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THE PROBLEM OF OTITIS EXTERNA

BY

CHARLES KEOGH, M.B., F.R.C.S.

AND

BRIAN RUSSELL, M.D., F.R.C.P.

From the London Hospital

Otitis externa is a form of dermatitis, either confined to the external auditory meatus or extending on to the concha or even over the whole pinna.

The external auditory meatus and pinna usually remain free from disease throughout life, the skin being able to keep itself healthy provided it is not damaged. The skin of the concha contains many sebaceous glands but no sweat glands, whereas the skin of the outer third of the meatus is well supplied with hairs, sebaceous glands, and modified apocrine sweat glands. The opening is only 7–8 mm. in its greatest diameter, and will not admit even the little finger. The hairs at the orifice are protective, like those in the vestibule of the nose.

Cerumen (wax) is a mixed accumulation of the products of sebaceous glands and modified apocrine sweat glands. It acts as a lubricant, as a bactericidal agent, and as an adhesive to prevent the entry of foreign bodies. The glomeruli and ducts of the apocrine glands have an inner layer of secretory cells and an outer layer of contractile myoepithelial cells.

Sebaceous glands are not under direct nervous control, but apocrine glands respond to sympathomimetic agents and to strong emotional stimuli of pain or fear (Shelley and Hurley, 1952, 1953). The action is believed to be a mixed one of contraction of the muscular elements and reduced reabsorption from the ducts (Ackermann, 1939). Lobitz and Campbell (1952) state that hypersecretion of the apocrine glands occurs in some patients with otitis externa. The ceruminous glands secrete and also sweat. The secretion is a slow, continuous, and

barely noticeable process. The sweat consists of drops of white fluid which are discharged on the surface by contraction of the myoepithelial sheath. Mechanical stimuli, adrenaline, severe pain, or fear, all cause emptying of the glands (Shelley and Perry, 1956). Qualitative and quantitative changes in the production of apocrine sweat can result in obstruction of the ducts by horny material, which may produce itching (Weddell, 1948). Trauma, with or without itching, is clearly the precursor of otitis externa.

The skin of the inner two-thirds is thin, with only a narrow band of collagen fibres between the epidermis and the periosteum. Hairs and glands are inconspicuous or absent. In healthy ears it is most unusual to see dust particles on the skin of this portion of the canal. Scratching the meatus, syringing the ear, blast injuries, swimming, or even washing the hair can carry dust, organic matter, or chemicals beyond the hairy barrier, but the barrier of hair and cerumen is a most efficient filter under all ordinary circumstances. Healthy wax travels slowly out of the meatus, like a glacier, carrying foreign bodies with it. The movements of the mandible probably help this mechanism. It is uncertain how dust particles and desquamated cells are removed from the skin of the inner part of the canal. They probably become embedded in the wax by gravity—for example, in the lower ear when sleeping.

Bacteriology of the External Ear in Health and Disease

Stewart (1951) made a bacteriological study of 104 apparently healthy external auditory meatuses. There were 34 sterile cultures, 62 cultures of saprophytic organisms, 6 of *Staph. pyogenes*, and 2 of *Bact. coli*.

We have each made clinical and bacteriological examinations of 50 patients attending our departments with otitis externa. In 43 of the otologist's patients the inflammation was confined to the meatus and in the remainder there was some dermatitis of the adjacent concha. In the dermatologist's patients there was usually both meatitis and dermatitis of the concha or even of the whole auricle. It so happened that each examined 24 males and 26 females, but the two series were independent of one another. The ages of the patients are shown in Table I.

