In 1951 we were able to show that sensory chronaxy is prolonged in scleroderma — and in scleroderma alone — in not only the lesions but the entire unchanged skin. This is so invariably and in all cases of scleroderma, even in the early stages, when clinical changes are slight. This makes sensory chronaximetry highly important for diagnosis, and decisive for differentiation in clinically doubtful cases (Jabłońska and coll., 1957). We have had 80 cases of diffuse scleroderma and 50 of circumscribed scleroderma (morphea). In all of these, prolonged sensory chronaxy in the entire seemingly normal skin was an invariable finding. On the other hand, in diseases often closely resembling scleroderma — such as lichen sclerosus et atrophicus, atrophic scars, dermatitis atrophicans sclerodermiformis, facial hemiatrophy, Raynaud’s disease, and chronic dematomyositis with sclerodermiform skin lesions — sensory chronaxy was unchanged in the normal skin irrespective of whether or not it was in the lesions, where it depends on the degree of induration, thickness of the plaque and others.

Sensory chronaximetry is important also in evaluating the progress of the disease, since the indices grow before an impending relapse, but diminish when the tendency is one of regression. In subsiding circumscribed scleroderma (morphea) they become almost normal, which shows the disease has become totally inactive. In diffuse scleroderma they never return to the normal level, even though they may have been relatively low in the milder cases. This incidentally, also indicates that there is today no effective treatment for scleroderma.

Our investigations also show that circumscribed and diffuse scleroderma are essentially varieties of a single disease and not two different entities, even though circumscribed scleroderma never causes visceral involvement, is not associated with vasomotor manifestations of the type seen in Raynaud’s syndrome, and runs a relatively mild course frequently terminating in spontaneous recovery.
There are two parameters of tissue excitability — the rheobase and chronaxy. The rheobase is — as we all know — the minimum potential of electric current necessary to produce stimulation. Below this potential no stimulation is possible, irrespective of the duration of the current’s action. Chronaxy — just to restate the definition — is the minimum time at which a current double the rheobase causes stimulation. It defines the rate at which electric stimuli are propagated in the nervous system.

In our efforts to clarify the nature of the prolongation of sensory chronaxy in scleroderma, we administered to healthy subjects drugs acting on the nervous system at different levels, and registered the behaviour of sensory

![Graph 1](image1)

**Fig. 1.** Prolongation of sensitive chronaxy after sympathectomy. Ordinates: $\Sigma =$ chronaxy. $KV =$ rheobase. Abscissae: days after sympathectomy.

**Fig. 2.** Return of the chronaxy and the rheobase to the normal level 150 to 160 days after sympathectomy.

chronaxy. The starting point was provided by the fact that after sympathectomy, sensory chronaxy grows in the extremity as does the electric resistance of the skin, which — like in scleroderma — does not react to pilocarpine. These changes are fully reversible within several months (Fig. 1 and 2). Sensory chronaxy is likewise prolonged in a limb after novocaine blocking, and is so in the entire skin when 0.5% novocaine is given in 10 ml. intravenous doses, or 4% novocaine in 2 to 4 ml. intramuscular doses; here, the effect lasts up to six hours.

That chronaxy is controlled by the autonomic nervous system is shown by that it is prolonged by pendiomide and hexamethonium, which selectively block autonomic ganglia (Fig. 3).

The prolongation is fairly conspicuous, and persists several hours before the indices are entirely normal again. It needs to be noted that the rheobase, that is the threshold sensitivity, is unaffected by pendiomide (Fig. 4), but is distinctly lowered by sympathectomy, which means that sensitivity to stimuli is increased (Fig. 5).