confirmed (McConkey, Fraser, and Bligh, 1965). Furthermore, the skin of many patients is friable, resists shear stresses poorly, and may produce problems in wound healing. Previous studies on skin collagen in these patients have been confined to measurements of soluble or total content. However, although total collagen is reduced, particularly in patients receiving corticosteroids, measurements on the small soluble fraction (<5 per cent) have been inconclusive. The major fraction of skin collagen is polymeric collagen, and having developed methods of measuring quantities and stability of this collagen in biopsies (85 sq. mm.) of human skin, we have applied them to patients with rheumatoid arthritis (Francis and Macmillan, 1971).

So far 19 biopsies have been performed, including repeat biopsies in two patients after 6 months' penicillamine therapy. Compared with matched normal controls, a modest reduction in total skin collagen, particularly in patients on prolonged corticosteroid therapy has been confirmed. However, the stability of the polymeric collagen was not clearly altered by these drugs but was reduced in patients with active disease. With penicillamine, skin thickness and total collagen content were dramatically reduced. In addition, there was a reduction in collagen stability. In patients on corticosteroids there was an increased proportion of soluble collagen.

It will be suggested that important changes in collagen metabolism occur in these patients which may influence skin strength, integrity and wound healing (and perhaps renew interest in the 'collagen diseases').

**Discussion**

DR. B. McCONKEY (Birmingham) There is a distinction which is in danger of being lost between two different kinds of skin abnormality seen in patients with rheumatoid disease and sometimes in the elderly. One is the abnormality in which you get senile or steroid purpura and fragile skin, and the other is what we have called 'trans- parent skin' (McConkey, Fraser, Bligh, and Whiteley, 1963). Although patients with one tend also to have the other, I think the conditions are quite distinct and ought to be considered separately in studies of this sort.

DR. R. GRAHAME (London) One of your earlier slides suggested that there was no difference in total skin collagen in normal subjects and in patients who have not had steroids. This is different to the results of Shuster, Raffle, and Bottoms (1967).

DR. F. FRANCIS No, they showed in fact, that total skin collagen in patients with rheumatoid arthritis who had not been on steroid therapy was lower, but not significantly so.

DR. T. C. HIGHTON (New Zealand) Some years ago (Highton, 1963) I did some relevant work using the granuloma pouch system in rats and measuring the amount and weights of granulation tissue produced following injection of serum from rheumatoid and normal subjects. I also measured the strength of a standard wound. The results indicated that serum derived from patients with active rheumatoid arthritis, when injected into rats, leads to their producing significantly less new tissue in the granuloma pouches, and these rats had wounds of less tensile strength than those injected with normal serum or saline.
between the patient groups were demonstrated. The results may influence the surgical management of these patients.

Discussion

PROF. V. WRIGHT (Leeds) I am interested to know how you determine when the wound is healed.

DR. MOWAT We did not find this in the medical notes but on looking carefully through the nursing notes we found enough information.

MR. S. J. BURROUGH (Stoke Mandeville) What significance do you attach to separation? Is a separated wound a delayed healing wound as far as you are concerned?

DR. MOWAT It is a delayed healing wound, but we have assessed independently those that were infected and those that were just simply separated with the wound-edge gaping.

MR. S. J. BURROUGH But there were rather more separated wounds in the rheumatoid group?

DR. MOWAT Yes, there were 15 compared with 5 in the control group (P < 0.05).

DR. D. A. H. YATES (London) You mentioned vasculitis in passing and the possible effects on wound healing. How many of this group had active vasculitis and was this relevant?

DR. MOWAT Something like four or five of our seropositive patients had an overt vasculitis. They did not appear to run into any problems. Overall, it is very difficult to say when a patient has vasculitis or not and indeed, even whether the seronegative patient may really have a vasculitis. Certainly we could not detect any obvious difference between our seropositive or seronegative patients, and similarly no apparent association with the severity of the disease.

DR. A. J. POPERT (Droitwich) Serum proteins have been amply demonstrated to be a significant factor in wound healing (Rhoads and Kasinskas, 1942). The severity and activity of the disease is also an important factor and it is closely bound up with related parameters such as haemoglobin concentration and rheumatoid factor titre. All these factors operate adversely in patients with the more severe kind of connective tissue disease and particularly when the disease is active. Such patients with active disease are often anaemic or have disturbed serum proteins with elevated globulin and low albumin or are underweight; they undoubtedly carry a high incidence of wound infection. Treatment with corticosteroids influences wound healing adversely only if it is given in a dose high enough to produce obvious hypercorticism. When the dosage is optimal, there is an improvement in the general condition of the patient and a favourable change in the anaemia and serum protein concentrations with hypercorticism; there will then result an improved wound healing rate and a reduced incidence of infection. Comparable patients not treated with steroids will heal less well. On the other hand, if the dose of steroids is enough to produce the clinical signs of Cushing’s syndrome, then there will be a corresponding increase in the rate of wound dehiscence and infection.

Lymphocyte Sensitivity to Human Skeletal Muscle Antigen in Polymyositis. By M. M. ESIRI, B. L. HAZLEMAN, and I. C. M. MACLENNAN (Radcliffe Infirmary, Oxford)

Evidence has been accumulating which suggests that polymyositis may be due to a breakdown of tolerance to skeletal muscle. If this is so, lymphocytes should be sensitive to muscle and express this sensitivity by undergoing transformation in the presence of muscle in vitro. This hypothesis has been tested using a quantitative method of estimating blast transformation. Peripheral blood lymphocytes were separated from venous blood, suspended in tissue culture fluid, and incubated with varying concentrations of an homogenate of normal human muscle. Tritiated thymidine was added before taking the cultures down on the fifth day. The DNA was extracted and sampled in a liquid scintillation counter for the amount of incorporated tritium present. The amount of tritium incorporated by lymphocytes in the presence of muscle was compared with that incorporated in lymphocytes grown alone, the differences between these figures giving a measure of stimulation or inhibition produced by the muscle antigen. The results are seen in the