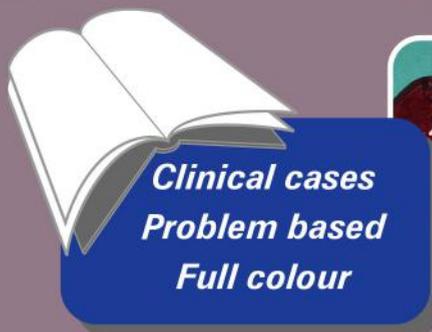
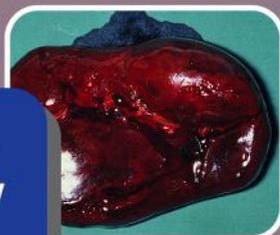


Self-Assessment  
Colour Review of

LEARN • REVISE • REINFORCE

# Clinical Anatomy

E. J. Evans  
B. J. Moxham  
R. L. M. Newell  
R. M. Santer



*Clinical cases*  
*Problem based*  
*Full colour*

 **MANSON**  
PUBLISHING

Self-Assessment Colour Review of  
**Clinical Anatomy**

**Edward J Evans**

MB BS (Lond) LRCP MRCS MSc (Surrey)  
Lecturer  
Anatomy Unit, Cardiff School of Biosciences,  
Cardiff University, UK

**Bernard J Moxham**

BSc BDS PhD(Bristol)  
Professor and Head of Anatomy  
Anatomy Unit, Cardiff School of Biosciences,  
Cardiff University, UK

**Richard L M Newell**

BSc MB BS (Lond) FRCS (Eng)  
Clinical Anatomist  
Anatomy Unit, Cardiff School of Biosciences,  
Cardiff University, UK

**Robert M Santer**

BSc PhD (St Andrews)  
Senior Lecturer  
Anatomy Unit, Cardiff School of Biosciences,  
Cardiff University, Cardiff, UK



---

**MANSON  
PUBLISHING**

---

CRC Press  
Taylor & Francis Group  
6000 Broken Sound Parkway NW, Suite 300  
Boca Raton, FL 33487-2742

© 1999 by Taylor & Francis Group, LLC  
CRC Press is an imprint of Taylor & Francis Group, an Informa business

No claim to original U.S. Government works  
Version Date: 20141208

International Standard Book Number-13: 978-1-84076-551-9 (eBook - PDF)

This book contains information obtained from authentic and highly regarded sources. While all reasonable efforts have been made to publish reliable data and information, neither the author[s] nor the publisher can accept any legal responsibility or liability for any errors or omissions that may be made. The publishers wish to make clear that any views or opinions expressed in this book by individual editors, authors or contributors are personal to them and do not necessarily reflect the views/opinions of the publishers. The information or guidance contained in this book is intended for use by medical, scientific or health-care professionals and is provided strictly as a supplement to the medical or other professional's own judgement, their knowledge of the patient's medical history, relevant manufacturer's instructions and the appropriate best practice guidelines. Because of the rapid advances in medical science, any information or advice on dosages, procedures or diagnoses should be independently verified. The reader is strongly urged to consult the relevant national drug formulary and the drug companies' printed instructions, and their websites, before administering any of the drugs recommended in this book. This book does not indicate whether a particular treatment is appropriate or suitable for a particular individual. Ultimately it is the sole responsibility of the medical professional to make his or her own professional judgements, so as to advise and treat patients appropriately. The authors and publishers have also attempted to trace the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission to publish in this form has not been obtained. If any copyright material has not been acknowledged please write and let us know so we may rectify in any future reprint.

Except as permitted under U.S. Copyright Law, no part of this book may be reprinted, reproduced, transmitted, or utilized in any form by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying, microfilming, and recording, or in any information storage or retrieval system, without written permission from the publishers.

For permission to photocopy or use material electronically from this work, please access [www.copyright.com](http://www.copyright.com) (<http://www.copyright.com/>) or contact the Copyright Clearance Center, Inc. (CCC), 222 Rosewood Drive, Danvers, MA 01923, 978-750-8400. CCC is a not-for-profit organization that provides licenses and registration for a variety of users. For organizations that have been granted a photocopy license by the CCC, a separate system of payment has been arranged.

