

Aquatic Osteopathy : Contribution of Aquatic Osteopathy to Patients in Rehabilitation For Surgery of the Supraspinatus

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Summary : In aquatic osteopathy, the resting patient floats in a non-gravitational environment in 35°C water temperature. The therapist utilizes the same test and treatment principles as in osteopathy. According to several osteopaths, including Bernard Darrailans D.O. in Perpignan (France) and Michel Dufresne D.O. in Quebec (Canada), this method of treatment achieves very good results. Nonetheless, it is practically unknown in Europe. We decided therefore to conduct this research to evaluate its effectiveness and to determine the level of interest.

Participants in the research project were patients in rehabilitation after having undergone surgery for a tear of the supraspinatus. The study compared standard rehabilitation with rehabilitation associated with osteopathy and rehabilitation associated with aquatic osteopathy. The referring physical therapist, using an inclinometer, measured the evolution of the R.O.M. of both shoulders over a period of 15 days. That enabled us to analyze the evolution of the R.O.M. in all three groups.

Results: Both osteopathy and aquatic osteopathy contribute to rehabilitation but in the case of aquatic osteopathy, the result is statistically more significant. What's more, aquatic osteopathy seems to be particularly effective for hyperalgetic patients as well for those whose lesional patterns show psychosomatic dysfunction.

Key words: Osteopathy, Aquatic Osteopathy, Supraspinatus, Rehabilitation, Rotator-cuff, Emotions, Randomised study.

1 - INTRODUCTION

The objective of our study was to evaluate the contribution of an aquatic osteopathy treatment to patients in rehabilitation after surgery for a torn supraspinatus. We posed the following questions:

- Can an aquatic osteopathy treatment have a beneficial effect on patients rehabilitating from surgery on the supraspinatus ?
- Can we compare the effectiveness of an aquatic osteopathy treatment to the effectiveness of an Osteopathy treatment ?

We also wanted to verify the hypothesis formulated by Michel Dufresne and Marie Panier¹:

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- Do patients feel more emotions during an Aquatic Osteopathy treatment than they do during an osteopathic treatment ?

2 – METHODOLOGY

2.1 Sample population

The subjects for our study were patients at the following centers:

- Hôpital National de Saint Maurice (92, France)
- L'Institut Robert Merle d'Aubigné à Valenton (92, France)
- Le centre de rééducation motrice et fonctionnelle du Finnosello à Ajaccio (2A, France)

Inclusions criterias

- To be in post-surgical rehabilitation following an operation for a ruptured supraspinatus
- To be authorized by the establishment to access the therapy pool.
- To have the surgeon's authorization for active joint mobilization.

Exclusions

- Patients whose remaining stay at a center was shorter than two weeks.
- Patients who already had another surgery on this joint.
- Patient receiving additional rehabilitation outside the center.

Our sampling:

A total of 27 patients - 13 females and 14 males between the ages 42 and 73, divided into groups of nine, randomly assigned into three categories – a rehabilitation group, osteopathy group and aquatic osteopathy group.

Procedure

After verifying the eligibility of each patient, we gave them an information sheet explaining aquatic osteopathy and the goal of our research. After obtaining their signature for a consent waiver, we conducted a complete anamnesis. The referring physical therapist then took the first set of passive and active measurements of both shoulders using an inclinometer and a goniometer and reported these data in the evaluation file. In each center, the patients were randomly assigned to one of the three following groups using a nine-elements permutation table.

- Rehabilitation group
- Osteopathy group
- Aquatic osteopathy group

Patients were chosen center by center in a random manner, in order to control for possible bias due to treatment and recruiting methods of each center.

Results following the first measurements:

The patients in the rehabilitation group continued with their usual rehabilitation given by their physical therapist. One week after the first measurements were taken (J8), the physical therapist retook the measurements. The last measurements were taken 15 days (J16) after the first ones.

The patients from the osteopathy group received one osteopathic session and then continued with the usual rehabilitation with their physical therapist. On (J8) the physical therapist retook the amplitude measurements and the patient received a second osteopathic treatment. Finally, on (J16) the physical therapist took the final measurements.

As for the patients in the aquatic osteopathy group, they received an aquatic osteopathy session and then continued with the usual rehabilitation with their physical therapist. On (J8) the physical therapist retook the amplitude measurements and the patients received a second Aquatic osteopathy treatment. Finally, on (J16) the physical therapist took the final measurements.

All participating patients received the same regular rehabilitation treatments, which were conducted in the therapy pool. The measurements were taken by the patient's referring physical therapist. The referring therapist did not know which group the patients belonged to. The osteopaths conducting the experiments were not present during the rehabilitation sessions, nor was the physical therapist aware of the values of the previous measurements.

