Clinical Remarks

ON

MODIFIED LINEAR EXTRACTION.*

BY

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V.—EXCISION OF IRIS. OPENING OF THE CAPSULE.

FROM further experience, I have still more strongly than before to urge that whatever of iris presents itself in the incision should be thoroughly excised at the level of the external wound. Where the intra-ocular pressure immediately after the operation is very moderate, small slips which were left behind at the corners, may, indeed, be caused to glide back partly by the contraction of the remaining iris, and partly by such gentle rubbing of the lids as we are familiar with from flap-extraction. This, however, cannot with certainty be relied upon; and, as a rule, the slips referred to become fixed in the wound-channel. What shall be the consequence hereof, depends on the degree of irritation, or the state of the intra-ocular pressure, during the period of healing, and perhaps on other less obvious circumstances. When the secretory tendency runs high, or the ocular pressure (though perhaps still physiological), is relatively strong,† portions of iris thus fixed may come to form small prolapses which force the wound-edges asunder, and render the curvature of the neighbouring cornea irregular. They also cause an annoying sensation of pressure, and may, in the end, require to be removed by excision. In four cases, indeed, I was compelled to perform this at all events not desirable after-operation, from my having neglected the practice of precise excision of the iris. But, apart from the formation of prolapse, the mere coalescence of the iris with the wound-channel is liable to occasion swelling of the wounded parts, together with displacement of the pupil, or conjunctival lymph-angioitis, with serous chemosis, whereby the recovery is materially retarded. And, lastly, we must even, in principle, deprecate the occurrence; seeing that any coalescence of iris with a corneal wound is apt under circumstances to become the cause of secretory irritation in the interior of the eye, a fact sufficiently known from the history of anterior synechiæ and of iridodesis. I admit that the precise excision of iris up to within the corners of the wound is often a rather difficult task; and that, perhaps, it is not possible altogether to avoid minute impactions. If, after the first action of the scissors, there remains some iris standing in the corners, I do not hesitate gently to pull it out and excise it. Should, however, the eye feel uncommonly soft, I forbear, as, under such circumstances, the relinquished portions of iris are prone to slip back during or after the operation.‡

In lifting the iris with the straight forceps, no

force should be used, in order to avoid dragging forward any neighbouring portion, or, still more, stretching the ciliary attachment; yet the prolapse ought to be carefully displayed, and the scissors, as in the operation for glaucoma, be made to act with a certain pressure against the level of the wound. From a *post mortem* inspection—the patient, who had made a good recovery, died of delirium tremens some weeks after the operation—I learnt that, even where we suppose the excision of the iris to have been strictly peripheral, a continuous seam of more than $\frac{1}{2}$ mm. may yet be left standing. The object of a radical removal of the prolapsed portion would best be secured by dialysis. At this, a proposal of Bowman appears to aim; viz., first to incise the prolapse close to one of the corners of the wound; thereupon, by appropriate pulling towards the other, to detach the iris from its ciliary insertion; and, lastly, to sever the remaining connections. The practice recommended by our esteemed friend certainly deserves every attention. However, that a real dialysis of some extent can thereby be obtained I have not been able to verify, either in my operations or by experiments on the subject. I should also expect that dialysis, apart from other possible consequences, would, as a rule, be attended with bleeding.

In the operation on the left eye, I employ for the excision of iris a pair of rather strongly curved knee-shaped scissors (Richter's), which have the advantage of interfering but little with the light. For the right eye, straight scissors are more convenient and not in the way of the light either, if but the head end of the couch be somewhat removed from the window.

Prior to the excision of iris, let the conjunctival flap, to avoid its being injured, by all means be carefully reversed upon the cornea. Should the flap, even but partially, come to be excised, this would, of course, be a much graver fault than to have formed none at all. For, corresponding to the excised portion, the extent of wounded surface would be increased, and hence, in behalf of reparation, an irritation be set up which is liable to propagate itself to the wound-channel.