**Trademark Notice:** Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

Visit the Taylor & Francis Web site at  
<http://www.taylorandfrancis.com>

and the CRC Press Web site at  
<http://www.crcpress.com>

# Preface

This book has been written and designed to appeal to medical students and to post-registration trainees. It allows both types of reader to cover the whole field of topographical (gross) anatomy, whether in the context of regional, systematic, or clinical anatomy. Indeed, we have conceived the book from the conviction that, without a basic understanding of anatomy, the medical practitioner will remain ill-equipped.

All of the scientific and clinical disciplines, in many medical schools throughout the world, are concurrently involved in major educational revisions. Increasingly, both undergraduate and postgraduate training schemes are becoming more 'integrated' in order to emphasize clinical relevance. Furthermore, teachers are expected to establish, and define, 'core' material so as to lighten the demands placed upon novice learners! However the new courses and training programmes are organized, anatomy remains a core subject, provided that its relevance to clinical practice is highlighted. It is for this reason that most of the questions in this self-assessment book have the format of case histories or clinical puzzles that require anatomical information for their elucidation. These latter should not only confirm the importance of basic anatomy to the clinical situation and aid motivation but also conform with modern teaching practices that encourage problem solving.

An important component of the new courses is 'student-centred learning'. This has the aim of trying to make students more responsible for their own education, and develop an independence of mind that will fit them for continuing education once their formal courses are completed. For student-centred learning to be effective, it is important that students should assess their progress by frequent testing of their knowledge and skills. This book has been written to help students at various stages of their courses to revise and to assess their progress; it is not purely for the purpose of passing examinations.

With respect to the content of this book, we are only too aware of the pressures nowadays placed upon students undertaking medical and surgical training programmes. Whilst it is undoubtedly tempting to cut material from courses, it is exceedingly difficult to do this without reducing standards. This book was written with the aim of presenting a body of material that we believe approximates the minimum standards required for those undertaking courses that include topographical anatomy. It should enable students to test themselves on a wide range of essential topographical material and will point them to those areas that need further study.

It is also our belief that a proper appreciation of anatomy does not rely upon the assimilation of a mass of facts. Anatomy is essentially a ‘visual’ subject (including a three-dimensional appreciation of human structure) and cannot be mastered simply by reading a text. In addition to some true/false questions to test factual knowledge, we have therefore provided the opportunity for readers to assess their development of a visual appreciation of important anatomical features by incorporating numerous full-colour illustrations. These illustrations do not merely cover human dissection (of a quality typically to be found in any dissection room) but also include radiographs, magnetic resonance images (MRIs), computed tomograph (CT) images, and clinical photographs.

## Acknowledgements

A book of this kind, which brings together preclinical science and clinical case histories, could not have been compiled without the generous support of many friends and colleagues (from a variety of medical disciplines), who loaned material and photographs. We would therefore like to acknowledge and thank Mr J. Stansbie (Walsgrove Hospital, Coventry), Mr E. Roberts, Professor G. Roberts, Dr A. Williams, Dr A. Fraser, Dr J. Potts, Dr M. Crane, Professor R.E. Mansel, Mr R.D. Weeks, Professor M.F. Scanlon, Mrs L. Beck, Mr M.H. Wheeler, Mrs C. Lane, Dr M.D. Hourihan, and the Department of Medical Illustration (all at the University of Wales, College of Medicine).

Within the Anatomy Unit at Cardiff, we would like to say an especial thank you to our demonstrators and prosectors and to our students who gave advice freely and who sometimes acted as ‘guinea pigs’ to test the questions. A major debt is also owed to our secretaries, Miss A. Filice and Mrs C. Malpass, for their clerical assistance and for keeping the office happy! Furthermore, we could not have produced this book if it was not for the skill and enthusiasm of our photographer, Mr G. Pitt.

Finally, we would wish to remember all those who bequeath their bodies for anatomical examination and who, by such kindness, do so much for medical education and research.

## THE LOCOMOTOR SYSTEM

### Upper Limb and Back

For each of questions 1–20, state whether the statement provided is true or false.

