DUPUYTREN'S CONTRACTION.

BY

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DUPUYTREN'S CONTRACTION was described by Sir Astley Cooper in the early part of last century, but it was not till 1831 that the first case was dissected by Dupuytren, who found that the disease was due to a thickening and shortening of the palmar fascia, and not to a contraction of the tendons.

Mr. Robert Jones of Liverpool¹ has recently described the process as a plastic inflammatory one, a "fibrositis of the palmar fascia, not associated with any inflammatory thickening of the skin."

A wound, abscess, or burn of the hand may lead to flexion of the fingers and simulate Dupuytren's contraction, but the contraction in them is due—for example, "miners' beat-hand" and glass-blowers' "hook-hand"—to the formation of scar tissue (which contracts), and is not limited to the palmar fascia. The congenital condition of finger contraction, not infrequently seen and generally involving the little finger, is due not to a thickening and contraction of the palmar fascia, but in part to a shortening of the finger-joint capsules and in part to a contraction of the skin and tendon sheaths. Several writers have erroneously termed this condition a "congenital" form of Dupuytren's contraction.

PATHOLOGY.

The condition is due to a thickening and contraction of the digital processes of the palmar fascia; the main body of the fascia is affected secondarily. As a result of the thickening and contraction, the fingers become more or less drawn into the palm; the flexor tendons are not actively contracted. In extreme cases the interphalangeal joints may become partially dislocated. Microscopically the thickened palmar fascia is found to consist of fibrous strands intermingled with cellular infiltration, indicating a plastic inflammation.

The skin over the thickened fascia, normal in the earlier stages of the disease, may become puckered owing to the contraction of the fibres of the palmar fascia attached to the skin; in the later stages the skin generally becomes closely adherent to the fascia. The results of investigations to ascertain the presence of micro-organisms have been negative. The condition appears to be not unlike the sclerosis occurring in the tertiary stage of syphilis.

COURSE AND SYMPTOMS.

The disease has been described in four stages by Dr. Collis and Mr. Eatock.²

1. In which the palmar fascia only is involved.
2. In which the palmar fascia is involved and one or more digits are slightly flexed.
3. In which the palmar fascia is involved and one or more digits are semiflexed.
4. In which the palmar fascia is involved and one or more digits are totally flexed.

In a bilateral case the two hands may be affected in different stages. The disease is very chronic; in some cases it may remain stationary for many years and in others it may develop comparatively rapidly, Stage 4 being reached in the course of a few months from the onset of the disease.

In the first stage a cord-like thickening of the palmar fascia is felt extending backwards from the base of one or more digits; in a few instances this has been preceded by or associated with a little pain in the palm, but generally the disease comes on painlessly. Next, the skin over the thickened, cord-like fascia usually becomes puckered at one or more places in a characteristic way. As the disease progresses the affected digits become more and more flexed into the palm and the skin intimately adherent to the fascia. Lastly, the interphalangeal joints may become dislocated.

The disease may affect one or both hands; when unilateral the right hand is the more frequently involved. Some observers, who appear, however, to be in the

minority, believe that the disease is more often bilateral. My figures are as follows:

Bilateral	...	...	...	...	104
Unilateral—					
Right hand	...	...	...	...	89
Left hand	...	...	...	...	47
Total	...	...	...	...	240

Dr. Hume¹ collected 118 cases among men and found 40 bilateral and 78 unilateral cases (57 right hand, 21 left hand). On the other hand, Dr. Keen³ of Philadelphia noted that in 184 cases both hands were involved 103 times and one hand 81 times (right hand 58, left hand 23).

The digit most commonly affected is the ring finger, next the little finger, then the middle finger, then the thumb, and lastly the forefinger. Some observers have stated that the little finger is most frequently involved, but this is not the experience of the majority.

Etiology.

