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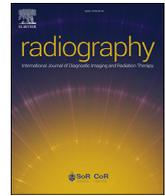
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Imaging of the adjacent upper limb: Outcomes and diagnostic yield

D. Abu Awwad*, E. Ekpo

Discipline of Medical Imaging Sciences, The University of Sydney, Susan Wakil Health Building, Camperdown, Sydney, Australia



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ABSTRACT

Introduction: Injuries to extremities are a common presentation to emergency departments and may be associated with multiple abnormalities. Patients may be referred for X-ray imaging of multiple adjacent regions, but the diagnostic outcomes of these X-ray examinations have not been fully explored. The aim of this study was to assess the diagnostic efficacy of X-ray examinations of adjacent body regions in the upper limb.

Methods: Upper limb X-rays examinations performed over six months were collected from two hospitals, and all patients who had adjacent regions X-rayed were included. Using the radiology reports as a reference standard, the diagnostic yield of these additional adjacent X-ray examinations was assessed. Descriptive statistics and Pearson's Chi Square were used for data analysis.

Results: 591 patients had 1455 X-ray examinations, ranging from two to six X-ray requests. More than 80% of X-ray examinations were due to an injury, but less than 60% had symptoms mentioned in the clinical history. Overall, 39.1% of initial examinations reported a new finding but only 1.5% of all subsequent imaging had a new abnormality detected. Examinations with symptoms specified in the clinical history were more likely to detect new findings ($p < 0.001$).

Conclusion: Imaging is an essential diagnostic tool in medical settings, but all radiographic tests should be justified, and adjacent imaging has a low diagnostic yield, hence, all limbs should be carefully assessed individually to assess the need for imaging. Every request should be justified based on presentation and symptoms, particularly when multiple areas may be impacted.

Implications for practice: Radiographic imaging is easily accessible but adherence to guidelines and assessing the diagnostic yield of common examinations is important to ensure benefits to patients.

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Introduction

Radiographic imaging is an essential component of patient workup in every emergency department.¹ Australia has many radiology clinics and departments, which makes imaging tools easily accessible and increases the utility of imaging in medical practice; however, there is low accountability in the medical use of imaging.^{2,3} Reasons for increased X-ray imaging include fear of litigation or malpractice, limited resources to aid decision making, limited training in evidence-based practice, and the need for certainty.² Diagnostic imaging is beneficial to increase clinician's certainty by confirming the presence or absence of disease.⁴ However, the need for reassurance is leading to multiple testing with limited clinical value, particularly for extremities.^{4,5} A qualitative study

demonstrated that 85% of participants believed that emergency department physicians order more diagnostic tests than may be necessary including medical imaging.² In 2021, there were almost 11 million X-rays performed in Australia, 3.7 million of which were for distal extremities, accounting for 34% of all X-rays performed.⁶ This constituted regions from the hand to the elbow and the foot to the knee.⁶ Including the shoulder and hip, which are proximal extremities as they are closer to the centre of the body, extremities overall constituted 54% of all X-rays performed.⁶

Adjacent imaging for distal forearm fractures is estimated to cost the US economy \$3.6 million.⁷ Patients referred to imaging may have multiple regions requested for X-rays, and this is sometimes necessary as some injuries cause a contrecoup effect.⁸ This is mostly observed in the forearm where fractures or dislocations may occur in both the distal and proximal aspect of the forearm in Monteggia and Galeazzi injuries.¹ Hence, it is recommended to X-ray both wrist and elbow joints when a radius or ulna shaft fracture is present.¹ However, multiple paediatric studies only focused on

* Corresponding author.

E-mail addresses: дания.abuawwad@sydney.edu.au (D. Abu Awwad), ernest.ekpo@sydney.edu.au (E. Ekpo).

forearm fractures and questioned imaging of the adjacent limb regions.^{5,8,9} To maximise the use of healthcare resources, it is important that examinations have diagnostic impact, and are associated with low radiation dose.^{5,10}

In Australia, more than 500,000 X-rays of extremities were billed as pairs for adjacent body parts.⁶ This estimate does not consider imaging requests where each limb was requested separately; thus, the number of X-ray examinations performed on the adjacent unaffected limb may be higher than estimated. There are limited studies focusing on adjacent imaging of other upper extremity regions. Radiographic imaging of the wrist and forearm have been the focus of the few studies that have assessed the diagnostic outcomes of X-ray examinations of the adjacent limb, albeit more adjacent limbs are also requested for injured patients.⁶ Therefore, the diagnostic yield of X-rays performed on adjacent limbs and its impact on patient management is unclear. Thus, this study aims to assess the diagnostic efficacy of X-ray imaging of multiple and adjacent regions in the upper limbs. It also examines the relationship between different patient presentations and radiographic findings so that this can be used to inform imaging of the adjacent limb.

