International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

A STUDY TO ASSESS EFFECTIVENESS OF CRYOTHERAPY AS A COMPLEMENTARY THERAPY ON PAIN AND SWELLING AMONG PATIENTS SUBJECTED TO ARTHROSCOPIC SURGERY ADMITTED AT SELECTED HOSPITALS IN VADODARA

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ABSTRACT

Background of the study: Arthroscopic surgery is a common procedure that can cause pain and swelling in the joint. Cryotherapy, or cold therapy, is a safe and effective way to reduce pain and swelling after surgery. Cryotherapy can be applied in a variety of ways, including ice packs, cold compresses, and cold baths. Most studies recommend applying cryotherapy for 20-30 minutes at a time, 3-4 times a day. **Aim:** To assess effectiveness of cryotherapy as a complementary therapy on pain and swelling among patients subjected to arthroscopic surgery. **Material and method:** Quasi experimental research design was used to conduct study. 44 patients who received arthroscopy were assigned to receive cryotherapy (the experimental group, 22 people and the control group, 22 people). For the experimental group, three 10-minute sessions of ice packing were conducted over a three-hour period, with 50-minute intervals between each session. The first session of ice packing was applied immediately after recovery from anaesthesia. **Result:** Cryotherapy was shown to be effective in decreasing the pain and swelling score in post-arthroscopy patients. The pain and swelling score of the

experimental group decreased from 4.14-2.23 and 2.68-1.73 respectively. **Conclusion:** Cryotherapy is a safe and non-invasive treatment, and it can be used in addition to other treatments, such as pain medications or physical therapy.

Keywords: Cryotherapy, Pain and Swelling, Arthroscopic Surgery

INTRODUCTION:

Pain is the most common problem experienced by patients after arthroscopy. Pain is an uncomfortable feeling that tells you something may be wrong. It can be steady, throbbing, stabbing, aching, pinching, or described in many other ways. Sometimes, it's just a nuisance, like a mild headache. Other times it can be debilitating. Pain can bring about other physical symptoms, like nausea, dizziness, weakness or drowsiness. It can cause emotional effects like anger, depression, mood swings or irritability. Perhaps most significantly, it can change the lifestyle and impact of the job, relationships and independence **[1]**. Cryotherapy is a treatment where the healthcare provider applies extreme cold to freeze and destroy abnormal tissue. To create this severe cold, the health-care provider will use a substance like liquid nitrogen or argon gas **[2]**. Currently, the best way to treat the pain is to manage the symptoms. If postoperative pain is not relieved, it may result in delaying physiotherapy, extending a hospital stay, delaying healing and consuming medical resources. The structures of the knee joints include the synovial tissues, the infrapatellar fat pads and the articular capsules. As the structures consist of free nerve endings, they can receive pain stimuli associated with clients perceive intense pain **[3]**. Therefore, the importance of early and active postoperative pain management should not be overlooked **[4]**.

Arthroscopy is a procedure for diagnosing and treating joint problems where a surgeon inserts a narrow tube attached to a fibre-optic video camera through a small incision — about the size of a buttonhole. The view inside the joint is transmitted to a high-definition video monitor. Arthroscopy allows the surgeon to see inside the joint without making a large incision. Surgeons can even repair some types of joint damage during arthroscopy, with pencil-thin surgical instruments inserted through additional small incisions **[5]**. As early as the fourth century BC, Hippocrates used ice and snow for the treatment of acute soft tissue trauma. Since then, cryotherapy has been widely applied in acute trauma of soft tissues to reduce pain and swelling **[6]**. Few studies have examined the efficacy of applying cryotherapy via ice in a plastic bag to relieve pain after arthroscopy. Cryotherapy is routinely used in postoperative treatment in orthopaedics, traumatology, facial surgery,

pain prevention in sport, etc. **[7]**. The empirical properties of cryotherapy have been investigated, applying different means of cooling. Some authors have reported that cryotherapy decreases the need for medications and improves rehabilitation after arthroscopic reconstruction, while others failed to confirm such beneficial effects **[8]**.

