

A Colour Atlas of Gastrointestinal Endoscopy

**K.F.R. Schiller
R. Cockel
and
R.H. Hunt**



CHAPMAN AND HALL MEDICAL

A Colour Atlas of Gastrointestinal Endoscopy

K.F.R. Schiller

MA, DM, FRCP

Consultant Physician and Gastroenterologist

St Peter's Hospital, Surrey, UK

Roy Cockel

MA, MB, FRCP

Consultant Physician

Selly Oak Hospital, Birmingham, UK

and

Richard H. Hunt

MB, ChB, FRCP, FRCP(C), FACC

Professor and Head of Division of Gastroenterology

McMaster University Medical Centre, Hamilton, Ontario, Canada

with the collaboration of

B. Sterry Ashby

M.Chir, FRCS

Consultant Surgeon

Southend General Hospital, Essex, UK

and

Giles W. Stevenson

MA, FRCP, FRCR, FRCP(C)

Professor of Radiology, Department of Radiology

McMaster University, Hamilton, Ontario, Canada

LONDON

CHAPMAN AND HALL

*First published in 1986 by Chapman and Hall Ltd
11 New Fetter Lane, London EC4P 4EE*

© 1986 Schiller, Cockel and Hunt

*Printed in Great Britain by
Jolly & Barber Ltd, Rugby*

ISBN 0 412 25590 1

*All rights reserved. No part of this book may
be reprinted, or reproduced or utilized in any
form or by any electronic, mechanical or other
means, now known or hereafter invented,
including photocopying and recording, or in
any information storage and retrieval system,
without permission in writing from the
publisher.*

British Library Cataloguing in Publication Data

Schiller, K.F.R.

A colour atlas of gastrointestinal endoscopy.

*1. Endoscope and endoscopy 2. Gastrointestinal
system*

I. Title II. Cockel, R. III. Hunt, R.H.

616.3'307545 RC804.E6

ISBN 0-412-25590-1

*To Judy, Ann and Marlene
and to our children
with love and in appreciation of their indulgence and support*

Acknowledgements

First we must thank our collaborators, Mr Brian Sterry Ashby and Professor Giles Stevenson, for their specific contributions and for their general help and advice. Mr Sterry Ashby wrote the chapter on choledochoscopy, while Professor Stevenson provided many of the radiographs. We would also like to acknowledge the loan of material from a number of friends and colleagues. Dr Jerome Waye, a co-editor, kindly allowed a number of illustrations that had appeared in *Colonoscopy* (see Bibliography) to be used in this atlas. Dr Harold Bernhard, Dr Stephen Bown, Mr Roger Celestin, Dr Duncan Colin-Jones. Professor James Elder, Dr Stephan Jain, Dr Jonathan Rhodes, Professor Francesco Rossini, Dr Wilfred Sircus, Dr John Summerfield, Dr Paul Swain, Dr Robin Teague and Dr Christopher Williams have also been generous with their loans of material. Medical and nursing members of our Endoscopy Units, both past and present, have helped immeasurably in the collection and collation of illustrations. Our hospital photographers have, as always, shown their skill. Adrian Schiller has taken some time out of his studies to produce the line drawings. Our secretaries have been helpful far beyond the call of duty and in this connection our special thanks go to Mrs Ann Terry who has typed the bulk of the manuscript, and to Mrs Jean Denning. Mr Andrew Burrell and Mrs Sandy Burrell designed the atlas. Dr Peter Altman, Mr Brian West and Ms Madeleine Metcalfe of Chapman and Hall have been the most attentive of midwives. To all these and to our anonymous patients whose normal and abnormal findings are here recorded, we extend our profound thanks.

KFRS
RC
RHH

Preface

This book is first and foremost a colour atlas of appearances which may be encountered during gastrointestinal endoscopy. It is supplemented by a descriptive text and line drawings which we hope will aid interpretation. Points of endoscopic technique are also included where we consider that such information is relevant. The compass of the book is broad and includes oesophagogastroduodenoscopy, colonoscopy, endoscopic retrograde cholangiopancreatography and operative choledochoscopy. It does not seek to supplant established monographs on these subjects but instead gives an overview of the whole field. Radiographs are incorporated in some sections, for example where endoscopy is of particular value in solving radiological problems, though no systematic correlation has been attempted. The chapter on endoscopic retrograde cholangiopancreatography (ERCP) contains more radiographs than endoscopic views. This is inevitable: in this investigation the endoscopist's main function is to provide a method by which radiographs essential to the solution of certain clinical problems may be obtained. Although the endoscopist appears to be merely the radiologist's technician, he or she must be familiar with the radiographic appearances obtained at ERCP and their interpretation.

