

WELCOME TO: COVID 19 PRACTICE SURVIVAL GUIDE

Week 10 of a series

Guest Speaker:

Applying Nudge Theory to Optimize Biomechanical Treatment of Diabetic Foot Ulcers



*Josh White, DPM, CPed Principal,
HealthOutcomes EOS Founder,
Safestep*

Moderators:



Ira Kraus, DPM, FACFAS



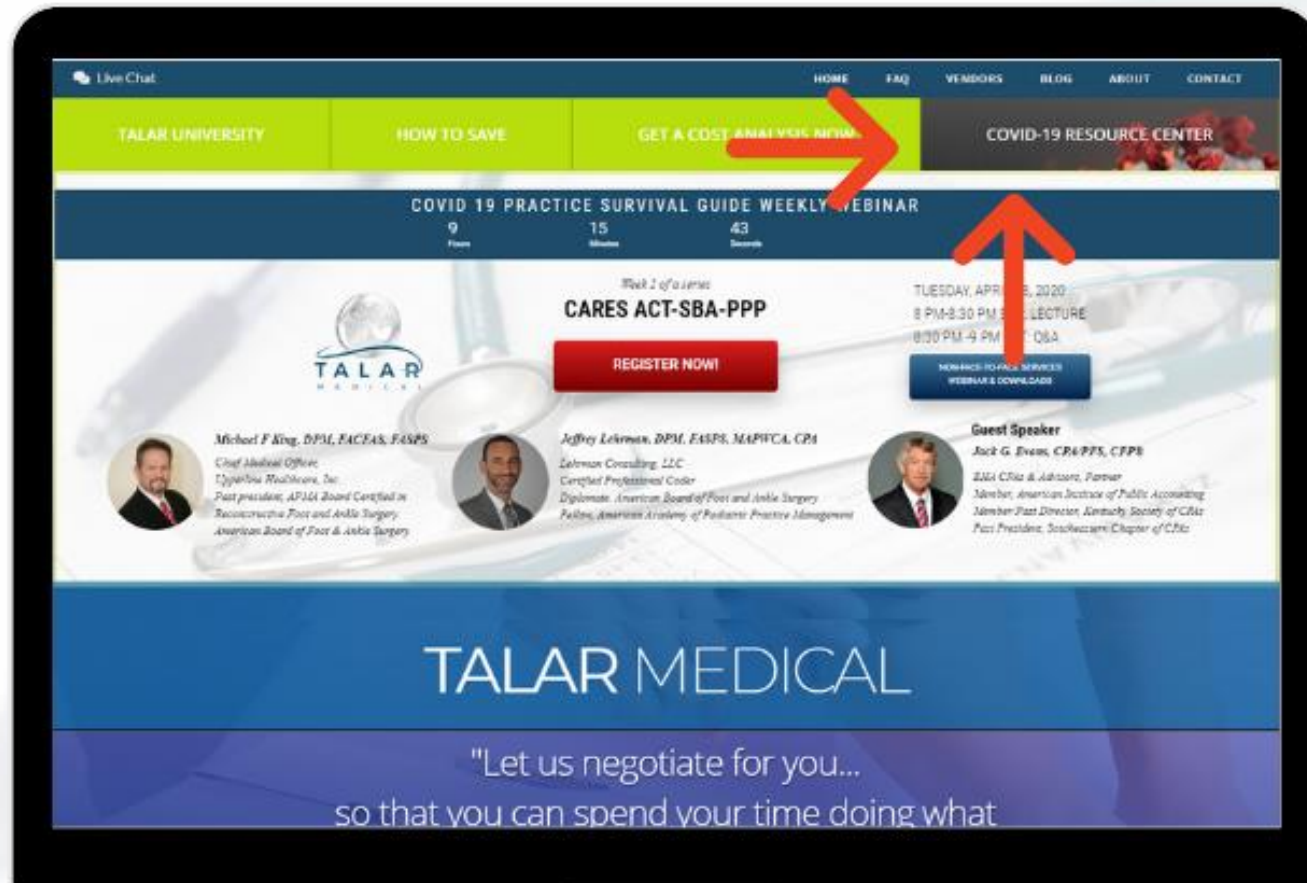
*Ashley Watkins, Sales & Member
Services, Talar Medical*



