

## III. PEDIATRIC SURGERY

### CONSIDERATIONS UPON A CASE OF SPONDYLOLYSIS IN A PRE-SCHOOL AGED INFANT

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#### Abstract

Movement and implicitly traumas of various intensities and etiologies are constant features of childhood.

The affections of vertebral spine are not rare within this period.

Although the clinical picture is not very rich: inconstant pain, especially at mobilization, spastic contracture followed by antalgic posture, the anatomical structure concerned is the vertebral osteoarticular, especially the one from the lumbar area, the pathological substratum being given by phenomena of spondylolysis and spondylolisthesis.

**Key words:** spondylolysis, spondylolisthesis

#### Case presentation:

Two years ago, the child G.P., now 6 years of age, male, from Timisoara, came for a medical orthopedic examination because of a painful discomfort in the lumbar area, without recognizing an important traumatic history in the period preceding the clinical examination. The clinical examination shows painful sensitivity at palpation in the L5 region, pain at the dorsal flexia.

It is recommended a lumbar spine radiography, front and side, which does not emphasize anatomical modifications.

It is recommended physical rest, orthopedic surveillance. At the next follow up examination (at three months from the first examination) it is told about the persistence of the painful discomfort that appears during playing, leading to its interruption (when returning from the forward bending position, to rotation moves). The x-ray made in oblique incidence confirms the suspicion of L5 level spondylolysis.

#### *Definition*

The spondylolysis represents the interruption of the intra-articular area of the vertebral arch.

Spondylolisthesis = the anterior glide of a vertebral body compared the other one, followed by a possible

anterior throw and the description of a kyphotic deformation.

Spondylos = vertebra, olisthesis = glide

The spondylolysis and spondylolisthesis from the lumbosacral region represent a consequence of the biped propagation. At mammals, this affection is not known, the lumbar spine of four-footed presenting a kyphotic curve. The lordosis from the level of the human lumbar spine seems to be the premise for the appearance of this affection.

Spondylolysis may be accompanied, but not compulsory determined by the spondylolisthesis. The spondylolisthesis is not compulsory determined by the spondylosis. It may be given by dysplastic, degenerative, congenital and traumatic causes.

The etiology stipulates as determinant causes the mechanical and genetic factors.

The mechanical particularities refers to the intra-articular component which in case of a hyperextension lead to an increased closeness of the L4 inferior articular face with the L5 intra-articular component. If this trauma is repetitive, as it happens when practicing sport activities that involve hyperextensions of the lumbar region, there may occur fractures of the intra-articular area, spondylolysis.

Another possible mechanical cause that may lead to the spondylolysis is given by the particular situation from the caudal end of a longer fusion path. A frequent association of the spondylolysis is with the Scheuermann disease, due to the fact that there is at the level of thoracic spine an exaggerated kyphosis that generates in turn an exaggeration of the lumbar lordosis.

The genetical factors show a high incidence of affecting the intra-articular area at the 1<sup>st</sup> degree relatives. Also, it is observed a high incidence within some populations (Eskimos).

The traumatic causing agent may be both unique and repetitive; when it is unique it generates a spondylolysis situated above L5.

The frequency is located within the white population at 6.4%, within the Afro-American population at 1.1% and at Eskimos at approximately 50%.

A high frequency is also observed at teenagers and among those who practice various sports: artistic

gymnastics, ballet, javelin throw, weight lifting, soccer, and skydiving.

The highest incidence of spondylolysis is in early age of childhood.

In patients with cerebral palsy, who present hip flexion contracture, the incidence of spondylolysis increases up to 21% due to compensation of the hip flexion contracture with lumbar hyperlordosis and with the existence of an exaggerated movement, with the purpose of stabilizing the upper body.

#### *Diagnosis, clinical picture*

A very small number of patients become symptomatic. When the symptoms appear, they are given by pain of the lumbar spine, that appear during the day, after orthostatism or extended sitting position. Pain is related to typ of motion.

Especially the reclination movement is very painful.

