INCONTINENCE OF URINE IN CHILDREN.

BY

CHARLES W. TOWNSEND, M.D.,

BOSTON, MASS.

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A STUDY of the etiology of any disease or abnormal condition, its frequency and the circumstances under which it occurs, is always essential to the rational and successful treatment of that condition, while the treatment of a disease as a symptom without regard to its causation is generally as unsuccessful as it is irrational. The symptom of incontinence of urine, or enuresis, in children illustrates very perfectly this fact, for the physician who attempts to treat it in a routine way without investigating its cause generally regards it as a disease unaffected by the healing art, an idea which, as a natural consequence, prevails among the people.

As shown by Goltz,* there is a reflex centre for micturition in the lumbar spinal cord. Impulses descending from the brain call this centre into action, and result in contraction of the muscles of the walls of the bladder and ejaculator urinæ, and in relaxation of the sphincter, thus causing micturition. The sensation of a full bladder is, of course, the normal incentive to this reflex act. In the child, owing to the high state of tension of the nervous system, various peripheral irritations may send reflex impulses to this centre, which, proving too strong to be overcome by impulses from the brain, throw the centre into action, and involuntary micturition, or incontinence of urine, is the result. This would occur most naturally during sleep, when the centre for volition is least active, but if the irritation be strong enough, it may occur as

* Pflüger's Archiv, viii. p. 474.

well during the waking hours. Various reflex disturbances would therefore be among the causes of incontinence of urine; a second cause would be found in a relaxed or atonic state of the bladder, and a third in any malformation of the bladder or urethra.

The following table of these three great causes, with their subdivisions, will, I think, be sufficiently clear after this physiological explanation:

Causes of Incontinence of Urine.

I. Reflex.
   1. Increased quantity of urine:
      (*a*) diabetes, (*b*) nephritis.
   2. Irritant quality of urine:
      (*a*) increased acidity, (*b*) uric acid crystals, (*c*) calcic oxalate crystals, (*d*) excess of phosphates.
   3. Vesical calculus.
   4. Hypersensitive state of external genitals from:
      (*a*) stricture of urethra.
      (*b*) phimosis.
      (*c*) balanitis or vulvitis.
   5. Anal irritation from:
      (*a*) pin-worms.
      (*b*) eczema.
      (*c*) fissure.
   6. Psychical.
   7. Increased irritability of bladder.

II. Atony of sphincter vesicæ.
   1. General debility.
   2. Spinal disease.
   3. Acute febrile disease.

III. Malformations of bladder or urethra.

Owing to the common idea that this disorder cannot be cured, statistics obtained from lists of diseases treated in out-patient departments give no idea of its prevalence. Thus, Adams* finds that out of nineteen thousand two hundred and sixty-one cases in children's out-patient departments of various hospitals, only fifty-five applied for treatment for incontinence. I found that in fifteen hundred cases of children's diseases treated in the medical out-patient department of the Boston Children's Hospital, twenty-five applied for treatment for this disorder. Morris† states that in some boys' reformatories one boy in twenty wets his bed, and that incontinence is even more frequent than this among the colored.

In order to get some idea of the prevalence of this disorder and its most frequent source, mothers of families as met in a dispensary district and at the out-patient department of the Boston Children's Hospital were asked the ages of all their children, their general health, the time at which incontinence ceased, or, if it continued or began again later in life, the particulars of this habit were inquired into and the child examined if possible. The families were therefore all among the lower and lower middle classes, and the results are rather surprising that twenty-one and a half per cent. of all cases were found to have or have had incontinence. As the mothers were generally ashamed of their children's habit in this regard, it is probable that some cases that existed may have been denied, and therefore that the figures are not exaggerations.

The following is an analysis of my cases: Boys, 179; girls, 176; total number of children, 355. Of these, 77 were incontinent, 278 were not, or twenty-one and a half per cent. of

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* Journal Am. Med. Assoc., 1885, iv. 6.

† Med. and Surg. Reporter, 1881, xliv. 652.

all cases were incontinent; and of these, 42 were boys, 35 were girls. The incontinence was diurnal and nocturnal in 28, diurnal only in 2, and nocturnal only in 47.

The ages at which the physiological incontinence of infancy ceased were:

Under 1 year	in	45
1 to 1½ years	"	129
1½ to 2 "	"	45
2 to 2½ "	"	44
2½ to 3 "	"	15
Total,		278

Cases in which incontinence continued beyond the third year were classed among the abnormally incontinent. Incontinence was found rarely to cease before the ninth month; in three it was said to have stopped at six months, and in one at three months. It continues generally longer at night than day, and is apt to recur in slight acute diseases, especially colds.