- 1 Abduction of the shoulder takes the upper arm further away from the body.
- 2 The scapula has no direct bony attachment to the axial skeleton.
- 3 The coraco-acromial ligament forms part of the capsule of the shoulder joint.
- 4 The shoulder joint is partly innervated by the suprascapular nerve.
- 5 Subscapularis is attached to the dorsal surface of the scapula.
- 6 Teres major is one of the rotator cuff muscles.
- 7 Supraspinatus is attached to the greater tubercle of the humerus.
- 8 The median nerve is derived from posterior divisions of the brachial plexus.
- 9 The upper trunk of the brachial plexus contributes to the ulnar nerve.
- 10 Biceps brachii is attached to the anterior surface of the humerus.

## I-10: Answers

- 1 TRUE – abduction is defined as a movement away from the sagittal plane.
- 2 TRUE – the scapula articulates with the clavicle, and the clavicle with the axial skeleton.
- 3 FALSE – it bridges between the coracoid process and acromion of the scapula, but plays no part in the structure of the shoulder joint.
- 4 TRUE – Hilton’s law says that the nerve supplying a muscle also supplies the joint that the muscle moves.
- 5 FALSE – it is attached to the deep or ventral surface.
- 6 FALSE – teres minor is the cuff muscle.
- 7 TRUE – its tendon blends with the capsule of the shoulder and the adjacent tendon of infraspinatus.
- 8 FALSE – the median nerve comes from anterior divisions and will supply flexor muscles (among others).
- 9 FALSE – the ulnar nerve gets its fibres only from the lower trunk.
- 10 FALSE – biceps is not attached to the humerus at all; it is attached to the scapula and the radius, and (indirectly via the bicipital aponeurosis) to the ulna.

## I I–20: Questions

11 Brachialis is an important flexor of the elbow.

12 Triceps brachii is attached to the olecranon of the ulna.

13 Triceps brachii is innervated by the radial nerve.

14 All the extensor muscles in the upper limb are innervated by the radial nerve.

15 Flexor digitorum superficialis is innervated by the median nerve.

16 The inferior radio-ulnar joint lies immediately dorsal to pronator teres.

17 The scaphoid bone articulates with the lower end of the radius.

18 The tendons of flexor digitorum profundus to the fingers share fibrous sheaths with the superficialis tendons in each finger.