TABLE I

	Otologist's Patients	Dermatologist's Patients	Total
Up to 9 years	1	1	2
10–19	7	1	8
20–29	15	6	21
30–39	5	8	13
40–49	14	11	25
50–59	5	15	20
60–69	3	6	9
70–79	0	2	2

TABLE II

	Otologist's Patients	Dermatologist's Patients	Total
<i>Staph. pyogenes</i>	10	13	23
<i>saprophyticus</i>	—	2	2
<i>Ps. pyocyanea</i>	—	2	2
<i>Pr. vulgaris</i>	—	2	2
<i>B. aerogenes</i>	1	—	1
<i>C. albicans</i>	1	—	1

Pure cultures were obtained from 31 patients (Table II). In the 69 mixed infections sometimes two and sometimes three different pathogenic organisms were recovered.

The total bacteriological findings from the 100 patients are shown in Table III. These organisms can be classified, so far as the skin is concerned, in three main groups—namely, pathogenic cocci, intestinal pathogens and sapro-

TABLE III

Organism	Otologist's Patients	Dermatologist's Patients	Total
<i>Staph. pyogenes</i> ..	35	40	75
<i>Str. haemolyticus</i> ..	5	8	13
<i>Pr. vulgaris</i> ..	11	15	26
<i>Ps. pyocyanea</i> ..	6	10	16
<i>Str. faecalis</i> ..	6	8	14
<i>Bact. coli</i> ..	5	5	10
<i>Paracolon bacillus</i> ..	0	1	1
<i>B. aerogenes</i> ..	1	0	1
Gram-negative bacillus (of uncertain classification)	0	3	3
Diphtheroid ..	19	3	22
<i>Staph. saprophyticus</i> ..	10	9	19
<i>Pneumococcus</i> ..	1	0	1
<i>Micrococcus</i> ..	0	2	2
<i>B. subtilis</i> ..	1	0	1
<i>Str. non-haemolyticus</i> ..	1	0	1
" <i>viridans</i> ..	1	0	1
<i>C. albicans</i> ..	2	1	3
	104	105	209

TABLE IV

	Otologist's Patients	Dermatologist's Patients	Total
Pathogenic cocci ..	40 (38.5%)	48 (45.7%)	88 (42.1%)
Intestinal pathogens ..	29 (27.9%)	42 (40.0%)	71 (34.0%)
Saprophytes and facultative pathogens ..	35 (33.6%)	15 (14.3%)	50 (23.9%)

TABLE V

	Otologist's Patients	Dermatologist's Patients	Total
Pathogenic cocci alone ..	22	15	37
" " and intestinal organisms ..	15	19	34
Intestinal organisms alone ..	9	13	22
Facultative pathogens and non-pathogens ..	4	3	7

phytes, or facultative pathogens, including *C. albicans*. The figures and percentages for these three groups are shown in Table IV.

The only significant difference between the two groups of patients was the relatively heavier infection with cocci and, particularly, with intestinal organisms of the dermatologist's patients.

The organisms recovered from individual patients are shown in Table V.

In 56 of the 100 patients examined the ears were contaminated with intestinal organisms (32 of the dermatologist's patients and 24 of the otologist's).

In 14 of the dermatologist's patients nasal swabs were taken in addition to aural swabs. In six of these patients staphylococci recovered from the nose had a pattern of susceptibility to antibiotics identical to that of staphylococci recovered from the meatuses: in the other eight patients either the antibiotic susceptibility tests indicated different strains of staphylococci in the two situations or different species of organisms were recovered. This suggests that infections of the external ear often come from sources other than the nose.

In a series of 27 patients with widespread infections and otitis externa (including four in the present series) cultures have been made from the ears and elsewhere. The patterns of infection are similar but with a greater proportion of intestinal organisms in the ears (Table VI).