Methods

Data from all upper limb X-ray examinations performed between 01.07.2021 and 31.12.2021 were extracted from two hospitals and collated into a spreadsheet. These examinations included digital X-rays of the hand, wrist, forearm, elbow, humerus, and shoulder. These X-rays examinations were screened to identify those performed for adjacent limbs. Only adult X-ray examinations that were performed for adjacent limbs at the same time or within 24 h were included in this study. Each examination was reviewed and information such as the requested body region, clinical history, radiology report, and time of examination were collected. Ethics approval was obtained from the University of Sydney's Human Research Ethics Committee (2022/ETH01291).

X-ray examinations performed for chronic diseases or pre-op imaging were excluded. If two upper limb regions were requested at separate times, the X-ray requested first was deemed to be the 'initial examination', while the examination performed later, on the same limb but in a region distal or proximal to the region of injury, was considered the 'adjacent examination'. If the X-ray examinations were requested at the same time, the clinical history was used to determine which region demonstrated clinical symptoms and was allocated as the 'initial examination'. For example, if a patient had a clinical history of wrist pain but a wrist and elbow X-ray were requested within the same request form, the wrist was deemed to be the 'initial examination'.

For each request, the clinical history was used to identify the presentation or reason for imaging and the symptoms for the body part. For example, if the clinical history stated that the patient had a fall and has wrist pain, but X-ray examinations of the wrist and forearm were requested, fall was considered the presentation or reason for imaging for both wrist and forearm, but forearm had no specific symptom specified. At the same time, if the request form stated injury to wrist and forearm, injury was considered both the presentation and symptom. The categorisation of both symptoms and rationale for imaging were checked at multiple steps of the analysis.

For symptoms, each requested region was categorised as either having specified or unspecified symptoms. The presentation or mechanism of injury was grouped into five categories (Table 1). Previous examinations denoted regions that were requested on the basis that an adjacent region had no or new findings. For example, if the patient had a forearm X-ray request because they had a distal

forearm or wrist fracture, this was considered a known fracture and categorised under 'previous examinations'. Post-reduction requests were excluded if they were of the same region; however, if the forearm was requested for a wrist post-reduction, then this was still considered an adjacent region because the inclusion of the elbow joint still needs to be justified.

All requested projections in a series were checked for findings. Using the radiology reports, cases were categorised into four categories: No Finding, Other Finding, Suspicious Finding, New Finding. If there was a New Finding on the initial examination and the same injury was seen on the adjacent X-ray, this was deemed as 'No New Finding'. Table 2 illustrates the grouping of images according to radiologists' report categories and the definition of subcategories.

Descriptive and inferential statistics were used to analyse the data. Comparisons were made between the regions requested, presence of symptoms, and report findings using Pearson's Chi Square. Suspicious finding results were combined with new findings as they would require similar management to new findings. We calculated diagnostic yield (detection rate) as the ratio of the number of adjacent X-rays which demonstrated new findings and the total number of adjacent X-rays performed. The p-value was set to 0.05 and the Statistical Package for the Social Sciences (SPSS) version 28 was used for analysis.

Results

A total of 1455 X-ray examinations were completed for 591 patients/cases, accounting to an average of 2.5 X-rays per patient. This resulted to 591 initial examinations and 864 subsequent examinations for six upper limb regions. Overall, 401 patients (67.9%) had two requested regions, and 190 patients (32.1%) had three or more imaging requests (Fig. 1). Of the total number of patients with multiple upper limb X-rays, 39.4% (n = 233) demonstrated at least one new finding (previously undetected abnormality), 2.9% (n = 17) had suspicious findings, and 30.6% (n = 181) demonstrated other findings. About 27.1% (n = 160) of patients had no detected abnormality (no findings) for any of their requested projections.