At clinical examination there is an increased local sensitivity at pressing and with easy hitting of the specific area coresponding to the spinal process, usually L5.

If spondylolysis is also associated with spondylolisthesis typical pain occurs at the level of ischiocrural muscles.

By emphasizing the kyphotic changes between L5 and S1, previous migration of the body mass center occurs. In order to correct the anteversion of the pelvis an sustained and extended contracture of the ischiocrural muscles follows, they shorten and become painful.

Also at the level of lumbar paravertebral muscles a painful contracture occurs, caused by the instability of the interrupted vertebral arch.

One of the tests of clinical examination refers to the painful reaction induced by maximum reclination. Another important clinical sign is the lack of painful accuses during forward bending, with the appearance of intense pain when resuming the initial position, pain located in the lumbosacral area.

#### *Radiological diagnosis*

In the initial phase, on conventional x-rays, the spondylolysis often cannot be discovered.

On the scintigram there is an increased accumulation area, even before the appearance of the spondylolysis area on x-ray. On the profil x-ray, spondylolysis can be seen when the image was focused on the lumbosacral area and the lysis area is large enough.

The best image of spondylolysis is obtained from oblique incidence.

The most frequent location of spondylolysis is in 95% of cases at L5 level, sometimes associated with olisthesis between L5 and S1. Rarely, within teenagers the location is at level L1-L4 and usually has a traumatic cause. In adult, spondylolysis is located between L4 and L5 and has degenerative causes.

The severity of associated spondylolisthesis is given by the Meyerding classification (that refers to the slide angle and the kyphosis degree).

The kyphosis degree is given by the angle formed of the tangent at the posterior edge of the sacrum bone and the line that passes through the inferior edge of L5 vertebra.

1 <sup>st</sup> degree	under 25%
2 <sup>nd</sup> degree	25-50%
3 <sup>rd</sup> degree	51-75%
4 <sup>th</sup> degree	over 75% glide, with total glide representing spondyloptosis

#### *Evolution*

Spondylolysis frequently remains asymptomatic during the existence even when associated with spondylolisthesis.

The greatest risk for agraveting spondylolisthesis is situated between 10 and 15 years of age, in this period the patient should be clinically and radiologically supervised for an early discovery of lumbar pathology.

Frequently, a scoliosis occurs, usually a lumbar one, probably given by the spastic muscular contracture.

Rarely, spontaneous neurological lesions accompanie spondylolisthesis.

#### *Treatment*

In asymptomatic patients with an olisthesis degree of up to 30%, clinical and radiological monitoring is recommended, without limiting sport activity. With the appearance of painful symptoms, the activities that involve more intense physical effort are suspended for a limited period of time. If the symptoms persist an elastic support belt is recommended( for a period of 3-6 months).

In symptomatic patients, the following therapeutic measures may be used: physical therapy, belt, cast, surgical intervention.

The purpose of physical therapy is to relax the spastic muscles and then to work them up. It may not stop the progression of the spondylolisthesis phenomenon.

The movements that lead to the exacerbation of the lumbar lordosis should be avoided.

The belt treatment is recommended in recent cases of spondylolysis in order to give local stability and positive influence to local pain( belt with a light kyphotic orientation).

The patient G.P. underwent kinetotherapeutic treatment, resulting relaxation and consolidation of lumbar area muscles. He was clinically monitored, returning to foollow up examinations at 6 months period. The evolution was positiv, the painful symptomatology was fading until its disappearance. At the radiological follow up examination, there were no signs of spondylolisthesis not even after one year since positiv spondylolysis diagnosis.

#### *Surgical intervention*

It is not recommended in milder cases, meaning spondylolisthesis of 1<sup>st</sup> and 2<sup>nd</sup> degree. In other circumstances surgery is needed, using the direct osteosynthesis with bolt, the posterolateral spondylodesis or

the ventral spondylodesis, or for spondylolisthesis fusion in situ or repositioning followed by fusion with dorsal

instrumentation.

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