The early development of myositis ossificans progressiva multiplex : illustrated by an apparently congenital or almost congenital case / by F. Parkes Weber and Alwyne Compton.

THE BRITISH JOURNAL
OF
CHILDREN'S
DISEASES.

REPRINT

PRINTED AND PUBLISHED BY ADLARD & SON,
BARTHOLOMEW CLOSE, LONDON, E.C.

THE EARLY DEVELOPMENT OF MYOSITIS OSSIFICANS PROGRESSIVA MULTIPLEX, ILLUSTRATED BY AN APPARENTLY CONGENITAL OR ALMOST CONGENITAL CASE.

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Reprinted from 'The British Journal of Children's Diseases,' December, 1914, Vol. XI, pp. 497–508.

THE EARLY DEVELOPMENT OF MYOSITIS OSSIFICANS PROGRESSIVA MULTIPLEX, ILLUSTRATED BY AN APPARENTLY CONGENITAL OR ALMOST CONGENITAL CASE.

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The patient, Mary T—, was shown by one of us on March the 28th, 1913, at the Royal Society of Medicine (Section for the Study of Disease in Children) on account of the peculiarity in her thumbs and great toes, and the presence of a bony spicule on the left side of her neck.* She was then a healthy-looking baby aged $7\frac{1}{2}$ months. At the time, careful examination by palpation, ordinary inspection, and Röntgen rays (Dr. N. S. Finzi), showed that the deformities in the feet and hands were quite symmetrical. The great toes (see Figs. 1 and 2) were everted ("hallux valgus") and overlapped by the other toes; they were abnormally short and altogether small, though the first metatarsal bones were of about average size. The child's thumbs were turned inwards across the palms and were abnormally short and slender, the shortness being especially well marked in the first metacarpal bones (see Fig. 3). There was congenital ankylosis (will become synostosis) or non-development, of the interphalangeal joint of each great toe and each thumb. In addition to this microdactyly of the great toes and thumbs, there was an abnormal bony projection on the left side of the neck, which might have been mistaken for a cervical rib, but Röntgen ray examination (see Fig. 4) showed the outgrowth to be a thin spicule of bone attached to the back of the middle of the left clavicle. This spicule, which reminded one of the styloid process of the temporal bones at the base of the skull, projected about half an inch upwards, appa-

* 'Proc. Roy. Soc. Med.,' Section for the Study of Disease in Children, 1913, vi, pp. 160–163.

rently at the outer border of the clavicular origin of the sterno-cleido-mastoid muscle, and its upper end could be felt almost immediately below the skin. Apart from these slight deformities, the

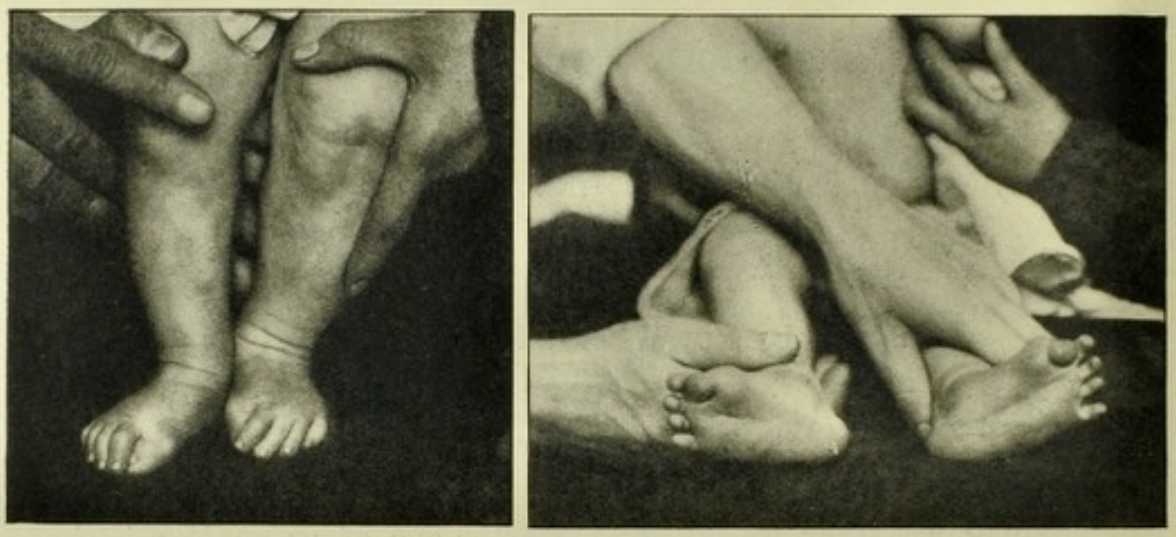

FIG. 1.—Photographs of the child's feet, showing position of the great toes.

