PART VIII
THE DISEASES OF THE SKELETAL MUSCLES

GENERAL DISCUSSION

The skeletal muscles are protected by their anatomical relationships from many of the diseases affecting the visceral muscles. Very few of the primary muscular diseases are found in ordinary practice, especially in this country. Anything which interferes markedly with the innervation or the circulation of striated muscles may produce atrophy or weakness.

Toxins or infections of the muscles cause the muscle fibers to lose their striæ; the muscular nuclei may increase in number; and there is usually a multiplication of the interstitial connective tissues. Fat is frequently deposited between the muscle fibers under such conditions. The abiotrophic muscular diseases, like similar diseases in the nervous system, appear to be due to a congenital or hereditary defect of the germ plasm.

Muscles kept contracted by a constantly acting stimulus acquire a peculiar state which seems intermediate between normal muscular contraction and contracture. Doubtless the condition finally terminates in fibrosis. This constant contraction is noticed most frequently in the muscles of the deeper layers of the back, when these are stimulated by nerve impulses reflexly produced by bony lesions or by visceral disease. The muscle becomes stiff on palpation, often with harder knots or cords which are usually very hypersensitive; sometimes the entire muscle becomes hypesthetic or anesthetic after long contraction. Rigidity of the spinal areas affected is promoted by these contractions, especially when several spinal segments are involved.

The affected muscles are weaker than normal; they tend to recur to their contracted state after relaxation, and it appears very probable that they are responsible for the perpetuation of bony lesions, and for their recurrence after correction. It is evident that normal sensory stimulation does not arise from muscles kept unduly tense; thus, they are at least partly responsible for the diminished activity of the nerve centers of the corresponding spinal segments. Such muscular tension is properly called a "muscular lesion."

Bony lesions are frequently found responsible for weakness of individual muscles or for muscle groups, but not, so far as our present knowledge goes, for true muscular disease.

CHAPTER XLI

DISEASES OF MUSCLES

ACUTE POLYMYOSITIS

(Infectious myositis)

This is a rare disease, probably due to the presence of some unknown infectious organism. It is a true inflammatory process, characterized by hyperemia, swelling, pain, and edema of the muscles. Leucocytic infiltration is present in the muscle.

The muscles of the arms and legs first become hard, swollen, painful and stiff; later, the muscles of the face and trunk become involved; swallowing and respiration become difficult; and death usually occurs in a few weeks in the acute form. Rarely the acute form of the disease may become chronic and death be delayed for two or three years. A low fever is usually present during the earlier stages.

The **treatment** is unsatisfactory, on account of our ignorance concerning the true cause of the condition. Such treatment as seems to be indicated by the condition of the patient at the time of the examination may be given as a palliative measure. The treatment which generally increases the resistance of the body to infection is indicated on general principles. Rest in bed, a non-purin diet, with very free water drinking, are perhaps the most useful factors in the treatment.

MYOSITIS OSSIFICANS

Two forms of this disease are known. The **local** form is due to irritation of single muscles, or muscle groups. It is present in horsemen as the result of the pressure of the saddle upon the legs; it occasionally affects the muscles of the shoulders in men who carry heavy burdens upon the shoulders. In this form the muscles affected undergo first the changes characteristic of acute myositis, with marked overgrowth of the interstitial connective tissue. The scarlike tissue thus formed undergoes slowly progressive calcification.

General, or systemic, myositis ossificans is a rare disease, characterized by the spontaneous occurrence of bonelike growths, involving mostly the musculo-tendinous areas. The cause is unknown. No history of heredity or syphilis is present. It appears usually before the tenth year of life.

The muscles affected, usually first of the shoulder or pelvic girdle, become slightly swollen, stiff and painful; a small hard lump appears, which may reach the size of an orange; the calcification extends along the tendon and the muscle, following the connective tissue trabeculæ. The muscle does not become paralyzed, but movement of the neighboring joint becomes impossible on account of the ossification of the tendons. In this type the tumors resemble newly formed bone.

It is rare for life to be prolonged beyond the twentieth year. Death occurs either from some intercurrent disease, or as the result of suffocation due to the involvement of the respiratory muscles.

SECONDARY MUSCULAR DISEASES

Rheumatic Myositis. Rheumatic myositis is an inflammation of the muscles due to the bacteria which cause other rheumatic diseases. (q. v.)

Suppurative Myositis. Suppurative myositis, or muscular abscess, may be due either to the infection of a wound or to septicemia. The diagnosis of this condition rests upon the pain, leucocytosis, and other symptoms of pus formation. The treatment is surgical.

Gouty myositis is a painful chronic inflammation of the muscles associated with systemic gout. (q. v.)

