What Babies and Seniors Have In Common

How Babies Absorb Calcium Could Be Key to Treating Osteoporosis in Seniors

At both ends of the aging spectrum (babies at one end, seniors at the other), continuing research and recommendations regarding the uptake of calcium in the body, are becoming clearer. For babies much of the calcium needed for development of healthy bone and cartilage appear to be met through adequate nutrition, particularly breast milk.

But how much calcium is needed for seniors concerned about bone health? If a frail (bone compromised) senior falls and breaks a hip, what causes the break? Does the frail bone cause the fall, or does the fall cause the frail bone to break? Regardless, there appears to be persistent acceptance around the need for senior to expose themselves to calcium supplements as an aid in building and maintaining bone density and health. How much of that is accurate and how much amounts to promotion of Urban Myths?

According to Dr. Walter Willett, chair of the Department of Nutrition at Harvard T.H. Chan School of Public Health, considerations about supplements for bone health are not just about calcium, but also about Vitamin D. Although most daily requirements for calcium and vitamin D can be met through proper diet, and appropriate exposure to sunlight, if supplements are desired, his recommendation are: 500 to 700 mg a day of calcium and 800 to 1,000 IU of vitamin D.

Adequate calcium is necessary for good health, and not just because it's a major component of our bones. It also plays a vital role in keeping our organs and skeletal muscles working properly. The body gets the calcium it needs for basic functions by releasing the calcium stored in our bones into the blood through bone remodeling—the process by which bone is constantly broken down and rebuilt.

The truth about how much calcium you need

In the past two decades, several clinical trials involving thousands of postmenopausal women have sought to determine how calcium intake affects the risk of hip fractures. In each study, women were randomly assigned to one of two groups—one to receive calcium and supplements of vitamin D (to aid calcium absorption) and the other to get placebo pills. After several years, the researchers looked at the number of hip fractures in each group. Here's what they found:

High calcium intake—from either food or pills—doesn't reduce hip fracture risk. This was the conclusion of a 2007 report by Swiss and American scientists who conducted an analysis of more than a dozen studies of calcium.

The downside of calcium supplements

The studies also revealed a couple of downsides to high levels of calcium supplementation, but not to calcium obtained through a regular diet:

An increased risk of kidney stones. In the Woman's Health Initiative, women taking the calcium–vitamin D combination had a higher risk of developing kidney stones than those who got the placebo. Although high levels of dietary calcium are thought to offer

some protection against kidney stones, high doses of calcium from supplements may promote stone formation by increasing the amount of calcium that is eliminated in the urine.

An increased risk of heart attack. In a randomized study of 1,471 postmenopausal women conducted in New Zealand, 21 of 732 women who took 1,000 mg of calcium a day had heart attacks, compared with 10 of 736 who received a placebo. A 2010 analysis of 15 randomized controlled trials also linked calcium supplementation with an increased risk of heart attack.

In the same vein there is also recent research about how calcium is absorbed into the body. A study in *Cellular and Molecular Gastroenterology and Hepatology* details how breastfeeding infants absorb large amounts of calcium, with potential application for treating osteoporosis in seniors, reports *ScienceDaily*. The researchers identified calcium-absorbing channels in the lower two-thirds of the small intestines of breastfed infant mice, while most absorption in adult mammals occurs in the upper segment. Babies require massive ingestion of calcium in the first year of life to build the cartilage they are born with into the bones, with deposition sustained at a reduced rate until about 25 years of age. "You can imagine that if you have someone who has poor bone health, such as an [older] person . . . it would be very useful therapeutically to turn this pathway on for them," said the University of Alberta's Todd Alexander. Further research will examine this same mechanism in pigs, to determine if a hormone in breast milk is responsible for regulating the calcium channels. "Understanding that would allow us to either take the active ingredient out of breast milk or synthesize it as an additive so we could give it to people as a tablet or an injection," Alexander noted.

Regardless of your thinking about calcium and vitamin D supplements, (or not), the good news is that your awareness of issues that relate to fall-prevention and injury-protection are important, because if you are a senior, you REALLY don't want to fall! If you do, your life, and the lives of those around you, could change forever. The odds are stacked strongly against positive outcomes if you sustain a fall-related injury.

We don't make this point to sew doom and gloom, but to assure you that there is an effective, simple solution that can protect you from fall-related injuries and keep you from becoming a statistic.

Preventing falls is key, and strong preventative measures and practices, like strength and balance training, monitoring of medications, and careful control of physical environments can reduce the likelihood of falls, but the reality is that in spite of best efforts, falls still occur.

While falls may be inevitable, injuries from falls are not, reversing the negative statistical trends toward positive outcomes! **It isn't the fall that causes injuries; it's the landing!**

Here is how to reduce the negative odds that can keep you from living a healthy vibrant way-of-life, even after a fall.

