

HYDROKINETOTHERAPY CONTRIBUTION IN LOWER LIMBS MOBILITY RECOVERY AFTER INJURIES AS A RESULT OF PRACTICING SPORT ACTIVITIES

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Abstract: The recovery of musculoskeletal system injuries, by means specific to hydrokinetotherapy, becomes much faster and more easily accepted by the patient, due to the correct use of exercises prescribed by the physical therapist and with the help of modern technology. Compared to the exercises done at room temperature, the use of hydrokinetotherapy in recovering musculoskeletal injuries causes thermoregulatory mechanisms activation in whole body. When are done in water, exercises involving sudden change of direction encounter a resistance that becomes even more important, because of the aspiration inertia force and turbulence phenomena.

Next, we will describe few aspects of muscle strength, muscle mass and the stretching contribution, together with relaxation in the aquatic environment.

Key-Words: adaptation, dynamic, corrective exercises in water, loisire activity.

1 Hypothesis: The specific means of hydrokinetotherapy that you can use in recovering lower limbs injuries present a significant potential for adaptation and a dynamics which can provide more improved results when used correctly. The considerable contribution of hydrokinetotherapy facilitates the recovery thanks to direct and indirect effects generated by the aquatic environment.

1.2 Methods: clinical examination, medical history, testing, palpation, joints and muscle testing.

2 Subjects:

Group I – recovery with hydrokinetotherapy:

- 25 people with musculoskeletal problems, aged between 23 and 40, 18 male and 7 female:
- 12 people who practice performance sport;
- 13 people who practice different kinds of sport, but only as a loisire activity.

Group II – recovery with kinethotherapy:

- 23 people with musculoskeletal problems, aged between 22 and 41, 16 male and 9 female:

- 10 people who practice performance sport;
- 13 people who practice different kinds of sport but only as a loisire activity.

Patients' injuries occurred at different moments of the day and had different causes. Both groups were subjected to the initial investigation methods, subsequently being established a specific diagnosis for each patient and a personal recovery program which uses hydrokinetotherapy specific means.

Assessment tests:

- Leg lateral sway and touching the wall very high point.
- Lifting the bent leg at chest for 30-second.

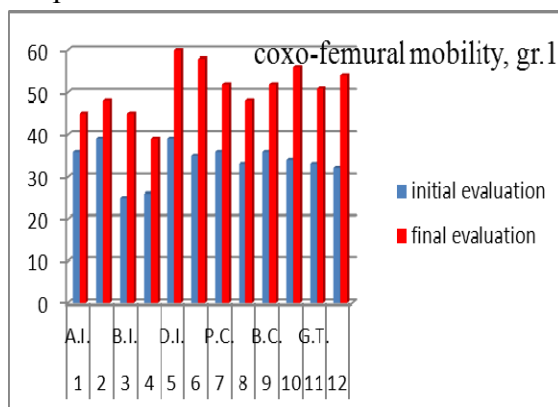
Group 1 – performance sport practitioners

Coxo-femoral mobility

Table no. 1

Leg lateral sway and touching the wall at a higher point			
Nr.crt	Name initials	First test	Final test
1	A.I.	36	45
2	G.R.	39	48
3	B.I.	25	45
4	D.E.	26	39
5	D.I.	39	60
6	F.B.	35	58
7	P.C.	36	52
8	V.M.	33	48
9	B.C.	36	52
10	R.T.	34	56
11	G.T.	33	51
12	R.D.	32	54
	Arithmetic average	33,66	50,66

Graphic no. 1



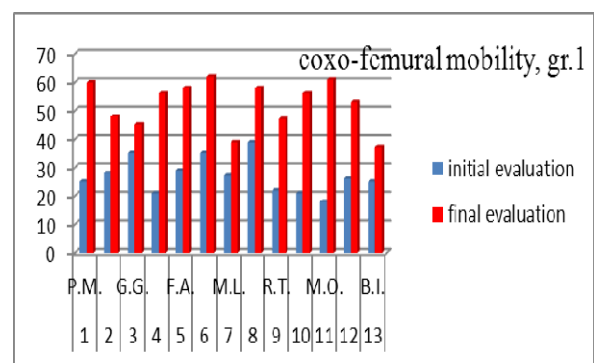
With these evaluation samples we can see very well the initial/starting level of this activity and also the level reached by the subjects after completing the course. Seeing the obtained values, we can say that the subjects started with a bigger initial level, this being due to the sport performance.