In the sections dealing with normal appearances the order of illustrations reflects the order in which the endoscopic procedure is undertaken, for example, oesophagus, stomach, upper duodenum, J-manoeuvre, withdrawal. In other sections illustrations are in the main grouped on the basis of similarity of appearances or of pathological findings, as seemed most appropriate.

The design of the endoscopy room is not discussed, neither are the different types of endoscopes listed or described. Where this seemed indicated there are illustrations and outline descriptions of ancillary equipment. The reader is reminded that much of the basic and ancillary apparatus, such as light sources, photographic and CCTV equipment, may be used in connection with all the major varieties of endoscopy illustrated in this atlas.

Excellent manuals on endoscopic technique and a multitude of textbooks of gastroenterology already exist. These should be used alongside the present work which aims to complement rather than replace them in any way.

For whom is this colour atlas intended? First, for the less experienced endoscopist so that he or she may gain confidence by having available a range of appearances from which to learn and with which to compare findings. Secondly, for the more experienced endoscopists who wish to broaden their horizons and may be stimulated by seeing a wider range of appearances than those with which they are familiar. Next, it is hoped that this atlas will find a place as a reference book in the endoscopy room. Radiologists, pathologists and non-specialist physicians and surgeons may also be interested to examine what the endoscopist actually sees and does during diagnostic and therapeutic procedures. We hope that this colour atlas will make a contribution to a wider understanding of the place of endoscopy in gastroenterology, that it

will help in deciding which patients are most appropriately referred for endoscopy, and not least that it will reveal some of the limitations of the technique. Finally, a book of this type should be of value to clinical students and their teachers during discussions on gastroenterological topics.

No atlas can ever be entirely comprehensive—and we apologize if we have omitted some rarity dear to the heart of a reader. We have tried to illustrate the full range of normal appearances, most of the abnormalities which an endoscopist will encounter, ERCP appearances and material on therapeutic endoscopy. A short chapter on the techniques of endoscopic photography has also been included. Detailed references have been omitted as most of the atlas derives from personal experience, but we have included a substantial bibliography as a guide to further reading.

The great majority of pictures are our own. Not surprisingly our collections were incomplete. We have therefore turned to our friends and colleagues whom we formally thank for allowing us to use some of their material.

KFRS

RC

RHH

Foreword

There is no substitute for experience. The authors of this atlas have provided a composite experience of many years of endoscopic observations and documentation in a practical format with superb illustrations.

Contributions by clinicians from different geographical areas and with various practice orientations provide as excellent a demonstration of the spectrum of anatomy and gross pathology as any of us are likely to encounter. This volume will be a prized possession of those who appreciate the value of morphological detail in accurate diagnosis. It is difficult to imagine how such a marvelous collection of normal, pathological and radiological images could be more effectively combined under one cover.

In this era of diagnostic urgency and therapeutic potential, the atlas format is an essential contribution to our intellectual preparation for making sound clinical judgements. This atlas provides that necessary resource. The authors and publishers have provided a high quality offering that will be timeless in its clinical value. The ultimate beneficiaries will be the patients we treat.

