Editorial comment

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Lifting with straight legs and bent spine is not bad for your back

https://doi.org/10.1515/sjpain-2018-0302

In this issue of Scandinavian Journal of Pain, Caneiro and Australian co-workers present the results from a survey in 67 pain free persons on beliefs about bending and lifting (especially with a round back posture) [1]. They have asked the participants if these postures are perceived as dangerous to the back.

They found that participants perceived that it might be dangerous to perform round back bending and lifting. The results suggest that high fear of movement, unhelpful back beliefs, and perceived danger to round-back bending, were associated. Qualitative assessment of safe lifting descriptions included a straight back and squatting when lifting. Although this survey is small, results are interesting.

The Swedish Back School was introduced in the eighties in order to protect the spine from postures that were believed to increase the risk of back injuries [2]. The experimental studies by Nachemson et al. evaluating disc pressure in various postures and in lifting were the scientific rationale to recommend straight and not round back lifting [3]. The message was clear: bend your knees, keep the object close to your body. Lifting with a round back was considered dangerous.

1 Lumberjacks and lifting

Some were sceptical to this new ergonomic school. Two of us met some years earlier at the running track when we were still at the high school age. We did not know then that both our fathers were lumberjacks, a very demanding physical work that involved much lifting. Kåre Birger Hagen was educated as a physiotherapist and defended his thesis on physical workload, perceived exertion, and output of cut wood as related to age in motor-manual cutting, and has continued to conduct interesting studies in the muscle-skeletal field. He started to study lumberjacks, who used a chainsaw and were paid on a piece-rate basis [4]. To evaluate their work load he measured oxygen consumption with a portable equipment and found that their work load corresponded to about 50% of maximal oxygen consumption, which for these fit workers were similar to running 8 km/h during the working day. Mean heart rates were about 138 for the 29-year old and 126 for the 59-year old and were highest during bunching. In the next study, Hagen and Harms-Ringdahl found that the experienced forest workers preferred to lift with a round back and not to bend their knees [5]. They rated local thigh perceived exertion as higher with the squat techniques (bending knees) than the stoop technique (straight knees). The results from this study indicated that they preferred a movement strategy best suited to reduce the demand on the knee-extensor muscles. Most likely also to reduce the total work load and to save energy.

Was this a healthy strategy? This question is difficult to answer, the lumberjacks worked on a piece-rate basis and had to survive. Today manual workers are replaced by large machines in the forest industry and the muscle-skeletal problems are not reduced. One study reported the prevalence of neck/shoulder disorders were higher among both machine operators and manual workers compared to administrative workers but no difference was found for low back pain disorders in machine workers and manual workers [6].

While on the other hand the introduction of lifts in nursing homes is likely to be helpful for the transportation of immobile elderly from bed to chair or to the toilet, and weight lifters bend their knees to rise a heavy weight, advice for the general population that lifting with a rounded back is dangerous may actually do more harm than good. The spine is normally a strong and stable unit built to tolerate daily activities. It is built by strong elements such as vertebrae, discs, joints, ligaments and muscles. The structures normally degenerate during adult life and too little or too much activity may increase degeneration. At times degeneration may be associated with pain and disability but in general the association is weak.

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In two trials including patients with chronic low back pain and disc degeneration we advised patients to use their back and bend it during daily activities including ordinary lifting [7–9]. We found that this strategy resulted in reduction of fear and avoidance behaviour compared to patients randomised to lumbar fusion, and that fusion surgery was not more effective for the primary outcomes: reduction of pain, disability. For medicine consumption, return to work and patients who had previous disc surgery, results slightly favoured the cognitive and exercise intervention.

2 Evidence for training proper handling techniques?

Ergonomics has been studied for years with contradictory results. A Cochrane review from 2012 included nine randomised controlled trials with a total of 20,101 employees and nine studies including concurrent controls with 1,280 employees [10]. None of the studies provided any evidence that training proper handling techniques and provision of assistive devices prevented low back pain compared to no intervention or another intervention. Another meta-analysis included eight longitudinal studies and estimated that lifting loads over 25 kg and lifting at a frequency of over 25 lifts/day increase the annual incidence of low back pain by about 4% [11].

