

AN
INAUGURAL DISSERTATION

ON

The Pathology of the joints

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BY

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Dedicated respectfully
to the eminent Professors
Thos. R. Jennings
and A. H. Buchanan
of the Medical
Department of
the University of
Knoxville Tennessee
By D. S. Owen

Medical Philosophers have already reached the period, and position, in the profession, which calls upon them not to believe, or hold to a theory, that is not based upon unequivocal facts. It is an act that has raised, and will continue to elevate the science, until it shall have reached a point, which will place its votaries far beyond the reach of the well directed arrows proceeding from the contemptuous, and conspiring, bow of empiricism. It is the only means by which the quack, with all his hypotheses, may or can be brought to his true position. The day is already dawning, which, with its effulgent rays spreading to the four corners of the globe, will enable the non-professional to distinguish

between the scientific man and the friends
of quackery. It is a date upon which,
we may in subsequent life, look back
with joy and not with grief.

Such being the state of
circumstances, with which we are surrounded,
we would humbly ask the indulgence of
those, whose duty and privilege it is to
investigate the following.

We have chosen
for consideration the Pathology of the
joints.

By investigation, and by the elaborate
and explicit teachings of our worthy
and intelligent friend—Prof Buchanan,
we have been enabled to conceive, that by
understanding one joint, we thereby have
a knowledge of all. We shall therefore
confine ourselves more directly to the

Knee joint and the diseases to which it is subject. It seems necessary that we should first consider the Anatomy and Physiology connected with the knee joint, by which means we hope, not only to render ourselves more intelligible, but be enabled to speak more definitely concerning its many diseases.

Anatomy, the great orb of the science, sheds its effulgent rays of light upon the other planets, (branches) whose real beauty and worth are only seen and appreciated, by having a complete knowledge of it. The anatomical structure of the knee joint is, bone, cartilage, ligaments, and synovial membrane. The end of the articulating bone is covered-in, by a thin lamella of cartilage, which adheres so closely, that it requires protracted maceration before it can be removed.

It presents two surfaces, one of which is covered by synovial membrane, the other is rough for the purpose of being received into the pit-like surface of the bone. The thickness of this cartilage is variable, but is found generally to be greater in large than small joints. The concavity and convexity of the articulating surfaces exert an influence upon its thickness. The convex at the center is thicker than at the periphery, but the concave is to the reverse.

When cartilage is cut, it presents a pearly white color, partly transparent with a slight coat of blue. It seems to be a complete homogeneous mass, yet it is found to have numerous fibres similar to the villi upon a piece of velvet, but more closely and densely situated. In the embryonic state,

Articular cartilage has the appearance and consistence of mullilage, but gradually increases in hardness until it is almost as solid as the osseous tissue. The yellow ligamentous structure is highly elastic and flexible, but the white is non-elastic yet quite flexible. Although articular cartilage is elastic and flexible during adult life, yet they harden and become opaque in old age. Cartilage is easily severed by a sharp instrument. By the action of boiling water, they become brittle, but if boiled for a great length of time, will assume the appearance of a pulpy and tremulous mass. If exposed to the direct rays of the sun, they will present a transparent yellowish color, but if placed in water for several days, they will again present their

former aspect. They will not putrify in a short period of time, nor will they yield to maceration before the lapse of months. Their chemical composition is, Albumen 44.5 Water 55.00 Phosphate of lime .5 making one hundred parts in all. There perhaps may be some gelatine and carbonate of lime, as is contended by some chemists. It is quite probable that the chemical composition of cartilage varies at different periods, for in children there is a greater quantity of animal matter, which decreases in old age and earthy matter is replaced. The Cartilages, in the immovable joints, are arranged rather differently, to what they are in the diarthrodial articulations. They have no synovial membrane.

The existence, of blood vessels in

Carriage, is denied by some, and affirmed by others, yet those who contend for their existence cannot demonstrate it, leaving it to be proven by analogy. Their vascularity, and presence of nerves, is a mooted question, remaining to be settled by subsequent demonstration.