Jamieson (1946) expressed the view, with which we agree, that mycotic otitis externa is extremely uncommon in the British Isles. There were three patients from whom

TABLE VI

	Ears	Elsewhere
Pathogenic cocci ..	57.9%	72.4%
Intestinal organisms ..	26.3%	18.6%
Saprophytes ..	15.8%	6.0%
No growth obtained ..		3.0%

C. albicans was recovered in our series, one in pure culture. All of these patients had been treated with antibiotics before the cultures were made. Fungi are often found in otitis externa when it occurs in hot, humid climates, but they are not common pathogenic fungi. Syverton *et al.* (1946) and Salvin and Lewis (1946) found aspergilli, strains of actinomyces, and monilia. The fungi were usually found with bacteria, but in 2 out of 72 of Syverton's patients and in 8 out of 100 of Salvin's patients fungi were found alone. Both of these authors found pseudomonas the predominant organism and far commoner than pathogenic cocci. In more temperate climates Friedman and Hinkel (1941) and Birrell (1945) also found pseudomonas infections most common, while Daggett (1942) mentioned *Pr. vulgaris* as often being present. McLaurin (1954), from cultural studies of 157 patients in the United States, found cocci in 69, Gram-negative organisms in 55, mixed infections in 32, and *C. albicans* in 1. Of the Gram-negative organisms 21 were pseudomonas, 11 were paracolon bacillus, 9 were *Pr. vulgaris*, and 14 were unspecified.

Killinger *et al.* (1954) reported a case of otitis externa from which a pure culture of *Salm. florida* was obtained. One of us has recently seen a patient from whose ear Friedländer's bacillus was recovered.

Pseudomonas is dependent for its existence on the products of proteolysis and often establishes a foothold in the tracks of preceding proteolytic invaders such as coagulase-positive staphylococci and haemolytic streptococci.

A study of the types of skin conditions from which intestinal organisms are often recovered has been made by collecting 100 consecutive bacteriological reports of this nature obtained from patients attending the skin department. There were 29 from otitis externa, 29 from areas of infective (flexural) dermatitis, 22 from ulcers and infected dermatitis on the legs, 11 from paronychia, 6 from nasal vestibulitis, and 3 from conjunctival infections. It is a significant pointer to the means of transmission that 49% were either orificial or digital infections.

Story (1954) has shown that proteus infections are usually autogenous. This is also probably true for infections with other intestinal organisms.

Comments on Bacteriological Findings

Otitis externa is an infective condition usually caused by pathogenic cocci or by intestinal organisms. The staphylococcal infections may arise from organisms already present in the ear, or the organisms may be transferred on the fingers from the nostrils, from boils, folliculitis, ulcers, or areas of infective dermatitis. Brodie *et al.* (1956), as a result of serological typing of staphylococci and antibiotic sensitivity tests, conclude that in hospital practice the faecal carrier of staphylococci plays a more important part in communicating staphylococcal diseases than has previously been realized. Faecal carriage of staphylococci, if accompanied by pruritus ani or when hygienic standards are poor, may well play a prominent part in the dissemination of cutaneous infections. The figure mentioned above of 56% of cases contaminated from the anal region does not include the possibility that some of the staphylococcal infections (37%) may also have come from the intestinal tract. In 14 patients infected with staphylococci, cultures were made from the ear and from the nose. In eight of these the strains recovered from the ear were different from those recovered from the nose. Some of these organisms may have originated from the intestinal tract. Streptococci may be conveyed from areas of pyoderma, from the nasopharynx, or from the anal region. The intestinal organisms can reach the ears only by digital transference from the anogenital region. Once the organisms are transplanted to the meatus, the chance of survival of all except the streptococci is excellent. Once infection has occurred the meatus itself becomes a reservoir of infection, forming as it does a test-tube-like canal containing a selective culture medium favouring certain organisms.

Burtenshaw (1948) has shown that while ethereal and alcoholic extracts of cerumen are strongly bactericidal to *Str. pyogenes*, *Str. viridans*, and *C. diphtheriae*, they are harmless to *Bact. coli* and *Bact. typhosum*. Some strains of *Staph. aureus* and *Staph. albus* are partly sterilized; others are unaffected.