Trichiniasis. Trichiniasis (q. v.) often involves the muscles. The diagnosis rests upon the history of pork eating, the character of the pain, marked eosinophilia, and sometimes a microscopical examination of an excised bit of muscle. The treatment is symtomatic, and the prognosis may be very serious.

Paralysis of the Striated Muscles without Atrophy is due to some lesion of the upper neuron system.

Paralysis, or Weakness, of the Striated Muscles with Atrophy may be due to injury to the muscle itself as in the primary muscular diseases, to diseases affecting the motor end-plates, to disease of the nerve trunk, or to disease of the anterior horns of the spinal cord. These conditions are discussed in connection with the diseases of the nervous system.

Arthritic Muscular Atrophy. After the occurrence of arthritis anywhere in the body, the muscles which move the affected joints undergo a variable amount of atrophy. This type of atrophy is not associated with the presence of any hypertrophic fibers and with only slight increase in the interstitial tissue.

It seems to be due to some reflex trophic effect, resulting from the irritation of the sensory nerves distributed to the articular

surfaces, with the subsidence of the inflammation in the joint. The muscles may regain their normal size and strength. Occasionally the atrophy persists and secondary contractions occur which may resemble those found in anterior poliomyelitis.

THE MUSCULAR DYSTROPHIES

This group of diseases affecting the skeletal muscles includes several subdivisions, all of which are characterized by the importance of heredity in their etiology; by the appearance of the disease before puberty; as a rule, by the fact that a certain amount of hypertrophy is associated with the atrophy; and by the lack of recognizable nerve lesions.

No treatment appears to be of any value in preventing the ultimate fatal outcome, though in some very mild cases the afterhistory of the patient may not be seriously modified by the occurrence of this disease in early life.

Myotonia Congenita (Thomsen's disease). This is a familial disease of the muscles, characterized by the following symptoms: When the patient attempts any movement, after a period of rest, the muscles affected contract strongly and do not relax for a considerable interval; the next contraction is followed by a somewhat diminished contracture period; the third, by a still less prolonged tonic contraction; until finally the patient becomes able to perform the motion which he had first decided upon. This series of events is repeated whenever the patient endeavors to begin any complex action, as in walking. Sometimes the attack is so severe as to throw him to the ground, more frequently there is merely difficulty in getting started.

The visceral muscles are never involved. Mental disturbances may be present. Reflexes are slightly modified or unchanged. Muscular weakness is noticeable, though the muscles may be normal or considerably increased in size. Electrical reactions are changed (myotonic reaction).

A similar atypical disease may occur without hereditary basis; its cause is unknown.

The attacks are made worse by exposure to cold and by emotional excitement. Treatment is practically useless. It does not greatly shorten life, but recovery is not to be expected.

Pseudohypertrophic Muscular Atrophy, or pseudomuscular hypertrophy (Duchenne) is a form of the disease which is characterized by its first affecting the muscles of the calves of the legs. This comes on rather slowly as a hypertrophy and may at first be considered evidence of the child's excellent health. There is usually a lordosis, which exaggerates the deformity. The muscles are very weak, even when the size is much greater than nor-

mal. Other muscles of the body, including the trunk and respiratory muscles, become affected and death occurs from cachexia.

Occasionally this form of muscular atrophy is associated with epileptic attacks and with mental defect.

Leyden-Moebius type. In this form of muscular atrophy the hypertrophy is not apparent, and the hereditary influence is even more marked. Otherwise, the disease is like that just described.

The Scapulohumeral type has been described by Erb. It comes on later in life, even up to the age of twenty, and affects first the muscles of the shoulder girdle.

A peculiar wing-like position of the scapulæ results from the atrophy of these muscles. The disease extends to the leg and trunk muscles, and death occurs as already mentioned.

Facioscapulohumeral type (Dejerine-Landouzy). This disease is especially characterized by its onset in about the third or fourth year, affecting first the muscles of the face. The disease affects then the shoulder, leg and trunk muscles. This form of the disease is very slow in its progress and patients may live to be thirty or forty years old.

Atrophic Myotonia. This is a rare disease characterized by abnormally slow relaxation of certain muscle groups after contraction, and by the occurrence of atrophy in the muscles affected.

Oppenheim's Myotonia. In this disease the muscles undergo flaccid paralysis with loss of the reflexes. It does not shorten life and is incurable. The muscles atrophy and the patient becomes helpless. Massage of the affected muscles and electrical stimulation seem to delay somewhat the course of the disease. Some relation between the thymus gland and this disease has been suggested.

Myasthenia Gravis. This is a rare disease of unknown etiology. The muscles of mastication, speech and deglutition are involved, and also the extrinsic eye muscles. The disease is characterized by very rapid fatigue, which is inherent in the muscle itself, rather than in the nervous control. Dyspnea, dysphagia, and ptosis of the eyelid are noticeable symptoms. Death occurs from exhaustion, or the patient may be strangled while trying to swallow.

