



Effect of different mattress designs on promoting sleep quality, pain reduction, and spinal alignment in adults with or without back pain; systematic review of controlled trials

Ahmed Radwan, PhD*, Philip Fess, BS, Darcy James, BS, John Murphy, BS, Joseph Myers, BS, Michelle Rooney, BS, Jason Taylor, BS, Alissa Torii, BS

1600 Burrstone Rd, Physical Therapy Program, Utica College, New York, 13502

ARTICLE INFO

Article history:

Received 23 February 2015

Received in revised form 13 May 2015

Accepted 31 August 2015

Keywords:

Mattress design

Ergonomics

Spinal alignment

Pain

Sleep quality

ABSTRACT

A significant number of US citizens lack appropriate sleep for several reasons. Back pain has been identified as possible cause for inappropriate sleep in adults. Previously, the quality of mattresses and bedding systems has been correlated to the pain perceived by individuals. However, there is controversy in the literature regarding the type and characteristics of a mattress that best serve the purpose of decreasing spinal pain, and improving spinal alignment and quality of sleep. This study gathered the best available evidence in the literature related to this matter through conducting a systematic review of controlled trials that were published since the year of 2000. In those trials, mattresses were subjectively identified as soft, medium firm, firm, or custom inflated. Articles examining the effect of temperature alterations of mattresses on promoting sleep quality and reducing pain were included as well. Twenty-four articles qualified for inclusion into this systematic review. The methodological quality of the reviewed clinical trials was deemed moderate to high according to the PEDro scale. Results of this systematic review show that a mattress that is subjectively identified as a medium-firm mattress and is custom inflated (self-adjusted) is optimal for promoting sleep comfort, quality, and spinal alignment. Evidence is not sufficient yet regarding the appropriate temperature of the optimum mattress; however, warm temperature has been recommended by authors.

© 2015 National Sleep Foundation. Published by Elsevier Inc. All rights reserved.

Introduction

Sleep is an important part of our lives, with approximately one-third of our life spent sleeping,¹ but in the United States, it is estimated that more than 70 million individuals have trouble sleeping, with this number only expected to rise.² Although 7 to 8 hours of sleep a night is preferred, the average adult in America gets less than 7 hours of sleep a night, with 26% of Americans reporting a good night's sleep only a few times per month.^{2,3}

Lack of sleep can impact an individual's quality of life, social interaction, and mood.² Sleep deprivation can also cause a decrease in work productivity, greater number of sick days used, and increased injury rates, with 56,000 motor vehicle crashes being a result of sleepiness due to a 50% slower response time and decreased accuracy.^{2,4}

The harmful impacts of sleep deprivation, such as impairments in cognitive and motor performance or the negative effects on social interactions, mood, and quality of life,⁵ are reasons enough to research which is the best mattress available on the market. Although numerous studies recognize the importance of a sleep surface on sleep quality, there is great controversy on what surface design is the optimum for the relief of neck or back pain. In terms of mattresses, some studies provide evidence that foam bedding designs can actually create symptoms of back pain, whereas other studies claim that medium-firm surfaces can actually lower pain in individuals with back problems^{2,6}. Manufacturers of mattresses claim that there are health benefits to using a particular sleep surface but have insufficient research to support these claims^{2,7}.

The limited research on the subject and the large discrepancy in the literature further support the need for continued investigation into what sleep surface is the best for relief of pain. The purpose of this systematic review was to assesses all available clinical trials pertaining to the effect of different types of mattresses on reducing back pain, and promoting sleep quality and spinal alignment. The level of evidence behind those trials was determined so that clinicians could have a better insight on the kind of mattress that they

* Corresponding author at: Physical Therapy Program, Utica College, New York. Tel.: +1 315 792 3853; fax: +1 315 7923248.

E-mail address: aradwan@utica.edu (A. Radwan).

Table 1
Summary of articles related to effects of different types and designs of mattresses on pain reduction.