Sex.—The disease occurs in men much more frequently than in women. I examined the inmates of the Nottingham Workhouse and found 57 cases of Dupuytren's contraction among 270 old men, or 21 per cent., and only 3 cases among 168 old women, or 1.8 per cent. Of the 240 cases collected by me, 19 only were women. Dr. Keen noted the sex in 227 cases of the disease, and of these 187 were men and 40 women, but his figures are not of great value, as he does not state the numbers of the men and women examined. Noble Smith⁴ examined 700 aged inmates of London workhouses, and found 55 cases of the disease among the 300 men, that is 18.3 per cent., and 15 cases among the 400 women, that is 3.75 per cent.

Age.—The disease occurs in middle and late life. The average age of the 270 old men examined by the writer at the Nottingham Workhouse was 63, and of these 21 per cent. were afflicted with the disease. De Lom, a surgeon in the British army, found only 3 cases among 203,000 soldiers between the ages of 17 and 35.

Heredity.—The disease often runs in families, and the hereditary tendency has been repeatedly observed. Keen found, out of 198 cases in which the family history was noted, that in 50, that is 25 per cent., members of the patients' families had been affected. Dupuytren's contraction has been known to occur through three and even four generations.

Class.—It has repeatedly been said that the disease in the non-working classes is as common as or more common than in the working classes. The only figures that bear on this question of the class affected are those of Dr. Keen and my own. Keen collected the records of 123 cases of this disease where the occupation was given; of these 49 were working class and 74 non-working class. In order to obtain information on this point I communicated with a number of general practitioners in the Nottingham district and received replies from 135, giving particulars of 131 cases of Dupuytren's contraction. These cases were analysed as follows:

Males	...	...	...	...	115
Females	...	...	...	...	16
Right hand	...	...	...	...	52
Left hand	...	...	...	...	29
Bilateral	...	...	...	...	50
Working class	...	...	...	...	63
Non-working class	...	...	...	...	68

The occupations of the affected persons were recorded.

These figures show a smaller difference in favour of non-working class than the figures given by Keen.

Associated Conditions.—Rheumatism or gout has been found to be associated with Dupuytren's contraction by many observers in numerous cases. Keen noted a history of gout in 95 out of 198 cases—that is, 48 per cent. of his cases had a gouty history. Luff believes there is no connexion between this disease and gout. It has been observed by several writers that in rare cases the disease is associated with a similar affection of the plantar fascia. Diabetes was found by Teschemacher⁵ to be associated with 33 out of 213 cases observed by him.

CAUSATION.

As to the cause of Dupuytren's contraction there are two antagonistic theories—namely: (1) That the disease

is brought about by external agencies—that is, palmar stresses; and (2) that it is due to an internal or constitutional factor. Some authorities believe that there is a combination of both causes.

The palmar stresses may consist of repeated blows or pressures in the palms of the hands, causing many slight injuries, with resulting chronic inflammation, and, finally, fibrosis and contraction; thus the use of the chisel by carpenters, the reins by cabdrivers, the spade by gardeners, and, among the non-working classes, the use of the oar, the gun, the golf club, the polo stick, the cricket bat, and so on, are all suggested as capable of causing palmar stresses.

The supporters of the constitutional theory of the causation of the disease include a number of writers, such as Sir William Fergusson,⁶ Little,⁷ Keen,⁸ Adams,⁸ and William Anderson,⁹ the last three being probably the leading writers on the disease. Keen states: "Its cause lies deeper than any local influence, and a constitutional vice like gout or rheumatism, if sought for, will nearly always be found." Adams states: "It always depends upon a constitutional rather than any local cause." William Anderson doubts whether occupation predisposes to or causes the condition, and states: "There is no question that the earlier observers greatly exaggerated the importance of this factor. It appears, indeed, that in various callings which involve much rough treatment of the palm, the affection is even less common than in the rest of the community."

