SENSITIZATION TO DENTURE MATERIAL AS A CAUSE OF ANGULAR STOMATITIS

BY

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Cracking of the angles of the mouth may be due to many causes. These vary from mechanical maceration by dribbling resulting from ill-fitting dentures to direct infection with monilia, staphylococci, or streptococci, and to that arising in association with vitamin deficiency, particularly in ariboflavinosis. I wish to draw attention to a further cause which is not generally recognized—fissure formation due to stomatitis caused by sensitization to denture material. Of nine cases of denture stomatitis I have seen during the last four years, in seven I was consulted because of cracks at the angles of the mouth, and only after direct questioning did these patients mention painful gums. All seven cases had been treated by local applications and by various vitamins without success, some of them for several years.

Stomatitis arising from sensitization of the buccal mucous membrane to the material of which dentures are made has been recognized for many years. Prinz and Greenbaum (1939) state that "rubber sore mouth" has been known ever since Thomas W. Evans, of Paris, introduced in 1844–5 vulcanite as a base for the construction of artificial dentures. The condition is mentioned in many of the standard dermatological textbooks, such as those of Sutton and Sutton (1939), Becker and Obermayer (1940), and Andrews (1946). Lain (1932) discussed briefly the basic constituents of dental plates and stated that probably the substance mainly responsible for the stomatitis is vermilion (mercury sulphide), which, in plates that have not been sufficiently hardened, is easily liberated on to the mucous membranes. Lindsay (1928) described glossitis occurring in a patient who was shown to be sensitive to a "plastic" type of denture by patch testing. Rattner (1936) described three cases of stomatitis due to sensitization to the newer plastic materials—two of which gave positive patch tests to the dentures strapped on to the arm for 48 hours. In the third case the patch test on the arm was negative, but Goldman and Goldman (1944) have shown that it is necessary in some cases to perform the patch test on the mucous membrane to demonstrate sensitivity, and they have devised a technique for doing this.

The patch tests in the cases described below were performed by taking scrapings from the denture which was suspect and leaving these moistened scrapings in contact with the skin of the upper arm for 48 hours. There was no difficulty in reading the results. A more spectacular way is to strap the whole denture on to the skin, but my patients did not wish to be without their teeth for a period of two days.

In addition to the cracks at the corners of the mouth, the one feature common to all the patients was redness and engorgement of the whole of the mucous membrane which came into contact with the denture. The sharp line between the red inflamed denture-covered part of the hard palate and the adjoining normal uncovered part was most striking. In some cases the mucous membrane of the cheek was also affected, and one case had superficial glossitis of the part of the tongue in contact with the denture. All have been cured by changing their type of denture.

Case Reports

Case 1.—A woman aged 31, seen on January 15, 1945, complained of having had cracking at the angles of the mouth for the previous six years; this started about six months after wearing a new denture. She had failed to respond to many different preparations. There was no history of previous trouble and her general health was good. On examination the cracking of the angles of the mouth was severe and there was redness and swelling of all the mucous membrane which came into contact with her dentures. The line of demarcation on the hard palate between the engorged mucous membrane and the normal-looking posterior part of the palate was very well marked. There was no history of previous skin disease or of any relevant past illness. The dentures were made of red vulcanized rubber, and a patch test performed with scrapings was strongly positive, blisters being formed on the skin of the upper arm after contact with the scrapings for 48 hours. She was advised to stop wearing her dentures and to have a "plastic" denture after first being tested with the plastic material to be certain that she was not also sensitive to that. She was seen again on April 12, 1945, when she was completely cured. In a letter dated July 30, 1949, she stated: "I have not had any recurrence of the trouble with my mouth and gums whatsoever."

