lack of knowledge about imaging correlates

Gaps in inter-team clinical communication between physicians and radiologists



CartoonStock.com

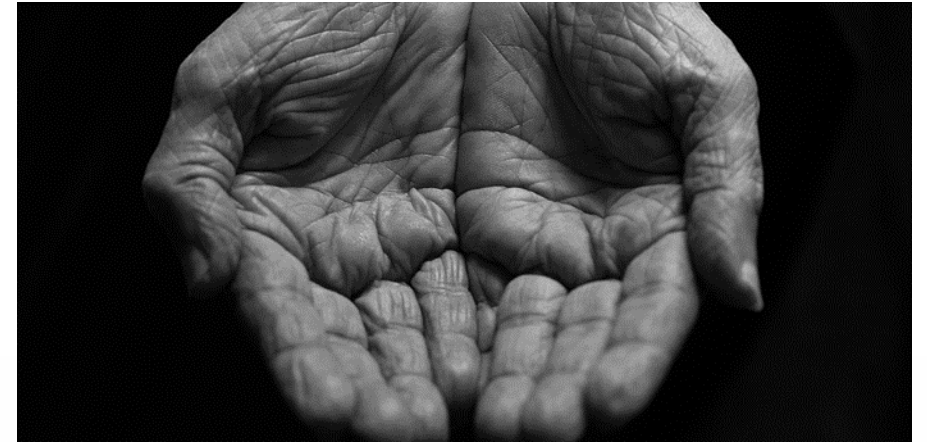
Addressing possible clinical signs of elder abuse

Clinical signs

Physical abuse:

- Manifestations:
- Abrasions
 - Lacerations
 - Bruises
 - Fractures
 - Use of restraints
 - Burns
 - Pain
 - Depression
 - Delirium w/wo worsening of dementia or related behavioral problems

Important clinical input



Lachs et al. N Engl J Med 2015;373:1947-56

Clinical signs

Injuries result from trauma mechanisms:

beating with fists (or other physical assaults)
striking with (household) objects

Injuries locations:

upper extremities (44% - 45%)
maxillofacial - dental – neck (22,9% - 42%)
skull – brain (12,3%)
lower extremities (10,6% - 32%)
torso (10,3%)
open wounds (66,1%)
internal injuries (24,4%) (often pelvic related: bladder / ureter)

Important clinical input

Check for bruises on chest, internal injuries and upper extremity dislocation

Murphy et al. Can Assoc Radiol J 2013;64:10-14
Rosen et al. J Emerg Med 2016;50:518-26

Addressing possible radiological signs of elder abuse

Radiological signs

Trained to detect injury patterns in child abuse

Detection of pathognomonic injury patterns in elderly abuse are more challenging

age related changes

co-morbidities: osteoporosis

drugs: anticoagulants / corticosteroids

Radiological signs

Russo et al. Semin Ultrasound CT MR 2019;40:18-24
Wong et al. Can Assoc Radiol J 2017;68:16-20
Chen et al. J Am Acad Otrthop Surg 2002;10:25-31
Rosen et al. AJR Am J Roentgenol 2016;207:1210-4

Same indications for abuse as in children :

Certain combinations of clinically visible injuries with injuries visualized on diagnostic imaging

Request analysis: inconsistencies between reported history and injury pattern

Multiple injuries at various stages of healing

Misalignment after healing

Multiple injuries at various timepoints

But difficult in severe osteoporosis with multiple fragility fractures

Radiological signs

Certain combinations of clinically visible injuries with injuries visualized on diagnostic imaging

Upper extremity fractures (with bruising on the ulnar forearm): ulnar diaphysis fractures

Maxillofacial fractures (midface and zygomatic fractures (left > right))

Posterior rib fractures (in combination with posterior torso bruising)

High energy trauma patterns:

Upper rib fractures

Anterior sternoclavicular dislocations after posterior shoulder rotation

Radiological signs

Upper extremity fractures (with bruising on the ulnar forearm):