If, after the iris-excision, some blood have trickled into the anterior chamber, as scarcely ever occurs unless there is a tendency to collapse of the cornea, it will be better to wait a little than, in spite of the obstacle, to proceed to opening the capsule. The latter act may, indeed, be accomplished, even though the fleam of the cystitome be hidden under the thin sheet of blood; and, in most cases, the rupturing of the capsule is itself the best means for the removal of the blood, since the pressure of the deeper parts, so long sustained by the stretched capsule, now extends unobstructed to the posterior surface of the cornea, and thus furthers the expulsion of the contents of the anterior chamber. Still, the action of the cystitome cannot be watched with the desirable accuracy; i.e., the danger of dislocating the lens cannot with certainty be avoided, nor can we rely upon the proper form and length being given to the capsular incisions. Therefore, previously to inserting the cystitome, a pad of charpie should for a minute or two be uniformly pressed upon the closed eyelids, when the source of the bleeding will mostly be stopped, and thereupon the blood, by gentle pressure upon the scleral wound-edge, be made sufficiently to escape. Only where there is plenty of soft surface matter, this caution may be dispensed with; since, in such a case, we may reckon upon the propagation of the deep ocular pressure across the lenticular system, and consequently upon the thorough escape of the blood at the moment when the capsule is ruptured.

* *Archiv für Ophthalmologie*, xii, Band I. Abtheilung, 1866.—Continued from page 381 of JOURNAL for April 6th.

† Such a condition resembles that of really glaucomatous eyes with their inherent tendency for bulging of any incarcerated iris, be it after operations or injuries or ulceration.

‡ Careful palpation of the eye after the escape of the aqueous humour may yet in other respects assist the judgment regarding the healing process. The remarkable differences in tension, which we meet with, partly depend on physiological differences of ocular pressure, and partly on intercurrent secretory irritation.

As regards the laceration of the capsule, I have to supplement my former prescriptions by the advice, that the steadying forceps should be employed to perform a slight traction downwards, and, where the ocular pressure is but indifferent, a cautious pressure upon the eyeball. By this means, the tension of the capsule may be increased, and hence the action of the cystitome at once facilitated and made more excursive. This is of particular importance where, the cortex being compact and adherent to the capsule, the fleam of the cystitome requires to be presented in a slanting position. Besides, by the proper co-operation of the cystitome and the forceps, the mobilisation of the lenticular system may be advantageously promoted.

In order to assure myself that the capsule has really receded sufficiently high up, I sometimes make the cystitome, in its return journey, pass round the near equator of the nucleus, and push it yet a little forward in the direction of the posterior cortex, the fleam being, of course, held flatwise. In this way, the peripheral portion of the anterior capsule is, as it were, slipped over the equator of the nucleus, the presentation of which is thereby rendered more easy. If the hook is intended to be used, this manœuvre is, of course, superfluous, as the hook accomplishes the object more effectually. But the practice recommends itself where, by the slide-manœuvre alone, we wish to overcome the relatively great resistance of a rather compact lens, combined with a tough and over-ripe cortex.

VI.—EVACUATION OF THE LENS.

Whether it might be possible, in our present method, altogether to dispense with the use of any instruments of traction, including the hook, was the question which of late has chiefly riveted my attention. After I had, up to January (1866), pretty closely adhered to my original practice—i. e., employed the slide-manœuvre for the soft species of cataract, and the hook for the more compact forms—the slide-manœuvre was exclusively resorted to in the 120 operations performed from January to the end of April. I have convinced myself that, with patience and circumspection, even the hardest cataracts may be removed from the eye by pressure alone. To this end, we require, above all, that the capsule be thoroughly opened—i. e., up to the near equator. If the anterior capsule be visibly thickened by deposits on the inner surface, its extraction by means of slightly curved forceps becomes the third step of the operation, and supersedes the action of the cystitome. I have further to recommend, when the spoon comes to be applied to the sclerotic, that the steadying forceps be made to exercise a suitable, but, on the whole, rather determinate traction downwards. This promotes the presentation of the equator. Continuing this traction, I proceed to those lateral slidings of the spoon described in my former paper, and during which, in cases of hard cataract, the convexity of the spoon is made to exert a somewhat more intense pressure than usual upon the scleral edge of the wound. If necessary, the slidings must be repeated several times. The spot where the edge of the lens appears most inclined to advance should be accurately watched; for, corresponding to that spot, the retrogressive movement of the spoon should take place, combined with a cautious increase of pressure, as has likewise been pointed out before. That the spot referred to does not always correspond with the middle of the incision, depends on the unequal resistances within the lenticular system itself. The connexion of the cortex with the inner surface of the capsule differs at different places; and, besides, the anterior capsule does not every where recede

equally beyond the near equator. Evidently, therefore, a part near one of the corners of the wound may present itself first. But, if this be taken advantage of in the prescribed manner, the equator soon presents all along the incision, and its progress may be promoted by another lateral sliding of the spoon. As the lens advances, the forceps must remit its traction downwards, and finally, when the bulk of the lens has come forward, in obedience to the natural tendencies of the ocular muscles, even carry the globe upwards; so that, while the wound is no longer filled up by the cataract, the pressure upon the eye may be as much as possible abated. Should the lower portion of the cortex threaten to detach itself from the nucleus, we may prevent this by applying the convex surface of the spoon flatly to the middle of the cornea, and moving the said portion of the cortex by gentle pressure upwards toward the wound. By this means we may frequently forestall the necessity of expressing the surface-matter later on by itself; to avoid which we are more particularly desirous, if chloroform have been administered. The same procedure may, too, advantageously be resorted to, to promote the exit of the nucleus itself, in case of deficient ocular pressure—e. g., in a deep-set eye with collapse of the cornea, when the cataract, although it readily present itself, advances but slowly and haltingly.*

