

Implementing an Osteoporosis Screening and Treatment Protocol for Patients with Fragility Fractures

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DNP Quality Improvement Project

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Abstract

Osteoporosis is a global health concern that can be identified and treated with appropriate screening and medical management. The number of fragility fractures that occur will continue to rise with an aging population and is a key predictor of osteoporosis. However, many patients with fragility fractures do not receive the recommended post-fracture care. Poor bone health places patients at increased risk for secondary fracture and has serious emotional, physical, and financial consequences (Kanis et al., 2021). Understanding the benefit of identifying osteoporosis and preventing secondary fractures in an orthopedic clinic has proven advantageous in optimizing bone health and reducing fracture risk. This paper describes a project that includes researching the current evidence-based practice for implementing an osteoporosis screening and treatment protocol for patients presenting to Texas Tech University Health Sciences Center El Paso Orthopedic Surgery and Rehabilitation Department Hand Service. The project aimed to close the post-fracture treatment gap, promote bone health optimization by applying secondary fracture prevention efforts, positively impact patient care while reducing health-care costs.

Implementing an Osteoporosis Screening and Treatment Protocol for Patients with Fragility Fractures

Osteoporosis is a significant health issue, and early identification in patients with fragility fractures can prevent secondary fractures and improve health outcomes. Osteoporosis is a disease characterized by low bone strength and mass to the degree that the bone becomes fragile; it causes at least nine million fractures worldwide each year (National Institute for Health and Care Excellence [NICE], 2012). There is an identified need to improve screening and treatment in patients considered at risk for underlying osteoporosis. Fragility fractures are sustained after low-energy trauma that would not typically result in a fracture; these fractures represent a significant sign of osteoporosis (Lems et al., 2017). Fragility fractures result in severe pain and disability and can have a negative impact on quality of life (NICE, 2012). Identifying individuals with increased fracture risk is essential to prevent secondary fracture. Currently, there is a low rate of identification of osteoporosis in patients with fragility fractures, although convincing evidence supports screening for secondary fracture prevention to improve patient outcomes (Ganda et al., 2013).

Problem Description

Osteoporosis is a chronic disease that is a global concern and bone health should be prioritized before a fracture occurs. The most common locations for fragility fractures are the femoral neck, vertebral body, and distal radius, and these should be considered potentially osteoporosis-related fractures (U.S. Department of Health and Human Services, 2004). Fragility fractures are a significant cause of disability, death, and health-care utilization (Neuman et al., 2011). As a result, fragility fractures can have serious physical, emotional, and financial consequences (Kanis et al., 2021). The American Academy of Orthopedic Surgeons (AAOS)

released a position statement calling for osteoporosis and bone health to become a national public health priority and described osteoporosis as a growing epidemic by emphasizing the devastating consequences of osteoporotic fractures, including excess mortality, morbidity, and economic costs (AAOS, 2014). The many identified risk factors for fragility fractures include reduced bone mass, the use of oral or systemic glucocorticoids, low body weight, age, sex, previous fracture, and a family history of osteoporosis (NICE, 2012). Perimenopausal and postmenopausal women are also more susceptible to osteoporosis. It is critical to note that as average life expectancy increases, the incidence of osteoporosis and fragility fracture will also rise (NICE, 2012).

According to the American Orthopedic Association (2022), osteoporosis is the most common bone disease in the United States (U.S.), and it is a “silent condition” until a fracture occurs (AOA, 2022a). It contributes to more than two million fragility fractures annually, which indicates that the occurrence of osteoporotic fracture is higher than that of stroke, myocardial infarction, and breast cancer combined (U.S. Department of Health and Human Services, 2004). These fragility fractures will result in direct health-care costs totaling over \$19 billion (AOA, 2022b). Again, these numbers are expected to substantially increase due to an aging population. Unfortunately, testing for osteoporosis following a fragility fracture is far from adequate. An estimated 80% of patients with fragility fracture in the U.S. will not receive the appropriate post-fracture care for osteoporosis (AOA, 2022b). These numbers are alarming because sustaining a fragility fracture is an indicator of poor bone health and increases secondary fracture risk to 86% (AOA, 2022b).