Group 2 – Loisire sports practitioners

Table no. 2

Leg lateral sway and touching the wall at a higher point			
Nr.crt	Name initials	First test	Final test
1	P.M.	25	60
2	M.B.	28	48
3	G.G.	35	45
4	V.I.	21	56
5	F.A.	29	58
6	C.V.	35	62
7	M.L.	27	39
8	D.I.	39	58
9	R.T.	22	47
10	G.I.	21	56
11	M.O.	18	61
12	M.L.	26	53
13	B.I.	25	37
	Arithmetic average	27,0	53,30

Graph no. 2



In the graph no. 2 we can see group evolution, sport performance practitioners who do it as loisire. They begin with an arithmetic average of 27.0 cm, this value showing a lower mobility at coxo-femoral articulation level. After a stage with hydrokinetotherapy exercises the evolution

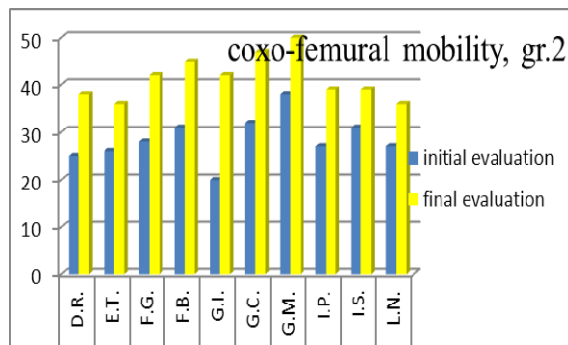
of this group is very good, with a value of 53.30 cm, value which has almost doubled. Because of the relaxing effect produced by the water, the joint could be treated with physical exercises, leading to a very good mobility increase at this segment.

Group 1– Sport performance practitioners

Table no. 3

Leg lateral sway and touching the wall at a higher point			
Nr.crt	Name initials	First test	Final test
1	D.R.	25	38
2	E.T.	26	36
3	F.G.	28	42
4	F.B.	31	45
5	G.I.	20	42
6	G.C.	32	47
7	G.M.	38	50
8	I.P.	27	39
9	I.S.	31	39
10	L.N.	27	36
	Arithmetic average	28,5	41,4

Graph no. 3



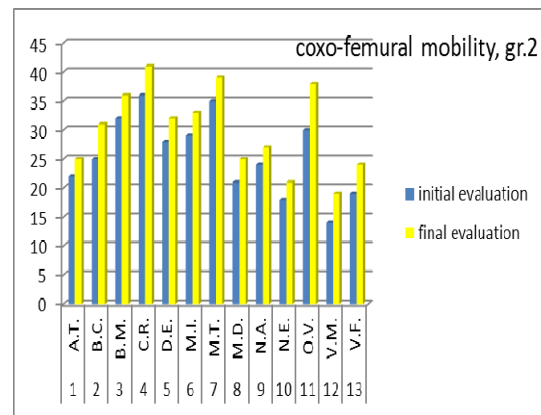
Group no. 2 formed by people who do not practice performance sport anymore, had a good result in the first test, starting with an arithmetic average value of 28.66 cm. The result of the recovery activities had a final value of 40.83 cm. We can already see that this group, which did exercises on land, had the coxo-femoral articulation much less flexible and with a more reduced evolution.

Group 2 – Loisire activities practitioners

Table no. 4

Leg lateral sway and touching the wall at a higher point			
Nr.crt	Name initials	First test	Final test
1	A.T.	22	25
2	B.C.	25	31
3	B.M.	32	36
4	C.R.	36	41
5	D.E.	28	32
6	M.I.	29	33
7	M.T.	35	39
8	M.D.	21	25
9	N.A.	24	27
10	N.E.	18	21
11	O.V.	30	38
12	V.M.	14	19
13	V.F.	19	24
	Arithmetic average	25,61	30,07

Graph no. 4



At this group, who develops loisire activities, the recovery of coxo-femoral mobility is poor. So, they had an initial value of 25.61 cm but they completed the task with a value of only 30.07. This is due to the reduced experience in doing sport but also to the exercises on land, which are hardly achieved and sometimes are painful.

