Rechitsy

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Rachitis or Rickets

Definition
This may be defined as a disease, arising from general malnutrition. It is only seen in childhood, and the human race is not the only one attacked, for in the British Medical Journal Dec. 24, 1887 is the following. Mr. Bland Sutton exhibited some specimens illustrating the peculiar effect of Rickets upon the skulls of lions. In the last session he showed, some similar specimens, showing that the skull bones, formed in membrane, were the most affected in Rickets; this applied to all mammals. The Carnivora possessed an ossified tentorium, which normally was the thickness of writing paper, when the skull was thickened by rickets this bony tentorium was also affected, the enlargement giving rise to pressure symptoms and some curious effects upon the brain.

Dr. Paul Gerber has described Rickets
found in the bones of an extinct species of whale.

It affects the texture, chemical composition and form of the bony system and by a state of altered function in the other organs, at times transient, at times lasting.

The disease has been studied in all its stages, but it has not yet been quite settled, when it does really commence.

It is found in every part of the globe, but is more common in the larger towns than in the rural districts.

Not one of the Chronic diseases from which children suffer, affords greater interest in the consideration than Rickets, from the frequency with which it occurs, the variety of tissues it affects — the influence it has on the course and termination of the other maladies from which the rickety patient may suffer.

It is a deathless, under its influence the development and growth of the body is arrested, debility is retarded — the tissues soften — the bones become soft and
lose their shape, the ligaments even waste, and in bad cases, changes are seen in the brain, spleen, liver and lymphatic glands.

The disease as a rule, begins in infancy. It is rare under six months, and is a matter of doubt whether the cases of Congenital Rickets are true examples of the disease.

From the eighth to the ninth month we see it more commonly, and from this time of life till the eighteenth month, any lowering of the vitality of the body, such as dyspepsia or may bring it on.

It is not so commonly seen in children who were healthy till they were 18 months old, but it may occur from the above mentioned age, till about the age of six and a half years, and rarely in those an older age in some few cases.

This disease is due to malnutrition during the early age of the infant.

The causes are to be found in several
things which produce a state of bad nutrition in the growing child—
Bad feeding, and bad ventilation are the chief of the causes, for bad or scanty aliment robs the body of proper nourishment, and an insufficient amount of fresh air and sunlight makes the body, unable to digest enough, owing to the digestive function of the body being below par—
The above mentioned causes of rickets are bad to relate only too often found in our large towns in the localities where the poor congregate.
Take for instance a child inhabiting a small, and very often, offensively close room, along with its parents, and perhaps several brothers and sisters, taking its food supply from a mother, weakened by bad air, bad food and often gin, and nearly always a dyspeptic from too much tea drinking, with perhaps also a boiled biscuit or some such preparation to keep it quiet when it cries—
How can it be expected that such a one can avoid becoming sickly? But we also find, that Richardaries in the houses of the well to do, for he also do we find his mother weak— and here also do we see that great fear of fresh air, which is so common among all classes— coupled with bad food in the form of the various farinaceous foods that are so largely advertised in the papers, and chiefly in the religious papers, with a testimonial from some clergyman, but here it is not that the child gets too much of these farinaceous preparations, for generally it is too much, causing the digestive powers to rebel. For in the infant we do not find a sufficient quantity of salivary ferment for the digestion of starchy and thus the child is weakened— It has been proved more than once, that rachitis has set in from the time the infant has had a starchy diet— We find two evils to contend against, in this form of hand feeding, firstly, too much...
Starvation food, and, secondly, not enough of the proper food. Children thus fed have a fat appearance, but their tissues are not hard as the tissues of a healthy child should be, but pale and flabby and therefore we often find mothers asking the medical man what can be the matter with their children, when they are so fat, and to the eye seemingly healthy, but when the medical man comes to examine the infant he finds that it is by no means so healthy and strong, as it seemingly appears to the mother's eye.

These children are as a rule weak and often very sick. So, and this clubbing is only caused by an increase in the subcutaneous fat, at the expense of the muscles.

Rickets very often makes its appearance at the time of weaning, for then instead of milk from the breast, the child only gets boiled bread or some such diet. Rickets may also be caused by the baby having been kept too long at the breast.
for here we have improper and bad supply of food, for the mother's milk is watery, weak, and not fit for the needs of the child's body.

So if the food be poor or not enough in quantity—the same goal is arrived at and we have Rickets developed—

In country places Rickets is not as common, for here we find that the child has fresh air, however unsuitable or coarse its food may be.

Therefore we see that country children have only one of the causes of Rickets to contend with, but town-bred children have to fight against both bad feeding and also bad air.

But again we may sometimes find that country children have to contend against the latter evil owing to their mother keeping them in too much from fear of their catching cold.

And in some cases the country children have to contend against dampness, which as a rule is not found in town dwellings unless of course the houses are new, but
This is only a minor cause of the disease, which is not of much importance, when a child is naturally healthy, but very much so, when an infant is weak from birth.

