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THE FIBROUS TUNIC OF THE EYEBALL, OR "OCULAR TUNIC": ITS ANATOMICAL RELATIONS AND BEARINGS IN OPHTHALMIC PRACTICE.

BEING REMARKS IN THE COURSE OF CLINICAL INSTRUCTION AT THE CENTRAL LONDON OPHTHALMIC HOSPITAL.

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It may seem strange to say that, till lately, the anatomy of the ocular appendages was not correctly taught. An extensive and important membrane about the eyeball, concerned alike with operations and in the discrimination of disease, was not recognised in orbital dissections, but disregarded and taken away as so much cellular tissue to be cleared out, in order to render evident other anatomical relations.

Knowing how little this structure is understood, how scarcely it has been alluded to either by anatomical writers or surgical teachers, and seeing the importance of it, I shall make it the subject of a short lecture, describing the anatomy, and pointing out the influence it has in actual practice.

So long ago as the year 1804 Tenon demonstrated this ocular tunic, and called it the tunic of the eye. Like, however, many valuable hints in anatomy and surgery, it was forgotten for a long series of years, till a later recognition of it was declared a new discovery. Drs. O'Ferrall and Bonnet were the next to treat of it, each claiming the merit of originality. The former made his views known in 1841, in the *Dublin Journal of Medical Science*, and to him indisputably is due the merit of surgical and pathological application. Bonnet's notice appeared a year later.

I shall now give a description of this tunic, which has been also called tunica vaginalis oculi, cellular capsule, Bonnet's capsule, cellular sheath of eye, fibrous sheath.

It is a distinct tunic of a white colour and fibrous consistence, continuous in front with the posterior margins of the tarsal cartilages, and, extending backwards, adheres to the optic nerve as this penetrates into the sclerotic. With the sharp end of a probe, or of a director, it may be separated from the eyeball, by breaking the fine cellular tissue to which connects them. Within, it is smooth, facilitating the ocular movements; externally, it is loose and cellular. The muscular portions of the recti muscles lie at the outside, so that it insulates and protects the eyeball in the most perfect manner possible. Half an inch posterior to its front margin are six well defined openings, through which the tendons of the muscles pass to their insertions in the sclerotic coat, and over which they play as through a pulley, and get their force properly directed, securing rotation, and opposing retraction, which would otherwise predominate.

The readiest way of exposing the tunic is to cut through the palpebræ vertically, to turn back the separated parts, and to divide the conjunctiva at its angles of reflection from the internal surfaces of the eyelids to the ball of the eye.

How different all this is from the usually received opinion of the orbital muscles being in contact with the eyeball.

The first beneficial result of a proper knowledge of the tunic was the present improved manner of extirpating the eyeball, in which the conjunctiva is cut through close to the cornea, the recti and oblique muscles divided

at their sclerotic attachment, and the optic nerve severed within the tunic; so that the orbit is as it were left sealed in front by the membrane. This contrasts greatly with the old operation of dissecting away the whole of the orbital fat and cellular tissue, when it was desirable only to get away the eyeball, and not any of the appendages, an act that can scarcely be justifiable, except in the somewhat doubtful measure of clearing out the orbit for a cancerous growth. The difference in the severity between the two processes and the after effects is great indeed. In the one, there is no shock to the system, and the patient is scarcely invalidated, and the effect passes off quickly in one or two days. The orbital vessels and nerves are left intact, and there can scarcely be any bleeding. The extent of the other, the hemorrhage, the general bodily disturbance, and the somewhat risk, are well known.

The better result in the operation for internal squint is also to be ascribed to the recognition of the ocular tunic. Formerly a very free dissection was made at the inner corner of the eye, and unfrequently the tunic detached from its connection under the supposition of being "adhesions" that needed disconnection. The common issue of such mal-operating being frightful eversion of the eyeball with prominence. We now know how essential it is, in order to secure the correct ocular movements, that the divided muscle should acquire an attachment as near the natural spot as possible, through one or other of the four or five processes that *post mortem* inspection has revealed to us, and which is beyond the range of possibility, if the parts in connection, especially the tunic, be much cut and displaced. I think, too, that prominence scarcely, if ever, occurs to any marked degree, when the tunic is not interfered with.