The osteopathy and aquatic osteopathy sessions were carried out by the osteopath conducting the experiment. After having done the anamnesis and tests, the treatment goal was to correct the different kinetic dysfunctions possibly influencing the amplitude of the targeted shoulder. In order to achieve this goal, the experimenter, taking into account the needs of each individual case, used structural techniques (articular, fascial, myotensing, thrust), visceral (mobility, motility, pumping), cranio-sacral and "Undulations" as described by Dufresne and Panier¹.

In their research Dufresne and Panier¹ have stressed the psycho-emotional effects of the aquatic environment. According to Michel Odent² "Water is synonymous with play, joy, letting go and is the ideal environment for therapy ... Water also promotes the rapid onset of emotional reactions".

Since one of our goals was to discover whether or not the patients felt more emotions while in the water, we asked our patients after each osteopathic and aquatic osteopathy session, whether they had felt one or more of the six primary emotions, namely joy, surprise, fear, anger, sadness or disgust. We then asked those who had felt one of these emotions to rate the intensity of their feelings on a scale from 1 (very low emotion) to 10 (intense emotion). According to Robin *et al.*³, each primary emotion triggers a specific physiological reaction. We wanted to know whether patients would feel more emotions in water and if so, which ones.

2.3 Tools used in aquatic osteopathy

For the aquatic osteopathy sessions, we used an inflatable secure neck collar to support the cervical spine. If the patient was suffering from cervicgia, we instead used a foam omega-shaped support. In all cases we also used floating foam ankle bands.

RESULTS

3.1 Post-surgery shoulder

We verified the comparability of the primary amplitudes between the three groups. The differences among the groups were insignificant, thus confirming that the random assignments of patients to their groups did indeed provide us with comparable amplitude measurements for the post-surgery shoulder before treatment.

We compared the mean amplitude gains on the post-surgery shoulder of all 12 movements, between the three groups, with an analysis of variance (ANOVA): the mean differences are highly significant at ($p=0,000022$) (Table I).

Table I : Mean amplitude gains in degrees of the surgical shoulder between J 1 et J 16

	Aquatic Osteopathy	Osteopathy	Rehabilitation
Passive Flexion	51	32	15
Extension	23	15	12
Abduction	41	37	18
Adduction	32	22	16
Internal Rotation	36	24	17
External Rotation	37	29	15
Active Flexion	53	30	18
Extension	18	12	13
Abduction	44	32	18
Adduction	28	23	14
Internal Rotation	32	31	12
External Rotation	37	32	4

We then conducted Scheffe's test to compare the means 2 by 2. (Table II)

Table II : 2 by 2 significant comparisons of mean gains

	Aquatic Osteopathy / Rehabilitation	Aquatic Osteopathy / Osteopathy	Osteopathy / Rehabilitation
Passive Flex.	0,000039	0,026438	0,038436
Ext.	0,000633	0,009301	0,538304
Abd.	0,010415	0,851452	0,036299
Add.	0,015133	0,138027	0,558739
I.R.	0,092336	0,380823	0,684406
E.R.	0,034151	0,611204	0,222191
Active Flex.	0,000001	0,000166	0,058822
Ext.	0,168463	0,041944	0,765667

Abd.	0,009536	0,305802	0,221116
Add.	0,025375	0,554468	0,207722
I.R.	0,047326	0,988727	0,064066
E.R.	0,000419	0,770508	0,002737

The significant differences at (<0,05) are indicated in red.

3.2 Primary emotions

Among the nine patients treated in osteopathy, none reported feeling a primary emotion during the session. Among the nine patients treated in aquatic osteopathy, six reported feeling a primary emotion during one of the two sessions.

2 DISCUSSION

4.1 Our questions and their answers

This research project has led us to answer three important questions about the effectiveness of aquatic osteopathy. First, can aquatic osteopathy benefit a patient in rehabilitation following a surgery of the supraspinatus ? The answer is yes.

In fact, taking post-surgery shoulder as an example, or both shoulders, the gains in amplitudes are more significant among the aquatic osteopathy group than the rehabilitation group. What is more, these results are statistically significant in the case of a post-surgical shoulder. Our aim here is not to replace standard rehabilitation techniques with aquatic osteopathy but rather to demonstrate how these two approaches can complement one another. Aquatic osteopathy has clearly maximised the work of the physical therapist.

We also wanted to compare the effectiveness of aquatic osteopathy with osteopathy. Rehabilitation following surgery on the supraspinatus demonstrates that aquatic osteopathy shows better results than osteopathy alone. But since this study has been done on very specific subjects and with a small sampling, we cannot generalize our conclusions.