Bottle fed infants, especially those put out to nurse, such as children (illegitimate) of servants, for instance, suffer from Rickets, for these poor creatures are put out at so much a week, and that means that the foster mother will try and make as much as she can, out of the child's weekly allowance, and here she does by stinting the child of its proper food, and also in these cases, the foster mothers are never so careful about the washing out of the bottles.

Then the milk turns sour, which causes diarrhoea, weakening the child and paving the way for Rickets, as soon as possible, some say that this disease is hereditary, but a disease so very common, must necessarily and then occur in families, where the mother or father have been previously affected, and where also we have bad.
feeding supposed.

But it is not generally believed, that the so-called cases of congenital Rickets are true Rickets.

Another observer, Mr. Parrot, is of the opinion that congenital Syphilis is always the cause of Rickets.

He founds his theory, mainly from the morbid anatomy of the diseases, and especially, does he say, that the swellings on the ends of the long bones show this, but we see that Rickets is not only a disease of the bones, there are other changes in Rickets which make the two diseases totally different.

It has been shown that Rickets is found in persons, where the most careful scrutiny has shown no specific taint, in either of the parents or in the children.

Moreover, it has been shown, that Rickets is common in districts where there is hardly any, or no syphilis, and rare in places where syphilis is common, for we find as much syphilis as it is possible to find amongst the sailor population of some of our small seaside places - the fathers...
have contracted the disease when going
before the mast, in foreign ports, and
then getting married, have settled down to
a fishing life, yet their children with
very rare exceptions, do we see suffering
from Rickets, although we may find
traces of the specific taint about them,
and well marked in some of their fathers.
Of course here as in other weakening
diseases, given a weakly child from a
weakly father and mother, plus bad, and
poor milk, or none at all from the afore-
said mother, with the feeding bottle badly
cleaned, thus we have the disease developing
as fast as it possibly can do. It is a curious fact that Rickets is not
common in the families of Tubercular
people, but for all that, weakly tubercular
parents may beget a weakly infant, which
falls a victim to Rickets, but yet, we find
that in a family where tubercular disease
of the membranes of the brain, or having
caused of several of the infant members
of the family, Rickets is not at all
common —
But again tubercular lesions may occur, in those already sickly.
The reason for this is that, should any of the evils which cause Rachitis be present in a certain tubercular family - the child having already weakened by the tubercular taint, can not stand against any of the predisposing causes of Rickets, and dies before Rickets can set in, to any extent. It was shown by some experimenters and especially Friedländer among the number, that a diet which lacked phosphoric acid, and the salts of lime, was not able, as was at one time supposed, to bring on the Rachitic state.

It however seems very probable, that this disease is not so much a mere want of lime in the bony tissue, but some substance, which prevents the deposit of bone in the cartilage.

Kitschmann has also shown that this irritation in the bony tissue, is caused by there being an excess of lactic acid in those of a rachitic constitution, and this along with a want of lime salts, brings
on the disease of rickets.

It has been also often shown, that, lactic acid is very freely generated in the digestive systems of the rickets, which are out of order. This acid has been found in the urine of the rickets in large quantity. In all probability the theory of Seitzman is correct, thus we have the lactic acid dissolving the lime particles in the bony tissue, and leaving only the cartilage, which having no supports, tends to bend when weight and pressure are applied. This must be much more so when there is in addition, a want of calcareous matter in the food supplied.

General appearance on inspection.

In a typical case we are struck at once by the enlargements, of the ends of the bones, and the general deformities of the whole body, which are caused by the softening of all the bony tissues. In this disease, the bones are affected in three ways.
The growth of the bone is retarded, but not entirely stopped, and what growth there is, is produced in not a very regular manner.

The parts which are still cartilaginous are prevented from becoming bony, and hard, as they would naturally do, and finally, we find the opposite also occurring, that is, that the parts which have already become bony, before the disease set in, are gradually softened. On cutting a long bone lengthwise, we see that it is very red and covered throughout.

We also see that the Epiphyseal Sacs of the bone are greatly enlarged — and that their enlargement of the Epiphyses is caused by a fast growth of cartilage, and we see a layer of cartilage in which the bony growth is advancing. This layer has been named the "Zone of Calcification."

The layer next to this, where the cartilages are in long rows, in a fit condition for the deposit of the lime particles, has been
named the Zone of Proliferation.

The above named zones are much thickened, and not at all separated, as we ought to see them in the bone of a healthy infant.

Also in the bones of sickly children the growth of bone is seen not to progress evenly up towards the ends of the bone but is more advanced in one place than another; consequently we see also that cartilage dehis in long lines, here and there, into the parts, which have already begun to turn into true bony tissue.

We observe also that medullary spaces are seen in places, where they should not exist, such as in the proliferating zone of cartilage already mentioned, also that here and there, small isolated masses of line are situated, in the matrix, that in some cases gives a dotted look to the section.

The same changes as above described also occur in the shaft of the long bones, and also in the flat ones. The periosteum becomes very thick as
full of blood vessels, and is so firmly attached to the bone, below it, that when force is used to pull it away, some portions of the bone are pulled away with the periosteum.

