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SURGERY  
OF  
CHILDHOOD

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EDITED BY  
J. J. MASON BROWN

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# SURGERY OF CHILDHOOD

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Edited by  
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## PREFACE

In earlier times surgery was essentially the general surgery of adult life and it was not until children's hospitals were established a little over a century ago that any special provision was made in Britain for the surgical care of infants and children. Although these special hospitals were not numerous, being established only in the larger centres of population or associated with medical schools, they made major contributions to the general and special surgery of this age group. Special children's departments in large general and in teaching hospitals were a later development and they too have shared in the advancement of paediatric surgery. More recently special centres and departments—orthopaedic, neurosurgical, thoracic, plastic, cardiovascular and urological—have made highly specialized services available for the adult patient, and the advances in knowledge and technique so developed have been applied to the investigation and care of the infant and child and have helped to solve many childhood problems.

The sick child requires more than highly specialized knowledge and technical skill. He should be treated in a department or hospital in which his special needs are provided with understanding by doctors and nurses with paediatric training who will treat him as a child and not merely that part of his illness or anomaly that falls within a speciality. Specialization is inevitable and desirable and specialities should be developed within the children's hospitals and departments.

This ideal is still far from being achieved and in many smaller centres the surgical care of the infant and child devolves upon the general surgeon on duty who may have no special interest in or experience of the emergencies of infancy that are necessary for the diagnosis and treatment of neonatal anomalies. The diagnosis will depend on those responsible for the care of the infant and child—family doctors, obstetricians, child welfare and school medical officers and paediatricians—and the treatment lies in the hands of the general and specialist surgeons.

The contributors, paediatric surgeons, general surgeons with an interest in paediatric surgery and specialists in various fields, have combined to give an account of the wide field of the surgery of infancy and childhood with the exception of the more highly specialized aspects of neurosurgery. Emphasis has been placed on the clinical features and diagnosis. Surgical treatment where it does not differ from that in the adult is not detailed, whereas in conditions peculiar to childhood the authors have given a detailed description of the method they employ. Some overlapping between

sections and minor differences of opinion between contributors have been retained. References to important papers have been quoted as sources of valuable information and guides to further reading.

The book is intended to cover the present field of paediatric surgery and not the syllabus laid down for any examination. It is hoped that it will be of value to undergraduates and postgraduates, general practitioners, paediatricians, and to hospital junior staffs who have to care for the injured or sick infant and child.

J. J. M. B.

EDINBURGH 1962

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## CHAPTER 1

### GENERAL CONSIDERATIONS

J. J. MASON BROWN

The surgery of infancy and childhood is not merely the general surgery of adult life on a reduced scale. Infants and children suffer from abnormalities and diseases peculiar to those periods of life and also from injuries during birth. In addition they are liable to some of the diseases of adult life which are so modified that they present an entirely different course and clinical picture. What is true for the surgical conditions is equally apparent in the medical diseases at this time of life. Some of these medical conditions may simulate diseases which require surgical treatment and it is necessary for the surgeon to have some knowledge of them in order that he may be able to consider them in the differential diagnosis.

A most important part of paediatrics is concerned with the care of the newly born and the premature baby. Recent advances in the knowledge of the physiology of this period of life have contributed greatly to the lessening in the mortality from immaturity. As the premature baby who is otherwise normal requires special care, skilled medical and nursing care is doubly necessary following operation. The surgeon must understand the special needs of the premature and small baby or failing this he must work in close collaboration with a paediatrician. The surgeon who from force of circumstances is called upon only rarely or in emergency to undertake surgical treatment in these young subjects will find that it is not sufficient to apply the same pre- and post-operative treatment and the same operative technique as he would in the adult. It is because of these differences that some surgeons limit their work to the surgery of infancy and childhood and it may be worth while briefly to consider the qualifications required for the handling of these young patients.

#### **The qualifications of the paediatric surgeon in the handling of patients**

The first essential is that the surgeon must enjoy working with children; he should understand their likes and dislikes, their pleasures and fears and their behaviour at different ages. In his early training resident appointments in paediatrics and in paediatric surgery are the first steps in acquiring some knowledge of these subjects, but they serve also to show him if he is likely to get on well with children—the greatest asset of all in his future work.

As the infant cannot speak and the young child is unable to detail his symptoms the surgeon must develop his powers of observation to the

full. It is scarcely necessary to add that he must be equally at home in the handling of adults, because he is responsible not only for the care of the child but for guiding the parents and ensuring that he and they co-operate fully in the interests of the child.

