Research

Comparative Evaluation of Two Cervical Orthoses in Flexion and Extension: A Comparison of the Sierra™ Universal Collar and the Philadelphia® Cervical Collar

Technical Report

OVERVIEW: The ability of a cervical orthosis to restrict motion of the cervical spine is a primary measure of effectiveness. Motion restriction testing of new orthoses and current products is essential in providing information about relative effectiveness.

MATERIALS & METHODS: Fifteen adults from 25 to 50 years old (8 men and 7 women) with no reported history of cervical injury or pathology served as subjects. The orthoses studied were: (1) the single size Sierra™ Universal Collar and (2) the Philadelphia® Cervical Collar (multiple sizes). Each orthosis was fitted by the same certified orthotist according to the manufacturer's written instructions.

Gross sagittal motion of the head and neck was measured relative to the horizon using a special mouthpiece with pointer assembly. The motion was recored with a video camera.

Each subject was instructed to flex (or extend) their head and neck as far as possible and then return to their neutral position under three conditions-no orthosis, Sierra™ Universal Collar, and Philadelphia® Cervical Collar. The order of these three conditions was randomized for each subject. The maximum angular motion in flexion and extension in each orthosis and with no orthosis (normal unrestricted motion) was recored for each subject. Each test was repeated three times and the results were averaged. The amount of flexion and extension allowed by each collar was calculated as a percentage of the normal unrestricted motion.

RESULTS: In flexion, the Sierra™ Universal Collar allowed 25% of normal unrestricted motion while the Philadelphia® Cervical Collar allowed 31%. In extension, the Sierra™ Universal Collar allowed 40% of normal unrestricted motion while the Philadelphia® Cervical Collar allowed 41%.

DISCUSSION: It is important for healthcare professionals to be able to make informed decisions about the effectiveness of new cervical orthoses such as the Sierra™ Universal Collar. The Philadelphia® Cervical Collar, introduced in 1971, was used as a point of comparison. The data suggest that the new, single sized Sierra™ Universal Collar and the Philadelphia® Cervical Collar, which is available in 25 adult sizes, provide similar motion restriction