Group 1 - sport performance practitioners
Knees mobility

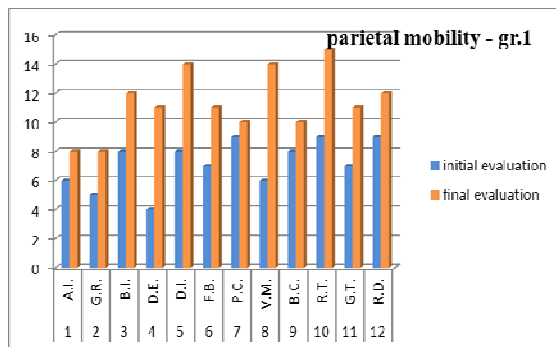
Table no. 5

Raise the bent leg at chest			
Nr.crt	Name initials	First test	Final test
1	A.I.	6	8
2	G.R.	5	8
3	B.I.	8	12
4	D.E.	10	11
5	D.I.	8	14
6	F.B.	7	11
7	P.C.	9	10
8	V.M.	12	14
9	B.C.	8	10
10	R.T.	12	15
11	G.T.	7	11
12	R.D.	9	12
	Arithmetic average	7,16	11,33

Group 2 - loisire sport practitioners
Tabel no. 6

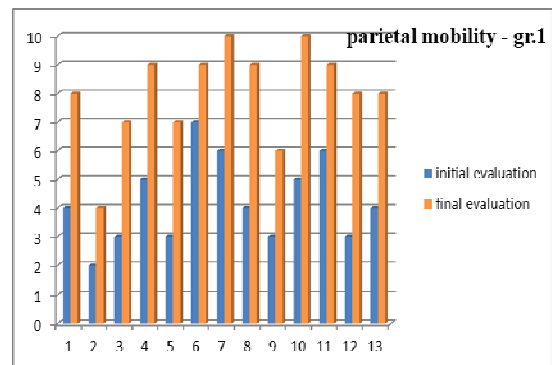
Raise the bent leg at chest			
Nr.crt	Name initials	First test	Final test
1	P.M.	4	8
2	M.B.	2	4
3	G.G.	3	7
4	V.I.	5	9
5	F.A.	3	7
6	C.V.	7	9
7	M.L.	6	10
8	D.I.	4	9
9	R.T.	3	6
10	G.I.	5	10
11	M.O.	6	9
12	M.L.	3	8
13	B.I.	4	8
	Arithmetic average	4,23	8

Graph no. 5



In group no. 2, the athletes who practiced performance sport have a good evolution, starting with an initial value of 7,16 repetitions at 11,33 repetitions. We note a positive evolution for the knee articulation, whose flexibility was developed through hydrokinetotherapy exercises.

Graph no. 6



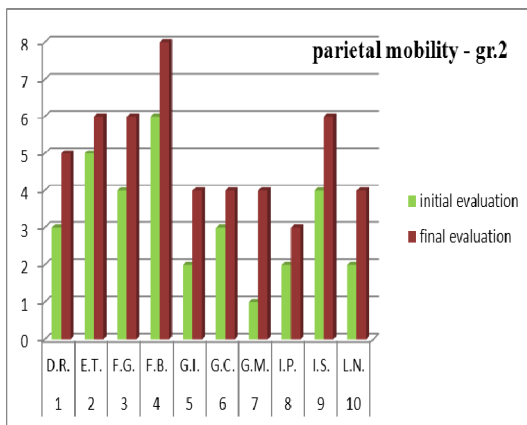
Group no. 1, loisire sports practitioners have a very good evolution at first test 4.23 repetitions and at final test 8 repetitions.

Group 1– sport performance practitioners

Table no. 7

Raising the bent leg to chest			
Nr.crt	Name initials	First test	Final test
1	D.R.	3	5
2	E.T.	5	6
3	F.G.	4	6
4	F.B.	6	8
5	G.I.	2	4
6	G.C.	3	4
7	G.M.	1	4
8	I.P.	2	3
9	I.S.	4	6
10	L.N.	2	4
	Arithmetic average	3,2	5

Graph no. 7



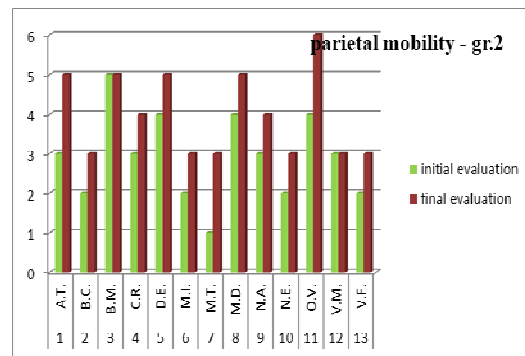
We can see very well the evolution of those who have done exercises on land. So, they start with an initial value of 3.2 repetitions and have an average that reaches 5 repetitions.