MATERIALS AND METHODS:

The study meant to find out the effectiveness of cryotherapy as a complementary therapy on pain and swelling among patients subjected to arthroscopic surgery, the research approach used for the study will be quantitative research approach. The research design used in the study was quasi experimental research design with two groups. I. E. Experimental and control group. Study will be conducted at selected hospitals in Vadodara, Vadodara, Gujarat. Patients who have undergone the arthroscopic surgery and are admitted at Selected Hospitals in Vadodara, Vadodara, Gujarat. Population for the study were the patient who were subjected to arthroscopic surgery and admitted at selected hospitals at Vadodara, Gujarat. 22 samples were assigned to the experimental group and 22 were assigned to the control group. The total number of samples were 44. Non-probability purposive sampling technique was used to conduct this study. Inclusion criteria, Arthroscopic post-operative people,

those willing to give consent, available at the time of data collection, and have undergone arthroscopic surgery, also people within the age group of 20-50 years of age. Exclusion criteria, was that clients unwilling to participate in the study, Clients suffering from mental illness at the time of data collection, and those uncooperative at the time of data collection, those clients who are undergoing home-care were also excluded, Patients with no pain and grade 1 swelling. The tool was prepared by the investigators, after an extensive study of the related literature and with the guidance of experts. The tool consists of two sections. Section I, This section included the demographic variables of the people subjected to arthroscopic surgery such as: age, gender, height, weight, duration of surgery, arthroscopic category, daily smoking habit, daily alcohol intake, surgical history, comorbid history. Section II, Standardized Numerical Pain Rating Scale, The Numerical Rating Scale is the simplest and most commonly used to assess the pain in which the patient's pain rates form 0(no pain) to 10(worst pain). - Dr Ronald Melzack & Dr. Warren Torgerson. Numerical Swelling Grading Scale, Grade 1: Immediate rebound with 2millimeter (mm) pit. Grade 2: Less than 15-second rebound with 3 to 4 mm pit. Grade 3: Rebound greater than 15 seconds but less than 60 seconds with 5 to 6 mm pit. Grade

4: Rebound between 2 to 3 minutes with an 8 mm pit.

RESULTS:

Table 1 shows frequency and percentage distribution of demographic variables of patients subjected to arthroscopic surgery In experimental group, during pre-test majority of the arthroscopic patients i.e., 13(59.1%) had mild pain, 5(22.7%) patients had moderate pain and 4 arthroscopic patients (18.2%) had severe pain. In control group, during pre-test majority of the arthroscopic patients i.e., 10(45.5%) had mild pain, 8(36.3%) patients had moderate pain and 4(18.2%) arthroscopic patients had severe pain **(Table 2)**.

In experimental group, during pre-test majority of the arthroscopic patients i.e., 12(54.5%) had grade 1 swelling, 6(27.3%) patients were in grade 2 and 4(18.2%) arthroscopic patients had grade 3 swelling. In control group, majority of the arthroscopic patients i.e., 11(50%) had grade 1 swelling, 5(22.7%) patients were in grade 2 and 6(27.3%) arthroscopic patients had grade 3 swelling **(Table 3)**.

In post-test experimental group maximum arthroscopic patients i.e., 17(77.3%) had mild pain and 5(22.7%) arthroscopic patients had moderate pain. In control group, majority of the arthroscopic patients i.e.,10(45.5%) had mild pain, 7(31.9%) patients had moderate pain and 3(13.6%) arthroscopic patients had severe pain **(Table 4)**.

In post-test experimental group, maximum arthroscopic patients i.e., 18(81.8%) had grade 1 swelling and 4(18.2%) arthroscopic patients had grade 2 swelling. In control group majority of the arthroscopic patients i.e., 13(59.1%) had grade 1 swelling, 7(31.8%) patients were in grade 2 and 2(9.1%) arthroscopic patients had grade 3 swelling **(Table 5)**.

In experimental group mean pre-test pain score was 4.14±2.07 and mean post-test pain score 2.23±1.34 with mean difference of 1.90 with obtained test value (t=3.521 at df=21, p=0.002) was statistically significant.

In control group mean pre-test pain score was 3.77±2.61 and mean post-test pain score 3.55±2.30 with mean difference of 0.22 with obtained test value (t=1.742 at df=21, p=0.096) was statistically non-significant **(Table 6)**.

In experimental group mean pre-test swelling score was 2.68±1.61 and mean post-test swelling score 1.73±0.98 with mean difference of 0.95 with obtained test value (t=2.226 at df=21, p=0.037) was statistically significant.

In control group mean pre-test swelling score was 3.14±1.64 and mean post-test swelling score 2.95±1.36 with mean difference of 0.18 with obtained test value

(t=1.449 at df=21, p=0.162) was statistically non-significant **(Table 7)**.

Findings revealed that cryotherapy was effective in reducing level of pain and swelling among patients subjected to arthroscopic surgery in experimental group as compared to control group **(Table 8)**.

