

OUR EXPERIENCE IN COSTA RICA WITH THE TREATMENT OF SOFT HERNIATED DISC.

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INTRODUCTION.

Our Country, COSTA RICA, is located in Central America, with a territory of 51,100 square kilometers; a population of 4,857,000 inhabitants -up to 2016-, composed of 60-70% of Spaniards descendants; and, the rest, Amerindians and mixture of all different countries and ethnic groups. The general life expectancy is of 79.5 years. The National Social Security, as of today, covers 85.5% of the whole population, which is a very satisfactory figure within the Latin American context.

At the beginning of the year 2003, both Dr. Humberto Trejos and I introduced the OZONOTHERAPY in the treatment of disc herniation in the country, which is performed in two private hospitals: HOSPITAL CLINICA BIBLICA and HOSPITAL CIMA DE SAN JOSE. A few years later, Dr. Verne Lizano Lutz joined our team.

During this period of time, regarding the Spinal Pathology, we have treated Post Operatory Epidural Fibrosis, Discitis and Soft Herniated Disc. The purpose of our next exposition is to show you our experiences in the treatment of SOFT DISC HERNIATIONS since the year 2003.

MATERIAL AND METHODS.

From 2003 on, we have treated 1,240 patients, of both sexes (571 women and 669 men), with ages ranging from 15 to 93 years. In total, these patients were treated of 1,114 disc hernias present at cervical spinal, Thoracic and Lumbar levels. Among our series of patients, there are some who are citizens and residents of several countries, mainly Nicaragua,

Honduras, Guatemala, Mexico, Panama, U.S.A., Canada and a few others from European countries.

Regarding the CERVICAL DISC HERNIAS, out of 91 treated cases, 61.9% were women and, 56% of them men, for a total of 147 patients.

On the THORACIC HERNIAS, only one woman was treated.

On the LUMBAR DISC HERNIAS, 479 women were treated (43.8%) and 613 men (56.2%).

TREATMENT PROTOCOL.

Our scheme of treatment has been highly influenced by the Italian School and we have followed the amendments and adjustments that have been given since early this century.

Generally we have used from 3 to 4 sessions of bilateral paravertebral infiltrations at intramuscular level, according to the intervertebral disc level prior to the Discolisis and 4 to 5 complementary sessions.

When the herniated disc was Lumbar or Thoracic, initially we used to infiltrate 40 cc on each side of the O2-O3 with 20ug of Ozone and later on, 20 cc, on each side of O2-O3, with 20ug/ml of Ozone in the cervical disc hernias. As for the intervertebral space, we would inject Ozone 38-40ug/ml, in doses of 20 cc at lumbar level and 10 cc at cervical level. Those dosages were further on gradually reduced, since around 6 years ago up to the present. At intramuscular lumbar or thoracic level, we would inject 12 cc on each side and 7-8 cc inside disc herniation. At Cervical level we would apply 8 cc of Ozone 20ug/ml, by intramuscular via, on each side, and 4 to 5 cc of Ozone 38-40ug/ml at intervertebral space. The diminution of these doses, in our opinion, did not affect the final result; in

fact, we consider this reduction to be positive as the discomfort or pains that patients used to have, was drastically diminished.

When at the Surgical Operations Room, if Hernias were Thoracic or Lumbar, we would put the patient in lateral decubitus position, on the side that was not affected; in cervical cases, they were put on dorsal decubitus position.

As for Discolisis, it was performed under sedation; our Anesthesiologists used a mixture of Midazolam 2.5 mg and Propofol drug from 3 to 5 mg/kg, intravenously, for a limited time which resulted fundamental for the success of the procedure. Discographies were initially practiced; but, during the recent years, they are seldom done.

As for equipment, since the very beginning we have been using the Ozone Generator from Yanco Laboratories, made in Canada.

In order to make the Discolisis, we used and still do, a Hemodynamic Room that has a Phillips Xpert 20, which images are of such high quality that it has become indispensable for the doctors performance.

ACTION MECHANISM.

The Ozone is an oxidant agent of very high power; its mechanism of action has been thoroughly exposed by Dr. Velio Bocci (5-6). Other authors like Renate Viebahn-Haensler (19), Dr. Alberto Alexander, Dr. Mateo Bonetti and Dr. Marco Leonardi (1-2-3-4-11-14) have also given great contributions to Ozonotherapy since the end of past century.

Also, Ozone counteracts with the enzymes involved in the inflammatory process like the Phospholipase A2, Prostaglandin E, quinine, etc.; and, at

the same time, it stimulates the secretion of antioxidant enzymes like the catalase, dismutase superoxide and others.

The production of a controlled Oxidative Stress is going to cause changes inside the intervertebral disc, shrinkage, like "mummification of the disc", as described by Andreula (11).

RESULTS.

Analysis of Data.

