

A CASE OF SPONDYLOLISTHESIS LUMBALIS
ACQUISITA

By

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Spondylolysis is a break in continuity in the pars interarticularis of a neural arch. Spondylolisthesis occurs when the ends of the bone glide apart at this break in continuity, and the vertebral body, with the anterior part of the arch and the superior articular processes and all the spinal column above it, slips forwards.

During the 19th century, spondylolysis was regarded as being a very rare complaint of women; but it has since been shown, partly by radiographic investigations, that it occurs relatively frequently, and almost as often in men as in women. The frequency of spondylolysis is given as approximately 5 % (*Neugebauer, Waldeyer, Willis, Friberg*). It should be remembered, however, that most of the information concerning its frequency is based on hospital material. Probably most cases of spondylolisthesis and spondylolysis do not give any symptoms and have therefore never been diagnosed.

A purely theoretical differentiation has been made between *congenital, acquired* and *traumatic* spondylolysis and spondylolisthesis.

Many authors have regarded the condition as congenital (*Willis, Neugebauer, Schmorl, Junghans, Friberg, Brocher, Turner*), in view of the fact that it is found in children. 2 ossification zones were thought to occur in the vertebral arch, instead of the normal one. After *Friberg's* work we may now consider it proved that spondylolysis can be a congenital deformity, and that it is so in the majority of cases.

Lane, and later *Meyer-Burgdorff*, favoured the view that all spondylolyses are acquired. They believed that the articular processes of the spines lying above and below it can produce "eine chronische Umbauzone" on the interarticular portion as a result of constant pressure. This would occur particularly when the back was subjected to abnormal strain as for instance with a gibbus deformity after a fracture, in pregnancy and with severe strains of the back. The authors have not shown any proof that this really occurs nor, in fact, that there is any such thing as acquired spondylolysis.

Jaeger attributes spondylolisthesis acquisita to metastases or to aseptic necrosis of the bone in the pars interarticularis.

Frank traumatic spondylolyses in connection with great violence have been described, but they have then always been combined with subluxation, luxation or compression fractures of one or more vertebrae, usually with compression of the spinal cord (*Friberg, Böhler, Watson-Jones, Aschan* and others).

"Traumatic spondylolisthesis" without other changes has, been described by *Kleinberg, Böhler* and *Steiner*. In support of their traumatic origin these authors point out that trauma was reported in the history. In *Steiner's* case there was a "fracture" with jagged bone ends of the pars interarticularis. In none of the cases had radiographs of the back been taken before the injury, and therefore the traumatic origin cannot be considered to be proved.

Roberts, Königstein, Gerlach, Turner and *Markellow* made experimental investigations on corpses. They could not cause spondylolysis, even when considerable violence was used. *Turner* and *Makellow* wrote: "das geht unzweifelhaft hervor, das es keine traumatischen Spondylolysen gibt" and *Gerlach* says: "auch durch maximalste Überstreckung der Lendenwirbelsäule in Sinne der Lordose und Kyphose ist es nicht gelungen, weder einseitige noch beidseitige Frakturen im Bereich der Interartikularportion, auch nicht durch stärkste Gewalt-einwirkung zu erzeugen".

Thus, in spite of considerable clinical and experimental

investigations of spondylolysis, only its congenital origin has been proved. The occurrence of acquired and traumatic spondylolysis has not yet been proved.

However, spondylolisthesis in a previously normal vertebral arch has occurred at the Orthopaedic Clinic of the Karolinska Institute in Stockholm.

Case No. 3835/38, a female hospital employee, born 1905. Attended the clinic for the first time in 1938, when she complained of her back. She had had increasing pain and a feeling of tiredness in her back for the past two years. Her condition was temporarily improved by massage and the use of a corset. Despite conservative treatment, however, she grew gradually worse; she found it difficult to perform her duties and was confined to bed from time to time.

Examination 1938. General condition good, tall and heavily built, Normal configuration and mobility of the back; she complained of intense throbbing pain in the lower lumbar region. Laségue negative bilaterally. No abnormal neurological findings.