Ulnar diaphysis fractures

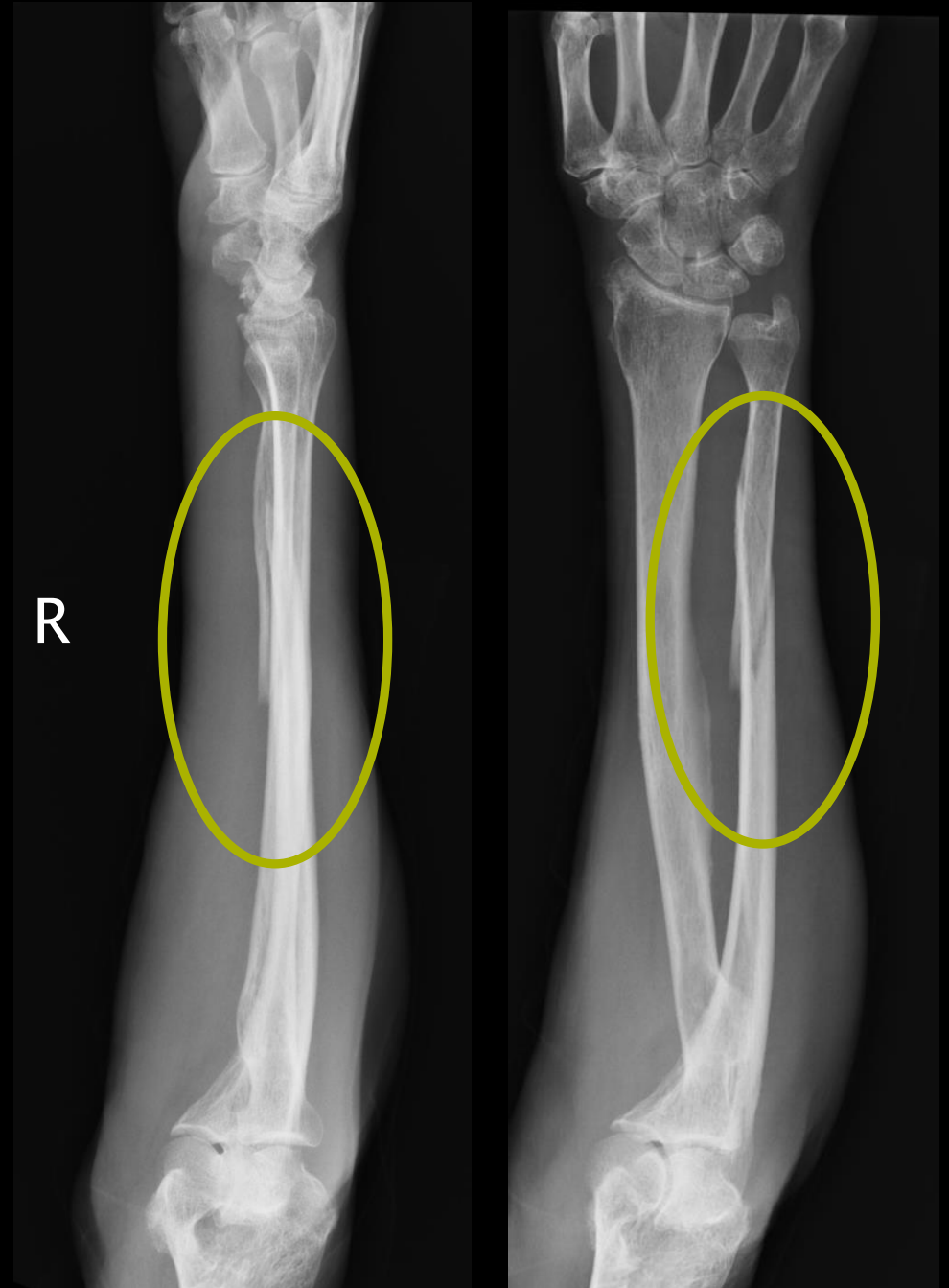
Self defence mechanism

Also seen in IPV:

Recognizing Isolated Ulnar Fracture as a Potential Marker for Intimate Partner Violence

B. Khurana et al. J Am Coll Radiol. 2021 Aug;18(8):1108-1117

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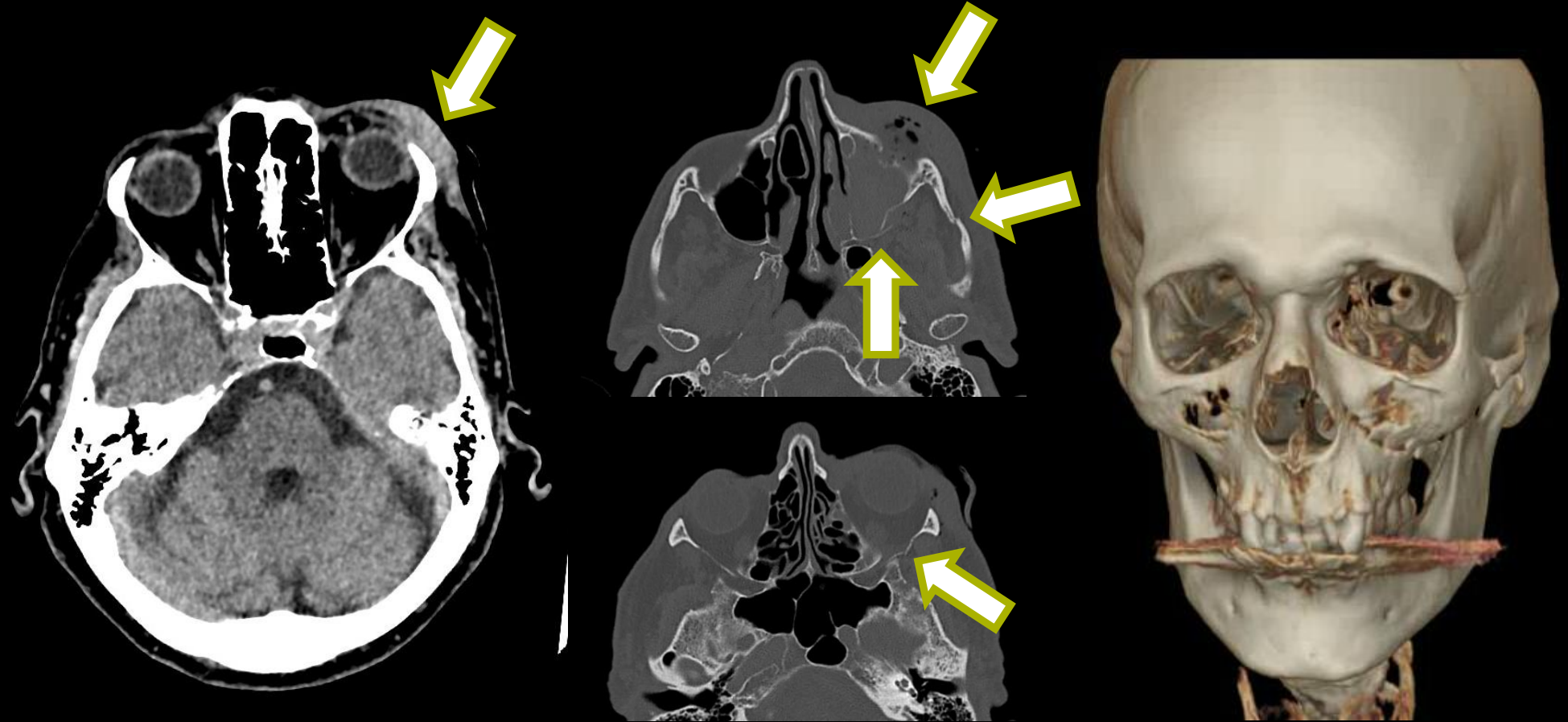