Multiple factors contribute to the undertreatment of osteoporosis in patients with fragility fractures. According to Queally et al. (2013), one factor contributing to the failure to initiate

appropriate osteoporosis treatment is the lack of knowledge of the disease by the patient and the primary care physician. Additional factors include lack of awareness of current practice guidelines by primary care physicians and orthopedic surgeons, the perception among orthopedic surgeons that they should not be the primary physician to manage this condition, poor compliance with prescribed medications, and a lack of communication among the health-care team involved in treating patients with fragility fractures (Queally et al., 2013). These individual fractures are considered sentinel events that provide a teachable moment for patients, physicians, and other health-care professionals to improve bone health and prevent future fractures (Bunta, 2011).

Currently, at Texas Tech University Health Sciences Center El Paso (TTUHSC EP), the orthopedic hand service does not follow any standardized protocol for screening for osteoporosis in patients with a possible fragility fracture. The treatment approach is focused on surgical management and rehabilitation planning. A patient who sustains a fracture presents to the emergency department or hand clinic, and the orthopedic team determines whether the patient will be treated operatively or nonoperatively. Regardless of the treatment approach, these patients will follow up in the orthopedic clinic. This early contact with the orthopedic team creates an ideal opportunity to improve osteoporosis screening and treatment rates in these post-fracture patients.

Available Knowledge

A literature review was performed to find the most current and effective screening tools and treatment guidelines to close the osteoporosis treatment gap following a fracture. The search terms used included “osteoporosis,” “fracture,” “fragility fracture,” “secondary fracture prevention,” and “post-fracture health-care gap.” The databases used were CINAHL, PubMed,

Medline, Embase, and Cochrane Library. Using these databases and keywords, I was able to find numerous systematic reviews and randomized controlled trials (RCT) on clinical practice standards on osteoporosis and fragility fracture risk to improve patient outcomes. The literature review indicated that orthopedic providers play a crucial role in addressing bone health concerns with patients who have sustained an osteoporotic fracture (AOA, 2022a; Bunta, 2011; NICE, 2012).

A multidisciplinary care team and systematic approach must be utilized when evaluating bone health in patients with fragility fracture (Bunta, 2011; Lems et al., 2017; Rozentel et al., 2008). A multidisciplinary approach with the orthopedic team and the primary care physician can effectively help close the osteoporosis care gap. The literature review demonstrated that the orthopedic team could initiate the screening process and then refer the patient to the primary care physician or specialists for management of osteoporosis if needed (NICE, 2012; Rosenwasser & Cuellar, 2016; Solomon et al., 2007). An RCT conducted by Solomon et al. (2007) established that primary care physicians were more likely to improve the management of osteoporosis after receiving education and reminders in osteoporosis care for at-risk patients.

The recommendation made by the guidelines is that every patient 50 years and older with a recent fracture should be evaluated for osteoporosis to prevent secondary fractures (Lems et al., 2017; NICE, 2012). Osteoporosis can be evaluated by using a risk assessment tool, several of which are available. The Bone Health and Osteoporosis Foundation (BHOFF), the U.S. Preventive Services Task Force (USPSTF), NICE, WHO, and AAOS all agree that the FRAX tool is widely used and a helpful starting point for assessing fracture risk (Bone Health and Osteoporosis Foundation [BHOFF], 2021; Curry et al., 2018; Kanis et al., 2021; NICE, 2012). The FRAX tool identifies a person's fracture probability over a 10-year interval (NICE, 2012). The score is

calculated by assessing risk factors: age, sex, weight, height, previous fracture, parental hip fracture, smoking status, current glucocorticoid use, history of rheumatoid arthritis, secondary osteoporosis, and alcohol intake (NICE, 2012). The FRAX score can be calculated with or without a bone mineral density (BMD) score. If a patient meets an intervention threshold, it is recommended that a BMD be obtained using dual-energy x-ray absorptiometry (DEXA). The intervention threshold determined by the BHOFF is a 3% or higher probability of hip fracture or a 20% or higher likelihood of other major osteoporotic fracture (BHOFF, 2021).

