“OVIDIUS” UNIVERSITY CONSTANŢA
MEDICINE FACULTY DOCTORAL SCHOOL

THE MORPHOLOGY OF THE LUMBOSACRAL VERTEBRAL COLUMN

DOCTORAL THESIS ABSTRACT

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TABLE OF CONTENTS

INTRODUCTION

Bywaters [quoted by Baciu] said that the “spine is a way of differentiate people and also other animal species from other less dominant. The spine gives the body’s symmetry but also direction on moving. It surrounds and protects our communicative systems, doing possible our motricity but also our equilibrium, due to the superposition of multiple bone structures, created by the original cartilaginous tube. We are given the chance to rule and to dominate the sky and the land.”

After [Louis] “the spine is not only a static organ, it is also the moves residence, being the organ of the overall spine moves, of the head and neck, each vertebra acting as a level one key factor, on which the assistance is done by the articular process, the force is performed at the level of posterior apophysic arch and the resistance is localized at the level of the disc, which repressed absorbs the pressure’s forces and on expansion it reestablishes the passive equilibrium modified by the motricity.” On moving “the lumbar vertebra has a side wise support role, limiting every propensity to the right or left” [Rouvière]. “The angular sacral motion has a unit that Farabeuf [quoted by Rouvière], sets it posterior to the arch, at the level of the deep ligament (axial), Bonnaire [quoted by Rouvière], sets it at the level of the horizontal and vertical auricular surface’s encounter and Wesl [quoted by Rouvière], limits it prior in the small pelvis, at the S2 and S3 level.”

After [Moore] “88-90% of the spines have a normal number of presacral vertebras. A growth at the level of the presacral zone increases the pressure by increasing the section of the key factor, these variations may have clinical importance, but these discoveries can be made accidentally at the x-ray or at TDM or during autopsies

or dissections on people that never had previous problems." After him "the more frequent anomalies and deformities of the spine are encountered at the lumbar level, the most common being occult spinal-bifida".

At the moment, the lumbar pain and/or sacral is one of the most frequent medical situation encountered at the majority of the population, and this condition does not occur only to the aged, as was previously considered. The patient's condition is complex and it cannot be solved during one analysis.

A complete understanding of the spine anatomy, a pertinent display of the anamnesis and of the examination, helps the investigations for the patient recovery.

The patients that appear to the recovery centers causing lumbar pain suffer this discomfort because of an inaccurate posture by using their computers, during sleep, a long activity, lifting or carrying a heavy object, muscle tone decrease and incorrect exercise, muscle tension caused by physic and psychological stress. Today, obesity is considered the century's disease affecting more and more people. All these factors lead to the creation of the principal lumbar suffering that we discussed in this analysis: lumbar discopathy, operated lumbar disc hernia, lumbar spondylo-discarthrose, lumbar spondylosis, lumbar stenosis, lumbar spinal stenosis, lumbar scoliosis, lumbar spondylosthesis.

The patients are not just physiotherapy patients but we can meet them also at: rheumatology, internal medicine, neurology, neurosurgery, and orthopedics. This fact can be explained by the diversity of the etiopathogenic features that can produce lumbar-sacral pain. The correctness of the therapeutic condition depends firstly on the indication's correctness and this will be connected with the patient's age, affection's etiology, the active life, type and the gravity of the clinical development. The treatment's aim is to maintain the body's function, of the inferior member or of the interior affected members of the individual. The balneologic–physical and kinetic treatment is the most sensible treatment when is not avoided and it is not in a stadium that imposes neurosurgical treatment. The evolution and the prognosis are benign. The symptoms require therapeutical measures that help the improvement of the patient's

status and fight against complications and come with prevention at the psychological level.

On the general part, the thesis starts with the presentation of the actual status of knowledge upon the morphology of the lumbar-sacral spine according to the famous works and books of anathomy of the international literature of Testut, Rouvière, Gray, Chevrel, Netter, Sabotta, Kamina, Bouchet, Moore, but also from the works from the Romanian literature: Papilian, Diaconescu, Cozma, Robacki, Baciu, Bordei.

On the personal structure it is firstly presented the method and the material, after being presented the results of the research done, with the morphological characteristics seen on the spine and after the results of the clinical study, all this being done and supported by personal images and suggestive charts.

In the second chapter, of discussions comparisons will be done between the personal results and the previous data existed in the specialized literature, mentioning the resembling results and underling the differences.

In the chapter dedicated to the conclusions, are presented a part of the conclusions that require discussions but also the presence of certain differences with results of the authors quoted in the biography. There are also mentioned some possible uses of these results in the medical practice.

At last, I want to remerciate my colleagues from anatomy that helped realizing this thesis, especially to mister Ionescu Constantin, thesis coordinator, to doctor Niscoveanu Cosmin, from Radilogy, for delivering the CT images.

I am grateful to the universitary professor Bordei Petru, scientific coordinator of the thesis, who was always near to me for guidance and support.

MATERIAL AND METHOD OF WORK

The morphology part was realized in the anatomy laboratory of the Faculty of Medicine, from Constanţa by direct measuring on the bone pieces (lumbar vertebra and sacral bones) by the help of the measured riband and of the calipers, the results being measured in millimeters. The anatomic reference points were analyzed also on the CT scans. All the CT scans were realized on a Lightspeed VCT rig of 64 slices.

The clinical-imagistic study of the lumbosacral vertebral spine was realized on a number of 655 patients that were present into the ambulatory from Constanţa, after suffering pain at the level lumbosacral spine with or without irradiation at the level of the right or left member, for realizing a program of treatment and recovery for 16 months.

I realized a correlation between the clinical exam with anamnestic data and images. The obtained data were statistically processed and confronted with the results from the specialized literature.

- the patient's accept with the acceptance model;
- the medical record;
- the imagistic investigation where it was realized (personally) and dispatch;
- sex and age classification;
- the results, graphically presented.

PERSONAL RESULTS

LUMBAR VERTEBRAL SPINE

THE HIGH OF THE LUMBAR VERTEBRAL SPINE

The high of the lumbar vertebral spine was realized just on a number of 12 patients, 8 female (66,67% of cases), 4 males (33,33% of cases), being studied from behind but also from profile. Measured from the superior body circumference of the L1 vertebra till the inferior body circumference of the L5 vertebra on the median line of the anterior face of the spine, I found a value of 167,0-182,3 mm, for the females and 167,0-173,7 mm, for the males, the length being for 2 of the cases between 179,5-179,9 mm and 181,0-182,3 mm.

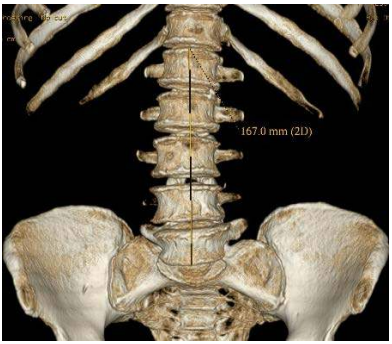


Fig 12. For the females the length of the spine is 167,0 mm (anterior view).

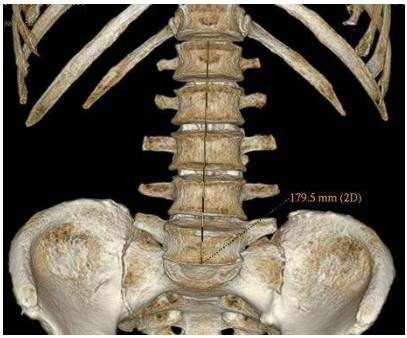


Fig 13. The length of the spine is 179,5 mm at the male (anterior view).

From profile the length of the spine was smaller, having between 156,7-176,1 mm, between both values existing a difference of 19,4 mm.

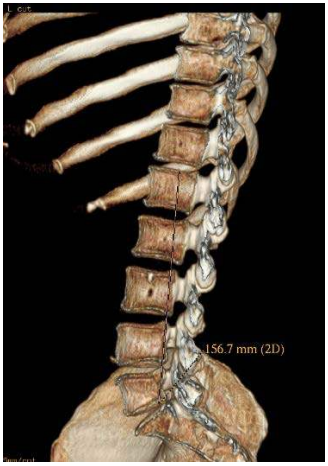


Fig 14. The same lumbar spine for the females, is 156,7 mm, so less than 10,3 mm.

THE HEIGHT OF THE LUMBAR VERTEBRAL CORPS

The height of the lumbar vertebral corps was measured at each vertebra on 30 patients, 16 female patients (53,33% of cases) and 14 males (46,67% of cases) at the level of the L1 vertebra and also 20 cases (10 cases for each sex), at the level of other lumbar vertebra.

At the level of L1 vertebra, the vertebral body had a height between 23,3-28,7 mm, for *the female* and the height between 23,3-28,7mm, and for *the males* between 24,7-28,7 mm.

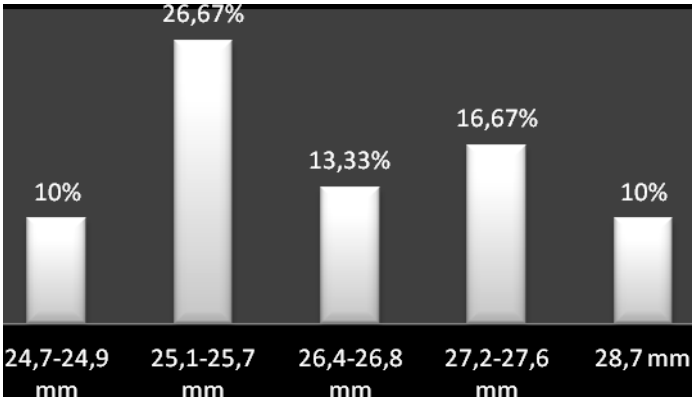


Chart 1. Height of the L1 Vertebra.

