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Managing pain in obese patients

Meeting weighty challenges

By Yvonne D'Arcy, MS, RN, CRNP, CNS

MS. S IS POSTOPERATIVE day one after a total knee arthroplasty. At 66 in (168 cm), she weighs 325 lb (147.4 kg) for a body mass index (BMI) of 52.5. (See *Sorting out weight by BMI*.) When she's had surgery in the past, recovery has been very difficult. She states that after her last surgery, she spent several days in the ICU due to "breathing problems" from pain medications.

Given her history and need for careful monitoring, she's placed in an ICU step-down unit. She rates her current pain intensity at 7/0-10. She has patient-controlled analgesia (PCA) without a basal (continuous) infusion programmed to deliver very-low-dose hydromorphone every 20 minutes as needed. After activating the PCA to get better pain control, she becomes sedated and falls asleep while talking to you and is difficult to rouse. Because of her body habitus, she can't effectively move to reposition herself in the bed.

Ms. S has poorly controlled type 2 diabetes and coronary artery disease. She isn't a candidate for nonsteroidal anti-inflammatory drug (NSAID) use because of cardiovascular disease, the bleeding risk following joint replacement, and increased serum creatinine levels.[1,2]

When her nurse assesses Ms. S, he realizes she has poor pain relief and compromised respiratory status. How will he manage Ms. S's pain while trying to optimize her respiratory function and meet her need for postoperative mobilization?

Ms. S is one of the growing number of patients whose healthcare is complicated by obesity and other comorbidities, such as diabetes and cardiovascular disease. By definition, she's classified as morbidly obese, obesity class III (BMI greater than or equal to 40.0), and the healthcare

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issues that result from her obesity will complicate normal postoperative care.[3] To help nurses better understand the problem of pain management in obese patients, this article provides information on the growing problem of obesity, comorbidities that are common in these patients, and guidance on managing their pain.

Obesity and pain

Obesity is a quiet epidemic that's growing throughout the world, including in the United States. Worldwide, about 1.5 million people are considered obese.[4,5] If the present trends continue, by 2030, 58% of the world's population will be considered obese or overweight.[6] The two biggest reasons for this problem are poor diet and lack of exercise, according to the World Health Organization. Adding to this problem is the burden of noncommunicable diseases related to obesity, such as cardiovascular disease, diabetes, and certain cancers, which account for 60% of global deaths.[7]

The story is similar in the United States. Based on responses to a Gallup survey of over 1 million people conducted from 2008 to 2010, only 19.2% of respondents could be classified as low-normal BMI (BMI 24.9 or less).[8] When questioned about pain, the respondent group classified as overweight (BMI of 25 to 29.9) reported 20% more pain.[9]

Obesity seems to increase pain, with the heaviest patients having the highest incidence.

Those in the heaviest group, obese class III, reported daily pain at rates 254% higher than for those in the normal weight BMI group.[8] Although specific information about pain and obesity is scant, these single survey results indicate that obesity seems to increase pain, with the heaviest patients having the highest incidence of pain.

Pain may not be the most important topic during an obese patient's visit to a healthcare provider. Only a brief time is usually allotted for the appointment, and managing these patients' multiple comorbidities, such as diabetes, hypertension, and dyslipidemia, takes up most of it. Although the patients may have diabetic neuropathy or low back pain related to their obesity, these may seem like lower priorities than glycemic control or hypertension management.

Obesity is the product of many years of inactivity and/or poor diet, sometimes starting at a very early age. In a study of 3,376 adolescents (1,424 boys; mean age, 17.8 years) in the United Kingdom with 7% of the study participants being obese, 44.7% of the respondents reported pain in the previous month that lasted for a day or longer.[10] The respondents also reported many musculoskeletal disorders, including:

- low back pain, 16.3%
- shoulder pain, 9.6%
- upper back pain, 9.4%
- neck pain, 8.9%
- knee pain, 8.7%
- ankle and foot pain, 6.8%[10]

Pain reports were more prevalent in the obese adolescents, who reported more chronic regional pain and knee pain at higher intensities than their nonobese peers.