H. WORTH BOYCE, Jr, MD
Professor of Medicine
University of South Florida College of Medicine
Director, Division of Digestive Disease and Nutrition
Tampa, Florida, USA
and sometime President of
the American Society for Gastrointestinal Endoscopy

Contents

Acknowledgements	ix
Preface	xi
Foreword	xiii
1 Upper Gastrointestinal Tract	1
NORMAL APPEARANCES	1
ABNORMAL APPEARANCES	18
POSTOPERATIVE APPEARANCES	66
BLEEDING	73
THERAPEUTIC PROCEDURES	80
COMPLICATIONS	110
2 Endoscopic Retrograde Cholangiopancreatography	111
INSTRUMENTATION	112
ENDOSCOPIC APPEARANCES COMMONLY ENCOUNTERED	113
ABNORMAL ENDOSCOPIC APPEARANCES	117
TECHNIQUE OF CANNULATION	121
PANCREAS	124
BILIARY SYSTEM	139
PAPILLARY CARCINOMA	154
THERAPEUTIC PROCEDURES	155
COMPLICATIONS	170
3 Choledochoscopy	171
4 Lower Gastrointestinal Tract	177
NORMAL COLON: APPEARANCES NORMALLY ENCOUNTERED	178
ABNORMAL APPEARANCES	184
THERAPEUTIC PROCEDURES	221
COMPLICATIONS	228
5 Techniques of Endoscopic Photography	229
Bibliography	233
Index	235

Upper Gastrointestinal Tract

NORMAL APPEARANCES	1
ABNORMAL APPEARANCES	18
POSTOPERATIVE APPEARANCES	66
BLEEDING	73
THERAPEUTIC PROCEDURES	80
COMPLICATIONS	110

NORMAL APPEARANCES

1.1	Larynx	3
1.2	Epiglottis	3
1.3	Hypopharynx	4
1.4	Trachea and bronchi	4
1.5	Oesophagus	5
1.6	Ridged rugae: a normal variation	6
1.7	Gastric mucosal prolapse during retching	6
1.8	Lower oesophageal venous palisade	6
1.9	Closed lower oesophageal sphincter	7
1.10	Dentate line: normal variations	7
1.11	Saliva obscuring clear view of body	8
1.12	Residual gastric juice	8
1.13	Appearances of stomach during inflation	8
1.14	Cup-and-spill deformity: a normal variant	9
1.15	Rugal appearances: body and antrum	10
1.16	Antral contractions and the normal pylorus	11
1.17	Duodenal bulb	12
1.18	Duodenal mucosa	12
1.19	Upper duodenum: junction of bulb and second part	13
1.20	Bile in the duodenum	13
1.21	Duodenal froth	13
1.22	Circular folds	14
1.23	Papilla of Vater	14
1.24	Antrum, angulus and body from below	15
1.25	Gastro-oesophageal junction from below	16
1.26	Mucosa of body and fundus	17
1.27	Appearances when taking a mucosal biopsy	17

While it is common practice to introduce the endoscope 'blind', some endoscopists perform this procedure under direct vision, allowing inspection of the pharynx and larynx. These areas are more commonly and more easily observed during extubation. The endoscopist must be familiar with the normal appearances of this region (Figs 1.1 to 1.3). Especially in the heavily sedated patient the endoscope may inadvertently slip into the trachea (Fig. 1.4). The oesophagus is best examined during insertion (Figs 1.5 to 1.10) while it is easier to view the stomach during withdrawal. However, adequate distension of the stomach with air, and removal of excess fluid by suction, may be needed to enable normal gastric landmarks to be observed during introduction (Figs 1.11 to 1.15). The appearance and behaviour of the antropyloric area can easily be observed and noted (Fig. 1.16) and it is advisable to complete this part of the endoscopic examination before giving any gastroduodenal relaxant; at a later stage suppression of peristalsis may be desirable. For routine upper gastrointestinal fibre-endoscopy (oesophagogastrroduodenoscopy or OGD) a forward-viewing endoscope is used, though, for special indications, another instrument can easily be substituted. This is simpler if an overtube is employed (Fig. 1.150E). Normal upper duodenal appearances are shown in Figs 1.17 to 1.22. Using a standard forward-viewing endoscope it is rarely possible to see the papilla of Vater in detail (Fig. 1.23) nor to advance the endoscope much beyond the papilla. The incisura, lesser curve, gastro-oesophageal junction and fundus are best viewed on withdrawal of the instrument in the upward-flexed or J-position (Figs 1.24 to 1.26), though the endoscope must of course be straightened before being pulled back into the oesophagus. It is also important to be familiar with the technique of obtaining biopsy material (Fig. 1.27) and cytological brushings (Fig. 1.71B) for microscopy.