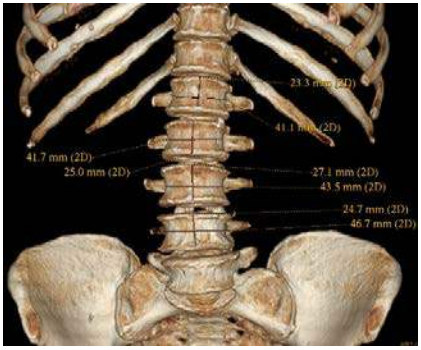


Fig 16. The height of the lumbar vertebral corps is 23,3 mm (L1), 25,0 mm (L2), 27,1 mm (L3), 24,7 mm (L4), the transversal width being of 41,1 mm (L1), 41,7 mm (L2), 43,5 mm (L3) and 46,7 mm (L5), anterior view, the females.

***At the level of the L2 vertebra*,** the vertebral body had a height between 23,9-28,7 mm, for *the female*, 25,0-28,7 mm, for *the male* and a height between 23,9-29,2 mm.

***At the level of the L3 vertebra*,** the vertebral body had a height between 24,7-28,6 mm, for *the female*, 24,7-27,8 mm, for *the male* and a height between 25,8-28,6 mm.

***At the level of the L4 vertebra*,** the vertebral body had a height between 24,7-28,9 mm, for *the female*, 24,7-27,2 mm, for *the male* and a height between 25,7-28,9 mm.

At the level of the L5 vertebra, the vertebral body had a height between 23,2-30,2 mm, for *the female*, 23,2-27,1 mm, for *the male* and a height between 25,2-30,2 mm.

Comparing the height of the vertebral body for the first two lumbar vertebra, I discovered that for the 20 cases, 14 (70% of the cases) *the body of the L2 vertebra was higher than the body of the L1 body's vertebra* with 1,1-3,3 mm, and in 2 cases (10% of the cases), *the 2 vertebras had the same height of the vertebral body*, and in 4 of the cases (20% of all cases), the *L2 vertebra had the height of the vertebral body smaller than the height of the L1 vertebra* with 1,7-3,7 mm, just for the males.

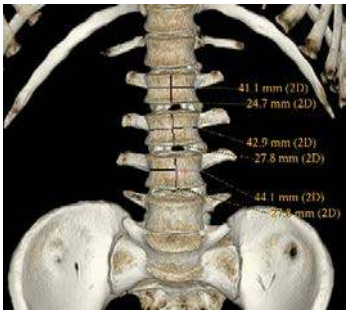


Fig 21. The height of the L2 body vertebra is bigger than the height of L1 with 1,1 mm, and the height of L3 is equal with the height of L2, the width of the vertebral body of L2 is bigger than L1 with 1,88 mm, and the width of L3 is bigger than L2 with 1,2 mm (anterior view, female).

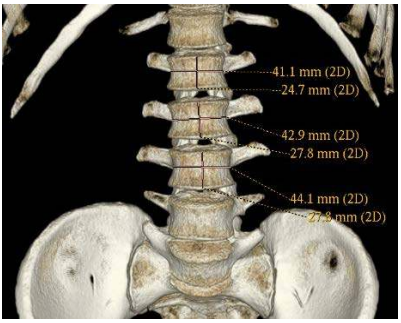
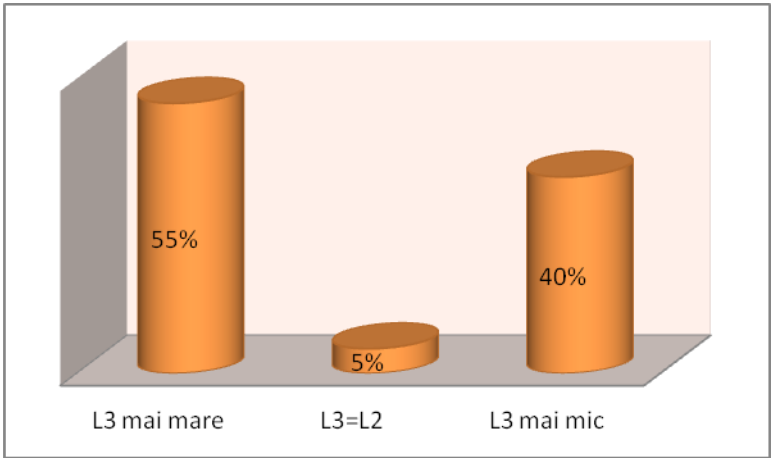


Fig 22. The height of the body of the L2 vertebra is bigger than the height of L1 with 3,1 mm and the height of L3 is equal with the height of the body of the vertebra L2, the width of the L2 vertebra's body is bigger than the width of L1 with 1,8 mm, and the width of L3 body's vertebra is smaller than L2 with 1,2 mm (anterior view, male).

Comparing the height of L2 and L3 body's vertebra, I discovered that in 11 cases (55% of the cases) *the L3 body's vertebra is bigger than the L2* with 0,6-2,1 mm, in one case (5% of the cases) *the 2 vertebras had the same height of the vertebral body* and that in 8 of the cases (40% of the cases), *L2 had a bigger height than the L3 body's vertebra* with 0,3-2,1 mm.



GRAFIC 7. THE DIFFERENCE OF HIGH BETWEEN THE BODY OF L2-L3

Comparing the height of L3 and L4 body's vertebra, I discovered that in 7 cases (35 % of cases) *the L4 body's vertebra is bigger than L3* with differences between 1,1-1,6 mm, and in 13 of cases (65% of cases), *L4 had a height smaller than L3* with differences between 0,1-2,4 mm, between the minimum value and the maximum being a difference of 2,3 mm.

. **Comparing the L5 and L4 body's vertebra height**, I discovered that in 12 of the cases (60% of the cases) *the L5 body's vertebra is bigger than L4* with differences between 0,6-3,0 mm, and in 8 cases (40% of the cases) *the L5 body's vertebra is smaller than L4* with 0,6-2,6 mm.

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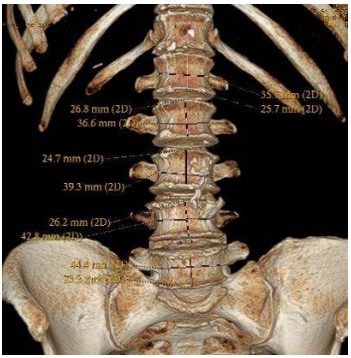

Fig 23. The L2 body's vertebra height is bigger than the L1 with 1,1 mm, the L2 height of the body's vertebra is bigger with 2,1 mm than L3, the L4 body's vertebra is bigger than L3 with 2,1 mm, and the L4 body's vertebra is bigger than L5 with 3,0 mm, the L2 width body's vertebra is bigger than L1 with 0,9 mm, the L3 width body's vertebra is bigger than L2 with 2,7 mm, L3 width body's vertebra is bigger than L2 with 2,7 mm, L4's body vertebra width is bigger than L3 with 3,5 mm and L5's body vertebra width is bigger than L4 with 1,6 mm (anterior view, female).

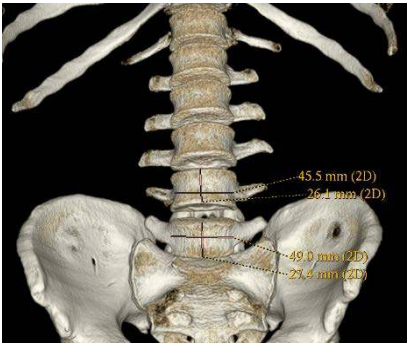

Fig 24. The L5 body's vertebra height is bigger than L4 with 1,3 mm and the L5 body's vertebra width is bigger than L4 with 1,3 mm (anterior view, male).

The lumbar intervertebral discs height

The lumbar intervertebral discs height was measured on a 32 cases, 18 female ceses (56,25% of the cases) and 14 cases for the male (43,75% of the cases), with the exception of the intervertebral disc L5-S1, wich height was measured on 30 of the cases, 16 female cases (53,33% of the cases) and 14 of the cases for the male (46,67% of cases).

For the T12-L1 intervertebral height, I found a height between 4,3-8,6 mm *for the female*, the disc had a height of 4,3-6,9 mm, and *for the male* the intervertebral disc had a height between 6,1-8,6 mm.

The L1-L2 intervertebral disc had a height between 6,4-10,4 mm. *For the female* the L1-L2 had a height between 6,4-10,4 mm and *for the male* the disc's vertebra height was 8,0-9,9 mm.

