

## Modern Therapeutic Methods and Exercises Indicators for Relief Cervical Muscle Spasm

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**Abstract:** The research aims at putting a suggested program of exercises and some modern therapeutic modalities on relief of cervical muscle spasm in female 35-45 years old. The researcher used experimental method to suit research subject which consist of two experimental groups. The researchers selected research samples intentionally, which consist of 16 women aged 35-45 years old; the mean of age 40.1 years, height 166 cm, weight 66.65kg, of those frequently attend physical therapy. The first program consists of tr4additional physical therapy (6 weeks) (ultrasonic waves, infrared rays, massage) and therapeutic exercises (for 6 weeks). The second program consist of medical ozone (ozone cabinet) for 4 weeks, twice weekly for 20 min. and therapeutic exercises (6 weeks) on getting rid of muscular spasm of the neck pains. Results indicated that using of the suggested therapeutic exercises with Ozone in curing muscular spasm of the neck and reduction of pain was effective. Also, to be aware of the importance of practicing exercise as a daily habit and life style for all ages.

**Key words:** Therapeutic Methods • Cervical Muscle Spasm

### INTRODUCTION

Treatment of injuries has improved through sophisticated rehabilitation programs, novel operative technique and advances in biomechanical research during the past two decades. Despite considerable progress, treatments remain limited due to poor healing capacity. New biological approaches seek to treat these injuries with growth factors to stimulate and hasten the healing process [1].

Robergs and Roberts [2] reported that from approximately age 35, the effectiveness of various physiologic functions decreases. Changes occur in all organ systems with age. Nerve conducting velocity, cardiac index, maximum breathing capacity, muscle strength and flexibility, bone mineral content. They also added that exercise prescription for the elderly, must begin with a pre exercise evaluation and may involve a medical history, physical and treadmill test.

Woman is half the society as it is the main factor in family which puts the main and effective role on her. In addition to various tasks which fall on her shoulder through her multiple roles inside home and outside, therefore, she should characterize with good level of health and physical fitness which suits doing her duties completely and properly.

Ganong [3] stated that if the blood supply to a muscle is occluded, contraction soon causes pain. The pain persists after the contraction until blood flow is reestablished. He added that a chemical agent (Lewis P factor) may cause pain when its local concentration is high enough. When the blood supply is restored, the material is washed out or metabolized. The identity of the P factor is not settled, but it could be  $K^+$ .

In recent years much focus has been on the importance of potassium in the development of muscle fatigue and pain during exercise. During muscle activity, potassium is released from the intracellular to the extracellular space, via voltage dependent  $K^+$  channels activated during propagation of action potentials. Potassium may also be released through  $K^+$  ATP channels during exercise.

A continuous efflux of potassium from the exercising muscle may be implicated in the fatigue process and pain sensation. Thus extracellular accumulation of potassium impairs membrane excitability [4]. Recently it has been demonstrated that interstitial potassium concentrations ( $K^+$  int) in human skeletal muscle can reach values over 12 m mol-L. During heavy exercise [5] which is considerably higher than extracellular concentrations which reduce contract ability in muscles.

Ozone therapy is one of the most powerful and versatile therapies known today. Ozone has beneficial effects on every part of the body. Ozone is not a drug and it is not a magic bullet. It is a therapeutic tool of great power which can aid the body in regaining health.

However, in the end it is the immune system that has to do the work of healing the body-Therefore, the immune system must be functioning. Ozone plays a significant role in restoring body resistance. In order to appreciate Ozone one must first understand fully the critical role Oxygen plays in human life. Oxygen is by far the most important necessity of human life. It performs hundreds of tasks in the body, but two most important are energy production and detoxification.

Chemically Ozone is oxygen, with an extra molecule added. Electrically Ozone (O<sub>3</sub>) is an allotropic form of oxygen, it is oxygen in its most active state and it therefore means a more generous supply of oxygen - the Life giver. Ozone is one of the most energetic and useful agents known to science. Its therapeutic action is due to oxygenation of the blood by the loose molecule of oxygen in the O<sub>3</sub> compound.

Ozone is a powerful therapeutic tool for curing disease, but it is equally important for prevention of disease. Ozone activates Krebs cycle and thereby stimulates the production of ATP Formation of peroxides Ozone reacts with the unsaturated fatty acids of the lipid layer in cellular membranes, forming hydro peroxides.