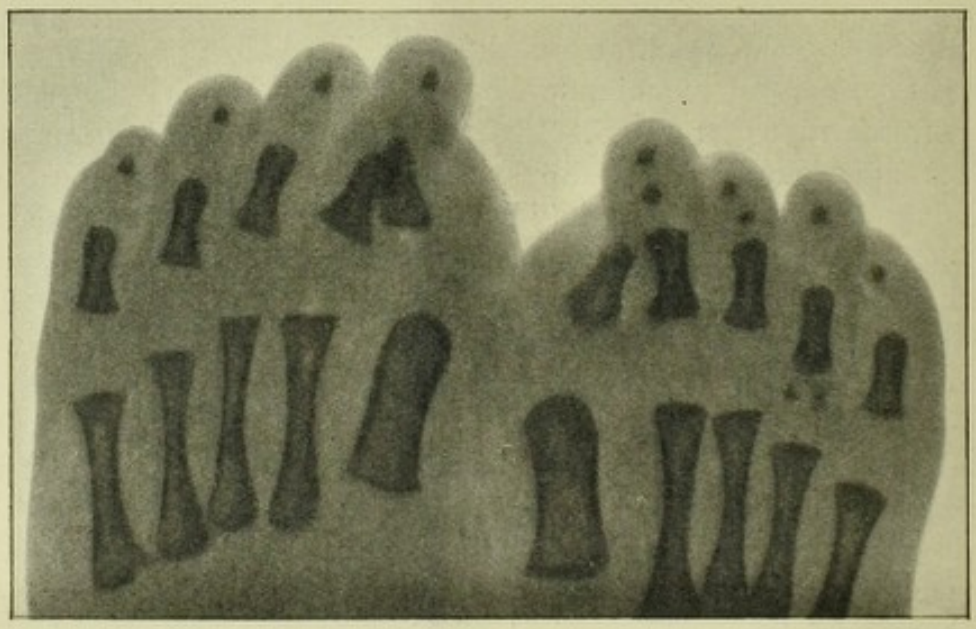

FIG. 2.—Skiagram of the child's feet (hallux valgus).

patient seemed well formed, and was the only child of healthy parents, both young. There was no history of any similar malformation in any other members of either the mother's or the father's family, nor was there any definite history of "maternal impressions."

The child apparently continued to enjoy good health and nothing

further abnormal was noticed until March, 1914, when a series of

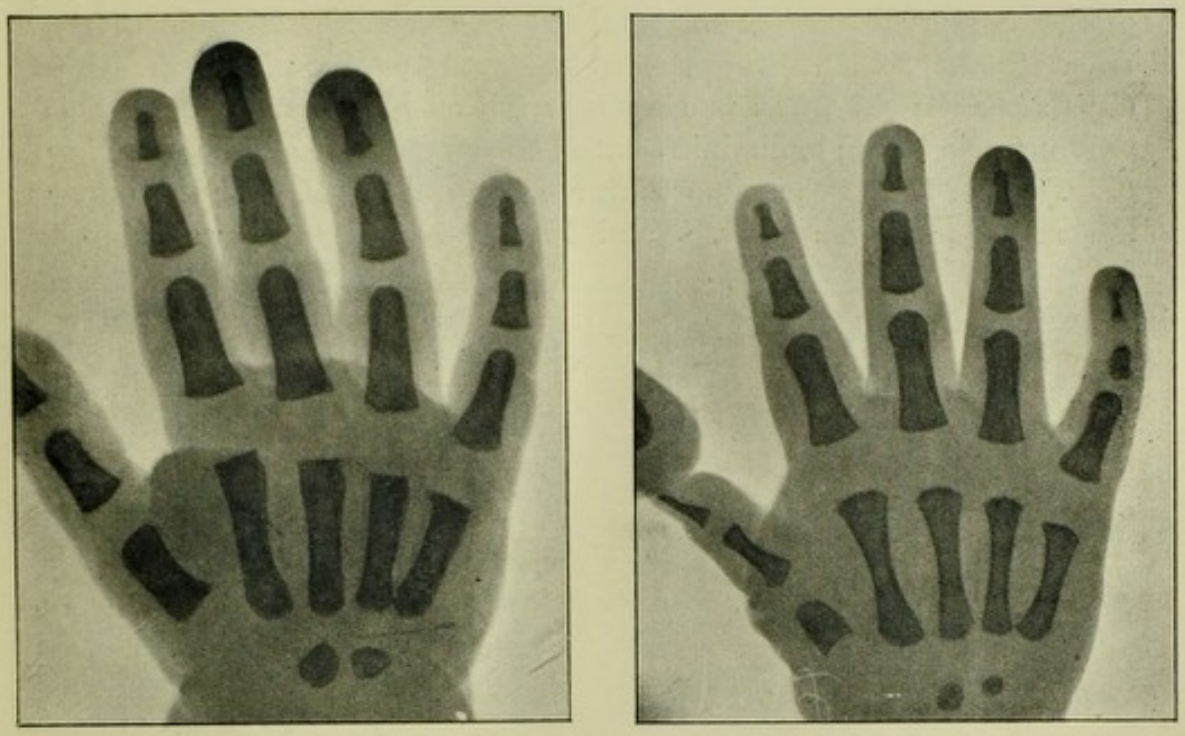

Fig. 3.—On the right is a skiagram of one of the patient's hands, showing the smallness of the metacarpal bone of the thumb; the thumb is being forcibly held in position. On the left is a skiagram of the normal hand of a male child, aged 10 months.