Clinical Appearances in Type of Case Usually Seen in an Aural Department

The signs are usually confined to the meatus. Sometimes the skin inside is greatly thickened, narrowing the passage considerably. Around the opening there may be fissuring, scaling, redness, oedema, or even bleeding. Occasionally cellulitis, or even a furuncle, may be present, making the meatus very tender to the touch.

Usually, however, there is no thickening of the skin of the meatus to be seen. The patient complains mainly of irritation, which is often severe and distressing because of the inaccessibility of its source. With an auriscope the walls of the meatus are seen to be coated with moist exudate. This may be any colour from yellowish white through every shade of grey. It may be very profuse and it may completely fill the lumen. There is sometimes a very unpleasant odour, particularly if *Bact. coli* or other Gram-negative organisms are present. Pigmented cerumen is often absent. The tympanic membrane usually shows loss of translucency, with oedema. In uncomplicated cases there is no involvement of the middle ear. In some cases there is no exudate to be seen, but shreds of desquamating epithelium hang from the meatal walls. Sometimes collections of dry, darkly pigmented wax are seen adhering to the walls or lying loosely in the meatus.

All these appearances are evidence of degrees or stages of dermatitis.

Clinical Appearances in Type of Case Usually Seen in a Dermatological Department

There may be one or more of the following: meatal furunculosis, impetigo, diffuse seropurulent exudation (Fig. 1), dirty grey scaling (Fig. 2), with or without some degree of redness and lichenification of the auricle; and fissuring (Fig. 3) within the hairy meatus or at folds on or around the ear. The meatus may be narrowed by inflammatory swelling of the skin.

It is not possible to identify the types of infecting organisms from the local physical signs. It is true that furunculosis or impetigo indicate coccal infections; but

Pr. vulgaris or *Ps. pyocyanea* may also be present. The flora from exuding, scaling, or lichenified ears may consist of cocci, Gram-negative organisms, or both.

Skin Diseases Accompanying Otitis Externa

Ten of the otologist's patients suffered from pruritus ani. The presence of skin lesions elsewhere was recorded in three patients. In one patient the otitis externa followed syringing of the ear canal.

Forty of the dermatologist's patients had skin conditions elsewhere, infective or itchy, or both, as follows:

Infective conditions	27
Infective flexural dermatitis	14
Folliculitis barbae	4
Furunculosis	3
Infected finger	1
Chronic paronychia	1
Nasal vestibulitis	2
Purulent rhinorrhoea	1
Impetigo	1
Itchy conditions	17
Lichen simplex (nuchal 3, of limbs 3, vulval 1)	7
Pruritus ani	4
" capitis	2
" vulvae	1
Cheilitis	1
Pompholyx	1
Erythrodermia	1
Other conditions, sometimes itchy	4
Psoriasis	3
Lupus erythematosus	1

In one patient the otitis externa followed syringing of the ear canal, and in another patient it followed a blow on the ear.

Comments on Dermatological Findings

The term "infective dermatitis" includes some cases of the condition designated by Brown (1948) "pityriasis amiantacea," in which diffuse asbestos-like scaling is present on the scalps of women, mostly over 40 years of age. The condition is accompanied by severe itching of the scalp and on other parts of the skin, particularly the neck, forearms, and thighs. Brown regarded the whole condition as a neurodermatitis, the scaling being secondary to friction and some degree of infection. He emphasized that neurodermatitis may be localized to the concha and the external auditory meatus. A psychogenic mechanism which may cause this itching has been referred to above.

The case labelled "cheilitis" was the only instance of apparent causation of the otitis by chemical contact. The patient had been using liquor chloroxylonolis ("dettol") as an antiseptic on the mouthpiece and ear-piece of her telephone. In addition to the cheilitis, the ear most commonly

FIG. 1.—Exudative otitis externa due to mixed infection with cocci and Gram-negative organisms.

FIG. 2.—Otitis externa with pityriasis amiantacea of the adjacent scalp. (Infected neurodermatitis of the ear and scalp.)

