
ABSTRACT

Low back pain a major causes of morbidity throughout the world and it is a most debilitating condition, and can lead to decreased physical function, compromised quality of life, and psychological distress.

Obesity is nowadays a pandemic condition. Obese subjects are commonly characterized by musculoskeletal disorders and particularly by non-specific LBP. However, the relationship between obesity and LBP remain to date

unsupported by objective measurements of mechanical behavior of spine and it is morphology in obese subjects.

Key words: obesity, low back pain,

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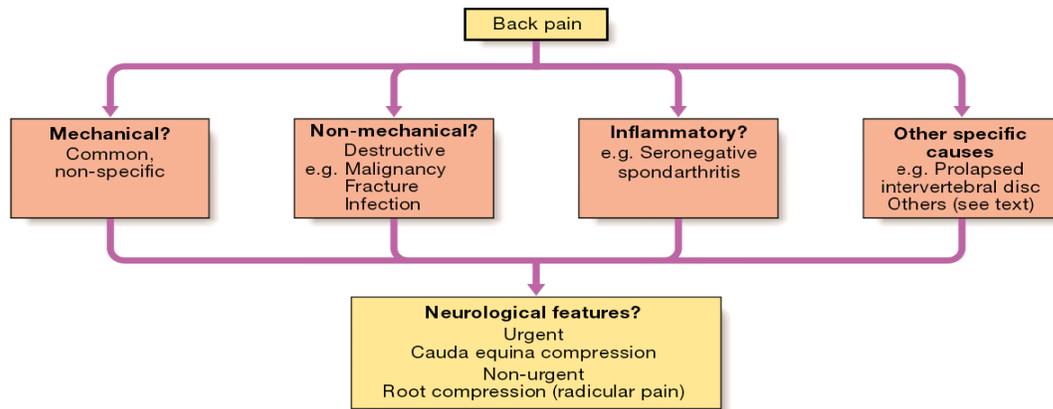
INTRODUCTION

Low back pain (LBP) is a most debilitating condition, and can lead to decreased physical function, compromised quality of life, and psychological distress⁽¹⁾. The prevalence of back pain in the general population has been reported to be as high as 50 % or more in both developed and developing countries⁽²⁾. Approximately 5-15% of back pain has specific cause such osteoporotic fracture, infection or neoplasm, but the cause in the remainder of the cases is unknown⁽³⁾.

Back pain affects 60-80% of people at some time in their lives. Although the prevalence has not increased, reported disability from back pain has increased significantly in the last 30 years. In western countries, back pain is the most common cause of sickness-related work absence ,and in the UK 7% of adult consult their GP each year with back pain⁽⁴⁾.

It is estimated that about 80% of the United States and Canadian population will experience LBP during adulthood. Most low back pain is self-limiting and will ultimately resolve in two weeks (50% of those affected) to six weeks (90% of those affected), however it remains an intriguing clinical problem⁽⁵⁾.

LBP is a symptom that can be caused by a wide variety of factors such as mechanical, inflammatory, infectious and psychological. During normal daily activities, the forces acting on the back amount to between two and three times the body weight⁽⁶⁾. It would therefore seem reasonable to suggest that an increase in body weight would worsen the symptoms of all types of low back pain whatever the cause was, especially the mechanical type.



Specific causes of low back pain

Obesity is widely regarded as a pandemic, with potentially disastrous consequence for human health. Nearly one quarter of adult in the UK were obese i.e. Body mass index (BMI) 30 Kg/m² in 2006, compared with 7% prevalence in 1980 and 16% in 1995. More ever, almost two-thirds of the UK adult population are overweight of BMI 25Kg/m², although there is considerable regional and age group variation. In developing countries, average national rates of obesity are low, but this figure may disguise high rate of obesity in urban communities, for example, nearly one-quarter of women in urban India are overweight. There is increasing public awareness of the health implication of obesity .many patient will seek medical help for their obesity, other will present with one of the complications of obesity and increasing numbers are being identified during health screening examination ⁽⁷⁾.