Radiological signs

Maxillofacial fractures (midface and zygomatic fractures (left > right))

M 85y

Fall

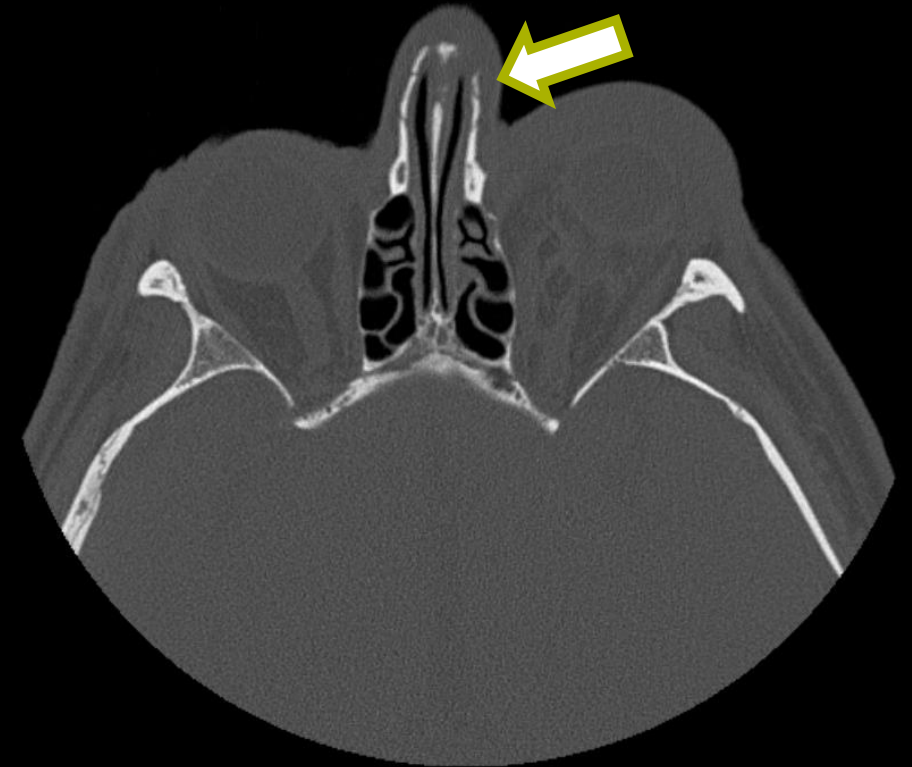
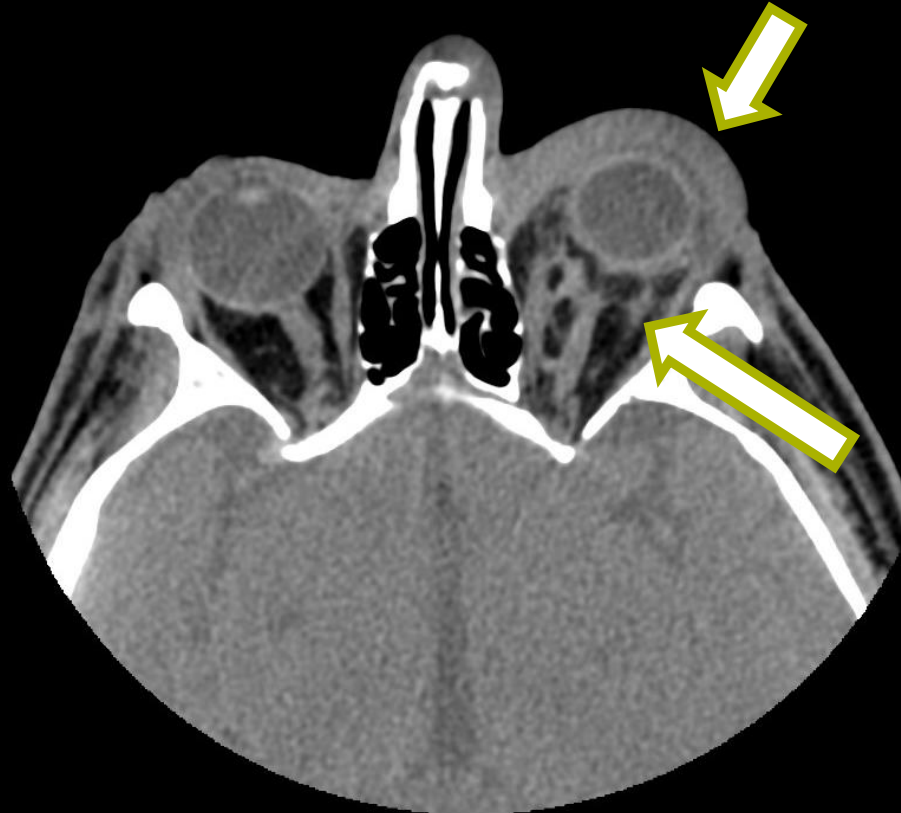