Group 2 – loisire activities practitioners

Table nr. 8

Raising the bent leg at chest			
Nr.crt	Inițialele numelui	First test	Final test
1	A.T.	3	5
2	B.C.	2	3
3	B.M.	5	5
4	C.R.	3	4
5	D.E.	4	5
6	M.I.	2	3
7	M.T.	1	3
8	M.D.	4	5
9	N.A.	3	4
10	N.E.	2	3
11	O.V.	4	6
12	V.M.	3	3
13	V.F.	2	3
	Arithmetic average	2,92	4

Graph no. 8



This group presents a poor starting with 2,92 repetitions at initial test, reaching 4 repetitions at final test. We can see very well that it presents little evolution, and knee injuries are difficult to correct through exercises on land.

Hydrokinetotherapy may be implemented early in the recovery complex programs, especially in posttraumatic sequels, even before kinethotherapy, but subsequently too, in subacute and chronic stages of various musculoskeletal diseases.

Conclusions

➤ Hydrokinetotherapy positive contribution appears obviously in the locomotors, orthopedic and posttraumatic

injuries (post orthopedic surgery), but also in the pain therapy, through hydrokinetotherapy being developed individual or collective programs, depending on the diagnosis, the patient's needs and limits.

➤ Recovery using hydrokinetotherapy allows corrective exercises in water, the induced positive effects being felt immediately by the patient due to the aquatic environment where exercises are done.

➤ Having a general positive mood due to the collateral effects that appear in the recovery with hydrokinetotherapy (peripheral vasodilatation, easing muscle tone, improve flexibility of tendons and synovial fluid lubrication to the joints, etc.) increases the ability of recovery and influences positively the final result of this recovery at articular and muscular level.

➤ Hydrokinetotherapy means involved in recovery allow us to permanently monitor and grade a customized patient's workload, due to hydrostatic pressure exercised by the aquatic environment, which enhances the patients' rate of recovery.

References

Albu, C., Vlad, T., L., Albu, A. (2004) - *Kinetoterapia pasivă*, Polirom Publishing House, București;

Buckup, K., (2005) – *Clinical test for the musculoskeletal system: Examination – Signes – Phenomena*, 2nd edition, Thieme;

Cordun, Mariana (1999) - *Kinetologie Medicală*, AXA Publishing House, București;

Cordun, Mariana (2009) - *Kinantropometrie*, CD Press Publishing House, București;

Damian, M. (2002) – *Gimnastica de baza*, Ovidius University Press Publishing House, Constanța;

Dragnea, A., (2009) - *Elemente de psihosociologie a grupurilor sportive*, CD Press Publishing House;

Drăgan, I. (2002) - *Medicina sportiva*, Medicală Publishing House, București;

Ionescu, A., Anton, B. (2004) - *Dirijarea medicală a efortului*, Proxima Publishing House;

Popescu, Roxana, Traistaru, Rodica, Badea, P., (2004) – *Ghid de evaluare clinică și funcțională în recuperarea medicală*, vol. I –II, Medicală Universitară Publishing House, Craiova;

Rateau, P. (2004) – *Metodele și statisticile experimentale în științele umane*, Polirom Publishing House, Iași;

Sabău, E. (2008) - *Refacere – Recuperare. Kinetoterapie în activitatea sportivă*, Fundației România de Mâine Publishing House, București;

Sbenghe, T. (1987) - *Kinetoterapie profilactică, terapeutică și de recuperare*, Medicală Publishing House, București;

Tudor, V. (2008) - *Măsurare și evaluare în cultură fizică și sport*, Moroșan Publishing House, București;

Vâjială, E., G. (2008) - *Biochimia efortului*, ediția a III-a, Fundației România de Mâine Publishing House, București;

Vâjială, E., G. (2000) – *Igiena și evaluarea biologică*, Fundației România de Mâine Publishing House, București