1860

Diseases of "Articular Cartilage"  

Smith King

A

a denseth of credible statement
The diseases of joints are regarded by surgeons, and with justice too, as among the most important with which the art and science of surgery have to deal. Acute Synovitis sometimes threatens the existence of joints. Chronic Synovitis often renders a man useless for life; and White’s Swelling, representing several diseases, is familiar alike to the learned and the unlearned as a fertile cause of lameness, emaciation, and even death.

I need not attempt within the short space of time which can be devoted to a dissertation like this, to consider in any but the most unsatisfactory manner the principal diseases of joints commonly met with in our Hospitals; indeed so important do I consider these affections that to my thinking even the experience of
many years would scarcely warrant a surgeon in giving an unqualified opinion in regard to all of them.

In the winter Section of 1859 I had the honor to read before the Royal Medical Society here, an essay on the diseases of articular cartilage, and as the opinions expressed in that essay are such as still appear to me representative of the soundest views on this subject, I shall now endeavour to express very briefly the statements, and views, brought forward at that time—adding whatever may seem valuable among the more recent observations of our best surgeons. Originally in this matter I cannot and do not pretend to; and if I have chosen this subject from among many others, it is because I consider the diseases of joints of scarcely less than the highest importance in surgery, and among these diseases the affections of articular cartilage to have a peculiar interest not only to the Surgical Pathologist, but to the Surgeon engaged in the more congenial task of curing or alleviating the sufferings of those affected.
with them.

In the following observations I shall consider and propose to speak 1st. Of the so called Ulceration of Cartilage existing by itself, and regarded therefore as a primary disease. 2nd. Ulceration occurring as the result of any severe disease of the bone, or Synovial membrane, as in Periarticular disease of joints. 3rd. The changes induced in healthy cartilage by injury, and 4th. Movable Cartilage in joints.

To these I shall confine myself because they are the best known; and although others probably do exist, yet their characters are not so generally familiar to the Surgeon—Ulceration existing alone—

The essentials of this process in particular Cartilage are, softening of the intercellular substance; release of the cells; frequent, escape of the contents of these by destruction of the cell wall; and afterwards ejection of all the constituents of the tissue upon the ulcerating surface.

Although some difference of opinion does exist as to the nature of the ulcerative
process in other textures, still without any very evident objection, it may be described as a gradual softening and disintegration of their sub-
stance, followed by detachment and extraction of the dead molecules separated from the
changing mass. Such is the nature of the changes observed in osseous tissue in that
remarkable disease called Caries, and such also without doubt is the nature of the
changes which take place in the softer textures.

Thus the process of ulceration as met with in Cartilage, and other tissues, is precisely
the same if we regard merely the actions of the essential textures. In both, softening
and disintegration occur, with ejection of the molecular or granular matter into
which the part has been reduced; in both small particles of the tissue are
thrown off, which are capable of being recognised by the Microscope — larger par-
tions of both are at times detached which are visible to the naked eye; in the one
case in the form of Sloughs, in the other
in the form of portions of Cartilage, which
are certainly not so far advanced in de-
composition; and, again, in both the process may go on with great rapidity or may scarcely make any visible progress for a considerable time.

The points of dissimilarity, Dr. Redfern says, are these—Articular cartilage contains bloodvessels, consequently ulceration and other changes of structure confined to it, are never complicated by inflammatory exudations and can be examined very satisfactorily, whilst in tissues containing blood vessels, the ulceration is almost always complicated with inflammation, and the ejected particles of the tissues having undergone a very complete degeneration and become mixed with a mass of structures formed in the inflammatory exudation also degenerate and are therefore very difficult to recognise. Ulceration confined to Articular Cartilage has never been shown to be productive of pain—no doubt for the simple reason that these structures contain no nerves—the severe pain attending ulceration of other tissues is owing to the implication of the nerves sacrificed.
in their substance.

Ulcération of the cartilage may commence either on the deep surface which is adherent to the bone, or on the free surface towards the articular cavity.