Case 2.—A woman aged 46 was seen on January 7, 1946. She gave a history of cracking of the corners of the mouth for one month, and for a week before being seen she had mild dermatitis of the circumoral region, chin, and neck. She had worn "plastic" dentures for six years, and during this time often had ulcers of her gums. There was no previous history of skin disease. She had marked cracking of the angles of the mouth, with a dry scaling dermatitis of the circumoral region, the chin, and the anterior aspect of the neck. The mucous membrane in contact with the dentures was red and engorged, and showed the sharp line of demarcation described above. A patch test to the denture was strongly positive. She was advised to change to a vulcanite denture. On July 30, 1949, she wrote saying that she "had slight recurrence of the trouble about 12 months ago which quickly responded to treatment. Apart from this I have experienced no trouble whatsoever."

Case 3.—A woman aged 44 was seen on November 22, 1946. She had had cracks at the corners of the mouth for three years continuously in spite of various forms of treatment. She first had artificial teeth in 1938, and had since noticed soreness of her gums from time to time. On examination there were deep cracks at the corners of her mouth, and the mucous membrane showed the changes seen in the other patients. The dentures were made of red vulcanite, and a patch test was strongly positive. She was fitted with "plastic" dentures, and wrote in January, 1947: "I got my new plastic teeth on December 29, and am delighted to say the cracks in my lips have quite gone and my skin is clear. My mouth has lost its soreness and I am free from ulcers."

Case 4.—A woman aged 64 was seen on August 27, 1945. On January 1, 1945, she had an irritable rash on the central part of the face, involving the forehead, nose, mouth, chin, and neck. She also had noticed cracks at the angles of the mouth during this time. She had worn dentures for about 40 years. On examination she had dermatitis of the areas mentioned above, cracks at the corners of the mouth, and marked redness and swelling of the whole of the mucous membrane in contact with the dentures. The dentures were made of black vulcanite with red vulcanite at the gums. Patch tests to the black and red vulcanite, to lipstick, and to face powder were negative. The rash and cracking persisted in spite of treatment, and in April, 1946, she was asked to discontinue wearing her dentures. She left them out only at night, but even with this the condition improved. Eventually she was fitted with a plastic denture, and wrote to me on July 29, 1949, to say that she was perfectly well, with no trace of the trouble.

Case 5.—A man aged 74 had had cracks at the corners of the mouth for about four weeks when seen on October 12, 1948. He had worn dentures for about 30 years. In addition to the cracks there was redness and swelling of the buccal

mucous membrane. A patch test to dentures was strongly positive. He was fitted with "plastic" dentures, and when seen again on March 7, 1949, the cracks had gone and the stomatitis was cured.

Case 6.—A woman aged 39 came to the out-patient department on May 14, 1949, with an infected mole. Angular stomatitis had been present for five and a half years; she had worn vulcanite dentures for about six years, and examination revealed the characteristic redness of the denture-contact area. A patch test when first tried was negative, but when repeated a delayed positive result was obtained. She was fitted with new teeth and the cracks have now healed.

Case 7.—A woman aged 58, seen on July 30, 1949, had had cracks at the angles of the mouth for many years despite many different kinds of treatment. She has worn black vulcanite dentures for 35 years. The mucous membrane showed the characteristic appearance, and a patch test to the denture was strongly positive. She has now stopped wearing dentures and the condition is much better.

Comment

These cases establish the association between denture sensitization and angular stomatitis. It is of interest that all these patients were in the habit of keeping their artificial teeth in at night, and it is reasonable to postulate that such a practice leads more readily to the establishment of a contact sensitization. In view of the numbers of dentures worn this condition is relatively uncommon, but in all the above cases the gum sensitivity was discovered only by direct questioning and examination, so that probably many cases are missed.

REFERENCES

- Andrews, G. C. (1946). *Diseases of the Skin*, p. 816. Saunders, Philadelphia.
 Becker, S. W., and Obermayer, M. E. (1940). *Modern Dermatology and Syphilology*, p. 554. Lippincott, Philadelphia.
 Goldman, L., and Goldman, B. (1944). *Arch. Derm. Syph., Chicago*, 50, 79.
 Lain, E. S. (1932). *Ibid.*, 25, 21.
 Lindsay, H. C. L. (1928). *Canad. med. Ass. J.*, 18, 308.
 Prinz, H., and Greenbaum, S. S. (1939). *Diseases of the Mouth and their Treatment*, p. 346. Febiger, Philadelphia.
 Rattner, H. (1936). *J. Amer. med. Ass.*, 106, 2230.
 Sutton, R. L., and Sutton, R. L. (1939). *Diseases of the Skin*, p. 1484. Kimpton, London.