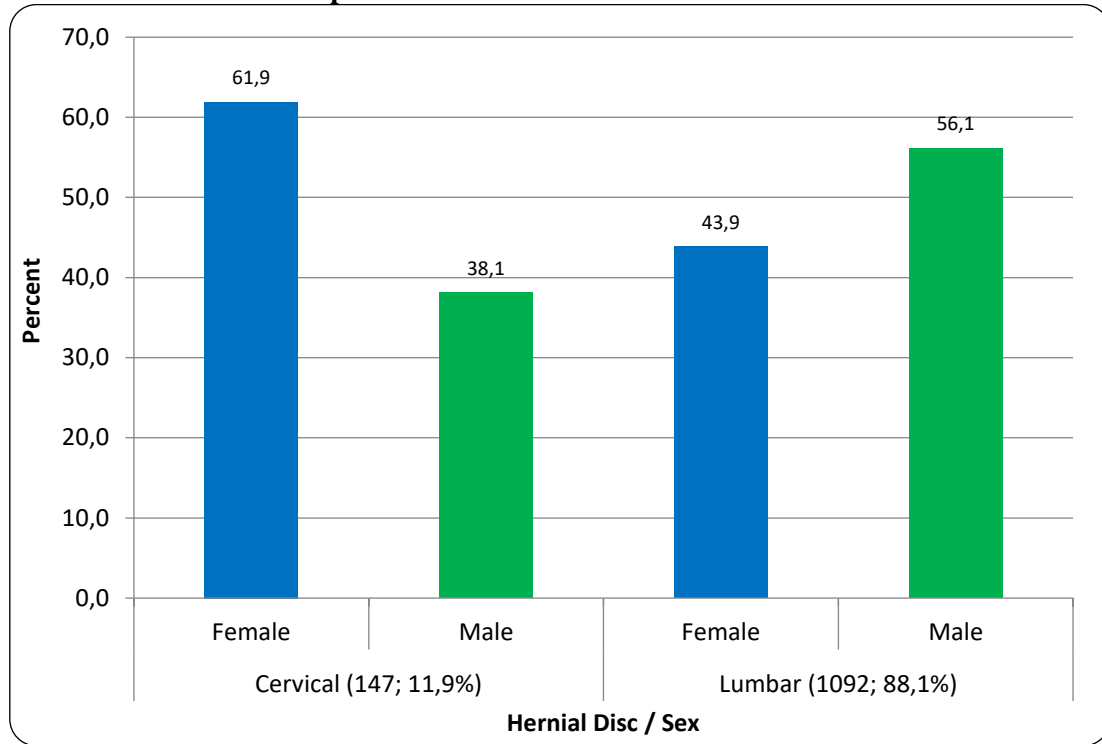
This study, includes years 2003 - 2016 cases. The incidence of cervical, lumbar and thoracic hernias, according to sex, age, clinical course, diagnosis, disc level, location, signs, symptoms, final outcome and associated comorbidity were analyzed, showing that approximately 81.0% to 89.0% of studied patients , presented lumbar herniated discs and, the rest of them, in the cervical spine with only one case of thoracic hernia.

Cervical disc herniation, more frequent in women and the lumbar ones, in men. (Table 1) (Graphic 1)

Table 1: Herniated disc. Sex. 2003 a 2016.

Herniated Disc	Sex	Patients	Percent
	Total	147	100,0
Cervical	Female	91	61,9
	Male	56	38,1
	Total	1092	100,0
Lumbar	Female	479	43,9
	Male	613	56,1

Graphic 1: Herniated disk. Sex. 2003 a 2016.



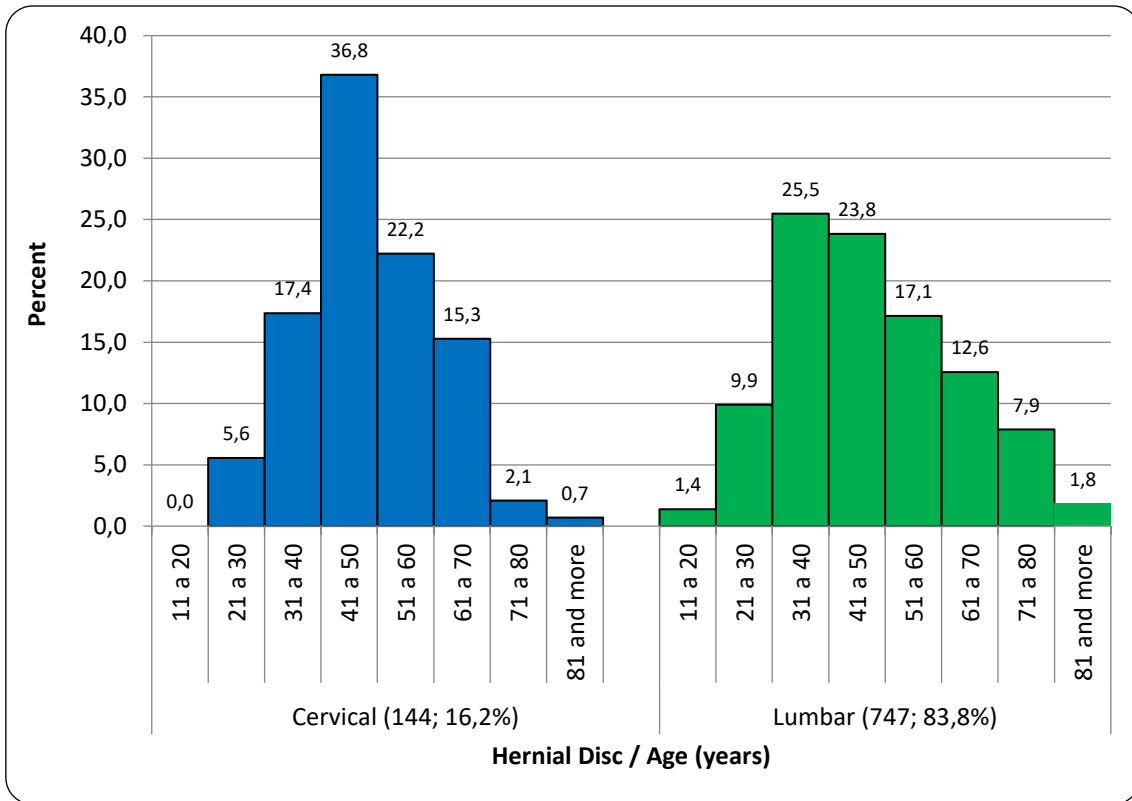
A 59% of patients that had cervical hernias, were between 41.0 and 60.0 years old. The 49.3 % of patients that had lumbar hernias were between 31.0 and 50,0 years old. (Table 2) (Graphic 2).