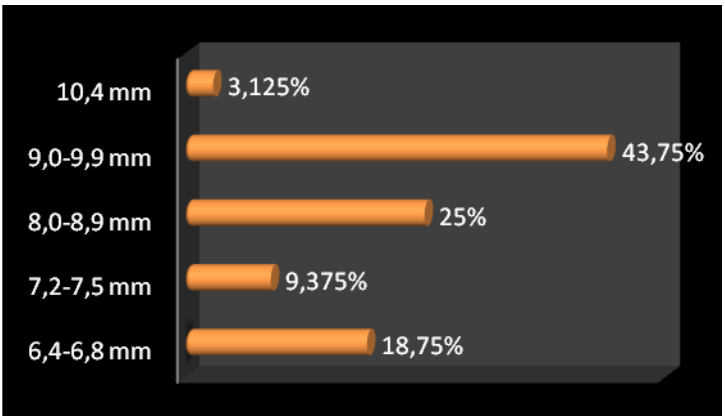

Chart 12. The height of the intervertebral disc L1-L2

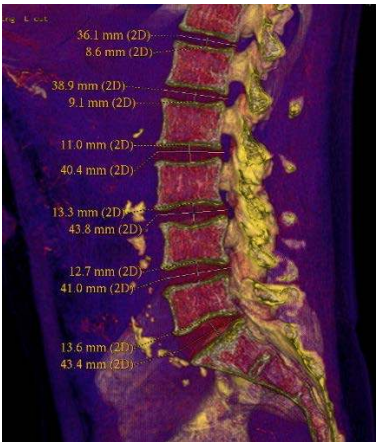

Fig 25. The T12-L1 intervertebral height is 8,6 mm, L1-L2 is 9,1 mm, L2-L3 is 11,0 mm, L3-L4 is 13,3 mm, L4-L5 is 12,7 mm and L5-S1 is 13,7 mm. The intervertebral width is T12-L1 36,1 mm, L1-L2 is 38,9 mm, L2-L3 is 40,4 mm, L4-L5 is 41,0 mm, L5-S1 is 43,4 mm (male).

Between the T12-L1 and L1-L2 intervertebral discs, I discovered some height differences between 0,5-4,9 mm, in which cases the L1-L2 disc was higher than the T12-L1, fact encountered in 31 cases (96,875% of the cases), between the extrem values we have 4,4 mm difference, for one case (3,125% of cases), the L1-L2 disc was less height than the T12-L1 with 0,1 mm.

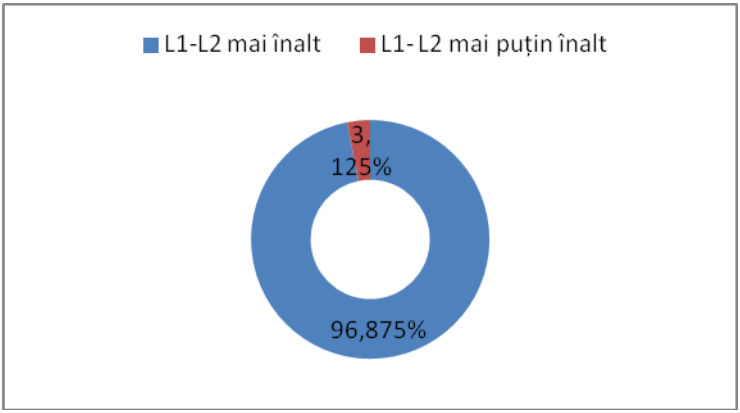

Chart 13. Height differences between T12-L1 and L1-L2

For the L2-L3 inter-vertebral disc I found a height difference between 7,4-10,4 mm, *for the female*, the disc had a height of 7,4-11,2 mm, *for the male* the intervertebral disc had a height between 8,3-10,8 mm. **Between the L1-L2 and L2-L3 it existed some differences**, the L2-L3 intervertebral disc was higher in 30 of the cases (93,75% of cases) than L1-L2 disc with differences between 0,4-3,4 mm; and in 2 cases (6,25% of the cases) the intervertebral disc height L2-L3 was smaller with 0,2 mm, than the L1-L2 intervertebral disc height.

The intervertebral disc L3-L4 had a height between 6,6-13,6 mm, *for the female* L3-L4 had a height between 6,6-11,0 mm, and *for the male* the L3-L4 had a height between 7,2-13,6 mm. ***Between the L2-L3 and L3-L4 inter-discs*** were differences of height, in 14 cases (43,75% of the cases), the L3-L4 being higher than the L2-L3 with 0,1-2,8 mm, in 2 of the cases (6,25% of the cases) the two discs had the same height and in 16 of the cases (50,0% of the cases) the disc L3-L4 was shorter than L2-L3 with 0,2-2,2 mm.

The intervertebral disc L4-L5 had a height between 5,5-12,7 mm, the difference between the extreme values were 7,2 mm. In 4 cases (12,50% of the cases), the difference were between 5,5-6,2 mm and in 7 cases (21,875% of the cases) of 7,3-7,9 mm, in 6 cases (18,75 % of the cases), the differences being of 8,3-8,8 mm, and 9,2-

9,7 mm, in 3 of the cases (9,375% of the cases) of 10,5-10,7 mm, in 2 of the cases (6,25% of the cases) of 11,6-11,8 mm, and in 4 of the cases (12,5% of the cases) of 12,0-12,7 mm. ***Between the L3-L4 intervertebral discs and L4-L5***, I discovered in all the cases differences of height, in 14 of the cases (43,75% of the cases), the L4-L5 being higher than the L3-L4 with 0,4-2,6 mm and in 18 of cases (56,25% of cases) the L4-L5 disc was shorter than L3-L4 with 0,5-3,5 mm.

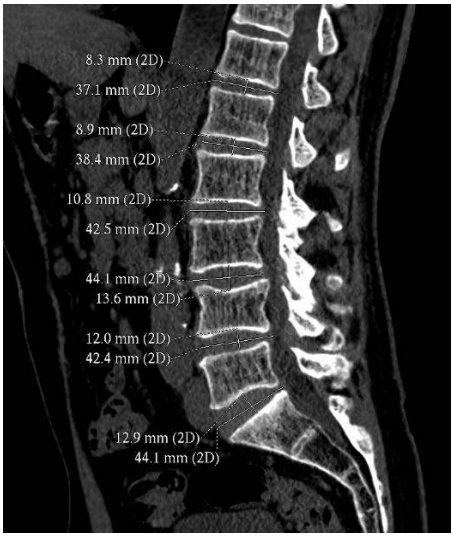

Fig 28. The height of the T12-L1 lumbar intervertebral discs was of 8,3 mm, L1-L2 was 8,9 mm, L2-L3 was 10,8 mm, L3-L4 was 13,6 mm, L4-L5 was 12,0 mm, L5-S1 was 12,9 mm. The width of the T12-L1 inter-vertebral discs was 37,1 mm, L1-L2 was 38,4 mm, L2-L3 was 42,5 mm, L3-L4 was 44,1 mm, L4-L5 was 42,4 mm, L5-S1 was 44,1 (male).

The intervertebral disc L5-S1, on 30 cases, presented a height between 6,0-9,5 mm, *for the female*, the L5-S1 disc had a height between 2,3-9,0 mm, *for the male*, the intervertebral disc L5-S1 had a height between 6,0-13,6 mm. ***Between the intervertebral discs L4-L5 and L5-S1***, there *were differences* of height in all cases, in 24 of the cases (80% of the cases), the disc L4-L5 was shorter than L5-S1 with 1,2-6,3 mm, and in 6 of the cases (20% of the cases) the disc L4-L5 was smaller than L5-S1 disc with 0,8-0,9 mm.

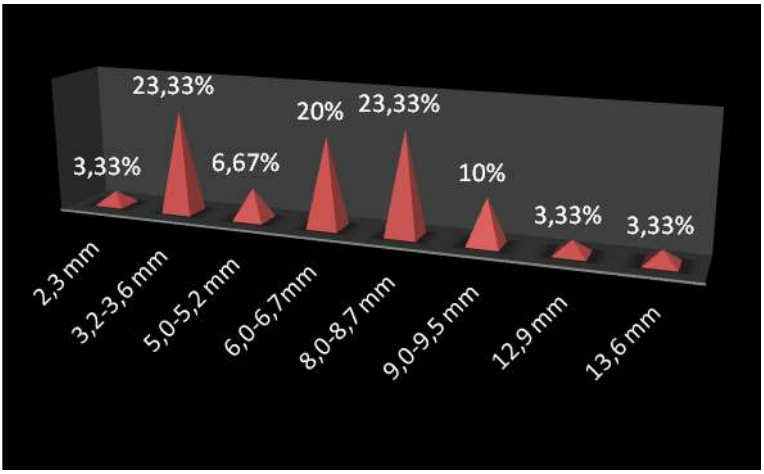

Chart 20. The height of the intervertebral disc L5- S1

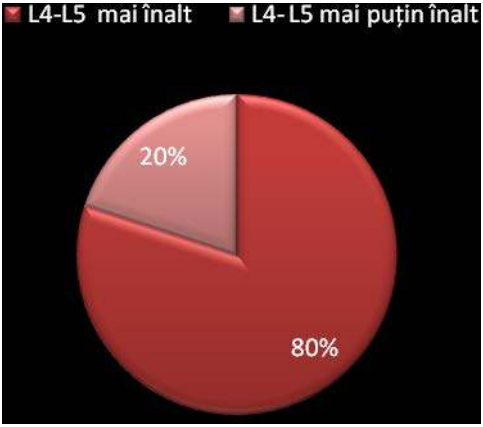

Chart 21. Differences of height between the intervertebral disc L4-L5 and L5-S1

THE DISCAL VALUE AT THE LEVEL OF THE SPINE

Studying 20 cases, 10 for every sex, we measured the discal value for every vertebra.

The discal value L1 was found between 2,23-3,78, *for the female* the value was between 2,23-3,78, and *for the male* the value was between 2,72-3,78.

The discal value L2 was found between 2,85-4,55 *for the female* the value was between 2,85-4,18, the discal value *for the male* it was 2,85-4,55.

