

## NEEDLE-LIKE SUBTARSAL FOREIGN BODIES

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Needle-like foreign bodies penetrating the tarsal plate, with a projecting end causing irritation of the cornea, are familiar to most oculists, who probably see several cases every year in private or hospital practice. Somewhat surprisingly, I have not seen any reference to this condition in several of the standard ophthalmology textbooks. Probably for this reason, this clinical entity is not as well known as it might be. The microscopic appearances and properties of the collection of foreign bodies illustrated in this article indicate and explain the clinical effects.

The foreign bodies were found driven into the back surface of the upper or lower eyelid with a small projection scraping the cornea. They varied between 0.5 and 1.5 mm. in length and were about as thick as a cat's hair. Fig. 1 indicates typical positions and sites in which they have been found in different patients.

The clinical picture is logical and is similar to that caused by ordinary subtarsal foreign bodies. The patient complains of watering of the eye, with intense irritation and sometimes a sharp pricking sensation on blinking. The cornea is scarified by linear abrasions resulting from movements of the eye and lid. The site of the foreign body may or may not be marked by an area of congestion in the palpebral conjunctiva. A little oedema in the conjunctiva may engulf and hide the projecting end, with relief of symptoms. When the oedema subsides, possibly as the result of treatment, re-exposure of the foreign body may occur, with return of irritation. Its position is further indicated by the most abraded portion of the cornea. When this is in the lower quarter (Fig. 2) the foreign

body is likely to be in the upper portion of the lower tarsal plate. When most scratch marks are in the upper segment of the cornea (Fig. 3), the irritant is probably in the middle level of the upper tarsus. Presenting virtually in cross-section, these foreign bodies are usually invisible without the aid of a slit-lamp microscope. They are thin enough to pass between sensory nerve endings and so may cause no pain or reactionary congestion in the eyelid, presumably from lack of antidromic impulses and minimal disturbance of the embedding tissue. It is the scraping of the cornea that causes the symptoms. In this it differs from ophthalmia nodosa, in which local lesions are caused by caterpillar hairs in the conjunctiva or cornea.

The foreign bodies were too small to be grasped by forceps and were removed by stroking with a needle under magnification by the corneal microscope. Most were picked up in a drop of tear fluid and mucus after being dislodged from the tissues. In conveying the foreign body to the laboratory the mucus usually dried to form a tough encasement from which the specimen was removed by dissection under a binocular microscope, with varying success. The specimens have been photographed under high power in canada balsam under a cover slip (Plate I). Many have been photographed in a bed of mucous detritus from which isolation was not possible. Many were lost in the breeze or from an incautious exhalation.

The physical properties required in theory to produce such clinical effects are to be found in these specimens in fact. They are light enough and small enough to be airborne. One patient felt the irritation first in a boat sixty