Obesity is worldwide concern because it increases the risk of various health disorders such as cardiovascular diseases, stroke, diabetes, cancers, metabolic syndrome, non-alcoholic fatty liver, and asthma. It also lead to psychosocial problems, decreases productivity and adds to health-care cost ⁽⁸⁾.

Obesity is recognized as major public health problem in industrialized countries and its associated with various musculoskeletal disorders, including impairment of the spine ⁽⁹⁾. While body weight is only a weak risk factor for LBP ⁽¹⁰⁾. Whether obesity is correlated with LBP still under debate, the association is generally stronger in lake population studies than in smaller or occupational studies⁽¹¹⁾. Being persistently overweight was associated with disk degeneration on MRI ⁽¹²⁾. When differences in spine biomechanics are investigated, only a moderate link between LBP and BMI appears ⁽¹³⁾.

During stance phase of gait, obese patients show hyperextension of lumbar spine ⁽¹⁴⁾. Few studies demonstrate a correlation between obesity and functional impairment of spine secondary to weakness and stiffness of lumbar muscle, possibly leading to LBP and disability ⁽¹⁵⁾.

Recent literature suggests a weight loss of at least 3-5% will improve the health and prevent the development of many chronic diseases related to obesity ⁽¹⁶⁾. Historically, studies have suggested a weak association between body weight and low back pain ⁽¹⁰⁾. The guidelines for the treatment of low back pain have not included diet and weight loss as a recommendation ⁽¹⁷⁾. Updating this view

appears to be in order as an elevated body mass index is considered a risk factor for low back pain chronicity⁽¹⁷⁾.

Obesity has been recently recognized as a risk factor of LBP⁽¹⁸⁾.

Literature review

LBP is a symptom, not a disease⁽¹⁹⁾. This may be due to degenerative processes of the spine axis, various trauma, occupational position⁽²⁰⁾ and congenital malformations. Very often we find in literature review that a widespread cause is also obesity. Back pain in the lumbar area is a widespread problem in the world's population, approximately 70%-80% of the people suffer from it at least once in their life-time. Low back pain is a pain that manifests itself in the lumbar region and may also include the sciatic nerve^(19,21). Back pain is classified as acute and chronic. Its treatment is carried out in several ways depending on the stage the patient is. Handling goes through the stages such as drug treatment and physical therapy. The goals of rehabilitation are patient education; pain control and inflammation reduction; early mobilization; the application of physiotherapy exercises; reaching the full amplitude of movement without pain in the injured region; strengthening, endurance and coordination; the restoration of normal life activities; the prevention of illness relapse and other injuries⁽²²⁾.

Previous studies have yielded inconclusive results concerning the association between LBP and BMI^(10,23,24). Other possible risk factors were studied; waist circumference (WC),^(25,26,27) hip circumference (HC),⁽²⁵⁾ waist to hip ratio (WHR),^(25,26,28,29) and smoking^(20,25,30,31,32).

Several modern healthcare initiatives focus on the obesity epidemic due to associated co morbidities, including hypertension, heart

disease, diabetes and osteoarthritis^(8,33). Obesity is associated with an increased prevalence of LBP as well as seeking care for it⁽¹⁸⁾. Being overweight increases the risk of lumbar disc degeneration, particularly at a young age⁽¹²⁾.

Obesity represents a heterogeneous classification. The severely obese have more co morbidities and higher health care demands than the moderately obese. From 1986–2000, while the prevalence of obesity (BMI \geq 30) doubled from 1 in 10 to 1 in 5, the prevalence of BMI \geq 40 quadrupled from 1 in 200 to 1 in 50, and that of BMI \geq 50 quintupled from 1 in 2000 to 1 in 400⁽³⁴⁾.

Obesity is a problem of epidemic proportion^(35, 36). Despite record rates of non-physician supervised dieting and the availability of numerous weight loss programs, the problem is not abating⁽³⁷⁾. Complicating this, is that most primary care physicians do not treat obesity, citing a lack of time, resources, insurance reimbursement, and knowledge of effective interventions as significant barriers⁽³⁸⁾. Musculoskeletal disorders including LBP represent a considerable public health problem and a common diagnosis creating absenteeism and the need for disability pensions⁽³⁹⁾.