Fig. 2 shows the results of the initial and subsequent examinations for all 591 patients. Looking at the data per imaging request, only 244 of the 1455 requested X-rays had a new finding, leading to a diagnostic yield of 16.8%. These 244 abnormalities consisted of fractures (n = 218), dislocations (n = 17), foreign bodies (n=3), ligament injuries (n = 3), or fracture dislocations (n = 3). Of these, 94.7% (n = 231/244) were detected on the initial X-ray examination. An additional 1.3% (n = 19/1455) of the total requests demonstrated a suspicious finding. These suspicious findings were either suspected fractures (n = 17) or displacement (n = 2). About 63.5% (n = 924/1455) of the requested X-rays demonstrated no abnormality and 18.4% (n = 268/1455) demonstrated other incidental abnormalities such as osteoarthritis (n = 107) or previously detected abnormalities (n = 60). Overall, 39.1% (n = 231/591) of initial examinations reported a new finding but the diagnostic yield or detection rate of subsequent imaging of adjacent regions was 1.5% (n = 13/864). Fig. 3 shows the diagnostic outcomes for initial requests and subsequent X-ray requests. The differences in detection rates were significantly higher in initial examinations than subsequent adjacent examinations ($\chi^2(2) = 498.981$; $p < 0.001$).

Thirteen patients had a new finding on subsequent imaging. Ten patients were females over 60 years old, one male over 80, and two males less than 30 years old. Eleven patients had a secondary abnormal finding while two had no abnormal finding on the initial X-ray but had a new finding on the second X-ray taken. Both these patients were female, and one patient had a shoulder X-ray with no abnormal finding, and returned for elbow and wrist X-rays which

Table 1
Clinical history categories.

Clinical History Categories	Comments or Examples
Injury	Fall, FOOSH, trauma, injury, item fell
Symptomatic	Pain, atraumatic pain, discomfort, tenderness
Soft Tissue Presentation	Bite, bruise, laceration, abrasions, swelling, oedema, deformity, foreign body
Previous Examinations	No abnormality detected on previous or adjacent image, known fracture or injury, known fracture in other area, progress, post reduction
Unspecified	No reason given

Table 2
Radiological report categories.

Report Findings	Subcategories	Comments or Examples
No Finding	No Finding	No finding found on X-ray
	No New Finding	No new finding was found compared to the initial X-ray examination
Other Findings	Osteoarthritis	–
	Effusion or Swelling	Effusion, swelling, or oedema
	Old or Known Injury	Old injury noted or known injury with follow-up or progress
	Other Degenerative Changes	Rotator cuff injury, degenerative changes, bursitis, arthropathy, chondrocalcinosis, calcification, ankylosis, spurs
	Tumours	Cyst, benign lesion, bone island
	Other Findings	Soft tissue cuts, laceration, ulnolunate abutment, stroke hand contracture
Suspicious Findings	Suspected Fracture	A fracture is suspected
	Suspected Displacement	Displacement or dislocation is suspected
New Finding	Fracture	–
	Dislocation	Includes displacement and subluxation
	Fracture and Dislocation	–
	Foreign Body	–
	Ligament injury	–

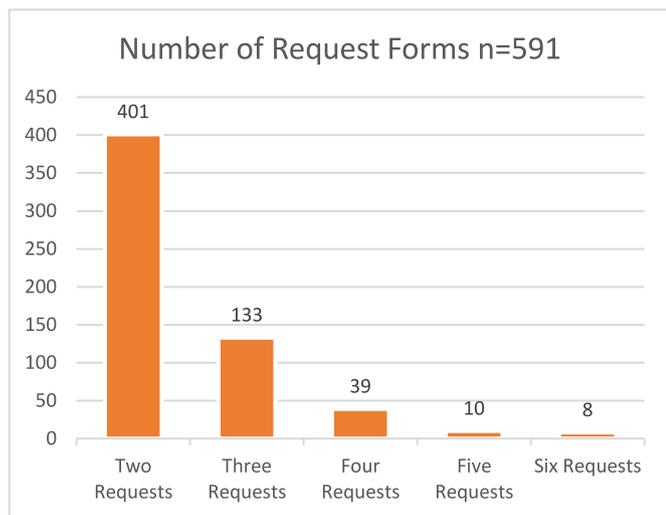


Figure 1. Number of requested upper limb X-rays per patient (n = 591).

detected a distal radius fracture. The second patient had an elbow X-ray and returned for shoulder and humerus X-rays which detected a humeral head fracture. Among the other eleven patients, five had injuries to the hand with wrist or distal forearm injuries. Five others had a shoulder injury with secondary injuries detected in the elbow, wrist, or hand. One patient had a forearm X-ray which detected a radial head fracture and returned for dedicated elbow X-rays and a coronoid fracture was found.