19 The interossei of the hand are innervated by the ulnar nerve.

20 The abductor pollicis brevis is innervated by the median nerve.

## 11–20: Answers

11 TRUE – it is at least as important as biceps.

12 TRUE – this is the insertion of triceps.

13 TRUE – the radial nerve supplies all the extensor muscles of the upper limb.

14 TRUE – (see 13) but the radial nerve does not *only* supply extensors.

15 TRUE – the median nerve is attached to the deep (dorsal) surface of this muscle.

16 FALSE – it lies dorsal to pronator quadratus.

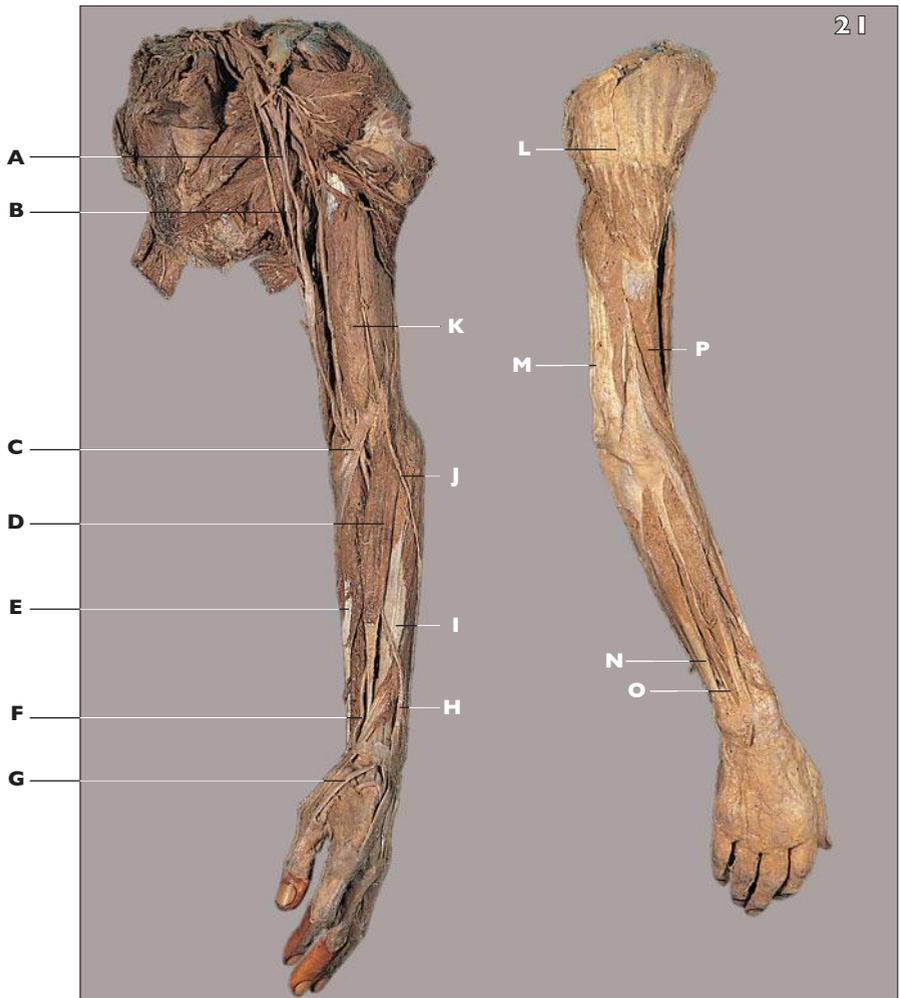
17 TRUE – the scaphoid and the lunate are both involved in the wrist joint. In full abduction of the wrist, the lunate is separated from the lower end of the ulna by a triangular fibrocartilage.

18 TRUE – the two tendons run in a common fibrous sheath along the palmar surface of the finger. They are also invaginated into a synovial sheath.

19 TRUE – wasting of the first dorsal interosseus muscle is an important sign of ulnar nerve damage.

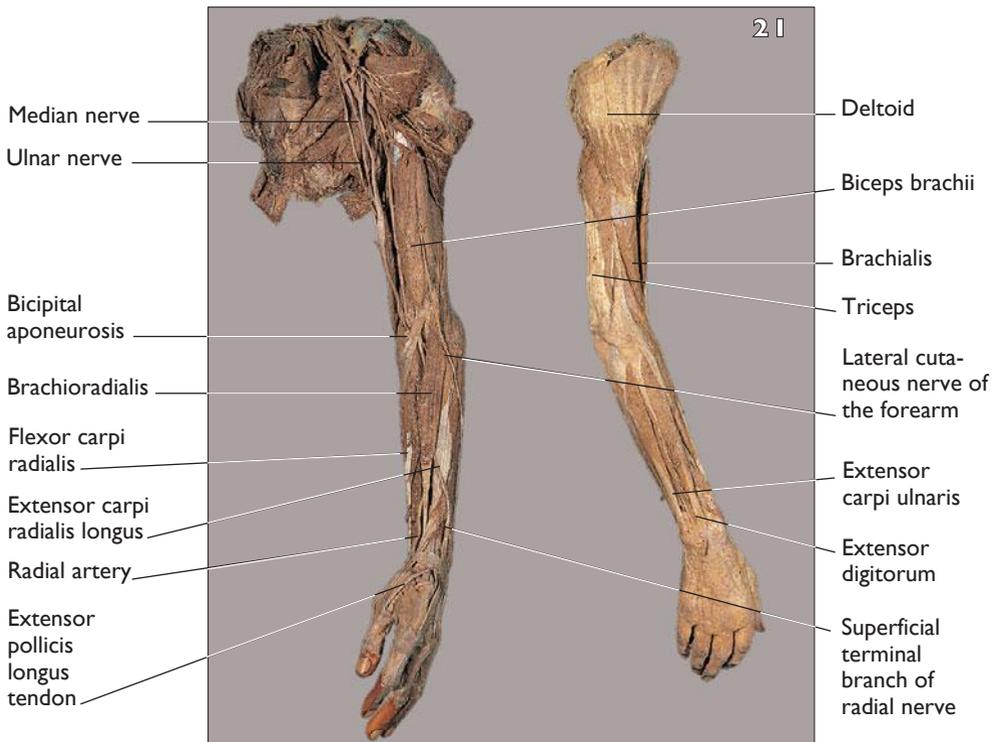
20 TRUE – wasting of the abductor pollicis brevis is an important sign of median nerve damage.

