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EVALUATION OF GAS CRYOTHERAPY IN THE TREATMENT OF TENDINOPATHIES

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INTRODUCTION

A randomized comparative trial in athletic patients was undertaken to evaluate the efficacy of gas cryotherapy in the treatment of acute and chronic (present for more than two months) tendinopathies.

MATERIAL AND METHODS

21 patients were treated in a randomized comparative trial using gas cryotherapy or standard methods.

Inclusion criteria were :

- Hobby or competition sport.
- Age over 18.
- Micro-traumatic tendinopathy of the shoulder, elbow, wrist, knee or Achilles tendon.

Exclusion criteria consisted of :

- Allergy to cold.
- Tendinopathy treated surgically.
- Metabolic (gout, dyslipidemia) or iatrogenic (fluoroquinolones) tendinopathy.

Classification as acute or chronic tendinopathy was arbitrary according to how long pain had been present, i.e. a month or more.

The equipment used was a Cryotron apparatus delivering carbon dioxide at 78°C,

The treatment protocol was as follows :

- Acute tendinopathies : 6 sessions of gas cryotherapy (one session a day) with thermal shock by scanning the painful area in one group, and standard treatment (systemic and topical anti-inflammatory together with ice packs) in the other group.

- Chronic tendinopathies : 6 sessions of gas cryotherapy (three sessions a week) by slow and regular scanning of the painful area until the patient reported a burning sensation, in one group, or standard treatment (systemic and topical anti-inflammatory together with ultrasound and stretching) in the other group.

None of the patients took analgesics.

The study population consisted of :

- Acute tendinopathy group : 12 patients, 11 men and 1 woman, mean age 25.

- Chronic tendinopathy group : 9 patients, all men, mean age 43.

The distribution of tendinopathies treated was as follows :

	ACUTE	CHRONIC
Rotator cuff (supraspinatus, long head of biceps)	7	
Anterior cubital	1	
Epicondylar tendons	1	4
Patellar tendon	2	1
Achilles tendon	1	4

Sports responsible :

Gymnastics	8
Tennis	5
Volleyball	2
Basketball	2
Golf	1
Soccer	1
Walking	1
Squash	1

Sporting level :

National or international	9
Regional or county	4
Hobby	8

Symptoms had been present on average for 10 days before treatment in acute tendinopathies, and for 4.5 months (excluding a patient with the problem for 10 years) in chronic tendinopathies.

RESULTS

Several parameters were evaluated :

- Grading of pain using a visual analog scale at pre-treatment examination, at the end of treatment and a month later : palpation, opposed movements, stretching.

- Variations in the clinical stage of tendinopathy.

- Sports activity a month after the end of treatment.

These factors are reported in the two summary tables concerning acute cases (Table 1) and chronic cases (Table 2).

Global functional result was graded according to return to sports activity and persistence or not of pain.

Excellent: return to sport at same level without pain.

Good: return to sport at same level with pain.

Average: return to sport with pain and at lower level.

Poor : no return to sport because of pain.

Overall :

- Results in acute tendinopathies were as follows (Table 1) :

	CRYOTHERAPY	STANDARD TREATMENT
EXCELLENT	5	0
GOOD	1	1
AVERAGE	2	2
POOR	0	1

- Results in chronic tendinopathies were as follows (Table 2) :

	CRYOTHERAPY	STANDARD TREATMENT
EXCELLENT	0	2
GOOD	1	0
AVERAGE	2	2
POOR	1	1

More detailed results are reported in Tables 3, 4, 5, 6.

DISCUSSION

The use of cryotherapy in recent acute tendinopathies provided more satisfactory and faster results than standard treatment, with 75% excellent and good results, without any adverse effect being seen. Results on pain were fast, and 5 out of 8 patients were able to restart their sport by the end of treatment wihout any relapse afterwards.

In contrast, in chronic tendinopathies, cryotherapy, in the few cases in which it was used, showed no evidence of efficacy greater than that of standard treatment, though the latter lasted longer. At any event, conclusions must be prudent because of the small number of cases, such that no statistical study was possible.

It can be concluded overall that this is certainly a technique to be used first line in the treatment of acute tendinopathies, because of its rapid efficacy and absence of adverse effects. As far as chronic tendinopathies are concerned, more refined analysis in large series of cases is required before any final conclusion can be drawn.

