

Original Research Article

Soft Vs Philadelphia Collar: A Short Term Effect on Pain, Gait and Balance in People with Cervical Spondylosis

Yashika Kumar, Anjani Kumar Sinha, Ranjeet Kumar, Dr. Chitra Kataria

¹Asst. Professor, ISIC-Institute of Rehabilitation Sciences, Sector-C, Vasant Kunj New Delhi -110070

²P&O Officer ALIMCO, Govt. of India, G.T Road, Kanpur-209217

³Prosthetist and Orthotist CRC, KV Extension Davangere-577002

⁴Principal, Chief of Rehabilitation Sciences, ISIC-Institute of Rehabilitation Sciences, Sector-C, Vasant Kunj New Delhi -110070

Corresponding Author: Yashika Kumar

ABSTRACT

Cervical spondylosis had been marked as the most common degenerative disorder. In cervical spondylosis degenerative changes starts in intervertebral disc with osteophyte formation and involvement of adjacent tissue structures. There may be shoulder and arm pain, muscle spasm, tingling sensation in extremities, there may be numbness, weakness, lack of coordination, difficulty in walking and loss of balance. Collar treatment is one of the conservative treatments for cervical spondylosis. Present study compared the soft and Philadelphia collar in terms of pain, gait and balance in people with cervical spondylosis. A total of 50 subjects had participated in this study both were men and women. Non probability convenient sampling technique was used, then out of 50 subjects, two groups were made randomly. Group 1 consists of 25 subjects who had been given soft collar. Group-2 consists of 25 subjects who had been given Philadelphia collar. Pre-test data, Pain by VAS (visual analogue scale), Balance and gait by performance oriented mobility assessment (POMA) scale had been taken after that collars were given respectively for five days .after that Post test data was taken. Philadelphia collar had shown better results as compared to soft collar for cervical spondylosis patients in terms of pain, gait and balance .It had been concluded that Philadelphia collar provide better balance , gait and reduce pain in people with cervical spondylosis as compared to soft collar so it should be prescribed instead of soft collar for the cervical spondylosis.

Key words: - cervical spondylosis, Philadelphia collar, soft collar, pain, gait, balance

INTRODUCTION

Cervical spondylosis is a common degenerative disorder of the human spine often caused by natural aging process. [1-5] As age increases so does the incidence rate, 60% of the population older than 45 years of age and 8% older than 65 years of age account for cervical spondylosis? It effects men and women, but slightly more common in males. [6] The pathological changes can frequently occur at C5-C6, C6-C7 levels as

most of the sub axial movement occur at these levels. [7] Patient with cervical spondylosis usually complaints of pain and stiffness which increases with extension of head, lateral flexion and rotation, [8-9] there may be numbness, weakness and lack of coordination, difficulty in walking and loss of balance. [10-12] In cervical spondylosis degenerative changes starts in intervertebral disc with osteophyte formation and involvement of adjacent tissue structures,

may lead to pain which is exacerbated by neck movements. Rotation of the head may also diminish blood flow which leads to vertigo. [13]

There is disruption in the load transfer because of the loss in the axial load bearing capabilities of the degenerative segment, which further leads to the change in the overall load balance. The moment arm about the centre of rotation is increased due to decrease in the lordotic angle. [14]

Numerous cervical collar options are available for the treatment of cervical spondylosis, among them soft collar and Philadelphia are often prescribed. According to the University of Maryland Medical Centre, cervical collar sufferer uses a collar during the day to restrict the motion of the neck and support neck muscles. Use of cervical collars restricts the motion of the neck as the motion may cause irritation and sharp pain due to the degeneration of the cartilage and bone. [15] Author in a study Stated that collar treatment is said to be effective at reducing compression of vertebral artery by fixing and distracting the cervical spine. [4]

Various research studies shows different results like in one study, author stated that soft collars effectiveness is derived through its kinesthetic reminder capabilities which are inherently present with the wear but Philadelphia collar provide substantially better immobilization than soft collar. [16]

In a literature there is one study which stated that wearing soft collar for treatment of vertebrobasillar insufficiency is more effective as compared to Philadelphia collar as it is comfortable to carry. [17] In one study author found that Philadelphia collar should be used both pre operatively and post operatively. [2]

Principle behind the prescription of collar is to limit neck and head motion and to restrict extension, flexion, lateral flexion, rotation of cervical spine and head to slightly relieve stresses induced by gravity by weight transfer. [18-19] A collar should be properly made and fitted, and correctly

used, should be beneficial, and neck should be held in flexed position this minimizes the need for the muscle “splinting”, restricts excessive motion, and gives sensory cutaneous stimulation and warmth to the neck musculature causing decrease in pain impulses. [20,21]

Previous studies have evaluated the effects of soft collar and Philadelphia collar in different aspects, clinicians often prescribe Philadelphia and soft collar but its effect on pain, gait and balance is not clear due to little evidences. Thus, the present study has been done to compare the effects of Philadelphia and soft collar in terms of pain, gait and balance in cervical spondylosis which will help in improving the collar prescription for cervical spondylosis patients.