It is widely noted that the economic cost of obesity and its related disorders are staggering, with lifestyle related conditions such as diabetes mellitus and coronary heart disease placing a large economic burden on the health care system^(35, 39).

One question, which arises from the discussion concerning obesity, is whether obesity is a risk factor for LBP. Buckwalter, et al contended that a number of medical conditions including obesity, along with diabetes and hypertension, may influence the pathophysiology of diseases of the tendons and ligaments during the process of aging thus potentially leading to low back

pain⁽⁴⁰⁾. Along with low back pain, the conventional wisdom is that overweight persons are at risk of osteoarthritis in weight-bearing joints such as the knee, the hips, and feet⁽⁴¹⁾.

Obesity has adverse effects on both mortality and morbidity. However, it is clear that the lowest mortality rates are seen in Europeans in the BMI range 18.5–24 kg/m² (and at lower BMI in Asians). It is suggested that obesity at age 40 years can reduce life expectancy by up to 7 years for non-smokers and by 13 years for smokers. Obesity has little effect on life expectancy at > 70 years, but the obese do spend a greater proportion of their active life disabled. Epidemic obesity has been accompanied by an epidemic of type 2 diabetes and osteoarthritis, particularly of the knee. Although an increased body size results in greater bone density through increased mechanical stress, it is not certain whether this translates to a lower incidence of osteoporotic fractures. Obesity may have profound psychological consequences, compounded by stigmatization of the obese in many societies⁽⁷⁾.

The body fat distribution rather than the absolute amount of excess adipose tissue appears to be important. Increased intra-abdominal fat causes ‘central’ (‘abdominal’, ‘visceral’, ‘android’ or ‘apple shaped’) obesity, which contrasts with subcutaneous fat accumulation causing ‘generalized’ (‘gynoid’ or ‘pear shaped’) obesity; the former is more common in men and is more closely associated with type 2 diabetes, the metabolic syndrome and cardiovascular disease⁽⁷⁾.

Severity of obesity can be quantified using the BMI. A waist circumference of >102 cm in men or >88 cm in women indicate that the risk of metabolic and cardiovascular complication of obesity is high.

The diverse complication of obesity requires a thorough history, examination and screening investigation. The impact of obesity on patient’s life and work is a major consideration⁽⁷⁾.

Multiple interrelated factors lead to weight gain and the development of obesity, the most commonly articulated is a positive caloric balance coupled with sedentary living^(42, 43).

All physicians should regard obesity as an important health problem because it is an independent risk factor for morbidity and mortality. Obesity is associated with a large number of diseases such as hypertension, coronary heart disease, non-insulin dependent diabetes mellitus, hyperlipidemia, cholelithiasis, fatty liver, varicose vein and obesity hyperventilation syndrome⁽⁴⁴⁾.

In addition, there is correlation between obesity and osteoarthritis,⁽⁴⁵⁾ particularly of the weight bearing joints (knees, hips and vertebral column),⁽⁴⁴⁾ and Orvieto et al have suggested a role of body weight and height in the pathogenesis of low back pain.⁽⁴⁶⁾

Quantifying obesity with body mass index (weight/height²)⁽⁷⁾

BMI (Kg/m ²)	Classification	risk of obesity comorbidity
18.5-24.9	Normal	Negligible
25.0-29.9	overweight	mildly increased
>30.0	obese	
30-34.9	class 1	moderate
35-39.9	class 2	severe
>40	class 3	very sever

References:

1. Deyo RA, Mirza SK, Martin BI Back pain prevalence and visit rates: Estimates from U.S. national surveys, 2002. Spine (Phila Pa 1976) 31: 2724-2727.
2. Louw QA, Morris LD, Grimmer-Somers K. The prevalence of low back pain in Africa: a systematic review. BMC Musculoskelet Disord. 2007; 8:105Africa: a systematic review. BMC Musculoskelet Disord.

