

The Easter Seal Guide To Children's Orthopaedics

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Easter Seal
guide to
children's
orthopaedics

Prevention, Screening
and Problem Solving

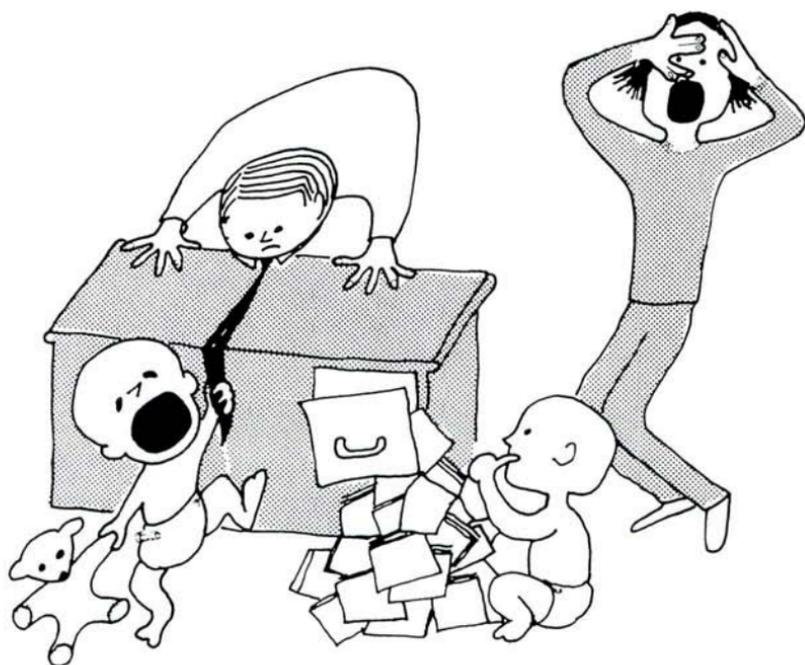
**Prevention, Screening,
And Problem Solving**



GLOBAL HELP
HEALTH EDUCATION USING LOW-COST PUBLICATIONS

The Easter Seal guide to children's orthopaedics

Prevention, Screening and Problem Solving



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CONTENTS

Chapter I

Page 4

GENERAL FEATURES

- A. Diagnosis
- B. Explanations
- C. Psychological Traits in Mothers
- D. Referral

Chapter II

Page 14

THE ROLE OF THE PRIMARY CARE PHYSICIAN

- A. Prevention — Spina Bifida
 - Cerebral Palsy
 - Genetic Disease
 - Injury
 - Child Abuse
- B. Screening — Congenital Dislocation of the Hip
 - Scoliosis
- C. Advisor on Lifestyle
- D. Problem Solving — injury
 - limp
 - pain
 - hip
 - knee
 - tibia
 - spine
 - the painful swollen joint
 - osteomyelitis
 - tumours

Chapter III

Page 47

THE PRIMARY CARE PHYSICIAN'S ROLE IN PARTICULAR AREAS

- 1. Newborn Nursery — congenital dislocation of the hip
 - feet
 - torticollis
 - obstetric paralysis
 - spina bifida
 - arthrogryposis
 - congenital amputations

2. **Toddlers and Preschoolers** – torsional problems
 - angular deformities
 - flat feet
 - trigger fingers
 - curly toes
3. **Adolescents** – spinal screening
foot problems

Chapter IV

Page 69

SHORT TOPICS

1. **Sports Medicine**
2. **Chronically Handicapped**
3. **Record Keeping**

Chapter V

Page 79

HANDOUTS TO PHOTOCOPY AND GIVE TO PARENTS

Chapter VI

Page 91

SKILLTEST

A note about The Easter Seal Society

Chapter I

GENERAL FEATURES

Obviously children's problems are different from those of adults. Children do not call you up with backache or a rupture of tendo-achilles sustained while playing middle-aged tennis. Children do not need joint replacements. Psychosomatic complaints are rare. Even children's fractures generally heal without operation. Children seldom need much in the way of physiotherapy. The main difference between children and adults is that children have parents!

Most parents worry about the shape of their children's legs and feet at one time or another and this forms the bulk of consultations. However most children grow straight by themselves. The doctor therefore needs only 2 simple skills: 1) to provide vivid explanations for parents and 2) to recognize the conditions that do not follow in this pattern.

Reassurance never works. The parents want explanations. It is no good saying "Don't worry, it will be OK", because every parent knows somebody who was told this who died shortly afterwards. Parents want information e.g. "This is a common condition in children; 30% of children are affected. Perhaps you know somebody else with it. We hardly ever see it in adults because it usually gets better by itself. I will show you how to keep a check on it yourself and I would like to examine it in six months' time. If it does not get better then we might think about doing something more".

Most primary care physicians are so familiar with common disorders that they instantly recognize conditions which do not fit into the pattern. These are the cases which require further investigation and perhaps referral.

There are several ways we make a diagnosis. Young doctors use *logic*; this leads them to seeing a world populated by canaries because they have not understood the incidence and probabilities for each diagnosis. Old doctors use the technique of *pattern recognition* which may lead to error because other possibilities are ignored. Many use the *dictionary approach* which is the mental equivalent of thumbing through a list of every possibility memorised for a MCQ test until the right one is found. Perhaps the best approach is to use both logic and probability.

Making a Diagnosis

Imagine this scene as you open the examining room door. The 4-year-old stands naked in a cool room. Mother opens the conversation. "Doctor, tell Jim he should do as he is told. Jim, you have only just been to the washroom. See doctor, he has hurt his knee — every time I press it here — like this — he screams". Jim starts to scream and shows no signs of stopping. What are you to do? Say "Good morning"? This is the real challenge of children's orthopaedics.

When a child is screaming on its mother's lap, it is hard to take a history, accumulate evidence, impart information and remain looking cool. Both children and their parents are easily frightened and upset. Subterfuge is necessary to make a diagnosis. Initial examination may easily get out of hand.

The Consultation

Have toys around and enough space to see a child walk about — the corridor outside can often be used.

Establish Rapport

It is always good to try to make friends with your patients. You don't know when you may need it. Use body language — get close to talk — don't stand talking down to them or sit behind the desk. Look them in the eye. Smile. Talk to the parents so that the children have time to get used to you and then gradually involve the child in the conversation.

Use their names, don't call them "mother" or "princess". Sit down to talk, don't stand — people think you are about to walk away.

History Taking

Discover the reason for the visit.

1. Is it real pain or disability?
2. Is it a desire to catch a problem early?
3. Were they sent by Granny or a worrying neighbour?
4. Is there a family history of a problem?
5. Do they not know what to expect and want a guarantee that the child is normal?

When you understand the reason for the visit you will appreciate what they are expecting from you. What ever else you may feel the situation demands you will deal with this first.

Wise parents don't like to make negative remarks about their children within earshot. At least some of the interview should take place without the child being present to allow for these exchanges. Either send the child out into the waiting area to play with some toys, ask the receptionist to entertain him or leave him getting dressed while the parents go into another room with you.

Always enquire about a family history and their knowledge of the condition to avoid the scenario like this:

Doctor — "He will grow out of it".

Mother — "Are you sure"?

Doctor — "Well, as a matter of fact, I listened to a three hour lecture on just this subject last week. Experts from Japan and New York agreed that children grow out of this".

Mother, pulling up her skirt — "Then, how do you explain these scars doctor? My legs were just like his and I needed operations".

Now all you can do is wriggle, wondering whether you meant that 99% get better and that she was just one of the unlucky 1% or did you mean that the operation was unnecessary. "If only I had taken a family history I would have been a little more accurate in what I said".

Examination

Quieten infants with a bottle when you examine them. A music box is wonderful. Small clinging children should be examined on their parent's knees to avoid the cutaneo-lachrymal reflex — when the skin touches the examining couch the tears begin to flow. If there is a tender place leave this until the last and then feel it gently, only once. A thorough examination should be carried out. The thirty-second examination of one small part lacks conviction. Undress the children sufficiently.



ROUTINE EXAMINATION IN 18 STEPS



1
'WALK'
? LIMP



2
'RUN'
? COORDINATION



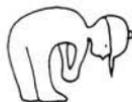
3
'JUMP ON 1 LEG'
? STRENGTH OF EACH
LEG



4
'WALK ON YOUR HEELS'
? SHORT HEELCORDS



5
WALK ON TIPTOES
? STRENGTH



6
'HOLD YOUR HANDS
TOGETHER AND BEND
FORWARDS'
? SCOLIOSIS



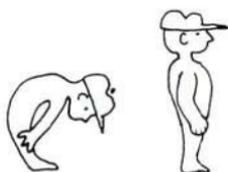
7
? SHOULDERS LEVEL
? SPINAL DIMPLES
? SPINAL HAIRY PATCH



8
? TORTICOLLIS
? CARRYING ANGLE
? LEG LENGTHS EQUAL
? KNOCK KNEE, BOW
LEG
? FOOT ARCHES
? IN-TOEING, OUT-
TOEING



9
 ? KYPHOSIS
 ? LORDOSIS



10
 'SIT DOWN, NOW
 STAND UP'
 SHOWS ARMS USED TO
 PUSH UP.
 A POSITIVE GOWER'S
 SIGN FOR MUSCULAR
 DYSTROPHY.

11
 'NOW LIE DOWN'
 ? EFFUSION
 ? WASTING



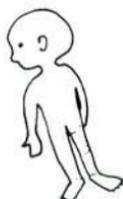
12
 'BEND UP.'
 ? STIFFNESS
 ? CLICKING MENISCI



13
 'DO THE SPLITS.'
 NEWBORNS SHOULD
 GET KNEES TOUCHING
 THE TABLE.
 ? ABDUCTION
 ? HIP DISEASE



14
 'AGAIN.'
 ? ABDUCTION
 ? HIP DISEASE



15
 'LIE FACE DOWN'.
 ? POPLITEAL CYST



16
 TEST EXTERNAL
 ROTATION.
 ? HIP DISEASE
 ? TORSION



17
 TEST INTERNAL
 ROTATION.
 ? HIP DISEASE
 ? TORSION



18
 'CAN YOU MAKE YOUR
 THUMB TOUCH YOUR
 FOREARM?'
 ? JOINT LAXITY

Investigations

Order an X-ray with as much deliberation as you would an expensive bottle of wine. If you want one bottle, do not ask for the whole cellar. Here are some guides:

Hips: request an AP and frog leg of the pelvis. It is important to compare one side with the other. An AP alone will miss half the pathology.

Spine: *scoliosis* can only be detected on standing films. A single 3' standing P.A. spine is sufficient. The PA projection irradiates the breast less than an AP projection. Do not order bending films. The fewer films the better for screening.

backpain. An AP, lateral and spot lateral of L5,S1 are a good choice. A spondylolisthesis can be recognized as easily on the spot lateral as on obliques.

Knee: An AP and lateral is a good start. When there is patellar pain ask for an *axial view with the knee flexed 45 degrees* and the quadriceps relaxed. This will show subluxation. A *tunnel view* is required for osteochondritis. To assess knock-knees request a *standing AP*.

Feet: Standing films always (unless fracture is likely.)

Legs: If you want the whole of the legs or you want to compare leg lengths request a 3 foot orthoroentgenogram.

Always put in your provisional diagnosis if you want to get a helpful report.

Radiologists lead lonely lives sitting in the dark reporting films. They enjoy talking. So if you don't know what to order or what the film means ask the radiologist. They always know what to do next.

Many parents will quiz you on the hazards of radiation — a difficult subject. Give them a photocopy of the handout in the appendix.

Explanations

"Relieving anxiety is a large part of every physician's stock-in-trade"
Victor Fuchs

(a) *Minor problems.* The more trivial the complaint the greater the psychological content. Careful explanations are required that will be understood and which will carry conviction when repeated to Granny. Unfortunately, some parents blank out as soon as you start to speak. One answer to this is the distribution of written handouts. This saves time and the chance of misunderstanding. If people look puzzled after a simple explanation you should not launch into a more elaborate explanation. Instead ask them to tell you what you just said.

A large part of an explanation is the art of putting problems into perspective. Some people see minor problems as major ones and regard normal variants as mysterious, rare diseases.

If simple analysis does not smooth the mother's furrowed brow it may help if you describe how you or your friends survived when your own children had the same problem. In desperation you may point out that if

parents are not prepared to sit the problem out the only other alternative would be an unnecessary operation. At this stage an orthopaedic surgeon can say "I earn my living doing operations and if I do not want to do it you should realize there is a good reason".

(b) *Explanations about more serious problems.* Send the child out and discuss it with the parents. Ignore all assurances that Jim is a big boy and should hear it from you. Tears will flow and everyone will get so agitated that communication becomes impossible.

If a child needs an operation discuss the details, possible complications and timing and other arrangements with the parents alone. They are the best people to decide how and when to tell their child. If the child is present they cannot ask all the questions they would like.

Always try to make parents feel good about their children. Find something nice to say. A consultation should be a happy memory for the parent and the child. It is a time to reinforce their confidence in parenting. Never say anything negative in front of a child to bruise its self-image.

Sometimes you cannot make a diagnosis the first time — there is no law that you must. Don't get carried away requesting investigations of very doubtful value. There may be nothing much the matter with the child. Wait and see him again.

Recognizing Psychological Traits in the Parents

A physician's job does not stop at making a diagnosis and providing advice. He must use words that are understood by the people he is talking to and make suggestions that they can accept.

Two examples of advice inviting non-compliance:

Doctor one — "Mother, you should stretch this child's foot". When mother does this the first time the baby cries. She will not do it again. Mothers do not like to hurt their babies.

Doctor two — "I know Jim is a 5-year-old boy but you must try and keep him quiet". This is impossible advice. Jim will only stay quiet if he is too sick to move or if you put his legs in plaster. But you can tell his parents to drive him to school and not to take him out for walks or stimulate him to other unnecessary activities.

There are some mothers with special qualities.

First generation orthopaedic mother

Mothers who were themselves shod in special corrective shoes, did exercises or wore braces, seem to seek a reason to put their children through the same thing.

Depressed parents

The child is brought up with a very minor variant of normal. Mother reacts very dramatically for no particular reason. If simple treatment is prescribed enormous difficulties are made. When you recognize these situations spend time finding out about the cause of depression and ignore the minor variant.

Little League father

This is well known.

The faddists

They may be into health shoes, gymnastics or vitamins. Fundamentally they want you to endorse the view they intend to impose on their children.

Fastidious mothers

Some mothers of very young children, particularly first children, have such an overriding impression of a beautiful bouncing baby that they get quite shaky at the knees if there is talk of putting casts on feet or Pavlik harness for the hip. Non-compliance is the rule for a rich variety of reasons. Each time the child is brought to the office looking beautiful with very lovely clothes but without any treatment being continued. You will either have to accept frequent removal of apparatus or if it is a serious problem, admission to hospital.

Mothers with mothers

Some Grannies seem to wield power in a family by undermining the self-image of the younger members. A frequent target is the shape of the grandchild's foot or leg. Sometimes, of course, Granny is right. If you suspect the situation ask "Are you worried about this or is it someone else in the family?" If the answer is "Granny" tell mother what to say to Granny.

Mothers with daughters

Mothers and teenage daughters sometimes choose to fight in the office.

"It began last week".

"No, it was the week before".

"It is worse after exercise".

"No, it is worse at night" and so on.

The discussion usually settles on the fact that mother doesn't like her daughter standing with round shoulders and wants a course of exercise for her. The daughter may be shy about her image but is angered by mother's criticism of her body. Take the daughter to one side and tell her she is good enough to be a cheer leader. Take the mother on one side secretly and tell her that being a cheer leader will be the best possible posture training she could have.

Tricky parents

Some parents will quiz you and can easily lead you into saying things which give the wrong impression and which you regret.

Doctor — "I think that he will grow out of it, but may I see him again in a year just to see that it is going along as expected".

Parent — "I guess you want to see him again because there is the chance that it won't get better".

Doctor, not rising to the bait — "No, it is just routine".

Parent — "And if it doesn't get better; what would you do then".

Doctor — "Well a small proportion require operation at the age of 18".

Parent — “Doctor, one minute you say it is nothing, the next minute you tell me he may need an operation. I guess you are going to tell me next that the operation may not work?”

The answer to this is to keep cool, explain it again, and don't lose the initiative.

Parents burdened by responsibility

Parent — “I know it's very slight, but I think he will blame me when he gets older for not getting it fixed when he was small”.

Doctor — “The operation is the same whether he is young or old. Why not leave it until he is old enough to decide for himself?”

Immigrant parents

They don't understand but keep saying “Yes”. They have rehearsed the history so that speech is better than comprehension. In addition to language problems there is a cultural difference.

Talking loudly, though frequently tested, is not enough. You need an interpreter. “Do you have a friend who speaks your language whom we could telephone now?”

Follow-up

Should you ask patients to come back so that they can give you a progress report? Skill is required to strike the right note.

“If it doesn't get better, come back”. This says that you are disinterested.

“Make an appointment to come back in two weeks. But if it is better by then you should cancel it.” You are saying that you are interested.

“Come back in six weeks so that you can tell me how it feels”. You are interested but you are encouraging a pre-occupation with symptoms.

“Come back in six weeks for a check. If it is no better the next step would be” Not only are you interested but you are the judge of progress. Frivolous complaints are discouraged by describing the next step.

“There is no need to make another appointment. I am sure it will settle in a week. But if it doesn't I would like to be the first person to know”. When you are 99% certain of cure this strikes the right note.

When should Patients be Referred?

It is hard to lose points when making a referral, unless you send patients to the wrong person. Paediatricians believe, of course, that “The natural enemy of a child is the orthopaedic surgeon”. When you do make a referral *send a letter* stating the problem you want solved. Only a line or two is necessary. Send the X-rays; an X-ray report is valueless. Describe the past and social history to provide some continuity. Referrals may be for:

1. *Unfamiliar problems.* When a patient comes with an unfamiliar problem; you can either read it up or refer them, which is much less trouble. There may be some diseases you do not like, and this is a good reason for referral.

2. *Diseases which need help you cannot provide.* For example, a child with multiple problems requiring services of a team, such as a child with cerebral palsy.

3. *Parents who need your opinion reinforced because they have doubts.* As soon as a patient is thinking about a second opinion, it is wise to arrange one. Do not create a scene if you want to keep them as patients. When the second opinion reinforces your advice they will be more inclined to believe you in the future. When patients shop for advice unassisted they become very confused and disbelieving.

4. *If you sense a potentially litigious situation.*

Chapter II

THE ROLE OF THE PRIMARY CARE PHYSICIAN

The primary care physician has four roles.

1. Prevention of musculoskeletal disorder — for which he is in a unique position.
2. Screening — recognizing problems before parents do.
3. Advisor on lifestyle.
4. Problem solving — diagnosis and management of patients with complaints.

PREVENTION

The worst diseases lend themselves to the preventive approach. The scourges of the past, e.g. polio, rickets and tuberculosis, have been eradicated by this approach. With help from primary care physicians, children's orthopaedic surgeons (who are now regarded as strong as a dinosaur and twice as smart) may in the future become just as extinct.

The incidence of diseases such as cerebral palsy, spina bifida and muscular dystrophy — the heavy weights — can be reduced through prevention. These are heart-breaking diseases. Many of the children require institutional care. Each child may cost a million dollars in medical, welfare and residential costs. There are strong human and economic arguments for prevention.

But prevention is always controversial. The evidence is often soft and people will say that their rights are violated. "If I want to have a baby at home without a doctor I am going to". Physicians will object to being directed and will talk about unforeseen effects. Even the success of a program is hard to assess in the early stages. Although prevention seems like a good idea, programs are slow to catch on.

Complete prevention of some diseases is already within grasp but little implementation has been undertaken.

Spina Bifida

Currently maternal serum AFP (alphafetoprotein) screening at about the fourth month of pregnancy will identify twins, open neural tube defects (anencephaly and spina bifida) and a few other even rarer disorders. Ultrasound, amniocentesis and fetoscopy will distinguish the cause of a raised AFP and make it possible to offer therapeutic abortion for the pathological foetus. The technique identifies 98% of affected fetuses and the proponents claim to have avoided false positives. The Spina Bifida Parents' Association has endorsed this campaign, but unfortunately the test is still not yet generally available.

In one study the incidence of spina bifida was reduced by a factor of 10 by nothing more than mother consuming extra vitamins before conception and during the first trimester.

Cerebral Palsy

At least 40% of cerebral palsy is preventable by the provision of good perinatal care. The leading causes of cerebral palsy are 1) anoxic brain damage due to foetal distress and 2) lack of exemplary care for the very vulnerable brain of the premature. Trauma has little to do with it.

The primary care physician is in the strongest position to ensure excellent care. Some aspects depend on mother — such as avoiding smoking and drinking during pregnancy. But the physician should identify a high-risk pregnancy using a scoring system such as the Ontario antenatal record. A history of a previous major obstetric problem or still birth, for example, may demand referral to a high-risk centre. Seventy percent of problems encountered during labour can be forecast in advance. A mother in premature labour should be referred to a high-risk centre so that the premature baby has an intensive care unit at hand when it is delivered. The uterus is still safer transportation than an incubator. But if a premature must be transported to a neonatal intensive care unit this should be done quickly and with care to keep the baby warm, oxygenated and hydrated. Foetal monitoring offers the best prospect for preventing intrapartum anoxia. Everywhere there is much greater willingness to perform a caesarian section for any suggestion of foetal distress.