The connective tissue of muscles become at once formed into bone, having first proliferated to a vast amount.

The bone formation here also occurs in the same irregular manner, as we saw it did, in the epiphyseal beds of the bones.

In the flat bones of the skull, the irregular way, in which the bone is formed, is well seen.

The new porous bone is chiefly found on the edges and on the flat surfaces.

Moreover in the bones of the head we see a process called Cricio-Takes, that is, the bone, in this region becomes very thin, and transparent.

This Cricio-Takes is due to two causes: a want of bony deposit, and also a thinning of the bone, owing to pressure by the brain.
Also all the bones are in consequence soft, and bend easily. This is not due to the absorption of the lime salts, after they have been placed, but to a delay in their being deposited. At the same time, the normal widening of the medulla, of the bone, is going on, but also tending to weaken the bones—

When the disease has reached its length, the bones are softer than in the normal state, not having the proper quantity of lime in them. Moreover as they also contain too much fat, their again tends to make them still lighter. When the disease ceases, bone is formed with speed of rapidity, and the bone is then very heavy and hard.

But in Rickets, we find pathological states, in other organs besides the bones.

In some cases we find, in rickets, children, liver, spleen, and the lymphatic glands, in a disease state, and in
bad cases, the muscles are diseased also and in a few the brain, in addition, and nearly always the urine, in a bad state.

The liver and spleen in this disease, when they are diseased, are tough, large, browm, normal, and hard, solid and heavy. This harden'd state is most often seen in the splenic tissue.

This has been said to be a part of the interstitial connective tissue.

In the liver, the fibroid sheath within the portal vessels, is twice the natural size and in the glandular part, of the organ, the yellowish acini are bounded by a thin, greyish or puckish line.

In the spleen the interstitial connective tissue, sometimes becomes, so enlarged, that the trabeculae, are as thick as her spaces they enclose, and in the meshes the corpuscles are seen to be crowded together — their organ in the same way as the liver is enlarged, tough, hard, and can be cut into thin
The surface of it is purple in colour, and the enlarged mafthighian cor-puscles, are seen as smooth white spots on its surface.
On section it is seen to be very red in color, and marked here and there by a pale yellowish appearance. Very little blood vessels, or can be squeezed from the cut surface. The lymphatic glands are also in bad cases, enlarged & hard, and on section are pale, and crowded with cells.
Sometimes the liver may undergo an enlargement from fatty infiltration, this occurs if a child is wasted from diarrhea &c.
Again it may be in a state of chronic congestion owing to repeated attacks of Bronchitis.
This chronic congested condition, it also sometimes seen in the spleen, from the same cause.
It has been shown by Sir Williams
Jenner that, the muscles are pale flabby and wasted. Under the microscope their fibres are paler than in normal, and the striæ are marked in a very indistinct manner.

The brain also is sometimes shrunken and wasted, and the areas which should have been occupied by brain tissue are filled with fluid.

In some few cases it may be enlarged. Dr. Hilton Fagge has shown that this increase of the size of the brain, is caused by an increase of the neuroglia, without any increase of the nerve elements.

The urine is pale in color and often full of oxalate of lime, crystals, and has a greater greasiness, or phosphate of lime in it, than should normally occur.

Some observers have seen lactic acid in it. Crystals of uric acid are also seen in children whose digestive apparatus
is out of order.

Other evils occur by the softening of the ribs, which bulge in wrong directions, and alter the shape of the thorax, thus causing pulmonary mischief.

This latter is seen in two forms, viz., Empysemus and Pulmonary collapse. The emphysema is situated at the anterior borders of the lungs, and extends backwards, for about an inch in length.

Just outside of this dilated part of the lung, we find a part which is in a state of collapse.

This latter portion separates the diseased and healthy parts of the lung. This is caused by the softened ribs sinking in, thereby the act of inspiration, moreover the lung is forced by the enlarged ends of the ribs, thus preventing the expansion of this outside portion, by the air, which on inspiration fills the rest of the pulmonary tissues, then while the chest is made smaller
Laterally the antero-posterior diameter is increased by the protrusion of the breast bone. Therefore, the alveoli just behind the sternum are greatly increased in size, by being continually filled by too large a supply of air, being sent into them.

Collapse of the lung tissue is also found on the back part, towards the bases of the lungs, this being due to plugging by mucus of the bronchial tubes.

Besides these local effects, the enlarged ends of the ribs cause opaque patches on the spleen and pericardium. The opacity on the pericardium is found at a short distance above the apex, on the left side.

This is the part of the heart with which the enlarged end of the fifth rib comes in contact.

The white patch on the spleen is also similarly caused by a rib rubbing against it, during the act of respiration.
The sparsity only 4 leads to the fibrous
denser in both these cases.

In congenital rickets, so called, we
find the limbs of the child at both
short, and thickened, and sometimes
in a few cases, they are bent, and
rarely, have even been found broken.
The epiphyses also are, enlarged, soft,
and quite capillary.

This state of matters, however, is
totally different, to true rickets, and,
Eberth has stated the fact that it is
exactly like the lesions found in
cretineous infants.

