



Why Ergonomic Backpack?

ARTICLE INFO

Article Type Editorial

Authors

Nazila Nejaddadgar¹, PhD
Fateme Yaghoubi², MS
Fateme Dadashi³, PhD candidate

How to cite this article

Nejaddadgar N, Yaghoubi S, Dadashi F. Why Ergonomic Backpack? 2019; 4(3): 207-210.

¹PhD in Health Education and Promotion, Ardabil University of Medical Sciences, Ardabil, Iran.

²Ms student in Health Education and Health Promotion, Tabriz University of Medical Sciences, Tabriz, Iran.

³PhD candidate in Health Education and Health Promotion, Mashhad University of Medical Sciences, Mashhad, Iran.

*Correspondence

Address: Health Deputy of Ardabil University of Medical Sciences, Ardabil, Iran.

Phone: +0098 9144534682

Email: n.dadgar60@gmail.com

Article History

Received: Oct 28, 2019

Accepted: Nov 24, 2019

ePublished: Jan 20, 2020

Introduction

According to the statute of the World Health Organization (WHO), health is considered as an individual and social value, and one of the most obvious human rights and needs^[1]. The carriage of heavy schoolbags by children is a concern for all those involved in student health and well-being^[2]. Backpacks are the most commonly used type of bag, and overweight backpacks are associated with several health issues, including increased spinal curvature, discomfort, and back and shoulder pain^[3]. While, it has been argued that the majority of students were carrying as much as 30% to 40% of their body weight^[3]. In this way posture modifications have been reported when children carry a load that corresponds to more than 10% of their body^[4].

In addition, items carried by students in their daily school bags have been found to include books, pencil cases, scientific calculators, sport-specific training clothing, lunch boxes and full water bottles^[5]. Even an empty backpack can distort posture and cause pain, there is no way to safely carry weight in a backpack, no matter how light the load, because it disrupts our body mechanics by design^[6].

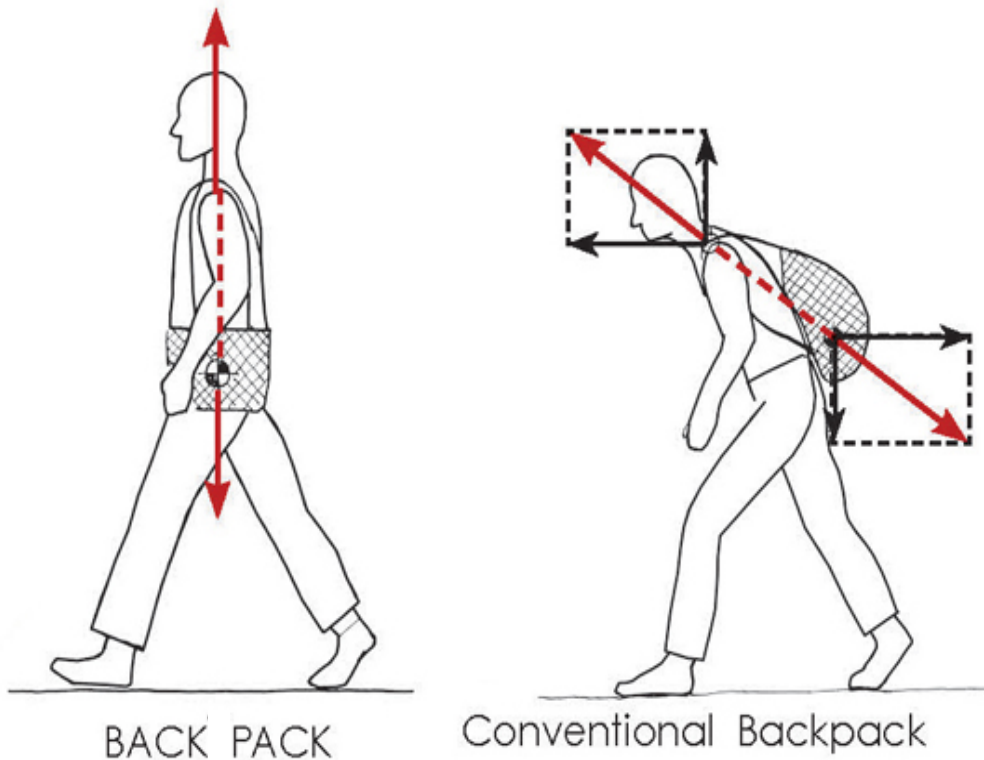
When posture is distorted, our joint and muscle mechanics become distorted as well. Even light loads applied to disrupted mechanical systems produce damaging forces in the joints and muscles^[7].