**Aim of this Study:** Putting a suggested program of exercises and some modern therapeutic modalities on relief of cervical muscle spasm in female 35-45 years old.

**Questions of the Study:**

- Is there any difference between traditional physical therapy and medical ozone in relief of cervical muscle spasm?

- What are the mechanisms of actions between traditional physical therapy and medical ozone?

**Subjects Protocol:** All participants complete a questionnaire detailing their physical activity or any medication intake. All participants gave their informed written consent before enrollment and the study protocol was approved by the ethic committee of the university.

The exclusion criteria from the study were: any cardiovascular respiratory, abdominal, urinary, neurological or any chronic disease and regular participation in any exercise inducing impact-type loading on the skeleton more than three times a week.

**MATERIALS AND METHODS**

The researcher used experimental method to suit research subject which consist of two experimental groups. The researchers selected research samples intentionally, which consist of 16 women aged 35-45years old; the mean of age 40.1 years, height 166 cm, weight 66.65kg, of those frequently attend physical therapy.

The first program consists of tr4adjitional physical therapy (6 weeks) (ultrasonic waves, infrared rays, massage) and therapeutic exercises (for 6 weeks).

The second program consist of medical ozone (ozone cabinet) for 4 weeks, twice weekly for 20 min. and therapeutic exercises (6 weeks) on getting rid of muscular spasm of the neck pains.

Variables were measured before and after the suggested programs of the two groups so as to relief cervical muscle spasm in females:

- Measuring pain (with visual analogue scale) (V.A.S) and potassium using kits and flame photometer.
- Range of movement of the neck in all directions (forward, backward, right left) using flexometer.

Table 1: Therapeutic exercises program

Training program	Program Control	Time
1-Warming Up	Preparation of muscles and respiratory-circulatory system	5-10 min
2-Principal program	Involve the precise exercise in every period of suggested program phases	30-35in
3-Cooling down	Involve relaxation exercise of all muscles so as to help body to normal state	5-10 min

Table 2: Statistical analysis of the two groups in some anthropometric variable (N=16)

Variables	Mean	SD	Skrew
Age (yrs)	40.1	1.8	1.1
Height (cm)	166.0	9.7	2.4
Weight (kg)	66.65	8.9	-1.3

SD= standard deviation

P < 0.05

Table 3: Group I, II before and after in pain [V.A.S] and K megil, range of movement [forward, backwards, right and left (N=8)

variable	Group I				Group II			
	bef	aft	P.value	%	bef	aft	P.value	%
Pain [N.A.S]	7.0	2.83	61.3	59.5	6.99	2.45	79	64.9
Pain K- megil	5.65	3.65	15.7	35.3	5.70	3.35	33.6	41.2
Range of movement forward	45.9	58.21	52.0	26.9	45.86	67.10	101.3	46.3
backwards	49.11	59.80	56.7	21.7	49.12	62.51	69.6	27.2
Right	50.15	61.05	57.1	21.7	50.11	63.76	150.6	27.2
Left	52.11	59.2	45.6	13.6	52.13	63.15	85.5	21.1

Group I Traditional phys.-Therapeutic exercises.

Group II Medical ozone-Therapeutic exercises.

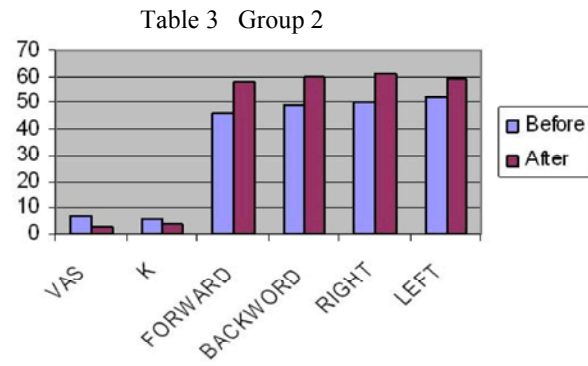
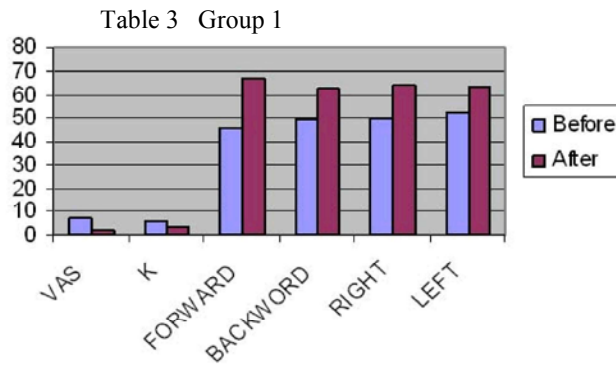
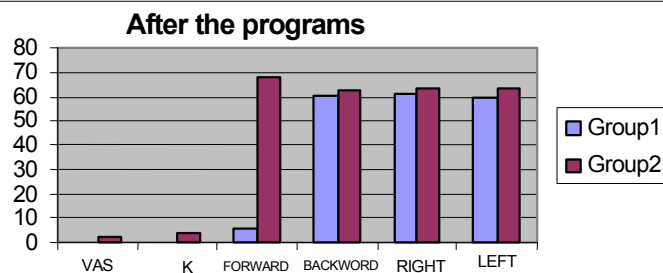