In these cases post-mortem examin-
ation has shown, that the bones are
pretty ossified, very thick, and
stunted.

This peculiarity makes the limbs very
short, and such an infant on exam-
ination, is found to have strangely short
limbs.

Also the epiphyses are not imperfectly
ossified, as in rickets, nor are we
found that great porosity of the
medullary parts of the bones, nor is the periostium in the thick condition common to rickets, but everything is very hard and compact. The epiphyses are also enlarged all over, and not at the line of ossification, as is the case in rickets.

In these cases of so-called Congenital Rachitis, there is also a tendency to an early ossification of the basi-scapital and post-sphenoidal bones. And the faces of these infants are very like those of cæsions.

Symptoms

Rickets is first heralded, caused as it is by some fault in the nutritive processes, by some derangement in these said functions.

Firstly, usually something goes wrong with the digestion, and their may be in vomiting, and diarrhoea, or there may be, at first there generally is, a weakening of the digestive power of the child, so we have the bowels opened.
too often, but yet not so often, as to be called diarrhoea.
The faecal stercus is too large in quantity, not of a proper colour, smells badly and curry-dyel matters are seen in it. Hei hei because the food is passing out of the body in very nearly the same state as it went into it.
All this makes the child very irritable and peevish, the mother tells you that she has no rest with him, either by day or night.
The abdomen is often puffed out with wind, this causing the child pain of a colicky nature, makes him cry out, every now and again — This is why he often prefers to sleep lying on his chest, with his head buried in the pillow.
This urine is also very acid in quality, burning him, which makes him cry whilst passing his water. —
At this time medical attendance is not sought, the child begins to grow
Thin, and flabby, though he be plump enough to look, to the eye of the mother, and friends. Then after a while, longer in the same robust, and shorter in the weaker, the well-known symptoms of rickets are seen, viz, the child begins to sweat about the head, and neck, and lies uncovered in bed, having pitched off his bed clothes, and cries out if he is at all roughly moved, in washing, etc.

In fact some older children begin to cry, directly one makes a motion, or if one were going to lift them up. In some cases the sweat stands on the child's head at night, in large drops, and may be large enough in quantity to wet the pillow. Also with the least emotion when the child is awake, the perspiration flows out.

The veins of the temple are seen to be full, and the carotids pulse in a visible manner.
The child throws his clothes off his bed, even in the most cold weather, and this as may be supposed, causes cataracts by exposure, and a child that is suffering from Rachitis, turns taking bronchitis by exposure, is further weakened by the cough.

In some cases, the exposure may cause inflammation of the bowels, or keep it a state of diarrhoea which may have formerly existed.

Just about this time, the mother notices that the child suffers from great tenderness, crying with the slightest motion, in the cradle or in her arms.

This pain or tenderness seems to be situated in the bones, as well as in the muscular structures of the body.

The tenderness occurs as a rule, when the changes in the bones are seen to be well marked, and is indicated by pain in the head—for the child moves her head from side to side, and moans. Their movement wears the hair away at the back of the head, where it is bald.
against the fellow.
This balsam is a very characteristic symptom of Rachitis.
In cases which are mild, and where the ends of the bones are only slightly enlarged, we do not see their balanese of the back of the head.
As has before been mentioned, the changes in the bones consist of an enlargement of the epiphyses, and also of a softening with a thickening of the flat bones.
The enlargement is chiefly seen where the epiphyses join the bones.
Changes may be found in both ends of the bones, but that part which is nearest to the surface shows it most.
The first of these enlargements is seen,
at the external ends of the ribs.
Then it is observed in the wrist joint,
generally also we find, that the bones of the arms show this enlargement,
more than those of the legs.
The thickening of the flat bones is well seen in those of the skull, and the
Softening is the cause of the deformities, one sees in rickety children. For directly, the weight of the child is brought to bear, on the softened bones, they not being able to bear it, give way, and take on the shapes one sees, as bony legs, sinking in of the head between the shoulders, etc.

In some bad cases, the distortion of the child's body is very great, and in very mild cases we may hardly find any misshapen bones at all.

But in very bad cases, even, we may not find all the lesions above mentioned, for in one bad case we may only see the misshapen bones, owing to their softness, in others the enlargement at the ends of the bones, attracts our attention most.

In some cases, the thorax may be much altered, and the bones of the legs very nearly normal in shape, and vice versa. This is due to the fact, that these changes
occur in the part, where growth was
most active at the time of the attack.
In a well marked case, these changes
are very well seen.
The cranium is large, and is long
antero-posteriorly, and because the face
is small, and pinched—the skull in
such cases looks larger, than it really
is.

The front part of the head, has a square
appearance from an enlargement of
the protruberances, of the frontal bones,
and in some few cases, this is to be
an extraordinary degree, owing to the
formation in the bones of cellular
spaces.