In another large population study of 7,373 Norwegian adolescents, sedentary lifestyle and pain were associated with only the girls in the survey group.[11] In both boys and girls, being overweight was associated with increased potential for pain and negative lifestyle factors such as depression and anxiety; chronic pain was associated with higher levels of disability.[11]

For healthcare providers, the link between obesity and chronic pain can provide a way to encourage adolescents to be more active and follow a healthy diet. But some patients

Sorting out weight by BMI

Classification	BMI
Underweight	<18.5
Normal weight	18.5 to 24.9
Overweight	25 to 29.9
Obese class I	30 to 34.9
Obese class II	35 to 39.9
Obese class III (morbid obesity)	>40

Source: Kulie T, Slattengren A, Redmer J, Counts H, Eglash A, Schrager S. Obesity and women's health: an evidence-based review. *J Am Board Fam Med.* 2011;24(1):75-85.

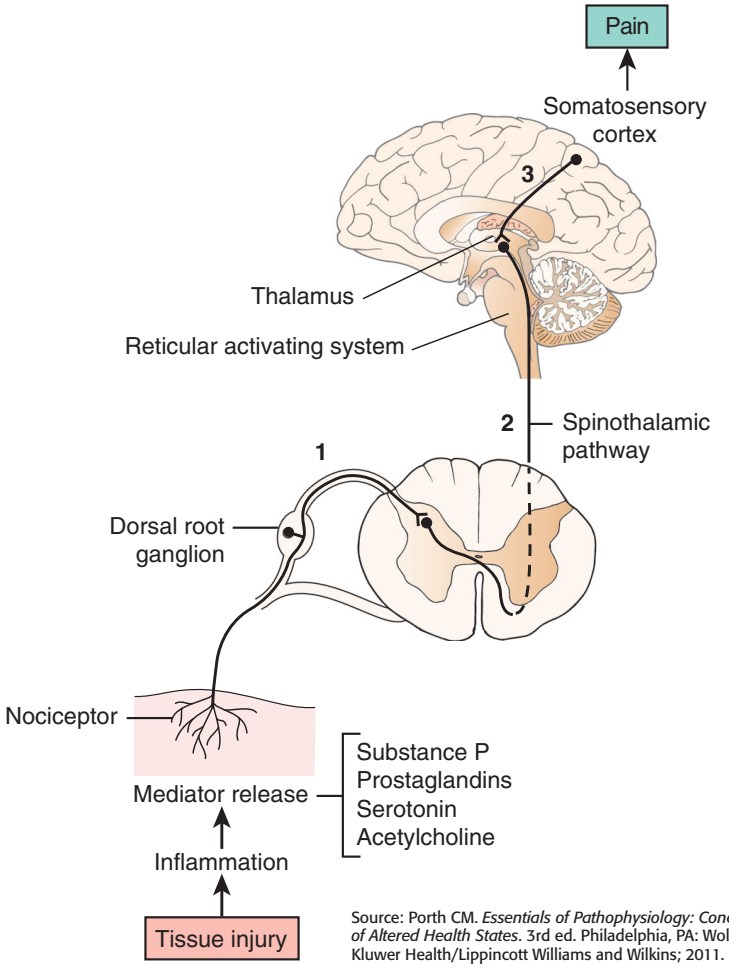
who change their lifestyle and lose weight still have problems associated with their formerly obese body, such as developing low back pain or joint pain caused by cartilage damage when the patient was obese.

Some healthcare providers who treat obese patients encourage only weight loss. Unfortunately, it isn't that simple. Genetic and metabolic factors that contribute to the complete patient picture need to be considered as well.

Obese patients may have had many negative experiences in their lives, including interactions with healthcare providers who may see obese patients as people who've created their own problems. Nurses and other healthcare professionals should allow time to listen to their patients and encourage them to participate in care discussion and planning. Validation of the pain is an important aspect of engaging the patient in trying new pain control strategies.[12] Above all, help the patient set goals that are realistic and achievable.

