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Title

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Permalink

<https://escholarship.org/uc/item/8dj3m847>

Journal

BackBone, 3(1)

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Publication Date

2020

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Peer reviewed

Single vs. Dual Adjustment Cervical Collars: A Critical Patient Evaluation

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Abstract

The purpose of this study was to assess the benefits, if any, of having dual adjustment on the cervical neck collar -- which allows for height adjustment and allows tilting of the neck slightly to the right or to the left. The collars are used for treatment of acute neck injury, painful cervical degenerative changes as well as post-surgical neck cases. Results indicate that dual adjustable collars provide more comfort and pain relief and allow for more air circulation and less skin irritation for patients as opposed to the single adjustment control collars.

Introduction

Cervical collars come in three categories, soft collar, rigid collar with multiple sizes and adjustable collar, which comes in one size but adjusts to different patients' neck sizes. The collars are used for treatment of acute neck injury, painful cervical degenerative changes as well as post-surgical neck cases. Philadelphia collar is one of the oldest braces and was used for many years; however, it has some drawbacks such as the multiple sizes that need to be stocked, and its side effects including skin abrasions. Braces with adjustable cervical collars, such as the Aspen brace was a great improvement. It is offered in one adjustable size and has foam cushioning that feels much more comfortable against the skin. This study compares the Saratoga collar to another one-size adjustable cervical collar. Saratoga has dual adjustment: one on the right and one on the left side of the neck which not only allows for height adjustment but also gives one the ability to tilt the neck slightly to the right or to the left. This study was designed to see if there was a benefit in having this type of adjustment.

Certain types of cervical collars leave little to no room for natural movement and mobility that people generally need. A common side effect of cervical immobilization is the breakdown of skin tissue.¹ In one study that highlights this, use of the cervical collar in over 400 participants showed a strong correlation with the level of skin breakdown. Pressure ulcers is another repercussion of cervical collar wear that limits cervical mobility.²

A study in Orthopaedic Nursing Journal reinforces the concept of adverse health problems such as ulcers, skin breakdown and further spinal cord damage resulting from rigid cervical collars that provide minimal padding.³ Increased cervical collar use is linked to potential delay in weaning from ventilators, the research shows.

Another study of cervical collars tested the efficacy of four different brands on 30 subjects between the ages of 20 and 60.⁴ It examined the limitation of movement, and stiffness was apparent among each test subject during axial load, backward and sideward bending. Results indicate that there is a reduced level of comfort with higher degrees of stiffness.

While a hard cervical collar may be an effective tool to immobilize the spine temporarily after injury, it does pose risks because occipital pressure ulceration can result from use of hard cervical collars.⁵

Methods

Participants

Participants were 50 individuals who suffered from neck pain. They included 35 males (70%) and 15 females (30%). Participants ranged in age from 42 to 68 years old. Out of the 50 participants, 40 of them were post-operative neck surgery patients, having undergone a one or two level anterior cervical fusion. The other 10 participants did not have surgery but experienced facet disease and neck pain.

Procedures and Materials

Twenty-five participants (Group A) received the Saratoga Cervical Brace. The other 25 participants (Group B) received a cervical brace of a different brand that was adjustable and contained a single adjustment point. As to the adjustment between the two braces, the primary difference is that the single adjustment point in Group B's braces allows for only one adjustment on the entire brace, which can raise the brace up or down to accommodate the length of the patient's neck. It is symmetrical on both sides and thus forces the neck to remain upright. The Saratoga brace that Group A experienced offers bilateral adjustment, with adjustment points on both the left and right sides of the brace. The patient can effectively adjust each side to different lengths depending on the need and comfort level of the neck.

All of the participants were evaluated after six weeks.

Criteria

The following criteria was used in assessing the effectiveness of each brace:

- a. Ease of use
- b. Level of support provided by the brace
- c. Padding -- assessing whether (1) there is enough air circulation, (2) it overheats, (3) it is comfortable enough for the patient. This also checked for sweating, skin irritation and soiling of the padding.
- d. Neck pain reduction with use of the brace
- e. Use of the tilting mechanism -- whether participants took advantage of the bilateral adjustment.

Data Analysis

In the present study brace performance in both Group A and Group B was ranked from 1 to 4, with each number representing a different level of satisfaction for each criteria.

Results

Ease of Use	Very Difficult (1)	Moderately Difficult (2)	Easy (3)	Very easy (4)
Saratoga (Group A)				100%
Other (Group B)				100%

Level of Support	Poor (1)	Fair (2)	Good (3)	Excellent (4)
Saratoga (Group A)				100%
Other (Group B)			20%	80%

Padding	Very Uncomfortable (1)	Fairly Uncomfortable (2)	Comfortable (3)	Very Comfortable (4)
Saratoga (Group A)				100%
Other (Group B)		70%	30%	

Neck Pain Reduction	Poor (1)	Moderate (2)	Good (3)	Excellent (4)
Saratoga (Group A)			20%	80%
Other (Group B)		20%	40%	40%

Use of Tilting Mechanism	20% of Participants (1)	40% of Participants (2)	100% of Participants (3)	N/A (4)
Saratoga (Group A)		X		
Other (Group B)				X



As the figures show, the adjustment component of the brace is on both sides of the Saratoga collar. In this figure we show the right side with different levels of adjustment. *University Braces*

Discussion

Most studies on cervical orthosis evaluate the amount of immobilization, pain relief and skin complications for treatment of trauma, fractures and whiplash injuries. The previous studies also compare rigid cervical orthosis such as Philadelphia collar with adjustable cervical braces that have softer cushions. This study compares adjustable cervical braces with one plane adjustment capability to Saratoga orthosis, which has dual adjustment and thus allows not only for upward and downward adjustment but also side to side. We also compared padding, which was a foam padding for the single adjustment cervical braces versus Saratoga that has a combination of cloth and foam padding, which allows for better air flow and also has less irritation on the skin. The study shows that patients found both braces to be very user friendly with respect to height adjustment. It also showed that both braces provided a lot of comfort with the Saratoga braces being perceived more comfortable with respect to the amount of padding, air circulation and skin irritation -- 100% of participants cited Saratoga padding as "very comfortable" while 30% and 70% cited the other brand as "comfortable" and "fairly comfortable," respectively. The most important finding in this study was that dual adjustment provided much more comfort and pain relief in some patients as compared to single adjustment control. This is due to the fact that some post-operative neck patients and some patients with neck pain due to sprain and strain and degenerative disease feel more comfortable with the neck being tilted slightly to the left and to the right. Saratoga orthosis provides this feature, which no other orthosis does.

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