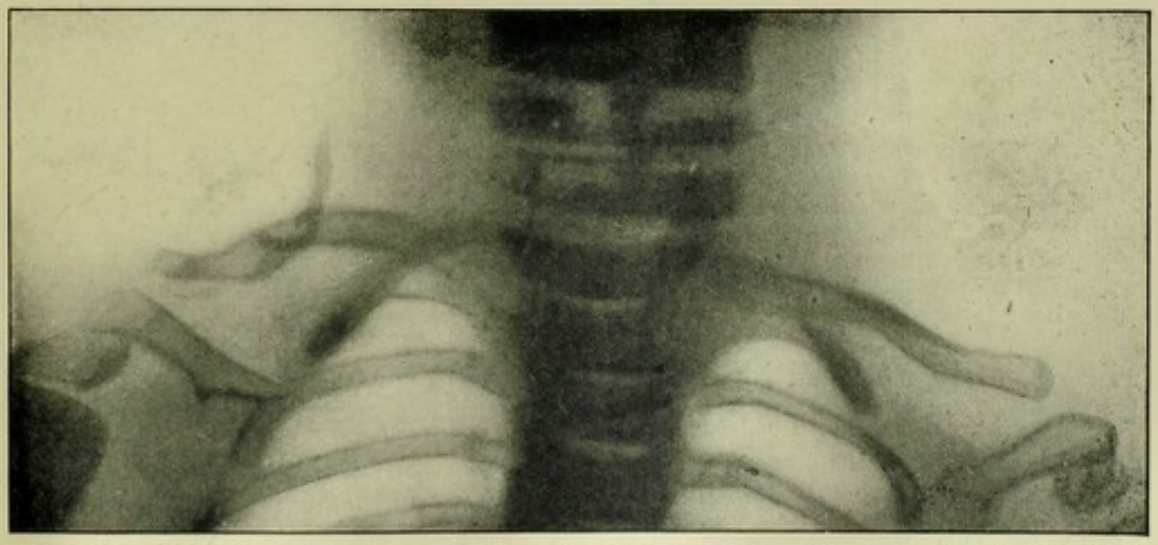

Fig. 4.—Skiagram of the child's cervical region from the back, showing the bony outgrowth from the left clavicle.

diffuse, ill-defined, hard, painless (and not tender) swellings began to develop under the skin of various parts of the trunk (see Figs. 5 and 6). These swellings involved the muscles and probably the subcutaneous

tissue, the skin could be moved freely over them, and they were not accompanied by fever or constitutional disturbance. The first one to attract attention was situated in the left posterior triangle of the neck (Fig. 5, No. I). It appeared about the middle of March, a few days after the child had had a slight fall on her left shoulder. This swelling soon began to diminish, but on March the 22nd another swelling (Fig. 5, No. II), of the same character, was observed over the upper left scapular region (Fig. 5 and Fig. 6, No. II), and was almost

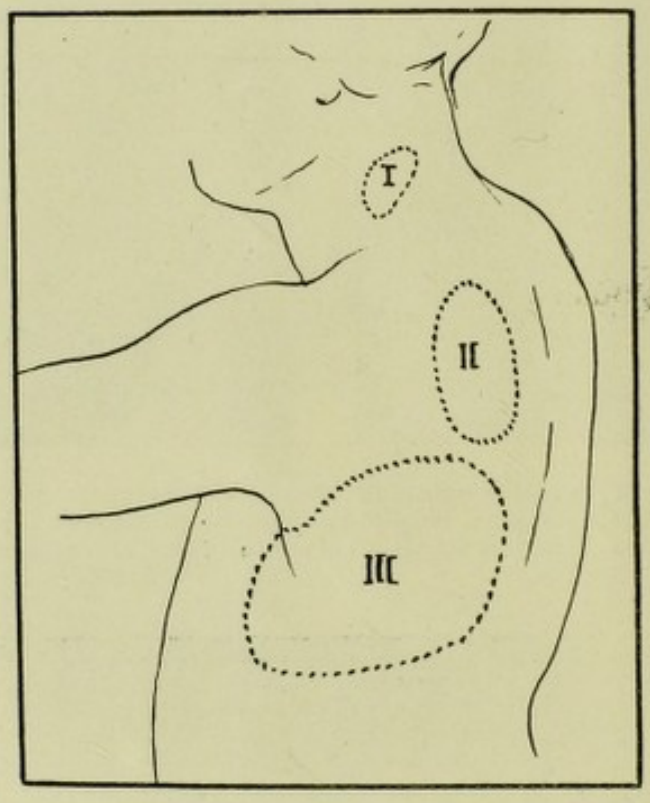

Fig. 5.—To show development of the swellings between March the 15th and March the 22nd, 1914. No. I appeared in the middle of March, a few days after a fall upon the left shoulder. No. II appeared on March the 22nd and was almost immediately followed by No. III. By that time No I had almost completely disappeared.

