Functional Disability & Grip Strength of Cervical Radiculopathy Patients before & after Cervical Collar Use & Traditional Physiotherapy Treatment

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Abstract

The purpose of the study was to observe the effect of a cervical collar use and traditional physiotherapy treatments on functional disability and grip strength in cervical radiculopathy patients. A total of 30 patients (male =16; female=14) were selected as subjects and they were further divided into 2 groups. Each group comprising of 15 subjects (male=8; female=7).The results of the present study suggest that there was an improvement in the mean values of Numeric Pain Rating Scale, Grip Strength and Neck Disability Index scores after treatment in both groups. But it was found that an improvement was statistical significant more in an experimental group than non-experimental group. It was concluded that if the patients of cervical radiculopathy used cervical collar alongwith traditional physiotherapy treatment then there was early recovery from pain, grip strength, disability index in them.

Keywords: Cervical radiculopathy, Functional disability, Grip strength, Pain

Introduction

Dillin et al, (1986) described cervical radiculopathy as a common disorder characterized by neck pain radiating to the arm and fingers corresponding to the dermatome involved. The condition may result in neck pain however the primary symptoms reported in this population are often upper-extremity pain, numbness, and weakness, which often result in significant functional limitations and disability *(Benini, 1987).* Cervical radiculopathy typically manifests as pain radiating from the neck into the distribution of the affected root. The exact location and pattern of pain may vary widely and a classic dermatomal distribution of pain is not always present. Associated sensory, motor, and reflex disturbances may or may not be present. Because acute cervical radiculopathy generally has a self-limited clinical course, non surgical treatment is the appropriate initial approach for most patients. Surgical treatment may be considered when nonsurgical treatment fails and in the patient with a significant neurologic deficit *(Bush et al, 1997). Heckmann et al, (1999)* reported that an annual incidence of cervical radiculopathy was approximately 83 per 100,000 and there was an increased prevalence of in the fifth decade of life (203 per 100,000). Treatment strategies for patients with cervical radiculopathy range from conservative management to surgery *(Sampath et al, 1999).* More than 50% of patients with neck pain are referred to physical therapists and this population comprises approximately 25% of all patients seeking outpatient physical therapy for musculoskeletal conditions *(Borghouts et al, 1999).*

Generally orthopaedicians prescribe cervical collar for treatment of cervical radiculopathy. In the present study, the effect of cervical collar use and traditional

physiotherapy treatments as cervical traction and exercises. Soft collar are the least restrictive, allowing the closest to normal range of motion. As many as 76% of the patients report reduced pain with their use *(Naylor & Mulley, 1991)*. Although the collar may be of symptomatic benefit, there is no evidence on long term outcome *(Spitzer & SkOvron, 1995)*. Many physicians cite anecdotal evidence of their clinical utility and soft collars are often prescribed by convention for patients complaining of pain.

Materials & Method

The 30 patients of cervical radiculopathy both male and female in the age range of 30 to 35 years were selected as subjects after obtaining their consent based on inclusion and exclusion criteria of the study. The subjects were further divided into two groups: Group-A (n=15) and Group-B (n =15). Each group was further comprising of eight male and seven female subjects.

Treatment Protocol: The subjects of *Group-A* underwent a use of cervical collar plus traditional physiotherapy treatment comprising of MHP, stretching exercise, manual traction and isometric exercise. The subjects of Group-A used the cervical collar in day time for 4-weeks. On the other hand, the subjects of Group-B underwent only traditional physiotherapy treatment comprising of MHP, stretching exercise, manual traction and isometric exercises only. The training frequency of MHP, stretching exercise, manual traction and isometric exercise for both groups was 3 times per week, training volume per session was 3 sets of 10 repetitions for 4 weeks. The rest between repetition and sets was 30 seconds and 60 seconds respectively. The subjects were seated by facing the therapist and treatment began with moist heat pack in supine position for 15 minutes and exercise was followed. The stretching exercises comprising of neck flexion. The isometric exercises comprising of forward, backward and side-to-side pressures exerted against the hands of the subject. The manual traction was given to the subjects in a supine position by placing right hand on the chin of the subject and left hand on the occipital then the distraction force was applied for 15 seconds. The scores of NPRS (Numeric Pain Rating Scale), NDI (Neck Disability Index) and Grip strength of each subject of Group-A and Group-B were recorded before and after 4-weeks.

Statistics

The data was analyzed using statistical computer software 'SPSS10 free trial version'. The mean, standard deviation and t-test was used. The level of significance was $p<0.05$.

Results & Discussion

The mean age and BMI of the subjects of Group -A and Group-B was 31.93±5.17 years, 32.53±4.17 years, 23.74±2.43 Kg/m^2 and 23.76±3.43 Kg/m^2 respectively. It was found that the difference in the mean values of age and BMI between Group -A and Group-B was not statistical significant (Table 1).