**21** Identify the labelled features (A–P) on the photograph (21) of the upper limb (anterior view of left arm and posterior view of right arm).

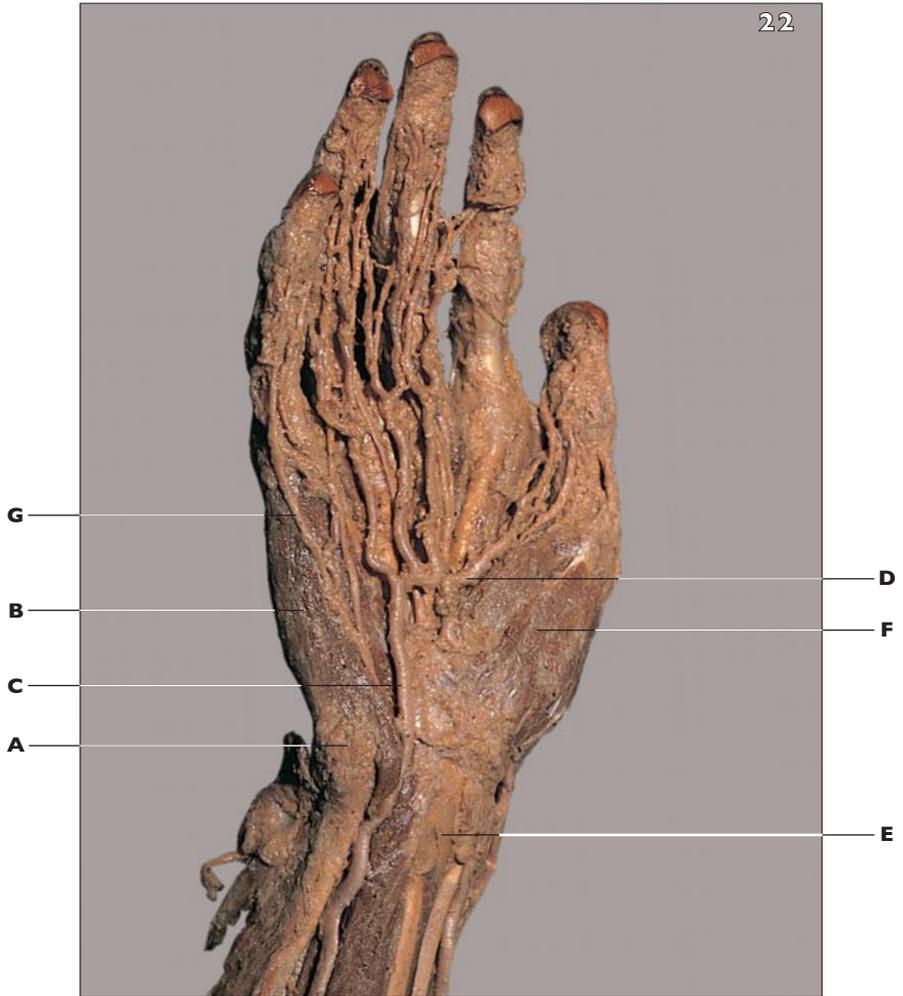


## 21: Answers

21 A: median nerve (note that as a result of dissection, the nerve is no longer in contact with the brachial artery). B: ulnar nerve. C: bicipital aponeurosis. The brachial artery is clearly seen in its normal position beneath the aponeurosis. D: brachioradialis. E: flexor carpi radialis. Distinguishable because of its lateral and superficial position. F: radial artery. Note that in this individual it has an anomalous course; it is just visible passing normally across the floor of the 'anatomical snuffbox'; it then passes deep to the insertion of extensor carpi radialis longus, which is unusual; finally, it is easily seen passing between the two heads of the first dorsal interosseous, as is usual. G: extensor pollicis longus tendon, forming one of the boundaries of the 'anatomical snuffbox'. H: superficial terminal branch of the radial nerve, supplying a variable amount of skin on the lateral part of the back of the hand. I: extensor carpi radialis longus. Longus is more superficial than brevis, so is visible in this view. J: lateral cutaneous nerve of the forearm, the terminal part of the musculocutaneous nerve. K: biceps brachii. L: deltoid. M: triceps. N: extensor carpi ulnaris. O: extensor digitorum. P: brachialis. The edge of the muscle shows clearly between biceps and triceps.

