Rachitis.

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Rachitis

Rachitis (from prefix the spine) or Rickets is a constitutional disease peculiar to early life, characterized by various disturbances of nutrition, by a delay in development, and by certain changes in the bones and sometimes the solid organs of the body.

Rickets has been known under many different names and its increasing frequency and its bad results of treatment be not adopted render it one of the most serious diseases of Childhood.

The question of the heredity of Rachitis is a very vexed one, many writers on the subject affirm its heredity.
without a doubt whilst others, foremost of whom is Sir William Jenner, can find no facts to bear this out. Speaking from my own experience I have in no case been able to trace hereditary influence as the direct cause of any cases that have come under my own care, although in many a previous family history of Rickets can be obtained yet in all a nearer cause such as improper feeding is to be found. A child born of parents who are one or both weakly will become rickety on a very much slighter cause than a child born of healthy parents will. In this manner such influence as Syphilis, Tuberculosis, etc., no doubt act very simply as predisposing causes. Prolonged Suckling is frequently a cause of Rickets, children
being often brought to me at the Hospital suffering as a 2 years of age — but beyond doubt the chief cause by far is improper feeding.

Rickets is almost confined to children of the poorer classes and the mothers in this class of life never do, and I am afraid never will, clearly understand that the breast milk or its nearest substitute is the only proper food for their offspring for the first 10 or 12 months.

I think this applies more to children in large towns, for I have found that where rickets has shown itself in the children of women living in the country or small villages the improper feeding has commenced when the mother has from some cause or other lost her milk supply and then...
in search of a substitute has resorted to food of any description— but with the matters in our large towns no matter how much milk they have, no matter how well their child is nursing they tell you that the child "does not seem satisfied" and despite all your urging they will feed them from almost the day of their birth. And of the food they give them the favorite one is bread which the mothers will treat in many ways; they will bake it, or boil it, or powder it, but bread in some form or other the little ones must have. As they attain the 5th and 6th months they are generally allowed to have a little of almost anything generally at meal times they have what the parents have, no matter what it is.
Another cause in those cases where the mothers, though not suckling their children, are careful in the manner they are hand fed is the substitution of Condensed milk for Cow's milk. I have never seen a child who has been fed on Condensed milk who did not improve directly this milk was given to him properly prepared from the Cow.

This question of Condensed milk is a very important one as I find that it is recommended by medical men very frequently as a food for young children and as a Substitute for the breast milk. I feel most strongly on this point that Condensed milk as sold and as prepared should not be so used. The use of Condensed milk is with the introduction of these tunnel foods a modern innovation no doubt the result of the
Frequent adulteration of the cow's milk sold in our large towns. In my own town of Birminghame, for example, showed for last year the percentage of milk adulteration to be 54 per cent in the samples submitted to the Borough Analyst. This adulteration which is mostly of water, if I think of anything an advantage than otherwise as I have always the greatest difficulty in getting the parents to dilute the milk to anything like a proper state after impressing mothers with the fact that they must give their children milk and say lime water in the proportion of half and half. I have often the next week ask them "how much lime water did you put in" and have invariably had such an answer as "about a leaspoonful a pint."
How the condensed milks used are almost always the sweetener form. Sweetened condensed milk in analysis yields:

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Water</td>
<td>25.63</td>
</tr>
<tr>
<td>Milk Sugar</td>
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<tr>
<td>Fat</td>
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<tr>
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<td>12.65</td>
</tr>
<tr>
<td>Ash</td>
<td>1.88</td>
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100.00

Human milk gives us:

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<tr>
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100.00

Now the sweetened condensed
Milk, if diluted with about four times its volume of water, until it contains the same percentage of casein and fat as breast milk, would then contain between 18 and 20 per cent. of solids, instead of 11 per cent. This excess is due to the added cane sugar which is difficult for the child to digest, and would soon produce symptoms of gastric and intestinal irritation.

The unsweetened condensed milk which has lately come into the market has not this objection, there being in this brand simply a condensation and no added sugar, and of course as a result the milk will not keep for long when once opened. If condensed milk is to be used for infants' food
Then by all means use it in this form.

An important factor that helps very much in the establishment of this disease is the improper state of atmosphere in which the child is reared. Windows are never open.

The child is generally one of many all occupying the one room, the chimney occasionally fills the room with smoke and the room always smells of the last meal they have had in it - in fact everything leads towards the encouragement of disease.