Radiological signs

Maxillofacial fractures (midface and zygomatic fractures (left > right))

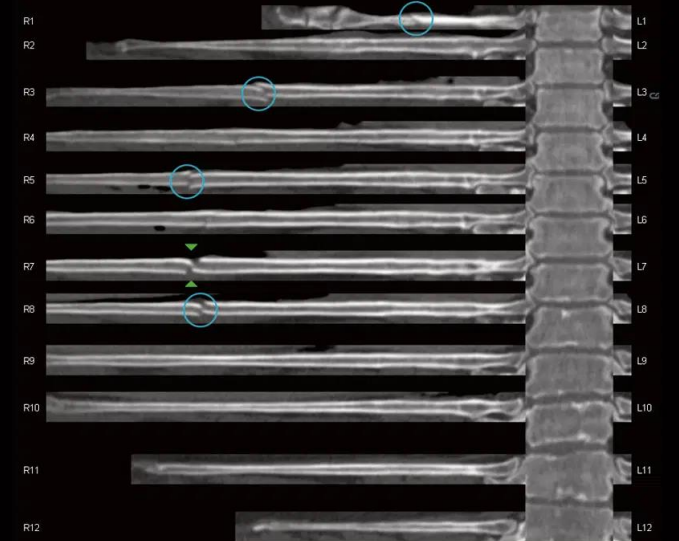
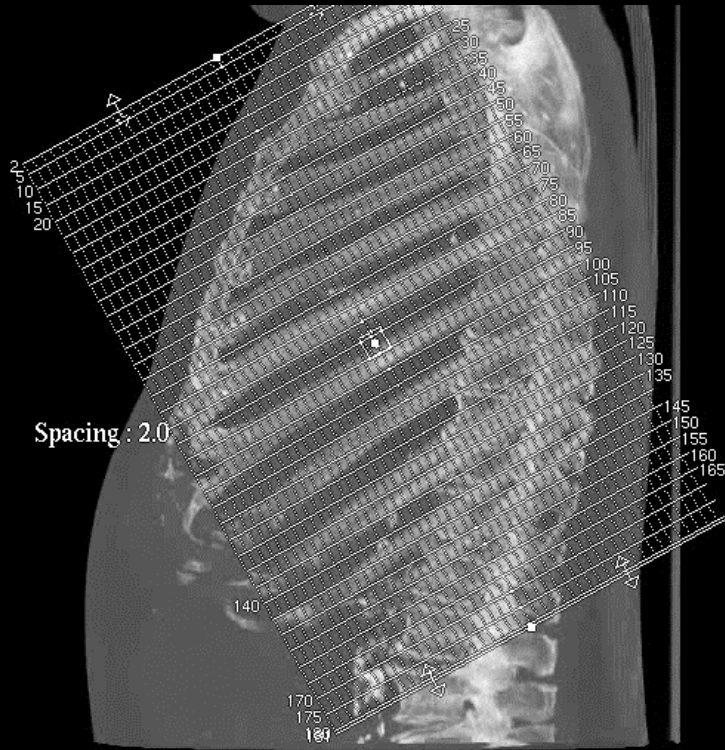
F 70y