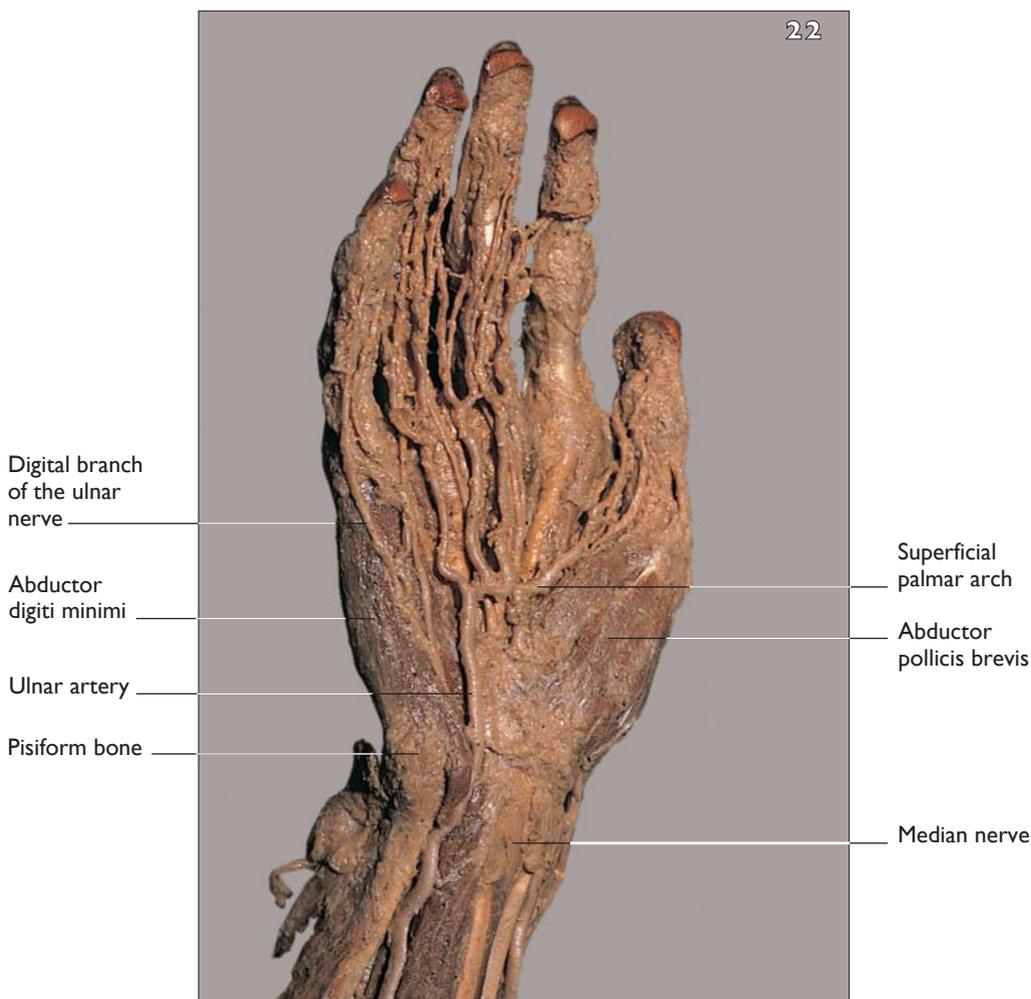


22 Dissection of the hand (22). Identify the features labelled A–G.



## 22: Answers

22 A: pisiform bone. B: abductor digiti minimi. C: ulnar artery. D: superficial palmar arch. In this specimen, the arch is large and supplies the thumb, but its connection with the radial artery is invisible. E: median nerve, wrapping around the lateral border of flexor digitorum superficialis and disappearing under the flexor retinaculum. F: abductor pollicis brevis. It is often hard to separate the muscles of the thenar eminence, but abductor pollicis brevis always occupies the centre of the muscle mass when seen from the front. G: digital branch of the ulnar nerve.