Children are sensitive to sympathetic understanding and the aim of the surgeon must be to establish friendly relations as early as possible. Apart from the very ill child or the child in real pain, the majority of children come for examination either in an antagonistic frame of mind or at the least with great reluctance for there are so many more congenial activities in which they would rather be engaged. Difficulties arise because the child has been handled with little understanding by the parents who may have deceived him about the reason for the visit, bribed him with all kinds of promises, threatened him with punishment if he does not behave or may even have used active compulsion to get him into the consulting-room. In many ways the ideal would be to see the child in his own surroundings at home, but difficulties may arise there also because some children resent the intrusion of a stranger into their private domain.

With children beyond the age of infancy the line to be taken in the first approach is usually evident from a rapid appraisal of mother and child as they enter the room. The mother and child who walk in quietly and placidly together will give rise to no difficulties. The very shy child who hides behind his mother or buries his head against her side requires a very different approach from the precocious child who frequently precedes his mother into the room and begins immediately to explore his surroundings. The obviously apprehensive mother communicates her fears to the child who is unlikely to co-operate for long and finally there is the child who is dragged into the room by the arm in a semi-sitting position by the flushed and already jaded parent.

The shy child requires most leisurely handling. Rapid advances serve only to increase his shyness. The best method is to go on with what you were doing, quietly question the mother and soon the child will begin to feel that he is being neglected. This is the time to bring him into the picture and very soon his confidence will be gained.

The highly intelligent and precocious child is easy to handle although it may be difficult not to feel irritated by the worst offenders. Take the history from him and he will respect your intelligence and co-operate to the full.

The flustered mother should be put at her ease by the taking of the history slowly and carefully while the child is allowed to inspect and play with the toys which should be available in the consulting-room.

The child who has been brought forcibly into the room presents the biggest problem. In the worst cases it is sometimes advisable to obtain the history from the mother while he is allowed to do as he likes. If the child reacts forcibly to the earliest advances made to him, and it is quite certain that the condition is a non-urgent one, it may be worth while to allow him to play with the toys and to arrange to see him again when his

co-operation is often secured. Examination of an actively resisting child is of no value and to indulge in a physical battle with him is a confession of failure.

Babies are not so difficult for they have not developed these peculiarities of behaviour. As little as possible should be done to alter the routine to which they are accustomed and the baby is examined on his mother's lap. He should not be awakened for the examination which can be carried out in many cases to greater advantage during sleep.

It seems hardly necessary to mention that babies and children resent being stared at and while observation is of great value the more unobtrusive it is the more will be gained from it.

Above all the quality of patience is invaluable to the surgeon. He must never convey the impression that his time is short or that his temper is being held only just in check. His attitude must never suggest that the parent does not handle the child as well as she might. It is well to remember that the word co-operation implies some give and take from all parties to the examination and if the surgeon has more than one or two non-co-operators in a busy clinic he must ask himself whether the fault does not lie in himself.

### Stages of childhood

It is customary to divide the period of childhood into two. *Infancy* is the period from birth to the completion of the eruption of the deciduous teeth, but the term is in fact employed to describe the first two years of life. It is convenient also to subdivide infancy by separation of the first month or *neonatal period* during which the baby becomes adapted to its extra-uterine existence and surgery is largely that of congenital anomalies.

*Childhood* extends from two years to puberty which varies in its time of onset. While many children's hospitals limit admissions to children of twelve years or under it would be preferable for the children's hospital age to correspond with that of the school-leaving age. A further subdivision may be made here also with advantage into the *pre-school* and the *school child*, for in the treatment of the former the paediatric surgeon, practitioner and Child Welfare Service must co-operate, while in the latter the School Medical Service takes the place of the Child Welfare Department.

### Manifestations of and modifying factors in disease in infancy and childhood

In the neonatal period the baby has to complete the change from foetal to a separate existence. Respiration, the adult form of circulation, feeding by means of the alimentary tract, and the control of temperature are all functions which are essential to the new environment. Infection is another complication from which the baby has previously been largely protected. It would seem likely that the newborn baby would be vulnerable, but in actual fact at birth he is conditioned to withstand the stress and strain associated with delivery and withstands operative procedures