immediately followed by a third swelling (Fig. 5 and Fig. 6, No. III) over the left lower part of the thorax. Before these last two swellings on the left side had disappeared analogous swellings formed on the right side. First of all, on April the 4th, one was noticed on the right side of the neck (Fig. 6, No. IV), and, a few days later, others appeared lower down on the right side (Fig. 6, No. V and No. VI) corresponding to the second and third on the left side. The lowest of these swellings occupied the lowest scapular, infra-scapular, and lateral regions of the thorax; the superficial veins over it appeared to be slightly dilated. A slight enlargement of superficial veins

was also noticed over most of the other "lumps" or swellings of this class.

Though Dr. J. Metcalfe, by Röntgen-ray examination on April the 20th, 1914, failed to find any evidence of calcification or abnormal ossification at the sites of any of these swellings, it seemed clear to us, owing to a publication by Dr. A. E. Garrod,* that our case was an early one of myositis ossificans progressiva. In his paper Garrod described the case of a boy in whom, from the age of five months onwards, lumps appeared on the head (occipital region) and trunk,

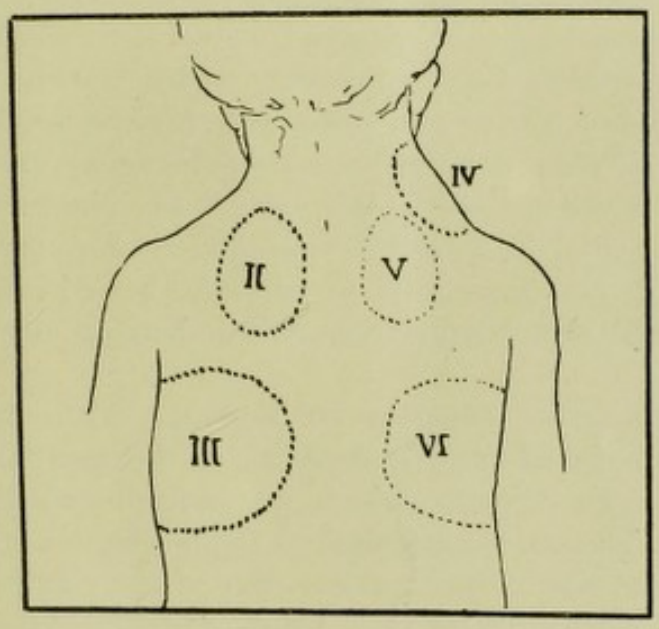

Fig. 6.—To show further development of the swellings. On April the 4th, 1914, while swellings No. II and No. III were still present, No. IV appeared and was followed, a few days later, by No. V and No. VI, corresponding on the right side to No. II and No. III on the left side.

which increased in size for a time and then gradually disappeared, leaving no obvious traces behind them. The swellings were most numerous on the boy's back, but two were situated on the front of the chest, apparently in the outer parts of the pectoral muscles. Garrod writes: "When the patient left the hospital no induration was felt in any situation in which the swellings had formerly been, although one can hardly doubt that some lesions must have remained. Nowhere was there anything to suggest that an abnormal formation of bone had taken place. . . . His rectal temperature never rose above 100° F., but evening rises to 99° F. were frequently recorded. The appearance of a fresh swelling, even though a large one, was not

* "The Initial Stage of Myositis ossificans progressiva," 'St. Bartholomew's Hospital Reports,' London, 1907, xliii, p. 43.

attended by any marked constitutional disturbance. Pain, if present, was evidently slight, and tenderness of the swellings was never elicited." No Röntgen photographs were made in that case, but in the following year information received by Dr. Garrod left no doubt that ossification was occurring in the muscles, and that the case was a very decided one of myositis ossificans progressiva. Garrod refers to other cases of the disease, in the earliest stages of which transient swellings were said to have developed and to have disappeared, leaving no obvious traces behind them. He kindly informs me that Dr. John Thomson, who confirmed the diagnosis in his case, had had the opportunity of watching the progress from an early stage in a similar case. He particularly cites a description, by Salvetti,* of the case of a child, aged 4 years. In that case, "although obvious bony deposits were already present in some of the swellings, and the presence of such was verified by microscopic examination of a portion removed during life, it is mentioned that in January, 1903, some swellings, which had been present upon the head in the summer of 1902, had completely disappeared without leaving any trace behind them."