The association between post-test levels of pain score after application of cryotherapy and with selected demographic variables in experimental group was tested by using chi-square test. Result reveals that demographic variables were non-significant at p<0.05 with post-test levels of pain score after application of cryotherapy **(Table 9)**.

The association between post-test levels of pain score after application of cryotherapy and with selected demographic variables in control group was tested by using chi-square test. Result reveals that demographic variables were non-significant at p<0.05

with post-test levels of pain score after application of cryotherapy **(Table 10)**.

The association between post-test levels of swelling score after application of cryotherapy and with selected demographic variables in experimental group was tested by using chi-square test. Result reveals that demographic variables were non-significant at p<0.05 with post-test levels of swelling score after application of cryotherapy **(Table 11)**.

The association between post-test levels of swelling score after application of cryotherapy and with selected demographic variables in control group was tested by using chi-square test. Result reveals that demographic variables were non-significant at p<0.05 with post-test levels of swelling score after application of cryotherapy **(Table 12)**.

Table 1: Frequency and percentage distribution of demographic variables of patients subjected to arthroscopic surgery (N=44)

S. No	Demographic variables	Experimental group (n = 22)		Control group (n = 22)	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
1	**Age (in years)**				
	a. < 20	1	4.5	1	4.5
	b. 21 – 30	6	27.3	6	27.3
	c. 31 – 40	5	22.7	6	27.3
	d. 41 – 50	2	9.1	3	13.6
	e. >51	8	36.4	6	27.3
2	**Gender**				
	a. Male	10	45.5	8	36.4
	b. Female	12	54.5	14	63.6
3	**Height (in cm)**				
	a. 120 – 150	1	4.6	1	4.5
	b. 151 – 180	16	72.7	14	63.6
	c. 181 – 210	5	22.7	7	31.9

4	Weight (in kg)				
	a. 50 - 60	6	27.3	4	18.2
	b. 61 - 70	4	18.1	4	18.2
	c. 71 - 80	6	28.3	7	31.8
	d. >81	6	27.3	7	31.8
5	Duration of surgery (in hours)				
	a. 1 - 2	1	4.5	2	9.1
	b. 3 - 4	10	45.5	9	40.9
	c. 5 - 6	8	36.4	2	9.1
	d. >6	3	13.6	9	40.9
6	Arthroscopic category				
	a. Meniscal repair/ resection	2	9	0	0
	b. Removal of loose bodies	0	0	0	0
	c. ACL and PCL reconstruction	10	45.5	11	50
	d. Synovial biopsy or synovectomy	0	0	0	0
	e. Both A and C	10	45.5	11	50
7	Do you have any smoking habit? (If yes then specify).				
	a. Yes	0	0	0	0
	b. No	17	77.4	16	72.7
	c. Daily	1	4.5	2	9.1
	d. Once a week	1	3.5	2	9.1
	e. Once a month	3	13.6	2	9.1
8	Do you have any habit of alcohol intake? (If yes then specify)				
	a. Yes	0	0	0	0
	b. No	21	95.5	19	81.9
	c. Daily	0	0	0	0
	d. Once a week	0	0	1	4.5
	e. Once a month	1	4.5	3	13.6
9	Previous surgical history				
	a. Yes	9	40.9	7	31.8
	b. No	13	59.1	15	68.2
10	Any comorbid history				
	a. Hypertension	0	0	1	4.5
	b. Diabetes mellitus	4	18.2	3	13.6
	c. None	16	72.7	17	77.3
	d. Both	2	9.1	1	4.5

Table 2: Pretest level of pain score among the patients subjected to arthroscopic surgery in experimental and control group (N=44)

Level of pain	Pre-test			
	Experimental group (n=22)		Control Group (n=22)	
	F	%	f	%
No pain	0	0	0	0
Mild pain	13	59.1	10	45.5
Moderate pain	5	22.7	8	36.3
Severe pain	4	18.2	4	18.2

Table 3: Pretest level of swelling score among the patients subjected to arthroscopic surgery in experimental and control group

Level of swelling	Pre-test			
	Experimental group (n=22)		Control Group (n=22)	
	F	%	f	%
Grade 1	12	54.5	11	50
Grade 2	6	27.3	5	22.7
Grade 3	4	18.2	6	27.3
Grade 4	0	0	0	0

Table 4: Post-test level of pain score among the patients subjected to arthroscopic surgery in experimental and control group (N=44)