Of the 591 patients who received imaging of the adjacent limb, 91.5% were requested at the same time. Only 8.5% (n = 50) requests required the patient to return to the imaging department, of which five patients demonstrated a new finding. Half of these patients (52%, n = 26/50) had a new finding initially and came back for

further x-rays. A total of 139 x-rays were performed for these 50 patients, 64 of which were taken subsequently after an average of 2.6 h. The majority of these subsequent X-rays had no finding (76.7%, n = 49/64) or other findings (15.6%, n = 10/64).

Hand and wrist X-rays constituted half of the requested upper limb regions. New abnormalities were more commonly detected in the wrist (41.0%, n = 100/244), shoulder (20.5%, n = 50/244), and hand (16.8%, n = 41/244). Proportionally, the wrist, shoulder, and elbow represented regions where imaging was more likely to detect an abnormality while imaging, performed for the forearm and humerus was more likely to have no findings or no new findings. This difference between region requested and imaging outcomes was statistically significant ($\chi^2(10) = 146.161$; $p < 0.001$). Fig. 4 shows the number of requests per region (inner circle) compared to the number of requests that have found a new finding for each region (outer circle).

The reasons for imaging were categorised into injury, symptomatic, soft tissue presentation, or previous examinations. Table 3 shows the reason for imaging per report findings. Most requested X-rays were due to an injury (81.8%, n = 1190/1455), 18.7% (n = 222/1190) of which resulted in a new finding on X-ray imaging. Only one of the 69 (1.4%) soft tissue presentations had a new pathology detected.

Fig. 5 shows the report results of all requests with and without specified symptoms. While most requests had information on the reason for the patient presentation and imaging, 42.5% (n = 618/1455) of requests had no symptoms mentioned for the requested region. Most of the requests (74.1%, n = 458/618) with no symptoms specified in the clinical history demonstrated no abnormality (no findings) on imaging. Of the request forms with no findings, there were an equal number of request forms with specified and unspecified symptoms. However, new findings and other findings were much more likely to have symptoms specified. Three-quarters of requests with new findings and two-thirds of requests with other findings had symptoms specified in the clinical history. This

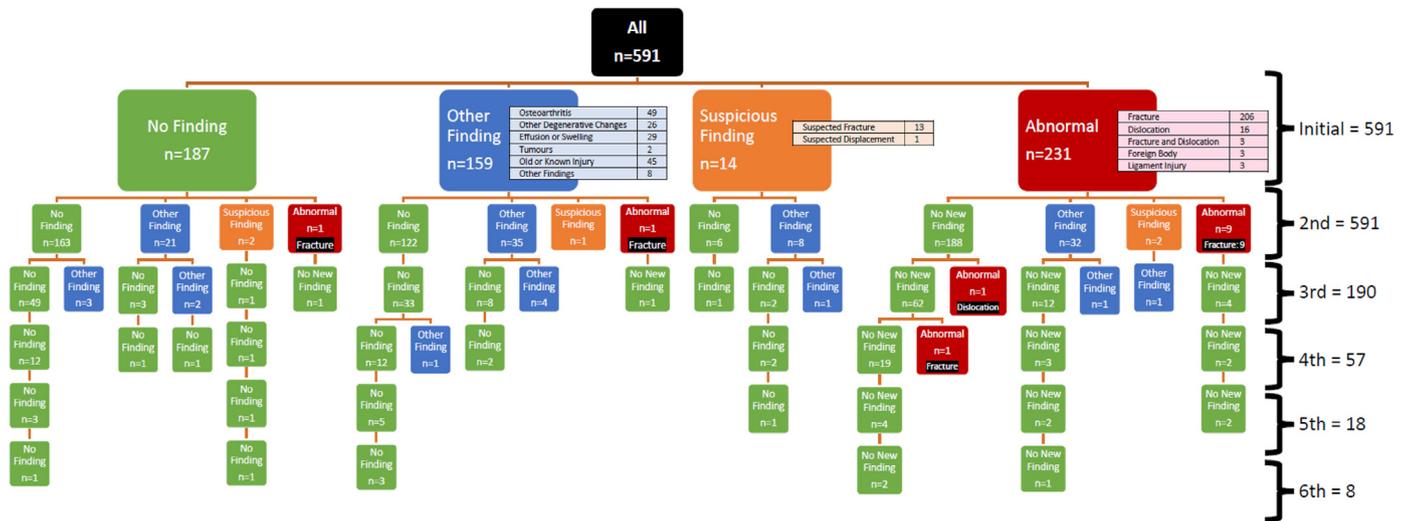


Figure 2. Flowchart of all the upper limb request forms.