3. Hoy D, Brooks P, Blyth F, Buchbinder R. The epidemiology of low back pain. *Best Pract Res Clin Rheumatol.* 2010;24(6):769–81.2007; 8: 105.
4. Davidsons principle and practice of medicine. 21nd edition 2010/part 2/chapter 25 (rheumatology and bone disease)/presenting problem in musculoskeletal disease./back pain. Page 1072.
5. Skinner HB: *Current Diagnosis & Treatment in Orthopedics* Lange Medical Books. New York; 2000.
6. Nachemson A. The load on lumbar disks in different positions of the body. *ClinOrthop* 1966;45:107-22
7. Davidsons principle and practice of medicine. 22nd edition 2014/part 1/ chapter 5 (environmental and nutritional factors in disease) /disorders of altered energy balance/obesity. Page 115.
8. Must A, Spadano J, Coakley EH, Field AE, Colditz G, et al. (1999) The disease burden associated with overweight and obesity. *JAMA* 282: 1523–1529.
9. Fanuele JC, Abdu WA, Hanscom B, Weinstein JN: Association between obesity and functional status in patients with spine disease. *Spine* 2002, 27:306-312
10. Leboeuf-Yde C: Body weight and low back pain. A systematic literature review of 56 journal articles reporting on 65 epidemiologic studies. *Spine* 2000, 25:226-237.
11. Leboeuf-Yde C: Body Americans. *Obes Res* 2003, 11:1159-1162.11. Toda Y, Segal N, Toda T, Morimoto T, Ogawa R: Lean body mass and body fat distribution in participants with chronic low back pain. *Arch Intern Med* 2000, 160:3265-3269 weight and low back pain. A systematic literature review of 56 journal articles reporting on 65 epidemiologic studies. *Spine* 2000, 25:226-237.
12. Liuke M, Solovieva S, Lamminen A, Luoma K, Leino-Arjas P, Luukkonen R, Riihimäki H: Disc degeneration of the lumbar spine in relation to overweight. *Int J Obes (Lond)* 2005, 29 (8):903-8.
13. Kostova V, Koleva M: Back disorders (low back pain, cervicobrachial and lumbosacral radicular syndromes) and some related risk factors. *J NeurolSci* 2001, 192:17-25.
14. O’Sullivan PB, Dankaerts W, Burnett AF, Farrell GT, Jefford E, Naylor CS, O’Sullivan KJ: Effect of different upright sitting postures on spinal-pelvic curvature and trunk muscle activation in a pain-free population. *Spine* 2006, 31(19):E707-12
15. Janke AE, Collins A, Kozak AT: Overview of the relationship between pain and obesity: What do we know? Where do we go next?. *Journal of Rehabil Res and Dev* 2007, 44:245-262
16. Dunn KM, Croft PR: Epidemiology and natural history of low back pain. *EuraMedicophys* 2004, 40(1):9-13
17. Chou R, Qaseem A, Snow V, Casey D, Cross JT Jr, Shekelle P, Owens DK: Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Ann Intern Med* 2007, 147:478–491.
18. Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E (2010) The association between obesity and low back pain: A meta-analysis. *Am J Epidemiol* 171: 135–154.
19. Wong D, Transfeldt E, Macnab I, McCulloch J. Philadelphia: Williams & Wilkins; 2007. Macnab's backache.
20. Tiric-Campara M, Krupic F, Biscevic M, Spahic E, Maglajlija K, Masic Z, Zunic L, Masic I. Occupational overuse syndrome (Technological diseases): carpal tunnel syndrome, a mouse shoulder, cervical pain syndrome. *Acta Inform Med.* 2014 Oct; 22(5): 333–340.
21. Szpalski M, Gunzburg R, Rydevik B. Verlag, Berlin, Hidenberg: Springer; 2010. Surgery for Low Back Pain.
22. De Lisa A J. Rehabilitation Medicine, Principles and Practice. Philadelphia: J.B. Lippincot Company; 1988.
23. Mirtz TA, Greene L. Is obesity a risk factor for low back pain? An example of using the evidence to answer a clinical question. *ChiroprOsteopat.* 2005;13:2.
24. Garzillo MJ, Garzillo TA. Does obesity cause low back pain? *J Manipulative PhysiolTher.* 1994;17:601–4.
25. Shiri R, Solovieva S, Husgafvel-Pursiainen K, Taimela S, Saarikoski LA, Huupponen R, et al. The association between obesity and the prevalence of low back pain in young adults: The Cardiovascular Risk in Young Finns Study. *Am J Epidemiol.* 2008;167:1110–9.
26. Han TS, Schouten JS, Lean ME, Seidell JC. The prevalence of low back pain and associations with body fatness, fat distribution and height. *Int J Obese Relat Metab Disord.* 1997;21:600–7.