DATE	TOPIC	GUEST SPEAKER
21 April 8 PM EST	Non-Face-To-Face Services During COVID 19	<i>Jeffrey Lehrman, DPM, Michael King, DPM (Moderator)</i>
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30 June 8 PM EST	How To Not Get Turned Upside Down When Using Skin Substitutes In Your Practice	<i>Ira Kraus, DPM, Director of Business Development, Extremity Healthcare, Inc.</i>

Would you like to find a replay of tonight's webinar? Find it on our website today!

1. Visit our website www.TalarMedical.com
2. Look for our COVID 19 Resource Center located in the upper right hand corner





Applying Nudge Theory to Optimize Biomechanical Treatment of Diabetic Foot Ulcers

Josh White, DPM, CPed

Principal, HealthyOutcomes EOS

Founder, SafeStep

Scope of Problem: Incidence of DFUs

- Medicare beneficiaries with diabetes, the incidence of foot ulcer is about 6.0%

<https://effectivehealthcare.ahrq.gov/index.cfm/search-for-guides-reviews-and-reports/?pageaction=displayproduct&productid=627>

- 40% recurrence rate within one year.

Diabetic Foot Ulcers and Their Recurrence. *Armstrong DG, Boulton AJM, Bus SA, N Engl J Med. 2017 Jun 15; 376(24):2367-2375.*

- *5% of patients with a DFU required a major amputation in 1 year.*

Prompers, L, Schaper, N, Apelqvist, J. Prediction of outcome in individuals with diabetic foot ulcers: focus on the differences between individuals with and without peripheral arterial disease. The EURODIALE Study. Diabetologia. 2008;51(5):747–755.