A systematic review by Merlijn et al. (2020) found that population screening using fracture risk assessment tools and BMD significantly reduced osteoporotic fractures and should be the standard of care. A DEXA scan is used to assess bone density at different body sites, with the most accurate site being the proximal femur (NICE, 2012). DEXA is considered the gold standard when diagnosing osteoporosis. The results of a DEXA scan are reported using a T-score; according to the World Health Organization (WHO), a T-score of 2.5 or more standard deviations below that of a healthy young adult indicates that a person has osteoporosis (WHO, 2007). Evidence suggests that patients referred directly from the orthopedic clinic for a DEXA scan have improved osteoporosis diagnosis and treatment rates compared with those referred back to their primary care physician to first obtain the order (Queally et al., 2013). To highlight, an order initiated on the first outpatient orthopedic clinic visit for a DEXA scan, after meeting the intervention threshold on the FRAX questionnaire, is a promising step the orthopedic team can take to identify osteoporosis in a patient with a fragility fracture.

Educating patients is critical in osteoporosis screening to help patients make informed decisions and improve outcomes. The AOA recommends educating patients on weight-bearing and resistance exercises, fall prevention, smoking cessation, and limiting alcohol intake to less

than three drinks per day (Cosman et al., 2014; Tosi et al., 2008). The literature demonstrates that these activities can improve bone health. The overarching principle of education is further established by the European League Against Rheumatism (EULAR) and the European Federation of National Associations of Orthopedics and Traumatology (EFORT) with an emphasis on patient education for improved bone health, which has been incorporated into their guidelines (Lems et al., 2017). Another recommendation is supplementation of calcium and vitamin D. The evidence supports that calcium and vitamin D supplementation is associated with reducing falls and nonvertebral fractures (Lems et al., 2017). These results demonstrate a clear benefit to closing the osteoporosis treatment gap post-fracture.

Rationale

Improving the management of fragility fractures has gained global attention from leading experts. The International Osteoporosis Foundation (IOF) has developed a campaign called “Capture the Fracture” to support the implementation of a framework for best practices for secondary fracture prevention (Akesson et al., 2013). Similarly, the AOA developed a national post-fracture initiative called “Own the Bone,” highlighting 10 measures to positively improve osteoporosis treatment (AOA, 2022a). The AAOS fully supports the efforts of these organizations and discusses changes in legislation and the current regulatory environment with the Center for Medicare and Medicaid Services (CMS) and the Joint Commission (Naso & Shaffer, 2019). CMS is considering an osteoporosis condition-based bundle and alternative payment models to improve outcomes and lower costs (Naso & Shaffer, 2019). The National Committee on Quality Assurance and the Physician Quality Reporting Initiative have already identified clinical performance measures to move fracture prevention efforts forward (Shams et al., 2011). Participating in these initiatives and dedicating efforts to prevent subsequent fractures

in these high-risk individuals can ensure compliance with these quality measures. After performing an extensive literature review, I found that the research supported a multidisciplinary approach for the screening and treatment of osteoporosis in patients with fragility fracture. Bridging the gap in care for the post-fracture patient using evidence-based guidelines improves the quality of care without posing additional risks.

Specific Aims

The aim of this project was to initiate a bone health protocol using an osteoporosis screening tool, DEXA testing when indicated, patient education, and medications in patients with fragility fractures in the hand service at TTUHSC EP Orthopedic Surgery and Rehabilitation Clinic. Current literature and evidence-based guidelines support identifying, evaluating, and treating patients with a recent fragility fracture at risk for osteoporosis to prevent secondary fracture.

Methods

The literature review produced evidence to support the guidelines implemented by NICE, EULAR/EFORT, and the AOA Own the Bone initiative to promote optimal care by implementing an osteoporosis screening and treatment protocol. It was determined that this was a treatment gap in the hand service at the TTUHSC EP Orthopedic Clinic after performing a 10-day reflective practice with a review of patients. After establishing best practice guidelines with supporting evidence and support from the supervising physician, I applied for institutional review board (IRB) approval from the University of Texas at El Paso (UTEP). It was determined that this was not a human subject research project under the review of the IRB and determined to be a quality improvement (QI) project (Appendix A).