Another addition arising out of this knowledge, is the greater facility and accuracy afforded in the removal of orbital tumours. As it is not in the plan of these remarks to give the detail of cases, I shall not cite instances. Suffice it to say, that it greatly furthers the execution of such operation, whether the growth be solid, or encysted. I have on many occasions been able to proceed with more confidence, better to avoid parts not involved in the disease, and to get superior results. I may mention that these morbid products may grow outside the tunic, on it, or within it. It should be the object of the operator, in every instance, to preserve the tunic as intact as possible. On one occasion, while removing a fibrous tumour from the upper part of the orbit that had cellular connections to the vestment, I was enabled by slow and careful scratching with the point of the scalpel, rather than cutting, to get the whole away without damaging it.

The position of abscesses in the orbit, and their relation to the eyeball, can be better understood, and therefore, the evacuation of the pus more surely accomplished. When a student, I was taught always to keep the instrument, used for such a purpose, towards the wall of the orbit, lest the eyeball should be wounded. But if this be adhered to, how is the abscess to be got at when it is within the tunic. With the commonest care when here, it may be evacuated without the least risk. I have relieved several patients after other surgeons, not cognisant with the anatomical matter in question, have failed to find the pus.

To Dr. O'Ferrall is due, too, the credit of recognising rheumatic inflammation of the ocular tunic; and, with his accustomed ingenuity and accuracy, he makes the anatomy of the eyelid available in the diagnosis. He shows that under the orbicularis muscle is a distinct layer of fascia, and that this is the first element of the eyelid that enters the orbit; that there is another layer of fascia beneath the levator palpebræ, which also enters it, and uniting with that above, forms a sheath for the accommodation and support of the muscle; and he points out the attachment of the ocular tunic to the orbital margin of the tarsal cartilages. This anatomical

arrangement he then traces on the outer surface of the eyelid in the two portions separated by the natural fold of the skin, the upper portion constituting about one-third of the surface of the lid, the lower the remaining two-thirds. From these he makes the pathological deduction, that certain forms of disease within the orbit that are seated in, or internal to, the motor apparatus—that is in the substance of, or within the cavity of the ocular tunic, extend their effects to the lower portion of the eyelid, with which they are continuous, and that certain other affections situated external to the motor apparatus—which is that part of the orbit containing the fat—will show themselves by inflammation or other changes in the upper division of the same.

The last subject to be noticed in connection with the ocular tunic, is the greater light that Dr. O'Ferrall has been able to throw on the causes that protrude the eyeball. Inflammation of the ocular tunic will in itself cause ocular prominence. This is chiefly through effusion into the cellular membrane connecting it to the ball of the eye. The infiltration is apparent where the conjunctiva is reflected from the eyelid to the eyeball, just where this membrane closes up the ocular tunic in front. Here it receives the pressure of the effused serum, and becomes separated from the sclerotic coat by the extension of the infiltration. The amber coloured chemosis, originating in inflammation of the conjunctiva, is distinguished from it by redness as well as serous infiltration.

ON THE USE OF NITRIC ACID IN THE CURE OF ULCERATION OF THE OS AND CERVIX UTERI.

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At a meeting in 1862 of one of the leading London medical societies, the subject of discussion was the value of nitrate of silver as an escharotic in cases of ulceration of the os and cervix uteri. Having for years past had extensive experience in the treatment of uterine disease, and tried the various kinds of applications in general use, both fluid and solid, and finding but one upon which I could rely in producing permanent amelioration of the disease, viz., pure nitric acid,—I will select from my notebook a few well-marked cases of ulceration in its various stages, from the phagedænic down to simple excoriation, that have not only been cured, but have borne inspection some years afterwards, and have never in a single instance in my practice shown a tendency to return—a fact that cannot be induced in favour of nitrate of silver, or any other solid, or, I believe, fluid, caustic application now in general use.