Profs Buckman, & Jennings, deny their presence, and by comparison of the different reasonings, we are forced to believe those who reason most logically. It is to me a strange piece of organism, that needs be diseased before its sensibility is aroused. Their sensibility while diseased may be readily accounted for, by the close approximation of the surrounding parts, which are endowed with nervous energy, and sensibility, which seems more an act of

sympathy than anything else. It is seen when a tendon is severed that it will unite again, but the union is formed by a substance whiter, and more opaque, than the original structure. It is a physiological fact of importance, worthy of remembrance, that separation is sometimes effected through the medium of osseous tissue. But it is found that costal cartilage which, when broken or torn, unites by osseous deposit, being analogous to the reparatory process which nature employs in fracture of the hard tissue. The cause of these different effects must depend upon a difference of structure, but is not easy to be accounted for, or determined how an organ which has less earthy matter, when injured

should be united by bone. The opposite
we would most readily suppose to be
the result. It is supposed by some
experimentalists that cartilages are
regenerated, but it is found to be
an imperfect production, seldom if
ever being as the original structure.
It seems plain therefore that cartilage
is not endowed with a true repair-
ing power. If it is an admitted
fact, that cartilage is endowed
with a true regenerative power,
why is not cartilage reproduced,
after having received an injury,
instead of producing as it does, in
most cases, a bony or hard substance.
It is seldom that inflammation of
Cartilage occurs as a primary disease,
but is brought on generally by disease

being set up in the bony, synovial,
or ligamentous texture. It proceeds
very slowly and its characters are,
in the main very obscure - very good
circumstantial evidence of the non-
existence of either vessels or nerves -
for the process of imbibition is by
far slower, than that of circulation.

The softening of cartilages, is no doubt
dependent upon severe inflammatory
action, in other adjoining parts, by
which the source of its nutrition
is cut-off. Such as caries of the articu-
lating surfaces of bone, which seem to
be analogous to gangrene of the soft
parts. The purulent matter which
is found in movable joints, is
usually poured-out by the synovial
and bony texture.

Landolphi and Hunter, it is said, have found pus in the pubis and sacro-iliac-symphyses, but it is rare in occurrence. Pus or purulent matter is not a constant accompaniment in ulceration of this tissue. The fingers and toes may be caused to fall-off by their cartilages becoming softened in gouty affections.

A case of the softening of the cartilaginous substance of the symphysis pubis, came under my care this last summer past. A female servant of my brother's, aged about forty, in her fourth or fifth pregnancy. Some months before her lying-in, she began to complain of pain and tenderness in that region, which soon grew so severe that she could not sustain herself in an erect position.

I at once enjoined upon her to keep the horizontal position. A month or more elapsed after parturition, before she was clear of pain, when I supposed that the bones were again in their proper position, this, however in the human subject, is fortunately very uncommon. But it seems to be natural in some of the lower animals, such as the rabbit, and guinea pig, the design of which seems to be that of facilitating the process of labor. Ulceration of cartilage is most generally found in the hip and knee joints, in individuals between twenty and thirty years of age. The disease may be confined to a single joint, but occasionally two or three are affected in the same person, simultaneously or in succession. It may be brought on by local injury, atmospheric

viciitudes, or a strumous, gouty, or syphilitic taint of the constitution.

Ulcers of the cartilage vary much in size and form. Some are small, but deep; sometimes and most generally they are superficial occupying a larger extent of surface. In the primary variety the surface of the ulcer is smooth, but commonly, the surface is irregular, and of a dull yellowish appearance, involving much of the structure, and extending to the adjacent bone. It is peculiarly strange that notwithstanding the cartilage may be in a state of ulceration, yet the synovial membrane sometimes retains its physiological character, but may become thickened and opaque. The loss of substance and ingress of ~~atmosphere~~

will hasten the process of ulceration, and will denude the surface of the articulating bones. There is another class known, under the name of synovial membrane, which enters into the composition of the diarthrodial joints.

It is distinguished from serous membranes by secreting a peculiar fluid called synovia.