The fontanelle is always much larger than
it should be, and is open long after
the time, it should have closed;—that is
about the end of the second year.
Sometimes the cerebral tissue is larger,
more normal in quantity, and in some
cases, we find a greater quantity of fluid
than there should be, and with this we
see that the sutures, in connection with
The Fontanelle are wider than they ought to be, owing to the liquid underneath them, bulging them out, and since as it has been already shown, the edges of the flat bones are thickened, this makes all the sutures stand out as ridges, and the Fontanelle therefore seems to be depressed.

As a rule the posterior Fontanelle has closed, before the disease has set in, but in some bad cases we find, even at so open late in life, comparatively speaking.

In some cases again, on pressing the finger over the posterior part of the head, we may find the condition of "Craniotubes," here we find soft spots on the bones, at the back of the head, where nearly all the bony tissue has been absorbed, and this causes a sensation, to the tip of the finger, as if it were pressing over an inner rubber membrane tightly stretched.

These spots of "craniotubes," are hardly ever larger in size, than the diameter of a small
Beau, and are generally found in the occipital bone. 
They are said to be caused by the bone being compressed between the pillow, and the brain of the child. 
They occur about the third to fourth month, and are the first signs of the disease. 
The hair of a rachitic child is thin, and often damp from the copious sweating, which occurs when he cried in allev.
In some cases we hear a systolic murmur on placing the stethoscope over the anterior Fontanelle, before when the Fontanelle is still open. 
Some observers say that they have heard it, even, when the Fontanelle was closed.
In some cases this systolic murmur is very loud.
We see also that the face is very small. The chief cause for this is a want of development in the jaws. The small face, large head, and the sunken eyes, with a general weaned
look, give the child a kind of an old man appearance, which strikes the observer at once, and if the child is a bit older, and is suffering much from general tenderness of body, he watches you with such a strange, searchy look, to see if you are going to touch him, or move him about in any way, that this curious old man look is only more exaggerated than ever.

The lower jaw has lost its normal curve, and is irregular in shape, being flattened anteriorly; on looking at the lower jaw, we observe that the incisors are in one line, and not in a curved line, as they ought to be, and just where the eye teeth point the jaw takes on an abrupt curve. This is due to a want of development of the middle part of the jaw. The children affected with this disease are very late in cutting their teeth, and mothers often want to know why their child is so late in cutting its teeth. If whatever age their disease set in, and
when the bones of the face begin to suffer, then immediately the development of the teeth is delayed. Therefore if this disease comes on the scene, before any teeth have been cut, the cutting of the teeth is delayed to a very long period, and if some teeth have been cut, and then after that Rachitic sets in, no more teeth will be seen for a very long time.

The teeth when they do put in an appearance, are very poor in quality, and with hardly any enamel on them, they therefore very soon decay, and the cutting process in these cases is always attended with great pain and trouble.

The thorax is deformed in a peculiar manner, owing to the ribs which have become softened, being unable to withstand the pressure of the air. Normally when during the act of inspiration, the ribs are elevated & the chest enlarges - the chest being strong and the ribs not soft but hard, the chest is able to resist atmospheric pressure.
and is able, with great facility, to grow larger and allow the air taken in by inspiration to expand it, but the chest of a rachitic child, in which the ribs have become softened as before mentioned, is not able, to bear up against atmospheric pressure, and when inspiration occurs, and an expansion of the chest takes place, the soft ribs are forced in, in all places, where they are not strong enough, to withstand the pressure of the outside air.

Thus when the ribs sink in, the sternum is consequently forced out— and we find that a rachitic chest has the breast bone elevated & sticking out, and a groove on each side of it. This groove is broad & not very deep, and beginning about the second rib, goes down as far as the hypochondriium. On examination, we find that the ribs outside of their junction with the cartilages, form the bottom of this hollow, and therefore we find the swollen ribs at the inner side of this hollow.
Having the appearance of large heads, this hollowing out of the breast bone is seen to be deepest in those muco-avitic children, who have had some chest mischief as bronchitis, &c.

In these children in Bronchitis, the tubes are swollen and narrower than is usual, and this along with the difficulty, the air has in entering the chest, from the mischief in the ribs, only makes matters worse, and the soft ribs get less pressure than ever, from the pulmonary tissue beneath them.

On examining one of these chests, we find that not only is the hollow alongside the sternum made worse, but also another deep hollow is seen going right across the chest, at right angles to the sternal hollows, at the level of the epigastrium, every time the child draws its breath.

This is also caused by atmospheric pressure as Sir William Jenner has ably shown.

The abdominal cavity is prevented
from being pushed in at the parts, where the liver, stomach, and spleen are, by these said organs.

Often the spine is curved.

Normally in the child we have the cervical curve, in Rickets this is greatly increased, so that the child has great difficulty in supporting its head, and it therefore falls back upon its shoulders thus producing the well-known attitude. Furthermore, the weight of the cranium, and shoulders, as the child sits bent forwards, makes the dorsal and lumber spines bend backwards, which are sometimes bent back too much, and in such a pointed manner, that at first sight an observer might mistake the lesion for one of disease of the spinal column at that part.

This projection disappears if the child is taken hold of under the arms, by the action of the weight of the legs and rest of the body, below the seat of the supposed curvies.