Higher BMIs can be directly related to a greater incidence of painful conditions. Women diagnosed with osteoarthritis have a BMI 24% higher than women with normal BMIs.[13] Joints degenerate more quickly with increased weight.[13] Many obese patients have low back pain because obesity stresses the spinal structures with an increased workload.[13] Research indicates that obesity is also an exacerbating factor for migraine headache.[14]

Tracing the pathophysiology of pain



Source: Porth CM. *Essentials of Pathophysiology: Concepts of Altered Health States*. 3rd ed. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams and Wilkins; 2011.

What's metabolic syndrome?

Current Adult Treatment Panel III criteria define the metabolic syndrome as the presence of any three of the following five traits:

- Abdominal obesity, defined as a waist circumference in men >102 cm (40 in) and in women >88 cm (35 in)
- Serum triglycerides ≥150 mg/dL (1.7 mmol/L) or drug treatment for elevated triglycerides
- Serum high-density lipoprotein (HDL) cholesterol <40 mg/dL (1 mmol/L) in men and <50 mg/dL (1.3 mmol/L) in women or drug treatment for low HDL-C
- BP ≥130/85 mmHg or drug treatment for elevated BP
- Fasting plasma glucose ≥100 mg/dL (5.6 mmol/L) or drug treatment for elevated blood glucose.

Source: U.S. Department of Health and Human Services. National Cholesterol Education Program ATP III Guidelines At-A-Glance Quick Desk Reference. 2001. http://www.nhlbi.nih.gov/files/docs/guidelines/atglance.pdf.

The BMI is a helpful tool to determine the likelihood that the patient will develop pain-related comorbidities such as painful diabetic neuropathy. The longer patients have been obese and the more they weigh, the more body fat they have. More body fat causes increased insulin resistance, which is linked to metabolic syndrome.[15] Metabolic syndrome is a multifaceted disorder that includes hypertension, abdominal obesity, elevated fasting plasma glucose, and dyslipidemia. (See *What's metabolic syndrome?*) The syndrome can be significantly debilitating and lead to higher rates of diabetes and cardiovascular disease.[16] (See *Tracing the pathophysiology of pain*.)

Comorbidities of obesity

When caring for an overweight or obese patient, assess for pain related to these disorders most commonly seen in these patients.

• ***Fibromyalgia (FM)***. Obesity is a common comorbidity of FM.[17,18] Research indicates that 32% to 50% of patients with FM are obese and 21% to 28% are overweight.[19,20] FM affects 3% to 5% of the American population and more women than men.[17,18]

In general, FM is characterized by chronic widespread musculoskeletal pain on both sides of the body. For a diagnosis of FM, a tender point examination should be positive for pain in at least 11 of 18 specific tender points.[21] (See *Visualizing tender points.*) Associated conditions include sleep disturbances, chronic fatigue, functional disability, cognitive disturbances, headache, paresthesias, and irritable bowel syndrome.[12]

In a study of 215 patients with FM, 47% were overweight with another 30% classified as obese. The obese patients reported increased sensitivity to tender point palpation in the lower body, decreased physical strength and body flexibility, and shorter sleep duration with increased restlessness during sleep.[18] Despite these findings, the only link identified between obesity and FM is that obesity contributes to the continued presence of FM and increases the severity of the disorder. Research is ongoing.