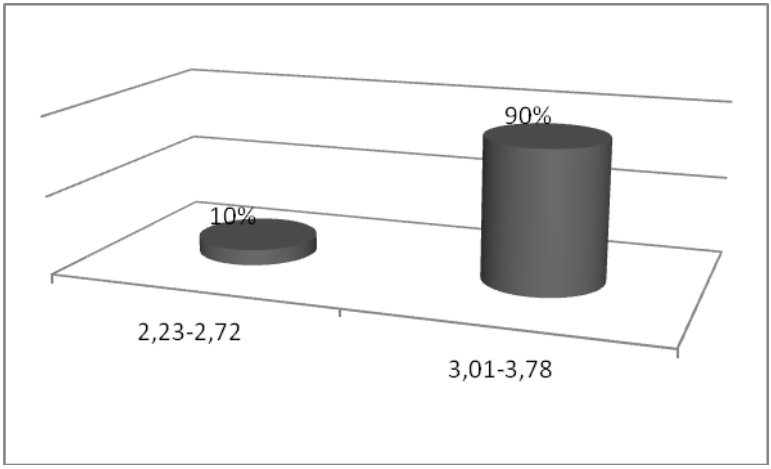

Chart 23. The discal value of L1

The discal value of L3 was between 2,37-4,89, *for the female*, the discal value was 2,71-4,05, and *for the male* the discal value was between 2,37-4,89.

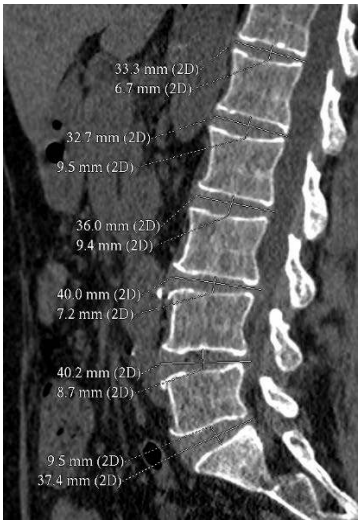

Fig 29. The discal value L1 is 3,70, the discal value of the L2 is 3,51, the value of L3 is 2,91, the discal value of L4 is 3,32, the L5 value is 4,09 (female).

The value of the L4 I disc was 1,97-4,83, *for the female* being 1,97-3,79, and *for the male* is 2,15-4.

The value of the L5 disc was 0,91-4,93 *for the female* being 0,91-2,51 and for the male is 1,37-4,93.

COMPARISON BETWEEN THE COSTIFORM LUMBAR RIGHT AND LEFT PROCESSES

At the level of the L1 costiforme, in 10 of the cases (66,67% of the cases), the right costiforme was longer than the left with 0,3-2,9 mm, and in the other 5 cases (33,33% of the cases), the left costiforme was longer with 1,0-2,5 mm.

At the level of the L2 costiforme, in 10 of the cases (66,67 % of the cases), the right costiforme was longer than the left one with 0,3-3,4 mm and in 5 of the cases (33,33% of the cases), the left one was longer with 0,7-1,7 mm.

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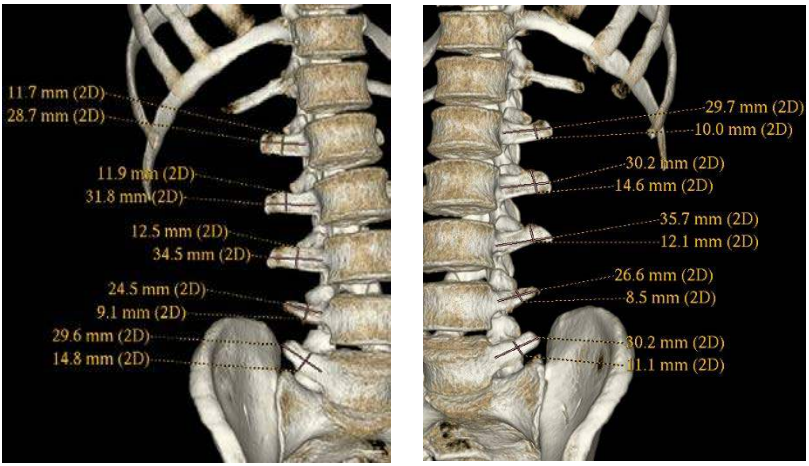

Fig 35. The right costiforme L1 is longer than the right one with 1,0 mm, the right costiforme L2 is longer than the left one with 1,6 mm, the L3 left costiforme is longer than the right one with 1,2 mm, the L4 left costiforme is longer than the right one with 2,1 mm, the L5 left costiforme is longer than the right one with 0,6 mm (male).

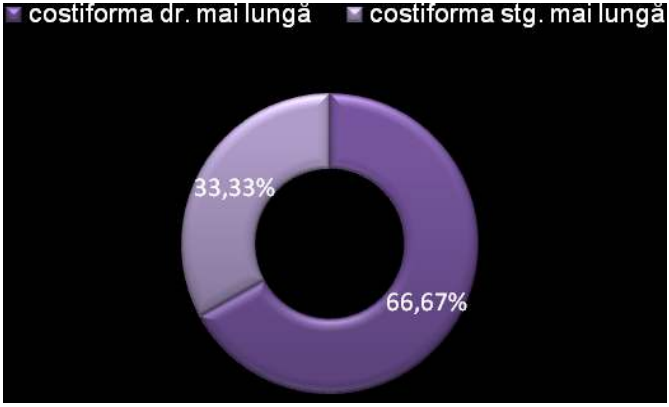

Chart 50. Differences of length between the left and right costiformes

At the level of the L3 costiforme, in 7 of the cases (46,67% of the cases), the right costiforme was longer than the left one with 0,4-

1,0 mm, and in 6 cases (40,0% of the cases), the left costiforme was longer with 0,2-1,0 mm and in 2 of the cases (13,33 % of the cases), the left and right costiformes were equal.

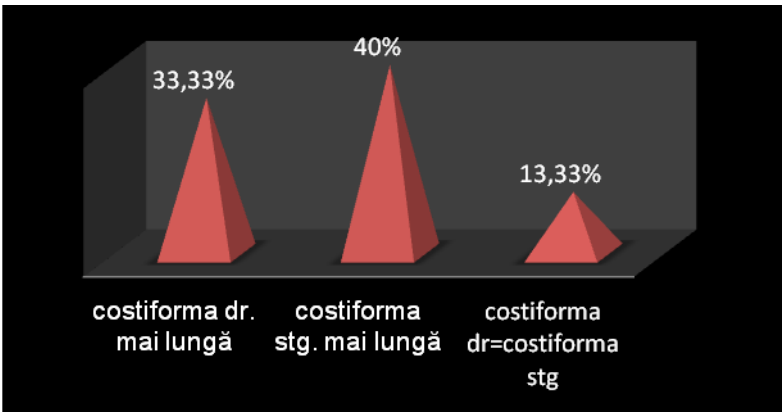

Chart 51. Differences of length between the right and left L3 costiformes

At the level of the L4 costiforme, in 8 of the cases (53,33% of the cases) the right costiforme was longer than the left one with 0,5-4,9 mm, and in 7 of the cases (46,67% of the cases), the left costiforme was longer with 1,5-2,1 mm.

A*t the level of the L5 costiforme,* in 7 of the cases (46,67% of the cases), the right costiforme was longer than the left one with 1,5-4,9 mm, and in 8 of the cases (53,33% of the cases), the left costiforme was longer with 0,6-2,7 mm.

THE SACRUM BONE MORPHOLOGY

The sacrum height, studied on 12 patients, was between 104,2- 122,0 mm, and the ***maximum width*** was situated over the second sacral vertebra, with a value between 90,4-97,6 mm. Immediately under the level of the forth sacral vertebra the width had values between 15,4-28,3 mm. ***The width at the level of the anterior-superior border of the S1 vertebra*** is between 50,0-88,1 mm, and ***the width at the level of the anterior-inferior border of the S5 vertebra*** is between 15,4-28,3 mm.

I measured from profile ***the height of the body's vertebra*** on 16 patients, for each sacral vertebra, 10 for the female (62,5% of the cases) and 6 for the male (37,5 % of the cases).

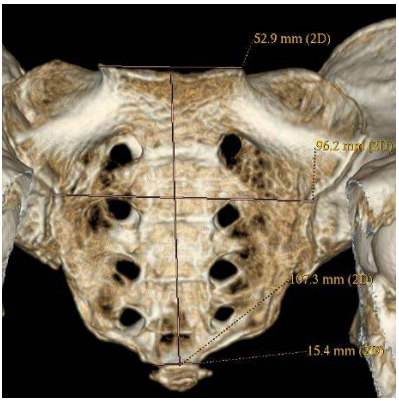

Fig 37. The height of the sacrum is 107,3 mm, the maximum width is 96,2 mm, the superior width of the first vertebra is 52,9 mm, the inferior width of the last sacral vertebra has 15,4 mm (female).

The height at the level of the S1 vertebra is between 25,5-29,9 mm, *for the female*, the vertebral body of the S1 was between 25,5-27,4 mm, *for the male*, the S1 body's vertebra having a height of 28,4-29,9 mm.

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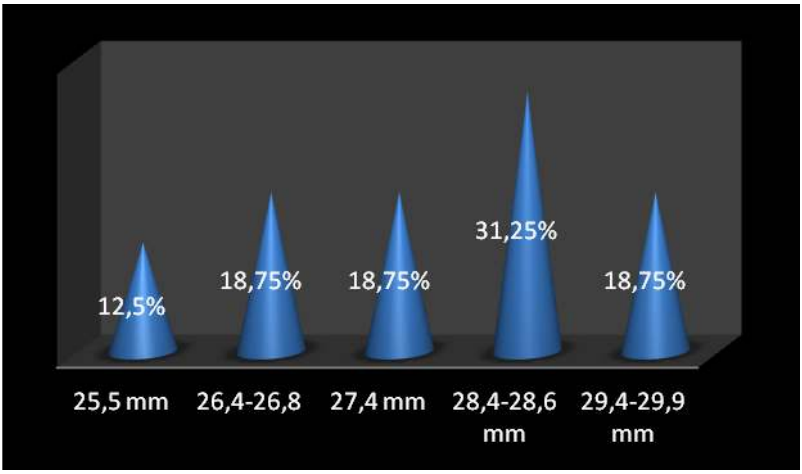


Chart 54. The profile height of the S1 body's vertebra.