Level of pain	Post test			
	Experimental group (n=22)		Control Group (n=22)	
	F	%	f	%
No pain	0	0	0	0
Mild pain	17	77.3	10	45.5
Moderate pain	5	22.7	7	31.9
Severe pain	0	0	3	13.6

Table 5: Post-test level of swelling score among the patients subjected to arthroscopic surgery in experimental and control group (N=44)

Level of swelling	Post-test			
	Experimental group (n=22)		Control Group (n=22)	
	F	%	f	%
Grade 1	18	81.8	13	59.1
Grade 2	4	18.2	7	31.8
Grade 3	0	0	2	9.1
Grade 4	0	0	0	0

Table 6: Effectiveness of cryotherapy on level of pain score among patients subjected to arthroscopic surgery (N=44)

Comparison		Mean	SD	Mean D	t value	df	p value
Experimental group	Pre-test	4.14	2.07	1.90	3.521	21	0.002*
	Post-test	2.23	1.34				
Control Group	Pre-test	3.77	2.61	0.22	1.742	21	0.096[NS]
	Post-test	3.55	2.30				

*P<0.05 level of significance   NS-Non significance

Table 7: Effectiveness of cryotherapy on level of swelling score among patients subjected to arthroscopic surgery (N=44)

Comparison		Mean	SD	Mean D	t value	df	p value
Experimental group	Pre-test	2.68	1.61	0.95	2.226	21	0.037*
	Post-test	1.73	0.98				
Control Group	Pre-test	3.14	1.64	0.18	1.449	21	0.162[NS]
	Post-test	2.95	1.36				

*P<0.05 level of significance   NS-Non significance

Table 8: Comparison of post-test level of pain and swelling score among patients subjected to arthroscopic surgery in experimental and control group (N=44)

Comparison Post-test	Experimental group Mean±SD	Control group Mean±SD	Mean D	t value	df	p value
Pain	2.23±1.34	3.55±2.30	1.31	2.319	42	0.015*
Swelling	1.73±0.98	2.95±1.36	1.22	3.425	42	0.001*

*P<0.05 level of significance   NS-Non significance

Table 9: Association between post-test levels of pain score after application of cryotherapy and with selected demographic variables in experimental group (N=22)

Demographic variables	Post-test pain		χ^2 value	df	P value
	Mild	**Moderate**			
Age (in years) a. < 20 b. 21 - 30 c. 31 - 40 d. 41 – 50 e. >51	1 5 3 1 7	0 1 2 1 1	2.593	4	0.628[NS]
Gender a. Male b. Female	8 9	2 3	0.078	1	0.781[NS]
Height (in cm) a. 120 - 150 b. 151 - 180 c. 181 – 210	1 14 2	0 2 3	5.202	2	0.074[NS]
Weight (in kg) a. 50 - 60 b. 61 - 70 c. 71 - 80 d. >81	5 4 4 4	1 0 2 2	2.071	3	0.558[NS]
Duration of surgery (in hours) a. 1 - 2 b. 3 - 4 c. 5 - 6 d. >7	1 8 6 2	0 2 2 1	0.552	3	0.907[NS]
Arthroscopic category a. Meniscal repair/ resection b. Removal of loose bodies c. ACL and PCL reconstruction d. Synovial biopsy or synovectomy e. Both A and C	2 -- 8 -- 7	0 -- 2 -- 3	0.932	2	0.628[NS]
Do you have any smoking habit? (If yes then specify) a. Yes b. No c. Daily d. Once a week e. Once a month	 -- 13 1 1 2	 -- 4 0 0 1	0.787	3	0.853[NS]
Do you have any habit of alcohol intake? (If yes then specify) a. Yes b. No c. Daily d. Once a week e. Once a month	 -- 17 -- -- 0	 -- 4 -- -- 1	3.562	1	0.059[NS]
Previous surgical history a. Yes b. No	7 10	2 3	0.102	1	0.862[NS]
Any comorbid history a. Hypertension b. Diabetes mellitus c. None d. Both	-- 2 13 1	-- 2 3 0	2.426	2	0.297[NS]

*p<0.05 level of significance   NS- Non significance

Table 10: Association between post-test levels of pain score after application of cryotherapy and with selected demographic variables in control group (N=22)