All this effort may seem misplaced when the incidence of cerebral palsy is only 2 to 3 per thousand - almost a lifetime's obstetric practice for a family physician. But these efforts have halved perinatal mortality in 10 years, may reduce the incidence of cerebral palsy and mental retardation and will perhaps people the world with geniuses.

Genetic Counselling

Several neuromuscular diseases are genetic, e.g. Duchenne's dystrophy, Friedreich's ataxia, and peroneal muscular atrophy. They should be referred for genetic counselling.

Counselling is not just a question of saying "Don't have more children". For example, Duchenne carriers can be recognized by an elevated serum CPK level (creatine phosphokinase). These female carriers can be told that each of their sons has a 50% chance of having muscular dystrophy and each of their daughters has a 50% chance of being a carrier. However amniocentesis will distinguish the male foetus; a blood sample from the foetus can be tested for the CPK level. When the CPK level is high a termination of pregnancy may be advised.

Injury

While most injuries are trivial and leave no permanent ill effects, injury remains a major cause of death and disability. More than half the deaths in childhood are due to accidents. Many are preventable, e.g., drownings, burns, falls from highrise apartments, falls from 'untended' baby's changing tables, diving accidents, hydro-electrical accidents. Children need car seats. Older children need to be taught bicycle safety.

The primary care physician can do as much to save a child's life by counselling accident prevention as he can with a stethoscope. The Easter

Seal Society of Ontario has appointed a prevention coordinator from whom literature can be obtained to distribute from your waiting room.

Child Abuse

Child abuse can probably be reduced by organizing child rearing classes in school so that the parents of the future will cope better. Much is being done to assist the recognition of the prospective abuser in the first few days of a child's life so that help can be offered. In some ways, it is too late to offer help when the child has already been abused, though it is better than nothing. Parents Anonymous group fill this role.

Highway Accidents

Much has been written about car seats for children, seat belts and the teaching of road safety by policemen at school. It has been shown that if a primary care physician talks to mothers about the importance of automobile restraints that parents are more likely to use them. Restraints are the best way to reduce highway deaths.

Drownings

Drownings are common in private pools and physicians should suggest that parents who have a pool should adopt a few inviolable safety rules.

Diving Quadriplegia

Diving quadriplegia is another disaster resulting from somebody diving into a pool with insufficient water or hitting an obstruction under the water. Everyone should follow the rule "jump in before you dive". Never let a child dive off a parent's shoulders into shallow water.

SCREENING

Screening means testing a group of apparent normals for a disorder. It is only worthwhile if early treatment is available and if it is better than late treatment.

Screening is controversial because it may worry more people than it helps. Most people are happy to be screened and found normal, but the false positives who require investigation to prove they are, in fact, normal become disenchanted. Hip and spine screening are well established and should be a part of everyone's repertoire. Congenital dislocation of the hip and genetic scoliosis are well worth catching early because treatment is so much easier. Surgery can be avoided in the early stages.

Other diseases may be prevented by screening — such as Volkmann's ischaemia after injury, spastic dislocation of the hip in young, chairfast, retarded children or those with cerebral palsy.

A GUIDE TO PREGNANCY RISK GRADING

At each antenatal visit give your assessment of pregnancy (fetal plus maternal) risk according to the following grading system. The risk factors or problems listed below are intended as *examples only*. Additional space is provided for other risk producing problems which you have identified. This risk grading system is intended as a basis for planning the ongoing management of the pregnancy.

Pregnancy at no predictable risk

- NO PRIOR PERINATAL MORTALITY OR LOW BIRTHWEIGHT INFANT
- NO SIGNIFICANT MEDICAL DISEASE
- NO PREGNANCY COMPLICATIONS NOW OR IN THE PAST (Bleeding, Hypertension, Premature Labour)
- FETAL GROWTH SEEMS ADEQUATE

Pregnancy at risk

The fetus and/or mother are definitely at risk and consultation should be obtained with a specialist obstetrician in your area. In addition, consultation with an appropriate internist may be necessary. These patients may be managed by continuing collaborative care and delivery in an obstetrical unit with intermediate level nursing facilities OR they may be returned to the care of the referring physician with a suggested plan of management for the remainder of the pregnancy.

- | | |
|---|---|
| <input type="checkbox"/> DIABETES, CLASS A (GESTATIONAL) OR CLASS B | <input type="checkbox"/> RENAL DISEASE WITHOUT HYPERTENSION |
| <input type="checkbox"/> HYPERTENSION WITHOUT TOXAEMIA | <input type="checkbox"/> MILD TOXAEMIA |
| <input type="checkbox"/> APH, CEASED AND IN HOSPITAL | <input type="checkbox"/> CONTROLLED PREMATURE LABOUR |
| <input type="checkbox"/> CERVICAL INCOMPETENCE | <input type="checkbox"/> MULTIPLE PREGNANCY |
| <input type="checkbox"/> HYDRAMNIOS | <input type="checkbox"/> BREECH PRESENTATION |
| <input type="checkbox"/> POST - DATE PREGNANCY (42 weeks +) | <input type="checkbox"/> PRIMIGRAVIDA (age 35 +) |
| <input type="checkbox"/> HISTORY OF PRIOR STILL BIRTH OR NEONATAL DEATH | <input type="checkbox"/> HISTORY OF GENETIC DISEASE IN FAMILY (Genetic Amniocentesis or Counselling required) |
| <input type="checkbox"/> MATERNAL OBESITY | <input type="checkbox"/> ANAEMIC NOT RESPONDING TO IRON (< 10gm) |
| <input type="checkbox"/> SIGNIFICANT TOBACCO, ALCOHOL, DRUG INTAKE | <input type="checkbox"/> WEIGHT GAIN < 10lbs. BY 30 WEEKS |
| <input type="checkbox"/> RHESUS IMMUNIZATION | <input type="checkbox"/> GRAND MULTIPARA |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

Pregnancy at high risk

Pregnancies which are so complicated that the fetus and/or mother are obviously in danger. If at all possible, these patients should be transferred to a regional perinatal centre (level III) for intensive care and delivery. Clearly, there are patients who deserve to be placed in this risk category (with problems such as excessive antepartum bleeding, cord prolapse, or advanced uncontrolled premature labour) who cannot be transferred safely or in time to benefit the fetus or mother.

- | | |
|---|---|
| <input type="checkbox"/> DIABETES CLASS C, D, F, R OR SIGNIFICANTLY COMPLICATED | <input type="checkbox"/> HYPERTENSION WITH SUPERIMPOSED TOXAEMIA |
| <input type="checkbox"/> RENAL DISEASE WITH HYPERTENSION ± ↓FUNCTION | <input type="checkbox"/> EARLY UNCONTROLLED PREMATURE LABOUR * |
| <input type="checkbox"/> PREMATURE RUPTURE OF MEMBRANES (± SEPSIS) * | <input type="checkbox"/> SEVERE FETAL GROWTH ARREST (< 10th Percentile) |
| <input type="checkbox"/> ANTEPARTUM BLEEDING, CONTINUING OR REPEATED * | <input type="checkbox"/> HEART DISEASE, ESPECIALLY WITH FAILURE |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

* particularly 24 - 34 weeks gestational age.

Two or more minor risk problems can combine to produce a high pregnancy risk. Such a patient may deserve to be placed in a higher risk category.

MAKE A CHILD'S WORLD SAFE

Pre-school children do not know how to prevent accidents. You can help by making their world as safe as possible. The commonest accidents which bring children to hospital are:

Falls from furniture — beds, changing tables, chairs and chesterfields. You can help by never leaving a baby alone on a table; it takes only a few seconds to fall off. Don't allow toddlers to stand on chairs.

Falls on stairs — Never leave a child in a walker or stroller near the stairs. Close the door to the cellar steps. Put gates at the top and bottom of the stairs.

Cuts — Bare feet are cut by glass. Children should not go outdoors in bare feet. Knives and needles should be kept in a safe place.

Pulled elbow — A sudden jerk to a child's hand or wrist can stretch the elbow. Don't lift your toddler by one arm.

Crushed fingers — Don't play near drawers, windows and doors.

Scalds and burns — Coffee, tea, hot water and irons. Keep hot things in the middle of the table. Turn pot handles towards the back of the stove. Keep kettle cords out of reach. Run cold bath water first and then warm it up. Ask Hydro to turn down the hot water thermostat to 70°C. Don't leave a hot iron and a child alone in a room together.

Car accidents — Don't let your toddler play on the road or ride a trike on the road. Backing out is a dangerous time; be sure you can see your toddler before moving an inch. Child passengers should always wear seat belts. They are safest in the back seat.

Playground falls — Falls from slides are common. Prevent pushing and showing off.

Falls from buildings — Balconies and windows of high rises are notorious. Make sure they are childproof.

Then there is poisoning by *drugs and medicines*. Keep them out of sight and out of reach. Don't take pills with children watching.

And *poisoning by chemicals*. Keep cleaners, polishes, shampoos, turpentine, bug spray and so on out of reach. Empty the cupboard under the sink and put the stuff on a high shelf. Don't put chemicals in soft drink bottles.

And *drowning*. Teach children to swim early. Don't take your eyes off a child in the water.

Make safety a habit

Modified from
"Make my world safe"
The Hospital for Sick Children, Toronto

ADVISOR ON LIFESTYLE

With the medicalization of everyday life some parents expect their physician to advise on exercises, sports, shoes and so on.

A handout on Normal Development for parents is included in the Appendix. You can photocopy it and give it to them. Neither you nor they need read it, of course; but both can feel good because advice has been sought and given.

PROBLEM SOLVING

Believe parents. If they say a child limps accept this and try to find the cause. Do not, on the basis of a quick examination, laugh them off. It may be wise to request an X-ray examination just to be on the safe side.

Injury

A child falls and mother wants to know if he has a fracture. An X-ray is the only way to detect an undisplaced fracture. Buckle fractures and epiphyseal separations produce little swelling; X-ray all limbs with persisting pain. You will never be thanked for not taking an X-ray.

Making a Good Start

Concern, not disbelief, is your role. Assume for a moment that there is a fracture; the best first move is not to press on it hard or try to displace it by moving the arm.

Instead, ask the child to point to the painful place. Test sensation and active (not passive) movements of the digits. Look for a wound. Check the circulation. Apply a splint and arrange for an X-ray. After the X-ray has been taken further examination may be indicated.

When the diagnosis has been made spend a few minutes talking to the parents. Explain what treatment will be needed.

Scenario I - An example of a lucid explanation.

"He has a fracture of the clavicle as you thought. He will need to wear a brace for 3 weeks while it heals."

"After removal of the brace he should be off contact sports and gym to avoid risk of refracture while the bone regains strength."

"I will write a note for his school."

"There is usually a large bump at the site of the fracture formed by the new bone joining the ends together. The bump disappears within a year."

"Do you have any questions?"

Scenario II

"It looks like the kind of fracture that will require setting under an anaesthetic by an orthopaedic surgeon. When did he last have anything to eat or drink?"

"I will phone the orthopaedic surgeon about this and make arrangements for you to see him at the hospital. Don't let him have anything to eat or drink from now on because of the anaesthetic —

at least 4 to 6 hours after eating and drinking must pass before it is safe to give an anaesthetic and this often causes a few delays”.

Ordering X-rays

If you don't make a habit of looking at children's X-rays you may have trouble distinguishing an epiphyseal line from a fracture. Every child is bilaterally symmetrical to help you out of this problem. Always X-ray the other side if you are uncertain.

When you suspect a shaft fracture include joints above and below the fracture. This will help you to know where things are and will prevent you from missing a dislocation.

When you suspect an injury to the knee joint or ankle joint order three views (AP, Lateral and Oblique) so that you do not miss subtle injury. Occasionally, X-rays should be repeated after two weeks because some injuries, such as a fracture of the scaphoid, become apparent only after a delay.

Child Abuse

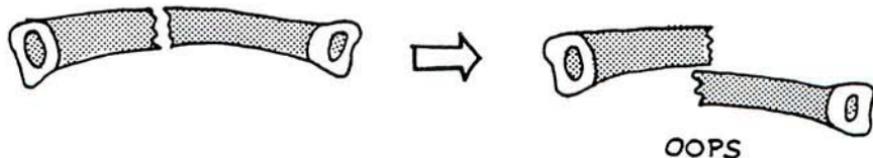
Every fracture in a child under the age of 18 months should be assumed to be due to abuse or neglect until proved otherwise. Even if nothing suggestive emerges from the history and examination a home visit by a public health nurse should be arranged.

Diseases that may be mistaken for child abuse include leukaemia, osteogenesis imperfecta and congenital pseudarthrosis of the tibia.

SOME COMMON CHILDREN'S INJURIES

1. *Complete fracture.* Often requires general anaesthetic, reduction and 6 weeks in a cast. Femoral shaft fractures may require traction in hospital.

All these fractures have a great capacity for shortening and angulation during healing and require skilled supervision to avoid disappointment when the cast is removed.



2. *A Greenstick fracture.* If it is angulated reduce under anaesthetic. Over correct the fracture to take the spring out of it. Cast for about 4 weeks. X-ray at one and two weeks because some displace in the cast. Beware greenstick fractures of the proximal tibia even when there is no suggestion of displacement; this fracture is a common source of litigation because of the frequency of a knock knee deformity afterwards. It should be referred promptly.

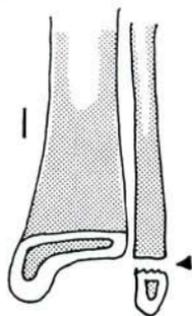
3. A *Buckle fracture*. There is little swelling. Apply a cast for 2 weeks to relieve pain.



4. *Bend*. A rare injury but requires general anaesthetic to straighten.

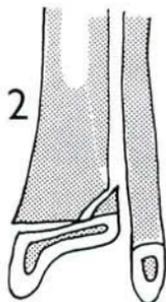


Epiphyseal separation

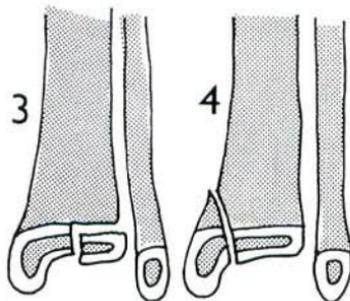


Undisplaced. Common. X-ray normal. Swollen and tender exactly over GP. Apply cast for 3 weeks to eliminate pain while it heals.

OUCH !



Displaced epiphyseal separation. Closed reduction under anaesthetic. Cast immobilisation for 3 weeks is sufficient.



Fracture through epiphysis. An operation is usually required whether they are displaced or not. Internal fixation will maintain growth potential and a smooth joint surface.

Dislocation

Dislocation and ligament injuries are unusual in children — but the following joints may dislocate.

1. Radial head, with an ulnar fracture. (Monteggia fracture). Closed reduction using anaesthesia is generally successful.

2. Patella. In adolescents the patella may momentarily dislocate laterally and then reduce spontaneously making diagnosis difficult. The medial border is usually tender when the tissues have been stretched or torn. The knee is swollen. Attempts to redislocate the patella by pushing it laterally produce apprehension. X-ray may show an osteochondral fragment lying in the joint.

Treatment: A padded bandage reinforced by a backslab for three weeks is popular. A quadriceps strengthening program follows. One in six adolescents proceeds to recurrent dislocation and will need surgical repair.

3. Metacarpophalangeal joints. Closed reduction under anaesthetic is desirable.

4. Hip. Urgent reduction prevents damage to the circulation of the femoral head.

5. Pulled elbow. When unwilling small children are yanked along by parents the carrying angle may be straightened out. The radial head is believed to be pulled distally and gets jammed within the annular ligament. The child screams and won't move the elbow or use the arm (pseudoparalysis). X-rays are normal.

Treatment is easy — supinate the forearm and extend the elbow until you are looking at the palm. There will be a click and within a few minutes the child will start using the arm. Warn the parents not to yank the arm again.

“No Bony Injury” Injuries

If all the signs point to a fracture (injury followed by bony tenderness and an unwillingness to use the limb) but X-ray is normal, believe the signs and put on a cast for a couple of weeks.

Which fractures need reduction?

Any fracture with displaced fragments should probably be reduced. Open operative reduction is indicated for fractures which cross the epiphysis and for all fractures entering the joint.

Plaster Care

Ask parents to let you know immediately if the limb is painful or circulation and sensation become impaired. A cast should make a limb more comfortable — not worse. Pain within hours of application means either that the cast is tight or that there is a compartment syndrome. Split the cast to the skin and if the pain does not go away refer as an emergency as a possible Volkmann's ischaemia. Late pain may mean

they have pushed a pencil inside the case; window the cast. Keep casts dry. Bath, if your patients must, with a polyethylene bag taped to the limb.

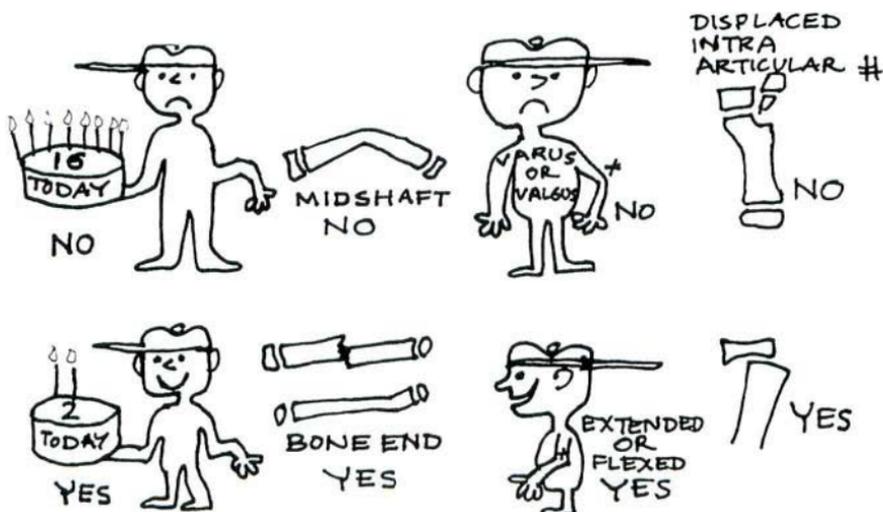
Wait 36 to 48 hours before putting weight on a walking cast.

Above elbow casts should be used in preference to below elbow casts in children because 1) they do not come off and 2) they relieve pain otherwise produced by forearm rotation.

All casts should be padded. Infants' casts should be glued on with Friar's balsam (Tincture of Benzoin).

When the cast comes off. The limb is hairy, thin and often stiff. Unlike adults, most children start to use the limb without help in their own time. Physiotherapy should only be prescribed if no sign of recovery is seen after 2 weeks. All children limp for 4 to 6 weeks after a leg cast is removed because the calf muscle becomes weak and thin. The leg may swell for about 2 weeks.

Will remodelling help?



Remodelling. Because children's fractures heal quickly and remodel there is seldom a need for open reduction for fractures of the shafts of long bones. But it means that the X-ray may look unsatisfactory when the cast is removed. Remodelling helps:

- 1) children with 2 years growth ahead
- 2) fractures near the ends of bones
- 3) deformity in the plane of movement of the joint.

The deformity disappears in the course of a year as remodelling straightens the bone and the muscle builds up again.

Remodelling will not help:

- 1) displaced intra-articular fractures
- 2) midshaft fractures that are grossly shortened or angulated
- 3) varus or valgus

These problems should be corrected before healing. When noticed late surgical correction may still be helpful.

All children's fractures round off on the X-ray but this does not help malalignment.

Major growth problems as a result of fracture through the epiphyseal plate are unusual in well treated injuries. Trivial growth problems are common. Parents should be warned of these possibilities before treatment begins.

Should you look after fractures? Consistently good results are the best protection against litigation. The answer is "Yes", if you have training and a good relationship with a local orthopaedist who will provide continuing care when you get out of your depth.

LIMP

Limp means difficulty walking — a word so simple that you can be sure that no ophthalmologist had a hand in its construction. Limp is a diagnostic challenge in young children because they have difficulty locating pain. Adults come to the point "I think it's my cartilage again doctor. It's making me limp". Young children just limp and require a veterinary approach to discover the cause.

The challenge is to find *where* and *what* the problem is with the smallest number of unnecessary tests.

Questions to ask:

"Does it hurt anywhere"? The answer may quickly lead you to the region affected.

"How long has he limped"? "Is it getting worse"? The longer it has been present the more chance of clinical and radiological signs if there is any significant cause. Acute rapidly worsening pain suggests infection, injury, a slipped epiphysis (in a teenager) or synovitis of the hip (in younger children).

The *approach* requires skill: It is easy to start badly. e.g.

Dr. X — "Walk John". John hurtles past.

Dr. X — "There doesn't seem to be anything the matter".

Affronted Mother — "He is not limping now. Can't you see I'm worried doctor".

