verse of those causing displacements they may substitute other displacements for ones already present, and there are no reliable methods of telling whether over-corrections are made or not because changes in positions of bones are so small. Bony variations are so common that differences noticed, upon deep palpation in sacro-iliac regions, of the two sides of the body are not always reliable, and certainly it is difficult to conjecture precisely what were the strengths and directions of sudden twisting strains which ushered in the pathological symptoms.

It is safe, however, to manipulate sacro-iliac joints gently when muscles are relaxed by ether. Success sometimes attends these efforts, and, if perfect replacements are not secured, no harm is done if care is used, because new strains produced in unsuccessful gentle handlings will subside during the period of recumbency at the time plaster supports are worn afterwards. Severe chronic cases are the ones to be subjected to this form of treatment, and the patient figured in 13 and 14 with persistent forward and lateral bending of the body eight months after onset of symptoms, illustrates a suitable case.

SUMMARY.

An attempt has been made to show that many things besides new clinical experiments and laboratory studies are required for improvements in treatments of backaches. The great value of careful surveys which are eliminative rather than additive in nature is insisted upon; and it is suggested that excessive accumulations of new data and therapeutic agents may hinder instead of accelerate progress, when they become so numerous as to overwhelm systematic classifications and rational conceptions, and if they compel practitioners to take handiest, most attractive untested novelties instead of most efficient methods and ideas.

Numerous details have been presented in a review of a few typical cases of different kinds of back troubles, and this review has been extended enough to indicate different anatomical, physiological, social and economic facts which must be understood for most successful management.

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Original Articles.

FRACTURE OF THE LUMBAR VERTEBRAE AND TRANSVERSE PROCESSES. A REPORT OF FOUR ADDITIONAL CASES.

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IN *Surgery, Gynecology and Obstetrics* for March, 1916, the author has already reported seven cases of compression fracture of the lumbar vertebrae following severe falls or accident. These four cases are an additional series, and bear out my previous statement that such fractures are much more common than is ordinarily supposed.

The fractures in these cases involved:

1. The twelfth dorsal and first lumbar and a portion of the fourth lumbar.
2. The first lumbar.
3. The twelfth dorsal, first and second lumbar.
4. The transverse processes of four lumbar vertebrae besides the disarticulation of the last rib on the same side.

They were all caused by falls from a height varying from 40 feet to 20 feet, with the exception of the last, this being a crush by a heavy truck wheel.

I will not go into the mechanics or general discussion of these cases, for these points have already been covered by my report of the previous seven cases.

A summary of the location of the fractures in the eleven cases is as follows:

Location of fracture.	Individual vertebrae included.
12th dorsal	2
1st lumbar	5
2nd "	4
3rd "	1
4th "	3
5th "	2
TOTAL	17

Location of fractures in individual cases:

1. Twelfth dorsal—first lumbar and a portion of the fourth lumbar.
2. First lumbar.
3. Twelfth dorsal and first and second lumbar.
4. The transverse processes of four lumbar vertebrae including the distraction of the articulation of the fifth lumbar rib on same side.
5. The first lumbar.
6. The first and second lumbar.
7. The second lumbar.
8. The second and third lumbar.

9. The fourth lumbar.
10. The fourth and fifth lumbar.
11. The fifth lumbar.

It may be seen from a study of these two tables that the first and second lumbar vertebrae are the most frequently involved, with the fourth following next in order.

CASE 1. F. N., age 48, carpenter. This man had a fall of 45 feet on May 28th, 1915, following which he was taken to a private hospital, where he stayed in bed eleven days. He then went home and later went to work again as a carpenters' foreman on August 16th, 1915. He was made unconscious by the fall, but so far as he knew suffered no broken bones, and received nothing but a strained back and a general shaking up. He never had any trouble with his legs, either in sensation or ability to move them, and he had no incontinence of his bladder or rectum.

I saw him first on October 9th, 1915, because of constant pain in his back, he having been sent to me by his own physician. An x-ray was taken by me, which showed that he had sustained a fracture of his twelfth dorsal and first lumbar vertebrae, besides breaking off a corner of the fourth lumbar vertebrae. See tracing of x-ray Nos. 1 and 2.

There was some diminution in the height of the twelfth dorsal and first lumbar vertebrae, and marked bony proliferation between them so that they were practically one vertebra. There was no lateral displacement or tipping. The fourth lumbar showed the upper left corner broken off, and displaced downward and outward. There was also some asymmetry of the body, but I could make out no definite crush of the body. Clinically, he had a very stiff, lame back with limitation of motion in forward and side bending, and considerable muscle spasm. He was fitted to a spring back brace which gave him some relief. There was no kyphos and no nerve involvement that could be determined. Not knowing that he had a fractured spine, this man was able to go back to work and do more or less his usual routine, until after he found out what the actual condition was. Then he at once developed considerable disinclination to work, and the mental change was quite striking, as soon as he knew he had a "broken back." He will be able to work as before, but probably will not ever be able to do heavy lifting or much stooping or bending, without more or less discomfort.