When the child walks, the curves set
worse.

Sometimes we find that the curvature is to one side, or the other. This all depends on which side the nurse or mother carries the child.

If carried on the left arm, the child's body leans over to the right side, and vice versa.

These deformities are caused by weaknesses in the ligaments of the parts.

Often the pelvic bones are misshapen, and sometimes very much so.

The shapes here however like the chest are not always the same, but assume many forms. Because the reason is caused by the softness of the bones, it will all depend at what age the child is affected. Consequently the shape depends on the various attitudes of the child, and whether it is able to walk about or not. Generally the shape is a triangle of an irregular kind.

In the female in after years when about to bear a child, these rebels, pelvis are
of grave import to the obstetric physician.
Also in the male the cutting of a
stone, out of the bladder, is made very
dangerous, and sometimes a very fatal
operation, by these rachitic deformities of
the pelvis.
In the bones of the limbs, both the ends
and shafts are altered in shape.
The former are enlarged and nodular and
the latter are curvèd, in various directions.
The upper bone of the arm is often curved,
where the deltoid is inserted, by the weight
of the rest of the arm, when the hand is
lifted up.
There is often also a curving and
twisting of the radius and ulna.
This is caused by the child aiding the
spine in supporting the body, by resting
the trunk on its hands.
The head of the femur may be bent at any
angle with its shaft, and if the child is not
able to walk, the bone is curved in a
forward manner. This is caused by the
weight of the legs, dragging on the upper
part, when he sits, in any position in which his legs are allowed to hang down. But if the patient is able to walk, we find that the normal curve of the femur is produced to a great degree, which is outwards and forwards.

We see also that the Tibia in the child unable to walk, is curved outwards, so that when the child is held up, we see what the public call "bandy-legs". This lesion is caused by the child's position, while sitting, which puts pressure on the outside of the ankle, for he is often found sitting like a tailor cross-legged.

In the child who is able to walk, the bone is curved outwards, and forwards at its lower third, that is the curve is seen just where an ordinary head of shaft reaches to.

The lesion whilst the child is walking straight towards one, is not so liable seen as when the lesion is that called "bandy-legs". In the child who is unable to walk,
there are as a rule no curves to be observed, but the arcs are nearly always found deformed.

In some cases where these deformities are very bad, we often have the lesion known as 'greenstick' fracture.

In addition to the softening deformities of the enlarged ends of the bones, we see another very important lesion viz. the arrest of the growth of the bones, which is a very serious thing.

This is well seen in all bad cases of rickets, for not only are the children short for their age, but they remain so, even after the disease has passed away.

This arrest is best seen in the bones of the jaws, the pelvic bones and in those of the lower limbs.

As has been shown before, the lesion in the pelvis is very serious indeed, for not only have we an arrest in the growth but in addition a distortion of the pelvic bones also.

The great debility of the legs is due to two
causes, for not only have we general weakness of the system, and muscles of the back, also great laxity of the ligaments, as well as weakness. This weakness is best seen in patients in whom the disease has begun after they were two years old.

In these cases, also, we do not as a rule find the blackened and derby-looking teeth, but nice white ones, nor is it because the disease has set in after they have made their appearance.

In these late cases, we do not generally find much deformity of the bones, but a far greater looseness of the ligaments.

While all these above-mentioned changes are going on in the bones, the general symptoms are growing worse than ever. The perspiration literally pours out of the head, the child will throw his bedclothes off and expose himself to the air, requires very careful watching to keep him covered, and if the case is an extreme one - the child very soon will let you know that he dislikes being
moved about, or disturbed in any way, and as long as he is left alone, he is quiet, but as soon as his mother, or other person goes near him, he begins to cry out, and watches all their movements like a cat.

She is seen to sit in her bed for hours at a time, not paying any attention to what is going on around him, supporting her body on her hands, and her legs bent up under her and her head thrown well back.

Owing also to the soft state of her ribs and the lesions caused thereby, he has difficulty in breathing and his attention is seen to be chiefly occupied in doing this to the best of his ability. The appetite is capricious, sometimes good, and at others bad.

He may at times eat ravenously, her is caused by the disordered state of her stomach. Vomiting is generally absent, her faces are pale in color and have a very bad smell. Purging is often seen, with the usual concomitants, the
bad smell, green color, and shreds of mucous membrane mixed up with the feces.

In these children we always find an enlarged abdomen, even though there may be no disease of the spleen, or the liver to be found.

The swelling is caused by weak, flatness of the abdominal parietes, and the shallowness of the pelvis, but causing all the intestines to be projected, above the level of its brink.

In some cases we find an additional well-marked tumor, caused by an enlarged spleen, which may reach as low down as a line drawn across the abdomen at the level of the umbilicus. It does not always follow that because we find neither the spleen or the liver below the ribs, that they are enlarged, for in some cases these organs are pushed down by the action of the diaphragm, owing to the diminished cavity of the chest.

Sometimes also we find that the lymphatic glands over the body are larger than normal.
This disease does not make the patient feverish.

