

Clinical Study

Posture, Muscle Activation and Pressure Distribution when using a Contoured Pillow with a Thoracic Wedge versus Standard Pillow

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Abstract

Background:

Neck pain is a common complaint in the population and it has an estimated one-year prevalence of 19.5%. Discomfort in the neck is attributed to post-traumatic muscle strain, intervertebral disk pathology, and facet joint disorders, all of which can be affected by the position of the neck during movement and at rest. It has been shown that any inappropriate posture of the spine that is held for a long period of time has the potential to irritate the cervical tissues. Posture outside of neutral can load the spine unnecessarily and prolonged, low-level mechanical loads are thought to provoke pain. The use of an appropriate neck support pillow at night has the potential to reduce symptoms and disability in neck pain patients over time. A neck pillow that allows for even distribution of pressure and low pressure peaks may assist with healing in neck patients.

Objective:

Investigate the effect of the Therapeutica® Sleeping Pillow which is a dual contoured, semi-custom fit pillow, against a standard sleeping pillow for improved posture, muscle activation and contact pressure. We hypothesized that the dual contoured pillow would promote a more neutral posture in supine and side lying than a standard pillow design, and that reduced muscular effort would be required. We also hypothesized that there would be lower peak pressures and greater contact areas with the Therapeutica® pillow than with the standard design pillow.

Methods:

34 female patients between the ages of 20-45 were recruited. All participants were free of neck pain, shoulder pain or upper extremity pain, and any known bone abnormality or cervical pathology. Patients were asked to lie on the specialized and standard pillows, in both supine and side lying positions, over a total testing period of 1 hour and 30 minutes. All participants engaged in five pillow support tasks: 1. Quiet standing with the head in neutral 2. supine lying with the standard pillow 3. supine lying with the specialized pillow 4. side lying with the standard pillow 5. side lying with the specialized pillow. Participants engaged in each support position for 5 minutes with the exception of the last condition which was held for an additional 25 minutes to capture any muscle activation. Measures for the quiet standing trial provided the comparison baseline for posture and muscle activation. Several biomechanical measures were taken in order to test the specialized pillow against the standard pillow: muscle activation (root mean square : RMS) electromyography (EMG), posture and contact pressure.

Results:

The findings of the current study showed that the muscle activation (RMS-EMG) and posture in the cervicothoracic areas were unchanged with the use of the specialized pillow as compared to the standard pillow in both supine and side lying. However, the specialized pillow had a significantly lower mean peak pressure and the contact area was significantly larger with the specialized pillow when lying supine.

Conclusions:

While the dual-contoured specialized pillow in the present study did not lead to changes in muscle activations or posture in the head, neck and upper back as compared to a standard pillow, it reduced mean peak pressures and increased the contact area. This has potential implication for a reduction in symptoms and improved healing in neck pain patients.