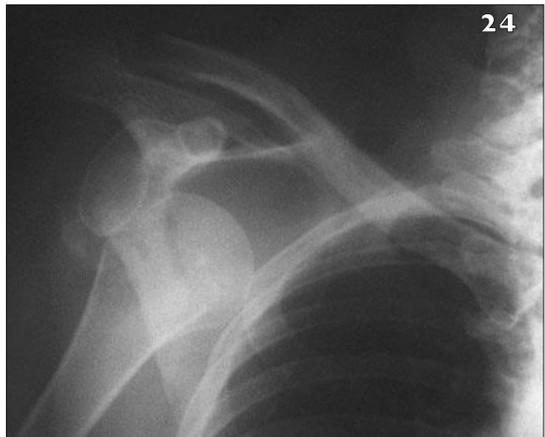
**23** A 55-year-old woman noticed that the skin of her right breast appeared to become stuck to a painless lump in the breast (23a). She consulted her GP who, as part of his clinical examination, confirmed the ‘tethering’ of the lump to the skin and looked for ‘tethering’ to deeper structures. He also examined the lymph nodes to which tissues in the area of the lump would drain.

- i. Which structures lie deep to the breast that may be invaded by a malignant tumour to cause ‘tethering’ of the lump?
- ii. To which lymph nodes do the tissues of the breast normally drain?
- iii. To which lymph nodes might this patient’s tumour drain?



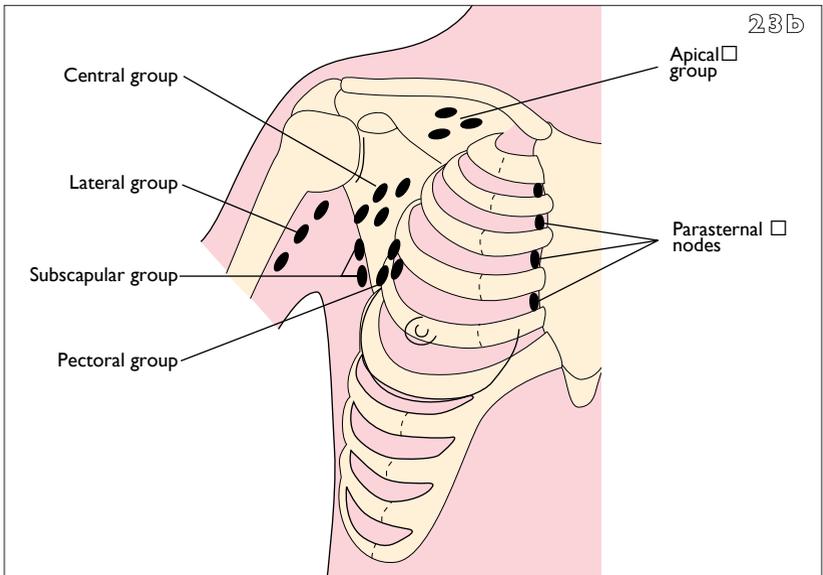
**24** A 25-year-old man injured his shoulder while playing football. Clinical and radiological examination (24) indicated a dislocation.

- i. Which nerve runs around the surgical neck of the humerus and is at risk of damage both by dislocation of the shoulder and by attempts at reduction?
- ii. Which muscles does the nerve supply?
- iii. Does the nerve supply any skin that the doctor could use to test for the integrity of the nerve before (and after!) reduction of the dislocation?

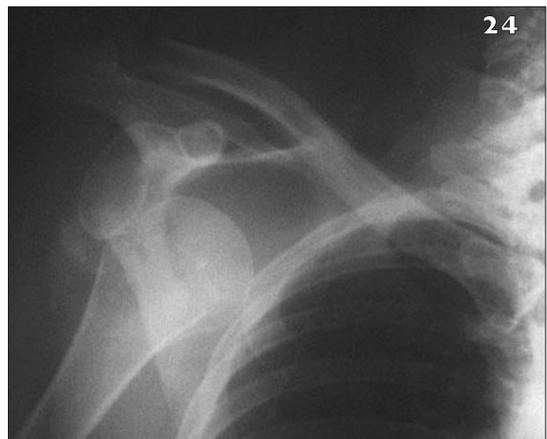


## 23 & 24: Answers

- 23 i. Pectoralis major and the deep fascia over it.  
ii. Mainly to the pectoral group and then to the central and apical groups of axillary nodes (23b). Some lymph passes directly to the apical groups. Some lymph from the medial half of the breast drains to the parasternal lymph nodes along the internal thoracic artery.  
iii. To any of the nodes listed above.