Table 2: . Herniated disk. Age. 2003 a 2016.

Herniated Disk	Age (years)	Patients	Percent
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	Total	144	100,0
	11 a 20	0	0,0
	21 a 30	8	5,6
	31 a 40	25	17,4
Cervical	41 a 50	53	36,8
	51 a 60	32	22,2
	61 a 70	22	15,3
	71 a 80	3	2,1
	81 and more	1	0,7
	Total	1091	100,0
	11 a 20	15	1,4
	21 a 30	108	9,9
	31 a 40	278	25,5
Lumbar	41 a 50	260	23,8
	51 a 60	187	17,1
	61 a 70	137	12,6
	71 a 80	86	7,9
	81 and more	20	1,8

Graphic 2: Herniated disk. Age. 2003 a 2016.



The clinical course of this pathology, presented very similar percentages for both types of hernias (cervical or lumbar) in period of 0 to 3 months and in 1 to 2 years but, in general, the distribution on the extent of time on both types of hernias, as above mentioned, is quite alike. (Table 3) (Graphic 3)

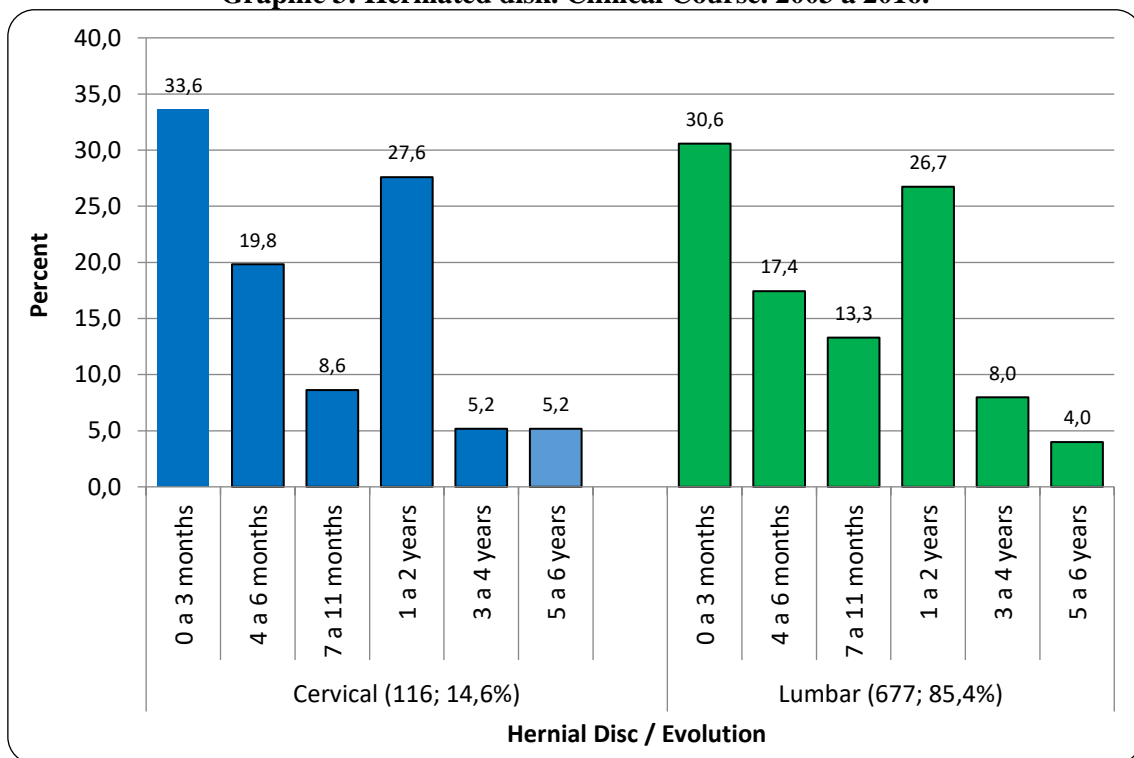
The average evolution time on patients who showed cervical hernias was of 12.3 months, and in those with lumbar hernias 12,7 months.