You should have known better. As the child hurtled past you should have said "Is he limping now"? Mother would have said "He only does it when he is tired" and you would have passed into another phase of examination.

Where? Localizing the Cause By Examination

1) There is no harm asking where it hurts and asking mother if she has noticed a tender place.

2) Next look at the child walking — a small room is useless — a hallway is best. Which side is being favoured? Are both legs taking as much weight? Then look at one part at a time, 1) the trunk — is there excessive side-to-side sway (a Trendelenberg gait) suggesting guarding of one hip, 2) the hip — is it moving, 3) the knee — does it extend fully and flex, 4) the foot — does the heel touch the ground first?

3) Ask the child to run — a hemiplegic or other neurological cause becomes more obvious.

4) "Now jump on the right leg and now on the left. Stand still — bend down and touch your toes" — this might reveal a stiff back. The best way to get a toddler to bend down is to drop a toy at his feet and ask him to pick it up.

5) Lie the child down. Look for signs of swelling, or wasting in the legs. Test *movements* at the hip, knee, ankle and foot. Check reflexes. Palpate for tender places. Turn the patient over remembering that half the leg is at the back. Palpate the abdomen for enlargement of the liver and spleen. Test the iliac fossae for tenderness. Check for enlarged lymph glands. Take the temperature.

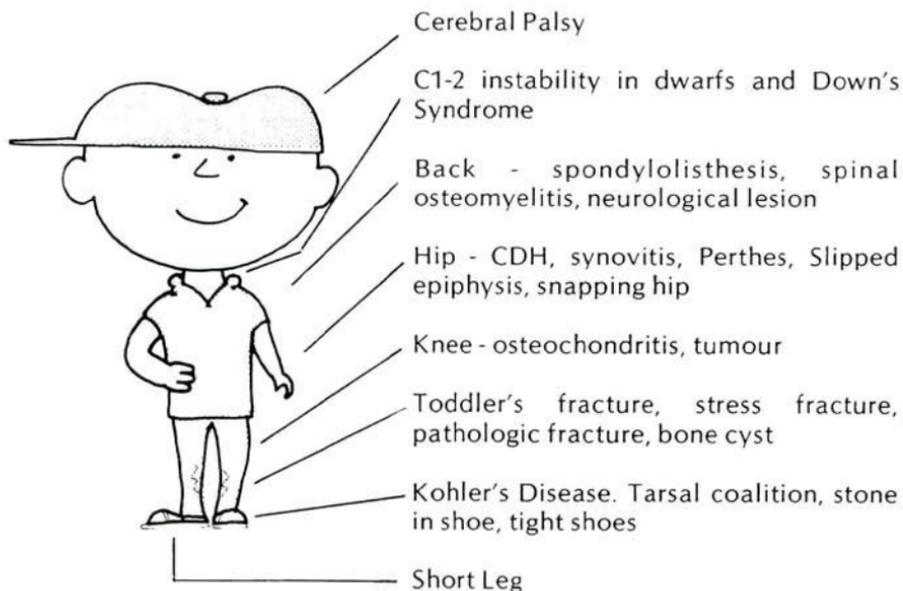
If you still have no leads you may decide that there is nothing significant the matter and recheck the child in a week. If you feel you must do some tests, in order to be credible, request a hip AP and frog leg view, a sedimentation rate and a WBC. Normal values are reassuring.

When you have noted some signs consider the various pathological possibilities and arrive at a provisional diagnosis. Order X-rays and lab. tests to confirm the diagnosis.

It is usually possible to come to some conclusion. Though many of the diseases require referral it is satisfying to send them on with the diagnosis made.

SOME CAUSES OF LIMP

Anatomical Causes



General Causes

muscle disease - Duchenne dystrophy

Disease of Bone

leukemia

rickets: renal failure

infection: osteomyelitis, Brodie's abscess

tumours.

Joint Diseases

rheumatoid arthritis

septic arthritis

Hysteria (Rare)

Obvious things

old polio - clubfoot

old injuries, etc.

recent injuries

PAIN

A List of Common Causes in Children

Children do not complain much of pain —
they reduce their level of activity first.

- | | |
|-----------|---|
| HIP PAIN | — Synovitis
— Perthes
— Slipped epiphysis
— Septic arthritis
— Pathologic fracture through cyst |
| KNEE PAIN | — Slipped epiphysis - referred from hip
— Osgood-Schlatter
— Chondromalacia patellae
— Osteochondritis dissecans
— Patellar dislocation/subluxation |
| TIBIA | — Toddler's fracture
— Stress fracture
— Growing pains |
| FOOT | — Heel pad pain
— Tarsal coalition |
| SPINE | — Scheuermann's
— Osteomyelitis
— Spondylolisthesis |
| ELBOW | — Pulled elbow |
| ANYWHERE | — The swollen painful joint — rheumatoid arthritis,
septic arthritis and haemarthrosis.
— Osteomyelitis
— Tumours and tumour like conditions
— Trauma |

The Hip

Problems at the hip produce pain, limp, stiffness or clicking. While the diagnosis can often be made easily over the phone considering nothing more than the child's age, the basic cause of these problems is obscure. Although dislocation does not produce pain, the condition is best considered here.

(1)



Congenital dislocation of the hip. It is seen in the newborn and up until the age of about 4 years. At first the femoral head moves in and out of the acetabulum. In the new born nursery this goes easily unnoticed. The problem is only discovered by screening using the Ortolani Test, which is described on page 48. X-ray is usually normal. Do not be misled. As time goes by the femoral head stays out of the acetabulum all the time producing a limp, a short leg and a diminished range of abduction. The diagnosis is obvious on X-ray.

(2)

Synovitis - Age 4 - 8. The pathogenesis remains a mystery. The child goes to bed with a little ache in the groin and wakes up in the morning with a stiff hip and groin pain. He walks with a limp. He is usually afebrile (ruling out septic arthritis), has no liver or spleen or other joint involvement (ruling out rheumatoid arthritis and Leukemia), but the hip has movement reduced by pain. Investigations should include an X-ray, white blood cell count, E.S.R. and in negroes a Sickle Cell Test. If any of these are abnormal another disease should be considered.



mental concept
inflamed synovium

(3)

Perthes' Disease or Avascular Necrosis. This disease was described in the year Captain Peary reached the North Pole with a dog team. Although remarkable advances have occurred in space travel since that time, we are no nearer understanding the cause of this condition. Apparently, the circulation of the femoral head is cut off leading to death of the femoral head. The circulation creeps back in the course of 6 months to 1 year. With a return of the circulation, a pathological fracture develops in the head and this leads to the first complaint of pain and limp; until then the disease has been silent. Untreated the head squashes flat over the course of months and leads to arthritis later on.



1. Head smaller than the other side



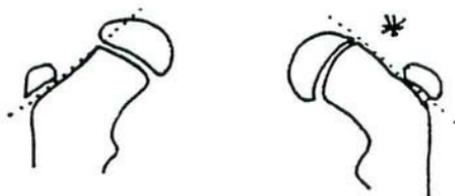
2. Lateral X-ray shows subchondral fracture



3. Bone resorbs
Metaphyseal cyst



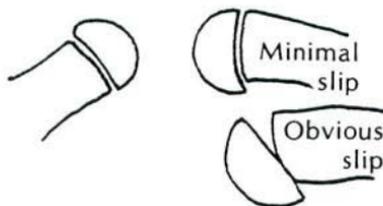
4. Head crushes



The AP X-ray is usually normal or almost normal, a lateral X-ray is needed for diagnosis. An honours graduate may notice that a straight line drawn along the neck does not cross the head.

(4)

Slipped Epiphyses. Unlike most epiphyses, which are held on by modified periosteum, the femoral epiphysis is held only by articular cartilage. In very heavy adolescents or very active people the plate may give way and allow the epiphyses to slip off posteriorly. It usually occurs slowly producing a little limp and a little aching, but is occasionally as dramatic as a fracture of the femoral neck.



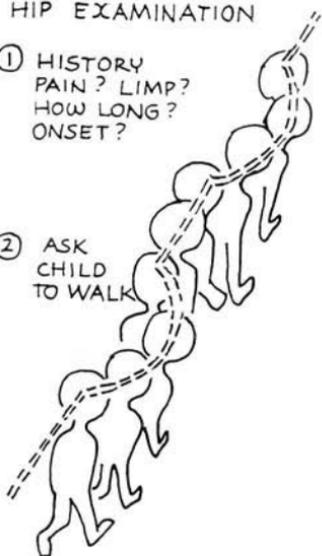
Lateral X-ray shows posterior displacement

(5) *Septic Arthritis.* See Page 39.

HIP EXAMINATION

- ① HISTORY
PAIN? LIMP?
HOW LONG?
ONSET?

- ② ASK
CHILD
TO WALK



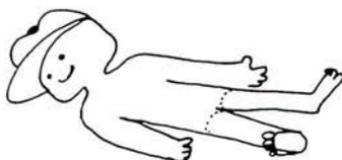
TYPICAL (R) HIP
LIMP: HEAD &
TRUNK SHIFT
TO (R)

: IT TAKES MUCH PRACTICE
TO DO IT WELL & IT IS
INCOMPLETE
WITHOUT
AN X RAY



③

ARE BOTH LEGS THE SAME LENGTH?
FEEL ANT. SUP. ILIAC SPINES.
EYEBALL LEVEL.

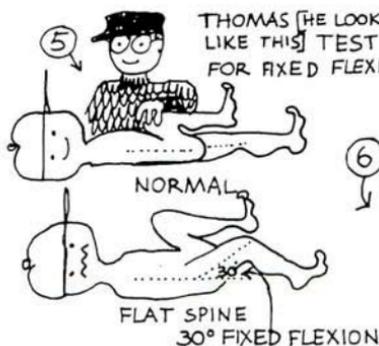


④

WHAT POSITION DO LEGS LIE IN
NATURALLY? IS ONE HIP
FLEXED OR ADDUCTED?
MEASURE THIGH GIRTH AS
A GUIDE TO HIP MUSCLE WASTING.

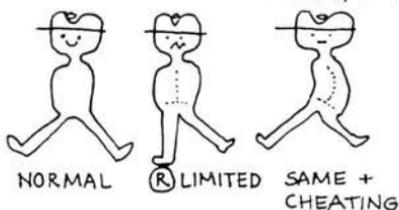
⑤

THOMAS (HE LOOKED
LIKE THIS) TEST
FOR FIXED FLEXION



⑥

THEN TEST ABDUCTION - WHEN ONLY ONE
HIP HAS LIMITED ABDN IT IS EASILY MISSED.



⑦ ORTOLANI TEST (IN INFANTS ONLY) see CDH section.

⑧ TEST ROTATION (see intoeing section).

Investigations

Any child complaining of hip pain should have an AP and frog X-ray of both hips. History and examination are good diagnostic tools in the hands of the experienced but X-rays are better for the inexperienced.

Hip Problems in Summary

	CDH	Synovitis	Perthes	SUFE	Septic Arthritis
Age	0-4	4-8	4-10	8-15	Any
Limp	+	+	+	+	Won't walk
Pain	—	+	+	+	+++
Limited movt.	Abd	Abd & IR	Abd & IR	Abd & IR	All
X-ray	Dis-location	Normal	Subchondral fracture Dense head Pebble stone epiphysis	AP may be normal. Frog shows slip	Normal

Treatment

CDH: requires referral.

0-6 months — Pavlik harness

8-18 months — Reduction (closed or open) and cast

18 months — open reduction and osteotomy

SYNOVITIS: The cause of this common condition is unknown. The main distinction is from septic arthritis. The child will walk, there is no fever and ESR and WBC (which should be measured) is normal.

Advise bed rest at home: in hospital only if: 1) diagnosis in doubt, 2) mother cannot control at home and 3) distance problem.

The pain usually goes after a night's rest but a full painless range of movement takes 4 to 7 days to return. When movement is full gentle activities may be resumed. The wise physician obtains an X-ray — 4 to 6 months later because 3% of these children develop Perthes Disease.

PERTHES' DISEASE: The diagnosis is usually obvious on X-ray, and children should be referred for treatment as emergencies. The aim of treatment is to prevent the femoral head from becoming flat. There are several methods for producing a good result — bracing, short periods of rest, soft tissue releases and osteotomy. The choice of treatment depends more on the surgeon's training than the details of the patient's disease. Supervision is required for at least a year or two.

SLIPPED EPIPHYSIS: Any adolescent with a limp or with knee pain should have an AP and frog X-ray of both hips. Otherwise cases of slipped epiphysis will be overlooked. Once the diagnosis is made the patient should be taken off weight-bearing and referred for treatment as an emergency.

Treatment: Minimally displaced epiphyses are pinned *in situ*. When there is acute displacement gentle reduction in traction precedes pinning. Remodelling after pinning takes care of most hips pinned in marked displacement.

Complications are not infrequent and may be serious such as fracture, avascular necrosis and chondrolysis which are all present with pain.

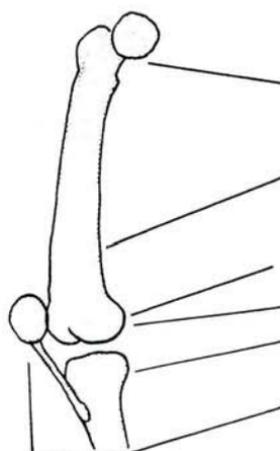
Other Problems

SNAPPING HIP: The tensor fasciae femoris snaps over the greater trochanter in adolescent girls. They say that the hip is dislocating. The diagnosis is obvious when they stand up wagging their hips. The advice — desist and it will go away.

BONE CYST: The diagnosis is obvious in X-ray. Injection with steroid usually produces healing.

THE PAINFUL KNEE

One of the commonest problems is a teenager with pain in one or both knees. Unlike the adult the symptoms seldom arise from the ligaments or menisci. Knee pain is unusual in younger children.



Causes	
Referred pain from the hip. Esp. slipped epiphysis	5%
Tumour such as an osteogenic sarcoma	0.5%
Osteochondritis dissecans	20%
Discoid meniscus	1%
Osgood Schlatter	35%
Patellar pain etc.	<u>35%</u>
	96.5%

Questions to Ask

The history is often not helpful apart from asking the patient to point to the place that hurts with one finger. Adolescents usually say "yes" to most questions.

"Have you had an injury?" "Yes".

"How long have you had it and how did it start?" Patient and parent disagree violently about the right answer to this question.

"Does it swell? Is it swollen now?" "Yes, yes", comes the answer in the face of a knee that does not look the least swollen.

All teenagers have knees that lock and give way.

Ask them about pain after sitting still in a cinema and on climbing and descending stairs — pain points to patella pain.

"Has the knee cap ever jumped out of place?"

Then ask about gym to guide you about the advisability of stopping gym.

THE KNEE

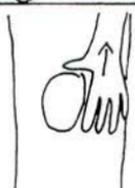
① LOOK



WASTING?
MEASURE QUADS WITH TAPE

SWELLING?

② TEST FOR EFFUSION



A MASSAGE FLUID
OUT OF LATERAL
RECESS



B HOLD IT
THERE



D FLUID BULGE -
SOMEWHAT
EXAGGERATED

C MASSAGE IT
BACK AND
WATCH FOR
SUDDEN FLUID
BULGE

③ TEST MOVEMENT



EXTENSION



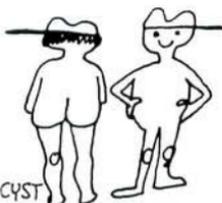
LOCKED IN
FLEXION



RECURVATUM



IN FULL FLEXION
THE HEEL TOUCHES
THE BUTTOCK

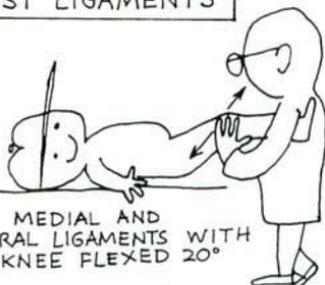


POPLITEAL CYST

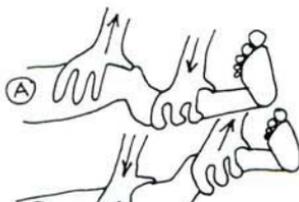
OSGOOD SCHLATTER'S

④ LOOK FOR BUMPS FRONT & BACK

⑤ TEST LIGAMENTS



TEST MEDIAL AND
LATERAL LIGAMENTS WITH
THE KNEE FLEXED 20°



A

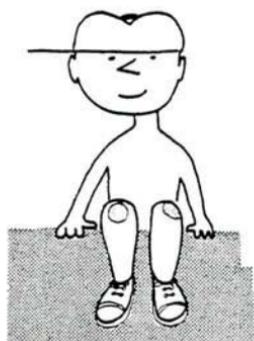
B LACHMANN
TEST FOR CRUCIATES

Diagnosis

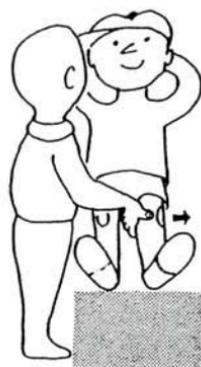
History, examination, X-ray, special X-rays, trial of exercises and reduced activity, will solve 90% of patient's problems. When symptoms continue or doubt remains arthroscopy is indicated.

Common Causes

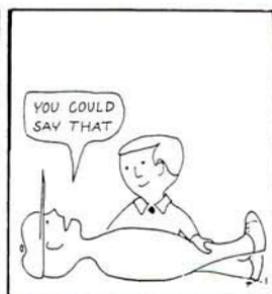
Patella pain may arise from recurrent subluxation, suprapatellar synovitis or chondromalacia. Subluxation is commonest in girls. They may complain that they feel the knee cap slipping out of place. When they sit in a chair the patella faces upwards and outwards. They have a positive apprehension sign. They often have knock-knees, recurvatum, loose joints and small quadriceps. An axial X-ray may show the degree of subluxation. Suprapatellar synovitis and chondromalacia can only be distinguished on arthroscopy. Both have pain on stairs and after sitting in the cinema. Both have pain and crepitus when the patella is pushed down,



THE LEFT PATELLA IS HIGH AND SQUINTS OUTWARDS. THIS IS ONE OF THE BEST SIGNS OF A PATELLA AT RISK OF DISLOCATION.



THE APPREHENSION TEST. HE IS TRYING TO DISLOCATE THE PATELLA Laterally. THE CHILD DOES NOT LIKE WHAT HE FEELS. ONLY CHILDREN AT RISK OF DISLOCATION COMPLAIN.



A SIMPLE TEST FOR PATELLAR PAIN

Osgood-Schlatter Disorder. A tender lump at the site of the slightly avulsed tibial tubercle is obvious to all. It hurts most on kneeling but may hurt a little after sports. X-ray is not necessary to make the diagnosis but may serve to rule out anything else such as a concomitant tumour.

Osteochondritis Dissecans. The knee aches, gives way, locks and swells. The diagnosis is made on X-ray, a tunnel view may show the lesion most clearly. Always X-ray the other knee because the condition is usually bilateral (and often familial).

Slipped Epiphysis. A Trendelenberg limp as the adolescent walks is the best clue. The knee is normal on examination but there is restriction of hip motion. The diagnosis is made on the hip X-ray — AP and frog leg views.

A Discoid Meniscus may click so loudly that the noise can be heard across the room. The knee may ache and lock. Arthrography or arthroscopy are needed to make the diagnosis.

Exostoses. Adolescents may develop bony protrusions that show easily on X-ray. If they become troublesome, excision is the answer.

Osteogenic Sarcoma is very rare and there is usually some delay in making the diagnosis. Pain after sport, muscle wasting, a tender swelling lead to X-ray which shows a mixture of bone destruction and bone formation.

Popliteal cyst. Between the ages of 4 and 8 years a painless bursa may appear in the popliteal fossa. It comes and goes. The diagnosis is made by the way it glows like a lantern when a flashlight is applied in a darkened room.

Treatment

Patellar Pain — reduced activities, isometric quadriceps exercises, and ASA to suppress synovitis are the first line of treatment. If pain continues after 6 weeks consider referral for arthroscopy; surgical releases or repairs are sometimes required.

Osgood-Schlatter Disorder — most patients buy a basketball knee protector and continue with sports whilst biting a bullet because the pain is not a warning sign nor very severe. Continuing activity does no harm. The tender lump usually lasts for a year even if all sports are abandoned.

Osteochondritis Dissecans — these children should be referred to an orthopaedic surgeon for follow-up. Most lesions heal spontaneously in children with open epiphyses but in the older teenager the lesion may need drilling and grafting to prevent the fragment breaking away as a loose body.

Popliteal Cyst — Leave it alone — one day it will disappear forever.

In general when you cannot think of anything better, knee exercises are a great standby — use the knee handout sheet (in appendix) to educate patients.

TIBIA

Toddler's Fracture: Infants have thick periosteum. They can fall down and produce a spiral fracture of the tibia that does not swell or displace because the periosteum holds everything together. They are locally tender and will not walk; an X-ray will make the diagnosis. A little cast for 10 days will make them comfortable and stop them waking at 3 a.m. and disturbing their parents who may in turn disturb you.