Demographic variables	Post-test pain			χ^2 values	df	P value
	Mild	Moderate	Severe			
Age (in years)				10.17	8	0.253[NS]
a. < 20	0	1	0			
b. 21 - 30	4	2	0			
c. 31 - 40	4	1	1			
d. 41 – 50	3	0	0			
e. >51	1	3	2			
Gender				2.772	2	0.434[NS]
a. Male	4	1	3			
b. Female	8	6	0			
Height (in cm)				6.884	4	0.142[NS]
a. 120 - 150	0	0	1			
b. 151 - 180	8	5	1			
c. 181 - 210	4	2	1			
Weight (in kg)				9.391	6	0.153[NS]
a. 50 - 60	0	3	1			
b. 61 - 70	2	2	0			
c. 71 - 80	6	0	1			
d. >81	4	2	1			
Duration of surgery (in hours)				4.321	6	0.633[NS]
a. 1 - 2	0	1	1			
b. 3 - 4	5	3	1			
c. 5 - 6	1	1	0			
d. >7	6	2	1			
Arthroscopic category				2.952	2	0.229[NS]
a. Meniscal repair/ resection	--	--	--			
b. Removal of loose bodies	--	--	--			
c. ACL and PCL reconstruction	4	5	1			
d. Synovial biopsy or synovectomy	--	--	--			
e. Both A and C	8	2	1			
Do you have any smoking habit? (If yes then specify)	--	--	--	3.012	6	0.807[NS]
a. Yes	8	5	3			
b. No	1	1	0			
c. Daily	1	1	0			
d. Once a week	2	0	0			
e. Once a month						
Do you have any habit of alcohol intake? (If yes then specify)				8.046	4	0.090[NS]
a. Yes	--	--	--			
b. No	11	4	3			
c. Daily	--	--	--			
d. Once a week	1	0	0			
e. Once a month	0	3	0			
Previous surgical history				3.140	2	0.118[NS]
a. Yes	4	0	3			
b. No	8	7	0			
Any comorbid history				9.100	6	0.168[NS]
a. Hypertension	1	0	0			
b. Diabetes mellitus	1	2	0			
c. None	10	5	2			
d. Both	0	0	1			

*p<0.05 level of significance   NS- Non significance

Table 11: Association between post-test levels of swelling score after application of cryotherapy and with selected demographic variables in experimental group (N=22)

Demographic variables	Post-test swelling		χ^2 values	df	P value
	Grade 1	Grade 2			
Age (in years)			6.539	4	0.162[NS]
a. < 20	1	0			
b. 21 - 30	3	3			
c. 31 - 40	4	1			
d. 41 – 50	2	0			
e. >51	8	0			
Gender			0.041	1	0.840[NS]
a. Male	8	2			
b. Female	10	2			
Height (in cm)			1.833	2	0.401[NS]
a. 120 - 150	1	0			
b. 151 - 180	12	4			
c. 181 - 210	5	0			
Weight (in kg)			6.875	3	0.076[NS]
a. 50 - 60	3	3			
b. 61 - 70	3	1			
c. 71 - 80	6	0			
d. >81	6	0			
Duration of surgery (in hours)			2.001	3	0.572[NS]
a. 1 - 2	1	0			
b. 3 - 4	7	3			
c. 5 - 6	7	1			
d. >7	3	0			
Arthroscopic category			5.867	2	0.053[NS]
a. Meniscal repair/ resection	2	0			
b. Removal of loose bodies	--	--			
c. ACL and PCL reconstruction	6	4			
d. Synovial biopsy or synovectomy	--	--			
e. Both A and C	10	0			
Do you have any smoking habit? (If yes then specify)			5.392	3	0.145[NS]
a. Yes	--	--			
b. No	14	3			
c. Daily	0	1			
d. Once a week	1	0			
e. Once a month	3	0			
Do you have any habit of alcohol intake? (If yes then specify)			0.233	1	0.629[NS]
a. Yes	--	--			
b. No	17	4			
c. Daily	--	--			
d. Once a week	--	--			
e. Once a month	1	0			
Previous surgical history			3.385	1	0.066[NS]
a. Yes	9	0			
b. No	9	4			
Any comorbid history			1.833	2	0.400[NS]
a. Hypertension	--	--			
b. Diabetes mellitus	4	0			
c. None	12	4			
d. Both	2	0			

*p<0.05 level of significance   NS- Non significance

Table 12: Association between post-test levels of swelling score after application of cryotherapy and with selected demographic variables in control group (N=22)