FIG. 3.—Scaling of the concha, narrowing of the meatus, and fissuring in otitis externa.

used for telephoning was more severely affected than the other. It is interesting that chloroxylenol, according to Martindale's *Extra Pharmacopoeia* (23rd ed., vol. 1, p. 841), "is active against streptococci, but much less so against staphylococci, and is almost inactive against *Pseudomonas pyocyanea* and *Proteus vulgaris*."

Pathogenesis

We believe that the underlying causes of otitis externa, in their sequence of operation, include the following:

1. There is sometimes a dysfunction of the ceruminous glands, leading to a qualitative or quantitative abnormality of the delivery of cerumen on the surface. This abnormality may be confined to the cerumen, but it may also affect the delivery and spread of sebum elsewhere on the skin, when it results in the more general condition of infective ("seborrhoeic") dermatitis. Emotional disturbances often play a significant part in the production or aggravation of this abnormality.

2. The cause of the itching is obscure. An abnormal secretion and an accompanying desquamation of the epithelium may be observed, but itching of the meatus, like anogenital pruritus, may also occur without visible change in the skin. The sudden emptying of the ceruminous apocrine glands in states of fear or pain may well be relevant, as also may be their emptying after the mechanical stimulus of scratching.

3. Scratching with the finger-nail or sometimes with a match, hair-pin, or paper-clip leads to abrasions of the epidermis or to fissures involving the dermis. The resultant serous exudate makes an excellent culture medium for micro-organisms, and it inhibits the bactericidal action of the lipoids. The moisture also encourages bacterial growth. Organisms are conveyed on the finger-tips from reservoirs of infection (paronychia, boils, folliculitis, infective dermatitis, etc.) to the ears, or from carrier sites elsewhere on the body, particularly the nasal vestibule, the nasopharynx, the eyes, and the anogenital region. An abnormality of the cerumen need not necessarily be present. Habitual fingering of the meatus or inexperienced syringing of the canal may make a break in the surface and provide a portal of entry for micro-organisms. Syverton *et al.* (1946) found an unusual incidence of ear-picking among 50 patients with otitis externa, but they could find no relationship to swimming or to any abnormal anatomical configuration of the ear canal. The use of unsuitable liquids for loosening wax is also sometimes responsible. Discharges from the middle ear are rarely the cause of otitis externa, and then only because of some complicating factor such as the use of antibiotics without bacteriological control or of some sensitizing substance which causes eczematization and scratching.

4. Climate plays a contributory part: otitis externa is most common in hot and humid areas; rarer in cold dry climates (McLaurin, 1954).

5. There is a predisposition to otitis externa in individuals with itchy or infective dermatoses elsewhere on the body, because transference of pathogenic organisms is more likely to occur.

6. It is exceptional to find any relationship between otitis externa and anaemia, avitaminosis, metabolic disorders, or endocrine imbalance. Evidence of a contact chemical causation is also rare, excepting contact dermatitis medicamentosa from the use of sensitizing substances, particularly antibiotics and sulphonamides. Post-auricular dermatitis, on the other hand, is sometimes caused by hair dyes, dyed nylon hair-nets, spectacle frames, and perfumes.

7. Occasionally otitis externa is superimposed on some other skin disease affecting the meatus and concha, particularly psoriasis, lichen simplex, erythrodermia, and lupus erythematosus. Post-auricular dermatitis of infective, lichenified, or mixed type may coexist.

8. Baird and Gaulton (1952) have suggested that otitis externa is related to allergy to bacteria or their products. Sensitization to chemicals and bacteria may develop on the skin of the ear, but we believe that this is entirely a second-

ary matter and that the essential cause of otitis externa is the transference of organisms from other sites on the body to the meatuses and their inoculation by scratching or by other injuries to the skin.