In 1910, Mr. Wardle, the Secretary of the Amalgamated Society of Operative Lace Makers, having found a large number of the lace "twisthands" or "mindors" of lace machines in Nottingham affected with the disease, communicated with the Chief Inspector of Factories, with the result that Dr. Edgar Collis, one of H.M. Medical Inspectors of Factories, and Mr. Robert Eatock, the Inspector of Factories in Nottingham, made a careful investigation.² They examined 1,156 "twisthands" employed in 182 factories, and found 85 cases of Dupuytren's contraction—that is, 7.35 per cent. They also examined 652 tinplate makers and 1,003 granite dressers, finding no cases among the former and only three among the latter. Their conclusions were as follows: "(1) The disease is more than usually prevalent among the lace-machine minders; (2) this prevalence has a direct relation to (a) the frequency with which the levers and wheels of the machines are manipulated, and (b) the power to actuate these levers and wheels, and their size, shape, and position."

A Departmental Committee, consisting of Mr. Ellis Griffith, K.C., M.P., Sir Clifford Allbutt, K.C.B., His Honour Judge Ruegg, K.C., and Dr. Morrison Legge, was appointed by the Home Secretary to inquire into this matter. The Committee examined "mindors" of lace machines at work in the city and district of Nottingham and took evidence from various persons, including a number of medical men from different parts of the country. The minutes of the evidence and the report of the Committee have been published.¹

Some medical men gave evidence that palmar pressures or stresses were the exciting cause in all cases, and prominent in upholding this view was Dr. Collis. Others, like Dr. F. Shufflebotham, stated that the disease might be due to this or some constitutional cause. Mr. Robert Jones thought that the cause was probably a predisposition in an individual with palmar irritation as the exciting cause. I was among those who suggested that the cause was internal or constitutional.

The evidence I gave before the Committee was based on information derived from various sources. First, there was the return from the medical practitioners in the Nottingham area already referred to, which showed fewer cases among the working class than among the non-working class. Secondly, I had examined the in-patient records of the Nottingham General Hospital for the seven years 1905 to 1911 inclusive, and out of 21,471 in-patients found only one case admitted for Dupuytren's contraction, whereas during the seven years 1903 to 1909 at St. Thomas's Hospital, out of 50,224 patients admitted there were 21 cases of the disease; this shows that the disease is more rare in the Nottingham Hospital than in St. Thomas's Hospital. Thirdly, I examined the hands of 1,329 lace machine "mindors" or "twisthands" at work in the city and district of Nottingham employed

in 68 factories, and found 23 cases of Dupuytren's contraction among them—that is, 1.7 per cent. of the twisthands examined were affected with the disease. There were various cases of congenital contraction, contraction following a wound, abscess, or burn, but these were, of course, disregarded as not being cases of Dupuytren's contraction. The discrepancy between my percentage—namely, 1.7, and that of Dr. Collis, who found 7.35 per cent. affected—may perhaps be accounted for by the latter having visited a larger number of the small tenement factories where most of the older men were to be found. There were very few cases of the disease to be met with in the large factories, where for the greater part the "twisthands" were younger men. I examined 1,329 men in 68 factories, Dr. Collis 1,156 men in 182 factories. Fourthly, I examined all the inmates of the Nottingham Workhouse at Bagthorpe, and noted, in the cases of the males, their ages, occupations, and the periods for which they had worked. The results were these:

	Males.	Females.	Total.
Number examined	270	163	438
Cases of Dupuytren's contraction	57	3	60
Percentage	21	1.8	13.7

The statistics obtained regarding the 270 males were analysed as follows:

	Average Age.	Average Number of Years at Work.
57 men affected with Dupuytren's contraction	67.6	41.8
213 men free from the disease	61.8	40.4

It will be seen that the average age of the men affected with the disease was 5.8 years higher than those unaffected, whereas the average number of years worked by the former was only 1.4 higher. Thus the length of time a man is at work seems to be a less important factor than his age.