In the first case there is an increased vascularity of that part of the bone lying in immediate contact with the cartilaginous layer; a less close adhesion of the cartilage to that layer is also observed so that the osseous and cartilaginous substance can be easily separated from each other. In a short time in most instances the deep aspect of the cartilage is excavated in spots on the side towards the bone, the space thus excavated being occupied by a highly organized lymph. The ulceration gradually penetrating through the whole thickness of the cartilage, at last makes its appearance on its free surface as a very small opening which gradually becomes wider. In other instances instead of such partial excavations, the cartilage is to a considerable extent becomes gradually thinner until at last it lies like a mere membrane.
on the surface of the bone below, and then wholly disappears.
When the ulceration begins on the free surface of the cartilage, it sometimes is at its extreme border where the synovial membrane is reflected over it, or close to the attachment of the internal or round ligament in the hip or the cruciate ligament in the knee joint, but the ordinary course of events seems to be the formation of shallow excavations, which afterwards assume the appearance of grooves at a greater or less distance from the margin, and frequently in the central part of the cartilage far removed from all the other structures of which the joint is composed. This disease is occasionally met with in the higher classes but principally amongst labourers and the poor. It occurs more frequently in the male than in females, and does not generally occur before the age of fifty, and it is liable to affect all joints more or less.
When it occurs in the lower extremities, if for example the Hip-joint
is the one affected, its origin is often attached to falls upon the great Trochanter; sometimes, it appears to be the result of an attack of Acute Rheumatism, but most frequently the patient is unable to describe its origin to any satisfactory cause or definite period of time.

It does not seem to endanger a shorten life, neither does it produce any bad effect upon the general health, and it seldom if ever terminates in true Anaemia.

It commences with stiffness in the joint, with a heavy dull pain which may extend for some distance down the limb; the stiffness is worst in the morning but this however to a certain degree disappears after the patient has had some exercise, but the pain is aggravated towards evening, and is again much relieved by a night’s rest.

If the patient throws the weight of the body upon the affected joint, the pain is much increased; but Mr. Adams has remarked, “Let the sur-
you press on the great Trochanter or strike the heel or foot, or adopt any other
exposition so as to push the head of the
bone even widely against the Acetabu-
lar. These manoeuvres are the sources
of no uneasiness to the patient.

During wet or even very damp
weather, the pain in the generality
of cases is much increased.

The patient affected with this
disease has a difficulty in standing
erect, the body is bent forwards, the
curvature is more or less acute at the
Hip-joint and comparatively slight
in the back and loins. The limb
gradually becomes shortened and the
foot everted; the shortening always
appears greater than it really is, for
the Lumbar Vertebrae become curved
towards the opposite side, the pelvis
oblique with respect to the spine
and elevated upon the affected side.

The muscles of the hip and thigh
become wasted and the Gluteal
fold disappears, as also the prominen-
of the Buttock.

A Post-mortem examination of joints affected with this disease shows that the muscles are paler and not so firm as those of the unaffected side; the Cytloid ligament disappears and the ligament which crosses the notch is generally converted into bone. In the advanced stage of the disease, the Ligamentum Teres disappears, as also the cartilage from the head of the Femur and the Acetabulum, the interior of which presents a rough and porous surface with here and there enamelled patches possessing the hardness and smoothness of ivory.

When the disease has existed for a long time and the joint has been subjected to much friction and pressure, there is found deposited upon the Femur a dense unorganised substance possessing the smoothness and polish of ivory.

It is however seldom that the entire articulating surface of the bone
covered by this porcellaneous deposit; it being generally confined to those parts which are most exposed to friction, in the ball and socket joints it usually presents an uniformly smooth surface, whilst in the hinge joints, it is generally grooved in the line of flexion and extension.

Some points of importance with respect to our diagnosis between the disease now under our notice and that occurring in Serosulose disease of joints may now be considered.

The former belongs chiefly to the middle and subsequent periods of life, while the latter occurs in children or those little advanced beyond the age of puberty.