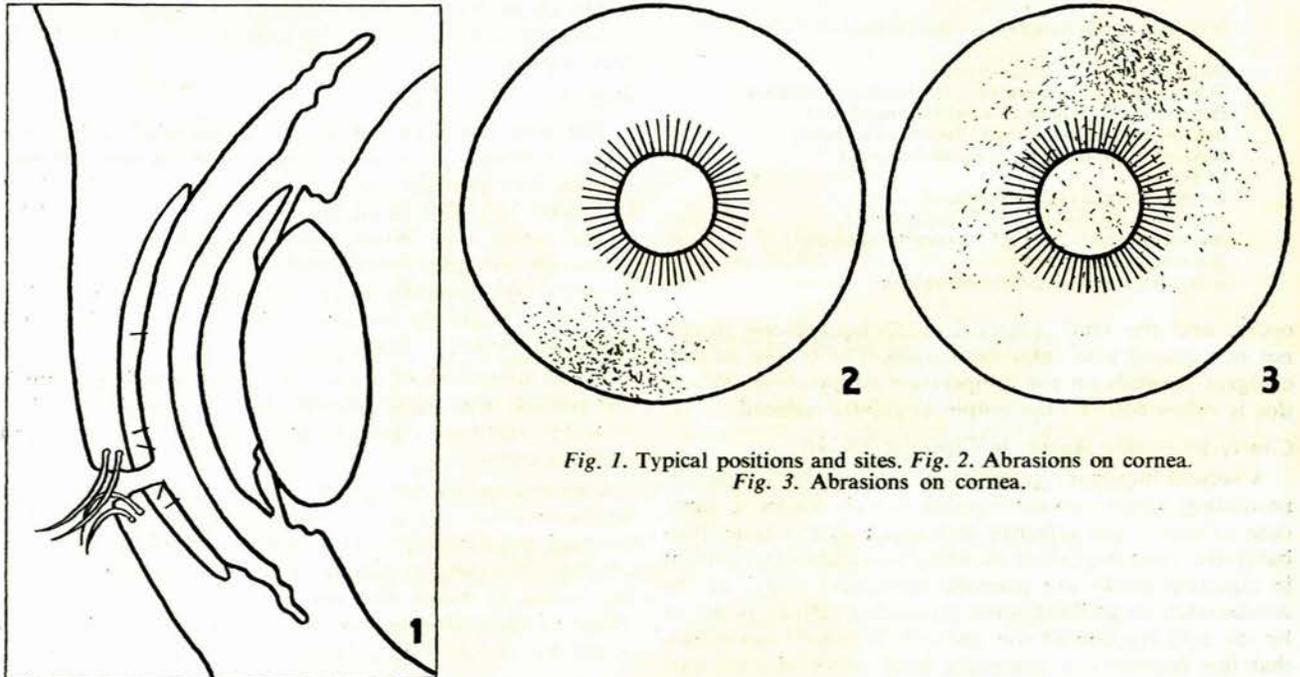


Fig. 1. Typical positions and sites. Fig. 2. Abrasions on cornea.  
Fig. 3. Abrasions on cornea.

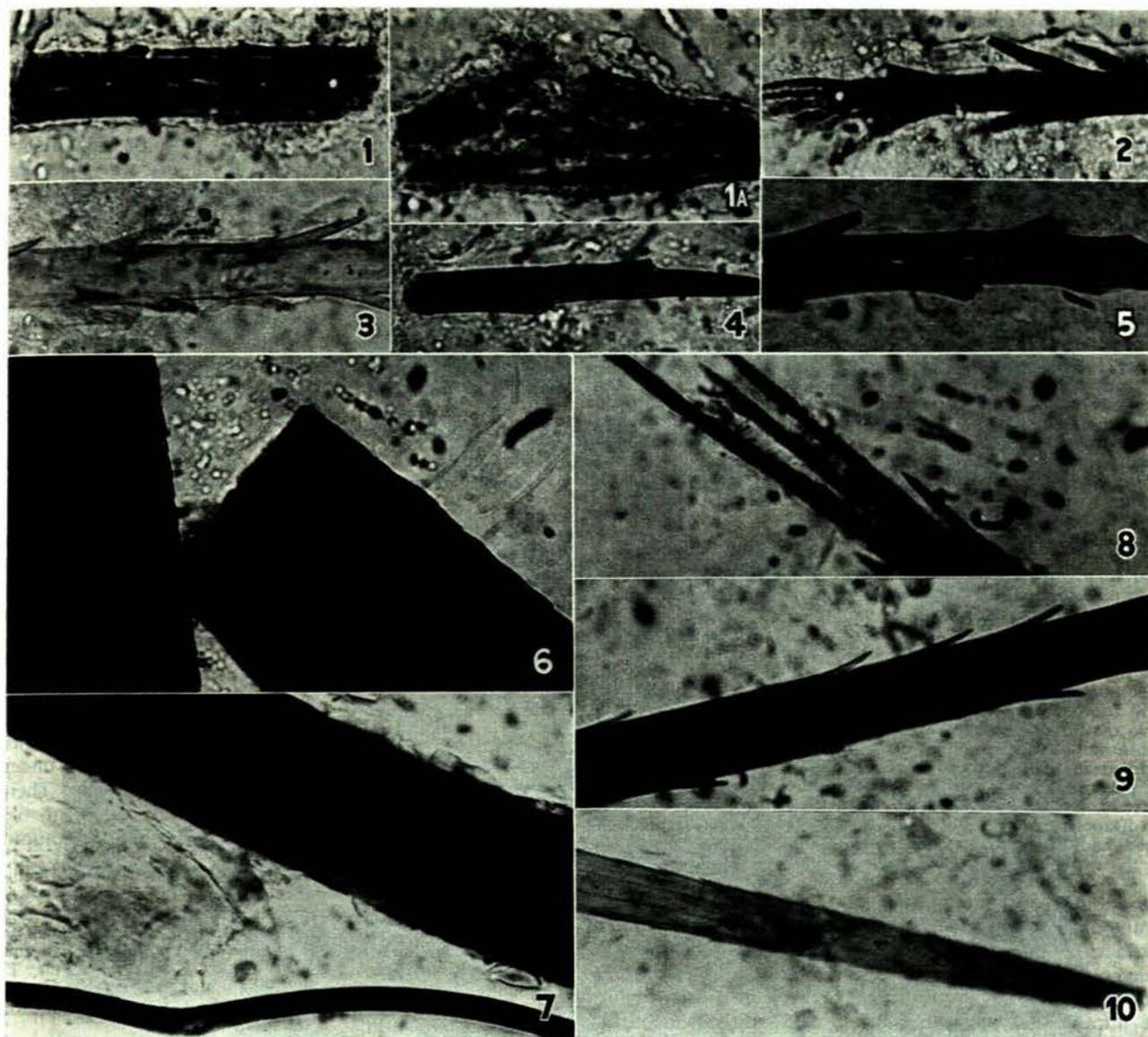


Plate I. Ten specimens of subtarsal foreign bodies.

yards from the bayside, and a medical colleague's symptoms started while shaving in the bathroom; but the foreign bodies might have been in the conjunctival sacs some time before irritating the cornea. The strength: weight ratio is increased in most cases by tubular structure. Specimen 8 (Plate I) is essentially a bundle of rods, 6 is solid and 7 nearly so. Being strong and hard and light, they are also brittle, as is shown by the clean breaks in 1, 2, 3 and 6. One portion of specimen 1 (1A) appears almost to have exploded under pressure of the dissecting needle. The preservation of fine structural detail, particularly of the barbs, shows that there has been no solvent or softening effect from tears and tissue fluid or from the mucus and canada balsam in which they are mounted. The other half of specimen 10 disappeared during the routine for paraffin section and was possibly dissolved by chloroform, or hot wax.