Table 3: Herniated disk. Clinical Course. 2003 a 2016.

Herniated Disk	Evolution	Patients	Percent
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	Overall	116	100,0
Cervical	0 a 3 months	39	33,6
	4 a 6 months	23	19,8
	7 a 11 months	10	8,6
	1 a 2 years	32	27,6
	3 a 4 years	6	5,2
	5 a 6 years	6	5,2
	Overall	677	100,0
Lumbar	0 a 3 months	207	30,6
	4 a 6 months	118	17,4
	7 a 11 months	90	13,3
	1 a 2 years	181	26,7
	3 a 4 years	54	8,0
	5 a 6 years	27	4,0

Graphic 3: Herniated disk. Clinical Course. 2003 a 2016.

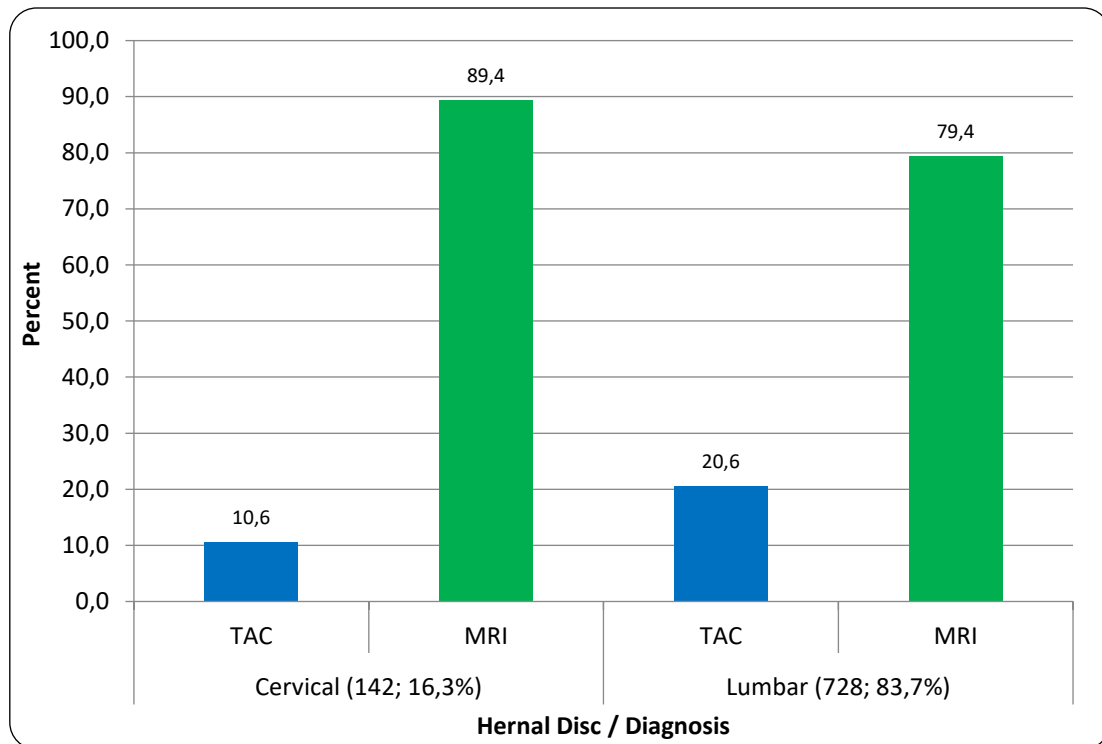


The main diagnostic test used on both groups of patients (those with cervical hernias and lumbar hernias), was the MRI test. (Table 4) (Graphic 4)

Table 4: Diagnosis test. 2003 a 2016.

Herniated Disk	Diagnosis	Patients	Percent
	Overall	142	100,0
Cervical	TAC	15	10,6
	MRI	127	89,4
	Overall	728	100,0
Lumbar	TAC	150	20,6
	MRI	578	79,4

Graphic 4: Herniated disk. Diagnostic test. 2003 a 2016.