But, although experience has proved that, under proper management, external pressure suffices for the evacuation of any kind of cataract, the question is not therewith settled, whether the total abandonment of instruments of traction implies a real advantage, so far as the results are concerned. After the first fifty operations performed without the aid of such instruments, I was strongly inclined to answer in the affirmative. Later experience, however, has led me to change my opinion.

We may at least prepare this important point for further discussion by briefly considering the advantages and disadvantages of simple pressure, as compared with the employment of the hook.

In behalf of simple pressure (the slide-manœuvre), we may first of all state that it is less apt to induce escape of vitreous humour. Amongst the whole of the operations performed with the hook, there were about 10 per cent. with prolapse of vitreous humour; among those accomplished by the slide-manœuvre, scarcely more than 4 per cent. And, although escape of vitreous humour has lately become less frequent in hook-operations than the above average implies, there remains still a considerable difference in favour of simple pressure. Besides, with the latter, the evacuation of the lens is, generally speaking, at once more complete, and more apt to comprehend the whole of the surface-matter. To various forms of cataract this, of course, does not apply—as, e. g., those with a pulpy or fluid cortex; nor to the totally hard cataract, the cohesion throughout all the layers of which is greater than that of its outermost stratum is with the inner surface of the capsule. But the difference referred to between the slide-manœuvre and the hook becomes of importance in regard to cataracts with a still imperfectly opaque cortex, and certain over-ripe cataracts, in which the peripheral strata have a greater tendency to detach themselves from the nucleus than from the capsule. In these cases, the presentation of the whole lenticular system is more readily obtained by pressure than by traction; since the

* The application of the spoon to the outer surface of the cornea, if but gentleness be observed, I believe to be free from danger. Whosoever dreads the pressure of the metal, may use a spoon made out of tortoise-shell, such as I sometimes employ for the purpose of evacuating the lens.

hook, making its way through the posterior cortex, is apt to leave chiefly the portion opposite the wound behind.

The two undeniable advantages just considered stand, however, contrasted with this important drawback, that, with the compact species of cataract, the evacuation by external pressure is laborious and tedious, and consequently attended with a good deal of bruising; for the obtaining resistances are too great for the expulsive power of the ocular pressure, together with the admissible assistance from without, to secure the ready emergence of the lens. If, in answer to the first lateral slidings, the equator be seen fairly to present itself, and the first retrogressive movement of the spoon be readily responded to by a further progress of the cataract, there is nothing to complain of. But where we require the spoon rather vigorously to be moved to and fro before the equator appears, and where, during the retrocession of the instrument, the lens stops again and again, its bulk remaining for some time in the wound-channel, and squeezing the walls of the latter, instead of smoothly gliding through, there is some ground for uneasiness, as, under such circumstances, the after-course is apt to prove irregular. It is here that the instrument of traction supplies a much more active power of expulsion, which, operating as it does straight in the direction of the yielding wound, facilitates and expedites the exit of the lens, and does proportionately less harm by way of bruising. Besides, the hook has the advantage of enabling us to open the capsule much more excursively than we can possibly do with the cystitome alone.

I may state the following as the conclusion at which I have arrived. Although any, even the hardest, cataract can be evacuated by adequate and systematic pressure, the hook still deserves the preference in those cases where the lens does not either present itself readily, or glide smoothly forward. Yet, in course of time, I have found the simple pressure to answer so much more frequently than before, that, out of eight cataracts, seven are now removed without traction.