Table 4: Pain [N.A.S], K conc and range of movement [forward, backward, left, right] in group I, II after the programs (N=8)

Variables	Group I	Group II	P.value
Pain(N.A.S)	2.7± 0.6	2.4± 0.5	7.27
K. megil	3.9± 0.8	3.6± 0.6	2.19
Range of movement			
Forward	58.5	67.3	91.46
Backward	60.2	62.4	11.26
Right	61.2	63.5	13.94
Left	59.7	63.1	26.98



Ozone cabinet was composed of fiberglass, triangle with rectangular base, 150 cm long, 75 cm breadth, 100 cm height, with wooden chair.

**Statistical Analysis Used:**

- Mean ± standard deviation.
- Skrewness.
- T test.
- Variance and percent of benefit.

Table 2 indicated that Skrewness was between ±3.

**RESULTS AND DISCUSSION**

All the participants (16 women, 35-45years old) completed the study without side effects or adverse reactions. The reported data in group (1) traditional phys. Therapy + therapeutic exercises and group (2) Medical ozone + therapeutic exercises indicated improvement in pain (VAS) or K concentration after the two programs and the improvement was obvious in the group (2) compared to group (1).

As for the extent of movement (Forward, Backward, Right, Left) there was an improvement after the two programs for the sake of the group (2)

### DISCUSSION

This study (Table 2) showed an improvement in pain variable (VAS) and K concentration for both groups (1, 2) with a better improvement for the sake of the second group (2) using ozone and therapeutic exercises. This is in accordance with results of Safaa [6] and Laurie [7].

The first adaptation mechanism of a skeletal muscle to therapeutic exercises might be neural [8-10]. Changes in the neural factors in response to training occur within shorter time than the morphological changes [8].

Maha *et al.* [11] stated that that controlled ozone administration has been shown to promote an oxidative preconditioning or adaptation to oxidative stress by increasing endogenous antioxidant system and decreasing Malondialdehyde. In the current study the suppression of pain might be directly or indirectly due to the proceeded causes.

Guyton and Hall [12] reported that tissue ischemia might cause pain due to accumulation of lactic acid in the tissue. It is also probable that other chemical agents, such as bradikinin and proteolytic enzymes and increased potassium leading to stimulation of the pain nerve endings.

Haines and Lancon [13] stated that muscle spasm is also a common cause of pain and it is the basis of many clinical pain syndromes. This pain probably results partially from the direct effect of muscle spasm in stimulating mechanic sensitive pain receptors but it might be due to the indirect effect of muscle spasm to compress the blood vessels and cause ischemia.

The results of range of movement of the cervical vertebrae (Table 2) forward, backward, left, right side indicated an improvement of the flexibility of the cervical vertebrae after traditional physical therapy and therapeutic exercises (group 1) and medical ozone and therapeutic exercises (group 2). The range of movement was greater in case of the second group.

Ozone therapy as a complementary medical approach has been known for more than four decades. Ozone (O<sub>3</sub>), an allotrope of oxygen, is the second strongest oxidant found in nature, next to fluorine. Its oxidizing potential (2.07) is by far superior to Hydrogen Peroxide (1.77), Chlorine Dioxide (1.57), Chlorine gas (1.36), Hypochlorite

(0.94), Iodine (0.54). The main areas where that kind of treatment could be useful include neurodegenerative diseases, orthopedic pathologies and vascular disorders [14].

Our data were in accordance with previous studies [15-19] as Ozone can help reduce inflammation and exerted protective effect on some antioxidant which help to restore joint action. These positive observations could be explained in the light of Ozone oxidative preconditioning, a state obtained on judicious and controlled use of O<sub>3</sub>[20].