very well during the first days of life. The surgery of this period is concerned with the treatment of congenital anomalies which would be fatal without relief (e.g. atresias or other obstructions of the alimentary tract), injuries sustained during birth and infection. Other congenital anomalies call for special management with a view to their later correction, e.g. cleft lip and palate and some myelomeningoceles. In the latter part of this period congenital anomalies may become manifest by the symptoms or complications which result, e.g. pyloric stenosis, some urinary obstructions and some congenital embryonic tumours. In the neonatal period also obvious deformities of the limbs are recognized and where indicated their correction is begun, e.g. talipes equino-varus. In the newly born baby a careful record must be kept of the passage of meconium for delay in its passage may indicate Hirschsprung's disease or failure to pass it may be a manifestation of meconium ileus. Abnormal meconium may be found distally in some intestinal atresias. In the neonate bilious vomiting has a special surgical significance while the normal transition from meconium to the infantile type of stool may be delayed or may not occur in certain obstructions of delayed onset.

Even in the neonatal period the baby passes urine in definite amounts and is not constantly wet. Any straining and difficulty in the passage of urine is significant and equally important is constant dribbling incontinence. It is obvious that at this period of life the recognition of defects which require treatment depends largely on the careful observation of these normal functions and the recognition of any departure from the normal should be investigated and not be dismissed lightly.

In infancy the absence of speech makes it impossible for the baby to draw the attention of his attendants to his symptoms other than by crying. The normal baby cries because he is hungry, because he is soiled or wet, but sometimes he cries for reasons which are beyond the skill of his attendants to evaluate. It is therefore of the first importance that the paediatric surgeon should be able to tell by observation when a baby is ill. What has been well termed 'the inarticulate expression of disease in infants' has the great advantage that it is honest, but its understanding comes only from experience. It will be referred to further in the examination of the infant.

In the child and infant the activity of growth and development influence powerfully the effects of disease which are likely to manifest an acute onset, intense symptoms and a rapid course even when the illness is comparatively slight. On the other hand, disease at this age is likely to be uncomplicated or modified by the effect of previous illness. In many ways the inability of the young child to describe subjective symptoms is an advantage because his examiner is not led astray by the over-emphasis the adult tends to place on the symptoms which he considers to be most important in the diagnosis he has made already for himself.



## THE EXAMINATION OF INFANTS AND CHILDREN

It may seem scarcely necessary to detail the methods of examination to be employed in the investigation of disease in infants and children for this subject comes after clinical medicine and surgery in the medical curriculum. Nevertheless, it is obvious that the medical student despite his instruction and his clinical work in these subjects is immediately at a loss when asked to examine a child. Whether the student is afraid that he will be made to look ridiculous by an antagonistic child or recalls the unkind way he and his friends ragged masters at school it is invariably the student who looks forlorn and apprehensive and not the child. A simple method will be given for the benefit of students or those who are called only occasionally to deal with children. It must be emphasized that such a scheme is not rigid and the physical examination should be carried out not by systems but by making first of all the examinations which will not upset the child and leaving those which are likely to upset him to the end.

### The history

In the infant and younger child the history is obtained from the parents or other attendant, while in older children the history of the present illness should be obtained in the child's own words supplemented where necessary by the parents.

In taking the history from the mother no detail no matter how apparently trivial it may seem should be ignored. The examiner must bear in mind that the mother is the only person who is aware of the child's normal habits and appearance and even the apparently frivolous or not very intelligent-looking woman can be a most accurate and penetrating observer when her faculties are accentuated by her love for the child.

*The history of the present illness.* The date of onset of the illness is easily obtained when it is sudden, but in more chronic conditions it may be less certain. In such cases it is better to go back to ascertain when the child was perfectly well and then to try to elicit the symptoms and mother's observations in chronological order. When the history is vague, as it may well be, the surgeon should ask general questions bringing in all systems and should inquire about changes in sleep or temper. If a question appears to elicit an answer which is suggestive that trail should be pursued by further questioning. When there are definite symptoms it should be possible to gain an accurate picture of the mode of onset and the course of the illness. The history is incomplete without a record of the treatment which may have been given by the mother or practitioner for this may well modify the progress of the condition.

*The family history* should be obtained as far back as possible for it may be of great assistance in assessing the possibility of transmissible disease or congenital anomalies. The health and possible consanguinity of the parents should be investigated.

*Pre-natal history.* The history of other siblings and the mother's obstetrical history are obtained, particular care being taken to elicit any history of abortion or of stillbirths.

*The history of the birth.* Prolonged or precipitate labour or instrumental delivery are inquired into and questions elicit whether there was any difficulty in resuscitating the baby.