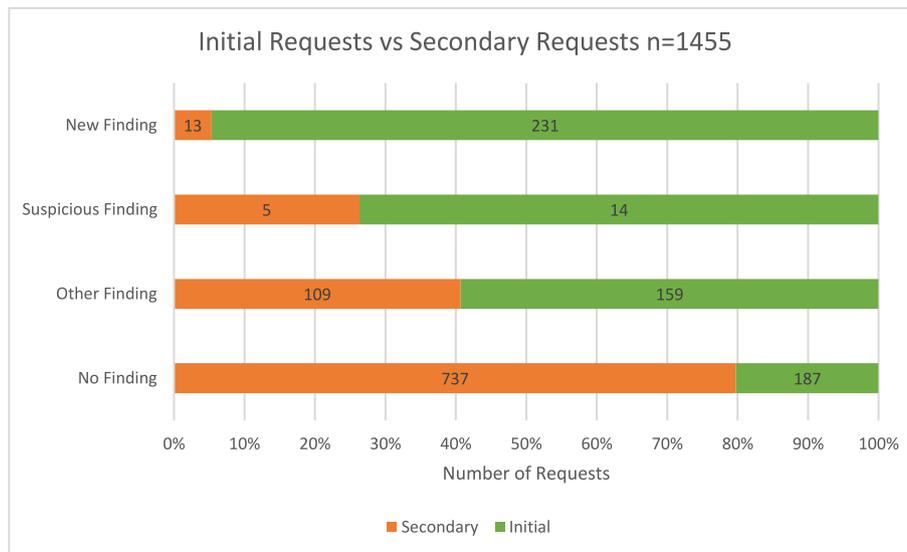


Figure 3. Radiological findings for initial requests (n = 591) versus subsequent X-ray requests (n = 864).

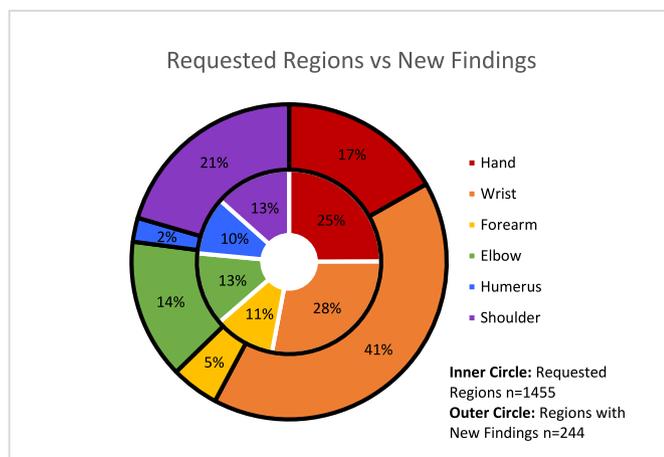


Figure 4. Upper limb regions examined relative to regions with new findings.

difference between the imaging outcomes and symptom information provided by the referring clinicians were statistically significant ($\chi^2(2) = 61.302, p < 0.001$).

The provision of information about patient symptoms varied across body regions ($\chi^2(5) = 57.321, p < 0.001$). Shoulders (73.3%, n = 143/195), elbows (69.5%, n = 130/187), and wrists (60.0%, n = 245/408) were more likely to have symptoms specified in the request forms in that order. Hands, forearms, and humeri had approximately 50% of requests with specified and unspecified symptoms.

Discussion

This study assessed the diagnostic yield of X-ray examinations of upper limb injuries for patients who had two or more X-rays of adjacent regions. Whilst a third of the sampled patients had three or more upper limb X-rays, most abnormalities detected were present in the initial X-rays. Imaging of adjacent regions was less likely to detect new (previously undetected) abnormalities for

Table 3
Distribution of radiological findings relative to the indications for imaging.