Again, the Serosulose affection of the joints is generally developed in those who are naturally of a weak habit of body having what is termed a Serosulose diathesis or who are brought into that condition by insufficient nourishment or under the influence
of some depressing malady, whereas it is dyspeptic persons of a sallow complexion without any peculiar defect otherwise who are more especially liable to the other disease. It has been observed that primary ulceration of the cartilage is often preceded, like Rheumatism, by pain in other parts; hence the conclusion has been drawn, that it is in many instances at least, the result of Rheumatism affecting the harder tissues.

Treatment.

This disease is but to a very slight degree amenable to treatment. No permanent relief is obtained either by bleeding or by counter-irritation. Perhaps the best remedy is rest and keeping the joint protected from the influence of cold and damp, either by flannel or wool being wrapped around it, using at the same time some Anodyne emboiations, and the Iodide of Potassium together with small doses of Colchicum internally. If the circumstances of the patient.
permit of it, residence in a dry warm climate, and the use of some of the Thermal springs should be recommended; though mitigation of symptoms and alleviation of pain, are the greatest advantages that can be hoped for when the disease under consideration has fairly established itself in a joint.

II Acute Ulceration

Sir Benjamin Brodie and Dr. Mayo have observed cases in which ulceration of the articular cartilages consequent on disease of the subjacent bone has shown itself in the form of an acute disease, attended with symptoms and proceeding rapidly to its termination; there is, however, no doubt that such cases are exceptions to the general rule and that in the ordinary course of things ulceration of cartilage so resulting is chronic in its character.

In many cases, the patient having previously complained of what he considered as rheumatic pains in limbs,
and these, finds these pains to become at last as it were concentrated in a particular joint. In others the disease is supposed to have followed some kind of mechanical injury.

The pain in the joint in a short space of time becomes severe, so that even in what may be considered the earliest stage of the disease it interferes with the patient's rest at night. If proper treatment has not had recourse to, the pain continued to increase and is aggravated by any attempt to move the joint, and also by pressure of the articulating surfaces against each other, and at last is attended with muscular spasms causing involuntary startings of the limbs especially at night. Here the question suggests itself. If the Articular Cartilages have no nerves, how is it that such excruciating pains arise? Sir Benjamin Brodie is of opinion that the increased sensibility in these cases is in the bony plate beneath the cartilage rather than in the cartilage itself.
and that the presence of severe pain with involuntary startings of the limbs is always to be regarded as a sign of the bone fracturing of the disease.

In the first instance no perceptible alteration in the appearance of the joint is observed. After some time a slight degree of swelling appears in consequence of a serous effusion into the cellular membrane externally to it, as also by the swelling of the bone.

It seldom happens that in the early stage of the disease there is any effusion into the articular cavity.

In all cases of ulceration of the articular cartilages may proceed to a great extent without suppuration being established, but sooner or later, unless the ulceration of the cartilage and the bones be stopped, suppuration takes place and abscess forms within the joint. At this period the greatest aggravation of the symptoms occurs, and now, if the joint be not superficially situated, it becomes manieelly
swollen from the presence of secretion collected in its cavity. If the joint be equally distended it presents the same appearance as when it is swollen from an effusion of serum in consequence of inflammation of the synovial membrane. But in the majority of instances the effects being limited to one part of the joint, which is separated by adhesions from the rest, the swelling is of an irregular shape prominent in one place and scarcely perceptible in another.

Ulcration of the cartilages may occur as the result of inflammation of synovial membrane, and such an extension of the disease is indicated by a new and intolerable pain in the joint with painful startings of the limbs preventing sleep. Tissue perforation may or may not follow.

In bad cases the cartilages are sometimes totally absorbed, and ankylosis is the result.