• ***Low back pain.*** In the general population, the annual prevalence of low back pain ranges from 25% to 60%.[22] Current findings indicate that a patient who's obese at age 23 faces a risk for low back pain within 10 years. The older the obese patient becomes, the greater the probability of developing this disorder.[15] Other research also indicates that a patient with a BMI above 30 is at a greater risk of low back pain.[23]

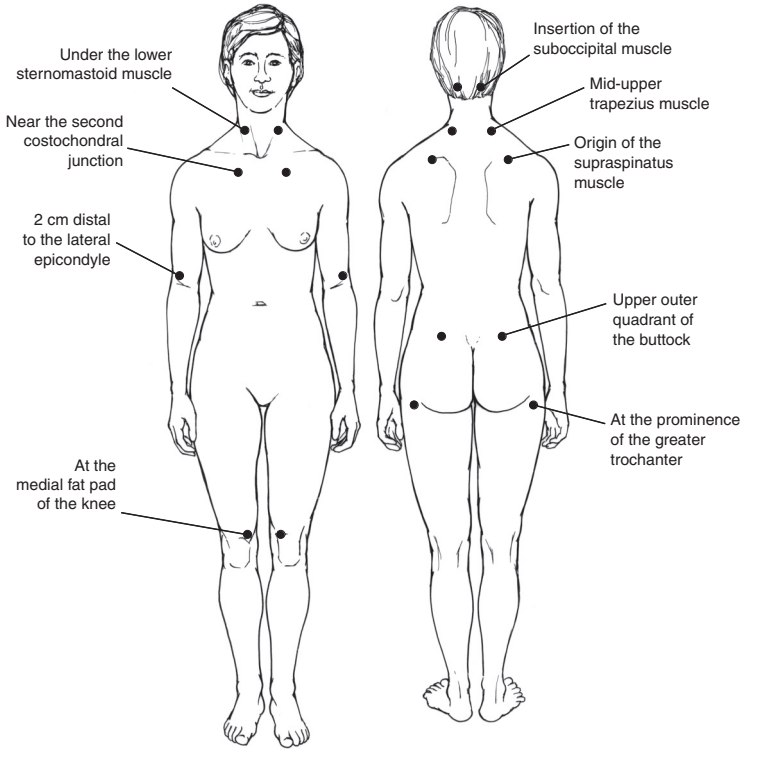
A large meta-analysis of 33 studies indicated that overweight and obesity increase the risk of low back pain and have a strong association with patients seeking help from healthcare for it.[22] In people who are obese, the cause of low back pain is considered to be mechanical stress on the intervertebral discs and the indirect effect of atherosclerosis decreasing blood flow to the lumbar spine.[15]

To the healthcare provider, the solution to low back pain seems simple: lose weight. However, studies demonstrate that this may not always be true. In a nonsurgical weight loss program, patients reported little improvement after losing weight.[23] But in a bariatric surgery program, morbidly obese patients had a significant improvement in low back pain.[23]

No matter what approach is selected, any multidisciplinary program with weight loss and exercise should also include diet and behavioral modification for the best results. Opioids aren't currently recommended for treating low back pain in any patients at this time.[5]

• ***Osteoarthritis (OA)***, a common cause of joint pain and disability, is characterized radiographically by joint space narrowing, subchondral sclerosis, marginal osteophytes, and subchondral cysts. Along with advanced age, being female and obese are two of the biggest risk factors for OA. Patients considered overweight had a 2.2 increased risk for developing knee OA when compared with their normal-weight counterparts.[24] In the United Kingdom, an estimated 69% of knee replacements in middle-aged women can be attributed to obesity.[25]

Visualizing tender points



Tenderness on palpation of at least 11 of these sites in a patient with at least a 3-month history of diffuse musculoskeletal pain is the recommended diagnostic standard for fibromyalgia.

Source: Werner R, Benjamin BE. *A Massage Therapist's Guide to Pathology*. 2nd ed. Baltimore, MD: Lippincott Williams & Wilkins; 1998.

Many patients with OA try weight loss and lifestyle changes. If these fail, knee replacement is one possible option. For patients who are morbidly obese, rehabilitation after surgery can be limited by obesity-related deconditioning.

Treatment choices

Pain management options for obese patients include not only medications but other therapies, such as acupuncture and regional analgesia. No matter what the source of the pain, a multimodal approach is required to achieve the best outcomes. Consider what other options might provide Ms. S, our postoperative patient, with better pain relief.