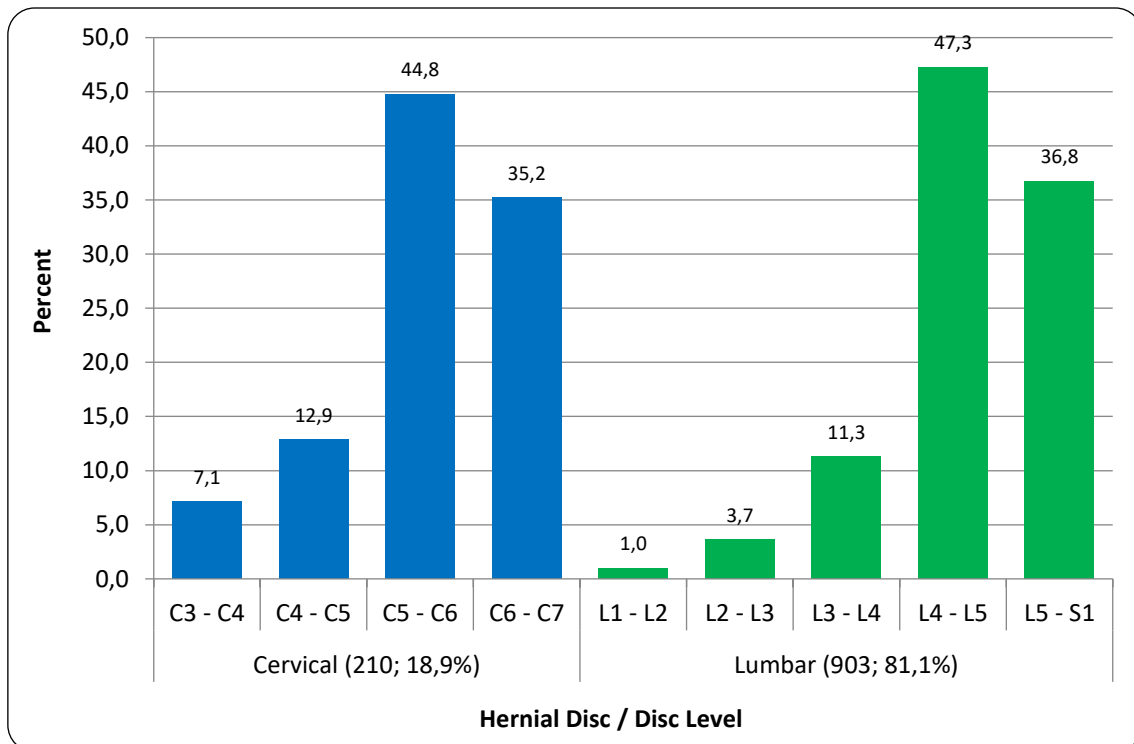


An 80,0% of the patients who had cervical hernias, presented disc herniation in C5-C6 or C6- C7, and 84,1% of those who had lumbar hernias, had this pathology in L4-L5 or L5-S1 intervertebral spaces. (Table 5) (Graphic 5)

Table 5: Herniated disk. Disc level. 2003 a 2016.

Herniated Disk	Disk Level	Patients	Percent
Overall		210	100,0
Cervical	C3 - C4	15	7,1
	C4 - C5	27	12,9
	C5 - C6	94	44,8
	C6 - C7	74	35,2
Overall		903	100,0
Lumbar	L1 - L2	9	1,0
	L2 - L3	33	3,7
	L3 - L4	102	11,3
	L4 - L5	427	47,3
	L5 - S1	332	36,8

Graphic 5: Herniated disk. Disc Level. 2003 a 2016.

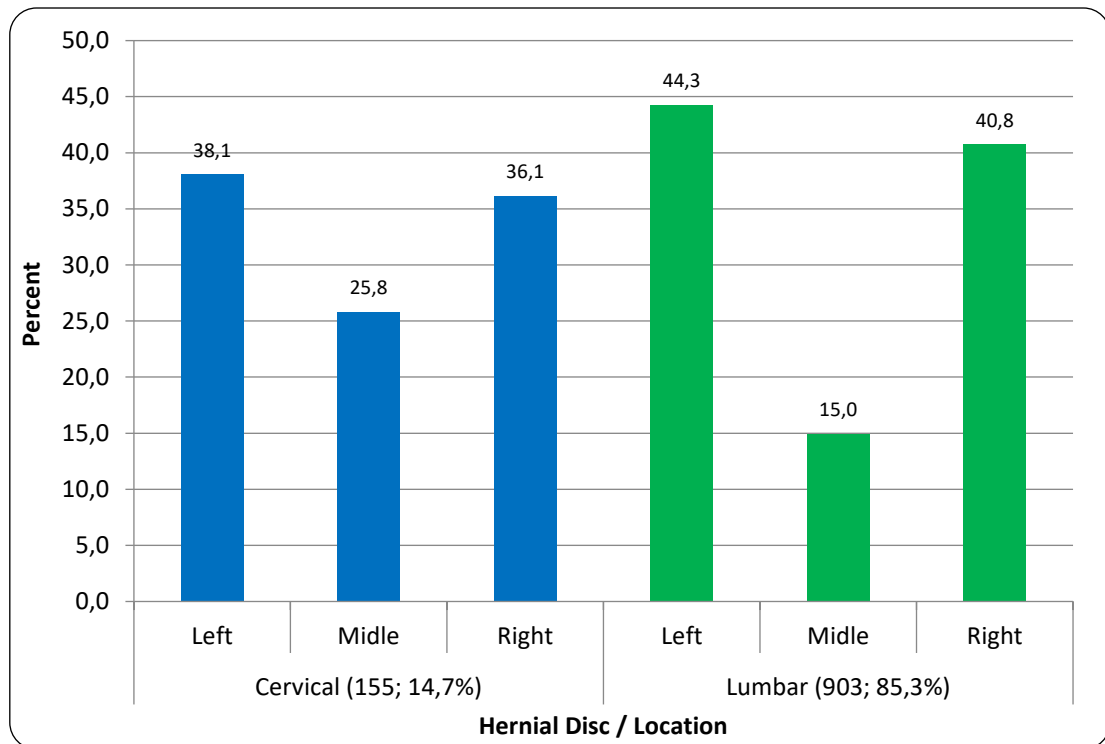


The location of the herniated disc (cervical or lumbar), is showed the same tendency; more frequent on the left side that on the right one. (Table 6) (Graphic 6)

Table 6: Herniated disk. Position. 2003 a 2016.