The synovial membranes bear the closest resemblance to the serous membranes, which line the splanchnic cavities. They are every where arranged in the form of shut-sacks, which reflect on the one hand, over the articular cartilage, and on the other, over the articular ligaments, to both of which they adhere very closely. Indeed they are connected so firmly to the central parts of the diarthrodial cartilage, that some Anatomists formerly denied their real existence in this situation,

viscid consistence. This fluid is admirably adapted to the surface, rendering it soft and thereby better fitting it for the great physiological functions, which it is designed to perform. The quantity of synovia is different in the various joints. The hip and knee joints contain comparatively more than the other joints. All joints are liable to inflammation, but the knee joint is most generally the seat of disease.

The causes are quite numerous. Synovitis is characterized by redness, opacity, and thickening, with alteration of the secretion and infiltration of the surrounding cellular substance.

As regards the treatment of the different diseases, to which the knee joint is subject, much has been said by different authors, but when

summed-up, it amounts seemingly to but little.

Although seeming short, yet no part of the profession deserves our undivided attention more than it. We cannot appreciate the benefit of a limb, or joint, until it is lost, or become diseased, therefore no time should be lost, nor pains spared in qualifying ourselves so that we may be enabled to afford relief to suffering humanity. Where inflammation of the synovial membrane exists, if the proper attention be given in time, the limb and perhaps the joint may be preserved, but which will require much care upon the part of both patient and surgeon, while if deferred to a later period (which is unfortunately too often the case) perhaps both limb and joint may be lost.

In this disease the best treatment consists in absolute repose, support and compression, by adhesive strips or leather splints uniformly applied, with some constitutional as well as local treatment. Sarsaparilla with small doses of Bichloride of Mercury given for a number of weeks in succession.

In the treatment of scrofulous diseases of the joints, notwithstanding it presents itself under many aspects, but little is required to be done in the first stages, more than keep the joint in complete repose, which is best accomplished by application of leather splints sustained by a stable bandage.

No issues by blisters, setons, or in any other way, are seldom if ever admissible, for every discharge not only weakens the patient, but aggravates

the disease. A Tonic course of Treatment long persevered in and omitted at proper intervals is the best course to pursue.

The preparations of iron and cod liver oil are considered the best. When an abscess approaches the surface, and the skin becomes inflamed, and tender, the splints should be removed, and recourse had to fomentation and poultices, replacing the splints as soon as convenient after the abscess has burst or been opened. The abscess should not be opened until the pus approaches near the surface, or in other words, points, for otherwise some of the blood might find its way into the cavity of the abscess, which might be productive of putrefaction. Being thus shut up in the cavity of the abscess would

without being removed, produce symptoms of Typhus, and thus end in death. An abscess is seldom if ever absorbed. It is some time thought prudent to amputate, but the patient most generally dies of some other diseased organ. A scrofulous joint should not be amputated unless we are able to diagnose, that the diseased joint is the cause of some more important organ or organs suffering from its irritating influence.

Kelvin a servant boy aged about thirty, in the year 1848 was attacked with disease of the right knee joint, which resulted in complete ankylosis, but not being conducted properly, the joint inclined outward and most of his weight was sustained by the inner condyles of

the Finn and Siberia. In the month of May 1855 he injured his knee again by going down a flight of steps, from which it continued to swell for more than a week, all the while suffering the most excruciating pain, with very high febrile action. About the middle of the second week the attendant physician thought prudent to amputate, which was done immediately. The fever still continued high and about the last of the third week death closed the distressing scene.

Through the kindness of his master C P Montgomery M.D, I obtained the diseased joint, which I had the pleasure of examining. After removing the integument and superficial fascia, I found the ligamentum Patella, Capsular ligament, and articular cartilage

entirely absorbed, and a bony deposit replaced. The Patella was found to be united firmly to the Femur, by osseous deposits. The Femur and Tibia were united together also by osseous deposit.

No synovial membrane could be found. In the centre of the articulation and popliteal region were found about an ounce of a greenish colored pus, which seemed to be infiltrating itself into the cellular tissue. It was found, that the Tibia had suffered from caries, more than either Femur or Fibula, the upper half of the Tibia having been extensively diseased in the first attack.

The specimen of complete ankylosis afforded by the above reported case has been placed in the hands of Prof Buchanan.