Table 3 : ACUTE TENDINOPATHIES

Sex	Age	Site	Time	Sport	Sport level	Type of treatment	Blazina before	Blazina after	Sport at 1 month	Same level	Pain D0	Pain end Treat.	Pain 1 mo. after	RESULT
M	22	Shoulder Supraspinatus	8 d	Gym	National	Standard	2	1	YES	YES	42* 51** 35***	15 15 15	11 11 11	**GOOD**
M	18	Wrist Anterior cubital	8 d	Gym	National	Cryo	3	0	YES	YES	0 32 0	0 0 0	0 0 0	**EXCELLENT**
M	22	Shoulder Long head biceps	21 d	Gym	National	Standard	3	1	Relapse Stade 3	NO	65 48 52	15 10 0	70 55 40	**POOR**
M	23	Shoulder Long head biceps	10 d	Gym	National	Standard	2	2	YES	NO	53 48 42	45 40 40	40 40 32	**AVERAGE**
M	18	Knee Patellar tendon	4 d	Gym	National	Cryo	2	0	YES	YES	31 35 5	0 0 0	0 0 0	**EXCELLENT**
M	20	Shoulder Cuff	2 d	Gym	Int'l	Cryo	2	0	YES	YES	79 88 35	0 0 23	0 0 0	**EXCELLENT**
M	18	Achilles	15 d	Gym	National	Cryo	3	2	YES	NO	0 10 21	0 0 5	15 0 10	**AVERAGE**
M	51	Elbow Epicondyle	8 d	Tennis	Hobby	Standard	3	2	YES	NO	51 63 48	27 32 15	22 25 10	**AVERAGE**
M	28	Shoulder Cuff	21 d	Volley	Regional	Cryo	3	2	NO	NO	45 72 0	47 38 0	50 42 0	**AVERAGE**
F	46	Shoulder Cuff	8 d	Tennis	Hobby	Cryo	3	2	YES	YES	52 80 0	23 37 15	0 0 0	**GOOD**
M	20	Knee Patellar tendon	8 d	Volley	National	Cryo	3	0	YES	YES	75 40 48	5 0 0	0 0 0	**EXCELLENT**
M	21	Shoulder Supraspinatus	7 d	Gym	National	Cryo	3	0	YES	YES	60 52 45	18 25 25	0 0 0	**EXCELLENT**

* Pain on palpation (scale graded from 0 to 100)
** Pain on opposed contraction
*** Pain on passive stretching

Table 4 : CHRONIC TENDINOPATHIES

Sex	Age	Site	Time	Sport	Sport level	Type of treatment	Blazina before	Pain daily life	Blazina after	Pain daily life	Blazina at 1 month	Sport at 1 month	Same level	Pain D0	Pain end Treat.	Pain 1 mo. after	RESULT
M	62	Elbow Epicondyle	3 mos	Golf	Hobby	Cryo	2	+	1	$\neq 0$	1	YES	YES	55* 55** 40***	38 48 27	42 45 18	**GOOD**
M	42	Achilles	3 mos	Soccer Tennis	Depart.	Standard	1	0	1	0	1	YES	NO	68 0 0	58 0 0	36 0 0	**AVERAGE**
M	42	Elbow Epicondyle	10 mos.	Tennis	Regional	Standard	1	+	1	$\pm$	1	NO	NO	60 50 30	8 8 8	12 10 10	**POOR**
M	45	Elbow Epicondyle Epitrochlear	6 mos	Tennis	Hobby	Cryo	2	+	2	0	1	YES	NO	35 45 20	0 0 0	19 0 7	**AVERAGE**
M	35	Achilles	3 mos	Soccer	Hobby	Cryo	3	+	3	+	3	NO	NO	82 0 0	62 0 0	57 0 0	**POOR**
M	29	Elbow Epicondyle	2 mos	Squash	Hobby	Standard	3	+	0	0	0	YES	YES	59 65 48	0 0 0	0 0 0	**EXCELLENT**
M	66	Achilles	10 yrs	Jogging	Hobby	Standard	3	+	1	0	0	YES	YES	62 25 20	15 0 0	11 0 0	**EXCELLENT**
M	22	Knee Patellar tendon	6 mos	Basket	Regional	Cryo	2	+	2	0	2	YES	NO	71 0 25	60 0 20	50 0 22	**AVERAGE**
M	50	Achilles	3 mos	Basket	Hobby	Standard	3	0	2	0	2	YES	NO	63 21 25	50 0 0	55 0 0	**AVERAGE**

Pain on palpation (scale graded from 0 to 100)

Pain on opposed contraction

Pain on passive stretching

Table 5 : variations in mean pain score in acute tendinopathies on the two types of treatment
(Grading scale : 1 to 100)

	Standard treatment			Cryotherapy		
	Before treatment	End of treatment	At 1 month	Before treatment	End of treatment	At 1 month
Pain on palpation	52.7	25.5	35	42.8	11.6	8.1
Pain on opposed contraction	52.5	24.5	23.2	51.2	12.5	5.2
Pain on passive stretching	44.2	18	23	19.2	8.5	1.2

Table 6 : variations in mean pain score in chronic tendinopathies on the two types of treatment
(Grading scale : 1 to 100)

	Standard treatment			Cryotherapy		
	Before treatment	End of treatment	At 1 month	Before treatment	End of treatment	At 1 month
Pain on palpation	62.4	26.2	22.8	60.7	40	42
Pain on opposed contraction	32.2	1.6	2	25	12	11.2
Pain on passive stretching	24.6	1.6	2	21.2	11.7	11.7