I think that in most of the cases of Parotitis that present themselves the cause will be invariably found to be improper feeding aided by such accessories as inspire our and a bad family history.
It would have been thought that with the increased educational knowledge, the health lecture for the working classes was given in so many of our towns, the number of cases of Rickets would be steadily diminishing instead of which the reverse is the case.

The below table shows the number of cases of Rickets that were attended at the Out Patient Department of the Children's Hospital Birmingham for the first nine years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Medical Out-patients</th>
<th>Cases of Rickets</th>
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<tbody>
<tr>
<td>1875</td>
<td>11946</td>
<td>147</td>
</tr>
<tr>
<td>1876</td>
<td>11829</td>
<td>479</td>
</tr>
<tr>
<td>1877</td>
<td>12678</td>
<td>527</td>
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<td>13276</td>
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<td>1880</td>
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<td>618</td>
</tr>
<tr>
<td>1881</td>
<td>9991</td>
<td>439</td>
</tr>
<tr>
<td>1882</td>
<td>10729</td>
<td>469</td>
</tr>
<tr>
<td>1883</td>
<td>10146</td>
<td>584</td>
</tr>
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</table>
This last number gives a higher percentage than that of any other year, viz.: 5.75 per cent. On referring to the annual report for that year I find that Phlebitis comes fourth in number of cases the order being: Bronchitis, Rheumatism, Eczema, & Phlebitis.

This is not the case in Wimborne, only. The same result is shown in an examination of the statistical of the General and Children's Hospitals of most of our large towns. At the Salisbury Infirmary the centre of a large agricultural district at which my pupilage was spent, I hardly ever heard the name mentioned of Phlebitis and very seldom saw any examples of it, yet these people were far below these in education.
There are cases on record in which Rickets has made its appearance in utero; but these are very rare. Rickets is essentially a disease of early childhood and as a rule appears between the 6th month and the completion of the 1st dentition; but however frequently found the earlier symptoms in children 2, 3, and 4 months old.

There are three stages in the symptoms of Rickets:
1. When the symptoms are mainly constitutional
2. Where local changes occur and the bone become deformed
3. Where ossification takes place and the deformities become permanent.

In the 1st stage the symptoms are generally referable to the gastro-intestinal tract. The bowels become irregular, diarrhoea sets in and the vomiting are of a watery...
Consistent, and frequently of a light colour and has the appearance of mucus. The mucus is very offensive.
The cause of these mucus seems to be that the food given to the child being of an improper kind instead of being assimilated acts as an irritant and is thus expelled rapidly along the course of the alimentary canal. The appetite changes the child will at times take its food without complaining and at other times feel sickish for it at all. It will in all these probabilities display a strong liking and craving for the very food which is causing all this irritation. The child soon begins to lose any superfluous fat and becomes very irritable and peevish. The tongue becomes flamed and dry and the pulse quickens.
The head symptoms are very characteristic — viz: profuse perspiration over the whole of the head and neck during sleep — in fact the pillow on which the child is sleeping becomes quite saturated. The child is also very restless at night when sleeping, and will invariably kick the clothes off, and lie with some part of his body exposed, irrespective of the surrounding temperature. One of the most characteristic symptoms in this stage is the great tenerness and soreness of the child. The child dreads being touched or moved or done anything to. Sir William Jenner in the Medical Times for 28th April 1860 graphically describes the movements of the healthy child: he says "strip a child of a few months old and see how
It turns its limbs in every direction, it will raise its head from the place on which it lies, coil itself round, and grasping a foot with both hands thrust it into its mouth as far as possible as though the great object of its existence at that moment was to turn itself inside out, in Reikit, the child is exactly the reverse, will lie still for hours afraid to move itself and crying out if anyone touches it. Sometimes children are brought for treatment for this one symptom only, but this is seldom the case and generally when they are brought for advice the 2nd stage has generally been reached but all the acute symptoms are still very well marked, and help in a diagnosis.