In our own case the diagnosis of myositis ossificans progressiva was strongly confirmed by the presence of the microdactyly of the great toes and the thumbs, which we have described and figured (see above). The bony spicule on the right side of the neck (possibly connected with the outer border of the clavicular origin of the sterno-cleido-mastoid muscle), which was already present when the child first came under observation, suggests that in regard to its commencement the disease was in our case congenital or almost congenital. Garrod quotes H. Lorenz's description of the microdactyly of the great toes in cases of myositis ossificans progressiva as follows: "This deformity consists in a change in both great toes, which usually takes the form of a hallux valgus with retardation of development, the great toes coming to lie beneath the second toes. The shortening is usually explained by an absence of the first phalanx; but this explanation does not hold good in every case, for recently von Zoege-Manteuffel has demonstrated on the skeleton a synostosis of the shortened phalanges of the toes, which could, in his opinion, be easily mistaken for absence of the first phalanx, which has so often been described previously. A similar condition had been described a short time before by Fürstner."† In our present case the condition of the great toes corresponds

* 'Arch. f. Kinderheilk.,' 1904, xxxix, p. 317.

† See H. Lorenz, 'Die Muskelerkrankungen,' Theil 1, Wien, 1898, p. 284.

exactly to Zoege-Manteuffel's description. The corresponding deformity in the thumbs, also noted in our case, appears to be by no means invariably present in cases of myositis ossificans progressiva.

In a single case of myositis ossificans (described long ago by the surgeon Cæsar Henry Hawkins) antisyphilitic treatment is said to have given a good result. In our present case the blood-serum (May the 3rd, 1914) gave a negative Wassermann reaction for syphilis. Examination of the child's blood (Dr. Sons, April the 23rd, 1914) gave the following results: Red cells, 6,160,000 to the cubic millimetre of blood; white cells, 20,200 (after the midday meal); hæmoglobin (Sahli's method), 60 per cent. Differential count of white cells; neutrophile polymorphonuclears, 65 per cent.; eosinophile polymorphonuclears, 0·5 per cent.; basophile polymorphonuclears, 0; lymphocytes, 31·5 per cent.; transitionals, 3·0 per cent. The urine showed nothing special. By ophthalmoscopic examination of the child's eyes (April the 27th, 1914) Dr. C. Markus found nothing abnormal. The lower jaw was not particularly small, as it has been found to be in some cases of myositis ossificans progressiva.

On April the 23rd, 1914, for biopsy purposes, Mr. A. Compton excised a small piece of the right latissimus dorsi muscle (over the lower part of the scapula, where it was obviously swollen), and likewise a piece of the subcutaneous fat covering it. The affected muscle was hard, swollen, and relatively pale, and the fascial covering was of a dull white colour. The subcutaneous fat over it also seemed swollen. He also excised a small piece of the right vastus externus muscle and a small piece of the subcutaneous fat over it, as specimens of the patient's clinically normal tissues to compare with the affected tissues. Of these four pieces the microscopical sections of the latissimus dorsi muscle (which was macroscopically obviously diseased) were the only ones which showed anything abnormal. The accompanying illustrations (Figs. 7, 8 and 9) are from microscopical drawings by Mr. A. Compton.

The chief histological change shown in the diseased muscle, a change well illustrated by Mr. Compton's drawings, is the invasion of the striped muscle tissue and the normal connective tissue belonging to it, by a newly-formed fibro-cellular connective tissue, which in its features resembles rather a fibromatous hyperplasia than a product of ordinary inflammation. The muscle fibres are, however, likewise undergoing degenerative changes, tending to split up longitudinally into fibrillæ and, in parts, to atrophy. No micro-organisms, special eosinophilic cells (local eosinophilia), or commencing calcification

was discovered in the sections. The correctness of the term "myositis" in regard to the present disease is very doubtful, and Gobo (of Japan) has (1913) suggested the substitution of the name "Hyperplasia fascialis ossificans progressiva."