Stress Fracture: After a slow winter young athletes who start training in the spring may develop an aching pain in the upper tibia which is made worse by exercise. A tender lump appears and when an X-ray is taken there is always someone who thinks it looks like a malignant tumour. But it will settle with rest or cast protection. If doubt continues a bone scan will show the transverse nature of the fracture.

Growing Pains: A slightly tired mother brings her six year old in with the complaint that he wakes up crying in the middle of the night with pains in both legs. She rubs them and perhaps gives him an aspirin and in 10 minutes the house falls asleep again. This has been going on once or twice a week for several months. This problem which affects about 1 child in 5, has no explanation and no physical signs. There is no point in doing any tests. You should consider other diseases if 1) the pain is only in one leg or 2) comes on during the day or 3) if there are abnormal signs.

FOOT

See section on the adolescent foot.

SPINE - BACKACHE

Despair seizes most of us when an adult complains of backache because diagnosis and cure are often fugitive. By contrast a cause can usually be found for backaches in children.



Scheuermann's disease (teenagers)
Spondylolisthesis.

Night pain = osteoid osteoma
Recent onset = osteomyelitis/discitis
After injury = wedge fracture

Questions To Ask

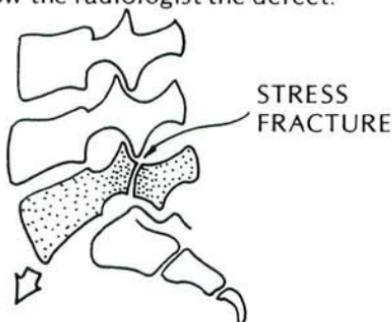
When, where, what makes it worse, what makes it better? How long does the pain last — minutes, days or weeks? How often does the pain stop you doing anything? Fever, bladder disturbance? Can you still bend as far forward as usual?

Features of Each Condition

SCHEUERMANN'S DISEASE produces thoracic pain and a round back. There is wedge compression of the growing vertebral bodies which is easily recognized on a standing lateral X-ray in the mid-thoracic region. The same process can also affect the thoracolumbar junction. The wedging leads to an appearance of being round shouldered (kyphosis). There is pain in the wedge area worse after activity, particularly bending. The hamstrings are short, so these teenagers cannot touch their toes. No one knows whether this is cause or effect.

Treatment. Explain, reduce forward bending in gym or replace gym with extension exercises for a few months. If there is much deformity (see page 00) referral with a view to bracing or surgery should be considered.

SPONDYLOLISTHESIS. The body of L5 moves forward on S1 because the articular facets are congenitally absent or because of a stress fracture in the pars inter-articularis. Pain is felt in the low back and often starts after a minor fall in children from the age of 3 years upwards. The hamstrings are tight so that 1) children cannot bend forward and touch their toes and 2) straight leg raising is reduced. Request a standing lateral X-ray and lying AP and both obliques. The lateral X-ray shows the forward slip and the obliques will show the radiologist the defect.



Treatment. Explain that this condition is common, affecting 8% of the population overall. So many gymnasts have a spondylolisthesis that it may be necessary for success. Typically the pain comes and goes. Developing strong muscles, such as gymnasts possess, makes the back better. Treatment — brace or fusion — is only required for 1) continuing pain and 2) increasing slip or severe deformity. Arrange a standing lateral X-ray of L5-S1 every 6 to 12 months to monitor the degree of slip. Young people should not live a life of semi-invalidism to avoid an insitu fusion — operation means about 7 to 10 days in hospital and then about 3 months at school in a light protective brace before full sports are resumed.

T.V. BACKACHE. A mid-thoracic backache seems common in teenagers who sit and recline slouched for hours. Exertion helps.

OSTEOMYELITIS/DISCITIS. This is rare but usually misdiagnosed. Bacteria, usually staphylococci, produce an abscess in the vertebral body. Day and night pain slowly increases. The back is rigid. There is fever. A raised WBC and ESR, positive blood culture and positive bone scan make the diagnosis. The X-ray signs are minimal — late narrowing of the disc space.

Treatment. I.V. antibiotics usually succeed.

PROLAPSED DISC. It is very unusual in children and similar to the adult picture.

TUMOURS. Tumours are rare and diagnosis is often delayed. Day and night pain or night pain alone should arouse suspicion. X-ray and bone scan are the keys to diagnosis. Tumours include osteoid osteoma, osteoblastoma and eosinophilic granuloma.

THE SWOLLEN PAINFUL JOINT

Infection, trauma, haemorrhage, and rheumatoid arthritis are the leading causes in children. They may be hard to distinguish, which is worrying because prompt treatment is obviously important.

In each there is commonly a history of a fall followed by joint swelling and stiffness. There may be a little fever. A high fever favours infection.

Children with an infected joint are usually not themselves they lie still not taking much interest in the T.V. or hamburgers. They will not walk; they cry when the joint is touched or moved.

A very tight haemarthrosis stretching the capsule may mimic infection but the tension will make the joint hard on palpation. Haemarthrosis is seen after injury (such as dislocation) or in children with a bleeding disorder.

Rheumatoid arthritis is less dramatic — the child watches T.V., plays games and walks about. Look for a skin rash, a palpable spleen and for other swollen joints which would point to rheumatoid arthritis or possibly infection detected late.

Investigation

A somewhat raised white cell count and ESR may not make the all-important distinction between infection and rheumatoid arthritis. But a WBC count of more than 12,000 and an ESR of more than 100 indicates infection until proved otherwise. Even children with florid rheumatoid arthritis seldom have a positive test for rheumatoid factor — there is little point in ordering it.

X-rays may be useful to demonstrate pre-existing disease (such as osteochondritis dissecans or a foreign body in the knee) or a fracture.

The most important test is aspiration of the joint — which can be done by anyone in a sterile room possessing a sterile syringe and a needle. Blood, the turbid fluid of infection or the clear fluid of a sterile synovitis can be recognized with the eye before the specimen is sent to the lab for culture.

Special forms of arthritis

Septic arthritis — this may damage any joint but the hip and knee are commonest. Immediate surgical drainage as an emergency and I.V. antibiotics are usually required. The usual organism is a penicillin resistant staphylococcus. In the newborn and infant consider Haem.

Influenzae. Meningococcus and gonococcus are rare.

Synovitis of the Hip — between the ages of 4 and 10 years the hip is the site of a little understood form of non-infective synovitis. The child goes to bed with a slight ache in the hip and wakes up in the morning unable to move it. So long as he/she is resting the leg is all right (in contrast to septic arthritis) but the hip is held stiffly, producing a limp, when the child plucks up courage to walk.

On examination the range of movement is reduced and the extremes cause pain. The child does not look ill though the temperature may be a little raised. ESR and WBC are normal.

Treatment consists of rest at home with the leg on a pillow for 3 to 4 days and ASA. Activity should be resumed gradually to avoid a relapse. X-ray of the hip is advisable to exclude other diseases such as Perthes Disease. About 3% of children with synovitis show signs of Perthes Disease 3 months after the attack of synovitis so there is something to be said for a follow-up X-ray.

Rheumatoid Arthritis — the commonest form is monarticular — a knee becomes swollen over the course of a few days with a little aching but no real pain. The joint feels stiff in the morning and improves with activity. The polyarticular form, accompanied by high fever, malaise and splenomegaly is very unusual.

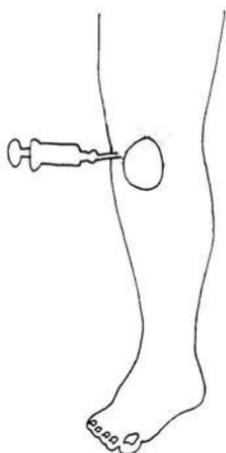
Improvement with ASA in doses sufficient to produce a blood level of 20 mgm/100 ml is the best way to make the diagnosis.

If this simple treatment is insufficient the child should be referred 1) to reconsider the diagnosis, 2) to look for such complications as iritis and 3) to set up a therapy, splinting and drug program.

ASPIRATING HIP AND KNEE



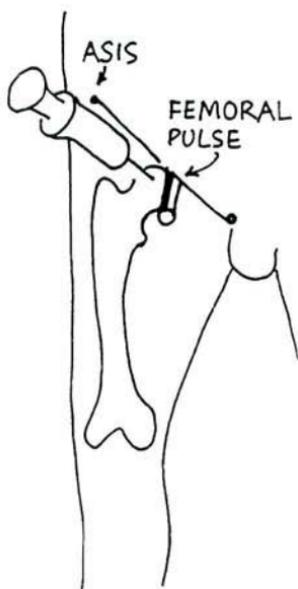
GOWN
AND
GLOVE
SKIN PREP &
DRAPE THE LEG



HORSESHOE
SHAPED SWELLING

AIM JUST UNDER THE
PATELLA AT THE LEVEL
OF THE UPPER BORDER.

PUT IN LOCAL
ANAESTHETIC &
IDEALLY USE AN L.P.
NEEDLE.



AN IMAGE INTENSIFIER IS HELPFUL FOR THE INEXPERIENCED. THE FEMORAL ARTERY IS PUSHED FORWARD BY THE FEMORAL HEAD. PALPATE THE FEMORAL PULSE. PUT LOCAL INTO SKIN JUST LATERAL TO PULSE AND FOLLOW THRO' WITH AN L.P. NEEDLE. AIM STRAIGHT BACK. PUSH IT IN AN INCH OR TWO UNTIL YOU HIT THE HEAD. PULL OUT THE STILLETTE ROTATE THE NEEDLE. IF NOTHING COMES OUT ROTATE THE HIP. TRY AGAIN.

OSTEOMYELITIS AND SEPTIC ARTHRITIS

Early diagnosis is the most important step. Even a doubtful case should be referred to an orthopaedic surgeon as an emergency. Delaying effective treatment until the diagnosis is obvious to one and all is an error.

Acute haematogenous osteomyelitis should be suspected when there is fever, spontaneous onset of pain at the end of a bone accompanied by bony tenderness and unwillingness to use the limb. At an early stage there is little swelling and never any redness because the inflammatory process is deep. The diagnosis is entirely clinical.

The X-rays at this stage are invariably normal but should be taken to exclude other pathology. The WBC and E.S.R. are elevated. Bone scan — proves to be a useful aid to making a diagnosis but there are one or two drawbacks. First, don't put off treatment while waiting for the scan to be done. Secondly, with overwhelming osteomyelitis the scan may be cold because the nutrient artery has thrombosed. A hot scan also occurs in septic arthritis.

Three blood cultures should be drawn. If the area is locally swollen, subperiosteal aspiration may be helpful. If no pus is aspirated this does not mean that there is no infection — it merely means that no evidence was obtained.

Treatment

If the diagnosis is made within 36 hours of the onset of symptoms a three week course of antibiotic is usually sufficient. The popular choice keeps changing but the antibiotic must be administered intravenously initially. The indications for surgical drainage are 1) pain, tenderness and continuing pyrexia persisting after 24 hours of I.V. antibiotic, 2) local swelling and 3) delayed diagnosis.

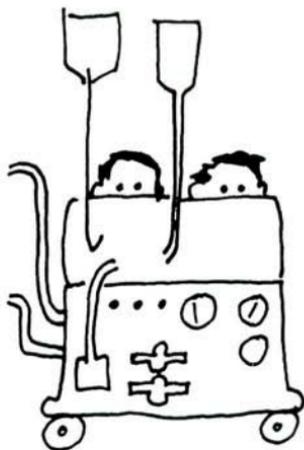
A common problem arises after a few days when the treatment is going well: no bacteria are cultured by the laboratory. In most series 40% of patients with osteomyelitis have negative cultures. Treatment with antibiotics should be continued.

Septic Arthritis

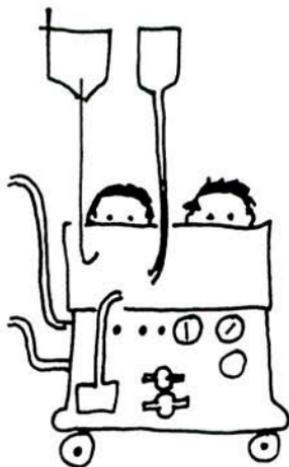
A swollen hot knee may contain pus. Aspirate the knee to make the diagnosis. If turbid fluid is withdrawn plan to have the knee drained and start I.V. antibiotics.

In the first few months of life children can have serious infections without any signs. The child who cries a little when the diaper is changed and seems to be a little off his feed, should be suspected of having septic arthritis of the hip. Range





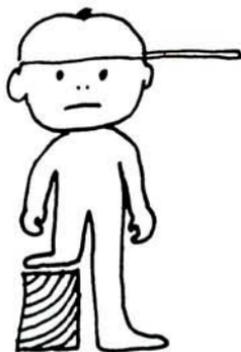
HE CRIES WHEN THE
DIAPER IS CHANGED. A
BIT YOUNG TO BE SHY!



HIS THIGH MAY BE
SWOLLEN BUT THE
NORMAL X-RAY
REASSURES ME.



STRANGE! THE X-RAY
SHOWS A DISLOCATED
HIP NOW.



IT'S FUN BEING SCORE
KEEPER.

NEWBORN INFECTIONS ARE EASILY MISSED. EARLY DRAINAGE IS ESSENTIAL. JOINTS & GROWTH ARE IRREPARABLY DAMAGED WHEN DIAGNOSIS AND TREATMENT ARE DELAYED.



of movement may be a little restricted, but the temperature, white cell count, sedimentation rate and X-rays are usually normal. Diagnosis is made by aspirating the hip preferably under general anaesthetic. This should be done in the operating room so that open drainage of the hip can be undertaken immediately.

Septic arthritis of the hip in infants is a real sleeper and if it is not picked up early, that is within the first day, one can expect total destruction of the femoral head, septic dislocation of the hip and destruction of much of the femoral shaft. Later in life the hip is very unstable and the leg may be about 8 inches short.

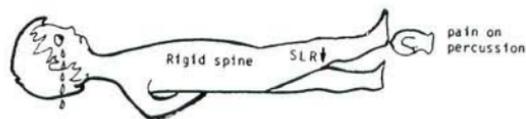
The children at particular risk for this problem are those who have femoral vessels punctured in the first few days of life. This is an argument against femoral vein puncture.

Other forms of infection

SPINAL OSTEOMYELITIS. This begins quietly with a little ache in the back associated with malaise and fever. The spine becomes rigid so that the child is unable to bend down and pick up an object from the floor. Later children lie down unable to turn over in bed. There may be local tenderness, reduced straight leg raising and pain on percussion of the heel. Radiographs show narrowing of the disc space and a scan shows the hot area. White cell count and sedimentation rate are raised. Diagnosis can be aided by needle biopsy and culture. Drainage is seldom required; antibiotics and rest are the mainstay of treatment.

PELVIC OSTEOMYELITIS begins quietly with a pain in the pelvis and a limp. Straight leg raising may be zero. There is local tenderness. Pelvic compression is painful. A scan will help make the diagnosis. In most cases systemic antibiotics are sufficient but a few will require drainage.

PSEUDOMONAS IN PUNCTURES OF THE FOOT. The characteristic smell of socks is due to pseudomonas. Hence when a person sustains a puncture wound to the foot they are inclined to inoculate pseudomonas organisms, sometimes resulting in pseudomonas osteomyelitis. The diagnosis can be made by injecting a little saline into the swollen area, aspirating and sending it for culture. Anti-pseudomonas antibiotic therapy is required.



TUMOURS

Important tumours are rare and most doctors see only one or two in a lifetime. However many children have fibrous cortical defects and metaphyseal defects in their bones which may be confused with a tumour. They are discovered accidentally on an X-ray taken with something else in mind. They are painless. A radiologist can usually quickly identify them before they gradually disappear.

When a child has bone pain and X-ray shows a bone lesion everyone naturally gets very alarmed by the possibility of a bone tumour. The situation can quickly get out of hand. Distinction must be made between 1) *infection* which may mimic a malignant tumour very closely until the biopsy, 2) *malignant* tumour and 3) *benign* tumour which can usually be distinguished from a malignant tumour on the X-ray.

The best approach is to talk to the radiologist armed with the WBC and ESR result. He will tell you what the possibilities are. This is usually enough because normal variants vastly outnumber anything serious. But if there is still concern about the diagnosis a speedy appointment should be made for an orthopaedic opinion. The cascade of investigation includes a skeletal survey, bone scan and biopsy.

Lytic lesions

Chronic Osteomyelitis. Some children given antibiotics for fever may appear 6 months or a year later with a chronic bone abscess. Biopsy, drainage and antibiotics are required.

Bone Cyst. These come to light when they fracture. More than half occur in the upper end of the humerus. The diagnosis is usually obvious on the X-ray. After the fracture has healed the cyst should be injected with steroid to help it disappear.

Osteosarcoma. The diagnosis is often missed at first because there is so little to notice. Pain on and off after sports. A place that is tender from time to time. X-ray shows a mixture of destruction and new formation that is characteristic in the late case but initially the X-ray may be passed as normal. This is good reason for X-raying continuing problems more than once.

The diagnosis is made on biopsy. The treatment consists of amputation and chemotherapy. This is a terrible time for everyone and requires hours and hours of conversation. A psychiatrist may help everyone to handle their grief. Surgery and chemotherapy are offering better results than in the 1960's.

Eosinophilic Granuloma. Within 2 to 3 weeks this yellow granuloma destroys a block of bone in a vertebral body or in a long bone. Pain and refusal to use the part lead to an X-ray which may show little at first but 10 days later there is a large lytic defect. The ESR and eosinophil count may be elevated.

Referral for biopsy or steroid injection is recommended. The prognosis should be guarded because recurrence and multiple lesions are possible.

Solid lesions

Multiple Exostoses. A mushroom of bone forms at the end of a bone—solitary due to trauma, multiple due to a family gene. This is the commonest bone tumour and is benign. The X-ray appearance is diagnostic. Often people want the lumps removed because tendons snap over them around the knee or because they look ugly. They are also called osteochondromata.

Osteoid Osteoma. This small benign tumour on a bone produces well localised aching pain which characteristically wakes the child at night. The pain is relieved by aspirin. This unusual history is enough to alert the doctor. The tumour is sometimes obvious on X-ray but not always. A bone scan shows a hot spot and makes the diagnosis. Excision is curative.

Chapter III

THE PRIMARY CARE PHYSICIAN'S ROLE IN PARTICULAR AREAS

1. The Newborn Nursery

The physician should look at the hips and the feet. In bygone days the hips of newborns were not examined at all and the result was that the congenital dislocation of the hip was overlooked until mother noticed that the child walked with a limp. With routine hip testing in the newborn, most, perhaps all, hip dislocations can be recognized. This is a useful discovery because the hip in the newborn period can be made quite normal very quickly and easily, whereas if the child's dislocation is ignored until the age of a year or two, treatment is more elaborate and uncertain.

The technique of the test is shown in the poster. Many controversies surround this test. There are the problems of false positives and false negatives.

False negatives — missed cases. Some people have become cynical about the test because the incidence of congenital dislocation of the hip has not been lowered in their areas. The enthusiasts claim few or no missed cases. This must say something about the way the test is conducted in each area. To be safe one should have a certain background of experience and a child who is relaxed with a bottle.

False positives. Many newborn hips and knees click when they are moved — much as a knuckle can be cracked. This is not the sign of a dislocation. Some children have a hip which is dislocatable for only a few days. These again need no treatment. The hip that can be felt to be dislocated on the first day of life should be re-examined after four or five days; if it is still dislocatable a Pavlik harness should be applied. Triple diapering has many failures and should be abandoned; it is too much treatment for a child with just a click in the leg and it is certainly not enough treatment for a child with a dislocatable hip.

X-rays are not helpful. If the hip is dislocatable, the X-ray may be taken when the hip happens to lie in joint leading to a false negative result. Ultra sound has become the best investigation; it will reveal dysplasia and subluxation. The images are hard to interpret.

CONGENITAL DISLOCATION OF THE HIP

DISLOCATABLE HIP

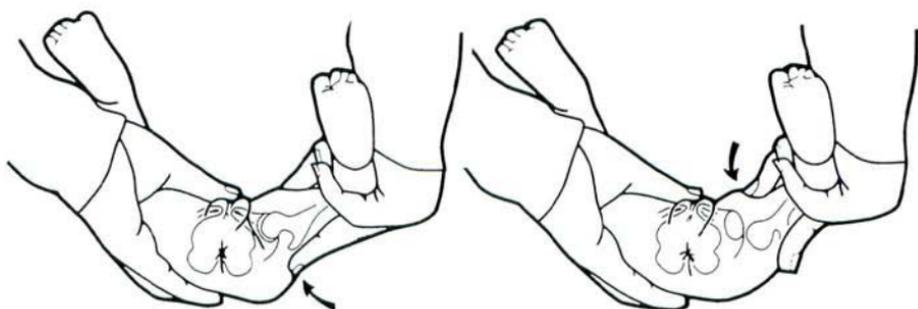
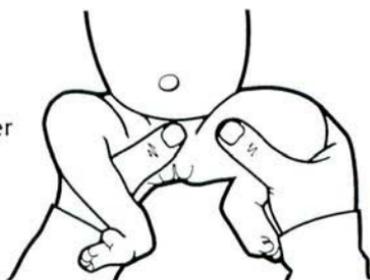
- 1:80 hips at birth • most become stable in a few days
- ORTOLANI CLUNK • if dislocatable at 5 days use PAVLIK harness for 6 wks. • X-ray unreliable — film may be taken when hip is in joint.

