

tro-magnet or modifications of it have been used, and the gradual decrease in size and the increase in suspensive force of the instrument are worthy of notice.

CASE I. November 18, 1879. F. S., machinist, aged twenty-four, received a blow upon the eye while at work chipping steel; piece penetrated cornea, and lodged in the substances of and posterior to the iris, with an exposure of only a point of one of its extremities upon it. The lens was opaque. Iridectomy was attempted, but unsuccessfully, hæmorrhage ensuing, the fragment disappeared, and could neither be seen or felt; the point of the electro-magnet was then passed into the eye at the place where the foreign body had been situated, and after the second trial it was seen engaged in the wound and removed with forceps. The magnet used weighed seventeen ounces, and had a suspensive force equal to eight ounces. Dr. F. P. Sprague, in whose clinic the case occurred, soon after removed the cataract, and when last seen, August 16, 1880, the patient had vision of six eighteenths.

Details of the second and third cases occurring in the services of Dr. B. Joy Jeffries, and Dr. C. H. Williams, may be found in the December 30, 1880, number of the Boston Medical and Surgical Journal. The magnet in each of these cases weighed eight ounces, and the ratio of suspensive force had increased to sixteen.

In the fourth case, that of J. S., stone cutter, aged twenty-seven, who came to Dr. Henry L. Shaw, the foreign body, a thin scale of steel, had passed through the cornea, and projected nearly two thirds its diameter into the anterior chamber. As the corneal wound had partially healed over the fragment, all attempts towards its removal were unsuccessful until the wound was reopened with the knife, when the fragment was immediately grasped by the magnet and withdrawn. The weight of the instrument, whose construction was the same as previously described, was five ounces, and its suspensive ratio had increased to over twenty.

The point of the magnet, shown in the engraving, can be removed, and smaller ones attached. Several of these accompany the instrument, which may be obtained of the manufacturer, Thomas Hall, 19 Bromfield Street, Boston.

## THE TREATMENT OF STRAINS AND SPRAINS BY COLLODION.<sup>1</sup>

BY A. N. BLODGETT, M. D.

PHYSICIANS are called upon to treat a great number of injuries to the joints in which there is no discoverable fracture or dislocation, but which are considered to be partial dislocations of the less mobile articulations, accompanied by more or less extensive rupture or laceration of the ligaments about the articulating surfaces, with some degree of effusion into the cavity of the joint, and often a very considerable amount of hæmorrhage and suggillation in the neighboring soft tissues. The nature of the injury makes its recovery a gradual process, the tissues involved are often those in which reparative operations are carried on slowly; the external swelling and the effusion into the articulating cavities are both mechanical hindrances to recovery, so that healing of the lesion can hardly be looked for until they have subsided.

<sup>1</sup> Read before the Suffolk District Medical Society, February 26, 1881.

Added to this is the fact that the most frequent seat of this class of injuries is some joint in the articulations of the ankle or foot, and we have in the location of the accident, perhaps, the most important obstacle to a speedy recovery from the injury. There are but few persons who so completely follow advice as to grant the injured limb freedom from use, for most people will persist in a certain amount of walking with the injured foot under any circumstances. It is often impossible to convince the patient that it is necessary to favor a *strained* joint for the same reason that this is necessary in a dislocated one. Oftentimes the difference between a strain and a dislocation is simply one of degree.

For these reasons the public has learned that recovery from a strain is usually a very slow process, subject to frequent interruptions from the many accidents to which the foot and ankle are exposed in walking, which constantly retard recovery and often are so severe as to prevent any reparative process at all. The formula of the domestic medical adviser that a sprain is often a more prolonged injury and slower to heal than a fracture or a dislocation is, therefore, in most cases correct. The treatment of sprains and strains is often in the highest degree difficult and unsatisfactory; the injury, when located in the foot or ankle, is in a part of the body where the anatomical proportions of the extremity make it unusually difficult to apply many desirable forms of external dressing. The whole limb is rendered useless for purposes of locomotion by any special treatment of the injured portion, and the discomfort and annoyance to the patient are very considerable.

Cold applications or evaporating lotions often macerate the skin and occasion soreness, and the chilling sensation is sometimes so uncomfortable, not to say harmful, to the patient that in some cases this mode of treatment has to be abandoned.