Regardless of how ergonomic a backpack is, there are some basic rules of good ergonomics when handling a backpack you should always follow^[8].

Ergonomic Backpacks

Backpack loads should be reduced both because they exceed proportionally the limits set for adults and frequently cause discomfort, and also because fatigue during backpack carrying and time spent bearing the backpack on the shoulders are parameters associated with back pain. Ergonomics is the scientific discipline concerned with understanding of interactions among humans and other elements of a system^[9].

Conventional backpacks used as schoolbags adversely affect the health, safety and productivity of developing school children, in clear opposition to the goals of ergonomics^[10]. They are off-axis, posterior-loading systems, causing the body to compensate with postural distortion^[11]. The postural distortion will continue unless the load is aligned with the body's axis, in obedience



to the laws of physics and physiology ^[12]. An ergonomic backpack has been designed to give you a healthier, more efficient and comfortable way to carry around your belongings^[13].

These backpacks differ from others in that they are been specifically designed to reduce the strain of a bag on your back but also make it easier to carry around your important belongings, whether it is a laptop or paperwork^[14].

There are a few features you can expect to find in an ergonomic backpack that might not be available with standard styles^[16].

Tips for Choosing and Using Backpacks are as following:

Consider the construction. Before you grab that new bag off the rack, make sure it is got two padded straps that go over your shoulders. Backpacks with multiple compartments can also help distribute the weight more evenly.

Carry it well. Before you load your backpack, adjust the straps so the pack sits

close to your back. Wear both straps over your shoulders. If your pack is really heavy and you can not get around the number of books you need, take some of the books out of your pack and carry them in your hands.

Try a pack with wheels. Lots of kids use these as an alternative to backpacks, but there are guidelines and considerations to keep in mind with this kind of pack.

Plan your homework. Plan ahead and spread your homework out over the course of the week so you will not have to tote all your books home on the weekend.

Limit your load. Doctors and physical therapists recommend that people carry no more than 10% to 15% of their body weight in the ir packs. This means that if you weigh 120 pounds, your backpack should weigh no more than 12 to 18 pounds.

Pick it up properly. As with any heavy weight, you should bend at the knees when lifting a backpack to your shoulders^[16].

Downloaded from ijmp.modares.ac.ir at 22:51 IRST on Friday November 27th 2020

10 TIPS ON GOOD BACKPACK ERGONOMICS



1. Choose a backpack with wide padded shoulder straps.



2. Wear both shoulder straps to prevent shoulder alignment issues.



3. Never overpack! Backpack should never weigh more than 15% of your body weight.



4. Always lift your backpack by squatting down and using your legs to lift, not your back.



5. Look for backpacks with a waist and chest belt to better distribute heavy loads.



6. Position the backpack below your shoulders and above your hips.



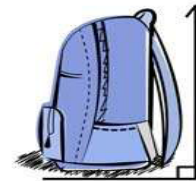
7. A backpack with multiple compartments can better distribute the load.