	New Finding	Suspicious Finding	Other Finding	No Finding	Total
Injury	222 (91.0%)	14 (73.7%)	193 (72.0%)	761 (82.4%)	1190 (81.8%)
Symptomatic	16 (6.6%)	4 (21.1%)	31 (11.6%)	81 (8.8%)	132 (9.1%)
Soft Tissue Presentation	1 (0.4%)	—	26 (9.7%)	42 (4.5%)	69 (4.7%)
Previous Examinations	4 (1.6%)	1 (5.3%)	18 (6.7%)	37 (4.0%)	60 (4.1%)
Unspecified	1 (0.4%)	—	—	3 (0.3%)	4 (0.3%)
Total	244	19	268	924	1455

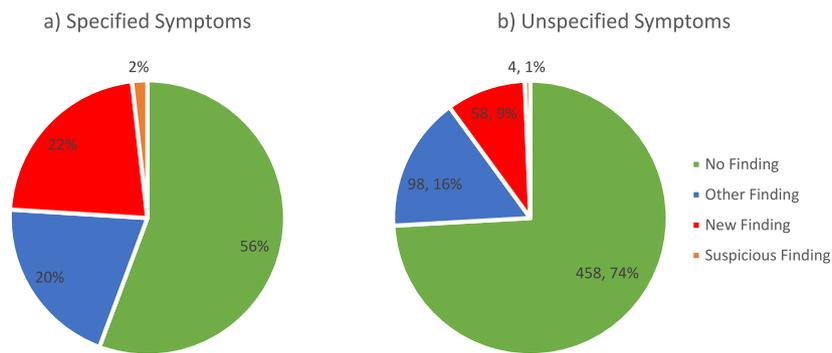


Figure 5. a) Specified (n = 837) and b) unspecified (n = 618) symptoms on requested region per report finding.

patients with upper limb injuries. Also, abnormalities were less likely to be demonstrated on imaging when information about the clinical symptom is not provided or unspecified by the referring physician. Overall, adjacent imaging demonstrated very low diagnostic yield, suggesting that such X-ray examinations have little or no clinical utility and can be considered inappropriate for clinical decision making and patient management.

It should be remembered that adjacent imaging are additional imaging tests that increase radiation dose and cost to patients and consume more hospital resources. Therefore, the diagnostic impact, cost-effectiveness, and dose should be considered when making requests for adjacent imaging. Another important aspect to consider is the difficulty of positioning a region if its adjacent limb is fractured. For example, elbow imaging often relies on shoulder and wrist movement.¹¹ If either the shoulder or wrist were fractured, adaptation of technique would be required for the elbow even if the patient had no symptoms in their elbow. This makes it a more difficult examination for the radiographers and often can lead to distorted images and takes more time to complete the examination and interpret the findings, limiting effective use of human resources.¹¹ Also, every additional imaging series increases patients' exposure to ionising radiation, thereby increasing their chances of developing radiation injury.¹² While doses from digital X-ray examinations may be minimal, repeated or multiple imaging increase the total dose to the patient.¹² The challenges faced by imaging personnel and the concern for patients' safety highlight the importance of ensuring that every X-ray request is justified to ensure that the benefits of imaging are accrued.

Good clinical practice involves the collection of adequate clinical information and physical assessment prior to requesting diagnostic tests. Clinical history and the findings from physical examinations

are often used to justify the need for an X-ray to maximise the benefits from imaging.¹² Therefore, it is important that request forms have adequate information about the region requested, the reason or injury, location of pain or other symptoms, and clinical question that should be answered.¹⁰ In our study, whilst the mechanism of injury was often provided in request forms, patients' symptoms were not always described in approximately half of the imaging requests for each region requested. Interestingly, the presence of symptoms or provision of information about a patient's symptom was associated with a positive diagnostic outcome. It is unclear whether this finding was due to patients' symptoms guiding the search to detect the abnormality or whether these symptoms were indicative of an underlying abnormality. Regardless, the findings emphasise the importance of patient symptoms for justifying imaging and underscore the need to avoid imaging of adjacent limbs when there are no symptoms or such information in request forms. Other studies have also reported limited information in request forms, or a lack of physical examinations being performed before imaging was requested.^{5,10,13} Another study reported that a third of advanced imaging requests were made by doctors without having seen the patient.¹³ These findings highlight poor justification practices and suggest that imaging should not replace clinical history taking and physical examinations.¹² This is essential particularly for patients who have multiple injuries and to determine which areas should be X-rayed with proper justification and optimisation.