Herniated Disk	Location	Patients	Percent
	Overall	155	100,0
Cervical	Left	59	38,1
	Middle	40	25,8
	Right	56	36,1
	Overall	903	100,0
Lumbar	Left	400	44,3
	Middle	135	15,0
	Right	368	40,8

Graphic 6: Herniated disk. Location. 2003 a 2016.



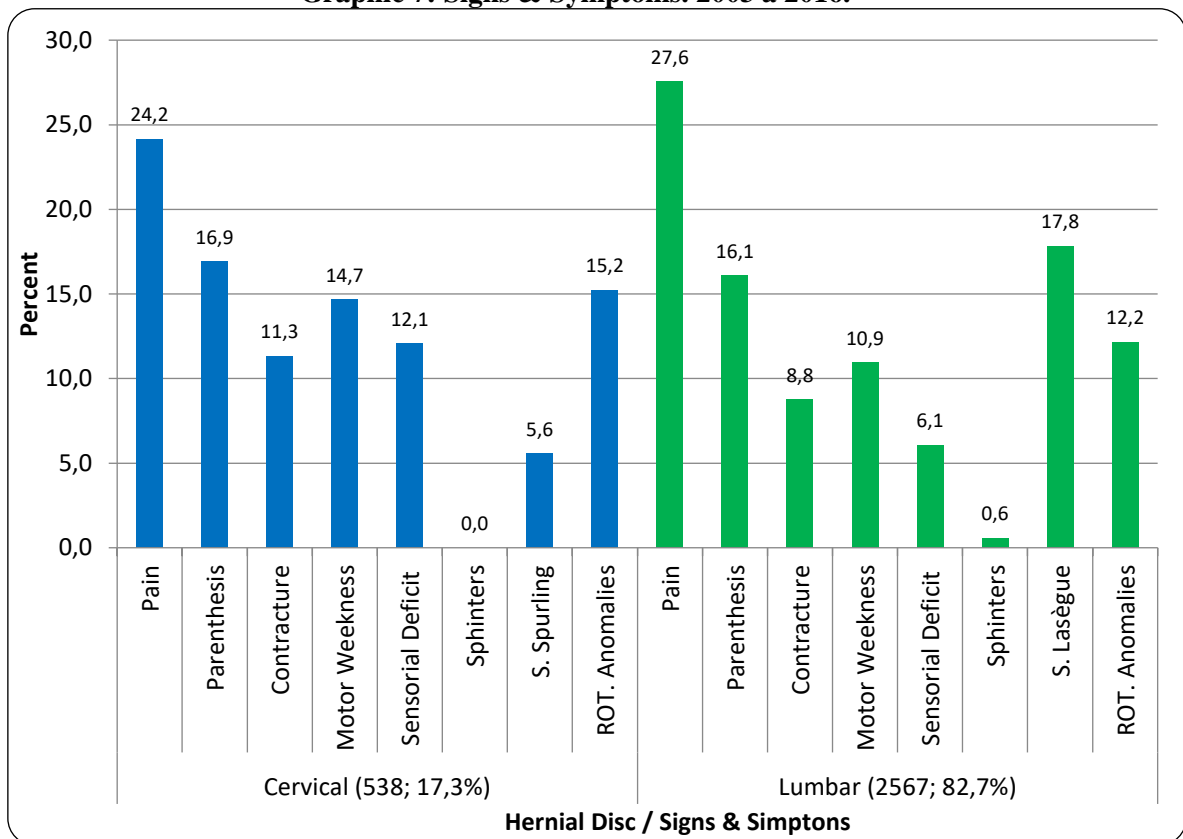
The main symptom in patients with both type of hernias (cervical and lumbar) was pain. (Table 7) (Graphic 7)

Table 7: Herniated disk. Symptomatology. 2003 a 2016.

Herniated Disk	Signs & Symptoms	Cases	Percent
	Overall	538	100,0
Cervical	Pain	130	24,2
	Paresthesia	91	16,9
	Muscle spasm	61	11,3
	Motor Weakness	79	14,7
	Sensorial deficit	65	12,1
	Sphincters	0	0,0
	S. Spurling	30	5,6
	Abnormal Myotatic Reflex	82	15,2
	Overall	2467	100,0
Lumbar	Pain	680	27,6
	Paresthesia	397	16,1
	Muscle spasm	216	8,8

Motor Weakness	270	10,9
Sensorial deficit	150	6,1
Sphincters	14	0,6
S. Lasègue	440	17,8
Abnormal Myotatic Reflex	300	12,2

Graphic 7: Signs & Symptoms. 2003 a 2016.