When we find a rise of temperature, it is owing, to some complication having arisen, sometimes when a patient is mending; we may have a rise in the temperature, this is due to the renewal of the process of digestion, and we find on examination, that a tooth is forcing through the gum. Sometimes debilitated children lose much flesh, and at others they become fat, and flabby; this is due to a large deposit of fat, in the subcutaneous tissue.

However fat and flabby a patient may appear, and therefore to the author's eyes very healthy, on putting our hands on its limbs, we can easily see that the muscles are in a very flabby condition.

These children are always pale, and the corners of their mouths, have a blue look. When we add that we find that the skin is larger than normal; the child is seen to be very jaundiced, and the mucous membranes are pale to an exaggerated degree.
The mind of rickety children is backward for their age, just like the same as the muscles, teeth, etc. are.

These children like the society of their elders, not because they are fond of it, but because they are not able to enjoy child's games, as their strength will not permit them to do so.

In their lessons at school, they do not hold to good a place as the average run of children.

This disease proceeds slowly but surely, and unless the child gets medical attention, fresh air, etc., as time goes on it is seen, that the child is worse worse.

At this time if they get an attack of bronchitis, they often die owing to the rib complication, from which they suffer.

A bad attack of diarrhea is another very bad affair, and generally kills them.

It is rare that rickets chiefly kills its victims, but, as a rule they die from one or other of the above mentioned complications.

When the child begins to get better, owing
to medical attendance, and the effects of good hygienic conditions.

We find that the first being which leaves them is the tenderness, from which they suffer too much, and we also find that the patient is not to take up with his own condition, and now appears to pay more attention to what is going on around him, such as the amusement of his brothers, & sisters.

Along with this, we find that the bones become harder, and thus the breathing becomes better, for the ribs are harder and more able to withstand the pressure of the external atmosphere.

Then teething commences, the wasting stops, the abdomen is not so large. The sweating, when the child is asleep, ceases and the general tone of the sickly child is better.

Such patients soon become strong, if all goes well, and grow into healthy beings, but they are always more or less stunted and thickset.

Some observers have mentioned that they
call Acute Rickets, in which the ends of the bones soon enlarge, and grow extremely tender; other swellings are also seen on the arms, and legs. 

This is not pure rickets but rickets, in combination with scurvy.

Rarely do we find a case of rickets which has no complications, this is because the patient's health, being in a weak state, generally he is apt to catch some catarhal mischief.

For besides his proneness to take on a complication, he as it were lays himself open to do so when the child is in bed hot and sweating, he throws off his bed clothes, and takes bronchitis, etc.

Very few children leaving this disease, are without a cough, and we must consider this very dangerous in their case, owing to the rib lesion, causing lung collapse, most of the children die from lung lesion and also from catarh of the intestinal tract, causing diarhœa, which however mild it may be, continuing as it does, often, for a long period,
in the end so weakens them, that they are past all treatment.
The nervous system is also attacked by
Rickets, and we find that these patients suffer
from the various forms of spasm, such as
Laryngospasm Stridulus.
In some cases catarrh of the larynx, causes
spasm, and we have therefore cough—this
is often a source of trouble and fear.
In others we may have fluid effusion
into the space resulting from the small
size of the tracheal tissue viz Chronic Hydro-
cephalus.
The amount of fluid as a rule, is not very
large, and therefore need not cause much
anxiety.
Rarely the patient may be attacked by
acute mischief of a tubercular nature.
This is very rare indeed but it does
happen sometimes.

Diagnosis.
These is not hard even in mild cases
for in them we find the bones enlarged
at their ends, the cutting of the teeth retarded
and the child's inability to walk.
At the age of eleven months, should the child have no teeth, and if his wrist are big, and if his lower limbs are of no use to him, and are held in a helpless way when we hold the child up, we may safely diagnose, that the child is suffering from rickets.

We may in some cases diagnose rickets, even before the wrists are swollen, by the general appearance of a child, for they are big, pale and flabby, and on asking the mother, we find that the child's head sweats at night, or that his bowels have a very offensive smell, or that she has great difficulty in keeping him covered at night in his cot.

Diagnosis is very easy in a well marked case of this disease, for here the ends of the bones are big, the long bones bent and if there has been any lung lesion, the chest out of the normal shape, the crossing of the legs, the weak spine and the head thrown back.

There is no paralysis of the legs— for, because the child creeps, when he is put in a walking
position, and owing to their general uselessness, he: mother thinks that they are paralyzed, but if you pull one of his legs to one side - you will see that he will move them out of your way.

The curving of the back is also a great source of fear, to the father and mother, but this will disappear if you lift the child up, by placing your hands in his axillae.

Another source of trouble to his parents, is the peculiar shape of his head, which they think is "Galea or the brain", but the head of a true ricketsy child differs from that of a hydrocephalic one, in the sphericity and long antero-posterior diameter of the former; whereas in the latter, the shape of the head is that of a rounded ball, and also in the case of the former, we can easily find other indications of his ricketsy constitution.