Robergs and Roberts [2] stated that loss of flexibility of joint is more likely the result of diminishing physical activity. Flexibility can be improved at any age through exercise that promote the elasticity of the soft tissues. The degree to which flexibility can be improved in older ages may be limited [21]. However, Rikli and Edwards [22] demonstrated that flexibility can be significantly improved in 57 to 85 years old women after an exercise program that included static stretching and range of motion exercises.

### CONCLUSION

Using of the suggested therapeutic exercises with Ozone in curing muscular spasm of the neck and reduction of pain was effective. Also, to be aware of the importance of practicing exercise as a daily habit and life style for all ages.

#### Recommendation:

- It is recommended to use the suggested program of therapeutic exercises for curing neck muscle cramp.
- The use of ozone therapy as a complementary medical approach in curing neck muscle cramp.
- To apply ozone to suppress pain in joint and bone injuries.

### REFERENCES

1. Vladimir, M., H. Freddie and J. Huard, 2000. Gene therapy and tissue engineering in sport medicine. *The Phys. And Sports Medicine*, 28: 114.
2. Robergs, A. and S. Roberts, 1997. *Exercise Physiology*. Mosby, USA.
3. Ganong, W., 1991. *Medical Physiology*. A Lange Medical Book, USA.
4. Fitts, R., 1994. Cellular mechanisms of muscle fatigue. *Physiol. Rev.*, 74: 49-94.

5. Nordsborg, N., M. Mohr and L. Pedersen, 2003. Muscle interstitial potassium kinetics during intense exhaustive exercise. *Am. J. Physiol.*, 285: 143-148.
6. Atta, S., 2007. Effectiveness of exercises and some modern therapeutic modalities on the relief of cervical muscle spasm in females from 25 to 30 years old. Master Thesis, Faculty of Physical Education, Helwan University, Egypt.
7. Laurie, B., 2003. Manual Therapy best for neck pain. *BMJ*, 326: 911-914.
8. Sale, D., 1988. Neural adaptation to resistance training. *Med. Sci. Sports Exerci.*, 20: 135-145.
9. Carroll, T., S. Riek and G. Carson, 2001. Neural adaptation to resistance training. *Sports Med.*, 31: 829-840.
10. Moritani, T. and H. De Vries, 1979. Neural factors versus hypertrophy in the time course of muscle strength gain. *Am. J. Phys. Med.*, 58: 115-130.
11. Maha, M., A. Hebatallah and A. Shaheen, 2006. Effect of ozone oxidative reconditioning on oxidant status of adjuvant arthritis rats. *EUMB*, 24: 357.
12. Guyton, A. and J. Hall, 2006. *Medical Physiology*. El-Sevier Saunders, USA.
13. Haines, D. and J. Lancon, 2003. *Review of neuroscience*. Churchill Livingstone, New York.
14. Bocci, V., 1999. Biological and clinical effects of ozone. *Br. J. Biomed. Sc.*, 56: 270-279.
15. Gad, M. and M. Khattab, 2000. Modulation of N.O. Synthesis in inflammation. *Arzneim-Forch. / Drug Res.*, 50: 449-455.
16. Ramprasath, V., P. Shanthi and P. Sachda, 2005. An indigenous drug preparation modulates reactive oxygen/nitrogen levels. *Mol. Cell. Biochem.*, 276: 97-104.
17. Ueki, M., S. Miyake and Y. Tominaga, 1996. Increased N.O. Levels in patients with rheumatic arthritis. *J. Rhenumatol.*, 23: 230-236.
18. Renate, V., 2002. *The use of ozone in medicine*. Iffeheim: Odrei Publishers, 4<sup>th</sup> English Edition, pp: 44-47.
19. Rilling, S., 1983. The possibilities of medical ozone applications in light of the historical development of ozone therapy. *Ozonachrichten*, 2: 27-39.
20. Leon, O., S. Menendez and N. Merino, 1998. Ozone oxidative preconditioning. *Inflamm.*, 7: 289-294.
21. Walker, J., D. Sue and N. Miles, 1984. Active mobility of extremities in older subjects. *Phys. Ther.*, 64: 919-923.
22. Rikli, R. and D. Edward, 1991. Effects of a three year exercise program on motor function and cognitive speed in older women. *Res. Quart. Exer. Sport*. 62: 61-67.