My nomenclature of diseases affecting the os and cervix uteri is, like the treatment, simple: 1. Cases of cancerous ulceration, or disease with apparent malignant tendency, where the ulcer is large, excoriated, discharging pus or matter of a mucopurulent character, in conjunction with great derangement of the general health—in fact, every symptom of cachexia; 2. Cases of simple ulceration or excoriation, with or without hypertrophy, accompanied by symptoms not quite so distressing to the general health. I will detail a few cases of each variety; and then offer some remarks on the relative value of the various applications, solid and fluid, generally employed in the treatment of ulceration situated about the mouth of the uterus. Of the first variety, or cases of an apparent malignant nature, I have selected three examples.

CASE. In the year 1850, I was requested by a gentleman to visit a poor woman aged 42, the mother of six children, the youngest two years old. Since the birth of this child she dated her failing health.

For the last fourteen months she had been gradually losing flesh, with pains in the back, sickness, loss of appetite, perspirations, constipation, and slight cough. She had been treated for pulmonary disease by a private practitioner, and had undergone a digital uterine examination in a neighbouring infirmary. On examination with the speculum (May 5th), I found the uterus prolapsed, and the os imbedded in a mass of mucopurulent discharge (although the patient used daily alum injections), on the removal of which both labia of the os uteri were found extensively ulcerated some distance up the cervix. The patient was directed to have a liberal diet, and for medicine a vegetable tonic with iodide of potassium; for local application, the nitrate of silver. At the end of two months, finding my patient no better and the ulceration but little checked, I resolved to change my treatment both locally and generally. Having washed the parts ulcerated with a moist sponge, and freed the sore from all discharge, I painted the diseased portion with pure nitric acid, requesting the patient to keep the speculum (one of Fergusson's) fixed in its present condition for half an hour. The application caused no pain of importance. Internally, I gave twenty minims of the tincture of sesquichloride of iron twice a day, and left her for a fortnight. At the expiration of this period, I again applied the speculum, and was surprised at the improvement that had taken place. The excavated portions of the ulcer were quite filled up, and the whole disease presented a most healthy appearance. The same treatment was persisted in, and the nitric acid was again painted over the unhealed portion of the ulcer. From this time the symptoms gradually improved; the discharge of mucopurulent matter decreased; and, in less than two months from the time when the nitric acid was first applied, the patient's health was quite restored.

In the year 1853, I attended her in labour of her seventh child. There was not a single symptom of uterine mischief present; nor did there appear any cicatrix to interfere with the proper contraction and dilatation of the os uteri. This patient died of consumption in 1858, without presenting another indication of uterine disease.

CASE II. In the year 1859, M. H., a poor woman, aged 33, sent for me one night, having been suddenly seized with a pain over the region of the heart and fainting. She was a washerwoman, and had been delivered of an illegitimate child three years before. She considered her disease to be of two years standing.

There was great emaciation; vomiting after meals; cough; loss of appetite; diarrhoea; fainting upon the slightest exertion or excitement; and every symptom of general cachexia. The catamenia were regular, but attended with pain and difficulty in micturition. Between the menstrual periods, the discharge was excessive, thick, and grumous. On examination with the speculum, the vagina appeared red and inflamed, and gave evidence of its disordered condition by frequent small discharges of blood. The os uteri, as in the former case, was encased by a layer of mucopurulent matter, on the removal of which the following state of disease presented itself. The labia of the os could not be defined; but the whole cervix appeared one mass of ulcerated disease (so far as a bivalve speculum could display), bleeding upon the slightest touch. The menstrual period being over, nitric acid was applied; the ulcerated parts being well covered with it, by means of a glass brush, as before. A pledget of wool was then introduced, fastened to a piece of silk, and passed up the vagina, so as to cover the diseased portion. This application was repeated three times in six weeks; and the last examination displayed a sound and healthy looking surface. The medical treatment was the same as in the last case—tonics, with a generous diet. The patient has remained quite well up to the present; the