The 57 cases of the diseases are analysed as follows:

	Total.	Average Age.	Average Number of Years at Work.
Cases in the 1st stage	19	68.8	35
Cases in the 2nd, 3rd, or 4th stage...	38	67	43.6

This table shows that the first or earliest stage of the disease occurred in men who were older but had done much less manual work in their lives than those affected with the disease in its later stages. And on comparing this table with the previous one it appears, curiously, that the men unaffected with the disease had on an average done much more work than the men affected in the first stage. Of the 270 inmates, 20 had worked as lace twisthands, and of these 20 only 3, that is, 15 per cent., were affected with Dupuytren's contraction, a percentage less than the average, in spite of the fact that the lace twisthands had worked longer than the average. The figures are analysed as follows:

	Average Age.	Average Number of Years at Work.	Number Affected with Dupuytren's Contraction.	Percentage.
Total inmates, 270...	63	40.7	57	21
Twisthands, 20 ...	64.1	43.7	3	15
Total excluding twisthands, 250 ...	62.9	40.5	54	21.6

Advocates of the theory of "external causation"—that is, that pressure or stress is the cause—of Dupuytren's contraction have explained (1) the greater prevalence of the

disease in the male sex as being possibly due to the hands of males, as a class, being subjected to rougher usage than those of females; (2) the greater prevalence among old men as being possibly due to their hands having been subjected to stress for longer periods than those of younger men; and (3) the prevalence among men of the leisure class, equally with those of the working class, as being possibly due to individuals of the former class having played games, such as golf, polo, and cricket, which give undue work to the hands.

These three explanations are interesting rather than convincing, for, as regards the first, it may be noted that there are other diseases, such as cancer of the stomach, which are rarer among women than among men. As regards the second, we have, as shown above, statistics showing, for workhouse inmates, a greater prevalence of Dupuytren's contraction in the first stage among men who had used their hands for a longer than among those who had used them for a shorter period; and, as regards the games of the leisured class, it cannot readily be believed that the amount of pressure or stress to which the hands of a golf player are subjected (and golf is almost the only game which to a large extent is practised by men who have left their youth behind them) has any approximation to the stress on the hands of a working man.

Even the further suggestion that the greater prevalence of Dupuytren's contraction in the right hand (the hand most used) supports the theory of "external causation" must, I fear, be discarded as being plausible rather than satisfactory, for we must not forget, first, that in a right-handed person there is a greater blood supply to the right hand than to the left; secondly, that cases of Dupuytren's contraction have been found in the left hands of right-handed persons; and, thirdly, that in nearly one-third (more than one-third in my experience) of the unilateral cases the hand affected is the left.

The tendency of Dupuytren's contraction to affect both hands, which would seem to be opposed to the theory of external causation, has never yet, so far as the writer can ascertain, been explained satisfactorily. One of the attempted explanations is that the disease becomes bilateral by "sympathetic" inflammation, and is akin to the "sympathetic" inflammation of the right eye when the left eye is inflamed and vice versa. This explanation (indeed the whole theory of "sympathetic" inflammation) is scarcely worth serious attention, in view of recent investigations showing that particular examples of what used to be regarded as "sympathetic" inflammation were due actually to the direct conveyance of organisms from one part of the body to another. Another attempted explanation of unilateral cases of Dupuytren's contraction becoming eventually bilateral is that when one hand is affected with the disease the other hand is required to do more work. This explanation is not very important, for it seems to be applicable exclusively to the rare cases in which a man's right hand is rendered so useless that he has become, and has remained for a great many years, a left-handed man.

It has already been mentioned that in rare cases of Dupuytren's contraction of the hand the plantar fascia of the feet has been found to be similarly affected—an indication, apparently, of the disease being entirely independent of the mechanical causes assigned by the advocates of the "external causation" theory. Nor on this theory is it apparent how the hereditary tendency of the disease can be explained, or the fact that "beat-hand," an affection due to external stress, is rarely, if ever, followed by Dupuytren's contraction. Though I realize that in the existing state of our knowledge it would be unscientific to assert that the disease is wholly unconnected with external pressure, I must decline to admit that the advocates of the "external causation" theory have, as yet, proved their case. I even venture to surmise that the true cause, or at least the principal cause, of Dupuytren's contraction will eventually be recognized to be a certain internal condition (possibly akin to a gouty or rheumatic condition) among persons of advancing age.