Demographic variables	Post-test swelling			χ^2 values	df	P value
	Grade 1	Grade 2	Grade 3			
Age (in years)				2.538	8	0.960[NS]
a. < 20	1	0	0			
b. 21 - 30	4	2	0			
c. 31 - 40	3	2	1			
d. 41 – 50	2	1	0			
e. >51	3	2	1			
Gender				0.464	2	0.793[NS]
a. Male	4	3	1			
b. Female	9	4	1			
Height (in cm)				1.062	4	0.901[NS]
a. 120 - 150	1	0	0			
b. 151 - 180	8	5	1			
c. 181 - 210	4	2	1			
Weight (in kg)				6.230	6	0.398[NS]
a. 50 - 60	4	0	0			
b. 61 - 70	1	2	1			
c. 71 - 80	4	3	0			
d. >81	4	2	1			
Duration of surgery (in hours)				3.438	6	0.752[NS]
a. 1 - 2	1	1	0			
b. 3 - 4	4	4	1			
c. 5 - 6	1	1	0			
d. >7	7	1	1			
Arthroscopic category				2.835	2	0.242[NS]
a. Meniscal repair/ resection	--	--	--			
b. Removal of loose bodies	--	--	--			
c. ACL and PCL reconstruction	5	4	1			
d. Synovial biopsy or synovectomy	--	--	--			
e. Both A and C	8	3	0			
Do you have any smoking habit? (If yes then specify)				6.558	6	0.364[NS]
a. Yes	--	--	--			
b. No	10	4	2			
c. Daily	2	-	0			
d. Once a week	1	1	0			
e. Once a month	0	2	0			
Do you have any habit of alcohol intake? (If yes then specify)				3.244	4	0.518[NS]
a. Yes	--	--	--			
b. No	11	6	1			
c. Daily	--	--	--			
d. Once a week	1	0	0			
e. Once a month	1	1	1			
Previous surgical history				1.156	2	0.561[NS]
a. Yes	3	3	1			
b. No	10	4	1			
Any comorbid history				3.304	6	0.770[NS]
a. Hypertension	0	1	0			
b. Diabetes mellitus	2	1	0			
c. None	10	5	2			
d. Both	1	0				

*p<0.05 level of significance   NS- Non significance

DISCUSSION:

The study aimed to assess the effectiveness of cryotherapy as a complementary therapy for reducing pain and swelling in patients who had undergone arthroscopic surgery. The research design was quasi-experimental, with an experimental group (receiving cryotherapy) and a control group (not receiving cryotherapy). The findings suggest that cryotherapy had a significant impact on reducing both pain and swelling in the experimental group, as compared to the control group. The pre-test and post-test measurements of pain and swelling in the experimental group demonstrated statistically significant improvements, while the control group showed non-significant changes. Demographic variables, such as age, gender, height, weight, duration of surgery, arthroscopic category, smoking habits, alcohol intake, previous surgical history, and comorbid conditions, were found to have no significant influence on the outcomes in both the experimental and control groups.

Daniel et al. (1994) used cooling pads for patients who received reconstructions of the anterior cruciate ligament to examine whether they could reduce patient's pain, limb swelling and joint stiffness. The results showed that no significant differences were found in terms of the length of hospital stay, analgesic use, knee circumference and range of motion. The results of that study also differed from the present studies. In the former, preventive anaesthetic analgesics were administered prior to surgery, which, by reducing pain levels preoperatively, could have confounded measurement of the efficacy of the cryotherapy. In fact, among the published studies related to post-arthroscopy pain, most administered analgesic medications prior to undertaking cryotherapy. It has been suggested, therefore, that baseline pain scores should be recorded prior to administering analgesics (9). Knee edema can also be influenced by cryotherapy associated with compression (10). Some investigators consider this outcome as somewhat subjective, since it is difficult to obtain a precise measurement of the edema (11). This could help to explain the lack of data on this outcome. Low temperatures might reduce post-surgery blood loss, thus helping to reduce swelling (12).

The present study indicates that cryotherapy is an effective complementary treatment for managing pain and swelling in patients following arthroscopic surgery. However, the results also suggest that the demographic variables investigated do not significantly affect the effectiveness of cryotherapy in this context.

CONCLUSION:

The study found that cryotherapy is an effective complementary therapy for reducing pain and swelling in patients after

arthroscopic surgery. The research design showed significant improvements in the experimental group compared to the control group. Demographic variables, such as age, gender, and other factors, did not significantly influence the effectiveness of cryotherapy in this context. These findings support the use of cryotherapy as a valuable post-surgery treatment option for pain and swelling management and also a relatively safe treatment, with few adverse effects. Therefore, cryotherapy could be a valuable addition to the treatment regimen for the patients who have undergone arthroscopic surgery.

Conflict of Interest:

The authors declare that there is no any conflict of interest.

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