Original article

Scaphoid views: a need for standardisation

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Aims: Several views are needed to visualise the scaphoid. These are routinely called 'scaphoid views'. The authors believe that asking for scaphoid views from the radiology department often leads to a wide variety and number of radiographic views being taken.

Methods: 50 radiographers were asked which and how many views of the scaphoid they would take, in the acute setting and then in the out-patient department.

Results: We found a wide variation in the descriptive terms used by radiographers for particular views. There was also little agreement on how many and which radiographic views to take when asked for 'scaphoid views'.

Conclusions: Not only is there complete lack of agreement on what 'scaphoid views' should be, it was also discovered that there was little agreement on the nomenclature of the individual views themselves. Loss of information can result from the wrong views being taken and unnecessary radiation exposure. We recommend five particular views, which together visualise all areas of the scaphoid.

Key words: Scaphoid views – Standardisation

Scaphoid fractures account for approximately 2% of all fractures¹ and are the most commonly injured carpal bone.^{2,3} They pose a considerable diagnostic and management problem, being notoriously difficult to diagnose both clinically⁴ and radiographically.⁵ Initial failure to diagnose a scaphoid injury and the subsequent delay can result in non-union and the complications arising from this.

Despite the problems associated with plain radiography in the assessment of scaphoid injuries,⁵ it is still the most commonly used imaging technique. However, for the scaphoid unlike many other bones, because of its complex shape, alignment and overlap by other carpal bones, standard postero-anterior and lateral films are inadequate.^{6–8} For the scaphoid, several views are needed to visualise the whole bone. These sets of views are routinely called 'scaphoid

views'. In the UK, it is fairly common practice to only get limited views in the accident and emergency department in the case of an acute injury to the scaphoid. These views are essentially to exclude other injuries from the diagnosis, such as distal radius fractures, peri-lunate fracture dislocations or carpal collapse. It is generally accepted that most scaphoid fractures are difficult to detect in the acute setting. Suspected scaphoid fractures are, therefore, immobilised in plaster and after a period of usually 2 weeks, 'scaphoid views' are requested in the fracture clinic. Though in the UK fewer views are routinely used in the emergency department, most of the imaging of subsequent assessment and treatment of scaphoid fractures is dependent on the use of these scaphoid views. This covers diagnosis, classification, assessment of displacement and healing, and before and after surgical intervention.

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Table 1 Number and type of views taken by 50 radiographers at initial presentation in the accident and emergency department

No. of views	No. of radiographers	Description of views
2	18	PA + lateral
	3	Lateral + PA in ulnar deviation
3	1	PA + lateral + PA in ulnar deviation with angled beam
	1	PA + lateral + oblique
	1	Lateral + posterior oblique + PA in ulnar deviation
4	10	PA + lateral + posterior oblique + PA in ulnar deviation with angled beam
	6	Lateral + posterior oblique + PA in ulnar deviation + PA in ulnar deviation with angled beam
	5	Lateral + oblique + PA in ulnar deviation + PA in ulnar deviation with angled beam
	1	PA + lateral + posterior oblique + anterior oblique
	1	Lateral + posterior oblique + anterior oblique + PA in ulnar deviation
	1	PA + posterior oblique + PA in ulnar deviation + PA in ulnar deviation with angled beam
5	1	AP + lateral + posterior oblique + anterior oblique + PA in ulnar deviation
	1	Lateral + PA in ulnar deviation + PA in ulnar deviation with angled beam + posterior oblique with 15° beam

Table 2 Number and type of views taken by 50 radiographers when asked for 'scaphoid views'