Fall



Radiological signs

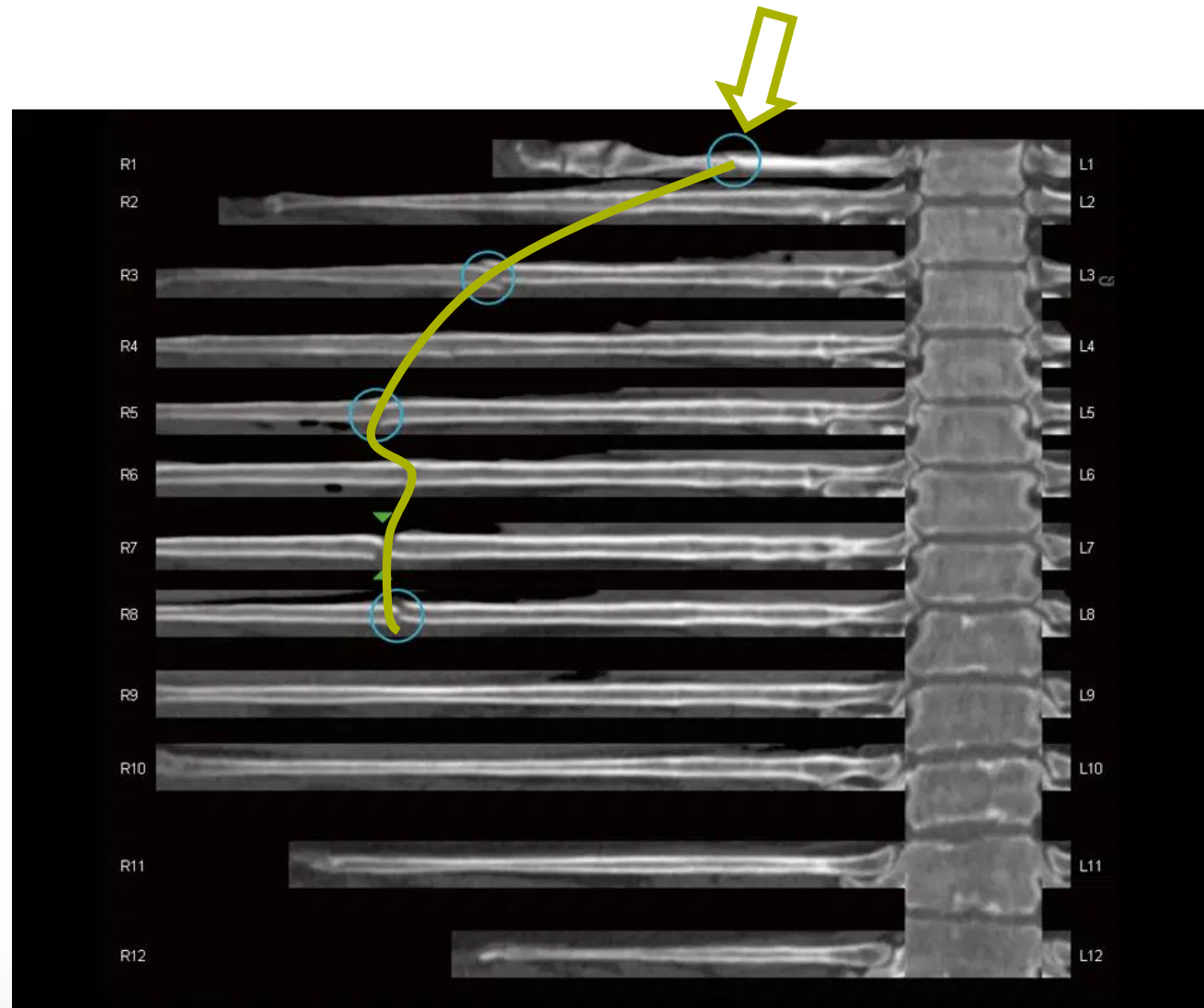
Posterior rib fractures (in combination with posterior torso bruising)



Radiological signs

High energy trauma patterns:

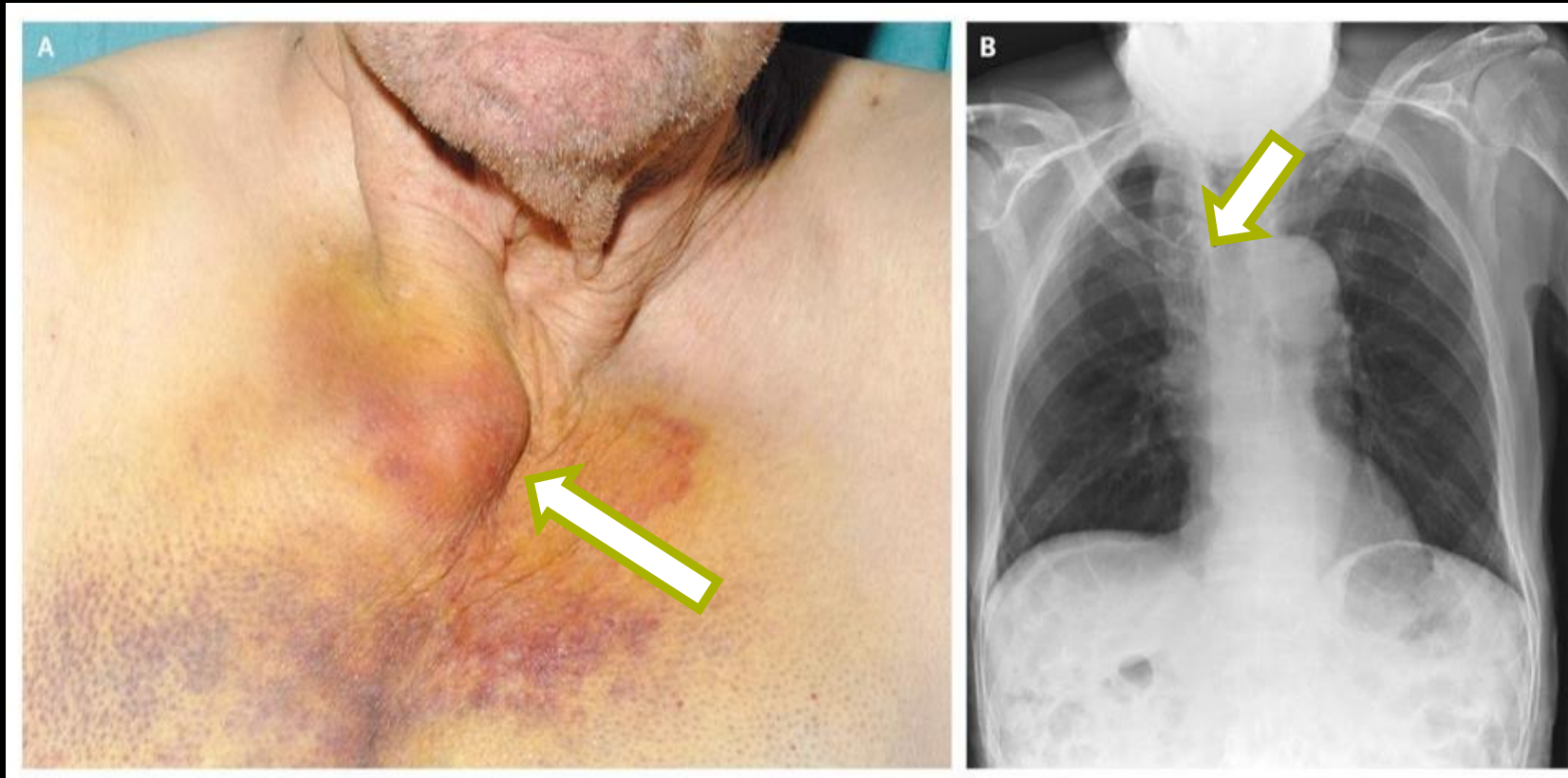
Upper rib fractures



Radiological signs

Anterior sternoclavicular dislocations after posterior shoulder rotation

N Engl J Med 2009; 361:e53



M 83y fallen in home

Anterior sternoclavicular dislocations often result from an indirect force to the shoulder, rotating the shoulder posteriorly. The physician must always consider the possibility of abuse having caused this type of injury.

Radiological signs

Request analysis: inconsistencies between reported history and injury pattern

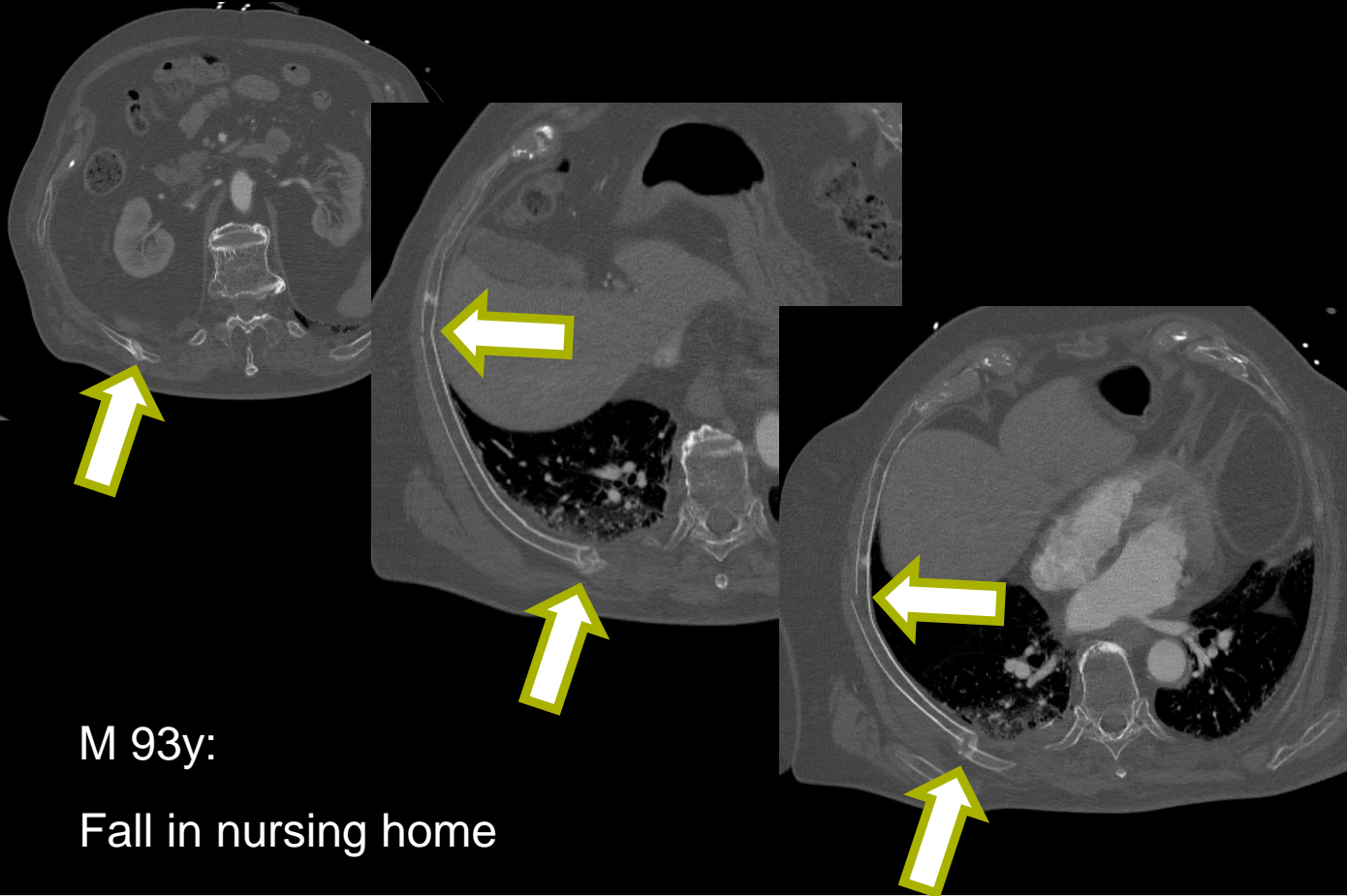
M 76y:

Clinical information: fall out of chair on chest



Radiological signs

Multiple injuries at various stages of healing



M 93y:

Fall in nursing home



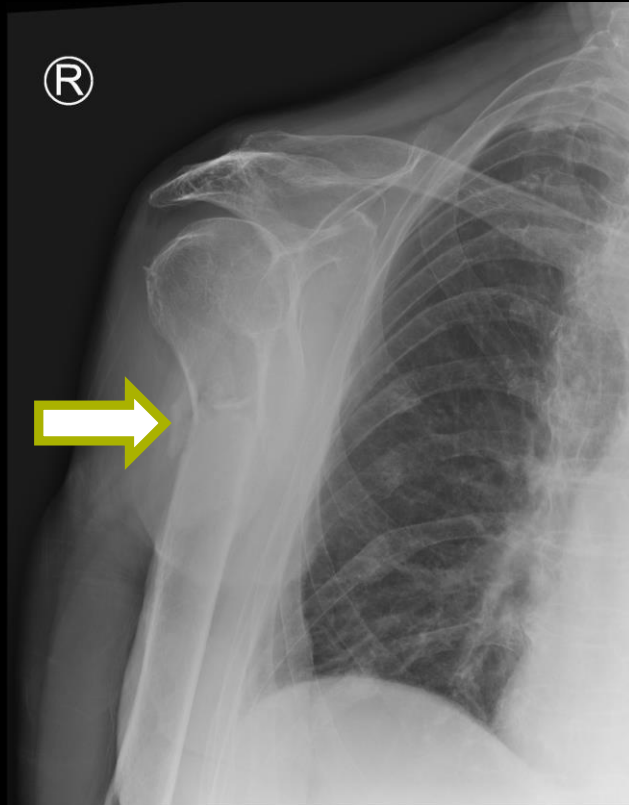
Radiological signs

Misalignment after healing

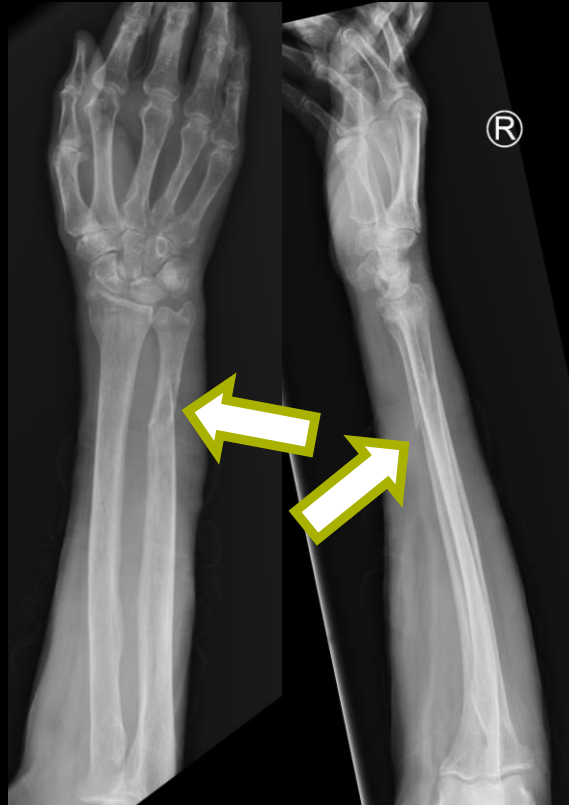


Radiological signs

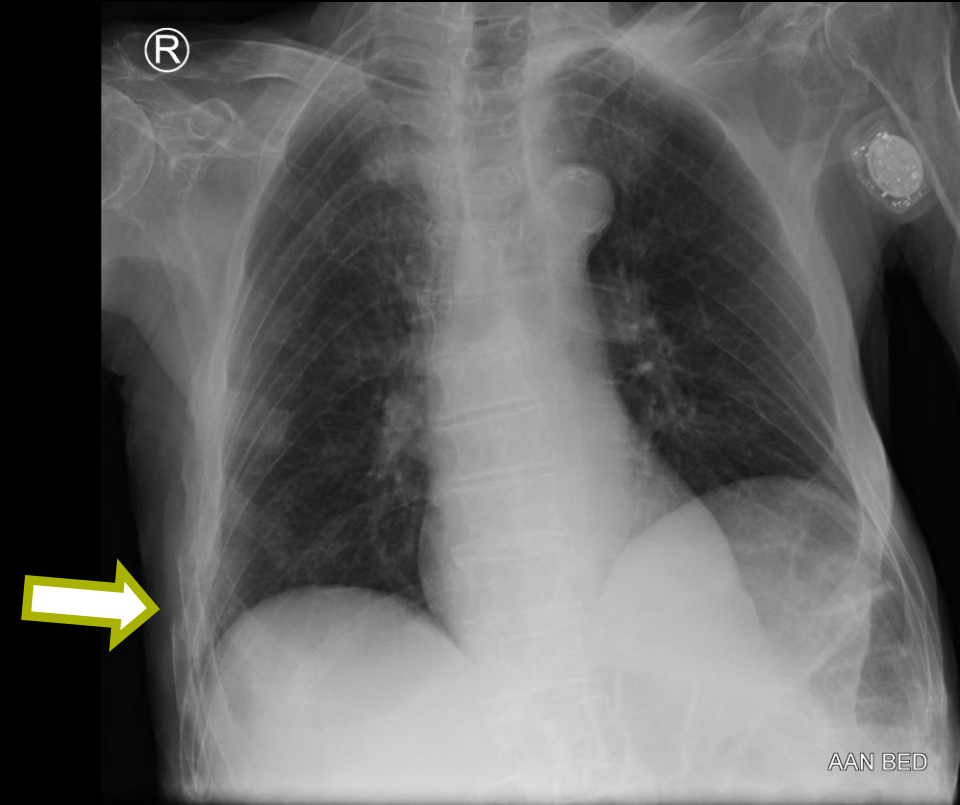
Multiple injuries at various timepoints



2/2016



3/2017



8/2017

Diagnostic limitations and opportunities in the suspicion elder abuse

Diagnostic limitations and opportunities

Detection of pathognomonic injury patterns in elderly abuse are challenging

age related changes

medical history

co-morbidities: osteoporosis

drugs: anticoagulants / corticosteroids

Diagnostic limitations and opportunities

From the **clinicians** perspective: in the case of trauma in the elderly

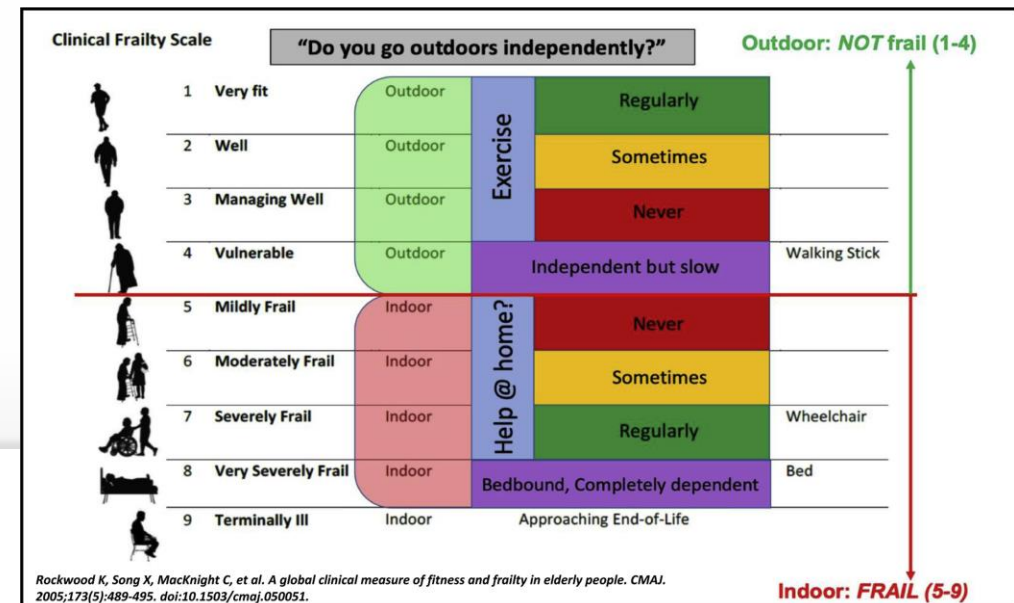
Provide the radiologists information:

functional / ambulatory status (clinical frailty scale)

relevant medication

relevant co-morbidities

good recent clinical history



Diagnostic limitations and opportunities

From the **radiologists** perspective: in the case of trauma in the elderly