Rule #1 DON'T FALL.
Rule #2 If you do fall, DON'T BREAK.

We'll explain more in a bit, but first consider that if you sustain a fall-related injury these staggering statistics could apply to you:

- About one-third of the senior population over the age of 65 falls each year, and two-thirds of those fallers will fall again within 6 months.
- Falls are the leading cause of death from injury among people 65 and older, and the risk of falls increases proportionately with age. At 80 years, over half of seniors fall annually. Falls account for 87% of all fractures among people aged 65 years or older.
- 20% of those who fall and break a hip or suffer a Traumatic Brain Injury (TBI), die within six months of the injury. That's about one every 19 minutes.
- Hospitalization after a fall leaves the elderly more vulnerable to hospital-acquired infections, such as pneumonia, sepsis, C. diff, and catheter-associated urinary tract infections (UTIs). Matters can be complicated further if an infection is resistant to commonly used antibiotic drugs.
- About half of all seniors hospitalized for hip fracture cannot return home or live independently after the fall. Only 22% of seniors in a University of Mississippi study could handle living on their own after being released from the hospital following a fall.
- Every 11 seconds an older adult is treated in an emergency room for a fall

Even without an injury, a fall or fear of falling can significantly alter quality-of-life, including:

- Limited activities, which increases the likelihood of a fall due physical decline
- Reduced social interactions resulting in depression, isolation, and feelings of helplessness
- Loss of independence

[1]

Additionally, your fall may be like a rock thrown into a lake, creating ripples that affect all those around you -- spouse, children and grandchildren, extended family members and care providers. An article by Eduardo Porter of the New York Times reports that the burden of care for aging relatives is reshaping the lives of millions. About 15% of women and 13% of men 25 to 54 years old spend time caring for an older relative, according to the U.S. Labor Department. Among those 55 to 64, the share rises to 1 in 5 Americans. And 20% of those caregivers also have children at home. More than 45% have full or part-time jobs. Caring for and ill or injured spouse or parent can stunt careers, weigh heavily on marriages, and hinder the ability to open up the next chapter in a care-giver's life.

And then there is the financial burden. The Genworth Cost of Care Survey estimated that the median annual cost for homemaker-type senior care services in the case of an individual requiring daytime or full-time care in shifts is $183,960, reports *Forbes*. The cost totals $100,375 for private-room nursing community care.

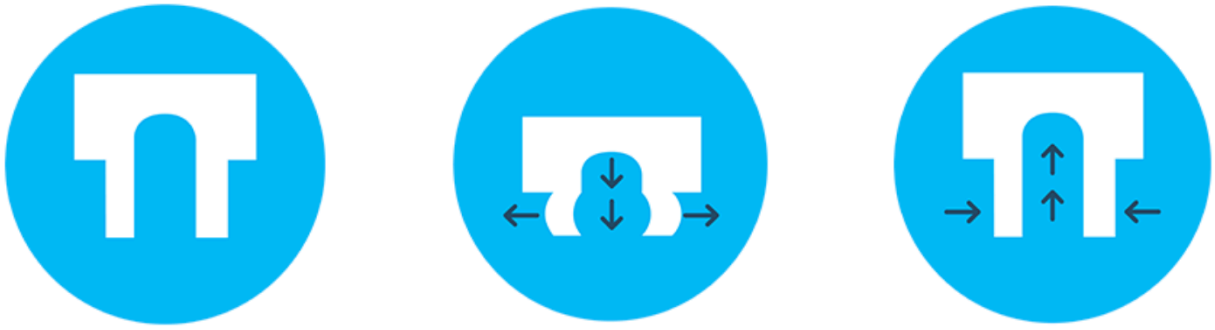
If you are lucky enough to have long-term care (LTC) insurance, the trend has been toward significant rate increases and reduced benefits as fewer and fewer companies choose to offer LTC insurance. Financial pressures have left only about a dozen companies selling new coverage, down from more than 100 just a few years ago.

So, clearly, avoiding fall-related injuries is a high priority. What to do? Here is an answer -- **SmartCells® Fall Protection Flooring** -- a stable, firm surface proven highly effective at reducing up to 90% of impact forces, while at the same time providing stability for balance-impaired persons and care-givers.

The SmartCells® cushioning technology is a flooring underlayment (under carpet or vinyl) where fall are likely to occur and serves as a "always there" passive intervention, providing security and dramatically reducing the likelihood of fall-related injuries, even when a caregiver isn't present.

Here is how the SmartCells® cushioning technology works. The SmartCells® patented, dual-stiffness structure becomes softer under impact while at the same time providing stability for balance-impaired persons and care-givers.