FRANKLY DISLOCATED HIP

- 1:800 hips • after 2 months the ortolani sign becomes negative
- tight adductors & short leg evident. • Treatment: 0-8 m — Pavlik harness; 8-18 m — Several possibilities: a) Traction — closed reduction + tenotomy + cast for 4 m. b) operation
- 18 m + Traction and open reduction + innominate osteotomy

EXAMINE EVERY NEWBORN'S HIP FOR DISLOCATION

- Flex the hips to 90°, abduct to 45°
- Hold the thigh with the thumb in the groin and the middle finger on the greater trochanter.
- Press forward with the middle finger and back with the thumb.



IF THE FEMORAL HEAD DISPLACES, THERE IS DISLOCATION!

The examination should be carried out on a firm surface. Relaxation is essential; a bottle may be given if necessary. The examiner should be gentle and use warm hands.

EARLY TREATMENT IS SIMPLE: DELAY MEANS OPERATION.

NOTES ON USE OF PAVLIK HARNESS

Holds legs in position of a
racing jockey



- legs should lie in 90°-100° flexion
- knees lie apart: with gentle pressure remain 2" apart
- nurse prone: very important.
- diaper may be changed without removal.
- X-ray at 1 wk. to see if hip is reducing (90% success)
- if unsuccessful at 3 wks. try something else.

The Child's Feet

There is little room to stretch out in the uterus and many children are born with postural deformities of the feet.

Although most deformities are postural, a few are due to more serious causes. Some children are too weak to kick in utero because of spina bifida, chromosomal abnormalities or arthrogryposis which is characterized by stiffness of many joints and little muscle bulk.

Whenever a deformed foot is seen, the back should be inspected and an eye cast over the rest of the child.

Calcaneovalgus Foot. This always gets better by itself and requires no treatment. Attention should be given to the hip since congenital dislocation of the hip is common when this foot deformity is present. If you wish to give mother something to do she could push the foot downwards at each diaper change.

Metatarsus Varus. This is usually a deformity that can be passively corrected. With pressure the foot can be pushed through a normal range of movement. With time many of these improve. If they are still abnormal at the age of three months, casting should be commenced.

If the deformity is fixed at birth below knee corrective casts should be applied at the time.

Applying a corrective cast for Metatarsus Varus

A little training and frequent practice is required to remain proficient. Most are referred to orthopaedic surgeons.



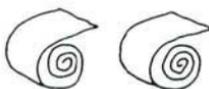
Bottle, to keep baby quiet!



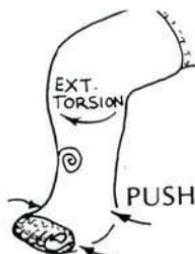
Massage foot



Friar's Balsam, to stop cast slipping off.



Padding & plaster roll. 2" under 2 m. 3" over 3 m.



Evenly padded cast. Leave bump to ease unwinding after soaking

Note: Warn parents to remove cast if the toes get rubbed, red, pale or cold. Then call the Office. For mild metatarsus varus use a Wheaton® Brace.

Congenital Talipes Equinovarus = Clubfoot

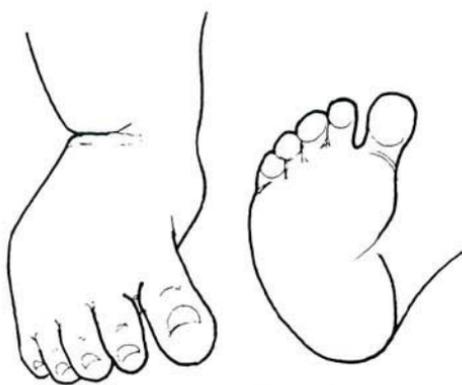
The "Golden Period" for treatment of this deformity is in the first few days of life. The joints at this time are more lax than later. An orthopaedic surgeon should be asked to see the child with a view to correction. Several techniques exist and each has its devotees, e.g., serial casts, adhesive strapping, and use of malleable aluminum splints. The faster the correction can be obtained the more likely it is to be complete. A child's foot is very chubby and it makes it difficult to appreciate the position of the bones. This makes assessment of treatment very difficult. X-ray examination in the simulated weight-bearing position may be helpful at 2 to 3 months. Correction by casting or splinting succeeds in 50% of children. Surgical correction will be required for the rest. There is much controversy about the best time for initial surgery; some surgeons choose to do this at about six weeks of age; others would leave it until 18 months of age. The majority favour two to three months of age.

When the foot has been corrected by either casts or surgery, the position must be maintained with some kind of splintage for many months afterwards in order to avoid a recurrent deformity.

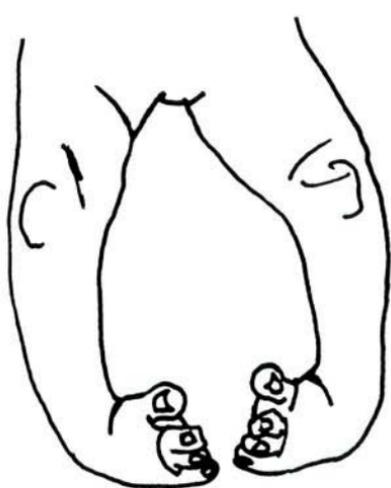
Vertical talus is rare and characterized by a rocker-bottom deformity of the foot. The diagnosis can be confirmed by radiographs. When the problem is recognized in the newborn nursery, it is often possible to



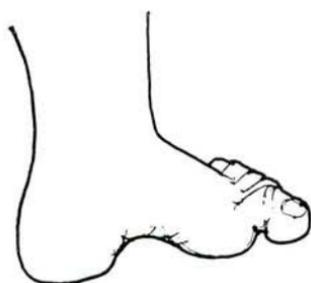
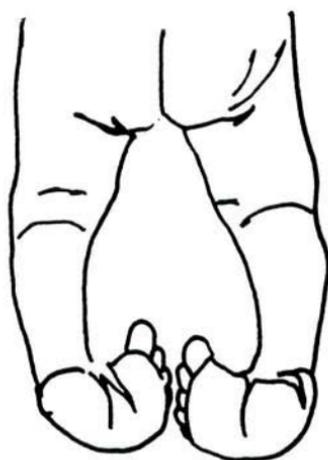
CALCANEVALGUS



METATARSUS VARUS



CLUB FEET (TALIPES EQUINO VARUS)



PES CAVUS



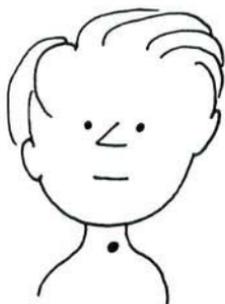
VERTICAL TALUS

secure reduction by cast immobilization and manipulation. Many children with this problem, however, have other problems as well which interferes with manipulative treatment. Probably more than half of the children with vertical talus will require surgical correction from the age of three months onwards.

Other conditions which may be recognized in the newborn nursery:

1. *Congenital Sternoid-mastoid Tumour.* After breech delivery some children develop a lump at the lower end of the sternoid-mastoid which can be easily felt. The lump usually develops 3 weeks after birth and only lasts 2 months. With time this haemorrhagic area within the muscle scars leading to a torticollis. Whenever the tumour is noted the child should be put on physiotherapy to prevent contracture as far as possible. If this is begun early enough no operation will be necessary and the child will be normal. Surgical release is required at 1 year if the muscle is tight.

In the Nursery look for a lump but do not expect deformity.



Without treatment the lump goes and deformity appears. He has his head cocked: one eye is closer to the corner of the mouth.

2. *Obstetric Paralysis.* When a child does not move one arm suspect a brachial plexus or a birth fracture of the clavicle or humerus. X-ray will show a fracture. Epiphyseal separation of the distal humeral epiphysis may masquerade as a dislocation of the elbow.

If there is no fracture a brachial plexus palsy is most likely. There is often swelling of the supraclavicular triangle. There may be a history of maternal diabetes resulting in a big baby. The shoulders of children with diabetic mothers become wider than the head so that the brachial plexus may be injured. If the lesion is complete or shows no signs of recovery within a few days the prognosis for full recovery is poor. Mother should be instructed in external rotation exercises in order to prevent development of a contracture. Continuous splinting is a thing of the past. The child should be referred to a centre for peripheral nerve injuries.

3. *Spina Bifida*. An obvious sac, leg weakness and deformity make the diagnosis. The child should be referred to a regional neurosurgical unit on the first day of life. Children with small low sacs will have the sac repaired and may well require a shunt. Long-term bracing and orthopaedic management is necessary. There is controversy regarding the closure of high sacs in the thoracic region particularly if they are associated with hydrocephalus and marked spinal deformity. Some physicians have advocated leaving these children to die. Why? Most of these children will, even if their sac is repaired, spend much of their life in hospital having major operations. They will attend a special school fitfully in a wheelchair. Their IQ will not be high. But not all die and the doctor is open to legal censure. A doctor's job is to treat people — not to leave them to die. In the past God committees have been formed and parents have been urged to make a decision about this for themselves. Hopefully in the future alphafetoprotein screening will spare everyone agonizing decisions.

4. *Congenital Bone and Joint Diseases*. Dwarfism, osteogenesis imperfecta, the multiple dislocations of Larsen's Syndrome, may be all too obvious at birth. Children with *arthrogryposis* are born with fixed joint deformities and often dislocations. Physiotherapy is the mainstay of treatment for arthrogryposis and should be started early. Some children have difficulty swallowing and require gastrostomy or tube feeding. Early referral is wise for all these problems.

5. *Congenital Amputations and Malformations*. Parents are aghast when a child lacks part of a limb. Arrangements should be made for them to go to a child Amputee Clinic as soon as possible so that they can see, with their own eyes, how children can be fitted with limbs and remain in the normal stream of life.

Toddlers and Preschoolers

Between 10 and 18 months of age most infants become independent walkers. If a child is not walking by the age of 18 months suspect retardation or cerebral palsy.

During the first year of life parents will expect your counsel on such things as jolly jumpers to which you can say "jolly good" and they will be honing questions about footwear. What sort of shoes are best?

Shoes, you say, are an article of dress, like a vest. They keep feet warm and protected against pins and sharp edges. They should not be too loose nor too tight. If they cause red marks they are too tight. But to expect them to do anything more for a foot is like expecting a particular kind of diaper to guarantee a happy sex life. Babies have chubby feet with small heels so that shoes won't stay on. This is the reason for boots in the first year or two of life. Support for weak ankles has nothing to do with it.

Three common problems dominate the scene — angular deformities of the leg, torsional problems and flat feet.

Torsional problems. The commonest one is in-toeing. When you take a history pay attention to these particular points: 1) Family history and that of friends. The readiness of mother to believe what you have to say

depends upon whether it concurs with her experience in the past. If her father had an osteotomy by old doctor what's his name, dead these 20 years, she may be unwilling to accept your belief that everything will straighten out by itself. She may have friends pressing a once-used brace onto her. Alternatively she may know several people who straightened out spontaneously and would therefore be unwilling to hear much to the contrary. 2) What effects does torsion have on the child? Does he fall over? Does he run as fast as his friends? Some children are poorly coordinated at first and the in-toeing is just one feature of this. 3) Is it getting better or worse? 4) What position does the child sleep in and sit in? If he sleeps with his feet turned in or sits on his feet all the time spontaneous improvement may be a long time happening.

Your examination should reveal the cause of in-toeing. It may be due to 1) metatarsus varus, 2) tibial torsion, 3) internal femoral torsion. Measure the degree of in-toeing by the gait angle (See page 55) while the child is walking up and down. Next look at his low back to exclude a neurological cause.

Lie the child prone on a couch to determine the site of in-toeing as shown in the picture. Next check that the hips have wide abduction so that a dislocated hip is not going unnoticed. Finally have the child sit on the floor and then stand up — a Gower's sign, which is a good test of generalized muscle strength. If a child has to put his hands on his knees, as shown on page 8, he should be assumed to have muscular dystrophy and investigated further.

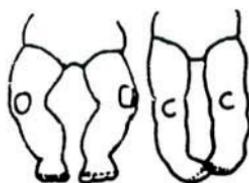
Treatment. The simplest management is to present mother with a copy of the in-toeing sheet and leave her to read it for 5 or 10 minutes with the appropriate section marked out. If she has no further questions the consultation is quickly over. Follow-up is strongly recommended. In this way you will be demonstrating interest in the case. No one likes to be looked after by a disinterested physician and they will quickly go and get advice from someone else — a waste of everybody's time.

IN-TOEING

VARIETIES



infants



toddlers



kindergarten

Metatarsus
varus

internal tibial torsion

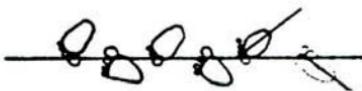
internal femoral torsion

EXAMINATION

1 ASSESS GAIT ANGLE

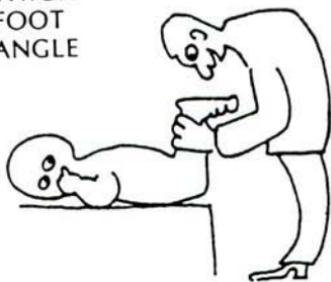


normal gait
angle is 10° external



This shows 30° internal
rotation gait angle denoting
 40° in-toeing.

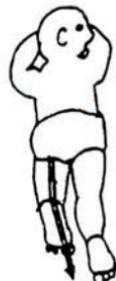
2 ASSESS THIGH FOOT ANGLE



$0^\circ - 30^\circ$ E.R.
is normal



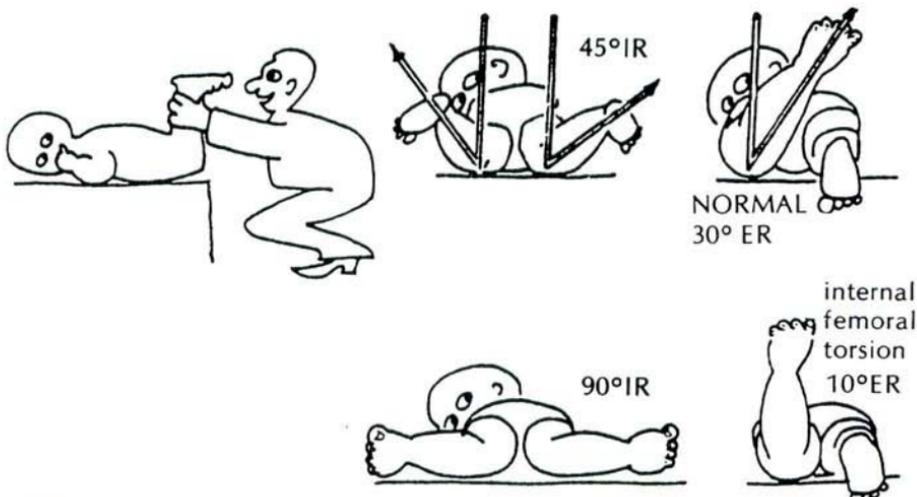
metatarsus
varus



10° I.R.
= internal
tibial torsion

3

ASSESS HIP ROTATION



TREATMENT

Metatarsus Varus at birth: watch
at 3m: casts every 2 wks until corrected
at 1 yr: reversed last boots
at 4 yr: surgery

Internal Tibial Torsion controversial, many improve spontaneously
0-15m: correct sleeping position
15-24m: Dennis Browne night splint for 3-4 months
(6" bar 45°ER)

Internal Femoral Torsion non operative treatment ineffective.
most improve spontaneously
correct sitting habits
if severe suggest
osteotomy aged 10 yr.

What every parent should know about in-toeing

Many small children in-toe as they are growing up. It is really a part of growing up for many toddlers. For these, there is nothing to worry about, and as they get older it will go away.



Some children in-toe because there is a twist to the bone in their leg, either in:



1. Foot. When the twist is in the *foot* it is called *metatarsus varus*. Often this can be helped by applying casts to the small child. The casts are changed every week or two gradually straightening the foot. After about 6 weeks the foot is usually straight; special shoes are needed for a few months afterwards to keep the foot straight.

2. Shin. When the twist is below the knee, it is called *internal tibial torsion*. This is something which is made worse by a child sleeping face down, with the feet turned in underneath. It is made worse by a child sitting on his feet habitually. For many children just stopping these habits is enough to allow the condition to get better by itself.



A page for parents

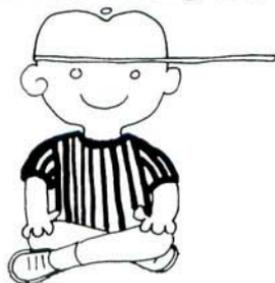
For others, with a more marked degree of in-toeing, the problem can be overcome by wearing a night splint for three to six months. This splint holds the feet turned out at night, when the bone is growing.



3. Thigh. Some children in-toe because there is a twist between the knee and the hip. This is called *internal femoral torsion*. It is more common in girls than in boys. Some girls are born with a tendency to this, and they find it very easy to sit in the W-position, which aggravates the condition and prevents it from getting better by itself. For some girls, stopping sitting like this will be

enough. For more than fifty years, people have been using different kinds of braces and splints and special shoes and special exercises in an attempt to overcome internal femoral torsion. All the studies show that this equipment makes no difference, and it cannot be recommended. The problem can be made to appear less by putting a child into ballet lessons. Most children show a tendency to improve until the age of eight or ten, after which things remain stationary. For the five per cent of children who do not improve enough by the age of ten, there remains the possibility of correction by an operation. However, this is hardly ever needed in practice. We do not do the operation at a younger age than ten, because we find that most children grow out of the problem on their own.

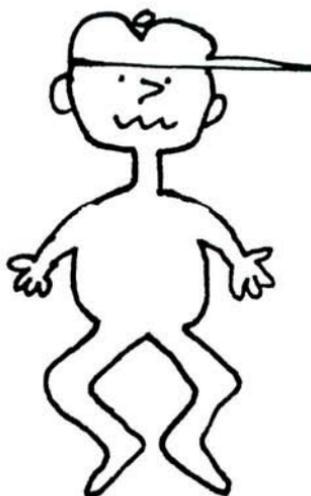
Remember that many track stars have a little toeing-in, and this seems to be a factor in their success. Remember that in-toeing does not cause arthritis.



RECOMMENDED
SITTING POSITION

THE FAMILY THAT DOES
YOGA TOGETHER TOES OUT.

Out-toeing. Children who lie with the legs apart commonly have excessive external femoral torsion. If you see this in an older child suspect hypotonia from some neurological cause or perhaps retardation. The foot deformity is the result of their lying immobile in one position for the greater part of the day and night. If they appear to be otherwise normal children warn the parents that walking is frequently delayed — the Charlie Chaplin position does not make it easy to balance — and try to improve their sleeping pattern.



Angular Deformities. Ask the same kind of questions as for torsion. Find out who is the real person who is so concerned in order that you can answer their questions. Ask them whether the deformities appear to be increasing or decreasing.

It is difficult to make much of a show of your examination. You can look for signs of rickets. Are the growth plates enlarged at the costochondral junction — a rachitic rosary, or at the wrist? An X-ray of the knees may be helpful. The best way to assess the degree of severity of knock-knee is to measure the intermalleolar distance with the child standing. Bow legs can be measured with the child standing by putting a tape measure between the knees.

In the absence of any diseases of bone these may be safely regarded as self correcting normal variants. More than 90% of children with angular deformities are otherwise perfectly normal and may be expected to enter adult life with straight legs irrespective of treatment. I usually suggest that the parents take a photograph of the child at home and write the date on it. They should take a sheet of paper and measure either the intermalleolar or intracondylar distance and keep a little record of this. An instruction sheet is given to them.