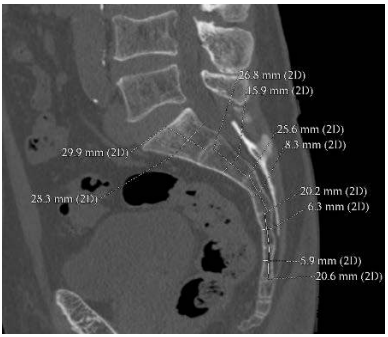


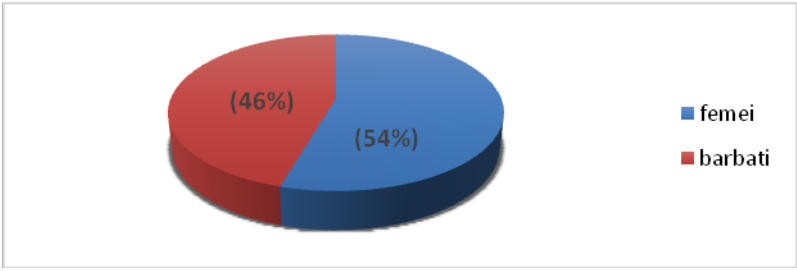
Fig 40. The height of the body's sacral vertebras: S1 is 29,9 mm, width is 28,3 mm, the S2 has a height of 26,8 mm, width of 15,9 mm, S3 vertebra is 25,6 mm for the height, the width is 8,3 mm, the S4 has a height of 20,2 mm, the width is 6,3 mm, the S5 is 20,6 mm, and the width is 5,9 mm (male).

The height at the level of the S2 body's vertebra was between 13,8-27,3 mm, *for the female,* having between 24,1-27,3 mm, and *for the male*, between 13,8-26,8 mm. ***The height at the level of the S3 body's vertebra*** was between 12,1-25,6 mm, *for the female* was 21,5-24,0 mm, and *for the male* was 12,1-25,6 mm.

The height at the level of the S4 body's vertebra was between 16,5-24,0 mm, *for the female*, the S4 body's vertebra had a height of 16,5-22,0 mm, *for the male*, the S4 body's vertebra having a height between 20,2-24,0 mm.

The height at the level of S5 was between 18,0-37,0 mm, *for the female*, having between 18,0-21,2 mm and *for the male* 20,6-37,0 mm.

THE RESULTS OF THE CLINICAL STUDY



GRAFIC 64. THE DISTRIBUTION BY GENDER

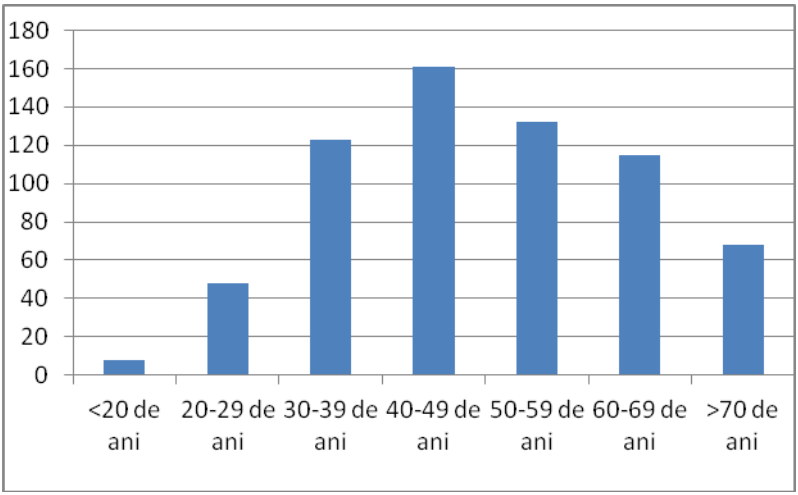


Chart 65. The structure on age group

For this patient's selection I considered that the proper drug therapy associated with the condition, makes possible the creation of the complex recuperation therapy, without any second effect.

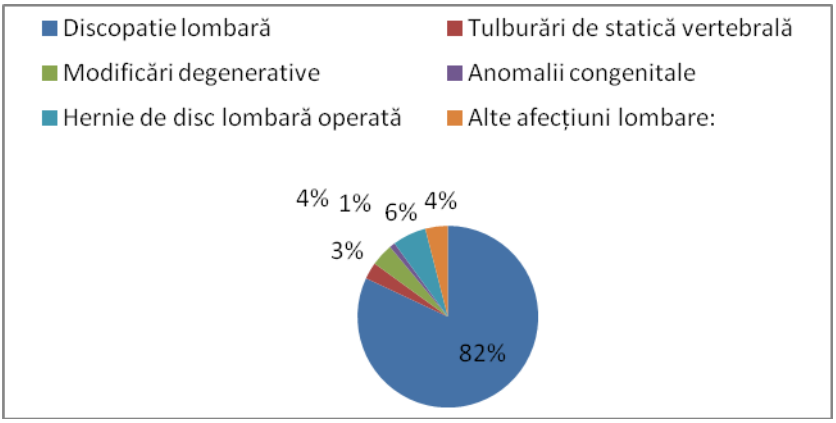


Chart 69. The group structure according to the lumbar pain

1.***Lumbar Discopathy***: 535 patients (82%)

- *lumbar discopathy phase I*: 158 patients (30% of the patients), 86 females and 72 males;
- *lumbar discopathy phase II*: 86 patients (16% of the patients), 43 females and 43 males;
- *lumbar discopathy phase III*: 194 patients (36% of the patients), 95 females and 99 males;
- *lumbar discopathy phase IV (spondylodiscarthrose)*: 97 patients (18% of the patients), 60 females and 37 males.

Table 3. LUMBAR DISCOPATHY PHASE I-THE DISTRIBUTION BY GENDER AND AGE

DISCOPATHY PHASE I	SEX	AGE
2 WOMEN	3 MEN	<20 YEARS OLD
8 WOMEN	6 MEN	20-29
22 WOMEN	18 MEN	30-39
14 WOMEN	19 MEN	40-49
19 WOMEN	10 MEN	50-59
18 WOMEN	10 MEN	60-69
3 WOMEN	6 MEN	>70

TABLE NR 4. LUMBAR DISCOPATHY PHASE II-THE DISTRIBUTION BY GENDER AND AGE

DISCOPATHY PHASE II	SEX	AGE
0 WOMEN	0 MEN	<20 YEARS OLD
5 WOMEN	5 MEN	20-29
6 WOMEN	10 MEN	30-39
12 WOMEN	17 MEN	40-49
13 WOMEN	8 MEN	50-59
7 WOMEN	3 MEN	60-69
0 WOMEN	0 MEN	>70

TABLE NR 5. LUMBAR DISCOPATHY PHASE III-THE DISTRIBUTION BY GENDER AND AGE

LUMBAR DISCOPATHY PHASE III	SEX	AGE
0 WOMEN	1 MEN	<20 YEARS OLD
7 WOMEN	8 MEN	20-29
17 WOMEN	23 MEN	30-39
27 WOMEN	39 MEN	40-49
24 WOMEN	16 MEN	50-59
14 WOMEN	7 MEN	60-69
6 WOMEN	5 MEN	>70

TABLE NR 6. LUMBAR DISCOPATHY PHASE IV-THE DISTRIBUTION BY GENDER AND AGE

LUMBAR DISCOPATHY PHASE IV	SEX	AGE
0 WOMEN	0 MEN	<20 YEARS OLD
0 WOMEN	0 MEN	20-29
0 WOMEN	1 MEN	30-39
3 WOMEN	2 MEN	40-49
9 WOMEN	6 MEN	50-59
26 WOMEN	15 MEN	60-69
22 WOMEN	13 MEN	>70

2.***Vertebral posture disorder***: 21 patients were diagnosed with lumbar scoliosis (3%), 12 female patients and 9 male patients;

3.***Degenerative modifications:*** on 125 patients

- 27 patients diagnosed with lumbar spondylosis, from whom 22 female and 5 males;
- 1 patient diagnosed with lumbar facets syndrome, male, 36 years old;
- 97 patients diagnosed with lumbar spondylodiscarthrose, 60 females and 37 men.

TABLE NR 8. THE DISTRIBUTION OF DEGENERATIVE MODIFICATIONS

SPONDILO DISCARTH ROSE	LUMBAR-SPONDYLOSIS	LUMBAR FACETS SYNDROME
60 WOMEN	22 WOMEN	0 WOMEN
37 MEN	5 MEN	1 MAN

TABLE NR. 9 LUMBAR-SPONDYLOSIS-THE DISTRIBUTION BY GENDER AND AGE

SPONDYLOSIS	SEX	AGE
0 WOMEN	0 MEN	<20 YEARS OLD
0 WOMEN	0 MEN	20-29
3 WOMEN	1 MEN	30-39
6 WOMEN	4 MEN	40-49
9 WOMEN	0 MEN	50-59
3 WOMEN	0 MEN	60-69
1 WOMEN	0 MEN	>70

4.***Congenital anomalies*: 6 patients (1%)**

- 3 patients diagnosed with L5 sacralization, 2 male, with the age between 40-49 and 50-59 and a female patient between 30-39;
- 3 patients diagnosed with spina bifida, 2 females between 30-39 and lower than 20 years and one patient, male between 30-39.