If there be an open wound at the seat of the strain or sprain the treatment of the case is still further complicated. An apparatus for restraining the limb in an immovable position is not often advisable, because of the swelling and other inflammatory conditions of the limb, and it is not desirable to apply an unremovable dressing to any lesion where it is possible to avoid it. It is safe to say that few patients would submit to it if proposed.

It has been my fortune to see quite a number of cases of this injury, and I have treated them according to the methods generally employed in such accidents, and have met with the average amount of success in their recovery; that is to say, after a longer or shorter period of disability the patients have regained the use of the joints, with the usual experience of relapses and weakness for a certain length of time afterward, when the limb is usually fully restored.

In the winter of 1878 I sprained my own ankle, and within the usual time found the parts all about much swollen, the pain considerable, and disability nearly complete. I tried to adjust a bandage, but succeeded only indifferently well, for at the best it would not do what was necessary, and was not easy to retain in place. Treatment by evaporating lotions was so troublesome to me that I soon discontinued all measures of that sort. I was resigning myself to let the sprain take care of itself, when it occurred to me that the application of collodion so prepared that it would contract in drying might be of some service. I made the trial, and was surprised and pleased at the result. For a

few minutes no appreciable effect seemed to follow, but after several coatings there commenced a contraction of the whole layer of collodion from all directions at once, to a much greater degree and in a much more efficient manner than any bandage could possibly effect. The contractile power of the collodion was so great that it seemed as if it would divide the skin at the border of the film. Some of the hairs around the ankle were accidentally included in the collodion film, and were so violently pulled upon that several of them were actually drawn out of the skin. The discomfort attending the contraction of the collodion subsided in a short time, and gave way to a feeling of coolness in the ankle and relief from the pain. The skin became drawn into wrinkles in all possible directions, with a positive and marked diminution in the measurements of the ankle, due to the decrease in the effusion in and about the injured part. After some hours the collodion film cracked in many directions, thus becoming divided into small scales, which I picked off. The skin was not in the least irritated or inflamed by the application. Another fresh coating consisting of several layers of collodion was at once applied before putting the foot to the floor, and the same powerful contraction and a similar diminution of the swelling was effected as at first. In the short space of three days the ankle was restored to its original size, and there was a total absence of pain and tenderness in the joint. I was able to walk without pain, unless the foot was set upon some inequality in the ground, when the strained place of course became painful. In a week I found myself quite well, and have never had a relapse, which I consider the more remarkable as I am not particularly careful, and am upon my feet a great deal.

Soon after this time a pedestrian of some note slipped in a walking match and strained his right ankle. He was ambitious, and considered the accident too trivial to merit attention, and frequently hurt the ankle by standing and walking upon it. In a few weeks his ankle was swollen, tender to the touch, and painful in walking, subject to continual injury from the slightest misstep, and the occasion of much inconvenience to the patient. In this unfavorable state of affairs, treatment by collodion was advised, and the patient left for New York. I have not seen him again, but heard a few weeks afterwards that by the use of collodion he had fully recovered from the weak condition of the ankle, and was less liable to hurt it by a misstep.

CASE III. A physician in this city made a misstep upon a grating over a hole in the pavement, and fell, spraining the ankle badly and also inflicting a deep punctured wound by some blunt instrument which could not be found afterward. The wound had lacerated edges and a large opening from which a portion of fatty tissue was protruding. The whole foot was greatly swollen, pain was considerable, and the disability complete. With scissors the protruding fragments of fat tissue were cut away, even with the surface of the wound, a square piece of clean, soft linen was laid upon the wound, and over this a larger piece of adhesive gold-beater's skin was applied, thus sealing the wound from the air. Collodion was then applied in several layers over the whole, and continued for a considerable distance upon the uninjured parts of the foot in all directions. When this was dry and firm, cold evaporating lotions were directed, and were faithfully applied. The effect of the cold was fully obtained in the diminution of heat in the swollen foot, but the

most desirable feature was the entire absence of any maceration of the skin or chilling sensation. It was, in fact, a *dry cold*, such as is obtained from an ice-bag, so thoroughly was the foot protected from moisture by the collodion. Not a drop of water reached the wounded spot, and nothing was discharged from it but a little clear serum at the time of the first application, which appeared to be mechanically squeezed out of the flesh from the compression of the tissues by the collodion. The pressure of the parts beneath by the contraction of the collodion film was moderately painful for a few minutes, and then absolute ease was obtained. There was no return of pain. The wound was not disturbed, the dressing was not changed. Healing of the lacerated surface took place by first intention and without suppuration, and, contrary to advice, the patient was walking in four days, without pain, and has remained perfectly well ever since.