*The post-natal history of the child* includes a number of items—

(a) the history of the early feeding with details of the feeds and their method of preparation if bottle fed

(b) the date of 'milestones' such as dentition, sitting, walking, speaking, etc.

(c) previous health including full information about previous illness

(d) social background and home conditions.

### Inspection

Inspection of the child has been carried out as unobtrusively as possible throughout the taking of the history. Most valuable information can be elicited by the trained observer merely by looking at the child and listening to its cry. In this connection much can be learned from a study of the face and of the facial expression of the child. It must be emphasized that this is part of the examination and not an attempt to short circuit the full examination by the dangerous practice of spot diagnosis.

*Facial expression.* In sleep the healthy child's face is in complete repose. The eyelids are completely closed, the lips are slightly parted, there is a faint sound of breathing and there is no obvious movement of the alae nasi. When lying quietly awake the infant's face shows a wondering expression as it observes all that is going on around it. The face is full, rounded and chubby. Under the age of six months the baby when awake shows only two expressions, pleasure and annoyance. In showing annoyance the healthy infant does so in no half-hearted way and the expression of annoyance is difficult to interpret because it is equally intense over hunger or being soiled as it is in pain.

Smiling is of great importance because infants and young children never smile when they are ill and the first smile during illness is a very welcome sign of improvement.

While the facial expression in various conditions will be described in other sections there are some features that require description.

*Colour.* The colour of the facial skin is best observed when the infant is asleep and never on waking when there are often well-marked vasomotor disturbances. This is of particular importance in estimating pallor for a child with severe anaemia does not flush easily but one with pallor from toxicity frequently flushes on waking (Brown, 1937). Cyanosis in an infant in the absence of fever usually indicates congenital heart disease. Flushing occurs in fever, the malar flush being most frequent in respiratory infection.

*Hair.* The face of the infant and small child is usually free from hair. Excess of hair in the upper part of the face is often found in mental

deficiency but the surgeon must also remember its association with gross congenital abnormalities.

In *dehydration* of sudden onset the face has lost its fluid but not its fat; there is hollowing of the orbits so that the eyes are sunken and staring; the skin of the lower lids is loose but the chin and cheeks do not show wasting. The baby shows *thirst* in varying degree, either the open mouth with the dry but not protruding tongue in minor degrees or in more severe cases the tongue is curled upwards so that its tip lies against the upper alveolus.

In dehydration of less rapid onset there is also some loss of fat and the face shows wrinkled loose folds of skin on the forehead, wasting giving a thin pointed chin and hollow cheeks apart from the sucking pad of fat which is the last to be affected.

The *eyes*. A sick child may sleep with the eyes partly open but this never happens in health. The infant who is awake will have the eyes wide open but should they not follow things around him and show no flicker of interest the baby is seriously ill. The eyes are also the main feature in the 'stare' of meningitis and the 'anxious expression' found when there is difficulty in breathing and in generalized peritonitis.

The *cry*. Crying is the only means by which the young baby can express his feelings. He is therefore unable to distinguish between pain, discomfort, hunger or mere displeasure. Long after the power of speech has developed the cry remains the ideal method of complaint which is most likely to bring help without delay. It is likely that the mother will have excluded hunger by test and wetness or soiling by changing the baby before the doctor comes so that these routine displeasures are readily ruled out. The diagnosis of the cause of crying is assisted by noting its features and its relationship to other happenings. The *type of cry*—the sudden sharp loud paroxysm of shrieking denotes the cry of pain in the head (the hydrocephalic cry), the sustained paroxysms of full-blooded screaming of intestinal colic, etc.—is of assistance in diagnosis. The *time relationship of the cry* is equally helpful. Crying only during and some time after defaecation points to anal fissure, crying during and after micturition indicates meatal ulcer, while crying and straining at the beginning of micturition and during it point to some obstructive lesion below bladder level. Movements associated with the cry may help in diagnosis, e.g. the hands are held to the ears in otitis media, to the head in headache, while the legs are drawn up during attacks of colic.

The *skin* affords valuable information. The healthy baby has a beautiful fine skin the smoothness of which is proverbial. There is good tone so that the skin is difficult to pick up and there is a considerable amount of subcutaneous fat. In dehydration the skin becomes lax and in more serious conditions wasting is shown by wrinkles most marked in the thighs. Skin rashes may be of value in surgical diagnosis, e.g. the purpuric rash may help in the diagnosis of Henoch's purpura from intussusception, while bruising without obvious cause may point to previously