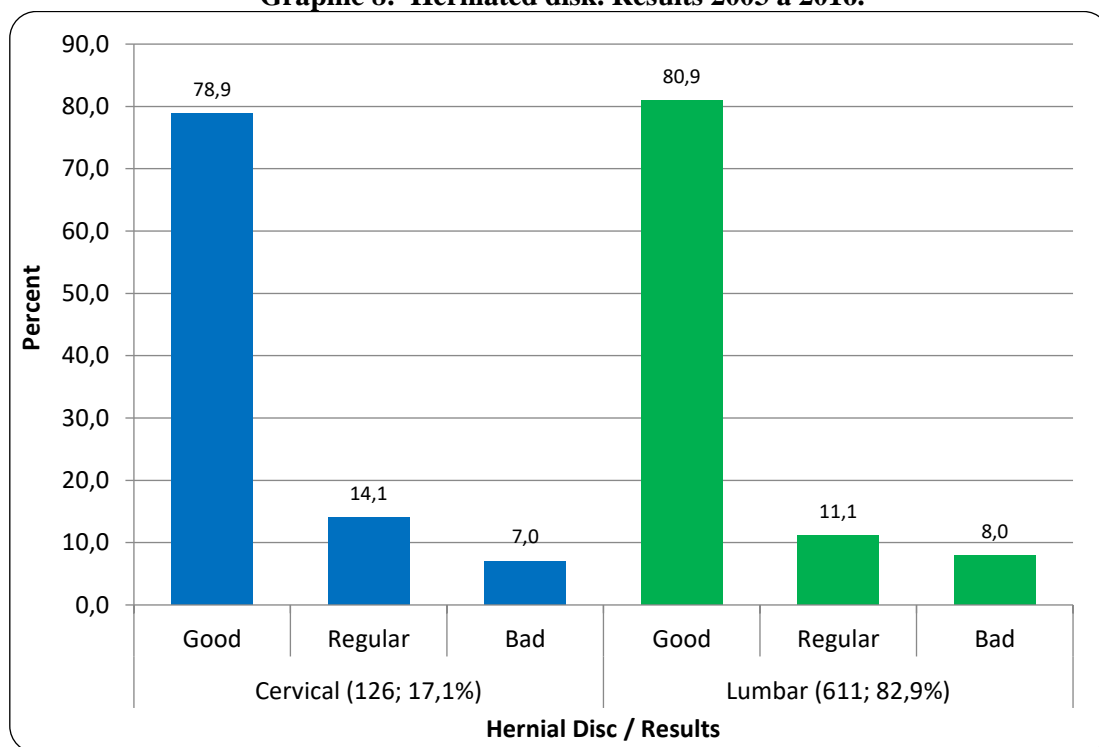


We had good results in 79,0% of the patients with hernia (cervical or lumbar), with this type of treatment (Table 8) (Graphic 8)

Table 8: Herniated disk. Results. 2003 a 2016.

Herniated Disk	Results	Patients	Percent
	Overall	142	100,0
Cervical	Very satisfied	112	78,9
	Satisfied	20	14,1
	Dissatisfied	10	7,0
	Overall	1017	100,0
Lumbar	Very satisfied	823	80,9
	Satisfied	113	11,1
	Dissatisfied	81	8,0

Graphic 8: Herniated disk. Results 2003 a 2016.