Medication efficacy can be affected by the ratio of adipose tissue to lean body tissue. Protein binding is thought to be limited in patients with higher ratios of adipose tissue. This allows for increased concentrations of medications in free plasma.[12] Obesity increases the total volume of both lean and adipose tissue when compared with patients of the same height, age, and gender.[26] Because of this difference, medications must be individualized and dosed appropriately for obese patients.

Other factors that can affect medication use include fatty changes in the liver affecting hepatic clearance and decreased renal function. Renal dysfunction can alter creatinine clearance, and obese patients may also have decreased cardiac performance, reducing tissue perfusion.[26] Research has shown that obese patients have lower clearance levels in the CYP450 pathway, a major route for processing pain medications, but increased clearance levels in the CYP PIA2, CYP2C9, CYP2C19, and CYP2D6 pathways.[4] If these differences affect how the body handles the pain medications, the patient will have less pain control.

A specific polymorphism associated with a decrease in mechanical pain sensitivity and an increase in morphine and fentanyl needed for pain relief is found in the G allele of the OPRM1 gene in the mu (opioid) receptor and is more common in obese patients than in normal-weight patients.[4] For patients who are obese, morphine may cause respiratory issues and fentanyl may not be ideal because of its lipid solubility. Although these patients need more medication, they can't get it due to their impaired respiratory function.

Obese patients need less local anesthetic than nonobese patients when epidural catheters are placed due to decreased spinal volumes.

Obese patients can tolerate opioids but require even more careful monitoring for sedation and respiratory depression.[27] Reviews indicate two factors that significantly contribute to an increased risk of pulmonary complications for obese patients: the site of the surgery and coexisting obstructive sleep apnea (OSA).[5] If the surgical site is thoracic or abdominal, the patient's respiratory function will be impaired physiologically. OSA is a common source of respiratory issues, which means the patient will need closer monitoring postoperatively if opioids have been used.

Careful patient selection, dosage adjustments, and monitoring are needed when obese patients are prescribed opioids for postoperative pain. Opioid requirements aren't related to body surface area, age, gender, or anesthetic regimen.[5] Patients like Ms. S can use opioids in PCA at the usual dosage but require more frequent monitoring, supplemental oxygen, capnography or continuous pulse oximetry, and dose titration as needed. Basal PCA infusions aren't recommended for obese patients on PCA. Each opioid-tolerant patient is a special case requiring careful planning.

General recommendations for postoperative pain management for obese patients include:

- multimodal analgesia using regional and opioid-sparing techniques.
- avoidance of all central nervous system sedatives, especially when combined with opioids.
- noninvasive ventilation with supplemental oxygen.
- early mobilization.
- elevating the head of the bed to 30 degrees unless contraindicated.
- using continuous pulse oximetry, which should be coupled with end-tidal carbon dioxide monitoring (capnography) for added safety.
- management of BP.
- placement in a high-acuity area such as an ICU or step-down unit with continuous monitoring during the postoperative period until oxygen saturation levels are greater than 90% while patients are asleep without supplemental oxygen.[5,27]

Postoperative pain relief needn't rely solely on opioids. Using

combinations of medications such as I.V. acetaminophen, NSAIDs if the patient is a good candidate, or coanalgesics (also called adjuvant analgesics) can help provide pain relief while reducing sedation. Using a nonopioid coanalgesic medication such as pregabalin or gabapentin can ease pain and also provide an opioid-sparing effect.[5,27]

Regional analgesia with a local anesthetic is also a good option for additional pain control. Both epidural and regional analgesia are recommended for use with obese patients. Femoral nerve catheters or subcutaneous catheters placed along the surgical incision can reduce pain and decrease the need for opioids.[28] The catheter reservoir is filled with a local anesthetic solution that infuses continuously into the insertion site.[29] Ultrasound can be used to help locate the landmarks needed to find the correct site for placement.

Obese patients will need less local anesthetic than nonobese patients when epidural catheters are placed. This is due to decreased spinal fluid volumes in obese patients.[26]

For patients with intact skin surfaces, using a lidocaine patch can provide localized pain relief in specific areas.