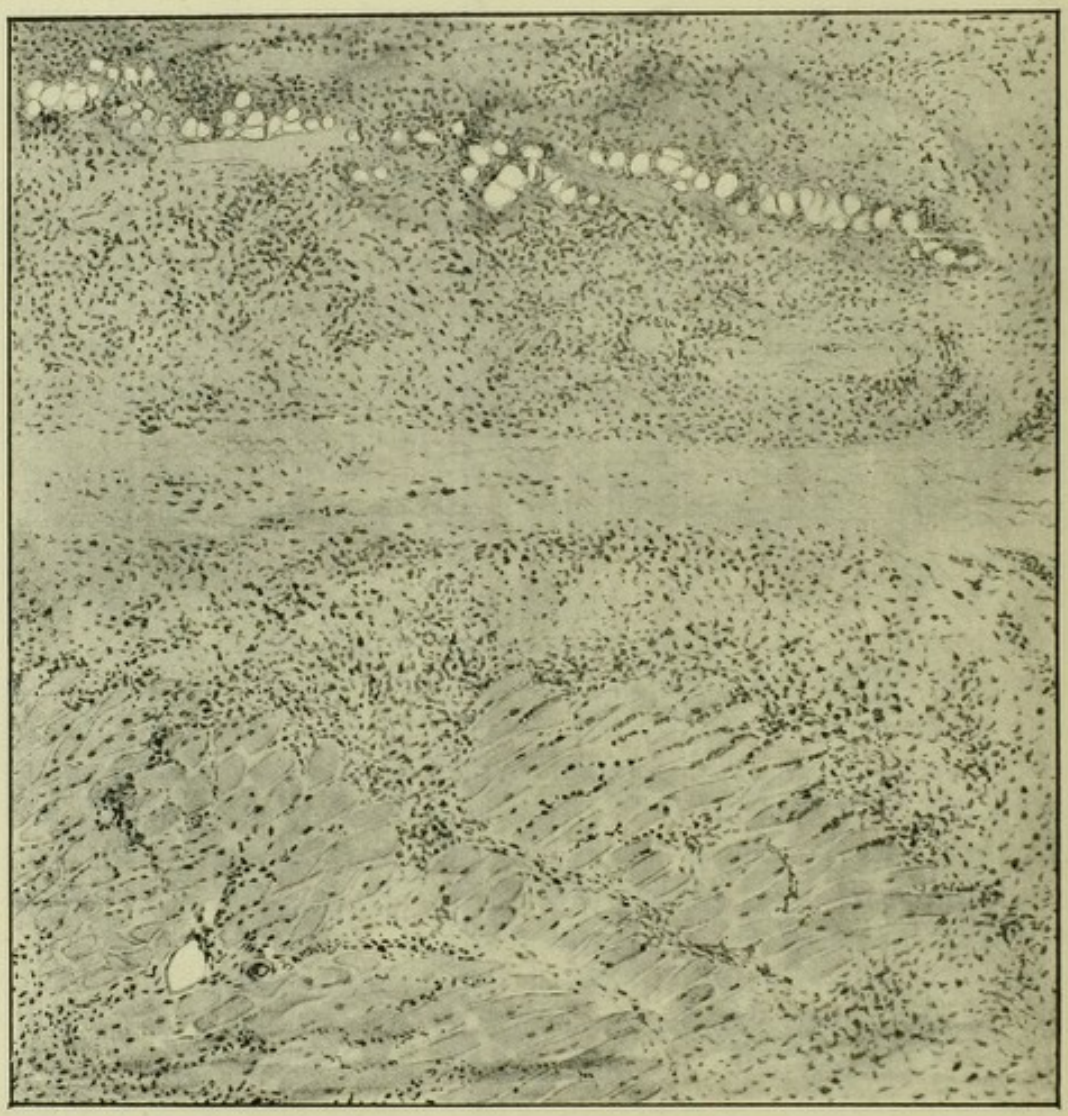

FIG. 7.—Microscopic section of right latissimus dorsi muscle, showing the invasion of the muscle by newly-formed fibro-cellular connective tissue. The muscle-fibres are seen best preserved in the lower part of the figure.

The later history of our case has abundantly confirmed the early diagnosis of myositis ossificans progressiva, though the rare disease in question is decidedly still rarer in females than in males.

In May, 1914, a distinct bony formation could be felt about the posterior axillary fold on the left side, probably in the left latissimus dorsi muscle. At the same time another of the transient swellings

occurred, namely, on this occasion in the region of the right pectoralis major muscle. Röntgen skiagrams kindly taken by Dr. J. Metcalfe on June the 4th showed marked shadowing, corresponding to the