Radiography in 1938, no abnormality in the lumbar region. *In 1943*, signs of degeneration in the 4th lumbar disc: diminished interspace, slight anteposition of the lumbar vertebra and lack of stability during functional tests. (Fig. 1).

1944, lumbar osteosynthesis performed on account of the severe complaints which resisted all conservative therapy; and because of an apparent disc degeneration. A tibial transplant was placed unilaterally on the resected arches of the 3rd, 4th and 5th lumbar vertebrae and sacrum. In addition, plentiful bone chips were inlaid on both sides of the spinous processes.

Progress: The patient was kept in a plaster bed for ten weeks and in a plaster jacket for three months. Six months after the operation she was free from symptoms, and radiography showed that the osteosynthesis had consolidated and that there were no changes in the condition.

We did not hear from her again until January, 1949, when she was asked to come for follow-up examination. She then said that during the first year after the operation she had been free from symptoms but then her original complaints had returned. She had tried to take up her previous employment as a hospital employee but could not do so.

Objectively there was a normal configuration of the back: but minimal mobility in the lumbar region. When she bent forwards she had to support herself with her hands on her knees in order to prevent herself from falling over. Pressure in the region of the upper end of the osteosynthesis caused throbbing pain. Laségue negative bilaterally. No neurological abnormalities.



Fig. 1 a.



Fig. 1 b.

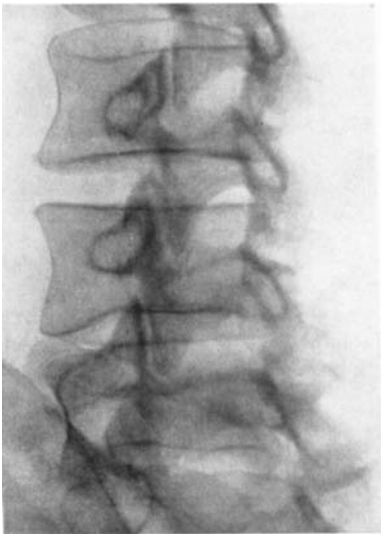


Fig. 1 c.

Fig. 1 a. 1943 (before operation). The back in normal position. The intervertebral space between the 4th and 5th lumbar vertebrae is slightly reduced.

Fig. 1 b. 1943 (before operation). The back in forward bending position. Besides the reduced space between the 4th and 5th lumbar vertebrae, there is a displacement forward of the 4th lumbar as a sign of instability of the 4th intervertebral disc.

Fig. 1 c. 1943 (before operation). Radiograph taken obliquely from behind in order to show the pars interarticularis of the neural arch.



Fig. 2 a.



Fig. 2 b.

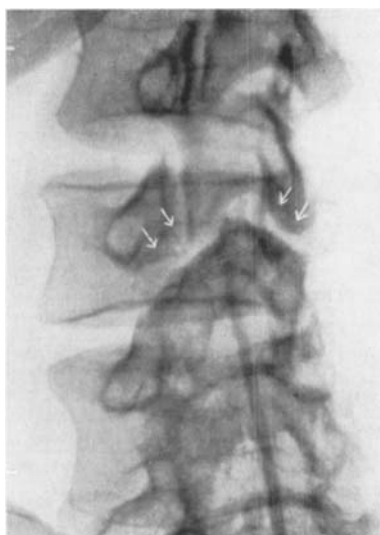


Fig. 2 c.

Fig. 2 a. 1949 (5 years after operation). The back in backward bending position. Bilateral spondylolysis on the arch of the 3rd lumbar vertebra. Reduced space between the 3rd and 4th lumbar vertebrae. The osteosynthesis shows satisfactory bone block formation.

Fig. 2 b. 1949 (5 years after operation). The back in forward bending position. The 3rd lumbar vertebra is anteposed and the diastasis at the spondylolysis has increased.

Fig. 2 c. 1949 (5 years after operation). Radiograph taken obliquely from behind, showing the bilateral spondylolysis and the osteosynthesis.