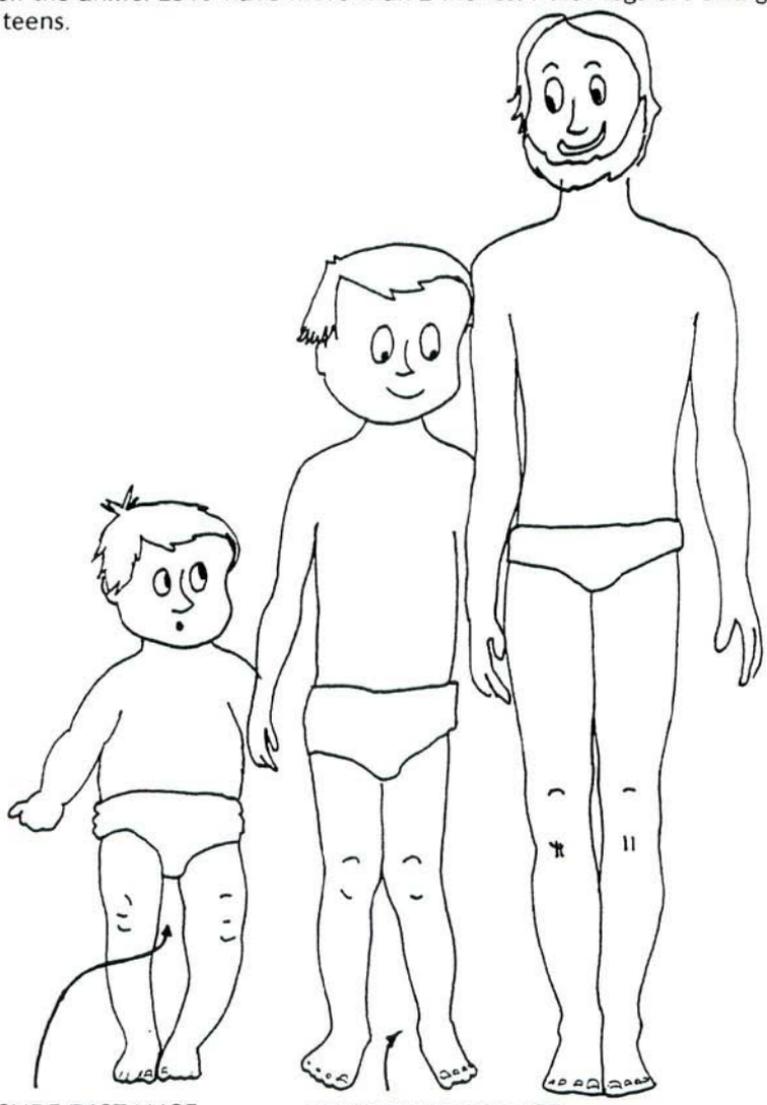
If the deformity continues to increase and shoe wear is jeopardized it may be helpful to prescribe shoe wedges. A medial sole and heel wedge of 3/16 of an inch may be helpful to the shoes of the knock-kneed and a lateral wedge to those of the bow legged. The efficacy of this prescription has never been tested.

If a severe deformity is present in late teenage life an osteotomy should be undertaken to secure straightening of the leg; controversy surrounds epiphyseal stapling and most orthopaedic surgeons prefer osteotomy in preference to stapling.

THE NORMAL PATTERN

Bow leg is common under the age of 2 years and usually straightens by itself.

Knock-knee is common between the ages of 2 and 7 years; the feet usually look flat: 50% of normal 3-year-old children have 1 to 2 inches between the ankle: 25% have more than 2 inches. Most legs are straight by the teens.



MEASURE DISTANCE BETWEEN KNEES

MEASURE DISTANCE BETWEEN ANKLES

FLAT FEET

Flat feet are very common in children when they begin to walk, particularly if they are fat and loose jointed. By 6 or 7 an arch forms in many. Many old books cover 20 pages on foot exercises, shoe therapy and other forms of magic. Today this is regarded as rubbish because flat feet are not harmful and because the magic does not work.

Causes

Infants have fat feet. Flexible feet are common in all ages. Pathological flat feet are seen in cerebral palsy and vertical talus. Many parents diagnose flat feet in an attempt to rationalize a weak child's problems. The child's real problem may be muscular dystrophy, cerebral palsy or inco-ordination.

Questions To Ask

Do they trouble him/her? Pain? Can he/she run as fast as friends? A positive answer will rule out muscular dystrophy or a neurological disorder. Does anyone in the family have *trouble* from flat feet? Who is concerned about this? Why? The answers will not help you to make a diagnosis but will help you talk their language.

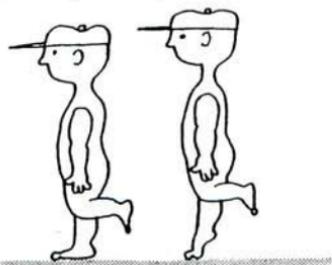
Tests

Say "walk", "walk on tip-toe". If the arch appears when the child walks on tip-toe then flattening is flexible and of no significance.

"Sit down on the floor — now stand up". Gower's test will exclude muscular dystrophy. Ask the child to hop on one leg and then the other to test co-ordination.

Look at the low spine for signs of a hairy patch or a dimple which may indicate an underlying neurological anomaly.

Test joint laxity by seeing if the thumb will touch the forearm. Joint laxity occurs in about 50% of children in the first year and drops to 6% by the age of 6 years. As the laxity reduces the arch increases.



The Tiptoe Test. If the arch appears when walking on tip-toe the feet are flexible and the flat arch is of no significance and requires no treatment apart from explanation.

Treatment: Flexible flat feet are uninfluenced by shoe therapy and it would be ridiculous to do a cosmetic operation. But lengthy explanations are required to give parents a sense of perspective (See Handout).

Differential Diagnosis

Vertical talus should be recognized in babies soon after birth. The arch is not just flat but rockered. An X-ray makes the diagnosis — the talus points downwards.

Vertical talus requires casts and often operation as soon as possible.

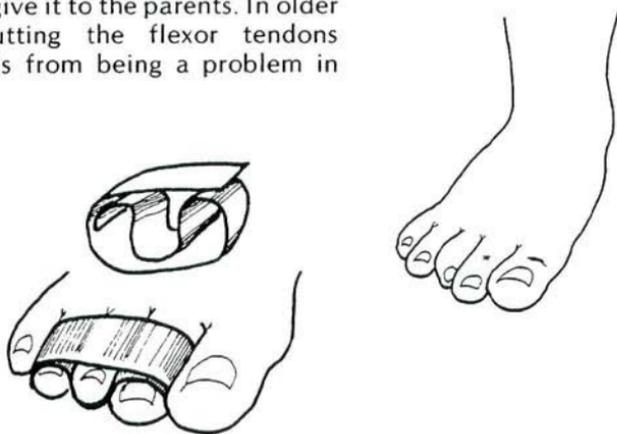
Trigger Fingers and Thumbs

Infants and preschoolers may have a thumb that is always flexed at the interphalangeal joint. Most people think first of a dislocation and are surprised when the X-ray is normal. But the thumb is flexed because a pulley grips a small nodule on the flexor tendon. Splinting seldom helps. The best answer is division of the pulley.

The same problem can be seen in the fingers at the PIPJ. The finger locks and unlocks. Here too surgical release works best.

A Curly Toe

This is common but only a few parents worry about it. One toe has a short flexor tendon and remains flexed all the time. Photocopy the strapping sketch and give it to the parents. In older children cutting the flexor tendons prevents this from being a problem in adult life.



ADOLESCENCE

THE ADOLESCENT FOOT

Heel Pad Pain

Pain seems to be due to bruising the heel pad. Hard shoes, heavy landings and a little flat-footedness are all causative factors.

The area is tender. X-rays are unnecessary.

Treatment. Explain that the bruised area can be protected by wearing soft heeled shoes or a sponge rubber sheet can be inserted. If you wish to be fancy tell them to buy a Scholl's heel cushion. Put it in their shoe. Apply a dab of lipstick on the tender spot on the heel and then put the shoe on. Cut away the part of the cushion coloured by the lipstick and take the load away from that area. A quick recovery is usual.

The Stiff Painful Foot Of Tarsal Coalition

Pain over the outer side of the foot, stiffness of the foot (which is difficult for the primary care physician to recognize) and an X-ray showing a bar bridging two bones in the hindfoot characterize the condition. When the bar is discovered early, between the age of 10 and 14, it should be excised. After this age an arthrodesis is more likely. Occasionally other lesions such as synovial swelling due to rheumatoid arthritis or tumour will mimic this problem.



Over-Riding 5th Toe

Shoes are uncomfortable until surgical correction is undertaken.

Bunions And Hallux Valgus

Some girls wear narrow shoes and get red marks over the bunion area. They want an operation. Only an orthopaedist newly in practice would acquiesce because they will become even more vocal about the discomforts of an operation (even one that has gone well). Wider shoes are the answer. When there is marked hallux valgus an operation is worthwhile. Probably correcting metatarsus varus in infancy with casts prevents the development of bunions.

High Arches (Pes Cavus)

The high arch is accompanied by curly toes. Most of the weight is taken along the outer border of the foot. Walking and shoe fitting may become difficult. The condition is brought about through weakness of the small muscles of the foot so that the long tendons concertina the foot. In about 50% you will find a neurological cause if you look. Check the reflexes and an X-ray of the lumbar spine. The ankle jerks are lost in *Friedreich's Ataxia* and *Charcot-Marie-Tooth* and there is often a family



history; nerve conduction times are slow. A *tethered cord* may be associated with a dimple on the back, a unilateral cavus foot and an X-ray showing a wide interpedicular distance. The bony spicule of a *diastatomyelia* may be seen in the lower thoracic spine.

Treatment. These children should be referred because it is important to detect a potentially remediable cause in the spine. If no cause is found, look for any change in the shape of the foot using footprints, photos and standing lateral X-rays.

Increasing deformity requires a plantar release. Tendon transfers, toe straightening and even arthrodesis may be required eventually in progressive cases.

SPINAL SCREENING

Screening is an effective mass approach to spinal deformities in children.

Scoliosis (lateral curvature of the spine) is common in adolescent girls. The cause is genetic but the mechanism is not known. In the bad old days of 10 years ago most girls came for treatment when the curve was severe; one-third were put down for operative correction when they were first seen. But then it was realized that curves start small and slowly increase. Small curves can be recognized by the forward bend test. Early brace treatment for these eradicates the need for surgery. In some States spinal screening is compulsory; if your area has not started school screening you should speak with the public health authorities. Movies and a complete educational package can be obtained from the Scoliosis Research Society*.

The Forward Bend Test — See Figure.

“Put your hands together”.

“Bend forward”. Look along the spine for prominence on one side of the spine.

“Stand up — turn around and bend forward again”. Look along the spine from the top for prominence on one side.

Problems With Spinal Screening

1. Screening tyros desire to miss nothing and call many normals abnormal.

2. Girls who know they have scoliosis feign sickness to stay away from school on the day of screening.

3. X-rays must be taken *standing*, lying X-rays under estimate the curve.

4. X-ray hazard (see page 88).

5. The key is a thorough educational program before instituting a screening program.

* Scoliosis Research Society, 430 North Michigan Avenue, Chicago, Illinois 60611

A SCOLIOSIS SCREENING POSTER

DO THIS



PREVENT THIS



1. STAND CHILD IN BATHING SUIT.
2. CHILD SHOULD BEND FORWARD TO TOUCH KNEES.
3. LOOK FROM BEHIND.
4. PROMINENCE ON ONE SIDE OF SPINE INDICATES SCOLIOSIS.
5. AN X-RAY AND ORTHOPAEDIC CONSULTATION ARE REQUIRED.



NORMAL



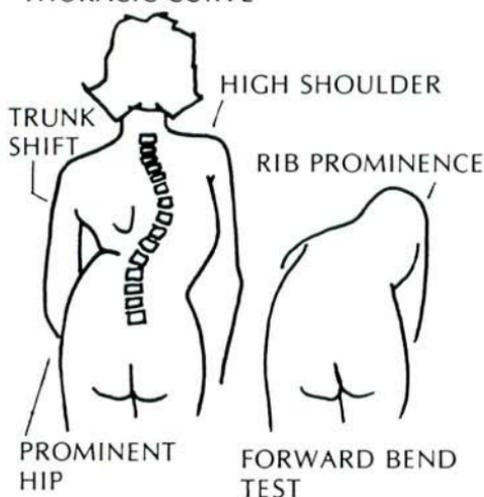
ABNORMAL

SCOLIOSIS BEGINS AT 8-10 YEARS.
EARLY TREATMENT IS EASY.
LATE DIAGNOSIS OFTEN MEANS OPERATION.
DIAGNOSE SCOLIOSIS EARLY

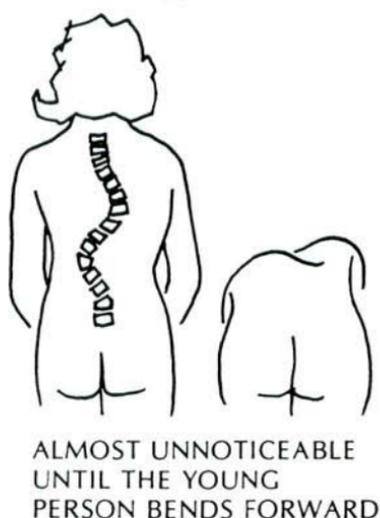
SCOLIOSIS

CLINICAL FEATURES:

THORACIC CURVE



DOUBLE CURVE



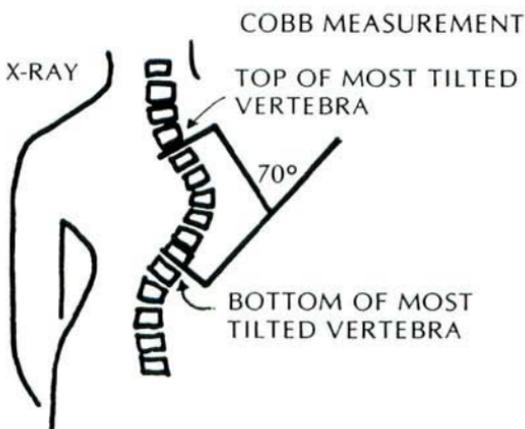
CURVES INCREASE DURING GROWTH.
SEVERE CURVES SLOWLY INCREASE IN ADULTS!

INCIDENCE

At school screening of 12-14 yr. olds:
6.5% had positive forward bend test
& required X-ray.
2.0% had scoliosis of more than 10° on X-ray.
0.3% required treatment.

ASSESSMENT

STANDING 3' PA X-RAY



TREATMENT

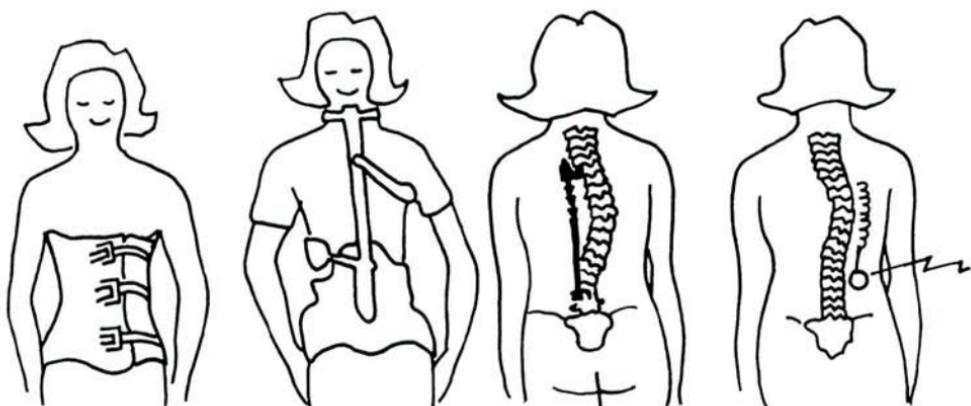
1) AIM

- 1) Preserve good appearance
 - level shoulders and no trunk shift
- 2) Prevent increasing curve in adult life

— a curve of less than 50°

It is NOT to produce a straight spine on X-ray.

2) METHODS



TOTAL CONTACT
ORTHOSIS

MILWAUKEE
BRACE

HARRINGTON
FUSION

ELECTRICAL
STIMULATION

- 3) The CHOICE of treatment depends on age, severity, speed of progress, appearance, cause, lung function, home circumstances and patient preference.

4) A THUMBNAIL GUIDE TO TREATMENT:

- still growing
- slight curve — less than 20° — Rx repeated exam + X-ray
 - 20° - 40° — Rx brace or electrical stimulation
 - 50° and more — Rx operate
- growth complete
- less than 40° - 50° — Rx leave alone
 - more — Rx operate.

KYPHOSIS or Roundback

Types:

1 ADOLESCENT

Localized Kyphosis
more obvious on forward
bend test.

2 CONGENITAL

Rare: may produce cord compression

mild postural type

structural type = Scheuermann's

more boys

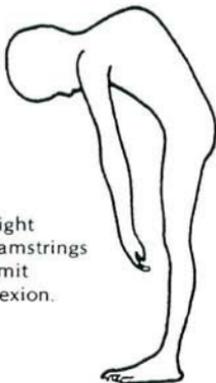
wedged vertebrae

often painful

often localized

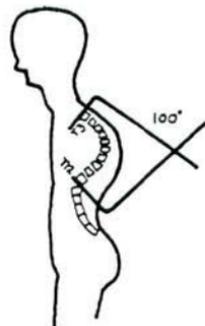
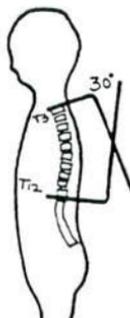
often short hamstrings

Assessment



A STANDING 3' lateral XR
is essential.

Measure maximum angle



Treatment

depends on type, age, pain & angle

CONGENITAL: in situ fusion ASAP

ADOLESCENT

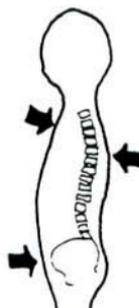
Mild > 45° :more activity

Marked > 50° & growing:
Modified Milwaukee
brace

> 55° & mature:
Harrington
compression fusion



Harrington
fusion



The brace exerts
3 point pressure

Chapter IV

SHORT TOPICS

1. SPORTS MEDICINE

Injury can end a professional sportsman's career and so specialists in sports medicine emerged to minimize the risk. In big cities there is a trend for all sports related injuries to be treated in sports medicine clinics even though there is little that distinguishes a sports injury in a child from any other kind of injury.

Sports medicine can guide athletes to look after themselves. Many injuries can be avoided by:

1. *Conditioning* — obviously fitness and practice will protect the sportsman.

2. *Lessons* — some young skiers out for the very first time bomb down the hill without any instruction and break a leg before they reach the bottom. Lessons are important in most sports. Neck injuries in football are a cause of quadriplegia — avoidance of charging and correct tackling techniques make this much less likely.

3. *Safe equipment* — face masks for hockey players prevent blinding injuries. Skaters should wear gloves to avoid being cut by a hockey skate. Ski bindings should be checked to see that they are correctly adjusted each day. Water sports require lifejackets to prevent drowning accidents. Protective clothing and good equipment are essential.

4. *Protection of weak joints* — ankle strapping before some sports reduces the incidence of sprained ankles.

5. *Avoidance of overuse problems* — repeating the same movement over and over again can concentrate all the strain on one part of the body leading to injury. This is particularly liable to happen in children whose skeleton is partly in growth cartilage. Children should not train as hard as adults. For example, if a baseball pitcher complains of pain in the elbow and cannot fully straighten the elbow he is doing too much.

Joggers get pain in the lower pole of the patella and swimmers get pain in the shoulder when they are over-exerted.

Some gym teachers favour deep knee bends to strengthen the knee. In fact this exercise is the cause of much disability because the patella surface is subjected to the greatest load; it is an exercise to avoid.

6. *Psychological tuning*. Players should not play injured 'at all costs'. Parents may need tuning down. Rules should be respected and enforced by referees.

Rehabilitation Of Injuries

Sportspeople are highly motivated to get better and are prepared to spend hours a day on body care. Many cities have a sports physiotherapist who will get the best out of them. The greatest difficulty comes in persuading them to stay out of competition until they are healed — that is they have a full range of joint movement and restored muscle bulk. After a cast is removed from a fractured limb the bone is liable to refracture: allow six weeks for the arm and three months for the leg to resume strength before returning to contact sports.

Physiotherapy

Resist the temptation to write “knee exercises” on a scrap of paper and leave the parents to make their own arrangements. Physiotherapists are beautiful people — they do not respond to this approach. You will find that your patient gets the run around. Always phone up and make the arrangements yourself and tell the therapist enough about the problem to awaken their interest.

Drugs

Steroids and anti-inflammatory drugs have no place in children's sporting injuries. Never inject steroids into any tendon — it may rupture at a later date.

Gym Notes

Mother needs a note to protect her child from disbelieving teachers and school wants a note to protect the teacher from litigation when a child returns after a fracture. Some children should be off all activities for a time; but chronic problems (such as patellar pain) may require a note which indicates exactly what should be avoided.

Being Careful

There are several diseases in young people which can be controlled either by avoiding all strenuous activities or by an operation. Spondylolisthesis, osteochondritis dissecans, recurrent dislocation of the shoulder and patella are examples. Perthes' disease may be treated by prolonged bracing or by operation.

Which is the right course? At first being careful seems right. But after 3 months many parents and young people are keen to put the problem behind them and start living again.

Sports For The Handicapped

Sports are now organized for the blind, the retarded and for people in wheelchairs. Skiing for amputees has been popular. Not only do these activities provide a physical outlet for energy but the children will surprise everyone, including parents, with the new enthusiasm and zest for life.

The Recreation Department at the Town or City Hall will know where a program exists.

2. PROBLEMS OF THE CHRONICALLY HANDICAPPED

The chief problem is that their difficulties never go away. The physical difficulties impede emotional development. The problems remain a life-time preoccupation of the entire family.

Crisis Times:

1. Prediagnosis — worry that the child is not normal.
2. On diagnosis — often late: parents blame themselves or their doctor.
 - hard to explain the disease to the parents
 - hard for the parents to understand and accept
 - they need ongoing support
 - "treatment" is not easy and is not curative
 - worry often increases after a few weeks when the full impact sinks in.
3. School entry — intellectual impairment may have to be faced.
4. Adolescence — lack of independence must be faced.
5. Parents middle age — arrangements for future care must be made.