Context

The TTUHSC EP Orthopedic Clinic Hand Service treats a wide range of pediatric and adult orthopedic conditions. This clinic is situated on the U.S.–Mexico border and serves a unique multicultural population. The population of El Paso is more than 700,000, with health disparities and access to health care remaining a challenge for many border residents due to economic limitations, language barriers, lack of transportation, and living in rural areas (TTUHSC, n.d.). The TTUHSC EP Orthopedic Clinic is an academic setting affiliated with the University Medical Center of El Paso (UMC) and El Paso Children’s Hospital (EPCH). UMC is El Paso’s only not-for-profit hospital that serves as the region’s only Level 1 trauma center (UMC, 2022). Patients seen at UMC and EPCH for orthopedic conditions will be referred to the TTUHSC EP Orthopedic Clinic.

Interventions

The QI project utilized the Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model as a translational framework to guide the implementation of best practices into patient care. The first step of this model is the evidence-based practice (EBP) question phase (Johns Hopkins Medicine, 2022). During this phase, an interprofessional team was established that included orthopedic surgeons, advanced practice providers, nurses, occupational therapists, and medical assistants who practice in the hand service at TTUHSC EP. Key stakeholders were also identified, including the orthopedic department, patients and families, and interdisciplinary colleagues. An evidence-based question was developed based on practice observations from the reflection of a 10-day practice log that identified an opportunity to improve the current practice. Using the PICOT format, an EBP question was developed and refined. The PICOT question for this project was as follows:

Population: Males and females, 50 years and older, with fragility fractures

Intervention: Implementation of a bone health protocol

Comparison: No bone health protocol being performed

Outcome: Increase osteoporosis identification and treatment rates

Time: Over a period of 4 weeks

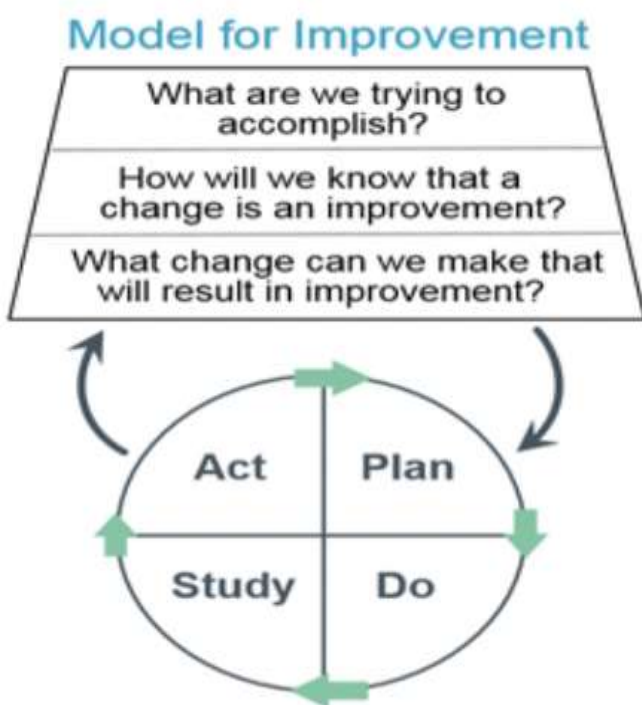
The second phase of the JHNEBP model is searching for evidence (Johns Hopkins Medicine, 2022). As discussed in the Available Knowledge section, an evidence search was conducted during this phase. After performing a comprehensive literature review, the highest level of evidence was selected for use in this project and assessed to ensure high-quality recommendations based on scientific evidence. The evidence was placed in a matrix tool so that a synthesis of the findings could be conducted. The phase was completed after the best evidence-based recommendations were developed.