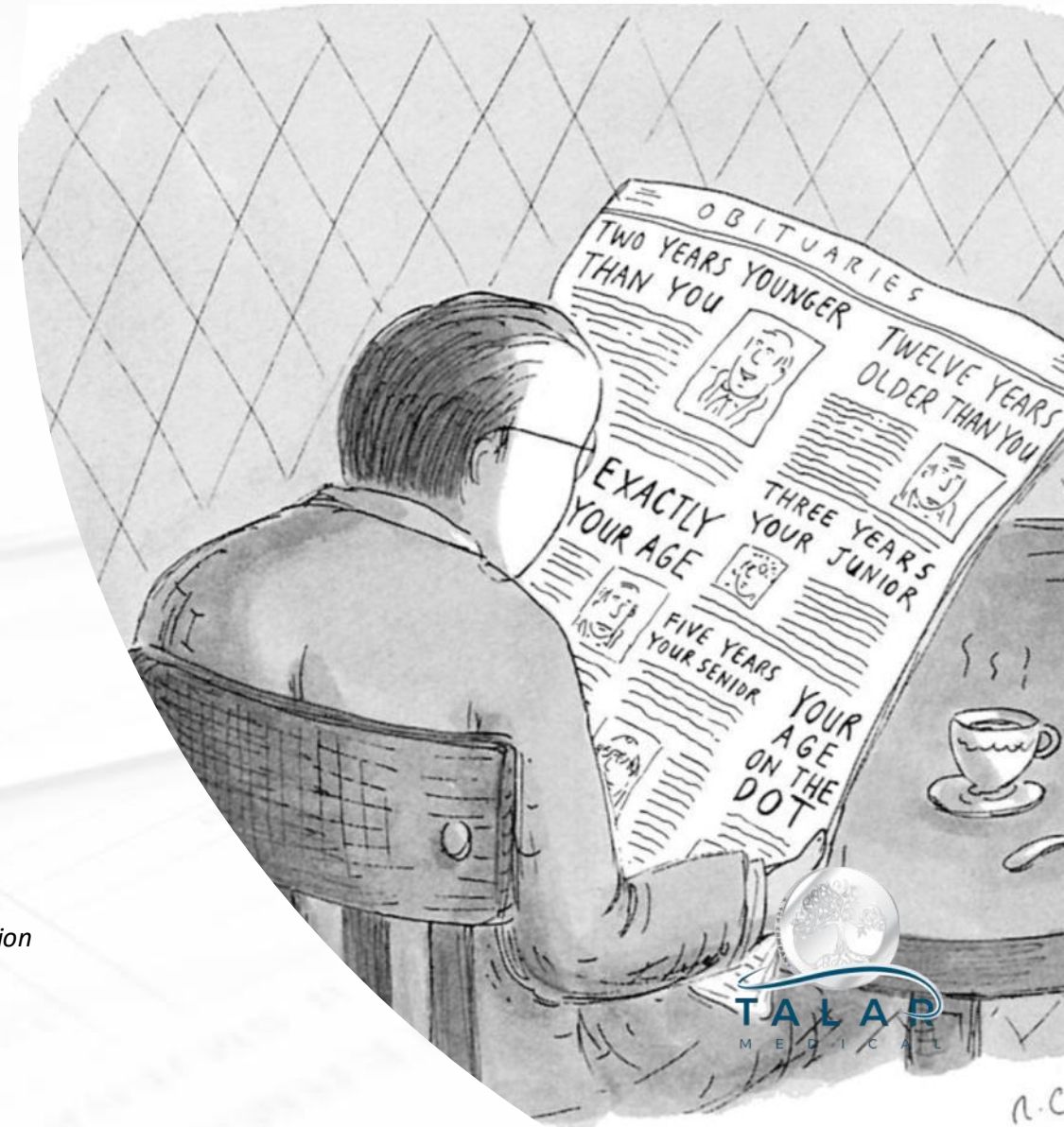
Scope of Problem: Mortality

- DFU is associated with a 5% mortality in the first 12 months and a 42% mortality within 5 years.

Walsh JW, Hoffstad OJ, Sullivan MO, Margolis DJ Diabet Med. 2016 Nov; 33(11):1493-1498.

- 5-year survival following presentation with a new DFU is only 50-60%; worse than many common cancers

Morbach S, Furchert H, Gröblichhoff U, et al. Long-term prognosis of diabetic foot patients and their limbs: amputation and death over the course of a decade. Diabetes Care 2012;35:2021-2027





Cost of DFU Treatment

- The cost of DFUs devoid of lower limb amputations ranged from \$993 to \$17,519.

Health-economic consequences of diabetic foot lesions. Ragnarson Tennvall G, Apelqvist J Clin Infect Dis. 2004 Aug 1; 39 Suppl 2:S132-9.

- Minor lower limb amputation (only at foot level), the cost was \$43,800, while the major lower limb amputations (above ankle) was \$66,215.

Diabetic foot ulcers in a multidisciplinary setting. An economic analysis of primary healing and healing with amputation. Apelqvist J, Ragnarson-Tennvall G, Persson U, Larsson J, J Intern Med. 1994 May; 235(5):463-71

Biomechanical Etiology

- Diabetic foot ulcers are typically caused by repetitive stresses (shear and pressure) on the foot in the presence of peripheral neuropathy and / or peripheral artery disease

Waijman R, de Haart M, Arts ML, Wever D, Verlouw AJ, Nollet F, Bus SA. Risk factors for plantar foot ulcer recurrence in neuropathic diabetic patients. Diabetes Care. 2014;37(6):1697–705.

- High foot pressures (≥ 6 kg/cm²) and neuropathy are independently associated with ulceration

Role of Neuropathy and High Foot Pressures in Diabetic Foot Ulceration, Frykberg, RG,, LLavery, L, Pham, H, Harvey, C, Harkless, L Aristidis Veves, A, Diabetes Care 1998 Oct; 21(10): 1714-1719.