Whether simple pressure or traction will prove more suitable, cannot in all cases be foreseen. That the former will have to be preferred, may, indeed, with full certainty, be prognosticated in many instances. But the necessity for the use of the hook can but very seldom be made out *à priori*; for the very hardest cataracts may so readily and fully respond to the slide-manceuvre as to present no occasion for anything more. This impossibility of deciding beforehand is, in regard to a number of cases, no disadvantage. I believe that an application of the spoon to the scleral wound-edge, and the execution of some lateral slidings, though they may not secure the exit of the lens, are not only harmless, but even useful in promoting the mobilisation of the lens—i. e., the separation of the cortex from the capsule, and so far facilitating the subsequent action of the hook. On this ground, I recommend the slide-manceuvre in all cases to be first resorted to, and only to be exchanged for the hook when either the lens is found not to present itself readily, or after presentation, not to glide smoothly and evenly forward. To find the right limit in this respect will, of course, always remain a matter of tact and practice.

In reference to the various species of cataract, the following may still be noted. The thoroughly soft cataracts, without any nucleus, occurring in youthful age, as from their consistency they do not bear the action of the hook, demand the employment of simple pressure. The same applies to the tough and glutinous cataracts of the age of from thirty to forty,

presenting a whitish (not yet yellow and hard) nucleus, whose power of resisting the hook can at least not with certainty be relied upon. I admit that these cataracts do not, under pressure, always glide out readily and evenly; but, being rather compressible, they do not injure the wound-channel so much as the senile cataract. Simple pressure is, again, if possible, to be adopted for those forms of cataract which we have reason for removing long before they have attained to maturity, such as the zonular kind, the posterior cortical and polar opacities within an otherwise still transparent lens; as also ordinary cataracts of excessively slow development. In these cases, it is the consideration of the more complete evacuation of the cortex, as obtainable by pressure, which turns the balance, although the consistence of the nucleus may not militate against the hook.

Lastly, simple pressure is unquestionably suited to those cataracts which present a hardish nucleus enclosed by a copious mass of swelled or pulpy and broken up or even fluid surface matter; whereas, in the presence of a rather scanty and in general strongly opalescent cortex of this kind, the choice between pressure and the hook depends on the more or less yielding consistency of the nucleus.

Regarding the mature and hard cataracts, with a cortex either uniformly yellow or presenting small whitish-grey spokes, all depends on the degree of compressibility, and, still more, of adherence to the capsule. The same holds good of the thoroughly compact, over-ripe, and flattened cataract. Sometimes I have seen flat and most unyielding lenses of the greatest dimensions glide out under pressure in the most desirable manner. This appears to occur where the connection between the edge of the lens, as it grew sharper during the progress of shrinking, and the capsular fold has become loosened, so as to admit of the latter being easily slipped over by the cystitome and the spoon. In other cases, however, the equatorial portion of the lens is intimately connected with the capsule, and the presentation of the former attended with greater difficulty. Here the hook steps in advantageously in supplementing the action of the cystitome.

With senile cataracts, in which a previously rather soft, though not emulsionised, cortex has, at the retrogressive stage, from the absorption of its fluid parts, become converted into a caseous or flaky mass, evacuation by pressure is highly desirable. In these forms, the shrinking appears to induce alterations in the hyaline attachments of the lenticular system, and therewith a disposition for escape of vitreous. But of particular moment is the tendency of the cortex, from its unequal cohesion, to divide in several portions, which stick to the capsule, and, once scattered, cannot without difficulty be got out. This is apt to occur when the hook has lifted the nucleus from its bed. Still, however much we have to say for the exclusive employment of pressure in these cases, as a better presentation of the whole of the lens may be secured by it, I must admit that sometimes the hook has to be called in requisition; viz., when the inherent toughness of the cortex does not permit the cataract to glide gently forward.

As soon as the lens has made its exit, the patient must be enjoined to look upwards. If this be done, the closure of the wound is promoted; and the removal of the retractor, during which some patients exercise an increased pressure with their lids, can be effected with greater safety.

As regards the fifth step of the operation, I have once more to urge the most careful clearing of the pupil from cortical remnants. The smoothing of the conjunctival flap with curved forceps must not be

neglected, even though it appear already perfectly re-adapted; otherwise, small portions of surface matter might lodge beneath, and, by distending the wound-channel, give rise to irritation.

After the operation has been fully terminated, I think it further advisable to wait half a minute or so, and thereupon by pressure to empty the chamber of the small quantity of fluid freshly secreted. This fluid has not only sometimes small fragments of surface matter suspended in it, but mostly also a slight admixture of blood.

[Every operator knows that the trial of the vision which it is quite proper to make for the reassurance of the patient after the operation is finished, does not succeed in all cases. This, unless a continuous mass of surface matter was left behind, arises either from the patient being momentarily dazzled, or from a yellowish discoloration of the aqueous humour by blood. In the latter case, when, by gentle pressure, the drop of aqueous humour has been made to escape, the trial of the vision proves perfectly successful. I do not imagine that this turbid aqueous humour is possessed of any deleterious qualities. But I think that, even where the vision is satisfactory, some advantage attaches to the evacuation of the humour secreted under the direct influence of the traumatic irritation.]