The project then progressed to the final phase of the JHNEBP model, which involves translation into practice. The model recommends that the first step in this phase is to identify feasibility, fit, and acceptability in the organization (Johns Hopkins Medicine, 2022). The project was developed closely with the supervising orthopedic hand surgeon and the clinic supervisor, who were identified as key stakeholders in adoption of the protocol. To ensure successful implementation, an action plan was created. Objectives were developed, the anticipated start and end dates were established, and observable measures were identified. The project was then presented to the department with the rationale, impact on workflow, and processes discussed. The project was well accepted among the staff, with all questions being answered. The final step in the model is to disseminate the findings. Internal dissemination will take place during the

monthly departmental meeting. A poster and PowerPoint presentation were prepared and will be presented at the Doctor of Nursing Practice scholarly project symposium.

The QI model used during the project is the plan-do-study-act (PDSA) cycle (see Figure 1). The Institute for Healthcare Improvement (IHI) recognizes that this model is beneficial when implementing ongoing changes in a short period (IHI, 2022). These qualities were important in selecting a QI model for this project. The model first addresses three items: setting a specific and measurable aim, establishing measures to determine whether the change was effective, and selecting changes that will result in improvement. These items are discussed throughout the paper. The second step of the model is to test the change by applying the PDSA cycle in the work setting (IHI, 2022). The second step was performed by planning and carrying out the project and then analyzing the data to make changes, refine the process, and incorporate the changes in the workflow.

Figure 1



Study of the Interventions

The QI project identified men and women, 50 years and older, who presented to their first follow-up appointment at TTUHSC EP Hand Service after sustaining a suspected fragility fracture. Each patient completed the FRAX questionnaire to estimate their 10-year probability of fracture. If the patient met the intervention threshold on the FRAX questionnaire, they were given an order to obtain a DEXA scan to assess bone density. The intervention threshold for the FRAX score determined by the BHOF was utilized: a 3% or higher probability of hip fracture or 20% or higher likelihood of other major osteoporotic fracture (BHOF, 2021).

All patients included in the study were given a prescription for supplementation of calcium 1,200 mg and vitamin D 800 mg to be taken daily. Patient education was provided on physical activity, fall prevention, smoking cessation, and limiting excessive alcohol intake. The education was performed orally and a written handout was provided during this clinic visit (Appendix B). Once the DEXA scan results are obtained, a referral letter with recommended care will be generated for the primary care physician for ongoing management of osteoporosis (Appendix C).

Measures

The goal of implementing a bone health protocol is to better identify and evaluate patients at high risk for osteoporosis or a fragility fracture related to low bone density. The measures collected included the number of patients screened with the FRAX questionnaire. Additionally, the numbers of patients provided with education and started on calcium and vitamin D were recorded. Finally, the number of patients who met the criteria for the DEXA scan was reviewed. The collected data were placed in an Excel spreadsheet for analysis.

Analysis

The presented data were descriptive so that the findings could be reported in a meaningful way and allow for a more straightforward interpretation. The data included the number of patients who presented to the clinic with a possible fragility fracture and who were given the FRAX questionnaire. Average age and risk factors for osteoporosis were also analyzed. The number of patients given education and initiated on calcium and vitamin D was collected. Last, the data summarized those patients who qualified for BMD testing.

Ethical Considerations

The first ethical consideration was confidentiality. It was important during this project to keep patients' information confidential and to not violate the Health Insurance Portability and Accountability Act (HIPAA). Another ethical consideration was patient autonomy. Each patient was provided with education and included in the decision-making process of their care, which is a vital component of patient-centered care. A third ethical consideration was justice. It was essential to order BMD testing only for those individuals who qualified based on the FRAX score rather than for every patient who presented to the clinic with a possible fragility fracture. Providing cost-effective care is a guiding principle of health-care justice. Finally, any results or findings were communicated with the patient during the project.

Results

Seventeen patients presented to their first follow-up visit at the hand clinic after sustaining a distal radius fracture that required open reduction and internal fixation and were considered at risk for osteopenia or osteoporosis based on their age and history. They qualified for inclusion in the protocol and were given FRAX questionnaires. Of these patients, 12 met the intervention threshold on the FRAX questionnaire. These 12 patients were given an order for

BMD testing by DEXA, a prescription for supplementation with vitamin D and calcium, and provided oral education and written educational materials about osteoporosis during the clinic visit.