It need hardly be emphasized that familiarity with basic routine and normal appearances is essential to the endoscopist before he or she can proceed with any confidence to the examination and interpretation of abnormalities.

1.1 A and B

Larynx

It is common practice to introduce the endoscope into the upper oesophagus 'blind' so that the larynx and hypopharynx are not normally seen at this stage. The area may, however, be inspected, either during intubation or extubation. Movement of the vocal cords can be assessed by asking the patient to say 'ee'.

A



B

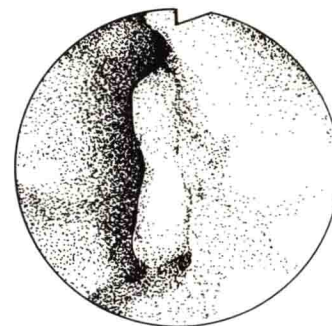


1.2 A to C

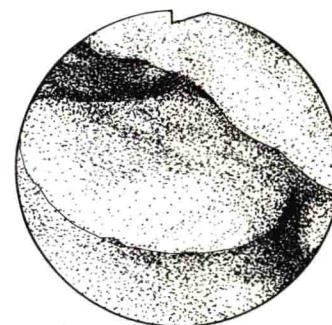
Epiglottitis

Figure 1.2 A shows the epiglottitis in its normal resting position, thrown forward. In Fig. 1.2 B its anterior surface is shown after the epiglottitis has moved backwards, while in Fig. 1.2 C the endoscope has been further advanced showing the root of the epiglottitis.

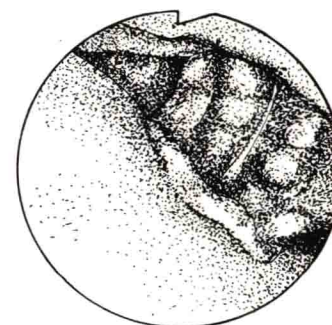
A



B



C

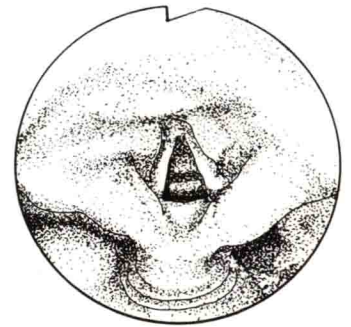
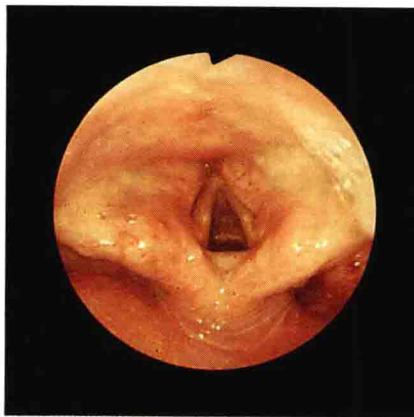


1.3 A and B

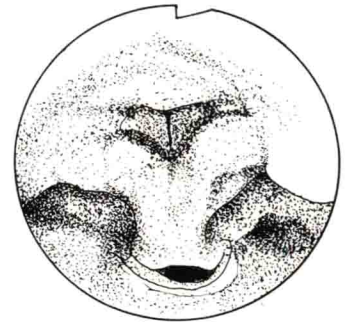
Hypopharynx

Figure 1.3 A demonstrates the posterior aspect of the larynx with the entrance to the oesophagus closed, while in Fig. 1.3 B it has barely opened. The pyriform fossae lie each side of the oesophageal opening. The cricopharyngeal sphincter can be opened by asking the patient to swallow. The pyriform fossae are obliterated by this manoeuvre allowing the instrument safely to be advanced into the upper oesophagus.

A



B



1.4 A and B

Trachea and bronchi

Occasionally the endoscopist will inadvertently slip the tip of the endoscope into the upper trachea, particularly in older patients, heavily sedated patients or those who retch during intubation. If the instrument is withdrawn immediately this is unlikely to be of great importance, although if coughing is provoked it is advisable to extubate the patient completely, and to restart the endoscopy after coughing has ceased. Figure 1.4 A demonstrates the endoscopic appearances of the trachea, while in Fig. 1.4 B the carina and main bronchi are illustrated.