But it is in that affection of the
joint called Scurfulous disease, that we see principally ulceration of the cartilage occurring as a secondary disease, when the cancellous structure of the bone is the part primarily affected. The adhesion between the cartilage and the bone is not so close as in the natural state, and it may even sometimes be entirely peeled off the bone; the surface thus exposed being of a bright red colour, from great vascularity. The cartilage afterwards ulcerates in spots, the morbid process generally beginning on the surface nearest the bone; the interval caused by the ulcerative process between the bone and cartilage being filled up with a very vascular Lymph. The ulceration of the cartilage generally progresses long. Dr. Benjamin Brodie mentions some cases in which thin layers of cartilage have been found lying on the surface of the bone, apparently unconnected with it, and others where in the advanced stage of the disease nearly the whole
of the cartilage has been found forming an exfoliation instead of being ulcerated. The morbid condition of the bones may exist without producing pain, but as soon as the cartilages begin to be affected, the patient experiences inconvenient symptoms.

As this disease is insidious in its origin and progress, the symptoms are sometimes not sufficiently urgent to excite any degree of anxiety to the patient or his friends, and they seldom come under treatment until the disease has made considerable progress. When the disease has not gone so far as to terminate in suppuration, the patient may recover with a useful and movable joint even when a considerable portion of the cartilage has disappeared; otherwise there is no recovery except with Amelioration.

Having now given a general statement of the symptoms and progress of this disease, I shall proceed to the consideration of its
Treatment

In treating this disease the first question to be considered is, whether suppuration has or has not taken place.

If it has, we must form a very unfavourable prognosis, but still we may endeavour by evacuation of the matter and application of ointments to attain ankylosis; but these agencies should not be obstinately continued when there is not a good prospect of success, as the patient had better lose a limb than incur the risk of losing his life.

If suppuration has not yet been established, our first object is manifestly to protect the joint from all irritation tending to render the morbid action more acute and hasten it on to suppuration.

For this purpose perfect rest insured by means of splints and bandages, together with strict attention to the various sensations, ought to be particularly insisted upon. Most writers agree that counter-irritation is very
advantageous in subduing the inflamatory or ulcerative action which is going on; and for this purpose an eschar three or four inches long on each side is unhesitatingly recom-
mended by Professor Lyne and others.

Sir Beng. Brodie advises the admin-
istration of mercury, taken so as to
produce a moderate degree of smart-
ess of the gums, discontinuing it as soon
as the symptoms are completely relieved.

To remedy the stiffness that re-
mains after recovery, Mr. Lyne recom-
mends steaming with the vapour
of hot water, friction with, gentle stim-
ulating liniments, shampooing and
persistent exercise.

III. The changes induced in heal-
thy cartilage by injuries.

Upon this subject Dr. Redfern has
written a valuable paper contain-
ing the results of certain experiments
upon the lower animals, in which
he clearly proves that wounds in the
particular cartilage are capable of per-
fect union by keeping the cut surface in close apposition; when they become firmly adherent by the formation of fibrous tissue out of the substance of the adjacent healthy cartilage the union being so perfect that after a short time it is quite impossible to detect the injured spot with the unaided eye.

In support of my observations I have found that from the 37th to the 42nd day after incisions had been made into the articular cartilages of dogs, adhesion had taken place between the cut surfaces to such an extent as to render it easy to make thin sections through both and leave them attached.

The uniting substance was composed of a granular mass containing very imperfect fibres and a number of corpuscles not distinguishable from the nuclei of cartilage cells. The cartilage cells lying near the cut surfaces were very much en-
larged rounded or oblong in shape and filled with corpuscles; in several places they projected into the mass between the cut surfaces and were therefore in a position to discharge their contents into it whenever the cell wall should offer too little resistance to their escape. The intercellular substance of the same part was somewhat softened and more transparent than ordinary and presented indistinct traces of fibers. From these appearances discovered on examination, I concluded that the stileoliles of the incision had produced an abnormal development of the cells of the part through which it had passed; whilst the intercellular substance having become softened, received the contents of the cells after the destruction of their walls; and that this process was similar in every respect to that by which a fibrous membrane is formed in diseased human articular carti-
lages, and therefore attaching the opposed surfaces firmly to each other.