The age range of patients who met the intervention threshold on the FRAX questionnaire was 59 to 92 years. Eight of these patients were female and 4 were male. The average body mass index (BMI) was 25, falling in the category of overweight. All but one of the patients had responded yes to having a previous fracture on the FRAX questionnaire. None of the patients had been screened for or diagnosed with osteoporosis. Eight of the patients were current smokers. The average 10-year probability for a major osteoporotic fracture was 29%, and the average probability of a hip fracture was 13%.

These 12 patients were contacted by telephone to follow up on the status of their DEXA bone scan appointment and initiation of calcium and vitamin D supplementation. Seven of the 12 patients had scheduled their DEXA appointment and had begun supplementation with calcium and vitamin D as prescribed. Three patients stated that they were planning to schedule their DEXA bone scan appointment and to start supplementation. Two of the patients (who were uninsured) expressed concern with the affordability of obtaining a DEXA scan and stated that they did not begin calcium or vitamin D supplementation.

Discussion

This project aimed to implement a bone health protocol in patients 50 years and older with a fragility fracture to prevent secondary fracture. It is vital for orthopedic providers to identify these patients early to screen for osteoporosis and positively affect fracture care. A 10-day reflective practice performed at TTUHSC EP Orthopedic Surgery Hand Service identified this as a treatment gap. Despite an abundance of evidence, there were no standardized practice

protocols in place to address bone health in the hand service before implementing the project. The literature review supported using the FRAX questionnaire, providing education, recommending supplementation with calcium and vitamin D, and ordering a DEXA scan if the patient met the intervention threshold.

Interpretation

The QI project confirmed the feasibility of implementing a bone health protocol in the hand clinic. Screening helped identify post-fracture patients at high risk of a future fracture to promote early intervention and treatment for underlying bone health problems. Incorporating the FRAX questionnaire on the first follow-up clinic visit was straightforward to implement without increasing clinic time. This project helped bring a valuable fragility fracture prevention initiative to the hand clinic that had no uniform protocol in place before implementation. The QI project was well received by the orthopedic surgeon in the hand clinic; the protocol was adopted into practice with the intent to make this a permanent change for secondary fracture prevention after completion of the project. Although no BMD results had been obtained by the project end date, these patients will be closely followed to ensure that they receive appropriate treatment and coordination of care. The project provides a significant opportunity to address the osteoporosis treatment gap at TTUHSC EP Orthopedic Surgery Hand Service and make changes consistent with evidence-based research and health-care reform.

Limitations

Despite the significant improvement in identifying patients who needed post-fracture intervention and treatment, some patients experienced difficulty accessing this care. Many of the patients seen at TTUHSC EP Orthopedic Clinic are low income, lack health insurance, or are underinsured. Unfortunately, this was one limitation identified in the project. Although patients

received an order for a DEXA scan to be performed, some stated that they could not complete this intervention because they lacked health insurance coverage or could not afford this imaging test. The same concern was voiced when some patients were asked whether they had started supplementation with calcium or vitamin D.

Conclusions

Osteoporosis is a disease characterized by low bone strength and mass to the degree that the bone becomes fragile; osteoporosis causes millions of fractures in the U.S. and worldwide each year (NICE, 2012). Implementing a bone health protocol provides a foundation for future practice scholarship by utilizing evidence to guide clinical practice. The project focused on the development of clinical knowledge and identified an opportunity to screen and treat patients with osteoporosis to improve patient care and outcomes in the community of El Paso. Numerous research publications, including systematic reviews and RCTs, support the Doctor of Nursing Practice project and bone health management for patients with fragility fracture. The TTUHSC EP Orthopedic Clinic supports an academic setting and provides educational opportunities for resident physicians, medical students, nursing students, and other health-care professionals. The project represents a QI initiative that can create a multidisciplinary bond and transform care for the entire fragility fracture patient population. By providing high-quality, age-appropriate screening and being a champion for bone health, the orthopedic community can be leaders in closing the post-fracture treatment gap.