The fascial and visceral techniques appear to be much more powerful in aquatic osteopathy. The palpatory sensations are more defined in water, so the reciprocal-tension of tissues is more precise and the technique more efficient. However, during high velocity low amplitude (HVLA) techniques, the right amount of tension is harder to achieve due to the lack of fulcrum. The goal of such techniques being to shunt the muscular barrier, their usage is of relative importance in warm water since it has been described in the literature (Juchmes⁶) that warm water inhibits muscular tonicity. Thus, in this environment articular techniques seem more appropriate than HVLA.

Another important point to note is that, since many of our subjects were hyperalgetic, the warm water environment allowed us to apply many techniques which would have been too painful for them during an on-land session. What's more, the tissue release time was much faster in warm water, thus the duration of certain techniques like the treatment of scars, were much shorter, therefore a lot less unpleasant for the patient.

Finally, we also wanted to know whether aquatic osteopathy was more likely than osteopathy, to provoke emotions. Again, despite the relatively small number of subjects in our study, the answer seems to be yes. Our research confirms the hypothesis of Gauthier⁷

and answers the question of Dufresne and Panier¹, which was, “Do emotional reactions appear more intensely, more rapidly and more often in warm water?” We certainly noted that warm water seemed to frequently trigger joyful emotions.

4.2 Impact of these results

Both aquatic osteopathy and osteopathy appear to have a place in the post-surgical rehabilitation of the supraspinatus. First, by increasing recuperation of amplitude over a period of 15 days, they could decrease the length of the stay of patients in rehabilitation centres and perhaps their time away from work, thus reducing costs.

Second, by decreasing the kinetic dysfunctions and improving the positioning of the head of the humerus in the glenoid cavity, both osteopathy and aquatic osteopathy help to reduce the peripheral tension of the rotator-cuff muscles, decreasing the likelihood of a recurrence of the tear. Aquatic osteopathy seems to be more appropriate than osteopathy for hyperalgetic patients, as well as for those presenting a pattern of psycho-emotional dysfunction. It seems clear that if patients feel the emotion underlying their pain and make the link in between the two, the results have a better chance of being successful.

4.3 Openings for future research

It would be interesting to continue this research with a larger group of subjects to confirm these results. A long-term, ongoing study could also verify whether osteopathy and aquatic osteopathy have helped to decrease the number of recurrences in the tearing of this muscle.

As noted by Dr. Dubert, *“A good result can only be considered as such, if it is good on a clinical, functional as well as socio-relational aspect⁴”*. The use of a functional and relational evaluation questionnaire such as the DASH⁵, could allow a more complete analysis of results. We would therefore need to evaluate not only the amplitudes, but the evolutions of these factors as well. During this research we only treated patients who were granted access to the therapy pool, that is: patients who had complete cicatrisation. It would be interesting in a future study to treat the patients in osteopathy as they are admitted into the center, before surgery, thus reducing their pain and potentializing their rehabilitation. All of the patients also had, in addition to diverse dysfunctions, an organic lesion: a ruptured supraspinatus muscle. Since the scope of both osteopathy and aquatic osteopathy embraces functional problems, it would be interesting to compare osteopathy and aquatic osteopathy on patients who do not have organic lesions.

Concerning the results for the application of aquatic osteopathy, we could also question to what extent these results could be due to simply resting in warm water for 45 minutes. Adding a placebo element to a future study would answer this question.

Finally, it is important to stress two advantages noted during this research. First, in water we actually “see” (Dufresne and Panier¹) the fascia and their movements. This has a major advantage because it makes it possible for us to show their impact on the patient’s body to medical doctors, surgeons and physical therapists, allowing them to better understand how we work in water. The correction of a kinetic dysfunction of the liver takes on a whole new

meaning to a surgeon when (he/she) actually sees the body of the patient moving “by itself” in water, responding to the axis imposed by the applied technique.

Also, according to Dufresne and Panier¹, from a pedagogical point of view, the aquatic environment offers numerous insights.

- Using our body weight is important
- The importance of fulcrum becomes quite obvious
- Palpatory sensations are greatly amplified
- You can observe the difference between primary dysfunctions and adaptation
- With the use of the undulation tool, the notion of wholeness of the body takes on a new meaning

To conclude, we would like to point out the intense enthusiasm of patients following their treatments with aquatic osteopathy. It was their enthusiasm that led us to conduct this research in the first place and which is the driving force behind our continuing interest in research, as well as in the practice of aquatic osteopathy.

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