

## Reposition and fixation of spondylolisthesis

***Citation for published version (APA):***

Snijders, C. J., Schijvens, A. W. M., Snijder, J. G. N., & Seroo, J. M. (1973). Reposition and fixation of spondylolisthesis. In R. Albert, W. Voigt, & W. Helbig (Eds.), *Digest of the 10th international conference on medical and biological engineering, Dresden, GDR, August 13-17, 1973* (pp. 65). s.n..

***Document status and date:***

Published: 01/01/1973

***Document Version:***

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

***Please check the document version of this publication:***

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

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## 4-8 REPOSITION AND FIXATION OF SPONDYLOLISTHESIS

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**PROBLEM.** With almost 2 to 4% of developed countries' population spondylolisthesis occurs. As a consequence of a fracture in the interarticular part of the arch the respective vertebral body has slipped forward, which may entail, next to irritation of the spinal marrow and the neural roots, a pronounced bad posture. On the long run this posture will give cause to a variety of complaints.

**METHOD.** In cases of spondylolisthesis, for normalizing the mechanical state, it first of all is necessary to reposit the slipped vertebra in its original position. The traction needed therefore is applied with the help of stainless steel wires, attached to the processus spinosi of the two vertebrae lying directly above the slipped vertebra. The wires are put through small holes, made into the processus spinosi with the aid of a pair of punching forceps. The isotone traction in the wires originates from a motorspring, suspended in a frame. By exchanging the pulley on the shaft, operated by this motorspring, in a most simple way a variety of forces can be obtained. The direction of the force exerted is of paramount importance and can be adjusted by means of wire guiding-rolls. Provision is made for bringing both the wires at tension simultaneously and gradually by means of a winding mechanism and a system of pulley sheaves (Fig. 1).

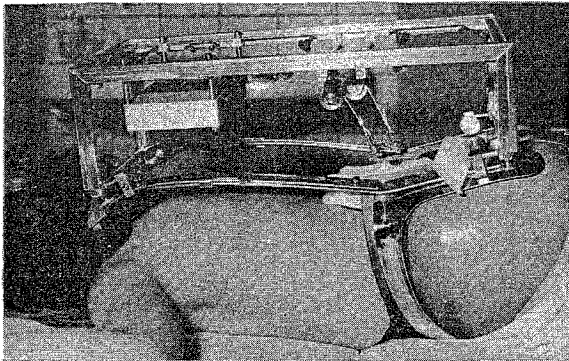


Fig. 1 Traction apparatus for repositing spondylolisthesis. Isotone forces originating from a motorspring are exerted directly on the vertebral column through wires passing the skin.

The olisthesis of a vertebra is measured with respect to the underlying vertebra and is expressed in percent of same's diameter. In the proceedings differentiation is made between

- 1) olisthesis less than 30%
- 2) olisthesis more than 30%

Since several biomechanical and clinical factors play a part herein this differentiation should not be set too strictly.

ad 1) If the olisthesis is under 30% the tissue of the annulus fibrosus and of the surrounding ligaments can be stretched such way that the olisthetic vertebra is fully reposit with comparatively low forces (in the order of 40 N). The corrective process takes about two days. For preserving the reposition an intercorporal (intervertebral) spondylodesis from dorsal is applied. For this purpose two bone grafts from the crista are introduced into the vertebral interstice on either side along the dura. Grooves have been milled into both

the boundary plates of the vertebral interstice. During the process of growing together the traction is maintained. The new method developed for intercorporal spondylodesis from dorsal for fixation after reposition of spondylolisthesis has also been applied by us for fixation in cases of instability, after operations in hernia nuclei pulposi, as well as for correction of scoliosis (subequatio vertebrae).

ad 2) In the case the slip is over 30% the force needed for reposition is too high with regard to the breaking strength of the spinous processes. Therefore the greater part of the annulus fibrosus and of the ligaments on olisthetic level are cut, so that the force for full correction need not exceed the proper weight of the lumbar spine. In these cases it is useful to prepare the vertebrae such way that they can grow together directly, so bone grafts have not to be introduced for fixation. In the post-operative phase the patient is revalidated. Above all the M. Ilio Psoas plays a dominating part in this respect. Also on the ground of altered geometrical proportions consequent on reposition, this muscle must lengthen through purposeful exercises in most cases.

## RESULTS

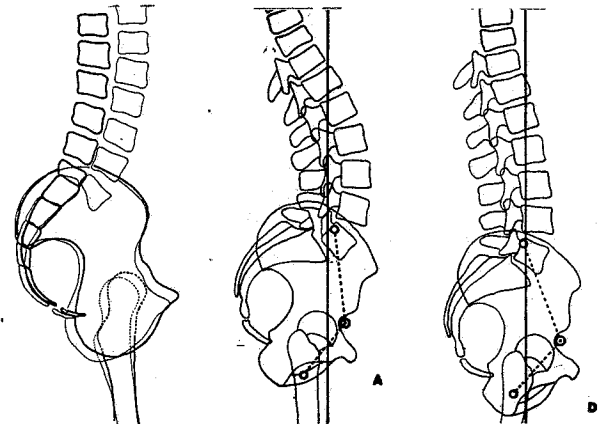


Fig. 2a

Fig. 2b

Fig. 2a Spondylolisthesis of more than 30% before and after reposition and fixation. It concerns here a girl, aged 8. The respective X-ray pictures were made of the person involved in a natural erect posture.

Fig. 2b Spondylolisthesis of less than 30% before (A) and after (D) reposition and fixation. For fixation two bone grafts from the crista were introduced into the vertebral interstice on either side along the dura. The illustration concerns a girl, aged 11, in natural erect posture. By changing the lordosis the inclination of the pelvis and the length of the M. Psoas, a better posture is obtained. With the dotted line a schematic representation is given of the M. Psoas.