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Appendix A



Institutional Review Board

Office of the Vice President for Research and Sponsored Projects
The University of Texas at El Paso IRB
FWA No: 00001224
El Paso, Texas 79968-0587
P: 915-747-7693 E: irb.orsp@utep.edu

Date: November 4, 2021

To: Lyndsey Slape

From: University of Texas at El Paso IRB

Study Title: [1811056-1] Implementing an Osteoporosis Screening and Treatment Protocol for Patients with Fragility Fractures

IRB Reference #: College of Nursing

Submission Type: New Project

Action: NOT RESEARCH

Review Type: Administrative Review

Approval Date: November 4, 2021

Thank you for your submission of New Project materials for this research study. The University of Texas at El Paso IRB has determined this project does not meet the definition of human subject research under the purview of the IRB according to federal regulations.

We will put a copy of this correspondence on file in our office.

If you have any questions, please contact the IRB Office at irb.orsp@utep.edu or Bernice Caad at (915) 747-6590 or by email at bcaad@utep.edu. Please include your study title and reference number in all correspondence with this office.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Dr. Lorraine Torres', is positioned above the typed name and title.

Dr. Lorraine Torres, Ed.D, MT(ASCP)
IRB Chair

Appendix B



Preventing Future Fractures

You've seen your health care provider and the diagnosis is official — you fractured a bone. A broken bone, which is the same thing as a fracture, can be very painful and traumatic. Even if your fracture occurred in an accident or fall that seemed like an isolated event, it may still indicate a problem with your bone health.

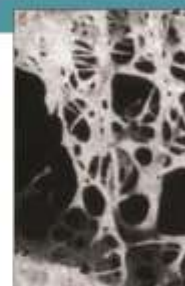
The Connection to Bone Disease/Osteoporosis

Many people are unaware of the link between fractures and osteoporosis. If you are over age 50, there is a very good chance that your fracture is related to osteoporosis sometimes called "brittle bone". Osteoporosis — also known as porous bone, bone that is full of holes — is a disease characterized by low bone mass, which makes bones more likely to break.

Fortunately, there is a lot you can do to prevent fractures. It's a matter of taking advantage of proper diet, exercise, medications and other resources available to you right now. Below are a few things you can do to get started.



Healthy Bone



Weakened Bone

Weak bone is more porous than strong bone. It's easy to see the difference in these illustrations, but people usually do not feel the difference at all.

Osteoporosis is a silent disease — until a fracture occurs.

7 Smart Steps to Better Bone Health



1. Talk with Your Health Care Provider

Discuss your fracture. Ask your health care provider if your break may be related to osteoporosis. **Seek advice about bone mineral density (BMD) testing (often referred to as a DXA scan).** It's the best way to detect low bone density, and its most extreme form, osteoporosis.

Also discuss medications that have been proven effective at minimizing bone loss and/or reducing the risk of future fractures. A number of medications have been approved by the U.S. Food and Drug Administration (FDA) for the treatment of osteoporosis.

2. Get Adequate Calcium

Everyone needs calcium to maintain strong, healthy bones and muscles. **The National Institutes of Health (NIH) recommends that women over 50 and men over 70 get 1,200 milligrams of calcium per day.** If you are not getting enough calcium, you may be able to increase your calcium intake by adding some calcium-rich foods like milk, cheese, broccoli or almonds. If you do not get enough calcium through your diet and multivitamins, calcium supplements will also work.





3. Get Adequate Vitamin D

Vitamin D, the "sunshine vitamin," plays a critical role in helping your body absorb calcium from your digestive system into your bloodstream. **The National Osteoporosis Foundation recommends 800 - 1,000 International Units (IU) of vitamin D per day.**

Sunshine and vitamin-D fortified foods, like milk, can help you meet your daily quota. Vitamin D supplements are also available and frequently necessary. You can discuss with your healthcare provider which options are best for you.

4. Get Ample Exercise

Exercise is one of the best ways to preserve bone density and maintain muscle strength.

To build and maintain bone density, do weight-bearing and resistance exercises, which make your body move against gravity.