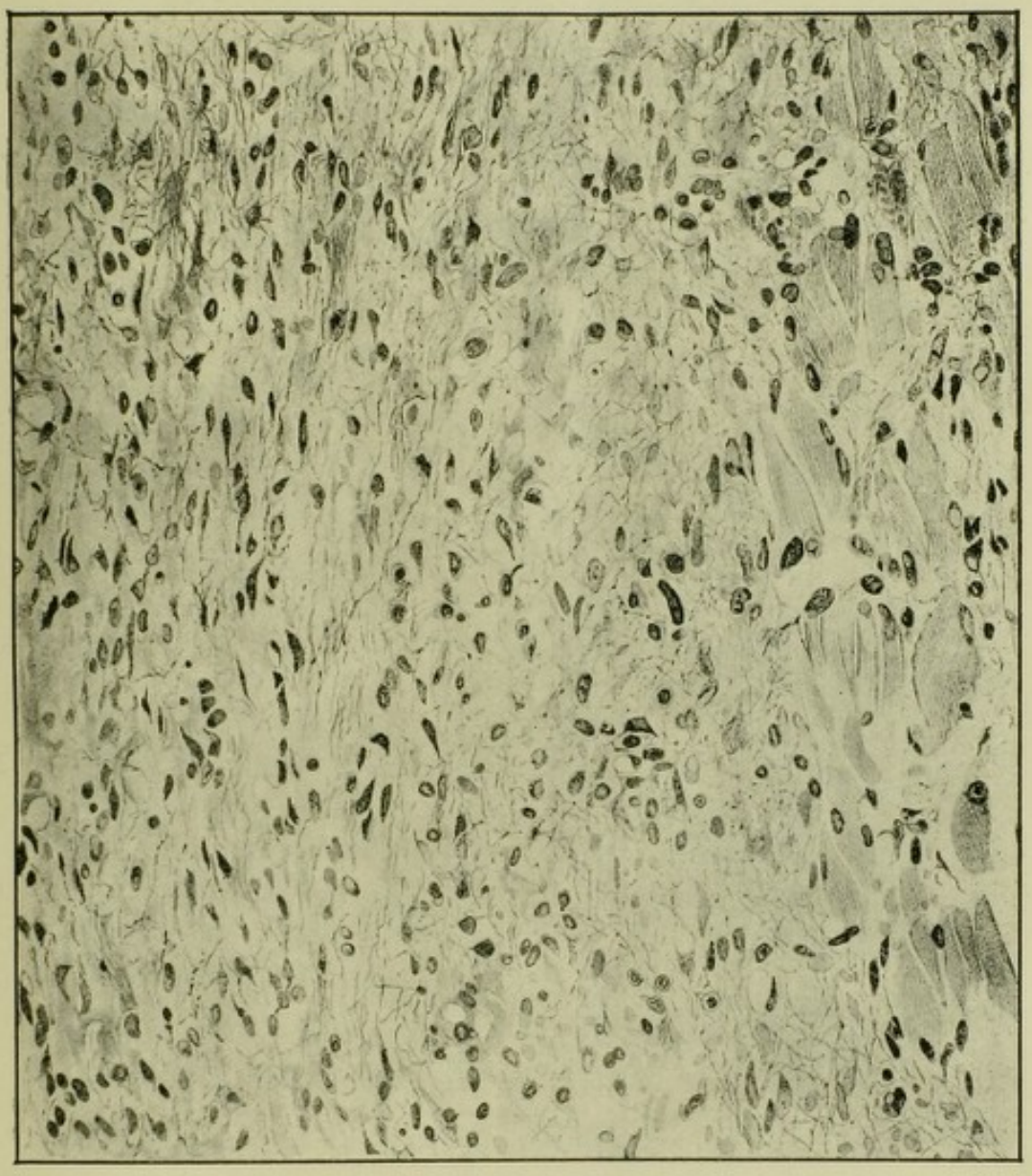

Fig. 8.—Right latissimus dorsi muscle. Higher magnification.

bone-formation in the left axillary fold. In June hard swellings developed in the right biceps muscle and over the lower part of the right scapula, and also at a corresponding position on the left side of the thorax. Treatment by subcutaneous injections of Merck's fibrolysin was tried in June, but was soon discontinued, as it seemed

to be doing no good. In August the child appeared well in her general health, but the previously-mentioned swelling in the right biceps muscle was very firm, so that the right elbow-joint was fixed at nearly a right angle. The lower end of the right scapula was bound by a bony, or partially bony, band either to the chest-wall