In fourteen cases incontinence came on after the primary incontinence of infancy had ceased, and of these it began again in seven at the sixth year, in six before that age, and in one—a boy—at the age of fourteen and a half years. Of the sixty-three in whom incontinence continued from infancy, in eighteen it had ceased; of these, in six it stopped at four years; in one, at five years; four, at seven to nine years; five, at eleven to thirteen years; one at fourteen years, and one at sixteen years. The average age of the remaining forty-five in whom incontinence still continued was found to be seven and a half years.

Of the list of families, six were found where two members were affected by this disorder, three, where three members were affected, and in one family four members were incontinent, the family in this case consisting of five members

otherwise healthy, and no cause for the trouble other than an irritable bladder could be found.

Where the incontinence occurred in the day, it was frequently said that if the child could go at once to the closet when the sudden desire to micturate came on the clothes would be saved. But in school, where this was impossible, and often elsewhere, the accident would occur. In some cases the mothers stated that drinking water the last thing at night was followed by bed-wetting. In many cases the mother would try to prevent the wetting by taking up the child once or twice in the night and compelling it to pass its water, but although this precaution was in some cases successful, in others it was not.

The following is a list of the causes of incontinence in the seventy-seven cases:

Long and adherent prepuce	8
Small meatus	1
Vulvitis	1
Pin-worms, or pruritus ani	4
Sloth and habit	6
Epispadias	1
Atonic condition, of which 4 were rachitic and 1 idiotic	18
No cause found	38
	77

In a considerable number of these cases no examination was made, as the child was not seen, and these were put down among those in which no cause was found. The following list of chronic diseases in which incontinence did not occur is of interest:

Pott's disease, 2; hip-disease, 3; scrofula, 8; rachitis, 3; chorea, 5; lateral curvature, 1; petit mal, 1; inguinal hernia operated on unsuccessfully, 2; pin-worms, 1; leucorrhœa, 1.

In one case incontinence occurred nightly till the fourteenth year, when menstruation came on; after that the incontinence ceased.

Of the cases put down as due to sloth and habit, five were in dirty families, and had been cured by the use of the rod. In the other case the habit came on after a fall on the back, and was nearly cured by the mother threatening to whip the child every time she wet the bed. After this, from occurring nightly it occurred only once a week. But, on the other hand, a large proportion of the cases are scolded and whipped for what they cannot help, as is evident from the uselessness of this heroic treatment in the majority of cases. Parker* says that punishment tends to confirm the habit.

The case of small meatus was treated by nicking and stretching the meatus, after which incontinence occurred only twice in several weeks.

Of the eight cases of long and more or less adherent prepuce, in one circumcision was followed by marked improvement, but not a cure, of the incontinence. In a second case the long prepuce was removed, with improvement of the symptoms for a few days, but incontinence returned as badly as ever at the end of a fortnight. In another case—a well-developed boy of ten years—incontinence of urine, both diurnal and nocturnal, had continued since infancy, with also almost daily incontinence of fæces. The boy was much mortified, but protested his inability to prevent it. Whippings and scoldings had been of no avail. There was slight balanitis from constant maceration in wet underclothing, and, although the prepuce was of but moderate length, it could not be retracted owing to adhesions all around the corona. These were broken up with the finger-nail.

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* Obstet. Journ. Grt. Brit., 1880, p. 206.

The boy was seen last four months after the operation; there had been no incontinence of fæces and no bed-wetting, and he had wet his clothes only once or twice a month, probably through carelessness.

As to its frequency in circumcised Jews an inquiry would be interesting, but its occurrence among them would simply show that other causes than a long prepuce may be responsible for the trouble. Among seven Jew boys in my list, two had been incontinent, but were cured by whipping. The surroundings were very filthy.

It is a very easy matter to find a long prepuce as the cause of incontinence, or any other reflex symptom, in boys, simply from the fact that a long prepuce is the rule, and even adhesions occur in a large number of cases. The investigations of Roswell Park* on the condition of the prepuce in hospital and private practice in boys under nine years of age are of interest here, and are as follows :

	Number.	Per Cent.
I. Cases permitting easy and perfect retraction of prepuce	30	19.62
II. Cases of slight or partial adhesions with little or no retained smegma	48	31.37
III. Cases of complete or nearly complete adhesions without stenosis but with retained smegma	36	23.53
IV. Cases where retraction was impossible and adhesions only could be felt by probe	39	25.48
	153	100.00

Adams† regards circumcision as a reliable cure for incontinence, and states that he has known only one instance where the incontinence continued after the operation, and in that case

* Chicago Med. Journ. and Exam., 1880, p. 561.