MATERIALS AND METHODS

A Sample of convenience of 50 cervical spondylosis took part in this study. The subjects were taken from Northern Railway central hospital and St. Stephen’s hospital New Delhi .subjects who fulfilled the inclusion criteria and were ready to wear collar were selected and consent had been taken.

Study design:

Pre-test Post-test experimental

Inclusion Criteria

Confirmed diagnosis of cervical spondylosis from orthopaedician, then the age of the subjects were between 45-55 years, both males and females participated in this study, [1-6] TUG score was 14-20 seconds, spurling test should be positive, there should be normal range of motion of hip, knee and ankle joint, the VAS score should be between 3-7 that is the average VAS score for mild to moderate cases, subjects should be the first time user of collar , subject should have minimum of 3 months of onset of disease.

Exclusion criteria:-

Subjects were excluded if they have any history of cervical spine surgery, any traumatic or neoplastic cause of cervical cord disease, peripheral nerve disease, any

congenital anomaly involving cervical spine, any subject with severe gait problems, any medically diagnosed illness (e.g. Diabetic neuropathy), if they have visual and hearing deficits, any tumour or any kind of infection involving cervical spine, neck pain after any trauma like whiplash injury.

Procedure:-

50 subjects with cervical spondylosis took part in this study. They were screened according to inclusion and exclusion criteria and participated in this study. A detailed explanation of the procedure is explained to the subjects and consent was signed. Demographic data of the subjects has been taken. The subjects were randomly assigned into two groups. Randomization was done using simple random sampling by lottery method. Group 1 consisted of those who got soft collar and those who got Philadelphia were categorised into Group 2. Both the collars were prefabricated. After that pre-test data was taken without intervention, balance and gait were evaluated using POMA (performance oriented mobility assessment) scale and pain was evaluated using VAS score and then subjects were instructed to wear collar respectively for five days. After five days post data was taken by POMA scale and VAS score was evaluated

Data analysis

Data was analysed using SPSS software. Descriptive statistics (mean and standard deviation) were computed for variables. Independent t- test was used to analyse the difference between pain, gait and balance in group 1 and group 2. Significant value of $p < 0.05$ was fixed.

RESULTS

A sample of 50 subjects with cervical spondylosis took part in this study. In which males and female both having cervical spondylosis participated in this study. An independent t-test was used to compare the differences between the two collars. The group 1 receiving soft collar

consist of 25 subjects with the mean age(years) of 49.60 ± 2.64 while the group 2 receiving Philadelphia with a mean age of 48.90 ± 3.31 years. The mean height (cm) of group 1 was 155.64 ± 8.43 and group 2 was 158.84 ± 11.04 . The mean weight (kg) of group 1 was 72.04 ± 7.25 and the mean weight of group 2 was 72.70 ± 9.36 . An independent t-test conducted for the comparative study of the results of balance and gait for the subject using the soft collar and Philadelphia collar shows significant difference (t value = -2.878 , $p=0.006$) in the favour of Philadelphia collar. (table 1.1 and figure 1.1). Pain was significantly reduced after using Philadelphia collar as compared to the subjects who were given soft collar (t-value = 3.04 , $p=0.004$) (independent t-test, $p < 0.05$) (table 1.2 figure 1.2)

Table 1.1 Comparison of POMA score in GROUP-1 and GROUP -2 (N=50)
Independent t-test between POPS score in group 1 and group 2

| POMA SCORE (POPS) | MEAN \pm SD | t-value | p-value |
|-------------------|------------------|---------|---------|
| Group -1 | 22.56 \pm 1.60 | 2.878** | 0.006 |
| Group -2 | 23.92 \pm 1.73 | | |

** significant at 0.05 level

Group 1- soft collar, Group-2- Philadelphia collar
POPS- post -test POMA score

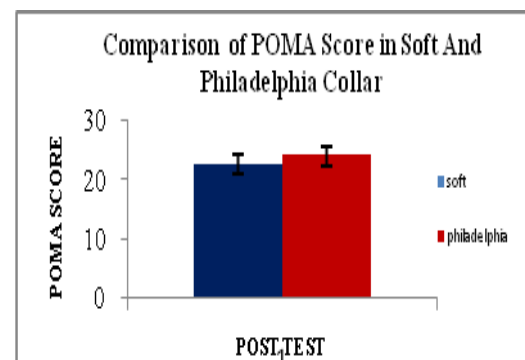


FIGURE 1.1

TABLE 1.2 Comparison of VAS score in group 1 and group 2 (N=50)