Dysbasia Lordoca Progressiva (Tortipelvis). This is a disease peculiar to Jews, which appears in children and young adults. Muscular spasms of the lumbar and pelvic region cause a deformity of this part of the body. There is marked lordosis of the dorsolumbar spinal column. There are no signs of organic disease of the nervous or osseous systems. The terms "monkey gait" or "dromedary gait" have been applied to this condition.

FUNCTIONAL MOTOR DISTURBANCES

The different varieties of chorea, spasm, tic and tremor are generally considered functional or idiopathic. It is needless to say that the use of these terms is merely a confession of our ignorance of the structural or biochemical changes which must necessarily be present in every disease. The term spasm is applied to those muscular contractions which result from some irritation in the lower reflex arc. True spasm is involuntary and is not to be controlled by any process of education. The choreiform movements resemble, to so great an extent, the movements resulting from pathological changes in the basal ganglia, especially in the lenticular nucleus, that it may be granted that these movements are due to the irritation somewhere in the higher reflex arc, including perhaps the pontine centers as well as the basal ganglia. Tic, or, as it is sometimes called, habit spasm, results from the repetition of complicated movements. These are involuntary in the beginning and are often initiated under some emotional strain. Reëducation is often efficient in dealing with these cases. The seat of the disturbed function in the tic is probably in the deeper layers of the cerebral cortex where other habitual unconscious actions are controlled.

All of the functional motor neuroses having a certain degree of hereditary taint rest upon the presence of a neuropathic constitution. In all of them, the treatment must include the measures necessary to secure good nutrition, good elimination, rest and wholesome, sane, hygienic life for the patient.

Primary Athetosis. This is a rare functional disease, characterized by the occurrence of slow athetoid movements of the hands. It occurs in late middle life or old age and is not associated with mental deterioration. Only after organic lesions of the brain and especially of the corpora striata and optic thalamus have been eliminated can a diagnosis of primary athetosis be made. No treatment affects the course of the disease. It persists throughout life, which it does not seem to shorten.

Senile Tremor. This occurs in old people frequently at the age of 70 or thereabouts. The fingers and thumb are usually held straight, at right angles to the hands, and the tremor involves both fingers and hand and occasionally the neck muscles are affected, so that the patient constantly nods his head. The condition is not associated with any mental peculiarity and the only pathological conditions are those characteristic of old age. No harm results from the condition and no treatment is of the least avail in controlling it.

Toxic Tremor. Alcohol or tobacco, lead, mercury and certain other metallic poisons or the organic poisons or autointoxication may all act upon the nerve centers as to produce a rather irregular

tremor. The condition disappears with the elimination of the poison.

PERIODIC PARALYSIS

(Family periodic paralysis)

This is a family disease of rare occurrence in this country, characterized by the occurrence of almost or quite total paralysis, from which the patient rather speedily apparently recovers.

Etiology. The disease is always hereditary. It appears to follow Mendel's law, though the number of cases on record is not sufficient to prove the law by exact numbers.

The individual attacks may occur without recognizable cause, but they are frequently precipitated by muscular exertion or by overeating.

Pathology. Almost no structural changes are constantly present. An examination of the muscles sometimes shows slight vacuolization with occasionally a hypertrophied cell. In some cases no changes in either the muscles or the central nervous system are to be found upon the most careful examination.

The diminished excretion of the calcium and magnesium salts in the urine seems to be fairly constant. It has been suggested that the paralysis is due to the excess of these salts thus retained within the blood which inhibits the action of the nerve and muscle cells.

Diagnosis. The symptoms and history are fairly typical. The family history shows the hereditary taint, while the history of previous attacks with recovery should make the diagnosis certain. There are prodromes usually of a vague discomfort. The patient goes to sleep and awakens completely paralyzed. Occasionally the paralysis is not quite complete, but it usually involves all four limbs. Speech, the sphincters, the respiratory muscles and deglutition are not affected. The reflexes are clearly diminished or may be absent. The muscles do not usually contract in answer to the electric current. The heart is frequently found dilated on examination during an attack. This disappears with recovery. Examination of the urine shows some albumin, some blood and occasionally some hemoglobin.

The attack lasts a few hours to a few days. Then a very profound perspiration occurs, followed by weakness, sometimes sleep and a gradual recovery. During convalescence the muscles are very weak and strength is regained only after some days or weeks of gradual improvement.

Treatment. The treatment is devoted to preventing attacks. Overeating, constipation, undue muscular exertion, are to be avoided. The correction of such bony lesions as may be found on examination should be of value in securing good nutrition and good elimination.

Prognosis. The prognosis is bad for complete recovery; is very good for recovery from any attack, and is bad for the descendents of the individual. Marriage should be prohibited.