Parents

Parents usually feel that they lack information, they misunderstand and misquote. Their lives are disrupted — housing, work and finances. Even the apparently successful ones are stressed. They may go through a *grief reaction*: at each stage the doctor has a special role.

Denial — hide disability: MD suggests investigation.

Disbelief — shop around for cure: MD puts cranks into perspective.

Anger — quarrel with people who try to help: MD is patient.

Apathy — leave it all to others: MD plans for them.

Acceptance — the sensible attitude: MD's reward.

Helping others — organizing groups, petitions, building residences: MD co-operates.

Handicapped teenagers and young adults face many problems:

- at this age they comprehend their future.
- they recognize their own social insecurity and lack of interpersonal skills.
- the change from being protected to being a social reject.

Physicians have difficulty relating to the chronically handicapped but can follow many helpful approaches:

- thorough assessment on suspicion and without delay.
- explanations should be slow, complete and repeated several times.
- group therapy important.
- establish a management plan — avoid "try this, try that" approach.
- avoid pinning hopes on tomorrow being better than today.

- emphasize care rather than cure.
- examine repeatedly, looking for an opportunity to offer medical help.
- turn pity into action by:
 1. suggesting books to read
 2. advice on groups to join
 3. where to go for treatment
 4. selection of schools
 5. suggesting helpful toys
 6. organizing recreation
 7. suggesting holiday relief
 8. suggesting baby sitting

Look on the bright side, give parents a morale booster. "You are doing everything possible and you must be pleased to see what a difference it makes".

Services For The Handicapped

Every community has a centre that provides comprehensive care for the handicapped. Early referral is beneficial to all because parents have more concerns than most doctors can handle.

Medical Services. Testing of hearing, vision and intelligence is routine in addition to orthopaedic, neurologic and urologic assessments as required.

Aids. Rehabilitation engineering has provided a great wealth of walking aids, orthoses, special chairs, communication aids and so on that can transform the outlook of some handicapped.

Sports. Most sports have been modified so that they can be enjoyed by the handicapped. Sport is more than fun and fitness — it builds self esteem, which is so important for the handicapped.

Schooling. Mainstreaming or special schooling? Few children have a choice. But where ever they go to school many will need special help to achieve their potential.

3. MUSCULOSKELETAL CARE AND RECORD KEEPING

As a child grows up there are particular diseases which should be actively sought at each age. Advice should be given appropriately at each age.

- | | |
|----------|---|
| PRENATAL | <ul style="list-style-type: none"> — Alphafetoprotein screening — Genetic history |
| NATAL | <ul style="list-style-type: none"> — Normal/LBW/anoxia — ? at risk for cerebral palsy |
| NEWBORN | <ul style="list-style-type: none"> — Ortolani test for C.D.H. — Sternoid mastoid tumour — ? fractures, ? birth palsy — Feet — normal/MV/CV/CTEV — CPK — Spine — scoliosis/spina bifida — Bonding (? help needed to prevent child abuse) |

- AT 3 MONTHS
 - Hips — abduction, ? C.D.H.
 - Feet for M.V.
 - Hands — trigger fingers
 - ? Normal development — holds up head
 - Advise on sleeping position
- AT 6 MONTHS
 - Hip — abduction, ? C.D.H.
 - ? Normal development — sits
- AT 1 YEAR
 - Hip — abduction, ? C.D.H.
 - ? Normal development — starting to walk
 - Advise on shoes and sitting posture
- AT 1-1/2 YEARS
 - Hips
 - Torsion — measure
 - Bow leg
- YEARLY CHECK
 - Physique
 - Scoliosis/kyphosis — spinal screening
 - Leg and Foot shape
- ADOLESCENTS
 - Heel pad pain
 - Tarsal coalition
 - Bunion
 - Patella problems

CODA

You have reached the end, congratulations. Go and try your skills on some children. To increase your knowledge further there is a lot to be said for reading in the evening about diseases you have seen during the day. You will never forget the essentials if you do this.

When you have passed the stage of trying to shake the hand of a mother who is holding a baby with one arm and a bottle with the other — when you have remembered to tuck your tie in so that it does not drag across areas best left untouched — when you say “Perthes” without feeling self-conscious about the pronunciation, then you will be doing quite well. You will be ready to think about polishing your thought patterns as you carry out a consultation so that parents and children get the most from it.

The Consultation

The consultation should be an exercise in thinking. After a few years in practice, when the terror of missing something has passed, there is every temptation to dig a rut. Unhappily a mindless routine only leads to boredom and disenchantment — a kind of medical menopause. Commonly the telegraphic approach to medicine develops about four o'clock in the afternoon. “Sitdown thereandtellmewhatthetroubleis . . . youhavenebulitis . . . getthisprescriptionandsendinthenextpatient . . .”

The stages in an ideal consultation are:—

I. Information Gathering.

a) *History.* Bear in mind that the history contributes 60% to diagnosis, examination — 30%, Xray and investigations — 10%. History taking often separates the good doctor from the pack. Remember there may always be more than one diagnosis. There may be nothing physical the matter. Some people make a lot of noise (in computer language, of course), without any message.

b) *Magnitude assessment.* What is the size of the problem? While there is no such thing as a little pregnancy, there are certainly patients with only a little pain or a little deformity. Their management depends on the SIZE of the problem. These are not all-or-nothing conditions like pregnancy. Always find out how bad, or how frequent, a symptom really is. I frequently tell patients that most people could have an operation for one thing or another. People avoid these operations because the size of their problem makes the operation not worthwhile.

c) *Attitudinal profile.* Management is determined by diagnosis —70%, attitudes —20%, and by social, geographic, financial and schooling considerations —10%.

The attitudinal profile includes: 1) how the problem is viewed, and 2) the outcome expected and 3) feelings about treatment.

d) *Examination.* Take it slowly and with a distracting patter and you will soon have a reputation for being good with children.

e) *Tests.* How many tests should be done? Tests are needed when the answer will make a difference to management. They are not

needed to confirm a diagnosis of a trivial condition. One should ask what the pain/benefit ratio of a test is. The more tests that are done the greater the chance of one of them laying a false trail.

II. Differential Diagnosis.

This is the time to let the mind wander over all the possibilities. Avoid jumping to a conclusion — you may be wrong because you have not considered other possibilities which are more likely. Remember de Bono's law: certainty may be nothing more than lack of imagination.

Many use a classification to remind them of all the possibilities, e.g. congenital, acquired, infectious, neoplastic, metabolic, vascular, etc. The next stage is to look at the pluses and minuses for each possibility. Until a diagnosis has been made, both patient and doctor are uneasy. However, one should beware of an obsession with diagnosis; there are many conditions which have to be treated without an exact diagnosis. The doctor scores no points when he says "Sorry. Can't help. Until I can make a diagnosis you will have to treat yourself".

It is not always enough to try to sum up people in two words of dog Latin — "he's got cubitus varus". Latin may once have been the language of scholars, but there is more to understanding a problem than translating "bent elbow" into a dead language. While Grannie can recognize a bent elbow, there is nothing clever in describing it in a language neither of you understand. Elbows are usually bent because a fracture has healed badly. The most significant feature may be the attitude of the mother. Is she grateful to someone for saving the arm? Or is she planning to sue for a poor result?

III. Differential Explanation.

Every patient expects an explanation of his problem. What is the best way to do this? Obviously, explaining a daughter's scoliosis to an orthopaedic surgeon is different from explaining it to a tree surgeon.

There are many styles of explanation:

1. analogies: "The spine grows crooked like a tree and we use a rod that works like a bumper jack to straighten it out".
2. using props: "You can see the picture in the book shows how the spine curves. This picture shows how it is straightened out. This is the kind of rod we use.
3. using hand-outs: "Read this".
4. demeaning method: "It's crooked and the reason is too complicated to explain — just leave the treatment to me".
5. mystifying method: "It's a very difficult problem. The collagen lacks S H bonding resulting in lateral migration of the nucleus pulposus, etc."

Just as patients like a doctor with warm hands, they like one with a heart warm enough to explain a problem in words they can understand.

IV. Differential management

First consider as many possibilities as you can imagine, next consider the pluses and minuses of each and then decide which is best. I often do this aloud to help patients understand.

The *minimax strategy* is one guide to selecting the best management and is especially useful when the diagnosis is not fully worked out. You assume the worst and treat it. The risk is minimised for the maximum situation. For example, imagine a child with pain over the metaphysis of the tibia. You suspect osteomyelitis but it seems to be the mildest case in the world. Yet if nothing is done you have missed a golden opportunity. Mini-max takes the bull by the horns, organizes all the tests, and starts IV antibiotics prepared to stop them in 3 days if the tests are negative.

The hope strategy: "I am going to treat this as a bruise because I hope it is a bruise and not osteomyelitis". Obviously disastrous.

Doctors vary very much in their approach to risk taking particularly when the natural history of the disease has not been spelled out. For example, many infants have internal tibial torsion. They walk pigeon-toed and trip over their feet at first. However, the majority straighten out spontaneously by the age of 5. A small proportion continue to intoe markedly. The mini-max strategy is to put all in-toers into splints at an early age, knowing that it was unnecessary for the majority. The surgeon who believes that "a chance to cut is a chance to cure", will treat none early but will offer surgical correction to the five year olds with problems. Only a chartered accountant would know which is right. The researcher will try to find what distinguishes those which cure themselves from those that do not.

The four line litany: When there are many problems and it is hard to know where to begin, recite this litany:

1. What is the main complaint?
2. What can be done for it?
3. What are the chances of success?
4. Is it worth the effort?

V. Think Through.

After winding through the maze so far, many of us stop thinking until a thoughtful parent asks about things we should have worked out, such as:

1. What are the complications of the disease and the treatment.
2. Suppose treatment proves impossible to follow (non-compliance). What is the alternative?
3. Suppose the condition worsens — how is this recognized? Does it mean a second opinion, re-admission to hospital etc.?
4. How will social life and schooling be affected?
5. Suppose you are wrong about the diagnosis — how would other possibilities be recognized?

VI. Subsequent Visits.

The pressure to make a diagnosis has passed. Enquiries should strike a nice balance between discouraging hypochondriasis and uncovering problems. Treatment should maintain a fair trade-off between the benefits and the insurance of further treatment. It is often difficult to know when to stop.

A few children have chronic diseases — their problems do not go away, which takes us back to page 71.

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Handouts to Photocopy and Give to Parents

NORMAL DEVELOPMENT FOR PARENTS

Parents naturally want to be sure that their child is developing normally and they desire to raise their child well. But parents are not always sure what to expect, particularly with a firstborn child, and may be confused by all the advice that is offered.

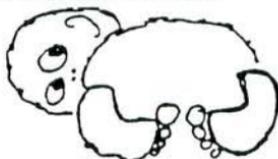
Walking

Infants do not get up and run on the day of birth because the nervous system is immature; the child has little control over the position of the feet. During the first year or two the nervous system matures so that the child gains balance, strength and control of the legs. When walking begins the feet point in all directions and turn over.

Some Milestones

During the first six weeks the hand is clenched tightly (the grasp reflex). Baby grabs things and won't let go, making use of the hand difficult.

At about 3 months baby holds up the head and looks about. Discourage baby from spending all the sleeping time with the feet turned underneath. This seems to twist the leg so that when the child begins to walk the feet are turned inwards.



If the feet themselves are twisted at 3 months and have not improved with exercises they may benefit from being straightened in a cast.



Between 3 months and 5 months baby starts to kick strongly and to roll over.

By 7 months baby can sit unassisted and pushes strongly with the legs. This is the time when babies may begin to enjoy walkers and jolly jumpers.

Between 8 and 10 months crawling begins. By 10 months children begin to pull up on the sides of the crib. They may enjoy toys to push about while they walk behind them.

By the first birthday many children begin to take a few steps. But some, particularly the ones who scoot quickly along on their bottom, may not begin walking until they are 18 months old.

During the first 2-3 months of walking most children turn their feet over and are unsteady. As the nervous system matures this improves and they stop walking on tip toe, tripping and begin to run and jump and turn around without falling.

If a child toes in at every step at 15-18 months and sleeps with the feet turned in all the time, a night splint may be helpful to correct the sleeping habit.

At first the foot usually looks flat because baby fat fills in the arch and because babies are very loose jointed. They can often put their foot in their mouths at first but as their joints gradually tighten up the feet look better.

Books to read: *The First Twelve Months of Life* (The Princeton Centre for Infancy and Early Childhood), by Frank Caplan. Bantam Paperback \$2.75.

The First Three Years of Life. Burton L. White. Avon Paperback \$4.95.

Shoes For Children

There are many different ideas about the best shoes for children. So many of us grew up with myths about the value of good shoes that it is difficult to accept any other point of view. Yet there is no scientific work which argues for one kind of shoe over another or for shoes over bare feet.

Shoes stop feet from getting cold, burnt or cut. They are an article of dress. They should be comfortable (like a shirt) and suitable for the occasion. For every day use running shoes are as good as anything. The wearer knows best.

You can tell when children have grown out of shoes because they complain of them being too tight and have red marks on their feet when they are taken off.

Some children twist their shoes out of shape quickly. It is usually a sign of vigour and not a sign of disease.

Foot Shape

Parents and relatives are often concerned about the shape of a child's foot. Foot shape is as characteristic of a person as the shape of their chin or the colour of their eyes and just as difficult to change. Flat feet at 3 years often improve by themselves. But not all.

The best study of the adult foot was carried out by the Canadian Army; they examined, foot printed and X-rayed 3,619 men. They found that about 20% of the population had flat feet, 11.8% had high arches, 2.2% had bunions and 4.9% had a prominent bump on the inner border of the foot. High arches were troublesome whereas few of those with flat feet had any problems.

A flat foot can be recognized by its wet imprint on the bathroom floor. The whole sole takes weight. Ask the child to stand on tip toe: if the arch appears the foot is flexible and there is nothing to worry about.

For hundreds of years parents have tried to put an arch into flexible feet with exercise, special shoes, arch supports and so on. Today these efforts are known to be unavailing. The shape of the foot is unaltered. Supports and special shoes are only useful for the minority

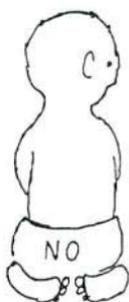
who have feet that are temporarily uncomfortable or whose feet rub on regular shoes. For the majority there is no scientific evidence that flexible feet cause problems or require treatment.

Growing Pains

About one child in five wakes up in the middle of the night crying with pains in the knees and calf muscles. A little rubbing of the area helps the child back to sleep. No cause for this problem has been discovered. After a few years the problem stops. No permanent effects have been seen. Sometimes calcium tablets seem to help or an ASA tablet before going to bed.

Sitting Position

Get a little chair and table for your child. So that they do not sit on their legs and risk twisting them.

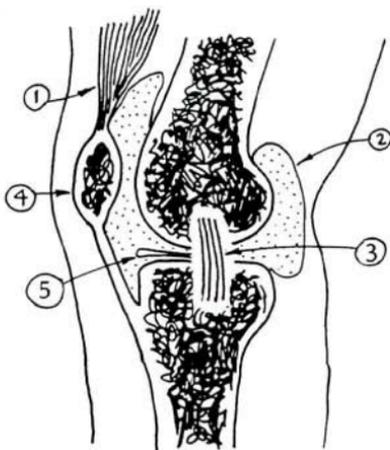


WHAT EVERYONE SHOULD KNOW ABOUT THE KNEE JOINT — A PATIENT'S GUIDE

Knee problems and their treatment make more sense if you understand how the knee works.

The Inside Of The Knee

- 1 *Quadriceps Muscle* — this is the big muscle in the front of the thigh. It is *the* muscle of the knee. When thin or weak, the knee feels weak, may give way and may be easily injured.
- 2 The *synovial lining* of the knee. When this is bruised or torn the knee becomes full of blood. Irritation of this by minor injuries or by arthritis cause it to produce water on the knee.
- 3 The *ligaments* are like strong cables holding the knee together. When they are torn the knee feels wobbly and unstable.
- 4 The *patella* (knee cap) is the bone in the front of the knee. It moves up and down when the knee is straightened and bent. The patella connects the quadriceps muscle to the bone of the leg (tibia). The patella moves up and down in a grooved track. If it jumps the track the patella is said to be dislocated.
- 5 The cartilage (or Meniscus) sit like the new moon and the old moon on the inner side and the outer side of the knee. They steady the knee, help to keep it lubricated and carry some of the body weight. The cartilage may be torn in twisting accidents in teenagers and adults.

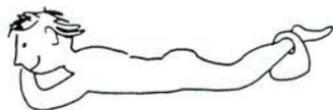
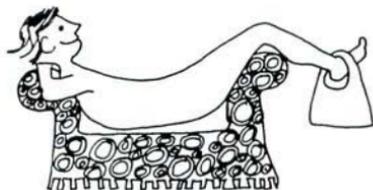
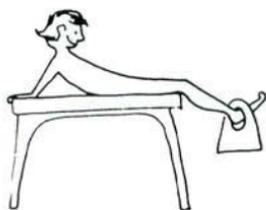


The Best Way to Avoid Injuring The Knee

1. Get into shape before going in for competitive sports.
2. Avoid deep knee bend and squatting exercises.
3. Check skiboot bindings regularly.
4. Avoid working out on a swollen painful knee.

Quadriceps Exercises

The key to a strong knee is a strong quadriceps muscle. The muscle is naturally thin in a few people. In everybody it becomes thin very quickly after the slightest injury. Just walking about does nothing to strengthen the muscle. Special exercises are required.



1. Get a plastic shopping bag and fill with 4 pounds of weight. Use cans of soup, packets of sugar, stones etc. Use scales to weigh these if the weight is not printed on the label.
2. Sit on the kitchen table, lean back.
3. Counting to 10 slowly lift the weight — keep the knee straight while you count 10 and then let it down slowly counting 10. Do it 10 times. The quadriceps should ache after this if you are doing the exercise well.
4. Repeat this exercise 2 or 3 times daily.
5. When you have mastered 4 pounds increase the weight until you reach 15 pounds.

For Something Different

1. Watch the TV from a reclining position on the chesterfield and do the exercise twice every time a commercial comes on.
2. To strengthen the muscle at the back of the knee — the hamstrings — lie prone and lift the weight.
3. To strengthen the quads and help the knee to bend. Fix a spring chest expander to the top of the door frame (a nail over the laundry door will do) put the foot into the stirrup and push down then let it up slowly. Repeat this 10 times.

Common Problems

The injured knee. Sudden twisting or a bad fall may stretch ligaments and cause bleeding or water in the knee. Children can repair most of these injuries given time, rest, and muscle strengthening exercises.

At the beginning the treatment depends on the particular kind of injury but after a short time most injuries require the same care.

1. Rest the knee — avoid a lot of walking and sports while the knee is swollen.
avoid a lot of standing.
avoid Physical Education at school.
2. Do quadriceps exercises. At least 2-3 times a day. Should be done as alternative to Physical Education at school.
3. Wear tensor bandage to limit knee movement. Re-apply at least twice a day to keep the pressure even. If the leg swells below the knee the bandage is too tight.

Chondromalacia Patella

Pain at the back of the patella is common particularly in athletic girls. The knee gives way occasionally and locks. Several factors contribute:

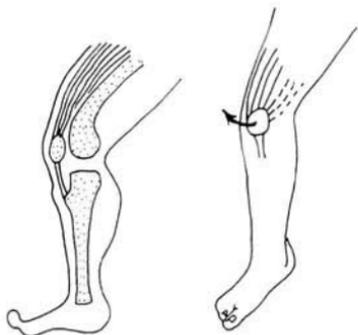
1. *Deep knee bend* exercises which put a lot of pressure on the back of the patella.

Solution. Stop all this.

2. *Weak Quadriceps.* Some people are endowed with small muscles that are not strongly attached to the inside edge of the patella. This means that the patella tends to slip out of the groove as the knee is straightened and bent.

Solution 1. Quadriceps exercises.

Solution 2. An operation to prevent the patella being pulled over — a lateral release.



Normal

Weak muscles
let patella slip
out

3. *The lining of the knee becomes irritated*, and there is creaking on movement. When the knee is fully straightened the patella rests against the soft synovial lining of the knee above the articular cartilage. When it moves over this tissue it feels like something moving over a washboard.

Solution. A.S.A. specifically reduces synovial thickening. One adult tablet 4 times a day is usually helpful.

There is a strong tendency for this to settle down if the level of sports activity is reduced. The problem often lasts for a year or two.

Osgood-Schlatter's Disorder

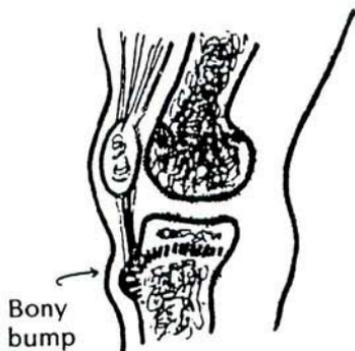
A bony lump forms just below the knee. It is very tender when it is accidentally hit or when kneeling on a hard surface. The knee may ache after sports. The problem is due to injury of a growing part of the bone, which grows too much and forms a bump. The bump is easily hit producing most of the pain.