TABLE NR 10. THE DISTRIBUTION OF CONGENITAL ANOMALIES

L5 SACRALIZATION	SPINA BIFIDA
1 WOMAN	2 WOMEN
2 MEN	1 MAN

5.***Lumbar disc hernya operated***: 38 patients (6%), 20 males and 18 women;

TABLE NR 11. Lumbar disc hernya operated-THE DISTRIBUTION BY GENDER AND AGE

LUMBAR DISC HERNYA OPERATED	SEX	AGE

0 WOMEN	0 MEN	<20 YEARS OLD
1 WOMEN	0 MEN	20-29
1 WOMEN	4 MEN	30-39
5 WOMEN	3 MEN	40-49
6 WOMEN	5 MEN	50-59
3 WOMEN	3 MEN	60-69
2 WOMEN	5 MEN	>70

6.***Other lumbar diseases*:** 27 patients (4%)

- 8 patients diagnosed with lumbar cavity stenosis, 7 women and 1 men, by the age between 60-69;
- 18 patients diagnosed with spondylolisthesis, 11 women and 7 men patients;
- 1 patient diagnosed with old spondylodiscite, female, 53 years old.

TABLE NR 12. THE DISTRIBUTION OF OTHER LUMBAR DISEASES

LUMBAR CAVITY STENOSIS	SPONDYLO-LISTHESIS	SPONDYLODISCITE
7 WOMEN	11 WOMEN	1 WOMAN
1 MAN	7 MEN	0 MEN

TABLE NR 13. SPONDYLOLISTHESIS-THE DISTRIBUTION BY GENDER AND AGE

SPONDYLOLISTHESIS	SEX	AGE
0 WOMEN	0 MEN	<20 YEARS OLD
0 WOMEN	1 MEN	20-29
1 WOMEN	2 MEN	30-39
2 WOMEN	2 MEN	40-49
3 WOMEN	1 MEN	50-59

3 WOMEN	1 MEN	60-69
2 WOMEN	0 MEN	>70

TABLE NR 14. LUMBAR CAVITY STENOSIS-THE DISTRIBUTION BY GENDER AND AGE

LUMBAR CAVITY STENOSIS	AGE
0 WOMEN	<20 YEARS OLD
0 WOMEN	20-29
1 WOMEN	30-39
1 WOMEN	40-49
1 WOMEN	50-59
2 WOMEN	60-69
2 WOMEN	>70

COMMENTS

Regarding the lumbar body's vertebra, in the written literature, I have not encountered the general description of the lumbar spine morphometry neither the every lumbar vertebra, with the dimension description of the morphological values. Consequently, it is considered that the lumbar vertebra is the most sizable [1,2,3,4,5], [2,6,7], mentioning that the traverse diameter is bigger than the anterior-posterior diameter, the traverse diameter rising in caudal cranial sense, being bigger on the inferior face of the body of each vertebra. [8] mentions that that the most sizable is the L5 vertebra, hat has the most massive vertebral body. It is to remark that the lumbar vertebra are higher on the anterior face and backwards (with their help describing the lumbar index of Cunningham) and that generally the men have a more voluminous vertebra than the women.

I discovered that ***the height of the lumbar vertebra*** was always bigger for the men, where the differences were bigger also for the minimum values but also for the maximum, between the biggest height of the lumbar spine at the men (182,3 mm) and the lowest height for the women's lumbar vertebra (167,0 mm) I encountered a difference of 15,3 mm for the anterior CT's and for the profile CT's this difference was 18,2 mm.

The medium height of the lumbar vertebra being of 26,43 mm, for the men was 26,84 mm, and 25,79 mm for the women. *At the level of the L1 vertebra*, the medium height was of 26,14 mm, for the men being of 26,96 mm and for the women of 25,32 mm. *At the level of the L2 vertebra,* the average height was of 26,69 mm, for the men, being 26,22 mm and for the women being 26,56 mm. *At the level of the L3 vertebra*, the average height was of 26,82 mm for the men being 27,24 mm and for the women 26,240 mm. *At the level of the L4 vertebra*, the average height was 26,39 mm, for the men being of 26,96 mm and for the women of 25,82 mm. *At the level of the L5*

vertebra, the average height was of 26,09 mm for the male being 27,34 mm and for the female being of 24,84 mm.

[5] mentions that the height of the vertebral bodies consequently to the direct anterior measurements was between 21,98-24,61 mm, the minimum height being at the level of the L1 vertebra, and the maximum at the level of the L4 vertebra. By imagistic anterior measurements, the height was between 22,57 mm (L1) and 25,09 (L5).

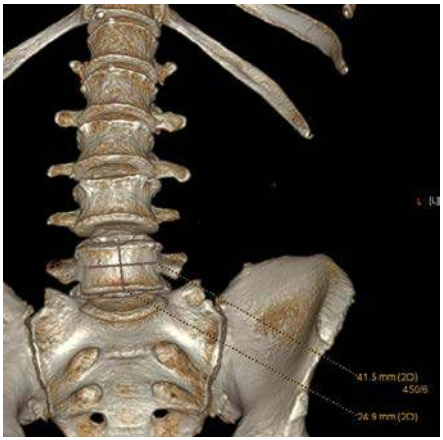


Fig 69. The height of the L5 vertebra is 24,9 mm and the width is 41,5 mm (woman).

I realized a gradual growing of the medium heights just at the level of the first three lumbar vertebra, after the average height was decreasing gradually at the level of the last two lumbar vertebrae. The average height of the lumbar vertebrae had the biggest value at the level of the L3 vertebra, for the male being at the level of the L5 vertebra (27,34 mm), and for the female being (25,82 mm), at the level of L4. Just at the level of the L2, the average height for the women was bigger with 0,34 mm than for the men in the rest of the cases the medium height was bigger for the men with differences between 0,84-2,50 mm.

I realized that *between the anterior and the posterior heights of the lumbar vertebrae's body* it is a difference of 0,1-0,2 mm, in favor of the anterior height, the lumbar index of Cunningham had a value of 92,0-95,65, Taillard [quoted by 9], giving it a value of 97,46-98,68.

I realized a gradual cranial-caudal growing of the average width at the level of the lumbar vertebrae, for the men but also for the women. The average width of the lumbar vertebrae had for the L5 the biggest values for both sexes, for the men having 47,80 mm and for the women 27,70 mm. Just at the level of L5 the average height for the women was smaller with 0,10 mm than for the men, in the rest of the cases the average height was bigger than for the women with differences between 0,30-2,33 mm.

TABLE NR 17. THE HEIGHT OF THE INTERVERTEBRAL LUMBAR DISCS

AUTHOR	HEIGHT OF THE IV DISCS
Papilian	**9 mm**
Robacki	**10-18 mm**
Ulmeanu	**9 mm**
Iliescu	**10,71-17,81 mm**
Personal results	**8,78 mm**
Sex	**male: 9,67 mm**
Sex	**fem: 7,96 mm**

I verified the general average height of the lumbar discs at the CT's and the values found by me are the lowest in comparison with the other authors, with 1,22-9,22 mm as [4] and 0,22 as [3,10]. Comparing by sex, the results are smaller for the male with 0,33-8,33 mm than the results found at [4], but bigger with 0,67 than the general values of [3,10] and for the female are smaller with 2,04-11,04 mm than the general values of [4] and smaller with 1,04 than than the results of [3,10].

TABLE NR 18. THE REPORT BETWEEN THE VERTEBRAL BODY'S HEIGHT AND THE IV LUMBAR DISC'S HEIGHT

AUTHOR	REPORT
Louis	**1/3**
Papilian	**1/3**
Robacki	**1/5**
Ulmeanu	**1/5**
Personal report	**30,32%**
Sex	**male: 30,59%**

Sex	**fem: 30,09%**

Comparing my results regarding the report between the height of the iv disc and the height of the corresponding vertebra, I realized that this has a value close to 1/3, being bigger for the men with 0,50% than the women. These differences can be observed also to the level of each lumbar vertebra.

The disc index at the level of the lumbar vertebra has a variable value comparing to the data previously given, the ***average value*** of the disc index being of 32,76 for the male is 32,95 mm and for the female 30,56 mm.

TABLE NR 21. THE AVERAGE OF THE DISC INDEX AT THE LEVEL OF THE LUMBAR DISC-PERSONAL RESULTS

L1	**32,48 mm**
L2	**37,01 mm**
L3	**36,24 mm**
L4	**33,32 mm**
L5	**25,03 mm**

Realizing a comparison between the body's vertebra's width and the width of the intervertebral discs, I discovered that the width of the intervertebra discs was bigger with 1,75-1,62% just at the level of the L2 and L3 discs, the width of the discs being closer to the intervertebral body's width, representing between 91,20-98,36% at the level of the other levels. Sometimes, the width of the intervertebral discs was smaller than the width of the body's vertebra, representing between 80,22-89,30% and just at the level of the L5 vertebra (3 cases) and L4 (1 case), I encountered cases with the value 61,54-74,95%.

Regarding the costiforme processes [1,3,4,6,7, 8,11], they describe them of being sizable, long and narrow. [6] said that the best represented are the L2 and L3 costiforme, the shorter being the L1 costiforme process.