Prevention

The prevention of otitis externa depends above all on maintenance of the integrity of the meatal skin. Habitual fingering of the meatus, digital or instrumental scratching, unskilful syringing, or unsuitable local applications must all be avoided. The risk is greatest when the standard of personal hygiene is low: hence, no doubt, the high incidence of otitis externa among Service personnel under active service conditions—one-quarter of all aural cases in the Army overseas, or one-sixth of all E.N.T. patients (Birrell, 1945).

Although they may look and feel sound, many toilet papers are in fact pervious and give a false sense of security.

Prevention may be summarized as: (1) wash the hands after defaecation; (2) keep the finger-nails short and the nail-folds clean; (3) have effective treatment for any co-existing itchy or infective skin condition; (4) try to control the urge to scratch the ear; and (5) when washing the hair or bathing, a pad of cotton-wool worked up in lanolin or face-cream will lessen the risk of contamination due to water getting into the meatuses.

Treatment

Treatment of the meatus differs from that of dermatitis of the concha, pinna, and its surrounding skin only in that the meatal skin is difficult of access. Exudate tends to collect in the meatus, and care has to be taken not to injure the delicate tympanic membrane.

Treatment should aim at re-establishing the natural protective mechanisms of the skin, destroying the organisms responsible for the infection, controlling the itchiness, and preventing further trauma and bacterial contamination. The absence of lipoids and the presence of exudate encourage bacterial growth. Olive oil, almond oil, and lanolin make the best available substitutes for sebum. Treatment by repeatedly coating the skin of the meatus with olive oil and gently rubbing lanolin into the skin at the meatal opening is of the greatest assistance.

The patient is told how to make cotton-wool twists on thin wooden applicators. The hands are first washed. A small piece of cotton-wool is teased out until it is almost possible to see through it. The end of the wooden applicator is placed on the flat piece of cotton-wool so that about half an inch of cotton-wool extends beyond the end of the applicator. The cotton-wool is twisted firmly on to the end of the applicator in such a manner as to leave about half an inch of cotton-wool twist extending beyond the end of the applicator. The cotton-wool extension should not be much thicker than the thin wooden applicator. This is important, because if it is too thick the cotton acts as a piston in the meatus. The patient holds the pinna gently but firmly out from the head with the other hand, and introduces the cotton-wool twist, which has been dipped in olive oil and is now firmly attached to the thin wooden applicator, into the meatus. The oiled cotton is wiped round the walls, and then removed and burnt with its attached piece of wooden applicator. The ear is cleaned in this way until the meatus is quite clear of discharge and loose scales. Provided the cotton-wool twist extends well beyond the end of the wooden applicator, there is no danger of injury to the tympanic membrane. The oil treatment is continued until the ears cease to irritate, but is restarted if irritation returns. It is particularly important to carry out this treatment about an hour before bedtime. If the ears itch during the night, the meatuses are cleaned and oiled afresh. Many cases clear up with oil treatment alone.

When infection is conspicuous, as shown by crusting, exudation, boils, greasy scaling, or fissuring, meatal cultures should indicate the appropriate antibiotic or bactericidal agent. A word of warning is necessary against the hazardous use of antibiotics without bacteriological investigation.

Two or more types of organisms may be present with different antibiotic susceptibilities. Thus, in one patient a faecal streptococcus was present, sensitive only to streptomycin; *Proteus*, sensitive only to chloramphenicol; and a staphylococcus which was insensitive to chloramphenicol. In these circumstances the use of a single selective antibiotic may make matters worse by removing one type of organism and so facilitating the growth of others. It may be better to reduce the whole mass of infection by the use of a quaternary ammonium compound such as cetrimide or domiphen bromide for cleaning the meatus. The alternative is to use a suitable combination of antibiotics.