Solution 1. Avoid kneeling on hard floors especially at gym.

Solution 2. During contact sports wear basketball knee protector (obtainable at most sports stores).

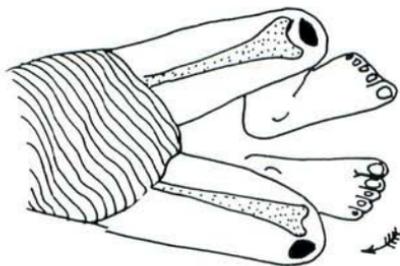
Most people can continue sports with this problem — it will hurt from time to time but this is not a danger sign.

The problem usually takes 18 months to settle down leaving a permanent bump as a memento. About 1% continue to have pain and require an operation.



Recurrent Subluxation of Patella

The patella does not always lie in its track but sometimes flips sideways. When this happens there is pain. The knee gives way because muscle action is momentarily switched off. Then the patella falls back into place again.



It is rather like a temporary derailment.

The patella has flipped its groove.

In some people the patella becomes completely derailed — a recurrent *dislocation*. The patella must be pushed back into place. Both these problems are commonest in teenage girls particularly if they have (1) a tendency to knock-knee and (2) loose jointed knees.

Solution. Step I. Quadriceps exercises. A strong quadriceps pulls the patella into the groove and makes it more difficult for subluxation or dislocation.

Step II. Operation. Many different operations are available. When the problem is minor, a minor operation such as a lateral release is sufficient — the tissue pulling the patella out of position is lengthened. Repeated dislocation usually requires tightening tissues up about the knee. A cast for six weeks is required to protect the repair followed by exercises.

A Torn Cartilage (torn meniscus)

Many sports stars have torn their cartilages as a result of twisting injuries. However this is a very *unusual* injury in people under the age of 18 years. The torn meniscus moves about inside the knee producing pain, swelling, instability and locking. If a torn meniscus is suspected the diagnosis is often made by (1) arthrography — a special kind of X-ray taken after a little dye is injected into the knee with a local anaesthetic. (2) arthroscopy — the inside of the knee is examined under anaesthesia with a little telescope measuring about 1/4" in diameter. When the diagnosis is certain the meniscus usually needs to be removed at an operation.

Remember

Most people will have some trouble with their knee at some time.

Self help is very important in knee injuries.

99% of knee problems in young people recover.

X-RAYS: RISK VERSUS BENEFIT

Benefits definitely outweigh the risks. The risks from low doses of radiation are not known precisely but we do know that the risks from diagnostic X-rays are very small. The risks of taking X-rays of the limbs is infinitesimal. The risks described here relate to X-rays of the trunk.

What are the risks?

Diagnostic X-rays use a dose well below that which will damage organs such as kidneys, lungs, eyes etc. Sterility is not a real risk.

X-ray in pregnancy. If an unborn child is irradiated there is no increase in birth defects. There is an increase in the chance of childhood cancer developing. The risk increases from the natural risk of about 1 in 10,000 to 1 in 1,000.

A pregnant woman should have X-rays necessary to protect her health. An X-ray is never a reason to abort a pregnancy.

The genetic risk. Lead shields are put over the gonads to minimize the risk of producing damage that could be passed on to the next generation. From animal data it appears that the natural human mutation rate is doubled by taking the equivalent of 200 unshielded X-rays of a child's pelvis.

The cancer risk. Cancer is caused by many factors in our environment and in our diet. For these reasons it is uncertain whether any cancers are produced by diagnostic X-rays. The theoretical risk has been calculated to be between 1 in 10,000 and 1 in a million.

The Benefits

X-rays are often the best method we have to find out what is wrong with a patient. To treat someone without knowing precisely what is wrong cannot be wise. X-rays are also needed to follow the progress of treatment.

X-rays should only be taken when the benefits outweigh the risks. The risks, which are small, can be minimized by X-ray control.

X-ray Control

1. *Only take X-rays that are necessary.* X-rays taken in other clinics or hospitals should be used whenever possible.

2. *Good X-ray technique.* Technicians are trained to keep radiation down to the lowest possible level. The Radiologist will see that fast film and fast screens are used. The government service inspects the X-ray machines.

You can note the steps the technician takes to produce the best pictures with least radiation.

- 1) Careful positioning to produce a standard image.
- 2) The correct exposure will be determined by measuring the distance between the X-ray tube and the film, measuring your thickness with calipers and consulting a set of tables.

HOW SHOULD I SIT ?



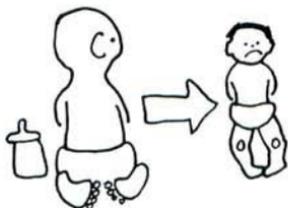
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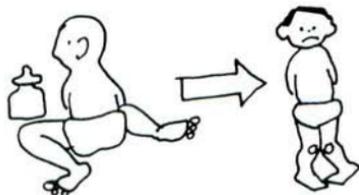
YES



YES



NO !



NO !

COLOUR ME PLEASE

CHAPTER VI

SKILLTEST

To each of the questions you should phrase the answer given by Dr. Rough and by Dr. Smooth. Dr. Rough is the subject of frequent complaints to the licensing body, but keeps his licence because making people angry is his failing not malpractice. Dr. Smooth, on the other hand, is our role model.

Questions

1. The mother of a family new to your practice wants you to prescribe some new shoes for her 4-year-old son. He has been wearing orthopaedic shoes because of flat feet for 3 years. His feet appear perfect without any suggestion of flat feet. What should you do?
2. Mother and father come in with their son — a sure sign of trouble. John has an obviously crooked forearm. "He broke his forearm seven weeks ago. Dr. Brown put on a cast and took it off last week. It doesn't look very good to me; what do you think, Doctor?"
3. Rick, aged 6 years old, has one normal foot and one very flat foot. The arch does not appear on the tip-toe test. What would you do?
4. Jim, aged 6 years, has pain in his right foot if he walks far. He is tender over the navicular bone. What investigation would you suggest?
5. Mother phones you up because her dear daughter Jane has been found to be a scoliosis victim at school. That sounds so terrible. Is it common? Why should she have the thing? I have always been so careful to see that she doesn't carry all those heavy books on one shoulder. Doctor do you think she will need an operation like Sally Green? Doctor please tell me all about it."
6. "I'm thinking of adopting a baby. He is one month old and has a club foot; the letter says it is a talipes equino-varus. He is in a cast at present. Do you think he will be alright?"
7. I have funny bumps on my bones and my second child, Brenda seems to be getting them. Do you think it is hereditary? Should we have any more children?
8. "John, you know he is 14, had a fall yesterday at gym. He can walk but has quite a limp. His knee hurts but it is not tender or swollen and he says he didn't hit it or twist it. Do you think he should play hockey tonight? It's an important game."
9. "The school are going on a week of wilderness camping. Do you think Jo should go? You remember that she has cerebral palsy giving her a lazy right arm and right leg".
10. "Doctor, I am so confused. You sent me to see Dr. Green about Fred's feet. He said there was nothing the matter with them. But to tell you the truth I didn't believe him because my feet were just the same shape when I was small: I had to wear special shoes and do exercises every day. So I took him to the clinic at the Children's Hospital and

they said he needed an operation. What should I do now, Doctor?"

11. Doctor, they are mad at the school. Bill has a cast all the way up his leg and they say he must do gym unless he has a note. Will you certify them insane?

12. This afternoon Bob was sideswiped at football. Bob is 17. He felt a snap in his knee and was carried off. He can walk after a fashion draped around his friend's shoulders. His knee is generally a little swollen but there is no effusion. X-rays are normal. The most likely diagnosis is*****

13. Should I put my six week old baby in a jolly jumper or will it damage her spine?

14. What would you do for a baby with a positive Ortolani sign at one week old?

15. You are the school doctor. The school board have asked you to organize a school screening program. How would you start?

16. When mother picks up her 6-month-old from the baby sitter she notices that he is not moving the right leg very much. He is restless. What does this history suggest? What would you do?

17. You are called to see your patient Ian in the Emergency Department of your Hospital. Half an hour ago he fell off the deck sustaining an open fracture of the right radius and ulna. He was brought up by the neighbour who is looking after him while his parents are camping somewhere on the way to Yellowstone. What would you do?

18. Pat is six and has had a fever for 48 hours. He has not been to school. This morning he woke up with pain in the right knee and will not walk. His temperature is 39. He tries to stop anyone from touching his knee but will flex and extend the knee about 50 degrees. Pat is tender over the distal femoral metaphysis.

His single mother is taking her first holiday for years on a charter ticket to Bermuda tomorrow. How would you handle this situation?

19. An 8-year-old boy has knock-knees. When he stands with his knees together the inter malleolar distance is three inches. How would you decide if this is likely to grow out?

20. Eighteen month old Tricia in-toes. You find that she has 45 degrees intorsion of the tibia. Her mother still toes in. What would you do?

Answers

1. *Dr. Rough:* "Must have been a lunatic who prescribed special shoes for normal feet." Dr. Rough didn't see the feet at the beginning.

Dr. Smooth, who instinctively trusts other people's judgements when he is unable to test them himself, says: "The shoes seem to have done their job well. He has normal feet now. There is no further need for special shoes."

2. *Dr. Rough:* "It looks terrible to me. I don't know what Dr. Brown could have been doing. I'll send you to Dr. Green to straighten this mess out."

Dr. Smooth: "Let me give Dr. Brown a phone call." Dr. Brown says the arm was straight when the cast was put on, but the boy did not keep any appointments. He kept soaking the cast in the lake and breaking it. The cast was changed three times in the Emergency Department late at night but mother would never come up during the day for a check X-ray. However the boy was only five so he expected it to remodel. If he were older or more reliable he would have planned to rebreak and reset the fracture.

3. *Dr. Rough:* "It just happens that the salesman left me a pair of arch supports the other day. The dog chewed up one of them so I'll give you the other, it's just what you need. I was wondering what I was going to do with one support."

Dr. Smooth knows that unexplained assymetry of the feet and pes cavus usually means neurological problems. He sends him for an X-ray of the spine (to see if there is any evidence of a congenital anomaly of the cord, such as a diastematomyelia) and for an orthopaedic opinion.

4. *Dr. Rough:* "He's probably acting up and doesn't want to go to school. Talk to his teachers. He has been rather clinging since you went on that holiday and left him with your friend."

Dr. Smooth: "I will send him for an X-ray of the foot." It shows Kohler's disease of the navicular bone. "I will put him in a walking cast for a month and then he will probably be better".

5. *Dr. Rough:* "Yes, you are right, operations often mean months off school and she is just in the middle of her last year. I don't have much faith in the specialists around here for dealing with problems like that. I'll arrange for her to go to Big Town City. It's *the* place you know.

Dr. Smooth: "There is no point in explaining anything until we know whether she has a scoliosis or not. Come around in the morning and we will have a 3' standing X-ray so that we can be sure".

6. *Dr. Rough's Secretary* speaks: "He has an elective student from the University with him this week and all the calls are going to him. Let me put you through".

Dr. Smooth: "It is not a major problem. The child will walk, and run and jump; but he may need one or sometimes more operations to do all these things if the cast treatment is not enough. One foot is often a size or two smaller. Go ahead. At least you know what you are

taking on; when you have a child of your own you never know what you are getting”.

7. *Dr. Rough:* “The answer to your first question is — yes, and to the second is — no. Good afternoon”.

Dr. Smooth: “It looks as though you both have multiple exostoses. Go and get an X-ray and we will see if the radiologist can confirm the diagnosis.” Dr. Smooth goes and looks up the genetics of multiple exostoses in one of the reference books in his office. He used to be rather embarrassed to do this but came to realize that patients did not see this as a flaw. “Multiple exostoses is inherited as an autosomal dominant: that means that each time you have a child there is a 50% chance that it will have this condition. It has not been much of a nuisance for you or for Brenda and you should take this into consideration before deciding to have no more.”

8. *Dr. Rough:* “Keep him off hockey if it hurts”.

Dr. Smooth: “Bring him up to the office right away so that I can examine him and we will probably have an X-ray.” Dr. Smooth suspects a slipped upper femoral epiphysis which is common at this age and which causes referred pain in the knee. If this is confirmed on the AP and frogleg view of the pelvis he would arrange admission for urgent pinning of the hip.

9. *Dr. Rough:* “She would miss her physiotherapy. She might fall over and hurt herself. Try to be sensible — you must know by now that she needs protecting just a little bit.”

Dr. Smooth: “Sure she is a strong girl and she will be going with all her friends. There may be some things she has difficulties with. It will be a wonderful experience for her.”

10. *Dr. Rough:* “Just do as Dr. Green says. You probably saw a Resident or some young numbskull at the hospital who was just looking for an excuse to try out some newfangled operation.”

Dr. Smooth: “Different opinions are often conflicting. When you went to see Dr. Green I wrote him a letter trying to give him a perspective on the problem but at the hospital they did not know anything about you. Did you say the same things at the hospital as you told Dr. Green.”

“Well no, I didn’t. Dr. Green seemed so turned off by what I said that I spiced it up a bit for the hospital”.

“Let me look at both the reports together when they arrive and see if I can make any sense of them for you. If not I will send you along with both the reports to Dr. Black”.

11. *Dr. Rough:* “They are always doing this. They are fools at the school. Just tell them you will sue them if they make him do gym. That should make them see sense.”

Dr. Smooth: “I’ll get my Nurse to put a note in the mail today.”

12. *Dr. Rough:* "He has probably sprained a ligament. It can't be too much if the X-ray is OK. If it was more swollen I would put a bandage on but I think he would be best resting with a pair of crutches until it is better. It may take a week or two."

Dr. Smooth: "I am concerned that he may have completely torn a ligament in the knee. I will arrange for him to be seen by an orthopaedic surgeon today with a view of him having an examination under anaesthesia. Don't let him have anything to eat or drink."

13. *Dr. Rough:* "How do you expect me to know? Try it and see."

Dr. Smooth: "Wait until she can hold her head up. Then it's OK. The West Coast Indians used this system for their young braves before Columbus even discovered America."

14. *Dr. Rough:* "Put on three diapers."

Dr. Smooth: "She will need a splint on her legs, I guess. Let me send you along to someone who knows more about it than I do."

15. *Dr. Rough:* "All this new-fangled nonsense. There are enough sick people around without going looking for them. I just told them that the whole thing is very controversial and they should have nothing to do with it."

Dr. Smooth: "I'll give Dr. Green a call, he has been organizing a screening programme in the next town. I know he came up against a lot of snags and I suppose he must have come up with some answers for this community."

Dr. Green tells him to send for the screening package from the Scoliosis Research Society and take part in educating the neighbourhood.

16. *Dr. Rough:* "I'll send for the police."

Dr. Smooth: "I will get an X-ray of the leg and we will see what it shows". It shows a fracture of the tibia. He puts a cast on and asks mother if she has been happy about the baby sitter. She has not: he calls the child abuse team.

17. *Dr. Rough:* "You had better start trying to find his parents so that we can get a consent to operate. The sooner you get the police to find them the sooner we can start fixing him up."

Dr. Smooth: "He will need an operation to get all the dirt out of the fracture and to set the bones. When did he last eat or drink? I will call the orthopaedic surgeon up right away. As far as I remember he is up-to-date on his tetanus shot so he won't need that; and he is not sensitive to any drugs so we will start him on I.V. Cloxacillin. I'll check his record to be 100% certain. If his family didn't leave a note giving you responsibility to make medical decisions for him the surgeon and I will have to take the responsibility because this is not something to delay."

18. *Dr. Rough:* "That kind of flu that is going around at the moment seems to produce muscle pains. I'll phone a prescription around to the

drug store. If you are leaving him with your mother you should go off to Bermuda. You have earned a break and will feel so much better when you get back."

Dr. Smooth: "It sounds as if it could be serious. You had better bring him along so that I can examine him; he will probably need a blood test and an X-ray. Do you have insurance on your charter ticket? It sounds as if he may have osteomyelitis in which case he would be admitted to hospital for I.V. antibiotics and you should think about putting off your vacation."

19. *Dr. Rough:* "There is no way to tell how this will turn out. But if it gets worse we can always operate."

Dr. Smooth: "Do you, his parents, have knock-knees? No? Then his will probably be as straight as yours. If you want to be sure that the legs are really straightening out measure the distance between his ankles when he is standing up. This hand-out tells you how to do it."

20. *Dr. Rough's Secretary* has been instructed to say that he is out of town — and that Dr. Smooth is taking calls for him.

Dr. Smooth gave mother the handout on in-toeing to read and prescribed a Dennis-Browne night splint.

The Easter Seal Society of Ontario

The Easter Seal Society is a voluntary agency serving children and youth with physical disabilities and their families since 1922.

The Society, formerly known as the Ontario Society for Crippled Children, employs a staff of 36 Easter Seal nurses, qualified in rehabilitation, who visit children in their homes and arrange treatment. More than 8,100 children up to age 19 are served across the province.

At the request of local medical societies, The Easter Seal Society sponsors annual diagnostic and consultant clinics in Northern Ontario. Each year over 800 youngsters are examined. The findings are reported to family physicians and arrangements made through The Society nurse to ensure the provision of prescribed treatment and equipment.

Five Society-owned and operated summer camps provide holidays for more than 1,000 children each year.

The Easter Seal Society, through The Easter Seal Research Institute, sponsors medical research into disabling conditions, preventative measures and new treatment techniques.

The Society was created in 1922 by 10 service clubs which adopted children with physical disabilities as their field of community service. Today, 230 service clubs – Rotary, Kiwanis, Lions, Kinsmen, and others – are affiliated with The Easter Seal Society.

This guide was prepared for THE EASTER SEAL SOCIETY by MERCER RANG, M.B., F.R.C.S.(C), Consultant Orthopaedic Surgeon, The Hospital for Sick Children and The Hugh MacMillan Rehabilitation Centre; Professor, University of Toronto.

The opinions expressed are those of the author and may not reflect the views of The Easter Seal Society. The idea for this publication came from the Paediatric Orthopaedic Society - an organization of orthopaedic surgeons specializing in children's problems.

THE EASTER SEAL SOCIETY

COMMUNITY SERVICES

The Easter Seal Society offers a number of community services which help children with physical disabilities and their families.

CHILD SUPPORT SERVICES

Infant-Toddler Program

Children from birth to two years are visited by Easter Seal consultants and therapists to assist with social, emotional, language, and skill development.

Integrated Preschools

Assessment, physio and occupational therapy, speech therapy, creative play, educational games and transportation are provided at two Toronto locations.

Preschoolers with physical disabilities interact with able-bodied children while developing important preschool skills.

PARENT SUPPORT SERVICES

Respite Care Programs

Trained care-givers provide one-on-one care to youngsters with disabilities so that parents and family members can have a period of relief.

Age-appropriate programs, designed in consultation with the children and teen respiteers, focus on developing independence, self-esteem and life.

Parent-to-Parent Link Program

A multi-agency program that matches trained parent volunteers with parents of children with special needs, each having common concerns.

Parent volunteers provide an understanding ear, support and information.

Easter Seals assisted in linking more than 80 parents in 1993, and gave advice and referrals to more than 400 parents.

Parent Delegate Resource Program

A network of parent delegates develop their leadership, advocacy and communication skills while assisting other families in their community and advocating change in services at local, regional and provincial levels of government.

Parent Delegates have unique opportunities to learn and share information at conferences on such topics as special education, stress management, estate planning, siblings, and home renovations.

Advocacy

Specially trained parents of children with physical disabilities work in partnership with professionals and government to ensure that services meet the individual needs of the children and their families.

Special Education Advisory Committee (SEAC) members represent to Boards of Education across Ontario the needs for educational programs and support services that will enable children to attain an education.

Easter Seal Parent Advocacy Committee (ESPAC) members address a range of issues including respite, equipment, therapy, services to the medically fragile, and long-term care.

The Coalition For Family Support Services provides a united parent and professional partnership which advocates on a global scale.

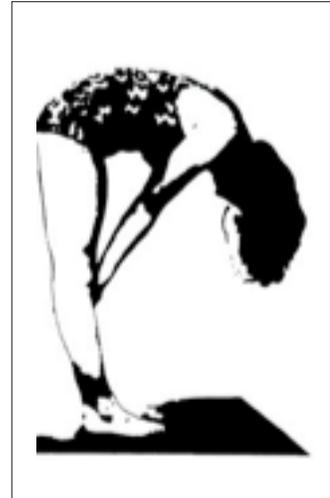
Resource Centre

Books and articles are available covering hundreds of topics such as parenting, advocacy, government legislation, community resources and disabling conditions.

Children's orthopaedics can be an easy and satisfying field for the family physician. This simple guide, which can be read in an evening, provides just enough information to do it with style. The emphasis is on solving everyday problems; the details of the care of once-in-a-lifetime cases are left for thicker books.

There is a quiz at the end and hand-outs you can photocopy to give to parents.

The Easter Seal Society brings you this booklet with the hope that it will awaken an interest in children. The Easter Seal Society is dedicated to the prevention and care of physically disabling conditions in children.



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