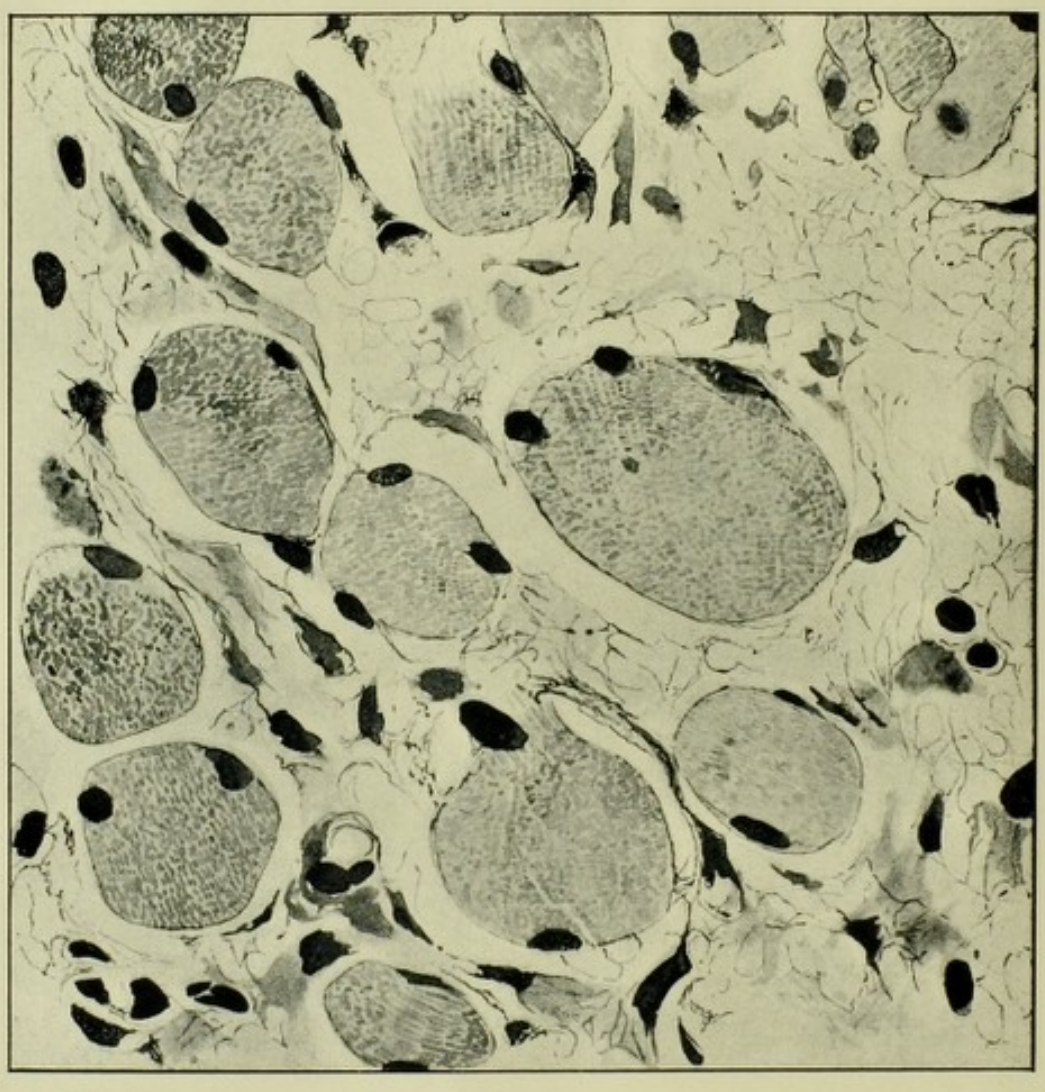

Fig. 9.—Right latissimus dorsi muscle. High magnification. Showing the splitting up of the muscle-fibres into fibrillæ.

or to the vertebral column. In the right thigh an irregular bony plate had developed over the vastus externus muscle at the site of the biopsy incision (of April the 23rd, 1914). Similarly, a bony deposit could be felt in the deltoid muscle area of the left arm, where the injections of fibrolysin had been made. Lastly, the whole left rectus abdominis muscle, from the pubes to the chest-wall, felt as if it had undergone a fibrous thickening, but this thickening has now

entirely disappeared. In September and October an apparently bony lump on the occiput at the insertion of the trapezius muscle gradually formed, and, for the third time, a swelling (of tough, leathery elastic consistence, like the preceding ones) developed on the back, just below the angle of the right scapula. The child now looks well nourished and happy, but is very stiff in the movements of her neck and back, the power of extending the neck becoming more and more limited. The limitation in all the movements of the head gives rise to a compensatory increase in the movements of the eyeballs, very characteristic of children suffering from any kind of chronic stiffness in the neck. There seems now also to be some osseous infiltration in both anterior and posterior axillary folds on both sides, limiting abduction of both arms.

The case is a striking example of the commencement of myositis ossificans progressiva in a baby, the first signs of the disease in the present patient having been almost, if not quite, congenital. The early diagnosis was due to the appearance of diffuse, hard, painless, transient lumps or swellings at various parts of the patient's body, similar in character to those so admirably described by A. E. Garrod in the paper above referred to. The effect of traumatism as an occasional exciting cause of the local manifestations of the disease is illustrated in the present case by the occurrence of the first "lump" (*i.e.* the swelling on the left side of the neck) a few days after a slight fall on the left shoulder, and is still further illustrated by the development of bony lumps at the site of one of the biopsy incisions and at the site of the fibrolysin injections. The disease appears in this case, as in other cases, to be due to a congenital, but not inherited, tendency to the formation of fibrous tissue and bone in striped muscles (that is to say, in the connective tissue normally belonging to the muscles), especially at the site of, and as a result of, traumata (even slight traumata) of various kinds. The present case also shows that the growth of the newly formed bone in myositis ossificans progressiva does not necessarily proceed from the periosteum, as it seems to do in cases of ordinary traumatic localised myositis ossificans ("rider's bone," etc.). The bony lump at the site of the incision into the vastus externus muscle of the right thigh has, indeed, developed quite far from any periosteum. How little an ordinary inflammation of muscle (*myositis* in the strict sense of the word) has to do with the disease is shown in the present case by the results of microscopical examination of the diseased muscle before any local bone-formation had occurred, and likewise by the practical absence of fever or constitutional distur-

bance during the exacerbations. There is, indeed, something to be said in favour of such a term as "Hyperplasia fascialis ossificans progressiva," already referred to, but, on the other hand, it is inconvenient and unnecessary to change the old-established names of diseases for the sake of pathological theories. The disease, which advances by repeated fits and starts, appears histologically to be an *ossifying hyperplasia of the fasciæ and connective tissue of the striped muscles, especially the muscles of the trunk.* In the early stages of the disease, however, the muscular swellings constituting the exacerbations sometimes subside without the immediate occurrence of any local ossification at the site of the swellings.

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