3 Dangerous lifting or dangerous and expensive beliefs?

From the studies in lumberjacks we have learned that the thighs and not the spine is the weak link during hard physical work including lifting. From the epidemiological studies, there is little evidence that teaching proper manual handling techniques prevents low back pain. The article published in this issue of Scand Journal of Pain focus on beliefs about lifting collected from a small survey of a pain-free population. Typically, round-back lifting was perceived as dangerous. Future research should examine such beliefs in larger populations. In particular, it would be interesting to evaluate if these beliefs can predict future back pain, the duration of back pain episodes and the use of health care and sick leave. In addition, health care providers' beliefs about lifting and physical activity should be better evaluated, particularly how their beliefs interact with advice and treatment provided. It may be hypothesised that if daily physical activity is perceived dangerous, these activities are avoided. Such beliefs may influence spells of sick leave and have health economic consequences.

Conflict of interest: The author declares no conflicts of interest.

References

[1] Caneiro JP, O'Sullivan P, Lipp OV, Mitchinson L, Oeveraas N, Bhalvani P, Abrugiato R, Thorkildsen S, Smith A. Evaluation of implicit associations between back posture and safety of bending and lifting in people without pain. Scand J Pain 2018;18:719–28.
[2] Zachrisson-Forssel M. The Swedish back school. Physiotherapy 1980;66:112–4.
[3] Nachemson A, Elfstrom G. Intravital dynamic pressure measurements in lumbar discs. A study of common movements, maneuvers and exercises. Scand J Rehabil Med Suppl 1970;1:1–40.
[4] Hagen KB, Vik T, Myhr NE, Opsahl PA, Harms-Ringdahl K. Physical workload, perceived exertion, and output of cut wood as related to age in motor-manual cutting. Ergonomics 1993;36:479–88.
[5] Hagen KB, Harms-Ringdahl K. Ratings of perceived thigh and back exertion in forest workers during repetitive lifting using squat and stoop techniques. Spine 1994;19:2511–7.
[6] Hagen KB, Magnus P, Vetlesen K. Neck/shoulder and low-back disorders in the forestry industry: relationship to work tasks and perceived psychosocial job stress. Ergonomics 1998;41:1510–8.
[7] Brox JI, Sørensen R, Friis A, Nygaard Ø, Indahl A, Keller A, Ingbrigtsen T, Eriksen HR, Holm I, Rise R, Koller AK, Reikerås O. Randomized clinical trial of lumbar instrumented fusion and cognitive intervention and exercises in patients with chronic low back pain and disc degeneration. Spine 2003;28:1913–21.
[8] Brox JI, Reikerås O, Nygaard Ø, Sørensen R, Indahl A, Holm I, Keller A, Ingebrigtsen T, Grundnes O, Lange JE, Friis A. Lumbar instrumented fusion compared with cognitive intervention and exercises in patients with chronic back pain after previous surgery for disc herniation: a prospective randomized controlled study. Pain 2006;122:145–55.
[9] Brox JI, Nygaard Ø, Holm I, Keller A, Ingebrigtsen T, Reikerås O. Four-year follow-up of surgical versus non-surgical therapy for chronic low back pain. Ann Rheum Dis 2010;69:1643–8.
[10] Verbeek JH, Martimo KP, Kuijer PP, Karppinen J, Viikari-Juntura E, Takala EP. Proper manual handling techniques to prevent low back pain, a Cochrane systematic review. Work 2012; 41(Suppl 1):2299–301.
[11] Coenen P, Gouttebarge V, van der Burght AS, van Dieen JH, Frings-Dresen MH, van der Beek AJ, Burdorf A. The effect of lifting during work on low back pain: a health impact assessment based on a meta-analysis. Occup Environ Med 2014;71:871–7.