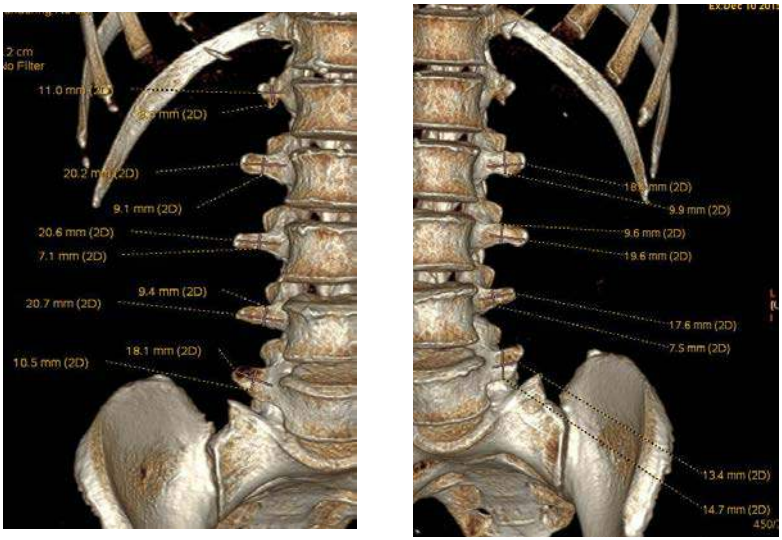


Fig 72. The morphometry (length and height) of the left and right costiforme lumbar processes

Table 24. The value of the general average length of the right lumbar costiforme processes-personal results

L1	**20,02 mm**
L2	**23,50 mm**
L3	**26,860 mm**
L4	**23,54 mm**
L5	**25,74 mm**

I realized a continuous growing of the value of the general length of the right lumbar costiforme processes just at the level of the first three vertebrae, the value at the level of the last two vertebrae being lower than that at the level of the L3 vertebra.

The sacrum had an average cranial-caudal length bigger for the men than for the women with a difference of 1,87 mm and the average width superior to the S2 vertebra was for the men with 0,85 mm bigger than for the women.

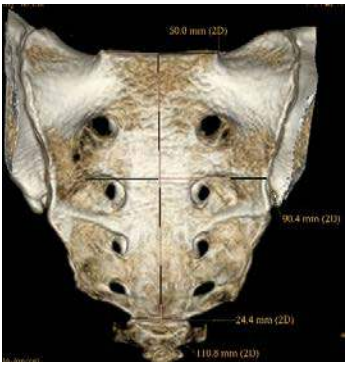


Fig 73. The maximum length of the sacrum (over the S2) is 81,59 of it's total length, and his width at the level of the apex is 22, 02 of length.

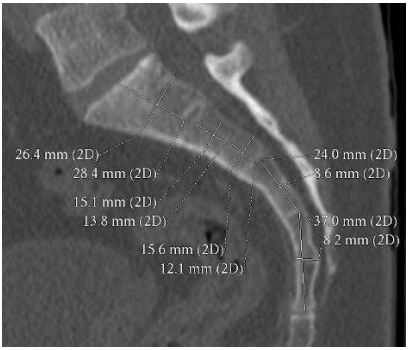


Fig 74. The average height of the sacral vertebrae is 20,68-27,75 mm, the average width is 14,84 mm (male).

The maximum height of the sacral vertebrae is 20,68-27,75 mm, at the men being of 18,85-29,15 mm , for the female is 19,27-27,05 mm, the average width is of 14,84 mm (male), for the male being bigger with 0,70-1,41mm.

The average lower width is 10,42 mm, and the average width is 15,32 mm. [12] considers that the S2 vertebra's height is 25,0 mm, and the S2 vertebra's width is 83,0 mm, S2 being smaller than the S1 vertebra.

After [8], for the women the sacrum width is frequently directly proportional with it's length, but the body of the first sacral vertebra is generally more voluminous for the men.

I also seen a bigger inequality for the vertical and horizontal diameters at the level of the anterior and posterior foramina, but also among them.

The vertical diameter of the anterior sacral right foramina is 12,87 mm, at the level of the first foramen having 16,47 mm, at the level of the second foramen is 13,04 mm, at the level of the third foramen is 12,23 mm and at the level of the forth is 9,77 mm.

For the anterior left sacral foramen vertical diameter I found a value of 14,21 mm, at the level of the first foramen we have a general average of 16,11 mm, at the level of the second foramen we have 15,97 mm, at the level of the third foramen is 15,33 mm and for the forth is 9,43.

The vertical diameter of the anterior vertical foramina presents a gradual decrease on the cranio-caudal average value, for the right but also for the left, for the right being bigger than the average at the level of the S1-S3, and for the left at the level of S1-S2. This diameter is bigger at the level of the sacral right foramina 2 and 3, with differences of 2,93 and 3,10 mm, at the level of the left sacral foramina 1and 4, with differences of 0,37 mm and 0,34 mm.

For the right sacral anterior horizontal diameter the value is of 15,03 mm, at the level of the first foramen having 18,35 mm, at the level of the second foramen is 18,43 mm, at the level of the third foramen is 14,90 mm, and at the level of the forth foramen is 8,45 mm.

The horizontal diameter of the left anterior sacral foramina has a general average value of 15,39 mm, at the level of the first foramen is 18,17 mm, at the level of the second foramen is 19,48 mm, at the level of the third foramen is 15,47mm, at the level of the forth foramen is 9,32 mm.

The horizontal diameter of the anterior sacral foramina does not have the same cranio-caudal gradual decrease of his average value, for the right but also for the left of the second foramen being bigger than the first foramen. At the left the average was bigger than for the right with 0,36 mm. This diameter is bigger at the level of the right sacral foramina of 2 and 3, with differences of 2,93 but also 0,34 mm at the level of the foramina being bigger at the level of left sacral foramina 1and 4 with 0,36 mm, but also 0,34 mm.

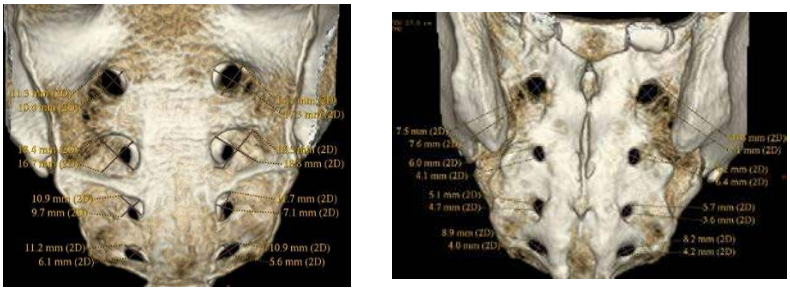


Fig 75. The vertical and horizontal diameter of the anterior and posterior sacral foramina

The vertical diameter of the posterior right sacral foramina has a general average of 8,08 mm, at the level of the first foramen having 8,75 mm, at the level of the second foramen is 7,68 mm, and at the level of the third foramen is 8,02 mm, and at the level of the forth is 7,87 mm.

For the left posterior vertical sacral foramen diameter we have a general value of 8,85,21 mm, at the level of the first foramen having 8,93 mm, at the level of the second foramen 7,62, at the level of the third foramen is 9,65 mm, and at the level of the forth foramen is 9,20 mm.

The vertical diameter of the posterior sacral foramina does not have a gradual cranio-caudal decrease of its average value, for the left or for the right, being smaller at the level of the second foramen than for the third foramen. At the left the diameter is bigger than the general average at the level at the foramina 1, 3 and 4 with differences of 0,8 mm, 0,80 mm and 0,35 mm, at the right is bigger only at the level of the foramina 1 with difference of 0,67 mm.

The horizontal diameter of the posterior right sacral foramina has a general average of 8,08 mm, at the level of the first foramen having 8,75 mm, at the level of the second foramen is 7,68 mm, and at the level of the third foramen is 8,02 mm, and at the level of the forth is 7,87 mm.

The vertical and horizontal diameters of the left and right posterior foramina are smaller than the same diameters of the anterior foramina, between the general average being a difference of

6,95 mm at the horizontal level of the diameter of the sacral foramina and of 1,08 mm at the level of the vertical diameter.

The distance between the the left and right sacral anterior foramina have a general average of 33,39 mm, at the level of the first foramina being of 28,04, at the level of the second foramen is 28,48 mm, at the level of the third is 26,98, at the level of the forth is 26,20 mm. This distance was bigger than the general average just at the level of the foramina 1 and 2, with differences of 2,40 mm, and 0,44 mm. At the level of the foramina 3 and 4, it was smaller with 2,06 mm and also 1,84 mm.

According to the studied pathology, for the sex distribution, we can observe a greater preponderance of the female patients, 356 patients (54%) than the male patients 299 (46%).

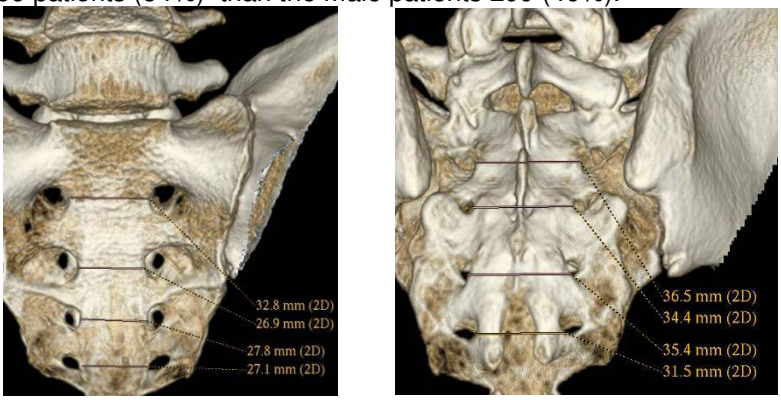


Fig 76. Anterior and posterior sacral foramina traversal distances

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From the age group distribution we observe the preponderance of the patients with the age between 40-49 (25%), 161 patients, 132 patients (20%) with ages between 50 and 59, 123 patients (19%) with ages between 30 and 39, and 115 patients (18%) with ages between 60 and 69. Contrary, on observe that just 68 patients (10%), over 70 years old, 48 patients (7%) with ages between 20-29 and 8 patients (1%) under 20 years old.