CASE 2. W. C., female, aged 25, single. During the night of April 2nd, 1915, this young woman walked out of a second story window in her sleep. She fell about 12 to 15 feet into soft ground where she was found later, unable to get up. She was taken to a nearby hospital where she stayed for seven weeks, and where she was treated for several weeks for hysteria. She stated that she lost feeling in her legs at once, but could always move them. Two weeks after the fall, she became incontinent, which condition continued for nine weeks. At first she had considerable pain in her back all the time, but has had none of any moment since nine weeks after accident. Three months after the accident she could walk alone with a cane, and now (September, 1915), can walk about 100 yards alone. Is able to get up and down stairs, only with considerable difficulty.

No. 1. Same case as No. 2. Note fusing of 12th dorsal and 1st lumbar.

No. 2. Note fracture of upper left corner of 5th lumbar vertebra.

Examination showed a poorly developed and nourished young woman, who walked with difficulty with a cane. There was considerable backward tilt to the trunk, and toe drop of right foot in walking. The abdomen was scaphoid. The spine not very flexible, with considerable increase backward in the dorsal convexity. There was a suggestion of a kyphos in the dorso-lumbar region standing up. The knee jerks were very faint, especially on the right. The thigh muscles were apparently normal, as well as the hamstrings. The right foot was held in equinus and showed that the gastrocnemius, and common extensor of the toes were very weak. The left foot was apparently normal, except for a weak gastrocnemius. Sensation was diminished only slightly on the right lower leg, and over the buttocks and upper thighs posteriorly in a saddle shaped area. In lying prone the kyphos was more marked, and was evident over the twelfth dorsal and first lumbar region. X-rays, see tracing No. 3.

The x-ray showed that she had sustained a crushing fracture of the twelfth dorsal and first and second lumbar vertebrae. There was an asymmetry of the body of the twelfth dorsal, the body being slightly wedge shaped, the apex pointing toward the left side. There was also evidence of a more extensive crush of the body of the first lumbar, it

No. 3. Fracture of 12th dorsal, 1st and 2nd lumbar vertebrae. Shaded areas represent callous formation.

apparently having been reduced in height considerably, as compared with other normal bodies of that region. There had been considerable new bone formation about the edges of the vertebrae, especially on the right side of the twelfth dorsal and first and second lumbar, with partial obliteration of the intervertebral space between the twelfth dorsal and first lumbar, and total obliteration of this space between the first and second lumbar bodies. The tracing of the x-ray is not very accurate, but was the best I could get. The shading represents the callous formation.

She was fitted to a back brace, which improved her walking and standing, and gave her more comfort. She evidently had had some cord injury, which accounted for her paralysis at first, and the present condition. She is gaining slowly, and in view of this fact, I felt that she might continue to gain for another year or so. If at the end of that time she was no better, or if she became worse meanwhile, some other procedures could be devised to help her. At present she seems to be doing about as well as she could with massage, electricity, and muscle training.

CASE 3. F. W. G., male, aged 43, carpenter. Accident, April 28th, 1915. This man fell a distance of about 30 feet from a gutter to the ground. He landed with his buttocks in a soft flower bed, and his back on the turf. He was conscious at first, but soon became unconscious. He was taken to a nearby hospital where he stayed 14 days. Besides hurting his back, he fractured two ribs on the right side, low down. He also sustained a fracture of the right wrist, and of one of the metacarpal bones of the right hand.

After leaving the hospital he went home and stayed in bed a few days, and three weeks later was able to go to Boston. Since July, 1915, he has worn a spring back brace.

This man never had any disturbance of sensation in the legs, could always move them freely, and had no loss of control of his bladder or rectum. I saw

this man five months after the fall, and he was still complaining of some pain and a soreness in the back. Examination showed that his back was fairly flexible except to side bending. There was no kyphos, but he was tender over the region of the fourth lumbar. No disturbance of motion or sensation of legs. Knee jerks normal.

The x-ray of his back (see tracing No. 4) showed that he had a compression fracture of the first lumbar vertebra, not very marked in degree and causing no especial deformity. He was advised to con-

No. 4. Crush fracture of 1st lumbar. Note irregular outline of body of 1st lumbar and decrease in thickness of body.

tinue with his back brace, and not to try to do heavy work. In time I should think that he could do his usual work.