Pay attention to the clinicians' information:

functional / ambulatory status (clinical frailty scale)

relevant medication

relevant co-morbidities

correlate between clinical history and the imaged trauma mechanism

Diagnostic limitations and opportunities

From the **general perspective**: in the case of trauma in the elderly

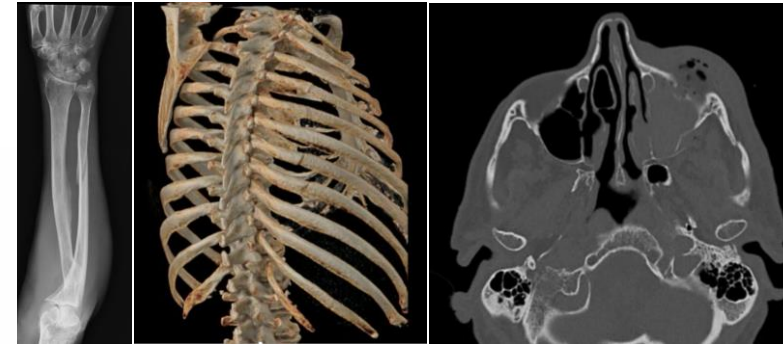
- ⇒ Better communication between clinicians and radiologists in elderly trauma
- ⇒ Provide education and discussion for clinicians and radiologists to detect intentional trauma
- ⇒ Train Rad technologists to recognize elder abuse (unique position!)
- ⇒ Additional large studies to raise awareness and validate imaging signs for elder abuse
- ⇒ Development of AI tools to help detecting elder abuse

Conclusions

Raise awareness around elder abuse

Highly suggestive imaging signs:

ulnar fractures
posterior rib fractures
facial bone fractures



Training and communication

Involvement of Rad Technologists (unique position!)

Need for large scale imaging validation studies





Thank you for your attention

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