Independent t-test between group- 1 and group- 2

| VAS score | MEAN \pm SD | t-value | p-value |
|-----------|-----------------|---------|---------|
| Group -1 | 4.12 \pm 0.83 | 3.024** | 0.004 |
| Group 2 | 3.48 \pm 0.65 | | |

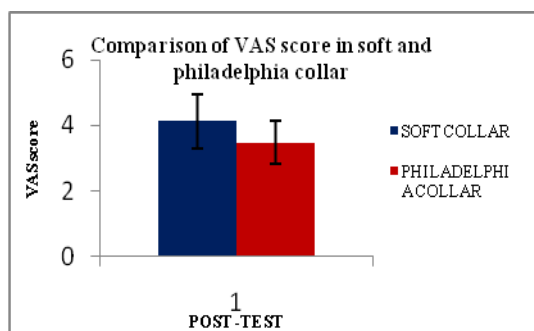


FIGURE -1.2

DISCUSSION

The present study compared and showed the significant difference between soft collar and Philadelphia collar in terms of balance, gait and pain in people with cervical spondylosis. The results obtained from the statistical analysis signify that Philadelphia collar is better in improving gait, balance and pain in person with cervical spondylosis.

Person with cervical spondylosis often exhibit balance problem due to the degeneration of the spine and formation of the osteophytes which impinges onto the vertebrobasillar artery thus leads to the reduction in the blood flow to brain. This produces vertigo which further cause gait abnormalities. Due to the degeneration of the cervical spine, the neck movement causes pain. [3,4] Cervical collar treatment is said to be effective at reducing the compression of vertebral artery by fixing and distracting cervical spine. [4] Philadelphia collar and Soft collar are often prescribed as the conservative management of cervical spondylosis. [22]

According to the results, the Philadelphia collar is effective in reducing pain and improving balance and gait. In the literatures it has been found that Philadelphia collar is better in motion restriction as compared to soft collar. It is also having more lever arm as it covers whole spine, whereas soft collar only covers upto C4-C5 level of cervical spine. [23] As per the previous studies it has been found that cervical spondylosis often seen at C5-C7 level of cervical spine so, for that collar with higher lever arm is required. [4]

In this study wearing Philadelphia collar improves balance and gait scores

(mean + SD =24.10 + 1.86) as compared to the soft collar (mean + SD =22.70 + 1.55). Emad .S. Abbas et .al in his study recommended that Philadelphia collar should be used instead of other types of collars for cervical immobilization in cervical spondylosis. [2] This was also supported by the study in which Kaufmann found that Philadelphia collar provide substantially better immobilization than soft collar but Johnson's study indicated that its application appear to be contiguous with that of soft foam collar. [16]

In this study, Philadelphia collar significantly reduce pain (mean + SD =3.4 + 0.598) as compared to soft collar (mean + SD =4.1 + 0.911). This was supported by the earlier study in which Zeliha Unlu et.al had found the efficacy of cervical collar treatment in patients with cervical spondylosis, and he found that pain had been reduced with the rigid collar. [4] Bruce et .al had also described that conservative therapy is to immobilize the spine with the collar that holds the neck in the neutral or in slightly flexed position. [24] This was also supported by the study which states that holding neck in the flexed position will minimize the need of muscle splinting and also reduced excessive motion and provides the warmth and sensory cutaneous stimulation to the neck and leads to decrease in pain. [20,21]

Clinical Implication

This study helped to determine the significant differences between effectiveness of Philadelphia and soft cervical collar on balance, gait and pain in people with cervical spondylosis. This study also helped in improving the prescription of cervical collars in terms of pain, gait and balance in cervical spondylosis patients.

Future Research

This study includes the subjects with cervical spondylosis and two commonly used collars were used. The future research will include other types of collars with the broadened aspect. As earlier mentioned this

study uses small sample and according to convenience. The relevance of this study can be increased by taking large sample size from different sector of society.

CONCLUSION

The study concludes that balance and gait were improved in those subjects who had used Philadelphia collar as compared to subjects who have used soft collar. Significant reduction in pain score had been seen in those subjects who have used Philadelphia collar as compared to soft collar. So the hypothesis that the Philadelphia collar will be significantly better than soft collar in improving balance and gait and reducing pain is supported by this study.

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