CASE 4. G. F. F., aged 49, male. This man was injured on September 27th, 1915, by being run over by the hind truck of a heavy pole carrying machine. He fell from the front truck, as the horses started quickly, and tried to get out of the way of the hind wheels, one of which apparently passed obliquely over his left flank, from below, upward. He was unable to stand up, but lay on the ground until found later and taken to the hospital, where he stayed about five weeks. Since going home his back has been painful, sore, lame and stiff, and he is unable to work.

Examination showed that his back was very stiff and irritable, especially in the lumbar region, and his forward and side bendings were considerably restricted. It hurt him to twist and hurt him considerably in getting up and down from the bed. There was no apparent deformity of the spine except that he had a slight right lateral curvature, probably occupational. His legs were normal and his sensation and knee jerks were normal.

The x-rays of his spine showed the following rather unusual condition, but in view of what happened to him just about what might be expected. (See tracing No. 5). The left side of the lumbar spine showed that the articulation of the last rib had been partly torn away, the tip of the transverse process on the left of the first and second lumbar vertebrae had been broken off, and practically the whole of the transverse process of the

No. 5. Note fracture of transverse processes on left, with partial disarticulation of 12th rib on left.

third and fourth lumbar vertebrae on the left, had been broken off. There was no apparent injury to the vertebral bodies themselves.

This injury was the result of direct violence, and if the man had not been fortunate in being heavily dressed, would have caused more damage. He should make a good recovery with support to his back, but will always probably have a rather stiff and lame lumbar spine, which may cause him discomfort and some disability.

NOTE:—Since the above paper has been in the hands of the Editors, the author has had four more cases, all without nerve symptoms except one, who has partial leg paralysis as a result of a crush fracture of the 9th dorsal and the 11th and 12th dorsal and 1st lumbar bodies. The other involved the 1st and 2d lumbar; the 12th dorsal, the 1st and 2d lumbar; the 1st and 2d lumbar; and the last the 1st and 2d lumbar likewise. All these cases were the direct results of falls, from heights of from 60 to 12 feet. This makes a total of 15 cases.

OCCUPATION AS A REMEDIAL FACTOR IN HOSPITALS FOR THE MENTALLY SICK.*

By EMILY L. HAINES, BOSTON.

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THE character of a hospital is such that we may say, with safety, that no one has entered as a patient with an expectation of pleasure.

* Read before the Conference of the Massachusetts Society for Mental Hygiene, Ford Hall, Boston, Nov. 18, 1915.

We can also say, with equal safety, that many patients look back upon their sojourn in hospitals with pleasure, as well as with lively gratitude. In support of this statement, there are found in each hospital patients who, after their recovery, have insisted upon remaining longer in the institution.

There is, in fact, very much that gives pleasure to the patient; but, as in life outside the gate, it depends upon the patient and his or her power to enjoy.

There is an impressive proportion of patients who might still be left to the doom of daily tedium and aimlessness, but who instead rise daily with some feeling of purpose, and retire at night with more or less of the sense that the day has meant something, and that something has been done. This recovered sense of purpose has come with the discovery that they, the patients, are again capable of action and of work.

The increased activity that prevails in our hospitals for the mentally sick has come from the full persuasion that work is the great remedial principle, and that occupation, in a greater or less degree, and for each according to his or her personality, gives to each day diversion, interest and benefit.

What this means, not only to the individual patient, but to the large aggregation in our state institutions, is understood from the fact that on October 1, 1914, there were in the 13 state and 25 private institutions for the insane, in Massachusetts,—14,619 insane patients.

This large number of mentally ill is continually increasing. The patients must be cared for, and as many as possible must be returned to their former places in the community. Some will be able to pick up but a part of the broken threads of their former life, and others—a large number—will have to remain patients in the institutions for a prolonged period of time.

Work by patients has always been done to some extent in the hospitals of Massachusetts. In the earliest records of the hospitals of this state, work has been emphasized because of its beneficial effect upon the patient, mental and physical: for the pleasure derived from work and also for the economic value of the labor to the institution.

Occupation has a curative effect upon the patient, and labor has been recognized as desirable for both the patient and the institution. Patients have been given a part in the household duties, outdoor work upon the farm, and in various trades.

The first report of the Worcester Lunatic Hospital, 1833, points out that the convalescents should not be idle. The second report of the same institution remarks: "It is believed that an appropriation for additional means of giving occupation to the patients,—such as shops for various mechanical and handicraft pursuits—would answer a valuable purpose."