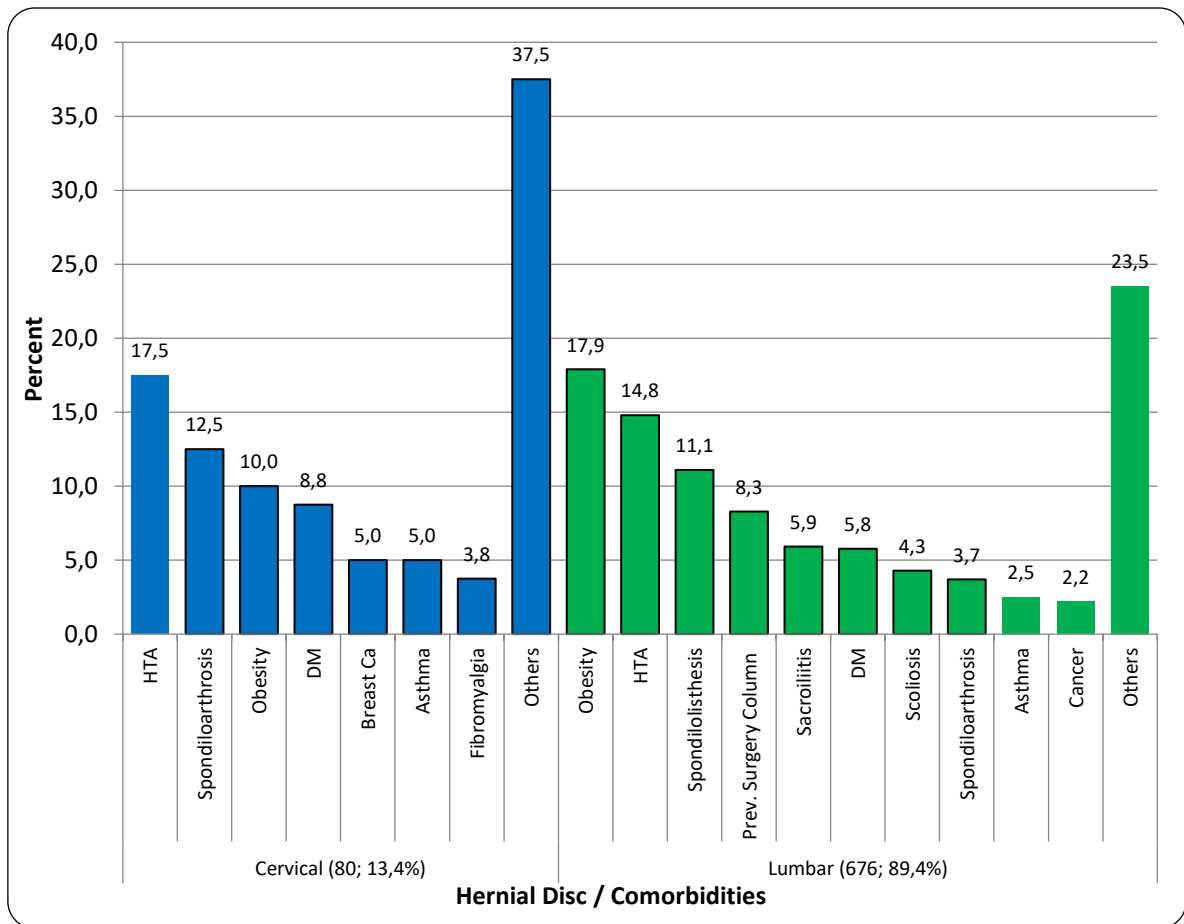


The main comorbidities that were associated in those patients with cervical hernia pathology are HTA and the Spondylosis, and in those with lumbar hernias was Obesity and the HTA. (Table 9) (Graphic 9).

Table 9: Herniated disk. Comorbidities. 2003 a 2016.

Herniated Disk	Comorbidities	Patients	Percent
	Overall	80	100,0
Cervical	HTA	14	17,5
	Spondylosis	10	12,5
	Obesity	8	10,0
	DM	7	8,8
	Breast Ca	4	5,0
	Asthma	4	5,0
	Fibromyalgia	3	3,8
	Others	30	37,5
	Overall	676	100,0
Lumbar	Obesity	121	17,9
	HTA	100	14,8
	Spondilolisthesis	75	11,1
	Previous Spine Surgery	56	8,3
	Sacroiliitis	40	5,9
	DM	39	5,8
	Scoliosis	29	4,3
	Spondilosis	25	3,7
	Asthma	17	2,5
	Cancer	15	2,2
	Others	159	23,5

Graphic 9: Herniated disk. Comorbidities. 2003 a 2016.



DISCUSSION.

Our first report was shown in Buenos Aires, Argentina, at the CLAN 2006 (Trejos, H & Contreras, C.A.)(17), where, out of 195 patients with Lumbar herniated disc, 81% of them were treated with good results. The second one was in November 2012, at the National Medical Congress in Costa Rica, where we presented 334 cases of patients with soft Herniated disc at the Lumbar Spine, obtaining a 77.5% of good results (9); and, the third and last one of our presentations, was at the Central America Neurosurgery Congress, in March 2013, where we reported 51 patients with Soft Cervical Herniated Disc with an 82 % of positive consequences (Contreras C.A.)(10)

These highly satisfactory results explain why we have more than doubled the amount of patients that we have attended during the years 2013 through 2016 (1240 cases), as compared with those from the period that goes from 2003 to 2012. As a matter of fact, now we receive more references of patients, from our colleagues, than in the past.

Dr. Lisa B.E. Shields (16), et al, in her publication of this year, informs that, in the U.S.A., during the year 2005, the costs related with the Pathology of the Column were of US\$ 86 billion; and that in 2011 the Spinal Fusion costs reached up to US\$ 12 billion. This 02-03 treatment in the soft Herniated disc, is a minor risk procedure, has a low cost and the advantage that patients may reincorporate to their jobs in a lesser time, which not only is a very important fact for the patient well-being, but also for his economy as well as that of his country.

Comorbidities is becoming a very important factor in Spinal pathology (Walid & Robinson, 2011)(19); for instance, the metabolic disorders are constantly and repeatedly increasing; so much so that now, in Costa Rica, it is very common to find Obesity and Diabetes in children, adolescents; and high blood pressure in young adults, while, in the in the past it was very rare. Those conditions can easily get involved in the development of a Herniated disc; or by blocking or preventing a good recovery in any kind of surgical treatment.

In recent years, gyms proliferation are a new source of Low Back Pain because clients exceed their capacity in physical exercising.

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