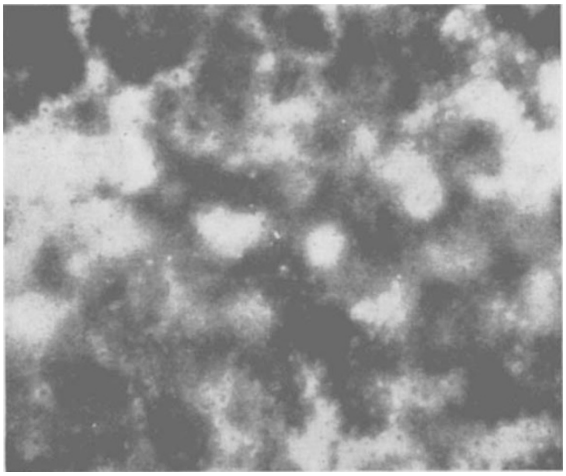

Fig. 2. Photomicrograph (× 500) of the same area as in Fig. 1, showing fluorescence with ultra-violet light. Note fluorescent circular and semi-circular areas in the matrix, and also fluorescence in isolated peritubular zones

areas showed a typical hypermineralized peritubular structure.

Since tetracycline is incorporated in tissue that is calcifying at the time of administration, the distribution of fluorescence in the matrix indicates that calcification occurs in a globular fashion. Furthermore, as the tubules with fluorescent peritubular zones are further from the pulp than the fluorescent matrix, this indicates that the laying down of the hypermineralized peritubular zone occurs at a later stage in dentine development than the mineralization of the matrix. This work tends to confirm earlier observations that the peritubular translucent zone is a manifestation of maturation of the dentine after the mineralization of the dentine matrix proper.

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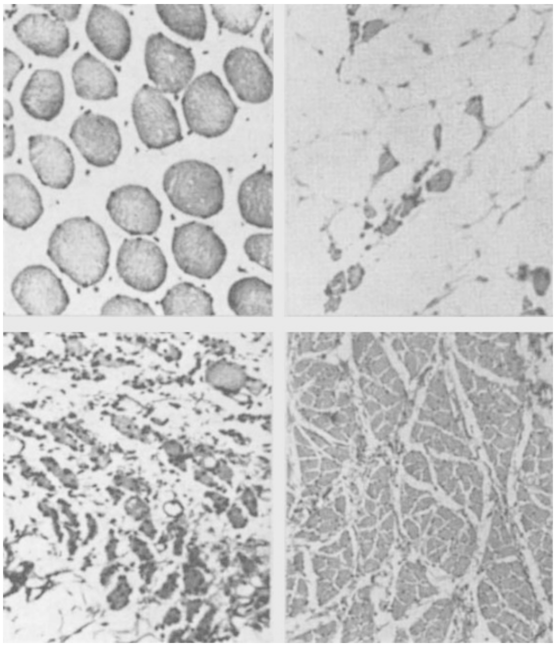
Morphological Changes in Red and Pale Muscles following Tenotomy

In recent experiments one of us[1] has shown that in rabbits the cutting of hind limb tendons produces changes in the pattern of electromyograph activity in a red muscle—soleus—at a time when no change in electromyograph activity can be observed in pale muscles. In conscious rabbits continuous electromyograph activity was recorded from the normal soleus, no matter whether the animal was standing, sitting, or jumping. After tenotomy no electromyograph activity could be recorded when the animal was sitting or standing. Only when the position of the animal was suddenly changed were short bursts of action potentials observed.

We have now carried out experiments to determine some of the structural changes accompanying these functional alterations. After cutting all the tendons around the ankle joint, the animals were killed at varying intervals after the operation, and cross-sections of the soleus and peroneus longus muscles were examined. It is known[2,3] that muscle fibres are only slightly reduced in size three months after tenotomy. In the experiments recorded here we were able to confirm this in the pale peroneus longus, whereas in the red soleus at a similar time after tenotomy most of the fibres have undergone complete degeneration, and those that remain are of very small calibre lying among a mass of fatty and fibrous tissue (Figs. 1 and 2). The degenerative changes in soleus are well advanced by the end of 2–3 weeks (Fig. 3).

1 2



3 4

Fig. 1. Normal soleus

Fig. 2. Soleus three months after tenotomy

Fig. 3. Soleus three weeks after tenotomy

Fig. 4. Soleus three weeks after tenotomy and spinal cord section. Apart from the atrophy due to cord section, there are no other degenerative changes

(All stained by Van Gieson. × *c*. 100)

This cannot be explained by suggesting that mechanical stretch is more important for maintaining the structural integrity of red muscles than of pale, as we have also found that when the spinal cord is sectioned at the same time as tendon section the degenerative changes in soleus are negligible (Fig. 4). The finding that much of the degenerative change in the tenotomized soleus can be prevented by simultaneous section of the spinal cord suggests that impulses from supraspinal structures are responsible for the dramatic changes seen in soleus following tenotomy.

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