The 2nd stage viz. where local change occurs and the
Some bones become deformed is supposed to be commencing when the bony or joint symptoms of general tenderness and looseness before mentioned are noticed. These changes consist in an enlargement of the articular ends of the bones at the seat of union of the bone and its epiphysis. These changes are generally first noticed at the sternal ends of the ribs, and on running the hand down the chest wall a distinctly beaded feeling is given to the ribs at this point. The next part generally affected is the wrist, and then the enlargement seems to become pretty general; the upper extremities however seem to enlarge more than the lower. Caries takes in an early symptom in this stage and in some cases it is one of the first to make its
appearance. The peculiarities of these "encephalic" or soft spots is that they only appear on the bones of the head. On palpating the posterior surface of the left of a Rachitic child's heart (their most frequent location) these spots can often be found, sometimes one or two and sometimes a good many. They are due to softening and thinning of a circumscribed area and upon pressure they give one the impression of a hole in the skull covered by a membrane. The flat be bones which become thickened, and whilst these thickenings and enlargements are going on a very important change is taking place in the bones themselves viz.: a general softening which is the cause of the green deformity so prominent a feature in Rachitis.
For a great deal depends on the time when this disease commences, if it begins early prominent symptoms then are delay in teething and the mother will tell you that the child will not make any attempt to walk over and over again Ricketsy children are brought by their parents for me other reasons than this latter the mother asking you to look at their ankles as they have no inclination to walk or stand; but if the Ricketty condition has not commenced until after dentition and walking has been accomplished then we find that the teeth drop out and become decayed and the softening which sooner or later begins soon leads to very great deformity. The Rachitic lead which is so typical of the disease is well described
by Eustace Smith in his "Feeding Diseases of Children," p. 119. "The skull is larger than it ought to be, it is of a peculiar shape. Its more prominent diameter is increased; the fontanelle remains open long after the end of the 2nd year. The thickening of the bone is most marked at the centres of the parietal bones so that the situation of the sutures is indicated by deep furrows, the forehead is high, square, and projecting, and is out of proportion to the face. This disproportion is exaggerated by the amount of growth of the bone of the face, particularly of the bone of the upper jaw and the malar bones." The open fontanelle is a prominent feature in the diagnosis. The deformity of the spine is greatly dependent on the time when the disease
appears - if it appears when the child is being
moved there is a posterior curvature from the 1st dorsal
to the last lumbar, but if
the child has been able
to walk about the posterior
curvature is confined to the
lumbar region, but there is
in addition to the lumbar
region an anterior curve.

The thoracic deformity
or as commonly called
"Pigeon breast" is a condition
typical of children with the apex
forward. This form of deformity
is too often seen in our
out-patient rooms - in it
the thorax appears as if it
had been flattened from side
to side and as a consequence
the anterior-posterior diameter
is very much larger.

This deformity is a very
serious one for through it
we have serious interference
with the acts of respiration,
Empysema and collapse of the lung are a consequent especially if there is much softening of the ribs. The beaded form of the ribs which are such sure signs of diagnosis seem to cause by their prominence and consequent pressure and friction certain characteristic changes in some of the organs of the body. The white patch so often found in the pericardium of Ricketts children is merely the result of friction with the muscles of the 5th rib. Similar spots are found on the spleen.

The pathological changes in Ricketts are chiefly separable to the ossifying crisis by seal cartilages and periosteum. These changes seem to be a morbid activity of the normal process of bone formation, forming in their manner structures which form their manner of formation or some
peculiarity due to the constitutional taint of the disease, can only become ascribed in an imperfect manner.

A microscopic examination of this layer shows a striking analogy to that presented by the physiological proliferating layer of cartilage. In the diseased layer, however, the primary capsules are much more distended and contain a greater number of secondary capsules, which are larger than in the normal.

Beneath this layer and continuous with it, there exists a red vascular and spongy tissue resembling a bone that has been partially softened by an acid." Comrie & Ranvier's Pathology, page 223.

Chemically the change is marked by a diminution in the inorganic matter of bone.

Normal bone contains 67 per cent. of inorganic matter and 33 per cent. of organic — in healthy children the percentage.
of organic matter is about 37 per cent; but in Osteitis we find the organic percentage much higher, we get organic matter 79 per cent and inorganic 21 per cent, in fact the bones become so soft that they can be bent and easily cut with a knife. The true pathological cause of this change is uncertain, whether there is an absorption of the calceineous matter already deposited, or whether the calceineous matter which should be deposited is kept in the blood in suspension and finally eliminated, or at present unknown. In what manner does this constitutional disease Osteitis cause these local changes in the bones? These changes are not only occasionally seen, in every case of Osteitis sooner or later they will take place. The primary irritation is probably caused from
The stomach to the nervous centres. Now it is well known how sensitive the nervous centres are to gastric irritation. Give a child the least thing irritating and very probably in a short time the breathing will be hurried, diarrhoea and sickness will be induced. the skin will become hot and dry, and convulsions may possibly ensue — this is the result in an acute form.