In infections due to one organism or organisms with similar antibiotic susceptibilities, various antibiotics, at one time or another, have their uses. The tetracyclines, chloramphenicol, neomycin, and polymyxin-B sulphate are most favoured, the last-named being effective against *Ps. pyocyanea* (Farrar, 1954). A French antibiotic, soframycin, now under trial, which is active against staphylococci, pseudomonas, proteus, and to a less extent against streptococci, seems to have a promising future. The use of sulphonamides, streptomycin, or penicillin is inadvisable because of the tendency of these substances to sensitize the skin.

In order to prevent patients developing a sensitivity to valuable systemic antibiotics, it is inadvisable to use them for local application, and, where possible, antibiotics should be used which are not normally employed systemically. The risk is also avoided of the emergence of strains resistant to antibiotics used systemically. In this respect, neomycin and polymyxin-B are useful, and soframycin also seems most promising.

A large mass of dry wax cannot be removed from the meatus with the oil treatment. From time to time various preparations containing benzene are advocated as efficient solvents of dry cerumen. They are good solvents, but they tend to enter the ducts of the secreting glands and may damage them. As the skin glands are probably at fault in any case, it is unwise to risk damaging them further. It is often the safest course to use the syringe to remove wax when the tympanic membrane is intact. It is advisable to instil oil into the meatus daily for several days before syringing. The patient lies with his meatus filled with oil for five minutes and then mops up the excess on rising.

The patient is informed of the commoner sources of infection and is instructed in the need for adequate personal cleanliness. The nasal vestibule may also have to be treated if bacteriological investigations indicate that it is the probable source of contamination. The nasal vestibule is naturally contaminated by air-borne organisms and may also be contaminated from other parts of the body by the fingers. Any itchy, infected, or eroded skin lesions on other parts of the body should receive treatment at the same time. The hands and nails must be kept clean and the nails kept short. Investigation should be made to uncover any underlying anxiety state. Everything possible must be done to prevent scratching of the meatus and contamination by the fingers. In difficult cases 1% hydrocortisone ointment, applied twice daily, is often highly effective as an anti-pruritic application. It can also be applied in combination with the appropriate antibiotic, usually a tetracycline, neomycin, polymyxin-B, or soframycin. An evening dose of a barbiturate or of promethazine hydrochloride is often advisable while the itching persists.

Summary

Otitis externa is an inflammatory condition of the meatal and auricular skin, usually caused by pathogenic cocci, by intestinal organisms, or by both.

The reservoirs of infection include the hairy vestibule of the nose, staphylococcal folliculitis and furuncles, paronychia, areas of infective dermatitis, and the anogenital region, particularly when anal or genital pruritus exists.

Prevention depends on avoidance of digital transference of organisms from these foci of infection. A high standard of personal hygiene is essential, particularly with regard to washing the hands after defaecation.

Treatment consists in eliminating the infective state, treating any associated skin disorder elsewhere on the body, restoring the natural protective mechanism of the meatal skin, removing irritating detritus, and relieving any persistent aural pruritus with local and systemic remedies.

It is undesirable for persons with otitis externa to be employed in the preparation, manipulation, or sale of food.

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EFFECTS OF SQUATTING ON THE NORMAL AND FAILING CIRCULATION

BY

E. P. SHARPEY-SCHAFFER, F.R.C.P.

Professor of Medicine, University of London
 (From the Department of Medicine, St. Thomas's Hospital
 Medical School)

Methods of changing the effective filling pressure of the heart have been used to study baroreceptor reflexes in man and the differences in response between the normal and failing circulation (Sharpey-Schafer, 1953, 1955a, 1955b). It is a relatively simple matter to decrease filling pressure: venesection, the Valsalva manoeuvre, and tipping into the erect posture are effective methods. It is more difficult to increase filling pressure. Large rapid intravenous infusions can be given safely to normal subjects but not to cases of heart failure; and there has been no simple method available for causing an increase over a few seconds.

Work on the mechanism of certain forms of syncope (Howard *et al.*, 1951) suggested that the squatting posture might provide such a method, with the additional advantage of rapid reversal in cases with heart failure.