**Prognosis**

Prognosis generally in this disease is not bad, barring complications, for when the medical man is called in, and his advice is strictly followed (which is hardly
over the case in the houses of the poor, owing to want of money, inability to change houses, and drunkenness, on the part of the parents, the patient begins to take on a change for the better in a remarkable short time.

In bad chest and intestinal mischief the prognosis is bad; sometimes a nervous lesion as Laryngismus Stridulus may kill the child, but in the case of convulsions caused by some reflex irritation the prognosis need not be a bad one.

Enlargements of the liver and spleen are very serious matters, but should we know that in a certain case, with splenic enlargement, our advice will be strictly followed, and the child well looked after, and the sickly condition be otherwise held our prognosis need not be an extremely grave one.

We are often asked, if the enlargement of the bones will ever go down, we can assure the parents that they need not be afraid of the child growing up exactly.
in the same condition, that he is in when we are called, for in many cases the enlargement and bent bones recover their normal shape, in a very wonderful manner. But this is not so in all cases, but yet though the lesions may not entirely disappear, yet there will be marked improvement.

**Treatment**

Here the first and most important thing to be considered, is the hygienic condition of the patient. Therefore we must inquire into the quantity and quality of the foods he is daily consuming. The amount of fresh air he receives daily, whether he wears flannel next to his skin, and if his clothing is sufficient in quantity and how clean he is kept, and whether he is taken out into the open air daily, if the weather be fit. When we have considered all these matters and have told the parents what must be done, in regard to them, then we must consider what medicine we will have to administer, but the hygienic treatment is of
the first importance, the drugs are a secondary affair.

Medicines are of course useful in this, as in many other diseases, but there is no good whatever to be gained by giving them, unless the child is well provided with fresh air, and the other things mentioned above.

We must treat any complications as they arise in each individual case.

Catarh of the bowels is found in nearly every case of rickets, in fact it is the complication for which the medical man is called in at first, and his labors through the whole course of the disease off and on.

This should be cured as soon as possible. A warm flannel binder should be put on around the abdomen, an alkali should also be given, to correct any acidity which may be present.

Lime water is very useful for this complication, a little opium may be added to him in very bad cases, but for formation of bone, it has been found that lime water is not of much use, but only as an alkali to correct any acidity which may be
present.

In this disease it will be found that the parents overload the child's stomach with starchy foods, and as the child is young, is not able to digest these, both on account of its want of salivary ferment, and on account of the irritability of its stomach, and bowels, while digesting with Fairchild's peptonizing powders will be of great benefit; or in some cases, advantage may be derived from the use of some forms of prepared food, of which there are so many kinds on the market at this present time.

The mother or nurse must be ordered to take the child out daily, so that it gets plenty of fresh air, whenever the weather is suitable.

If the child is old enough to be taken out in a perambulator, he should be warmly covered, and have a hat on all his feet. Then whilst he is out, the room the child inhabits should be well aired and cleaned, and in winter there should always be a fire in his sleeping apartment.

Every day in the morning the child should be
well washed with warm water, and soap, and in the evening, a good sponging should be administered just before he goes to his bed.
His flannels, blankets, &c. should be kept as clean as possible, and his flannels especially ought to be changed often, owing to their getting soaked by the profuse perspirations of the child, which render them sour, and rank.
Then also as soon as he is safe, his mattress should be daily well aired.
Then directly the bowels are in a normal state, we may administer cod liver oil, but not before.
A very small dose is all that is needed—ten drops three daily after food—and let the bowels be carefully watched to see if any oil is passed in an undigested state, and as long as we find that no oil is seen in the evacuations, we may increase the dose.
Iron is very useful, especially in the form of the Sodale. The syrup of the Sodale of iron is often given, but as a
rule, symptoms tend to increase, the acidity of the bowels, and thus make matters worse.

The ammoniacal carbonate is another good iron preparation, combined with a little tobe bicarbonates, and in some cases we find that the tincture of iron carbonate is of benefit. To stop the sweatings from the neck and head, the preparations of belladonna may be used.

Apply flour just before bedtime over the point where the perspiration pores out in the greatest quantity.

As soon as the tendency has disappeared, let good liver oil be rubbed over the child's body; they strengthen the flabby muscular tissue. The parents or nurse should also be ordered not to allow the child to get on its feet too soon, for it is a curious fact that mothers want their children to walk as soon as possible, and can not bear the idea that their walking should be discouraged, for they have the idea that walking strengthens the limbs, whereas it is for otherwise.
The child's attempt at walking only bend the soft limbs, and thus make matters worse.  

Walking should not also be allowed for another very great reason, viz, that as soon as the child finds he is stronger, he will of his own accord try to walk, and if he is not carefully watched, he will distort his limbs by so doing.  

We may support weak limbs by slight, lightly padded, and loose ligamentous structures, by the elastic bandage.  

When the child grows up with distorted limbs because it is strong enough to operate on by the surgeon, and nowadays with the great advances, which have been made in surgery, great improvement can be made on curved limbs by operation.  

Finis.

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