Another important finding was the detection of incidental abnormalities such as osteoarthritis, which were not related to the indication for the imaging examination. A previous study has reported that imaging leads to the identification of incidental degenerative changes not related to the symptoms for which imaging was requested.³ Even though these findings would be

normal, age-related, or clinically insignificant, the results can cause stress in patients.³ Patients have reported higher satisfaction in their care when they received appropriate information about their condition or pain despite having no imaging performed.³ Multiple studies have found that both clinicians and patients overestimate the benefits of diagnostic tests and underestimate the harms associated with radiographic imaging.^{14–16} These findings emphasise the need to consider the benefits, risk of harm, and costs associated with X-ray examination when requesting imaging of adjacent limbs.

To ensure that imaging examinations have the desired diagnostic impact, evidence-based guidelines have been developed. These guidelines' recommendations for imaging are based on evidence of diagnostic impact, cost-effectiveness, and radiation dose. The Royal Australian and New Zealand College of Radiology Imaging Pathways used to guide imaging request in Australia identifies X-ray examinations as the initial imaging modality for musculoskeletal injuries¹⁷; however, it does not have recommendations regarding imaging of the adjacent limb regardless of whether a fracture is detected or suspected. Our findings that X-ray imaging of the adjacent limb has extremely low diagnostic yield provide further evidence to undermine the practice of subsequent imaging of adjacent limb of adult patients. Studies focusing on the wrist, forearm, and elbow of paediatrics population only reported secondary fractures in less than 5% of patients.^{5,7–9} These pieces of evidence reinforce the importance of utilising information from both clinical histories and physical examinations to determine if imaging is required and which areas should be radiologically examined.

This study has a few limitations. Firstly, data were collected retrospectively from the radiology information system, which was limited by the information provided by the doctors. Detailed clinical history and patient symptoms from patient notes in the hospital information systems were not collected; only information from the request forms was used. Hence, it was not possible to accurately determine whether patients had symptoms for each region with requested X-rays. Some request forms were vague and difficult to categorise, but consensus was achieved for those cases. It is important to note that this vagueness reflects the same scenario that radiographers and radiologists face as the information they receive is often limited. Conversely, the results highlight current practices around imaging patients with limb injuries and demonstrate a lack of value in imaging asymptomatic adjacent upper limbs. The findings underscore the need for strategies to reduce X-ray imaging of the adjacent limbs.

Conclusion

X-ray imaging of upper limbs adjacent to the injured region has low diagnostic yield and leads to patient exposure to radiation without benefit. A change in the practice of imaging adjacent limb is required to maximise the effectiveness use of imaging tests and healthcare resources.

Conflict of interest statement

The authors have no conflict of interest to declare.

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QUESTIONNAIRE

A14(25) Part 1 of 2

Imaging of the adjacent upper limb: Outcomes and diagnostic yield

INSTRUCTIONS

- Read through the article and answer the multiple-choice questions provided below.
- **Some questions may have more than one correct answer;** in which case you must mark **all** the correct answers.

Introduction

Question 1: Reasons for increased X-ray imaging include which of the following?

- A:** Limited training in evidence-based practice
- B:** In-house staff training
- C:** Fear of litigation or malpractice
- D:** Need for certainty

Question 2: The need for reassurance is leading to multiple testing with limited clinical value, particularly for extremities. Is this statement **TRUE** or **FALSE**?

- A:** TRUE
- B:** FALSE

Question 3: It is seldom necessary to have multiple regions of the adjacent upper limb X-rayed, because

- A:** The countercoup effect is relevant to brain injury only
- B:** Fractures in the forearm do not occur in both the distal and proximal aspect
- C:** Monteggia and Galeazzi injuries and the need to X-ray both the wrist and elbow joints when a radius or ulna shaft fracture is present, occur only in 0,005% of cases
- D:** None of the above

Question 4: What is the main aim of the study discussed in the article? Assessing the

- A:** Specificity of MRI in imaging of shoulder injuries
- B:** Diagnostic efficacy of X-ray imaging of multiple and adjacent regions in the upper limbs
- C:** Use of CT scans for diagnosing elbow injuries
- D:** Effectiveness of ultrasound in detecting wrist fractures

Results

Question 5: What percentage of patients had two or more X-ray requests for adjacent regions?