† Archiv. of Pediat., April, 1887.

there was a possibility of stricture as the cause. D. B. Simmons* thinks that the adhesions and not the long prepuce are the cause of the trouble; of fourteen cases of incontinence twelve were cured by breaking up the adhesions, in one case without adhesions the removal of smegma sufficed, and in the remaining case, a young man just past puberty, relief was obtained by the passage of a steel sound. In one of the above cases there was also incontinence of fæces, which was cured as in my case. Klingensmuth† gives three cases of cure by circumcision; others, however, have found no result from the operation in some cases, and in others there has been a return of the habit in a few weeks after a seeming cure.

Farquharson‡ speaks of a case where the operation was temporarily curative, but nocturnal incontinence returned and defied all treatment. C. L. Dana§ gives two cases, both of whom had long, adherent, irritated prepuces, both had various nervous symptoms, the first only having incontinence. In this one circumcision was done without improvement. The second was not circumcised, but improved under various tonic treatment. Summing up, then, we may say that circumcision in some, but not in all, cases is followed by a relief from incontinence of urine, whether this cure be due to the impression on the nervous system of the pain and excitement of the operation, or whether it is the direct result of the removal of the point of irritation. Where circumcision is not curative, it is still possible that the long prepuce may have been the original cause, and that the symptom continues simply from habit.

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* Am. Obstet. Journ., 1880, xiii. p. 431.
† Archiv. Pediat., 1884, i. p. 577.
‡ Practitioner, 1879, xxiii. p. 7.
§ Med. Rec., 1881, xx. p. 569.

Where other reflex causes exist, such as abnormal quantity or quality of the urine or anal irritation (*vide* table), they should be treated. In the psychical class are to be included those cases where the child dreams of urinating, or has a nightmare and wets the bed. In some cases it appears to be similar to nocturnal pollutions of adults, by which it is superseded. In girls, as we have already seen, the incontinence may cease on the establishment of the catamenia. A plausible explanation for these cases is that the incontinence of the child acts as an escape-valve for reflex irritation, which after puberty is relieved by menstruation in the female and nocturnal pollutions in the male. These psychical cases are to be treated by avoidance of late suppers and of sleeping on the back, and by the use of bromides if necessary. The dorsal position, by favoring hyperæmia of the cord, makes the reflex centre for micturition in the lumbar region more ready to react to slight impulses.

Under the head of "increased irritability of the bladder" would come all those cases where no other cause can be found, and is a convenient refuge for our ignorance. In these cases various drugs have been used, but belladonna given in full and increasing doses and the treatment continued for weeks or months is as a rule very satisfactory. The reason this drug is regarded with disfavor by some, it seems to me, is because its use is discontinued too soon and the trouble returns. For a child of five years five drops of the tincture of belladonna should be given at night, the dose being increased one drop every other night till physiological effects appear. Given by the rectum, with a small dose of morphia, as recommended by Dr. E. T. Williams,* I have also found very effectual.

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* Boston Med. and Surg. Journ., Sept. 16, 1887, p. 257.

Ergot is another drug highly recommended by some, and believed to act by contracting the blood-vessels in the lumbar cord.

Goodhart* says that by long persistence of the habit the bladder becomes so contracted as to be incapable of holding the normal amount of urine, and in these cases he overcame the difficulty by distending the bladder by injecting water, the patient being chloroformed.

Atony of the sphincter vesicæ due to debility is probably not very common. Here nux vomica or its alkaloid, strychnia, and iron should be used. Some have had very good results from the use of electricity, one pole, the cathode, according to Althaus,† over the bladder, the anode over the lumbar region of the spine. Others place one pole in the membranous urethra or at the perineum. A tepid or cold sitz-bath at night, or cold douche or counter-irritation to the spine, are also to be recommended.

Every mechanical device for preventing the escape of urine is as harmful as it is irrational, whether it be a simple string tied around the penis or the elaborate apparatus of a physician‡ in Australia for giving an electrical shock to the offending member as soon as the first drop of water is passed.

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* Diseases of Children, p. 451.

† Brit. Med. Journ., 1883, i. p. 104.

‡ Anderson, Austral. Med. Journ., 1884, n. s., vi. p. 99.