

Hip Joint Function Dynamics in the Process of Physical Rehabilitation in Case of Spine Osteochondrosis

Manana Rukhadze

Department of Therapeutic Gymnastics, Sports Medicine and Ridetherapy, State Medical Academy of Georgia

Abstract

Certain syndromes of spinal osteochondrosis are characterized by movement amplitude restriction in hip joint. Goal of the work is development of optimal program for hip joint function recovery in the course of physical rehabilitation of spinal osteochondrosis. 35 patients of both sexes, 34-56 years old were under surveillance. Ridetherapy (therapeutic riding) was used in combination with classical methods of physical rehabilitation (therapeutic gymnastics, massage, physical therapy) and independently. Following results were obtained: 1) In case of hip joint movement amplitude restriction, most effective complex of physical methods includes - therapeutic gymnastics, massage, physical therapy and ridetherapy. 2) Ridetherapy may be used as an independent method of physical rehabilitation, it is efficient according to spent finances and time. 3) As therapeutic riding has multifactor influence on both muscular system and hip joint, it gives long-lasting and stable therapeutic effect. 4) Ridetherapy may be considered as effective, original method of rehabilitation in both vertebrology and arthrology.

Keywords: *physical rehabilitation, therapeutic gymnastics, ridetherapy, vertebrology, arthrology, lumbar osteochondrosis, hip joint*

Certain clinical manifestations of lumbar osteochondrosis, in particular piriform muscle and piriform submuscular pudendo-neuropathy syndromes are characterized by movement restriction in hip joint [1,2]. It is conditioned by reflectory muscular tonal strain in damaged spinal motor segment sanogenesis. The strain, in turn, causes secondary fixation of damaged spinal motor segment. At the beginning of disease, whole spinal muscular system and muscles of upper and lower limbs that are functionally related to it react at the pain signal. Only later is developed local myofixation of damaged spinal motor segment that is caused by strain of inter-transverse,

inter-spinal and rotator muscles, and also strain of corresponding segments of ilio-lumbar, multifidus and other long muscles. Though anti-algic posture represents protective reaction, as a result fixative and motor muscles of hip joint suffer from excessive static and dynamic strain that causes restriction of hip joint movement. The mentioned joint fixation takes months and sometimes years. Hip joint movement restriction was recorded in 22,3% of our patients with lumbar osteochondrosis [3].

Goal of the Work

Goal of the work is development of optimal program for hip joint function recovery in the course of physical rehabilitation of spinal osteochondrosis.

Object of Survey

34-56 years old 35 patients of both sexes, with diagnosis of osteochondrosis of lumbar part of spine - in particular, piriform muscle and piriform submuscular pudendo-neuropathy syndromes were under observation. Besides the common complaints of lumbar osteochondrosis, they had feeling of fatigue and weakness in the joint, periodical pain, hypotonus and hypotrophy of joint's motor muscles, joint movement was restricted, lower limbs strength asymmetrically decreased and movement ability limited.

Treatment process went in three directions that is why patients were divided into three groups: in the first group (20 patients) treatment started with therapeutic gymnastics, massage and physical therapy complex and afterwards ridetherapy was added. In the second group (7 patients), physical rehabilitation was represented by ridetherapy alone and in the third group (8 patients) rehabilitation implied only traditional methods (without ridetherapy).

Methods of Investigation

Patients had hip joint movement volume measurement in degrees: flexion, extension, abduction and adduction of femur, and functional test for determination of lower limbs muscular tone and strength. The test was carried out as follows: patient was asked to tip toe and stand so as long as possible. Time was fixed in seconds. Tests were carried out before treatment, in three months and a year after treatment. Obtained data were processed according to math statistics, in particular Student's criterion.

Methods of Treatment

Therapeutic gymnastics procedures were carried out according to methodology proposed by Z. Kasvande (1975), M. Deviatov (1983), V. Shargorodski (1989), V. Epifanov (1988,1990), I. Popeljanski (1989) and modified by us.

Massage was carried out according to methods proposed by N.A. Belaja (1974), L.A. Kunichov (1985) and V.I. Vasichkin (1990) and differentiated methodology modified by us.

From physical therapy methods, we used diadynamic currents, sinusoidal-modulated currents and diadynamic

phoresis in the type of electric- of phono-phoresis, ultra-high frequency currents, generally approved methods.

For the mentioned condition, ridetherapy was approved by us for the first time. Influence of ridetherapy in case of hip joint movement restriction is caused by:

1. posture taken by hip while sitting on the horse;
2. training of motor muscles of hip joint that are directed towards strengthening and development of muscles;
3. intensification of metabolism in hip joint and periarticular tissues;
4. hip joint sparing regimen while sitting on the horse (as body weight is partially leaning upon the joint) that is especially important at the beginning of the treatment;
5. doing dynamic and static exercises in turn that happens during different paces of horse (walking, trot);
6. Symmetrical load on hip joints taking place in terms that are new, unique and at the same time demonstrating maximum abilities.