In the same paper he remarks on the results of researches which he has instituted regarding the process by which articular cartilages are removed after amputation, and become changed into fibrous tissue to constitute a permanent covering for the end of the bone. I may here state the conclusions which he has drawn from his observations. He says,

When articular cartilage is rendered useless and has been relieved from pressure by amputation through a joint, it gives place to another tissue which constitutes part of the general covering for the end of the bone. The newly formed tissue is fibrous, and composed of white fibres originating in the splitting of the intercellular substance and of yellow or nuclear fibres produced by elongation of the nuclei of the cartilage cells.

Or should the synovial membrane opened by the amputation become con-
lapse, and therefore attaching the opposed surfaces firmly to each other.

In the same paper he remarks upon some researches which he has instituted regarding the process by which articular cartilages are removed after amputation, and become changed into fibrous tissue to constitute a permanent covering for the end of the bone. He says, I may here state the conclusions which he has drawn from his observations. He says, When articular cartilage is rendered useless and has been relieved from pressure by amputation through a joint, it yields place to another tissue which constitutes part of the general covering for the end of the bone. The newly formed tissue is fibrous, and composed of white fibres, originating in the splitting of the intercellular substance, and of yellow or nuclear fibres produced by elongation of the nuclei of the cartilage cells.

Or should the Synovial membrane opened by the amputation become co-


mobilised and again converted into a closed secreting sac during the cataractation so that free movement is allowed between the end of the bone and its fibrous covering; still there is no use for a covering of elastic cartilage on the end of the bone, and it becomes removed altogether or partially converted into fibrous tissue.

IV. Movable cartilage in joints.

Small movable bodies are occasioned only met with in the cavities of joints either quite detached or connected with the cavity of the articulation by a narrow neck.

The origin of such bodies has been ascribed to effusion and organization of blood lymph also to the detachment by fracture of a portion of the articular surface and to the separation of morbid growths from the margin of the cartilages of the joints.

The last of these explanations appears on the whole to be most probable; as when one is examined, it
presents externally all the appearances of cartilage, flattened of an irregular form and smooth on its surface. If it be of a small size, it is found to be calcareous throughout or being cut into; but if it be somewhat larger, there is always a deposit of earthy matter (Phosphate of Lime) in the centre.

A cartilage of this kind is originally formed in connection with the synovial membrane, as it increases in size it projects into the cavity of the joint but is still attached to the synovial membrane by a membranous band which is continuous at one extremity with the synovial membrane itself and reflected over the newly formed body at the other. After some time the membranous attachment having become elongated, and the cartilage having attained a larger size, the former gives way and the latter becomes a loose body slipping from one part of the joint to another interfering with its motions. Sometimes
there is only one of these loose bodies present in a joint, but frequently there are two or three and occasionally they are still more numerous.

But the inconvenience arising from the presence of these bodies is not the whole extent of the evil, for says Sir Roger
min. Brodie, ultimately where the loose bodies have long existed, the Articular Cartilages are found in spots to have degenerated into fibrous structure whilst in other parts they are entirely absorbed.

Treatment

Various methods have been suggested for the removal of these bodies. Mr. Lyne and Mr. Goyrand recommend that the body should be dislodged from the joint by puncturing the skin with a narrow-bladed knife and opening the synovial membrane by a single tangential incision through which the body could be pushed into the cellular substance where it may be allowed to remain or be removed when the
wound in the synovial membrane has healed. Professor Syne has, however, lately suggested a modification of this, viz., making a free subcutaneous incision through the synovial membrane, excising the lage and applying a blister over the part where it is retained. Dr. P. Bidde and Mr. Hey of Leeds, considering excision a hazardous proceeding, have advised the application of a bandage or a well-adapted laced cap which will have the effect of limiting the motion of the joint, and may possibly do even more than this by causing the loose cartilage to become permanently fixed in some part of the joint where it cannot interfere with its motions.

Mr. Hey has found this plan of treatment to be of very great service and has published some cases in which he obtained perfect cure in this manner: at all events this method should always be tried before any severer plan of treatment is had recourse to. If, however, the bandage
should not give the desired relief
and the patient suffers much inconvenience, there is no remedy but re-
moval of the cartilage by an incision into the joint by Mr. Gyses's method,

John Henry L. King.