A



B



Oesophagus

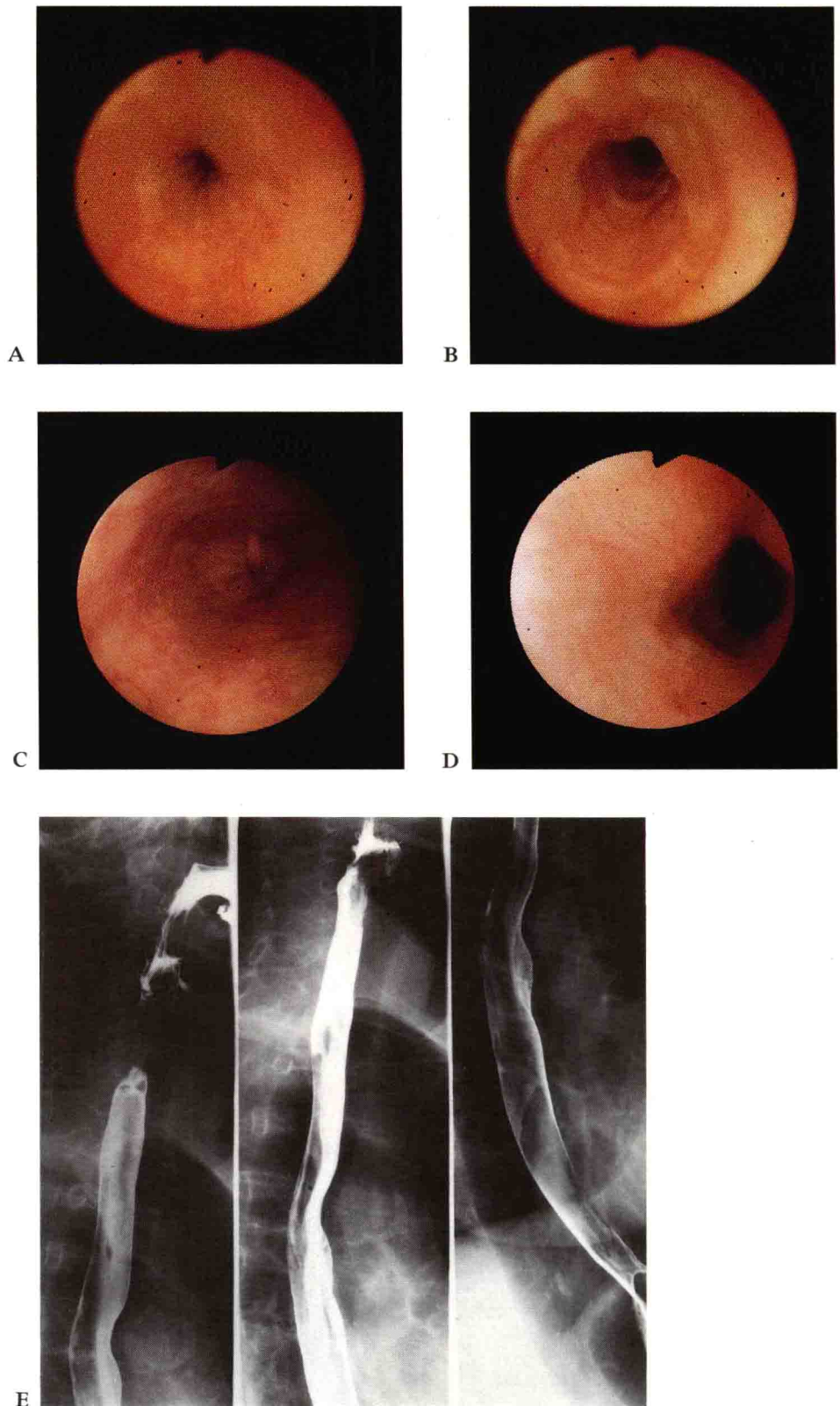
Figure 1.5 A shows a normal oesophagus before distension. This will present as a whitish-pink tube, often with raised longitudinal ridges representing the rugal pattern. It is unusual for the upper oesophagus to show peristaltic movements though these are commonly seen in the middle and lower third.