SmartCells® Cushioning Mechanism



Stable at Rest | Cushion on Impact | Energy Return

SmartCells® cushioning technology products have a "resting state" – much like a non-compressed spring – with a natural, supportive, upright force that provides a compressible, soft surface that is also stable and supportive.

SmartCells® Cushioning Products compress and absorb pressure/impact energy from standing, weight-shifting, walking, or from the impact of a fall. After reaching a "critical threshold" the cellular structures soften and collapse laterally, without bottoming out. SmartCells® get softer as force is applied and remain in this cushioned "sweet spot" for as long as the pressure remains.

Like miniature springs, SmartCells® store impact energy until pressure is reduced or eliminated. The SmartCells® resilient rubber material and structure work "in-phase" with body movements to actively rebound, releasing their stored energy back into the body, to increase stability, especially for balance-impaired persons.

<u>Research</u>

SATECH, Inc., the manufacturer of SmartCells® Fall Protection Flooring, has relied on extensive, published external research for all assertions and evidence about the effectiveness of the flooring to reduce fall-related injuries. Typical published, common-sense assumptions are accepted and stated as the foundations of these studies:

- “Preliminary evidence suggested compliant flooring may be effective at preventing fall-related injuries in long-term care.”
- "Controlled laboratory studies have shown that specific types of compliant flooring provide meaningful amounts of force attenuation and energy absorption during impact.”
- "Extensive biomechanical research demonstrates that specific types of compliant flooring provide substantial impact force attenuation without impairing balance or mobility during daily activities.”

Compliant Flooring Research Excerpts:

<u>Dual-stiffness flooring is effective in preventing falls in addition to preventing injuries from falls</u>

- “Results from our study of 1,907 falls provide strong evidence that the compliant flooring we tested does not influence falls in the LTC setting.”
- “…the rate of serious injury on the SmartCells® floor was still 28% smaller than the rate on the control, even with all the limitations mentioned in the study. Additionally, the rate of minor injuries on the SmartCells® floor was reduced by 15%.”
- “Overall, these results suggest that the safety floors we tested effectively addressed two competing demands required to reduce fall-related injury risk; namely the ability to absorb substantial impact energy without increasing footfall deflections. This study contributes to the literature suggesting that safety floors are a promising intervention for reducing fall-related injury risk in older adults.”
- “LIF (Low Impact Flooring) significantly reduced fall-related injuries compared with a standard vinyl flooring, whereas they did not alter the overall risk of falling.”
- “There was a tendency for residents falling on DSF (Dual Stiffness Flooring) to have less bruising and abrasions, while having more redness and cuts. There were 2 fractures on regular flooring (2.4% fracture rate) and none on the DSF flooring (0% fracture rate). The fracture rate of 2.4% of falls on the regular floor is consistent with previous reports in the literature, whereas a 0% rate found on the DSF floor is a clinically significant improvement.”

<u>Compliant flooring reduces impact forces</u>

- “This study demonstrates that during 'high severity' simulated impacts, novel compliant floors can substantially reduce the forces and accelerations applied to a head-form compared to common floors including carpet and resilient rubber. In combination with reports of minimal balance impairments, these findings support the promise of novel compliant floors as a biomechanically effective strategy for reducing fall-related injuries including traumatic brain injuries and skull fractures.”
- “Impact forces were 20–80% lower, and the authors reported that the risk of a moderate head injury (based on Head Injury Criteria) is 5–25% for a head impact on NCF (Novel Compliant Flooring) versus an 80–90% risk on carpet.”
- “With NO Flooring Protection -- A feet-first fall from a bed (most likely scenario) with NO floor protection has an approximate *25% likelihood* of causing severe brain damage.”

- "WITH Flooring Protection -- A feet-first fall from a bed (most likely scenario) WITH floor protection has a *less than 1% likelihood* of causing severe brain damage."

Specific Fall Protection flooring can have a positive effect on balance.

- "Compliant floors can attenuate femoral impact force by up to 50% while having only limited influence on balance in older women."
- "This study illustrates that the SmartCells®… novel compliant floors have minimal influences on balance and balance control responses…caused no impairments in ability to recover balance …ranked as high for balance confidence and practicality [as normal floors]."
- "While all floors affected postural sway during quiet stance, the effect was most dramatic for Firm Foam, which caused more than a doubling in sway range and velocity. **SmartCells® is statistically indistinguishable from a standard rigid floor."**
- "Compliant flooring… did not affect risk for falls."

Aging has unique challenges that can stack the odds against remaining vibrant, productive, healthy and happy and financially secure. Utilizing SmartCells® Fall Protection Flooring can help you beat the odds, and reduce the risks associated with Fall-related injuries.

Steps to take:

1. **Prevent falls** -- Determine if calcium and Vitamin B supplements necessary.
2. **Stay healthy, active and strong**
3. **Contact SATECH, Inc.** For further information. www.SmartcellsUSA.com