No. of views	No. of radiographers	Description of views
3	1	Posterior oblique + PA in ulnar deviation + PA in ulnar deviation with angled beam
4	12	Lateral + posterior oblique + PA in ulnar deviation + PA in ulnar deviation with angled beam
	11	PA + lateral + posterior oblique + PA in ulnar deviation with angled beam
	9	Lateral + oblique + PA in ulnar deviation + PA in ulnar deviation with angled beam
	5	PA + lateral + oblique + PA in ulnar deviation with angled beam
	2	Lateral + posterior oblique + PA & ulnar deviation + PA with angled beam
	2	PA + lateral + posterior oblique + PA in ulnar deviation
	2	PA + lateral + oblique + PA in ulnar deviation
	1	PA + oblique + PA in ulnar deviation + PA in ulnar deviation with angled beam
	1	Lateral + oblique + posterior oblique + PA in ulnar deviation
	1	PA + lateral + posterior oblique + anterior oblique
5	1	Lateral + anterior oblique + PA in ulnar deviation + PA in ulnar deviation with angled beam
	1	PA + lateral + posterior oblique + anterior oblique + PA in ulnar deviation
	1	Lateral + posterior oblique + posterior oblique with 15° beam + PA in ulnar deviation + PA in ulnar deviation with angled beam

Table 3 Various 'scaphoid views' as described in the literature

Study	No. of views	Description of views
Nishihara ¹¹	4 or 5	PA & lateral wrist, peri-apical view with wrist pronated 45° and peri-apical view with wrist supinated 45° and oblique view of the wrist in ulnar deviation (<i>i.e.</i> navicular view)
Ballinger ¹²	5	AP & lateral wrist, peri-apical oblique wrist with lateral rotation, peri-apical wrist in radial flexion, peri-apical wrist in ulnar flexion
Russe ¹³	4	PA & lateral wrist, semipronated and semisupinated
Munk <i>et al.</i> ¹⁴	3	AP & lateral wrist and PA + ulnar deviation with 30–40° cranial tube angulation
Berna <i>et al.</i> ¹⁵	4	PA & lateral wrist, oblique pronation and ulnar deviation
Gelberman <i>et al.</i> ⁷	5	Neutral, PA, ulnar deviation, lateral and oblique wrist in pronation
Leslie ¹⁶	4	PA & lateral wrist, PA with wrist supinated and pronated 45°
Wilson <i>et al.</i> ¹⁷	4	PA & lateral wrist, oblique and ulnar deviation PA
Compson ⁶	5	Ulnar deviated PA, PA in ulnar deviation with 30° angulation to elbow, 45° oblique (semipronated), 45° oblique AP (semisupinated) and lateral

However, certain views are better than others for imaging certain parts of the scaphoid, and some are more useful than others for assessing different stages of treatment.⁶ We believe it is essential for good fracture management that one fully understands the use of each view to give optimum information as well as reducing the number of unnecessary radiographs.

From experience, the senior author believes that asking for scaphoid views from the radiology department often leads to a wide variety of radiographic views even when a protocol was in place. To test this hypothesis, a study was undertaken to assess what views one is likely to receive if standard 'scaphoid views' are asked for.

Table 4 Frequent 'scaphoid views' taken and their various descriptions

View	Commonly described as -
Anterior oblique¹⁸ Radial oblique Dorsipalmar oblique Semi-pronated oblique Oblique pronation 45° oblique PA
Posterior oblique¹⁸ Ulnar oblique Semi-supinated oblique 45° oblique AP
Lateral¹⁸ (wrist) Lateral (navicular) Lateral (scaphoid)
Postero-Anterior with ulnar deviation¹⁸ Postero-Anterior with flexion to ulna Postero-Anterior with hand adducted Ulnar deviation Ulnar deviated PA (UDPA) Navicular view
Antero-Posterior oblique of both hands Ball Catchers view
Postero-Anterior with ulnar deviation and angled beam Bridgman view Elongated scaphoid bone projection "Banana" view Ziter ¹⁹ view

Table 5 Recommended scaphoid views [* indicates scaphoid bone]