27. Lean ME, Han TS, Seidell JC. Impairment of health and quality of life in people with large waist circumference. *Lancet*. 1998;351:853–6.
28. Yip YB, Ho SC, Chan SG. Tall stature, overweight and the prevalence of low back pain in Chinese middle-aged women. *Int J Obes Relat Metab Disord*. 2001; 25:887–92.
29. Toda Y, Segal N, Toda T, Morimoto T, Ogawa R. Lean body mass and body fat distribution in participants with chronic low back pain. *Arch Intern Med*. 2000;160:3265–9.
30. Björck-van Dijken C, Fjellman-Wiklund A, Hildingsson C. Low back pain, lifestyle factors and physical activity: A population based-study. *J Rehabil Med*. 2008;40:864–9.
31. Strine TW, Hootman JM. US national prevalence and correlates of low back and neck pain among adults. *Arthritis Rheum*. 2007;57:656–65.
32. Leboeuf-Yde C. Smoking and low back pain. A systematic literature review of 41 journal articles reporting 47 epidemiologic studies. *Spine (Phila Pa 1976)* 1999;24:1463–70.
33. Flegal KM, Carroll MD, Kit BK, Ogden CL. Prevalence of Obesity and Trends in the Distribution of Body Mass Index Among US Adults, 1999–2010. *JAMA*. 2012; 307(5):491–497.
35. Coulston AM: Obesity as an epidemic: facing the challenge. *J Am Diet Assoc* 1998, 98 (10 Suppl 2):S6-S8.
36. Zipfel S, Lowe B, Herzog W: Eating behavior, eating disorders, and obesity. *Ther Umsch* 2000, 57:504-510
37. Lissner L, Steen SN, Brownell KD: Weight reduction diets and health promotion. *Am J Prev Med* 1992, 8:154-158.
38. Bowerman S, Bellman M, Saltsman P, Garvey D, Pimstone K, Skootsky S, Wang HJ, Elashoff R, Heber D: Implementation of a primary care physician network obesity management program. *Obese Res* 2001, 9 (Supplement 4L):321S-325S.
39. Leijon M, Hensing G, Alexanderson K: Sickness absence due to musculoskeletal diagnoses: association with occupational gender segregation. *Scand J Public Health* 2004, 32:94-101.
40. Buckwalter JA, Goldberg VM, Woo SL: Musculoskeletal Soft Tissue Aging: Impact on Mobility American Academy of Orthopedic Surgeons Symposium. Rosemont, IL; 1993.
41. Felson DT: Weight and osteoarthritis. *Am J Clin Nutr* 1996, 63:430-432.
42. Bays HE: Adiposopathy: is sick fat a cardiovascular disease? *J Am Coll Cardiol* 2011, 57:2461–2473.
43. Bays H: Adiposopathy, diabetes mellitus, and primary prevention of atherosclerotic coronary artery disease: treating “sick fat” through improving fat function with antidiabetes therapies. *Am J Cardiol* 2012, 110(suppl):4B–12B
44. Kashgrai A. Obesity - Is it a disease? The Practitioner East Mediterranean Edition, Mediselect Publishing 1994;5:900-2
45. Benget L, Tahiya B, Ake A. Obesity and Osteoarthritis: A Retrospective Study in a Saudi Arabian Primary Health Care Center. *Saud Med J* 1991;12: 42-3.
46. Orvieto R, Rand N, Lev B, et al. Low Back Pain and Body Mass Index. *Mil Med* 1994;159:37-8