CASE IV. An athlete, while turning somersaults, failed to alight where he had intended to, and came to the floor with the right foot resting half on, half off, a thick mat. The result was a severe sprain, which the patient aggravated by endeavoring to "work it off," by standing squarely on the foot, rubbing it, etc. I was called the next morning, and found the foot much swollen, painful, hot, and entirely disabled. After bathing and carefully drying it, collodion was applied over the seat of the sprain, and carried for some distance on to the sound skin around. Vigorous contraction followed, and cold evaporating lotions were applied. In twenty-four hours the swelling had almost entirely subsided, the temperature of the part had sunk to normal, the pain had disappeared, and the relief was so great that the patient felt inclined to put on his shoe. Here, too, the effect of *dry cold* was obtained. Only two visits were made, and in four days the patient was walking in a high-laced shoe, without pain or discomfort. He was advised to continue the collodion for at least two weeks. I do not know if he followed my instructions, but he is perfectly well, and practicing athletic feats every day.

CASE V. A banker on State Street stepped from a horse-car, and strained his foot. He walked a little every day upon the injured foot, and every day he would in some way "tip it over," as he said, until it grew very painful, and threatened to become permanently weak. Under these unfavorable circumstances he was advised to apply collodion, and did so. After five days he reported that the pain and tenderness had entirely subsided; the liability to "tip over" was becoming remarkably less, and the feeling was as if a stout, supporting bandage were accurately adapted to the foot and ankle, which exercised gentle and continuous pressure in any position of the foot. The continued use of the collodion in this gentleman's case, also, has resulted in a perfect cure, when the prospect was that the ankle would remain weak, and become easily strained by any false step.

CASE VI. A young gentleman strained his foot in the gymnasium, the location of the injury being in the articulation between the scaphoid and the cuneiform bones. Before I saw the patient he had already made a vigorous application of tincture of arnica, followed by a similar application of a domestic preparation called "balm of Gilead," which is a tincture made from the buds of the tree which is known by that name. I did not know of this when I examined the ankle, which I found much swollen, very hot, and quite pain-

ful. The superficial tissues were quite œdematous and boggy, and the general appearance was that of a bad injury. It was impossible to examine the state of the joint satisfactorily on account of the pain and swelling, and collodion was applied as in the other cases. The next morning the swelling of the foot was not diminished but was rather increased, and beneath and around the film of collodion was an acute traumatic eczema, the result of the applications which had been made to the ankle the day before, which was also developed on the right hand of the patient, where the lotions had come in contact with the skin while rubbing the foot.

In this case all active treatment of the strain was at once discontinued, and the foot and hand were wrapped in cloths spread with diachylon ointment, which had the effect of gradually reducing the eczematous inflammation, until at the end of three weeks a large shoe could be worn, and in one week more the patient was able to go to his business. The strain was not materially influenced by the treatment of the skin disease, but was necessarily kept at rest, which did it some good. Upon trying to walk, however, at the end of three weeks, it was still weak and painful. Collodion was now applied with the effect of rapidly increasing the strength of the foot, and all pain soon disappeared. The patient has been to his office every day, and has no further discomfort.

CASE VII. Mrs. J. A. made a misstep, and had the usual symptoms of sprain, namely, pain in using the foot, considerable heat, and very great swelling. Collodion was applied, as in the other cases, with the effect of at once reducing the effusion, and in a week the foot was no longer painful in walking, though still somewhat weak. In a fortnight the recovery was complete, and although the patient is a large and heavy woman there has been no relapse.

CASE VIII. F. P., an oarsman of considerable celebrity, slipped while running, and suffered a subluxation in the articulation of the fifth metatarsal bone of the left foot with the tarsus. The injury was accompanied by a noise like the breaking of a stick, which was distinctly audible to the bystanders. When I saw him the foot was painful to the touch, swollen, hot, with all the signs of an extensive injury to the joint, and a partial dislocation of the metatarsal bone, which was more freely movable than its fellow on the other foot. The foot was gently washed, and then parallel lines were drawn upon the skin with ink. Collodion was applied in six layers, and soon a powerful contraction supervened with the effect of diminishing the distance between two sets of lines from 12.5 mm. to 10 mm., or twenty per cent. of its breadth of surface, and from 15 mm. to 12 mm., or twenty per cent. of its breadth respectively. The ratio of contraction is strikingly similar in these two measurements, and I feel quite certain that other experiments will show a permanent co-efficient of contraction which will only vary somewhat in amount, according to the location of application and the quality of collodion employed.