TREATMENT.

The treatment of Dupuytren's contraction requires great care and patience, but the results are often most encouraging.

Non-operative Treatment.—In the earlier stages of the

disease, when there is the slightest tendency to contraction, the patient should wear, at night only, a well-padded splint on the affected finger, for the purpose of hyper-extending it. Care must be taken to avoid giving pain, for pain would indicate that the extension was excessive, and more harm than good would be done. In combination with "extension," manipulations, massage, hot water, and Bier's treatment are useful. Fibrolysin injections have been tried, but the results cannot, on the whole, be regarded as encouraging. Ionic medication has also been tried. Leopold-Levi,¹⁰ who believes that Dupuytren's contraction is a symptom of thyroid deficiency, tried internal treatment with thyroid extract in 7 cases, with favourable results in 5. The daily dose consisted of 10 centigrams of thyroid powder, and in one case as many as 163 doses were given.

Operative Treatment.—When non-operative treatment fails, and in advanced cases of the disease, an operation is necessary. Apart from amputation (which, of course, must be reserved for exceptional cases of a very troublesome kind) there are two operations, known as the open and the subcutaneous respectively. In the open operation skin flaps are dissected from the palmar fascia; the palmar fascia is then excised and the wound is closed. The greatest care must be taken to keep the parts aseptic, for if the wound suppurates the operation will fail and the contraction will become excessive. The operation is by no means easy; it requires much patience; the dissecting back of the skin flaps from the adherent palmar fascia is troublesome, and the excision of the fascia from the sheaths of the flexor tendons must be done bit by bit. When this excision has been completed the digits, in favourable cases, will be found to be free and capable of being almost completely straightened. At this stage some surgeons rub fibrolysin into the open wound. The skin is then closed, and a well-padded splint is attached to keep the digits as straight as possible. The splint must be worn for some weeks uninterruptedly and afterwards at night only, until the digits are straight and all tendency to contraction has been overcome. The subcutaneous operation gives excellent results if carefully carried out after the manner described by Adams.⁸ A very fine tenotomy knife is inserted between the skin and the tense bands of the palmar fascia, all of which, through as many punctures as may be necessary, are carefully divided. Generally, from six to ten punctures suffice, but in extensive cases as many as twenty punctures may have to be made. A properly devised finger splint is then applied and worn continuously until the digits are straight; afterwards the splint is worn at night only for several months. In the event of a relapse, which is uncommon, the operation can be repeated.

REFERENCES.

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- ³ Keen: *Buck's Reference Handbook of Medical Sciences*, 1886, vol. iii, p. 159; also *Philadelphia Medical Times*, 1881-82, xii, p. 370.
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- ⁵ Teschemacher: *Ober das Vorkommen de Dupuytren'schen Finger kontraktur bei Diabetes Mellitus*, *Deut. med. Woch.*, 1894, No. 14.
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- ⁷ Little: Article in *Holmes's Surgery*, vol. ii, p. 253.
- ⁸ Adams: *The Contractions of the Fingers*. London, 1892.
- ⁹ William Anderson: *Deformities of the Fingers and Toes*. London, 1897.
- ¹⁰ Leopold-Levi: *Bulletins de l'Académie de Médecine*, January 14th, 1913.

DR. A. L. GARBAT publishes in the *Journal of the American Medical Association* of February 6th an article on sensitized versus non-sensitized bacteria in the prophylaxis and treatment of typhoid fever, with a report of 17 cases treated with sensitized vaccine. Dr. Garbat concludes that the treatment of typhoid fever by sensitized typhoid bacteria offers a more rational therapy from an immunological point of view than treatment by the ordinary non-sensitized vaccine. The repeated inoculation of large doses of sensitized vaccine, even in patients already very ill, was not attended by any harmful effects or a distinct negative phase. The general course of the disease seemed milder, and the complications fewer. Improvement was usually gradual, but crises occurred in a small percentage of cases. Dr. Garbat suggests that perhaps more striking results may be attained by a larger number of smaller doses more often repeated.