Table 1.Comparison of Age & BMI

	Group A	Group B	t-value
Age(years)	**31.93±5.17**	**32.53±4.17**	**0.35**
BMI(Kg/m^2)	**23.74±2.43**	**23.76±3.43**	**0.01**

*significant $p<0.05$

Table 2 shows the comparison of scores of Numeric Pain Rating Scale (NPRS), Grip strength and Neck Disability Index (NDI) among Group-A and Group-B before and after four weeks.

It was found that before the start of four week treatment programme to the subjects of Group-A and Group-B there was no statistical difference in the scores of NPRS, Grip Strength and NDI.

After four week there was statistical significant difference in the scores of NPRS, Grip Strength and NDI in both the groups but a greater improvement was observed in Group-A as compared to Group-B (Table 2).

Table 2: Comparison of Scores of NPRS, Grip Strength & NDI among different groups

		Group A	Group B	t-value
NPRS	before	6.80±0.77	6.73±0.70	0.24
	After 4 week	4.00±1.69	5.33±0.81	2.75*
Grip strength	before	10.60±2.24	11.07±2.96	0.48
	after 4 week	29.80±6.66	13.07±3.19	8.75*
NDI	before	22.07±4.23	23.53±3.60	1.02
	after 4 week	5.07±2.21	21.47±4.30	13.10*

***significant p<0.05; NDI- Neck Disability Index; NPRS- Numeric Pain Rating Scale**

Further, it was found that in Group-A there was a statistically significant improvement in the scores of NPRS, Grip Strength & NDI after four weeks (Table 3).

Table 3. Paired t-test of NPRS, Grip Strength & NDI of Group A

	before	after 4th week	t-value
NPRS	6.80±0.77	4.00±1.69	8.57*
Grip strength	10.60±2.23	29.80±6.66	13.19*
NDI	22.07±13.13	5.07±2.21	13.13*

*significant p<0.05; NDI- Neck Disability Index; NPRS- Numeric Pain Rating Scale

Similarly, in Group-B there was a statistical significant improvement in the scores of NPRS, Grip Strength & NDI after four weeks (Table 4).

Table 4: Paired t-test of NPRS, Grip Strength &NDI of Group B

	before	after 4th week	t-value
NPRS	6.73±0.70	5.33±0.81	4.83*
Grip strength	11.07±6.66	13.07±3.19	3.74*
NDI	23.53±3.60	21.47±4.30	4.37*

***significant p<0.05; NDI- Neck Disability Index; NPRS- Numeric Pain Rating Scale**

Discussion

The results of the present study shows that subjects in both the groups had significant decrease in pain, increase in grip strength and improvement in neck disability index. However, out of the two groups, the Group-A receiving cervical collar as a supplement to traditional physiotherapy treatment had a higher percentage of change in pain intensity, grip strength and neck disability index as compared to Group-B using traditional physiotherapy treatment alone (i.e. manual traction, eccentric strengthening, stretching exercises). Therefore the null hypothesis is rejected. There are many studies *(Persson et al, 1997; Garvey & Eismont, 1991)* done on cervical collar with conventional physiotherapy in isolation, which shows their effectiveness but the results obtained from this study are novel that proves the combined effect of cervical collar and conventional treatment in cervical radiculopathy patients. Both the groups in present study had equal number of subjects and there was no significant difference found with respect to their gender distribution, age and body mass index. A number of studies has examined the effects of cervical collar for cervical radiculopathy, *Dillin et al, (1986)* reported that the patient of cervical radiculopathy who used cervical collar had reduced arm and neck pain within three weeks as compared to traditional physiotherapy treatment which had taken six weeks to reduce arm and

neck pain, further interventions after this period was not likely to be of benefit in most patients. *Carlsson & Carlsson (1997)* also reported that in that treatment of patient with long lasting cervical radicular pain, cervical collar was effective in long term. *Naylor & Mulley (1991)* reported that patients of cervical radiculopathy who had taken standardized physiotherapy with semi hard collar use and doing home exercise for six weeks resulted in a significant reduction in arm and neck pain compared with the patients who had a wait and see policy. Thus, the results of the studies reported in literature support the result of the present study that is by the use of cervical collar alongwith traditional physiotherapy treatment reduced the time period of treatment that is there was early recovery from pain, grip strength, disability index in the management of cervical radiculopathy patients. But little evidence exists in the literature on the mechanisms of cervical collar use and physiotherapy in giving pain relief to the patients. The collar may reduces forminal compression and associated root inflammation by immobilizing the neck which might explain the larger reduction of arm pain compared with neck pain and neck disability as found in the present study.

Conclusion

It was concluded that if the patients of cervical radiculopathy use the cervical collar alongwith traditional physiotherapy treatment can reduce the time period of their treatment that is there was early recovery from pain, grip strength, disability index in them.

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