ANALGESIA INHALER FOR TRICHLOROETHYLENE

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Of the births in England and Wales 65% are supervised by midwives (Ministry of Health, 1946). In this circumstance the problem of the relief of pain is of lively interest to nearly half a million mothers a year, but is not easy of solution. The medical practitioner can choose the anaesthetic drug and vary its concentration to meet the requirements of any particular patient at any particular moment. The midwife, however, because of her limited training in anaesthesia, is at present restricted to apparatus set automatically to deliver 50% nitrous oxide and 50% air. This apparatus of Minnitt's (1938) has proved safe, but complaints are common that it is cumbersome, and in some hands the relief from pain it affords is disappointing. This may in some degree be attributable to the fact that the female is not mechanically minded, and gas-and-air apparatus does

indeed need a modicum of attention from time to time. Whether more latitude should be allowed to midwives in the way of new apparatus and drugs is a serious question. Increased relief from pain is easily achieved by raising the percentage of any anaesthetic vapour inhaled, but, quite apart from any noxious effect this may have on the foetus, it carries with it the possibility that unconsciousness and its many attendant dangers may be produced in a susceptible patient; and it must be faced that the midwife is not adequately trained to meet such a situation. With this limitation in mind work is being carried out at various centres with the object of providing better relief of pain with apparatus as safe as Minnitt's, which has rendered such useful service for the past 15 years, but more portable and less likely to present technical difficulties to midwives.

There seems to be a widespread opinion that trichlorethylene is a good analgesic agent; when carefully given it affords very considerable relief of pain without markedly impairing consciousness. In 1943 Freedman introduced a small inhaler for trichlorethylene which, under certain conditions at any fixed ambient temperature, delivers a substantially constant concentration of vapour. This inhaler proved highly convenient and successful in some hands—so much so that on the recommendation of the Anaesthetics Committee of the Royal College of Obstetricians and Gynaecologists extensive clinical trials were carried out at various hospital centres to discover whether the apparatus was suitable for use by midwives in domiciliary practice (Royal College of Obstetricians and Gynaecologists Annual Report, 1947). As a result of these trials the committee reluctantly decided that the apparatus was not satisfactory, and this view was supported by laboratory tests which showed that, even if the apparatus is kept still, the concentration of vapour in the inspired air increases by 60% for a temperature rise from 20 to 30° C. Furthermore, marked fluctuations in concentration result from filling, shaking, or tilting the inhaler.

Constant Vapour Concentration

Before discussing the design of trichlorethylene inhalers delivering a substantially constant vapour concentration, the question naturally arises whether any fixed concentration of this drug in air would improve on the relief from pain afforded by the Minnitt gas-air apparatus and yet not be dangerous.

Special trichlorethylene inhalers in which the concentration could be varied at will in accurately known steps were handed over to our colleague Dr. E. H. Seward, and his observations (1949) suggest strongly that: (a) A trichlorethylene concentration of 0.5% v/v in air can be inhaled intermittently during labour over long periods. (b) After about three hours a slight cumulative effect may become noticeable in some patients. If in these cases the concentration is now reduced to 0.35% v/v this tendency is halted. (c) A very large proportion of patients prefer this method of pain relief to that afforded by gas and air.

In the design of apparatus to deliver a constant concentration of vapour of an anaesthetic liquid one of the main difficulties to be overcome is the effect of variation of vapour pressure with temperature. This can be obviated either by keeping the anaesthetic liquid in a thermostat, as for example in the Oxford vaporizer, or by introducing a compensating device which, for any rise in temperature, reduces the amount of vapour leaving the vaporizing chamber. The latter method was adopted by Goodman Levy (1905) in the design of his chloroform inhaler. During the last war this department was asked to produce a dosimetric chloroform inhaler for paratroops. The resultant