8. Encourage your child to remove their backpack when waiting in line or standing for a long time.



9. Every few weeks, clean out your backpack for unused items that may be weighing you down.



10. Look for backpacks that stand upright when placed on the ground.

ERGONOMIC TRENDS

<http://ergonomictrends.com>

Original Illustrations by Kate Lite

References

- Unicef. Investing in a safe, healthy and productive transition from childhood to adulthood is critical 2018 [Available from: <https://data.unicef.org/topic/adolescents/overview/>].
- Brackley H.M., Stevenson J.M. Are children's backpack weight limits enough?: A critical review of the relevant literature. *Spine*. 2004; 29:2184–2190. doi: 10.1097/01.brs.0000141183.20124.a9. [PubMed] [CrossRef] [Google Scholar]
- Kjaer P, Wedderkopp N, Korsholm L, Leboeuf-Yde C. Prevalence and tracking of back pain from childhood to adolescence. *BMC Musculoskelet Disord*. 2011; 12:98. doi: 10.1186/1471-2474-12-98. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
- Jones GT, Watson KD, Silman AJ, Symmons DP, Macfarlane GJ. Predictors of low back pain in British schoolchildren: a population-based prospective cohort study. *Pediatrics*. 2003; 111:822–828. doi: 10.1542/peds.111.4.822. [PubMed] [CrossRef] [Google Scholar]
- White GL, Moore MJ, Moore DL. Association of relative backpack weight with reported pain, pain sites, medical utilization, and lost school time in children and adolescents. *J Sch Health*. 2007; 77(5):232–239. [PubMed] [Google Scholar]
- Maniadakis N, Gray A. The economic burden of back pain in the UK. *Pain*. 2000;84(1):95–103. [PubMed] [Google Scholar]
- Dahl KD, Wang H, Popp JK, Dickin DC. Load

- distribution and postural changes in young adults when wearing a traditional backpack versus the BackTpack. *Gait Posture*. 2016; 45:90–96. [PubMed] [Google Scholar]
8. Brzek A, Dworrak T, Strauss M, et al. The weight of pupils' schoolbags in early school age and its influence on body posture. *BMC Musculoskeletal Disord*. 2017; 18(1):117. [PMC free article] [PubMed] [Google Scholar]
 9. Pau M, Pau M. Postural sway modifications induced by backpack carriage in primary school children: a case study in Italy. *Ergonomics*. 2010;53(7):872–881. [PubMed] [Google Scholar]
 10. Birrell S. A., Haslam R. A. The effect of load distribution within military load carriage systems on the kinetics of human gait. *Applied Ergonomics*. 2010;41(4):585–590. doi: 10.1016/j.apergo.2009.12.004. [PubMed] [CrossRef] [Google Scholar]
 11. Mbaye I, Fall M, Wone I, Dione P, Ouattara B, Sow M. Chronic low back pain in a Senegalese public transport's company. *Dakar Med*. 2002;47(2):176–178. [PubMed] [Google Scholar]
 12. Bezzaoucha A. Descriptive epidemiology of low-back pain in Algiers. *Rev Rhum Mal Ostéoartic*. 1992; 59(2):121–124. [PubMed] [Google Scholar]
 13. Lasota A. Schoolbag weight carriage by primary school pupils. *Work*. 2014;48:21–26. doi: 10.3233/wor-131614. [PubMed] [CrossRef] [Google Scholar]
 14. Levin H. Laptops Unleashed A High School Experience. *Learn. Lead. Technol*. 2004;31:6–12. [Google Scholar]
 15. Downs S.H., Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J. Epidemiol. Commun. Health*. 1998; 52:377–384. doi: 10.1136/jech.52.6.377. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
 16. Zgul B, Akalan N.E., Kuchimov S., Uygur F., Temelli Y., Polat M.G. Effects of unilateral backpack carriage on biomechanics of gait in adolescents: A kinematic analysis. *Acta Orthop. Traumatol. Turc*. 2012;46:269–274. doi: 10.3944/AOTT.2012.2678. [PubMed] [CrossRef] [Google Scholar]