The uniform result which followed the use of contractile collodion in these few cases seems to me a sufficient reason for desiring to call the attention of the profession to this method of treating strains and sprains, particularly in and about the ankle. These cases may be supposed to represent the majority of such injuries as they present themselves in daily practice, and I consider them without doubt to be such as would other-

wise have been a source of trouble for weeks, as is usual under ordinary conditions. The treatment by contractile collodion greatly accelerated the recovery, besides restoring to the injured parts an almost perfect immunity from relapse, which is the exception in the healing of strains and sprains.

I do not remember ever to have heard of the use of contractile collodion in the treatment of sprains, and I have never known of its being employed by any person for this purpose previous to the injury which I sustained in my own ankle. This was my first experience in its use, and the result was so satisfactory that I have employed it in all appropriate cases occurring in my practice since that time. In each case its action has caused great surprise to the patient, and the treatment thus far is perfectly satisfactory. I do not know any objection to its use either from its composition or from its retracting power. It seldom causes any irritation of the skin, it does not interfere with the circulation, it never endangers sloughing. The fact seemed to me quite remarkable that, although the contraction was very powerful around the ankle, there was never any puffiness or swelling about the toes or any part beyond the ankle. I do not think a bandage could possibly be applied so as to exercise a similar compression upon the parts beneath without occasioning swelling of the parts beyond the bandage. A very desirable quality in collodion in the treatment of any accompanying wound, as in Case III., is the fact that it forms an impervious covering over the wounded surface, thus hermetically sealing it from the air and from the dangers which often threaten an open wound by infection from this source.

The adaptability of this mode of treatment to cases requiring the application of cooling or evaporating lotions is also of great advantage. The refrigerant is applied directly to the points where such an action is most desirable, and exercises its full force in the way of reducing the temperature of the part, and yet it does not absolutely *touch* the skin. The result of the protection to the skin is, that the effect of a *dry* cold is obtained instead of a *wet, chilling* cold. The skin does not become macerated and soggy from the action of the cold application, and the sensation of the patient is much more comfortable, not to say agreeable, than from the *contact* of a refrigerating application. Indeed, the film of collodion is so admirable a conductor of heat that I have seen the temperature in a sprained ankle become reduced from this alone, when I am convinced that without the collodion film an evaporating lotion would have been indispensable in the local treatment of the injury. The skin is not thickly covered as by a bandage, but a thin transparent film is spread evenly over its surface, through which every symptom in the injured part can be distinctly and clearly recognized and every shade of color in the skin be plainly discerned. After some hours the film already applied becomes cracked in the lines of its wrinkles when it may be easily peeled off and a new film immediately applied to the same spot, by which all the benefit of a new, fresh compression of the parts is at once obtained.

The treatment may be continued indefinitely. Before applying the collodion it is advisable to gently wash the part to be treated with soap, in order to remove any oily or greasy matter from the skin. These substances might decompose beneath the film and irritate the skin, and they might also prevent the collodion from adhering perfectly in every part. It is

desirable to avoid both these contingencies, and for these reasons I always wash the ankle and dry it carefully by pressing a towel upon it *without rubbing*, by which the moisture can be completely removed, when the collodion may be at once applied. Each additional coat of collodion strengthens the layers already applied, thus acting with a cumulative power in compressing the part and reducing effusion about the seat of injury.

Among the advantages of this mode of treatment are, briefly, prolonged elastic compression in parts notoriously difficult to bandage properly; waterproof protection to the skin from external irritants or applications; hermetical sealing up of wounds in the region of the strain or sprain; constant access to the part without the removal of dressings; an uninterrupted view of every part of the injured limb; reduction of heat in the tissues; great acceleration of the process of healing with perfect restoration of function; a great degree of immunity from relapse; and absolute simplicity in application.

So far as my limited experience warrants an opinion of collodion in the treatment of strains and sprains, I am inclined to consider it by far the best, simplest, and most satisfactory method I have ever known, and I am confident that others will obtain equally pleasurable results in similar cases. I think it more than probable that collodion may prove valuable in the treatment of certain other diseased conditions, upon which I trust to be able to communicate some observations at a future time.