- A:** 47.9%
- B:** 57.9%
- C:** 67.9%
- D:** 87.9%

Question 6: What percentage of patients had no detected abnormality on any of their requested projections?

- A:** 27.1%
- B:** 37.1%
- C:** 47.1%
- D:** 57.1%

Question 7: What percentage of X-ray examinations demonstrated no abnormality?

- A:** 23.5%
- B:** 33.5%
- C:** 63.5%
- D:** 83.5%

Question 8: What was the diagnostic yield or detection rate of subsequent imaging of adjacent regions?

- A:** 1.5%
- B:** 2.5%
- C:** 3.5%
- D:** 4.5%

Question 9: Which age group was most likely to have a new finding on subsequent imaging?

- A:** Patients under 30 years old
- B:** Females over 60 years old
- C:** Males aged 40-50 years old
- D:** Children under 10 years old

Question 10: What was the "no finding" detection rate for the 50 patients who returned for further X-rays?

- A:** 10%
- B:** 25%
- C:** 52%
- D:** 76%

THE END

QUESTIONNAIRE

A14(25) Part 2 of 2

Imaging of the adjacent upper limb: Outcomes and diagnostic yield

INSTRUCTIONS

- Read through the article and answer the multiple-choice questions provided below.
- **Some questions may have more than one correct answer;** in which case you must mark **all** the correct answers.

Question 1: Of which upper limb regions were new abnormalities less likely to be detected?

- A: Wrist
- B: Elbow
- C: Forearm and humerus
- D: Hand

Question 2: Most of the requests with no symptoms specified in the clinical history demonstrated an abnormality on imaging.

Is the statement **TRUE** or **FALSE**?

- A: TRUE
- B: FALSE

Question 3: Which regions had approximately 50% of requests with specified and unspecified symptoms?

- A: Wrist and hand
- B: Shoulder and elbow
- C: Hands, forearm and humeri
- D: Elbow and hand

Discussion

Question 4: What was the main conclusion regarding the diagnostic yield of X-ray imaging of adjacent limbs?

- A: It has a high diagnostic yield
- B: It has a low diagnostic yield and can be considered inappropriate for clinical decision-making
- C: It is most effective for detecting soft tissue injuries
- D: It should be the first choice for all upper limb injuries

Question 5: What should be considered when making requests for adjacent imaging?

- A: Radiation dose
- B: The diagnostic impact
- C: Cost-effectiveness

Question 6: What is recommended when there are no symptoms or relevant clinical history in the request forms?

- A: Avoid imaging of the adjacent limbs
- B: Always perform additional imaging to avoid future litigation
- C: Ask the patient what X-rays should be taken

Question 7: Which abnormalities were often detected and not related to the indication for imaging?

- A: Traumatic fractures
- B: Soft tissue injuries
- C: Incidental abnormalities
- D: Foreign bodies

Question 8: Which of the following statements are **TRUE**?

- A: Patient symptoms were not described in about one-third of the requests for each region requested
- B: The presence of symptoms was associated with a poorer diagnostic yield
- C: The provision of information about a patient's symptom was associated with a positive diagnostic yield
- D: One-third of advanced imaging requests were made by doctors without having seen the patient

Question 9: Studies focusing on the wrist, forearm and elbow of paediatrics population only reported secondary fractures in what percentage of patients?

- A: Less than 5%
- B: 10%
- C: 25%

Conclusion

Question 10: TRUE or FALSE?

"X-ray imaging of upper limbs adjacent to the injured region has high diagnostic yield and mitigates the effects of patient exposure to radiation".

- A: TRUE
- B: FALSE

THE END



FOCUS ON HEALTH

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Cell: 074 230 3874

Tel: 012 653 0133 / 2373 / 2394

Mon-Fri: 08:00-16:00

400 Theuns van Niekerk Street

Wierda Park

0157

PO Box 71

Wierda Park

0149

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ANSWER SHEET

A14(25)

Imaging of the adjacent upper limb Outcomes and diagnostic yield

*Time spent on activity						hour	min				
PART 1						PART 2					
	A	B	C	D	E		A	B	C	D	E
1						1					
2						2					
3						3					
4						4					
5						5					
6						6					
7						7					
8						8					
9						9					
10						10					

How relevant was the content of this activity to your scope of practice?			
			
Not at all	Somewhat	Mostly	Extremely
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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