The barbs vary. Some face toward the sharp end and others toward the stern. Some get larger toward the point and others toward the base. Some are very fine, as in 10, others are like short branches from a straight tree trunk ready for felling. In 4, the barbs or branches appear to have been broken off completely. In 5 they have snapped near their bases. The barbs would restrict and direct movement in the conjunctival sac and tissues according to their size and angle.

Some foreign bodies were removed easily and without hindrance. Others clung to their beds and required dozens of strokes and many aching minutes to dislodge them. It seemed as though some had penetrated with and others against the direction of the barbs.

In case 2 (Plate I, specimen 2) the first piece was removed easily with relief of symptoms. Two days later the patient returned with identical complaints. Another foreign body was

found at the original site. It was presumed to be the end portion of the original foreign body as it seems most unlikely that two should have entered at precisely the same point.

Specimen 10 differs from the others in its appearance and in the way it behaved. It had found its mark in the lower lid of another medical colleague. It offered considerable resistance to our efforts to remove it. When it was nearly out another rest had to be called because of exhaustion of both patient and myself. During this short rest it became dislodged spontaneously. It was found in a fold of bulbar conjunctiva opposite its original site when the patient looked upward, thus straightening out the creases. The pointed end had penetrated the epithelium slightly, so that the other end hung down as he looked up. It again resisted removal. In due course a further rest became necessary. As the patient relaxed the uncomfortable upward deviation of the eyes the folds in the bulbar conjunctiva reappeared, this time with the foreign body forming a bridge between two crests. A moment later it was underneath the conjunctiva. Movement of the eye downward was enough to allow the sharp end to penetrate the epithelium and in two or three seconds it had completed its journey from the conjunctival sac to the subconjunctival connective tissue. It began to move upward toward the limbus with movement of the bulbar conjunctiva over the sclera owing to the fine acute-angled barbs, like a grass seed traveling under a jersey sleeve as the arm is moved. An attempt was made to remove it by tilting the advancing end forward to puncture the conjunctiva from behind. In the process it moved a further 2 or 3 mm. toward the limbus and broke in two pieces separated by a similar distance. It was feared that further movement in this direction was dangerous because, on reaching the close attachment and junction of conjunctiva, episclera and sclera at the limbus, it might enter the lamellae of the cornea or even penetrate into the anterior chamber. The outer half was therefore removed in a snip of conjunctiva, and the deeper portion in a second snip of the loose connective tissue. The latter was mounted in the teased connective tissue and photographed after staining with haemotoxylin and eosin. The portion in the conjunctiva could not be so displayed owing to the thickness of the tissue, and was prepared for paraffin section. In this process, as mentioned above, it disappeared. The alcohol used for fixing the teased specimen had not affected that portion.

The fate of undiscovered foreign bodies of this type is speculative. Some may remain *in situ*, causing a small granuloma or scar, as is not uncommonly seen in the back surface of the tarsal plate. Others would be ejected in due course by tissue reaction, or be absorbed. The entry of one specimen into the episcleral area raises the possibility of intra-ocular penetration. Here a keratitis, episcleritis,

iritis, cyclitis or choroiditis, probably of granulomatous type, might result.

A less speculative complication is infection. The presence of a blocked lacrimal duct would be very dangerous as a source of bacteria. In one earlier case a foreign body in the upper tarsal plate was a short piece of the patient's hair after a haircut. In this case the injury to the corneal epithelium was followed by dendritic ulcers and deep keratitis of the herpes febrilis type.

Specimen 1 was from a laboratory assistant in the Physiology Department. In return for removal of the foreign body he prepared the first of this collection.

Identification of these specimens has not been attempted. They appear to be animal or vegetable, but not mineral. Showing obvious differences, they are likely to arise from many and varied sources. These are some of the 14 specimens that were collected over 3 years at King Edward VIII Hospital. These and others have been found in all seasons. The incidence is estimated at about a dozen cases a year at the eye clinic.

#### CONCLUSIONS

The slit-lamp microscope should be used to examine the exposed tarsal plates minutely before the presence of a foreign body can be excluded when scratch marks on the cornea are present.

#### SUMMARY

Foreign bodies of varying morphology, usually with barbs, were found driven into the tarsal plate from behind. They were recovered and photographed unstained under high power in canada balsam under a cover slip. Their features and effects are discussed. Scarification of the cornea by the exposed end is the cause of the symptoms.

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