Ridetherapy procedures were carried out at the hippodrome, lunge according to methodology developed by us.

Obtained results are given in *Tab. 1*.

As it is shown from the table, before treatment hip joint movement volume is identical in all three groups. After three months treatment movement volume enhanced in I and II groups. In particular, flexion ($p < 0.001$), ($p < 0.001$), extension ($p < 0.05$), ($p < 0.01$), abduction ($p < 0.001$), ($p < 0.001$), and adduction ($p < 0.01$), ($p < 0.01$) angles increased in I and II groups accordingly. In the III - control group trustworthy increase was manifested only in regard with extension angle ($p < 0.001$). While comparing the groups with each other it was found out that hip joint movement amplitude enhancement was similar in I and II groups and is less in the III group. As for the results of femur and shin muscles strength and tone tests, they were increased in all three groups, but in I and II groups more then in III one (*Fig. 1*).

Based on tests carried out in one year after treatment, we can state that reliable change of neither movement amplitude nor femur and shin muscles strength and tone was manifested that points at sustainability of obtained results.

Tests	Groups	n	Flexion	Extension	Abduction	Adduction	
Before Treatment	I	20	67,75±0,98	173,50±1,35	170,20±0,49	143,05±1,16	
	II	7	68,29±0,99	173,14±1,12	170,00±1,08	141,43±2,09	
	p I-II			*	*	*	*
	III	8	68,25±1,44	172,88±0,77	168,75±0,97	142,00±1,97	
	p II-III			*	*	*	*
	p I-III			*	*	*	*
After Treatment	I	20	61,25±0,26	167,15±0,86	164,30±0,56	137,4±1,03	
	II	7	61,85±0,77	168,57±0,84	164,57±0,83	134,86±0,87	
	p I-II			*	*	*	*
	III	8	65,75±1,51	168,50±0,73	166,88±0,64	141,9±2,03	
	p II-III			< 0,05	*	< 0,05	< 0,001
	p I-III			< 0,05	*	< 0,01	< 0,05
A Year after Treatment	I	20	60,85±0,23	166,97±0,57	164,07±0,44	136,80±0,88	
	II	7	61,53±0,73	167,87±0,77	164,00±0,82	134,42±0,74	
	p I-II			*	*	*	*
	III	8	66,03±1,18	168,00±0,78	166,43±0,55	141,65±1,58	
	p II-III			< 0,01	*	< 0,05	< 0,001
	p I-III			< 0,001	*	< 0,001	< 0,01
Defference before and after Treatment (P)	I	20	< 0,001	< 0,05	< 0,001	< 0,01	
Defference before Treatment and a Year after It (P)			*	*	*	*	
Defference before and after treatment. (p)	II	7	< 0,001	< 0,01	< 0,001	< 0,01	
Defference before Treatment and a Year after It (P)			*	*	*	*	
Defference before and after Treatment (P)	III	8	*	< 0,001	*	*	
Defference before Treatment and a Year after It (P)			*	*	*	*	

Tab.1 Hip joint movement volume dynamics in patients with lumbar osteochondrosis, in degrees (M+m)

Analysis of Results

Based on the obtained results we can state that high and stable therapeutic effect was achieved by rehabilitation of patients that underwent ridetherapy.

Influence of ridetherapy on hip joint is explained by both joint and muscular factors. While sitting on the horse even the posture itself is important factor for enhancement of hip joint movement amplitude [4]. And different paces of horse (walking, training and lightened trot) purposefully, with different intensity and load regimens directly affects motor muscles of hip - ilio-spinal, pyriform, quadriceps, abductor and other femoral muscles. Mentioned training promotes elimination of reversible contractual changes and accordingly improvement of functional state of muscles. While sitting on the horse hip joint posture and direct loan on it - friction between joint surfaces, changes in cleft size promote intensification of diffusion process and accordingly nutrition that should be regarded as anti-arthrose influence. Exactly by the posture while sitting on the horse should be explained especially significant enhancement of abduction and adduction in hip joint in I ($p<0.001$), ($p<0.01$) and II ($p<0.001$), ($p<0.01$) groups compared with the III one.

Conclusions

1.Usage of complex of physical methods is effective in case of functional restriction of hip joint due to spinal osteochondrosis.

2.Therapeutic riding has multifactor influence on both muscular system and hip joint represents an effective method for improvement of hip joint function restricted in case of certain syndromes of lumbar osteochondrosis and the result is long lasting and stable.