The partially distended normal oesophagus is shown in Fig. 1.5 B. The appearances are often slightly lumpy and irregular, at first suggestive of an abnormal mucosa. Further inflation will, however, assuage such doubts.

The fully distended normal oesophagus (Fig. 1.5 C) will appear as a smooth featureless tube lined by whitish-pink epithelium. Small intraepithelial venules are commonly seen. The lower oesophagus is often whitish and the upper a little pinker, this contrast being more obvious in elderly subjects.

The aortic indentation into the otherwise smooth oesophageal outline forms a useful landmark (Fig. 1.5 D). Being pulsatile it is easily distinguished from other extrinsic deformities. Transmitted cardiac pulsation is commonly seen in the lower oesophagus.

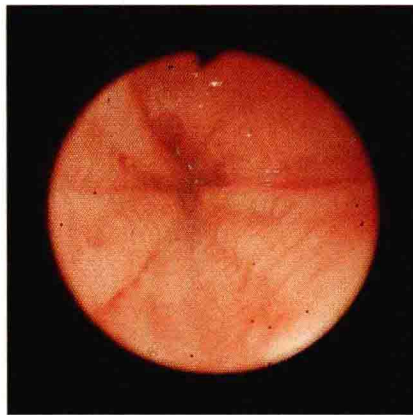
The oesophagus can be examined well using modern barium-based suspensions and gas granules or similar methods of obtaining double contrast films. Yet, as shown in this set of double contrast oesophagograms (Fig. 1.5 E), the region of the pharyngo-oesophageal junction is less clearly shown than the remainder of the oesophagus. The upper third can be well seen endoscopically provided due attention is given to this part of the examination, and air distension is adequate (Fig. 1.5 c).



1.6

Ridged rugae: a normal variation

It is not uncommon to see a multitude of tiny transverse ridges running across the oesophageal rugae. These ridges disappear during peristaltic relaxation or as a result of distension with air.



1.7

Gastric mucosal prolapse during retching

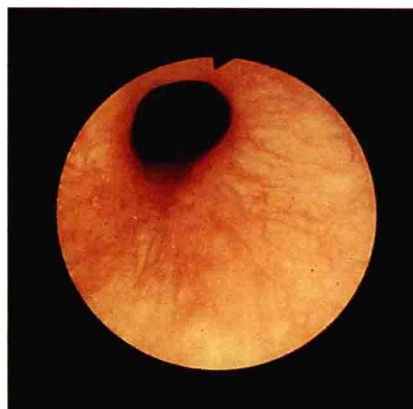
Introduction of the endoscope into the oesophagus often causes retching. This brings about an increase in oesophageal movement and the belching of air introduced by the endoscopist, making examination of the oesophagus difficult at this stage. With the tip of the endoscope situated in the lower oesophagus, momentary prolapse of the redder gastric mucosa can often be seen. This process, when it occurs during frank vomiting, is associated with significant shearing strains on the gastric mucosa and is the basis of the Mallory-Weiss tear.



1.8

Lower oesophageal venous palisade

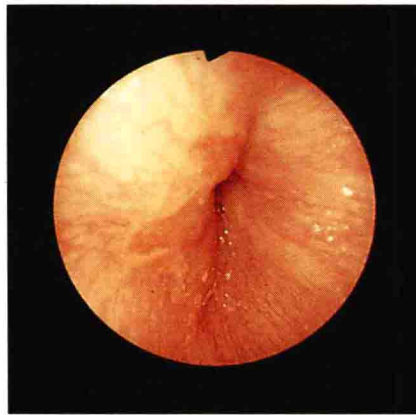
Particularly in the younger subject, a fine longitudinally running venous palisade is often seen just above the squamocolumnar epithelial junction. This is a variant or an exaggeration of normal, and of no clinical significance.



1.9

Closed lower oesophageal sphincter

The oesophagus is seen to be distended above the closed sphincter which is represented by the confluence of the lowest portions of the mucosal rugae. This is also called the oesophageal fleurette. Note the venous palisade referred to in Fig.1.8.