The degree of contraction depends much upon the quality of collodion employed. There is a *flexible* collodion which contains castor oil; this does not contract at all, or but very slightly, and will not do the work. The so-called "*contractile* collodion" must be employed for this purpose. It yields uniform and satisfactory results and is quite durable. It is very volatile and should be kept stoppered, and when being used the finger should be tightly applied to the mouth of the bottle. It is also liable to explode, from the ether it contains, brought too near a flame, but is fully as safe as ether, and we all use this agent by day or by night without accident.

To obtain the contractile effect of collodion it is necessary to apply several coats successively, one upon the other. I think I have never applied less than six layers, which is easily accomplished as the collodion dries very quickly and a second coat can be applied almost as soon as the first is finished. If for any reason it should become desirable to remove that which has been applied this can readily be done by means of a small quantity of ether, which dissolves the collodion with great readiness. This will hardly be necessary, as the collodion, even if applied to a part where it were not required, causes at most only slight inconvenience, but not great pain, and is not productive of dangerous results.

— The *British Medical Journal* is responsible for the statement in a late article that there has been only one single outbreak of trichinosis recognized in England, and that was from eating the flesh of a home-bred pig.

— The Fisk Fund Prize Essay for 1880, on the Sympathetic Nerve and its Relation to Disease, by C. V. Chapin, M. D., has been published by the trustees of the fund, and is to be had at Messrs. A. Williams & Co.

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## RECENT PROGRESS IN THE THEORY AND PRACTICE OF MEDICINE.

BY GEORGE B. SHATTUCK, M. D.

### INFECTIOUS (SO-CALLED ULCERATIVE) ENDOCARDITIS.

DR. WILLIAM OSLER,<sup>1</sup> of Montreal, discusses this comparatively rare disease, which has only received attention within the past few years, in connection with seven cases, one in a cow, of which he was cognizant, and all accompanied by autopsies. His paper is instructive and interesting, and is rendered more valuable by carefully executed plates of the microscopical appearances of the endocardial vegetations. We make such extracts from it as space will allow. Under the terms *diphtheritic*, *ulcerative*, *malignant*, *septic*, or *infectious* endocarditis, *arteria pyæmia*, *mycosis endocardii*, physicians now recognize one of the most formidable of cardiac affections, characterized by a peculiar morbid process on the valves, blood contaminations, constitutional symptoms of the typhoid or pyæmic types, and usually associated with multiple emboli.

With regard to the nomenclature, he thinks the terms *infectious* and *septic*, as given by Jaccoud,<sup>2</sup> better than the others. Against the name *ulcerative* is the fact that there may be no actual ulceration on the valves, and there may be, on the other hand, endocardial losses of substance without the special constitutional disturbances by which the disease is characterized. The term *diphtheritic* is good, in so far as it expresses a resemblance in the histological features of the valvular disease to that of true diphtheritic exudation, but this is scarcely sufficient ground for its use; and it is, in a way, misleading, indicating a relation between diphtheria and the disease which is not known to exist. The name *mycosis endocardii* certainly expresses a striking feature of the local process, but with our present imperfect knowledge of the relation of the micrococci colonies to the disease, such a designation is, to say the least, premature. On the other hand, the term *infectious* presupposes no special view as to the nature of the local process, and at the same time indicates, as Jaccoud says, a constant and exclusive character of the disease.

It would appear that, clinically, three classes of cases are included in the disease known as ulcerative endocarditis, and he thinks it important that a distinction should be made between them. We have:—

(1.) Those cases in which the disease appears without any obvious cause, either spontaneously or in connection with rheumatism or some other affection. The term *infectious* might be applied to this class. It is the *arterial pyæmia* of Wilks, the primary ulcerative endocarditis of some authors.

(2.) Those in which the endocardial disease is secondary to some inflammatory focus — acute necrosis, puerperal endometritis, etc. To these the term *septic* might be applied.

(3.) In certain cases of chronic valvular disease an acute endocardial process may be engrafted (recurrent endocarditis), presenting anatomical features similar to the infectious form, but not characterized by the same clinical picture, the patients dying with the symptoms of chronic heart disease.

The chief points to which Dr. Osler wishes to call

<sup>1</sup> Archives of Medicine, February, 1881, page 44.

<sup>2</sup> Pathologie Interne, tome i., and Nouveau Dictionnaire, tome iii.