



## RESEARCH ARTICLE

### EFFECTIVENESS OF CRYOTHERAPY ALONG WITH WEIGHT BEARING EXERCISE ON REFRACTORY SPASM AND FEAR OF FALL IN SPINAL CORD INJURY PATIENT

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#### ABSTRACT

**Background And Purpose:** Spasm are one of the most common complication in spinal cord injury persons which may cause increase the fall frequency in transfer activities even in wheelchair activities. Cryotherapy has been used in clinical practice to reduce the spasm in spinal cord injury patients, which positive results have been reported in clinical studies. Weight bearing exercise has some effects on spasticity which may improve joint and muscle function. The purpose of the case report was to document the effects of cryotherapy along with weight bearing exercise on refractory spasm and fear of fall present with the spinal cord injury patient. **Case Description:** The patient was 45 year old male injured with road traffic accident, who diagnosed with complete spinal cord injury at the level of D8 and D9. He was surgically treated with D8 and D9 reduction and posterior stabilization with decompression on July 2017. After 6 months the patient was taken rehabilitation for 6 months and make him independent with wheel chair assistance. The present complaint was refractory spasm in his lower limb which affect his daily activities like transferring activity. This also leads him to fall in some activities. **Results:** The patient had benefits with significant reduction of refractory spasm in the both lower limbs following 4 weeks of cryotherapy application along with weight bearing activities. The spasm frequency score showed significant changes from 3 at the week of one to score 1 at the end of 4 weeks. Spasm severity scale 3 in week one and 1 in week four. Visual Analogue scale showed the fear of fall from 8 to 2 at the end of 4th weeks. **CONCLUSION:** This study reported that cryotherapy along with weight bearing exercise significantly reduce the refractory muscle spasm and diminish the fear of fall in spinal cord injury patient with paraplegia.

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## INTRODUCTION

Spinal cord injury is severe form of traumatic condition which affects the person's day to day life activities. Depends upon the level of injury and severity of the injury this leads to tetraplegia and paraplegia (1). Common problem of spinal cord injuries are sensory motor dysfunction, bowel and bladder problems, exaggerated reflex activities, change in the sexual function and trouble in breathing and coughing ,etc (2). In India, approximately 1.5 million people live with spinal cord injury. Male is commonly getting the injury the age between 16- 30(3). Cryotherapy also known as cold water therapy which is very effective and convenience for many condition also very low cost. The effects of cryotherapy are reduce pain, working as local anaesthesia, decrease oedema cellular metabolism and local blood flow (4)(5).

Also cryotherapy decrease the nerve conduction velocities. Cryotherapy effects also depends upon the method, duration of application and temperature of the application (6). There are various methods in cryotherapy like ice packs, ice massage, ice immersion, vapocoolant spray, etc. These techniques commonly used for soft tissue injury, muscle spasm, tendonitis, swelling, delayed onset muscle soreness(DOMS) and bursitis and etc. Some of the risk of cryotherapy are ice burn, generalised cooling and cryotherapy induced nerve injury (7). The use of cryotherapy done with the weight bearing exercise for refractory spasm has not been widely tired. Limited report have been documented with the use of cryotherapy to manage the refractory spasm in spinal cord injury patients. Hence we report our experience with the use of cryotherapy along with weight bearing exercise on the spinal cord injury patient (8).

Spasticity is caused by any condition that damage the motor neurons from the brain and spinal cord which connects to the muscle. This leads to reduce the active and passive movement of the joint, involuntary jerking movement and also affect the day to day activity of the individuals (9). Weight bearing exercise is the form of exercise with help of body weight, which can help to reduce spasticity by maintaining the immobilised soft tissue and joint flexibility, and modification of neural component of spasticity and reduction of spasm(10) (11).

**CASE DESCRIPTION:** The patient was 45 year old male injured with road traffic accident who has diagnosed with the complete spinal cord injury ASIA-A (American spinal cord injury association) at the level of D8 and D9 and paraplegia. He was surgically treated with D8 and D9 reduction and posterior stabilization with decompression on July 2017. After 6 months he taken rehabilitation for 6 months and made himself independent with assistance of wheel chair. His present complaint was refractory spasm in his lower limbs which affects him day to day activities like transferring from bed to wheel chair and wheel chair to bed or car and other things. Some times this refractory spasm make him to fall. He had no other neurological conditions and comorbidities. And the higher mental function also normal. The spasm frequency was assessed by using spasm frequency scale the score is about 3 and spasm severity was assessed by using spasm severity scale score is about 3. The fear of fall was assessed by using visual analogue scale the score is about 8.

## METHODOLOGY

The patient underwent regular physiotherapy treatment to improve the bed mobility and transfers also for locomotor activity with wheelchair assistance and independent daily activities and bedsores prevention. For the treatment of refractory spasm baclofen is the primary option which the patient does not taken. Here the patient go for cryotherapy along with weight bearing exercise. Patient was asked to do the quadrupod position for total 12 minutes duration, 3 sets with one minute of rest between each time. After 2 minutes of rest the asked the patient to walk on parallel bar with use of caliper for 5 minutes. After the 5 minutes of rest patient underwent for cryotherapy (ice immersion technique). A bucket filled with cold water with 15 degree celcius. In back supported sitting position, asked the patient to immerse the both leg over the bucket up to the knee joint level with our assistance. This position maintained for 20 minutes. Chillness of the water was maintained.

**OUTCOME MEASURES:** Spasm frequency scale and the spasm severity scale was used to assess the refractory spasm (12)(13). Visual analogue scale was used to assess the fear of fall(21). These are valuable and simple clinically useful way to assess the refractory spasm and fear of fall in the spinal cord injury patients.

## RESULTS

The spasm frequency and severity and fear of fall was assessed every week with use of spasm frequency scale, spasm severity scale and visual analogue scale. At the end of fourth week of cryotherapy application and weight bearing exercise positive results were obtained.

The spasm frequency was reduced from 3 to 1 according to the spasm frequency scale and the spasm severity reduced to 1 according to spasm severity scale. The fear of fall was diminished from 8 to 2 according to visual analogue scale.

## DISCUSSION

In the present study we reported the effect of cryotherapy and weight bearing activities on refractory spasm in the complete spinal cord injury patient. The symptoms of spasticity in spinal cord may varies, which include sudden flexing or extending of limbs, uncontrolled jerking of limbs, reflex may hyperactive overactive even present in slight touch, tightening of muscle during some activities which cannot control by the patients(15). Baclofen is more effective drug which can reduce spasm frequency. But in severe cases the dosage get adopted for patients and need additional dose its action(16)(17). Previous studies have documented the effect of cryotherapy on refractory spasm is effective which reduce the refractory spasm(8). Weight bearing exercise can improve the joint function and prevent from the spasticity(19). Weight bearing excise can help to prevent from the osteoporosis in locomotor disability patients (20). Combined effect of cryotherapy along with weight bearing exercise much more beneficial on refractory spasm and spasticity. Temperature can affect the biological and neurological process. Low temperature can slow the sodium channel opening which also delays its inactivation that means which reduce the nerve conduction and improve the amplitude. The nerve conduction reduced by the low temperature, this in turn increase the latencies and decrease the conduction velocity.(2)

## CONCLUSION

These results indicates that cryotherapy along with weight bearing exercise has a positive effect on refractory spasm in spinal cord injury and it is more comfortable because its easy application and low cost.

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