On the realized study, from the total of 655 patients, 86 patients(13,13% of the total), were diagnosed with lumbar phase II discopathy, from whom 43 were female (12,08% from female cases), and a number of 43 male patients (14,38% of the male cases). In the specialized literature, the most affected sex is the

male, in 75,0% of the cases, [14], so I have found a lower percentage with 60,62% of the cases.

Regarding the age distribution of the phase II discopathy, we can observe the preponderance of the patients between 40-49, 29 of the patients (33,72% of the cases) from a total of 86 patients, 21 patients with ages between 50-59 (24,42%), 16 patients with ages between 30-39 years old (18,60% of the cases), 10 patients with ages between 20-29(11,63% of the cases) and also 10 patients with ages between 60-69 (11,63% of the cases). After [15], the affected population by this pathology is 25- 35, and after of a statistic of the clinic of Eforie Nord are the patient between 30-45 years old [14].

In my study, from the total of 655 patients, 194 of the patients (29,64%) were diagnosed with lumbar discopathy phase III, from whom 95 of the patients were female (26,69% from the female cases) and 99 were male (33,11% of the male cases). This data related to the sex distribution, are reflected into other author's studies, without percentages [14].

According to the age distribution of the phase III discopathy, we can observe the preponderance of the patients with ages between 40 and 49, a number of 66 patients (37,02% of the cases), 40 patients with the ages between 30-39 (15,46% of the cases) and 40 patients with the age between 50-59 from a total of 194 cases. Contrary, we can observe 21 patients between 60-69 (10,82%), 15 patients between 20-29 (7,73%), 11 patients over 70 (5,67% of the cases) and just a patient under 20 (0,52% of the cases). In the specialized literature the age of the potential patients is considered by many of the authors to be in the 3rd or 4th decade [14].

In the study, I realized that the most frequent lumbar disc hernias were at the level of the L4-L5 and L5-S1 with the touch of the L5 bottom and consequently S1.[16] says that 98% of the lumbar disc hernia are situated at this level.

The congenital lumbar disc hernia were encountered in 20% of the cases [17,18], those realized post-surgery, post-traumatic, post-infection) in 25-30% of the cases[17,19,20], and the primary lumbar disc hernia, determined by predisposed factors (old age, fat and raised abdominal pressure), mainly on the left, with a 2/1 left/right

incidence were reported in 50-55% of the cases [21,22]. [8] says that 95% of the disc hernia are produced at the level of L4-L5 or L5-S1.

In my study there were more right lumbar discs, with a incidence of 3/1.

In my study, from the total of 655 patients, 38 patients (5,80% of the cases), were diagnosed with lumbar disc hernia post-surgery. A statistic from 1983, quoted by [16] shows that in the US, this value was found at 2% of the population, and in Sweden was of 0,8%, less than my statistic with 3,80%, consequently 5,0%.

In the realized study, from 655 patients, just 3 patients (0,46% of the cases) were diagnosed with sacralization on the L5, 2 cases for the male (0,67% of the male cases) and one female (0,28%). The L5 sacralization had a preponderance of 17% [23], but [24] says that the incidence is 1,7-14% in 1983, [25] says that the incidence was of 14,1%, in India, in 2011, and [26] reported an incidence of 11,1% in Gujarat, in 2012. [8] mentions an incidence of 5% of the L5 sacralization, saying that in these cases the union of L5-S1 becomes harder and the inter-vertebral disc L4-L5 is being deteriorated, giving painful reaction to the patient.

TABLE NR 30. THE L5 SACRALIZATION FREQUENCY VERTEBRA

AUTHOR	FREQUENCY%
Ucar	17,0
Castellvi	1,7-14,0
Sharma	14,1
Kubavat	11,1
Moore	5,0
PERSONAL CASES	0,46
Sex	male: 0,67
Sex	fem: 0,28

Contrary to the results from the literature, my results are lower with 16,54% as [22], 1,24-13,54% as [23], 13,55% as [24], 10,65% as [25] and 4,54% as [8].

After [8], the stenosis at the L5 level produces a compression of the “horse tail” and the electromyography shows that the denervation is only on the innervated muscle by the lumbar-sacral nervous roots.

In this cases, the indicated treatment, could be decompressive laminectomy (cutting of the vertebra or of the entire vertebral arch). A lumbar spinal channel stenosis can be an hereditary abnormality responsible for degenerative age modifications, causing, for example, the intervertebral disc protrusion(Rowland and McCormick, quoted by 8).

In this study, from the total of 655 patients, just 3 patients (0,46% of the cases), were diagnosed with spina bifida. The spina bifida incidence is of 5% of the population [27]. After [8], occult spina bifida is the most frequent congenital abnormality, quoting Greer (1995), that gives a 24% percentage of the population.

In my study, of 655 patients, 18 patients (2,75%) were given the diagnosis lumbar spondylolisthesis. A lot of the authors consider that 5-10% of the cases of low back pain have as an origin a lumbar spine spondylostesis [14]. The general incidence reported is of 4-6% [28], that affirm that an important number can be found at the Inuit tribes (54% of the cases). It exist differences according to the race, the incidence is just 1% at the African-American women, and for the Caucasian the incidence is just 6% at men [28].

The vertebral channel stenosis we found in 8 cases (1,20% of cases), 7 cases for the female (1,97% of the female cases) and one male (0,33% of the male cases). The lumbar stenosis degenerative type is the most frequent type of vertebral stenosis, with an incidence of 2-8% of the general population [29,30], my percentage being lower with 0,80-6,80%.

In what concerns the age distribution, from the 18 diagnosed patients, there are 4 patients between 40-49 years old, 60-69 and 50-59, that represents 22,22% of the cases, 3 patients had between 30-39 years old (16,66% of the cases), 2 patients had over 70 (11,11% of the cases) and 1 patient had between 20-29 (5,55% of he cases). [31] considers that 80% of the symptomatic patients had over 60.

In my present study, from the total of 655 patients, just 1 male, of 36 years old was diagnosed with lumbar facets syndrome (0,15% of the cases). This data regarding the sex and age distribution is reflected on the other author's studies [14].

CONCLUSIONS

The lumbar-sacral morphology of the spine it is characterized by the big variability of its markers in what regards its morphometry (length, width and thickness), but also his asymetry of the two parts of the body. Consequently to the study we can count some conclusions. The height of the spine, generally and particular depends on the sex, but also by the body. We cannot observe a gradual cranio-gradual growth of the vertebra's diameter but neither of the inter-vertebral discs. The discal index mus be presented at the level of each vertebra and not as a total of the spine. This should be established morphometrically at every patient and at every vertebra, according with the CT, on profile. The thickness of the inter-vertebral discs does not always respect the studied level. The lumbar costiforme processes presents a big variety regarding its morphometry. The length of the right costiforme is bigger than the left one at the level of the L4 and L5, with differences of 0,2 mm and 1,08 mm. At the level of the L1, L2 and L3 vertebrae are longer the left costiforme with differences of 0,9 mm, 1,22 mm and 1,03 mm. For the male the right costiforme L1 are longer with 0,56 mm and L5 with 0,84 and at the level of the costiforme L2, L3 and L4 are longer the left costiforme with 0,7 mm, 1,08 mm and 0,82 mm. For the female, the right costiformes L4 are longer with 0,86 mm and the L5 with 2,38 mm and at the level of the L1, L2 and L3 the left costiformes are longer with 0,74 mm and 1,02 mm.

The lumbar pain is the most frequent cause for the patient's visit at the recuperation ambulatory, therefore the presence at the specialist, the imagistic modifications and the anatomical layer of the pain are very important, influencing the recuperation. “The epidemiology studies made on large group of people, show that

80% of the population has at least one painful disco-vertebral episode, in their life, the pathology being a large consumer of drugs and therefore responsible by the therapeutic usage for drawling, dis functional and negative evolution"[23].

From the total of patients, presented at the ambulatory for pain at the level of the lumbar- sacral spine with or without irradiation on the left or right inferior member, for a recuperation treatment and medical recuperation, the predominant sex is female, 54,35% and the male 45,64%.

The most affected age by the lumbar-sacral spine pathology is between 40-49: 161 patients (25%), 91 men (30,43%) and 70 women (19,66%).

I realized that the most frequent lumbar pain is the lumbar discopathy phase III, the lumbar disc hernia, 194 patients(29,61%), lumbar discopathy phase I, 158 patients (24,12%), lumbar discopathy phase IV (lumbar spondylodiscarthrose), 97 patients (14,80%), lumbar discopathy phase II, 86 patients (13,12%), post-surgery lumbar disc hernia, 38 patients (5,80%), lumbar spondylosis on 27 patients (4,12%), lumbar scoliosis, 21 patients (3,20%), spondylostesis 18 patients (2,74%), lumbar channel stenosis on 8 patients (1,22%), L5 sacralization, 3 patients (0,45%), spina bifida, 3 patients (0,45%), lumbar facets syndrome and old spondylodiscitis, 1 patient (0,15%).

The recuperation medicine is a complex medical , social and educational path that uses a large variety of physical agents and therapeutic methods with the only aim to reestablish the body's functional balance. The final result depends on the entire recuperation program, and every procedure plays the role of a "puzzle", in the place and with its well known role.

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