In ostelets by this means the nervous influence is probably conveyed to the ossifying ends of the bone and by its nervous influence this partially ossified bone is formed: thus why should it affect these localities always. It is because the most sensitive development that is taking place at this time (between the first and second year) is the ossification of bone?
The diagnosis of Poliomyelitis is one of comparative ease. As a rule the child is not brought for advice until the symptoms are well advanced, but the general appearance is so characteristic that there is little difficulty. The typical head and face, the large belly, the leading of the ribs and the enlargement of the wrists, the irritability of the child, and its strong dislike to be moved or even touched is most characteristic, added to which the history which one can almost always obtain of the improper feeding which the child has been treated with, together with the surrounding circumstances of its home and very much in any case of doubt.

The treatment of Poliomyelitis all tends to bring up the child and its sometimes with a healthy condition of the
Maternal milk does not seem to be agreeing with the child, or if the previous children, though brought up only by the breast, have not thrived, then as a last resort the child must be weaned and properly fed by artificial means. Hygienic conditions should be well looked after and the child’s bath should not be neglected - it should have plenty of fresh air & should if not able to walk be frequently carried or driven out. Its clothing should be well attended to and regulated. The food should be selected carefully according to age. In a young child even when suckling, much food can be given by occasionally letting the child have a teacup full of milk and lime water in the proportion of half and half. If the child is older we can give it animal food.
and of course if through
the disease the teeth have
come out or become decayed
digestion must be helped
by mincing the meat up
thoroughly before it being
taken. As for medicinal
treatment—almost every
remedy has been tried and
good results obtained from
their exhibition. Mercury
is intra-indicated. Alkali
per preparations of vine, Vinmar
Turpentine, Lime Salts,
are all useful but beyond
doubt the drug from which
we get the best results is
Cod Liver oil. Even in cases
where no other advice is
followed yet if Cod Liver oil
is being taken the child
will quickly show signs of
some improvement— or
where the parents are following
our strictly the directions
given, Cod Liver oil seems
to act like a charm, in
fact for the majority of cases this is all the medicinal treatment they require. I invariably use it with most beneficial results. Allmen calls attention to an important fact in his article on Richter in Reynolds System of Medicine Volume 1 page 845. "The condition of the rectal and intestinal changes should be examined when cod liver oil is given. I have often seen that much too large a dose of the oil is being given by seeing the oil pass by the stools. If such should happen a much less dose is sufficient; and generally, too large doses of cod liver oil are prescribed. This is very unfortunate; the tendency is to give the drug in 3 doses a day to children. This quantity is far too large at all events for the beginning of the treatment. I generally give my or x
to my according to age

Margaret or three times a day

and find that it is seldom

passed through the bowels

as in the case in the larger

doses. Cod liver oil is

too frequently given to

children in milk as a

vehicle, this is a bad practice

for knowing the great value

of milk as an article of

diet for children, nothing

should be done to make

the child dislike it; or to

associate it with anything

at all nauseous. It is

a popular idea that the oil

should be given just before

a meal as the food will

when taken directly afterward

propel it onwards, whereas

the reverse in this case it

should be taken at 1

to 2 hours after a meal.

In the former, the oil

simply floats to the top

of the contents of the stomach
not being touched by the food and digestion, and renders itself unpleasant when the whole time digestion is going on, but if taken at the end of digestion it simply goes straight through the stomach unchanged. But children, children soon take Cod Liver Oil very well and it is only at the commencement of its exhibition that there is any difficulty in its administration. Should however it be found that it can not be given by the mouth then it must be administered by friction.

I have had very good results from the doctrine of Iron and I think in most cases it is advisable to associate with the Cod Liver Oil some mixture containing Iron.

If the child is commenced to walk it is better to keep it off its legs for some
With time to per prevent deformity — and if deformity has started much good can often be done by carefully applied pressure by means of splints. Change of air to a bracing atmosphere or the sea side with salt water. Spreading is very beneficial but beyond the reach of most of the cases requiring it.

For the permanent deformity of the third stage of Tetanus the within recent years nothing could be done beyond attending to the general health and long continued pressure by splints we with very little success. But we have now, with our increased surgical knowledge and improved methods of operating and after treatment, a safe means of correcting the dreadful deformity so frequently seen in neglected
cases of Thickets in the operation of Astotomy. This operation which is now done so frequently at our Children's Hospitals is a means of, if not undoing the mischief, yet of rendering its effects almost impalpable, and by this means probably changing in a marked manner the future life of the child for good. The child growing up to all appearances like its fellows and not, as a child being laughed at and teased for its deformity, and as a man having his infirmity almost daily brought before him by his inability to take part in the many pleasures and amusements enjoyed by his fellow creatures.