| Author (year) | PE德罗 scale | Study design | Participant characteristics | Present condition | Interventions | Outcome | Conclusion |
|-------------------------------|------------|--|---|--|--|--|--|
| Kovacs et al ⁸ | 10 | Randomized, blinded, controlled trial | <u>Number:</u> 313 participants Male (n = 84) Female (n = 229) <u>Age:</u> Median age: 44.55 y | ≥3-mo chronic back pain while lying in bed or on rising. | 155 patients allocated to medium-firm mattresses 158 patients allocated to firm mattresses The study duration was 90 d. | <u>Subjective:</u> Self-reported pain intensity was measured daily while lying in bed and 30 min after rising through the use of the VAS. Degree of disability was measured using the Roland Morris questionnaire at baseline and after 90 d. | Patients who used the medium-firm mattresses were more likely to have improvements in degree of disability than patients who used the firm mattresses. Pain reduction was not statistically significant between groups while lying in bed or upon rising. Patients with chronic back pain will benefit more from a medium-firm mattress than a firm mattress. |
| McCall et al ⁹ | 8 | Randomized controlled trial | <u>Number:</u> 12 (6 married couples) participants <u>Age:</u> Range: 21-55 y | Asymptomatic | Compared use of conventional mattress and 7-zone pressure-relief mattress for 2 wk each after a 2-wk baseline period. | <u>Subjective:</u> VAS for pain and sleep diaries <u>Objective:</u> Actigraphy and pressure mapping | No significant statistical differences between the 2 mattresses in regard to any of the outcome measures; however, the pressure-relief mattress reduced the number of high-pressure points. |
| Bergholdt et al ¹⁰ | 7 | Randomized single-blinded clinical trial | <u>Number:</u> 160 participants <u>Age:</u> Range: 18-60 y | Symptomatic | Compared 3 different mattress types: water bed (Akva), body-conforming foam mattress (Tempur), and hard mattress (innovation Futon) for 1-mo trial period; mattresses were randomly assigned. | <u>Subjective:</u> Danish COBRA questionnaire, back pain, ADLs. | When compared with the hard mattress, the water bed and foam mattresses had a more positive influence on back pain and ADL performance. |
| Jacobson et al ⁴ | 5 | Controlled trial | <u>Number:</u> 22 participants <u>Age:</u> Range: 25-75 y | Symptomatic | Compared subject subjects' own bed for 28 d with prescribed sleep surface for another 28 d; prescribed sleep surface based on subjects' height and weight. | <u>Subjective:</u> VAS for back pain, back stiffness, shoulder pain, and sleep quality. | Participants showed significant improvement in back pain, back stiffness, shoulder pain, and sleep quality. |
| Jacobson et al ³ | 5 | Controlled trial | <u>Number:</u> 59 patients Male (n = 29) Female (n = 30) <u>Age:</u> Mean age: 45.14 y | Asymptomatic | New, medium-firm bedding system. Subjects slept in their homes for 28 d on their own mattress, then for another 28 d on the medium-firm mattress. Total length of test was 56 d. | <u>Subjective:</u> Two questionnaires. One related to sleep habit and another contained 32 items related to behaviors manifested by anxiety, restlessness, and stress. VAS used to assess 5 dependent variables: low back discomfort, spine stiffness, sleep quality, sleep comfort, and sleep efficiency (time in bed with time spent asleep). | Medium-firm bedding system will provide improved sleep quality, comfort, and efficiency. Significant improvements in sleep quality and comfort for high- and low-baseline groups. |
| Jacobson et al ⁵ | 5 | Nonrandomized controlled trial | <u>Number:</u> 59 subjects Male (n = 29) Female (n = 30) <u>Age:</u> Mean age: 45.14 y | Asymptomatic | Phase I: Subjects slept on own mattress for 28 consecutive days. Phase II: Subjects slept on generic (unlabeled) mattress (medium-firm) for 28 consecutive days. Patients used VAS to record perception of 6 categories: (1) low back pain; (2) shoulder pain; (3) spine stiffness; (4) sleep quality; (5) sleep comfort; and (6) sleep efficiency. Five to six months follow-up. | <u>Subjective:</u> Sleep promotion was measured through VAS was used for sleep quality, comfort, and efficiency. Pain reduction was measured through the use of the VAS to measure low back pain, shoulder pain, and spine stiffness. | Reduction of pain and stiffness and improvement of sleep comfort and quality became more prominent over time. Cheaper bed systems, when compared with the medium-/high-priced bed systems, were significantly uncomfortable and promoted higher reports of low back pain. Medium to firm beds were more comfortable than soft bedding systems. New bedding systems can significantly improve sleep variables. Thus, timely replacement of old bedding systems can significantly improve sleep quality. |
| Jacobson et al ¹¹ | 5 | Controlled trial | <u>Number:</u> 59 participants Male (n = 29) Female (n = 30) | Asymptomatic | Comparing subjects' own bed with the introduction of medium-firm mattress; 28-d evaluation period for each mattress. | <u>Subjective:</u> VAS for sleep quality and low back pain, 32-item stress questionnaire. | Medium-firm mattress reduced back pain and improved sleep quality compared with subjects' own mattresses. |

Download English Version:

<https://daneshyari.com/en/article/916285>

Download Persian Version:

<https://daneshyari.com/article/916285>

[Daneshyari.com](https://daneshyari.com)