Some examples of weight-bearing exercises include: dancing, walking, and using a stationary bike. Resistance exercises to consider include: limited weight lifting, using exercise bands, or rising up and down on your toes to strengthen your bones and maintain muscle strength.



5. Prevent Falls

You can reduce your chances of falling and causing a fracture by playing it safe wherever you are.

Outside your home:

- Wear shoes that offer good traction.
- Be careful about floors that can be slippery.
- Check out curbs before stepping up or down.
- In bad weather, use a cane or walker if you feel unstable.

Inside your home:

- Use nightlights.
- Keep floors clear of clutter.
- Don't walk around in socks or floppy slippers.
- Keep electrical cords out of the way.
- Use a rubber mat in the shower or tub.

You can also reduce falls by performing activities that boost your balance, flexibility, and strength. Balance is the ability to keep your body stable while moving or standing still. Activities like tai chi, swimming, and stretching exercises can help.

6. Don't Smoke

Tobacco is toxic to your bones, making you more at risk for low bone mass and osteoporosis. **Don't smoke.** Though that's easier to say than do, investigate programs, medications, and other stop-smoking methods that offer help.

7. Limit Alcohol Intake

Controlling your alcohol intake can connect you to healthier bones. Drinking heavily can increase bone loss and the risk of sustaining a fragility fracture from a fall. **According to the National Osteoporosis Foundation, on average, alcohol intake of 3 or more drinks per day is detrimental to bone health.**

Want More Information? Visit or call the National Osteoporosis Foundation: www.nof.org | 1 (800) 231-4222

The information contained above is not intended to be medical advice. In all cases, The American Orthopaedic Association recommends that you consult your own physician regarding any course of treatment or medication.



THE AMERICAN ORTHOPAEDIC ASSOCIATION

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Appendix C

Dear

Our patient _____ was recently treated for a fragility fracture sustained on _____. Fragility fractures are highly predictive of poor bone quality, even among patients not meeting the WHO criteria for osteoporosis. Most experts agree that the occurrence of a fragility fracture predicts future fractures better than other tests. The details of our patient's fracture are:

- ☐ Fracture site:
- ☐ The patient's risk factors for osteoporosis are:
- ☐ The patient is currently taking, or has taken, the following medications which increase the risk for osteoporosis:
- ☐ The patient has taken the following medications to treat osteoporosis or low bone density in the past:
- ☐ The patient has recently started taking the following medications to prevent future fragility fractures:

Own the Bone program recommends following up with our patient on eight key points:

According to the *Clinician's Guide to the Prevention and Treatment of Osteoporosis* from the National Osteoporosis Foundation and a report from the Surgeon General, patients with known fragility fractures should undergo **bone density evaluation**. Our patient had a bone density test on _____ with the following results:

Other evidence-based interventions to decrease the risk of a second fracture (unless contraindicated) include the following:

- ☐ Appropriate amounts of:
 - **Vitamin D:** At least 800-1000 IU per day
 - **Calcium:** At least 1200 mg/day (in divided doses), including supplementation, if necessary
- ☐ Patient counseling on fall prevention, smoking cessation, and limiting excessive alcohol intake (3 drinks per day or more is considered a risk factor).
- ☐ Regular weight-bearing and muscle-strengthening exercise.
- ☐ Pharmacologic therapy for osteoporosis. Many treatment options are available.

Thank you,

References:

- American Orthopedic Association. (2022a). *What is own the bone*. AOA Own the Bone. <https://www.ownthebone.org/what-is-otb/>
- Cosman, F., de Beur, S. J., LeBoff, M. S., Lewiecki, E. M., Tanner, B., Randall, S., & Lindsay, R. (2014). Clinician's guide to prevention and treatment of osteoporosis. *Osteoporosis International*, 25(10), 2359–2381. <https://doi.org/10.1007/s00198-014-2794-2>
- U.S. Department of Health and Human Services. (2004). *Bone health and osteoporosis: A report of the surgeon general*. <https://www.ncbi.nlm.nih.gov/books/NBK45525/>