[To be continued.]

ON A REMARKABLE ALTERATION OF APPEARANCE AND STRUCTURE OF THE HUMAN HAIR.

By ERASMUS WILSON, F.R.S.*

I HAVE the honour of submitting to the Royal Society a specimen of human hair of very remarkable appearance. Every hair is brown and white in alternate bands, looking as if encircled with rings; and this change of aspect extends throughout the whole length of the hair, and gives to the general mass a curiously speckled character. The brown segment of the hair, which represents its normal colour, measures about one-fiftieth of an inch in length, or something less than a quarter of a line; the white, or abnormal segment, about half that length—namely, one-hundredth of an inch; and the two together about one thirty-sixth of an inch, or one-third of a line.

The hair was taken from a lad aged seven years and a half, a gentleman's son. He is reported as being "an active healthy boy, quick and intelligent." He was delicate up to the age of four, having suffered in quick succession the diseases of childhood, a severe attack of croup, and several attacks of convulsions. The change in the appearance of the hair was first noticed when he was between two and three years old; and has increased perceptibly during the last two years. There is no similar alteration of structure of the eyebrows and eyelashes; his complexion is dark, while that of a younger brother is fair; and the latter is free from any alteration of the hair.

Examination of the hair with a lens shows that the cylinder of the hair is perfectly uniform; that the white portion is contained within the cuticle, and occupies the whole breadth of the cylinder; whilst it frequently presents a rounded cone at the central ex-

trinity, and breaks up into fibres at the opposite or distal end; and in some instances this fibrous structure is apparent at both ends of the white segment. Moreover, by transmitted light, the white segment is found to be opaque, and consequently presents a dark shade, while the intermediate or brown portion has the transparency of normal hair.

When the transparency of the hair is increased by immersion in Canada balsam slightly diluted with spirits of turpentine, the white and opaque segment is reduced in dimensions, and is rendered more or less transparent by imbibition of the volatile fluid. Moreover, it is clearly demonstrated by this process, that the opacity of the segment, its whiteness when seen by reflected light, and its darkness by transmitted light, are all due to the presence of spaces in the fibrous portion of the hair, filled with air-globules. The air-spaces are necessarily very numerous and assembled closely together; while at the ends of the white segment they have more or less of a linear arrangement, and give a fibrous appearance to the opaque mass. Moreover, the partial transparency of the hair caused by the balsam demonstrates that, besides the air-spaces, large and small, contained in the opaque portion, minute air-spaces, sometimes arranged in linear order, and sometimes communicating and forming short, irregular canals, are also met with in the transparent part of the hair. And, in addition to the minute air-spaces of the plates of the fibrous portion of the hair, an accumulation of air-globules is also very apparent in the cells of the medulla.

It is evident from this examination of the hairs, that they are imperfect in structure and development, and that their imperfection indicates a weak producing organ, and probably a weakly constitution of the individual; that the cells of which the fibrous portion of the hair is composed, instead of being filled with a horny plasma, are tinged with aqueous fluid, and the desiccation of this fluid leaves behind it vacuities which, in the subsequent growth of the shaft, become filled with air. The most remarkable phenomenon in connexion with the case, however, is the alternation of imperfect and perfect cells; the period of continuance of the two processes, supposing them to be equally active in point of time, being twice as long for the perfect as for the imperfect structure.

Since the publication of the observations of Berthold in Müller's *Archiv* for 1850, it is generally believed that the hair grows faster during the day than during the night. Hence the first suggestion that occurred to me in connexion with the present case, seeing that the white or opaque segment was shorter by one-half than the brown, was that the former represented the slower growth by night, and the latter the quicker growth by day; the white and the brown together representing an entire day of twenty-four hours. But other observations by myself have given, as the average growth of the hair of the head in persons who had been shaved, one-eighth of an inch for the week, and consequently one fifty-sixth of an inch for the twenty-four hours. Now, the length of hair comprehended by the white and the brown in the present case is one thirty-sixth of an inch, and consequently a much more active growth than is normally met with—corresponding, in fact, in a similar ratio, with thirty-seven hours instead of twenty-four.

I therefore refrain from speculating upon the cause of alternation of the healthy and morbid structure presented by this case, and restrict myself to the narration of the fact that, during a certain space of time, amounting to a day or more, the hair is produced of normal structure; while during another

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