Anterior oblique	Posterior oblique	Lateral	Posterior-anterior with ulnar deviation	Posterior-anterior with ulnar deviation + 20° beam
<p>Best for sulcal fractures, but also shows waist and tubercle fractures. Best for displacement of waist fractures and some sulcal fractures</p>	<p>Specific views for fractures of the proximal pole. Also shows dorsal avulsions</p>	<p>Shows alignment (<i>i.e.</i> detect carpal collapse), proximal radio-scaphoid joint and tubercle. Poor fracture detection due to overlap of carpal bones</p>	<p>Brings scaphoid into line with X-ray. Good at showing the long axis of the scaphoid</p>	<p>Specific view for fractures of the waist, beam is at right angles to long axis of scaphoid. Patterns oblique to the beam are poorly visualised</p>

Methods

Fifty radiographers with 0.5–30 years' (mean, 7.8 years) experience from four London teaching hospitals were asked standard questions regarding scaphoid views. The radiographers were asked to explain which views they would take to visualise the scaphoid, first in the accident and emergency department and second if asked for 'scaphoid views' in the orthopaedic out-patient department. They were also asked to demonstrate and describe how they would take the view(s) chosen.

Results

We found a wide variation in the descriptive terms used by the radiographers for radiographic views. In many instances, the radiographers were unable to describe the name of the view and could only demonstrate which view they meant by showing the researcher how they would place the hand on the radiographic plate. To standardise the nomenclature, all radiographers had to demonstrate to the researcher exactly how each view would be taken. Each view was then described in one standard way as shown in the tables.

At initial presentation in the accident and emergency department, the number of views chosen by radiographers ranged from two to five (Table 1). The majority (24 radiographers) chose 4 views. Twenty-one radiographers would take two views, the majority of who chose a plain posterior-anterior (PA) and lateral of the wrist.

In the out-patient setting, radiographers now chose between 3, 4 or 5 views; 92% of radiographers chose 4 views (Table 2). Of the 46 radiographers that chose to take 4 views, there was little agreement about which views to take, with 6 different combinations described.

When asked if the radiology department had a protocol (all departments had a protocol in place, all of which recommended different types and number of views), 41 radiographers answered yes, 5 thought there wasn't one and 4 did not know. Of the 41 that knew of a protocol, only 5 could describe it correctly with 30 describing it inaccurately and the rest not knowing.

Discussion

There is no general consensus on how many or which views are needed to view the scaphoid bone. On one hand, Watson-Jones⁹ recommended three views while on the other extreme Graziani¹⁰ suggested 16. A review of the literature (Table 3) demonstrates the variability in number and choice (description) of radiological views for the scaphoid.

Nomenclature of the views themselves is also inconsistent. The issue of nomenclature was only a secondary

aspect of the study. However, as the study progressed, it soon became apparent what a major problem this was. It was obvious that radiographers, radiologists and surgeons were all had very little agreement in what a specific radiographic view should be called. This can lead to confusion and unnecessary films being taken. We feel that radiographers, radiologists and orthopaedic surgeons have to come to a consensus that a particular radiographic view be known by only one universally accepted name. Common radiographic views and the various descriptions are highlighted in Table 4.

Our study revealed that ordering 'scaphoid views' resulted in a wide variety of views taken by radiographers. It also showed that there are major communication problems between surgeons and the radiology department.

The outcome is obtaining less than optimum images of the scaphoid, resulting in loss of important information, only available on certain views. It can also lead to excessive radiographic views and hence radiation exposure.

Conclusions

This study indicates that there is an important need to standardise the descriptive nomenclature for radiographic views between surgeons, radiologists and radiographers. Though this may be done at a local level by direct communication between departments, it is also important to have consensus at a national level. We recommend 5 particular radiographic views which should form what are known as 'scaphoid views' (Table 5). Each of the views highlights a particular area of interest in the scaphoid. These particular views were chosen based on work done by the senior author on anatomical and radiographic studies of the scaphoid.^{6,8} By choosing these 5 particular views, one can ensure that all areas of the scaphoid are studied. Our study showed that in many cases several radiographic views were being taken that detailed the same part of the scaphoid, adding little additional information to the previous view. However, we realise that studies based on anatomical and radiographic studies while helpful are not the same as clinical studies. We, therefore, recommend further work examining the optimal number and type of radiographic views.

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