Noninvasive techniques such as aromatherapy or relaxation techniques also help decrease pain and provide distraction. In one study, aromatherapy decreased morphine consumption in the postanesthesia unit, but more research is needed.[5] Relaxation tapes, music, and techniques such as Reiki or therapeutic touch can help to provide relaxation that can decrease pain and help the patient cope during the postoperative period.

For outpatients, physical therapy is recommended. It can be something as simple as walking, pool therapy, or yoga. As always, the healthcare provider needs to be aware of the patient's special needs and individualize treatments to obtain the best outcome possible.

Validation of the pain is an important aspect of engaging the patient in trying new pain control strategies.

Closing the loop on Ms. S

Ms. S's postoperative pain management problems are typical for obese patients. Her obesity makes it difficult to care for her, provide maximum pain management, maintain optimal respiratory status, and ambulate her. However, she's in the best setting for meeting her postoperative needs, the ICU step-down unit. She's being continuously monitored and is receiving supplemental oxygen titrated to a goal Spo_2 of 92% to 94%, but she's becoming oversedated with her PCA opioids, even without a basal infusion. Adding additional medications can help reduce her need for opioids to control her pain. She may benefit from these strategies:

- adding I.V. acetaminophen to her regimen because NSAIDs are contraindicated postoperatively. Her nurse will need to assess her liver function to determine if the medication is suitable.
- prescribing pregabalin or gabapentin to help reduce her opioid needs. Because she has some kidney dysfunction, she'll need renal dosing.
- using either an epidural or a femoral nerve catheter with local anesthetic to help decrease her need for opioids.
- adding aromatherapy, relaxation tapes, or music to help relax and distract Ms. S.
- giving Ms. S positive reinforcement about how her new knee will improve her quality of life and reduce her pain to encourage her to move out of bed, work with physical therapy, and ambulate. Teaching Ms. S how to move from the bed efficiently will make her feel more confident.

After adding some additional medication and complementary techniques, Ms. S rates her pain intensity at 4/0-10, better than her goal of 5/0-10, and she's able to work with physical therapy to rehabilitate her new knee. ■

REFERENCES

1. Bennett JS, Daugherty A, Herrington D, Greenland P, Roberts H, Taubert KA. The use of nonsteroidal anti-inflammatory drugs (NSAIDs): a science advisory from the American Heart Association. *Circulation.* 2005;111(13):1713-1716.

2. *Nursing2015 Drug Handbook*. Philadelphia, PA: Wolters Kluwer; 2015.

3. Cnattingius S, Villamor E, Lagerros YT, Wikström AK, Granath F. High birth weight and obesity—a vicious circle across generations. *Int J Obes (Lond).* 2012;36(10):1320-1324.

4. Lloret-Linares C, Lopes A, Declèves X, et al. Challenges in the optimisation of post-operative pain management with opioids in obese patients: a literature review. *Obes Surg.* 2013;23(9):1458-1475.

5. Schug SA, Raymann A. Postoperative pain management of the obese patient. *Best Pract Res Clin Anaesthesiol.* 2011;25(1):73-81.

6. Kelly T, Yang W, Chen CS, Reynolds K, He J. Global burden of obesity in 2005 and projections to 2030. *Int J Obes (Lond).* 2008;32(9):1431-1437.

7. World Health Organization. Global Strategy on Diet, Physical Activity and Health. 2014. http://www.who.int/dietphysicalactivity.

8. Stone AA, Broderick JE. Obesity and pain are associated in the United States. *Obesity (Silver Spring)*. 2012;20(7):1491-1495.

9. National Institutes of Health. National Heart, Lung, and Blood Institute. Calculate your Body Mass Index. http://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmicalc.htm.

10. Deere KC, Clinch J, Holliday K, et al. Obesity is a risk factor for musculoskeletal pain in adolescents: findings from a population-based cohort. *Pain*. 2012;153(9):1932-1938.