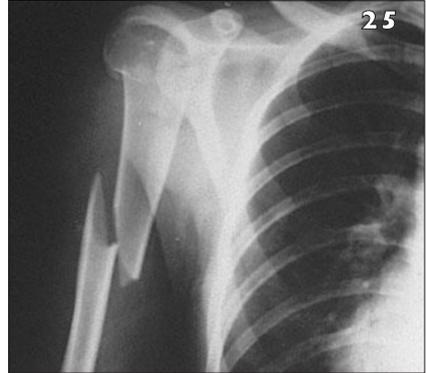


- 24 i. Axillary.  
ii. Deltoid and teres minor.  
iii. Yes, over the insertion of deltoid on the upper outer part of the arm.



25 A 55-year-old woman was knocked down by a car and injured her right arm. The radiograph (25) showed a fracture to the middle of the shaft of the humerus.

- i. Which nerve might be damaged by this fracture?
- ii. Which groups of muscles does the nerve supply below the level of the mid-shaft of the humerus?
- iii. Does the nerve have any cutaneous supply below this level?



26 A middle-aged man is brought to the accident and emergency department. He is bleeding heavily from a wound in the upper thigh and his trousers are completely soaked with blood. He is semiconscious and very restless. The casualty officer wishes to start a blood transfusion.

- i. Although there are superficial veins in the cubital fossa, the casualty officer does not use them in this case. Why not?
- ii. At which other site(s) in the upper limb are superficial veins commonly present and easy to cannulate through the skin for a transfusion?
- iii. Where else in the upper limb is a vein constantly present that is suitable for a 'cut-down' in an emergency?

27 A 40-year-old man caught his arm in farm machinery, sustaining a twisting injury of the whole of the right upper limb. The major injury was a compound fracture of both bones of the forearm (27).

- i. Name the muscles through which the exposed bones must have passed.
- ii. Which nerve supplying these muscles may also have been damaged?



## 25–27: Answers

25 i. The radial nerve.

ii. All extensors of the wrist, thumb, and fingers; brachioradialis; supinator; and abductor pollicis longus. The radial nerve also supplies anconeus. Paralysis of the extensors of the wrist causes a condition known as wrist drop.

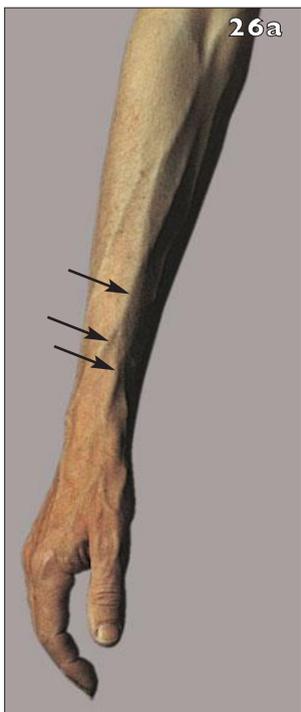
iii. Yes. It supplies an area of skin on the lateral part of the back of the hand. The posterior cutaneous nerve of the forearm is usually given off higher than midshaft.

Note that there is also a fracture of the surgical neck of the humerus in this patient.

26 i. First, because these peripheral veins are likely to be empty and therefore impalpable in a shocked patient; second, because the patient is likely to bend his elbow and dislodge the cannula.

ii. On the back of the hand, and the back or lateral side of the lower end of the radius (see arrows, 26a).

iii. In the groove between pectoralis major and deltoid (cephalic vein). Note (see 26b) that although the cephalic vein is not visible, the delto-pectoral groove is easily seen (arrows).



27 i. Brachioradialis, extensors carpi radialis longus and brevis, extensor digitorum communis, extensor carpi ulnaris, abductor pollicis longus, extensor pollicis longus.

ii. Posterior interosseous (deep) branch of the radial nerve.