Radiography showed a block of bone between the arches of the 3rd, 4th and 5th lumbar vertebrae and the sacrum. The transplant was well consolidated, but on the arch of the 3rd lumbar vertebra there was a bilateral spondylolysis, which had a typical interarticular columnar formation on both sides. Further, there was evidence of degeneration of the 3rd lumbar disc with diminished interspace. When she bent forwards, there was anteposition of the 3rd lumbar vertebra and the diastasis of the spondylolysis increased. When she leaned backwards, the 3rd lumbar vertebra resumed its normal position and there was contact between the bone surfaces of the spondylolysis (see Fig. 2).

Thus in this case a satisfactory fixation of the degenerated 4th lumbar disc was obtained: but a spondylolysis of the 3rd lumbar vertebral arch and a degeneration of the 3rd lumbar disc developed. The complaints which began one year after the operation, might be regarded as due to the spondylolysis. There is no record of any accident or over-straining of the back after the operation. The radiographs, which were taken with infinite care and from various projections, categorically exclude the possibility that the changes were present either before the operation or when the patient was re-examined six months after it.

It cannot be determined whether the degeneration in the 3rd disc preceded the spondylolysis and predisposed towards it, or whether it followed it. One knows that destruction of the underlying disc takes place in most cases of spondylolisthesis (*Schmorl and Junghans* and others). On the other hand, the degeneration in the 3rd disc might have been present before the operation, although not visible on the radiographs. Therefore, the spondylolysis was thought to be secondary to the degeneration and related to the severe strain to which it had been subjected.

Abnormal strain on the spinal column always follows osteosynthesis. The osteosynthesis, especially if it has been extensive, is itself subject to severe strain, which in many cases leads to fracture and "umbauzone" with residual pseudoarthroses (*Odelberg-Johnsen, Alvik, Bierring, Unander-Scharin* and others). In the case under review the strain did not cause a fracture of the osteosynthesis, but instead there was a break

in continuity in the arch of the uppermost spine of the osteosynthesis.

This is a highly interesting case, partly because, as far as the author can discover, it is the only definite case of acquired spondylolysis, and partly because it is the only reported case of spondylolysis following spinal osteosynthesis. Anyway, we can now say that not only congenital but also acquired spondylolysis has been proved to occur. It now remains to prove the occurrence of traumatic spondylolysis.

S U M M A R Y

The author describes a case of spondylolysis of the vertebral arch of the 3rd lumbar vertebra, which had been shown to be normal at three previous examinations. The spondylolysis was observed 5 years after an osteosynthesis involving the 3rd, 4th and 5th lumbar vertebrae and the sacrum. The osteosynthesis was performed for pain in the back associated with radiographic signs of degeneration of the 4th lumbar disc.

R E S U M E

L'auteur décrit un cas de spondylolyse de l'arc vertébral de le 3ème vertèbre lombaire qui avait été trouvée normale à trois examens antérieurs. La spondylolyse a été observée 5 ans après une ostéosynthèse atteignant les 3ème, 4ème et 5ème vertèbres lombaires et le sacrum. L'ostéosynthèse a été à la suite de douleurs lombaires associées à des signes radiographiques de dégénération du disque de la 4ème vertèbre lombaire.

L'auteur n'a pas trouvé de cas similaire décrit dans la littérature. Ce cas présente un très grand intérêt, parce que c'est la seule description que l'on ait d'une spondylolyse acquise et la seule qui se soit produite à la suite d'une ostéosynthèse lombaire.

ZUSAMMENFASSUNG

Der Verfasser beschreibt einen Fall von Spondylolysis des Wirbelbogens des 3. Lendenwirbels, der bei drei vorhergegangenen Untersuchungen normal erschien. Die Spondylolyse wurde 5 Jahre nach einer Osteosynthese des 3., 4., 5. Lendenwirbels und des os sacrum beobachtet.

Es war dem Verfasser nicht möglich einen ähnlichen Fall in der Litteratur aufzufinden. Der Fall ist sehr interessant da er die einzige Beschreibung einer erworbenen Spondylolysis darstellt und der einzige ist, der nach lumbaler Osteosynthese aufgetreten ist.

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