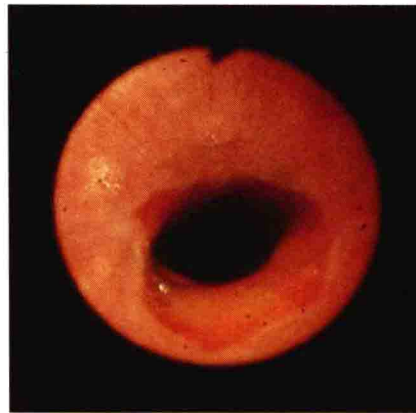
1.10 A to C

Dentate line: normal variations

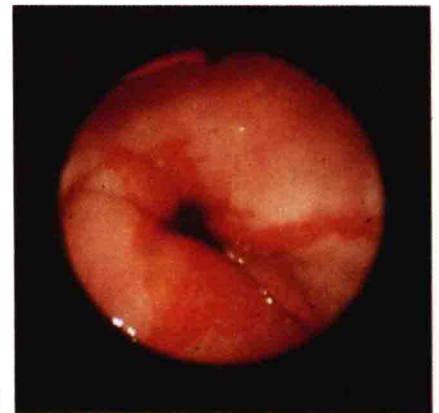
It is not always easy, even in normal subjects, to see the squamocolumnar epithelial junction, also known as the dentate or zee-line. In older subjects the line may be more pronounced because the lower oesophageal mucosa is often relatively paler in colour.

The dentate line is sometimes regular, giving the appearance of a sharp ring-like demarcation (Fig. 1.10 A), though the irregularity shown in Fig. 1.10 B is also normal. Less common is a dentate line with mucosal islands (Fig. 1.10 C) which must be distinguished from oesophagitis with erythema and patchy ulceration (Fig. 1.33 b).

A



B



C



Saliva obscuring clear view of body

It is not always possible to obtain good views when entering the stomach. Swallowed saliva, or regurgitated bile-stained yellow froth, may present difficulties. Bubbles may be dispersed by introduction of a silicone-containing defoaming agent or by suction to remove the offending material. Excessive use of suction may traumatize the mucosa causing petechiae or suction artefacts (Fig. 1.64A and B). Some endoscopists ask the patient to drink a small quantity of defoaming agent before the procedure.

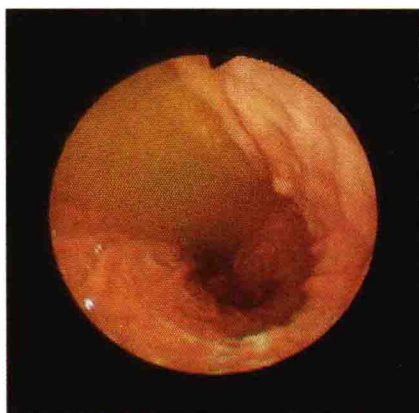


1.12 A and B

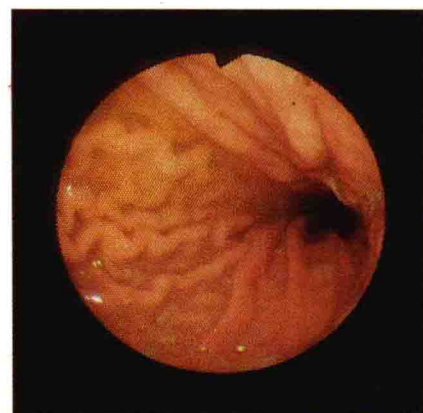
Residual gastric juice

In contrast with saliva (Fig. 1.11) and regurgitated frothy duodenal contents (Fig. 1.21A), residual gastric juice (Fig. 1.12A) can easily be aspirated through the endoscope. This enables a complete gastric survey to be undertaken with greater confidence (Fig. 1.12B). Residual gastric juice has been described as the 'mucus lake'.

A



B



1.13 A to D

Appearances of stomach during inflation

When first entering the stomach, the rugae appear lumpy and the way forward may not immediately be apparent (Fig. 1.13A). Moderate inflation will rapidly make orientation easier (Fig. 1.13B). During further inflation (Fig. 1.13C) the rugae will appear more linear, running towards the antrum and causing the appearance of the so-called 'Magenstrasse'. The rugal pattern may disappear altogether

A



B