3.Similar rehabilitation effect of ridetherapy alone and its combination with classical physical methods shows that ridetherapy is also effective as independent method and it is efficient according to spent finances and time.

4.Marked influence of ridetherapy on recovery-enhancement of joint functions is so significant that ridetherapy may be considered as an effective method not only in case of spinal osteochondrosis syndromes, but also - degenerative-dystrophic diseases of joints. Thus, ridetherapy has to be regarded as especially important not only in vertebrology but also in arthrology.

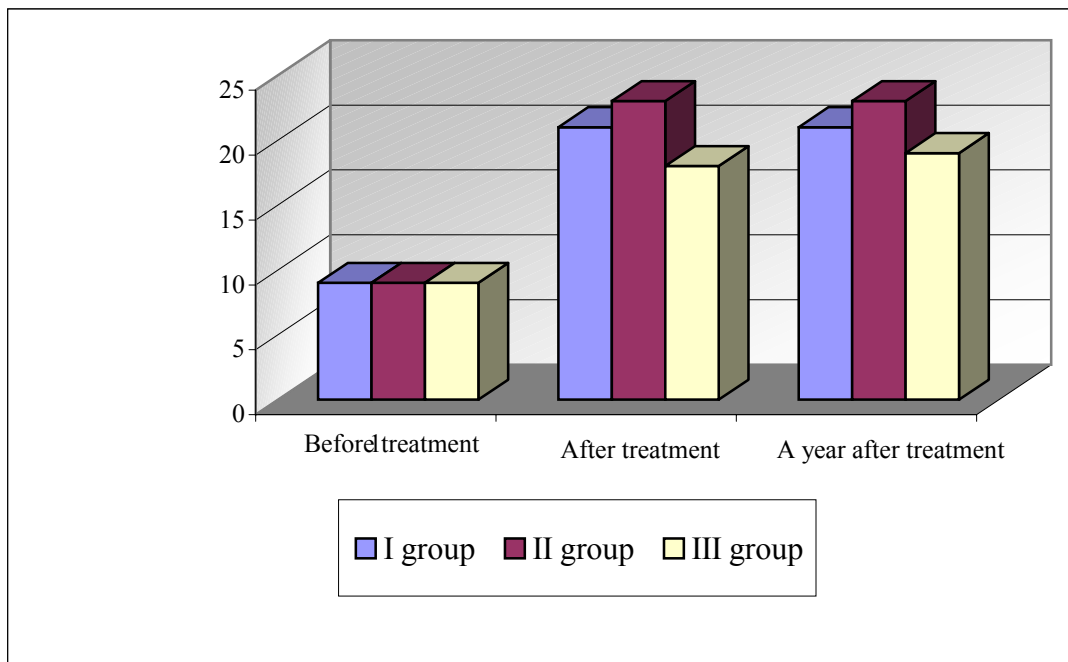


Fig.1 The results of femur and shin muscles strength and tone tests (sec) M+m.

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Динамика изменений функций тазо-бедренного сустава при физической реабилитации больных остеохондрозом позвоночника

Манана Рухадзе

Государственная медицинская Академия.

Кафедра лечебной физкультуры, спортивной медицины и райттерапии Грузинской государственной медицинской академии

РЕЗЮМЕ

При некоторых синдромах остеохондроза позвоночника характерно ограничение амплитуды движений в тазо-бедренном суставе. Цель исследования установление оптимальной программы восстановления функций тазо-бедренного сустава при физической реабилитации больных поясничным остеохондрозом. Под наблюдением находились 35 больных обоего пола, в возрасте от 34 до 56 лет. Наряду с классическими методами физической реабилитации (лечебная гимнастика, массаж, физиотерапия) нами проводилась райттерапия (лечебная верховая езда) в комплексе с классическими методами и самостоятельно. Выводы: 1) При ограничении амплитуды движений в тазо-бедренном суставе, наиболее эффективен комплекс физических методов реабилитации - лечебная гимнастика, массаж, физиотерапия и райттерапия. 2) Райттерапия может быть использована, как самостоятельный метод физической реабилитации, являясь экономичным по материальным и временным затратам. 3) Лечебная верховая езда обладая многофакторным воздействием как на мышечную систему, так и на тазо-бедренный сустав, тем самым дает продолжительный и стабильный лечебный эффект. 4) Райттерапию можно считать эффективным, оригинальным методом реабилитации, как в вертебологии, так и в артрологии.

Ключевые слова: *физическая реабилитация, лечебная физкультура, райттерапия, вертебология, артрология, поясничный остеохондроз, тазо-бедренный сустав*