11. Hoftun GB, Romundstad PR, Rygg M. Factors associated with adolescent chronic non-specific pain, chronic multisite pain, and chronic pain with high disability: the Young-HUNT Study 2008. *J Pain*. 2012;13(9):874-883.

12. D'Arcy Y. *A Compact Clinical Guide to Women's Pain Management: An Evidence-Based Approach for Nurses*. New York, NY: Springer Publishing Company; 2014.

13. Sowers MF, Yosef M, Jamadar D, Jacobson J, Karvonen-Gutierrez C, Jaffe M. BMI vs. body composition and radiographically defined osteoarthritis of the knee in women: a 4-year follow-up study. *Osteoarthritis Cartilage*. 2008;16(3):367-372.

14. Bond DS, Vithiananthan S, Nash JM, Thomas JG, Wing RR. Improvement of migraine headaches in severely obese patients after bariatric surgery. *Neurology*. 2011;76(13):1135-1138.

15. Kulie T, Slattengren A, Redmer J, Counts H, Eglash A, Schrager S. Obesity and women's health: an evidence-based review. *J Am Board Fam Med*. 2011;24(1):75-85.

16. American Heart Association. High blood pressure and metabolic syndrome. 2014. http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/AboutHighBloodPressure/High-Blood-Pressure-and-Metabolic-Syndrome_UCM_301801_Article.jsp#.

17. Ursini F, Naty S, Grembiale RD. Fibromyalgia and obesity: the hidden link. *Rheumatol Int*. 2011;31(11):1403-1408.

18. Okifuji A, Donaldson GW, Barck L, Fine PG. Relationship between fibromyalgia and obesity in pain, function, mood, and sleep. *J Pain*. 2010;11(12):1329-1337.

19. Neumann L, Lerner E, Glazer Y, Bolotin A, Shefer A, Buskila D. A cross-sectional study of the relationship between body mass index and clinical characteristics, tenderness measures, quality of life, and physical functioning in fibromyalgia patients. *Clin Rheumatol*. 2008;27(12):1543-1547.

20. Okifuji A, Bradshaw DH, Olson C. Evaluating obesity in fibromyalgia: neuroendocrine biomarkers, symptoms, and functions. *Clin Rheumatol*. 2009;28(4):475-478.

21. Wolfe F, Smythe HA, Yunus MB, et al. The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis Rheum*. 1990;33(2):160-172.

22. Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E. The association between obesity and low back pain: a meta-analysis. *Am J Epidemiol*. 2010;171(2):135-154.

23. Roffey DM, Ashdown LC, Dornan HD, et al. Pilot evaluation of a multidisciplinary, medically supervised, nonsurgical weight loss program on the severity of low back pain in obese adults. *Spine J*. 2011;11(3):197-204.

24. Neogi T, Zhang Y. Osteoarthritis prevention. *Curr Opin Rheumatol*. 2011;23(2):185-191.

25. Liu B, Balkwill A, Banks E, Cooper C, Green J, Beral V. Relationship of height, weight and body mass index to the risk of hip and knee replacements in middle-aged women. *Rheumatology (Oxford)*. 2007;46(5):861-867.

26. Leykin Y, Miotto L, Pellis T. Pharmacokinetic considerations in the obese. *Best Pract Res Clin Anaesthesiol*. 2011;25(1):27-36.

27. D'Arcy Y. Pain and obesity. *Nurs Manage*. 2012;43(3):20-25.

28. D'Arcy Y. *A Compact Clinical Guide to Acute Pain Management: An Evidence-Based Approach*. New York, NY: Springer Publishing; 2011.

29. Braun. ON-Q Pain Buster. 2014. http://www.bbraun.com/cps/rde/xchg/bbraun-com/hs.xsl/8782.html.

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The author has participated on advisory boards for Pfizer and AstraZeneca and has consulted for Pfizer.

This article has been reviewed and all potential or actual conflicts have been resolved.

The author and planners have disclosed that they have no other potential conflicts of interest, financial or otherwise.

DOI-10.1097/01.NURSE.0000459787.85677.da

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