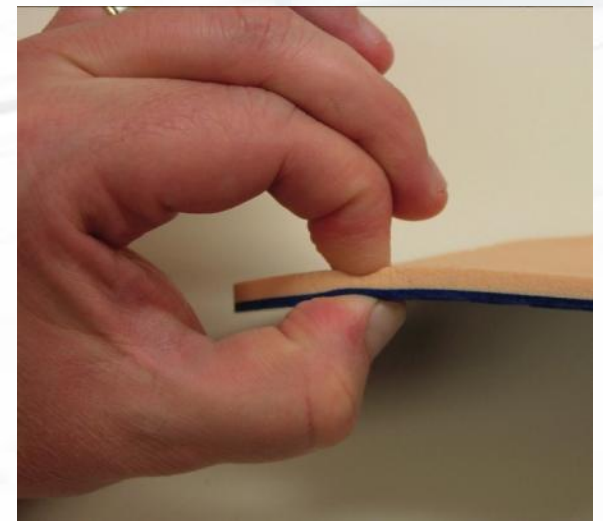
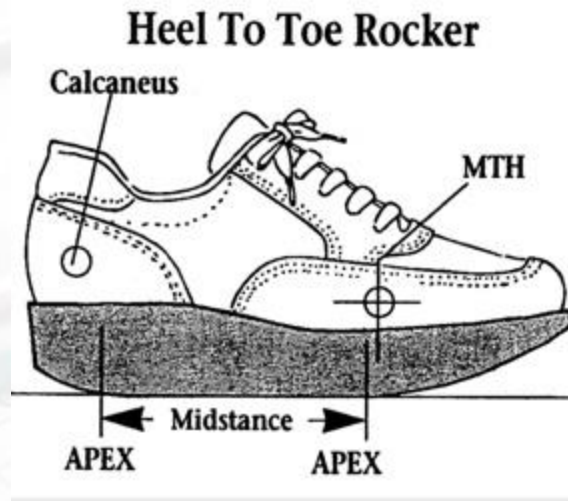
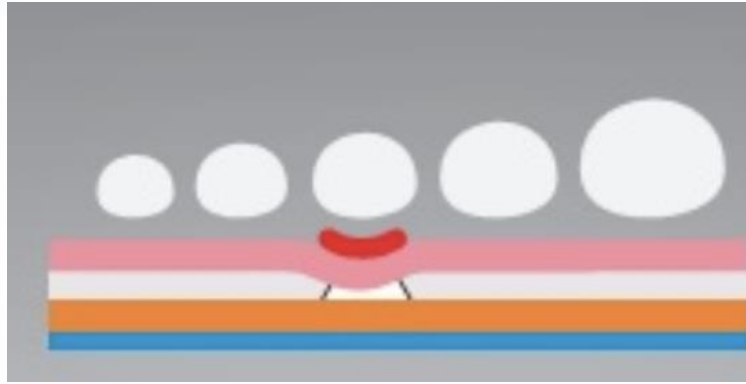
- Use of inappropriate footwear or walking barefoot are the leading causes of diabetic foot ulceration, as they increase the magnitude of the local mechanical repetitive stresses on the foot.

Waijman R, de Haart M, Arts ML, Wever D, Verlouw AJ, Nollet F, Bus SA. Risk factors for plantar foot ulcer recurrence in neuropathic diabetic patients. Diabetes Care. 2014;37(6):1697–705.



Biomechanical Treatment Mechanisms

- Accommodative Fit
- Offloading Plantar Pressure
- Shear Reduction (ShearBan)
- Rocker bottom soles
- Shock Attenuation



Biomechanical Treatment: Cam Walkers

- The evidence is insufficient to recommend any particular treatment or dressing product in preference to any other. The main exception relates to the use of off-loading for plantar ulcers

Bus SA, van Deursen RW, Armstrong DG, Lewis JE, Caravaggi CF, Cavanagh PR; International Working Group on the Diabetic Foot. Footwear and offloading interventions to prevent and heal foot ulcers and reduce plantar pressure in patients with diabetes: a systematic review. Diabetes Metab Res Rev. 2016;32(Suppl. 1):99–118

- The most strongly recommended devices are non-removable knee-high devices, such as a total contact cast or removable cast walker made irremovable

Bus SA, Armstrong DG, van Deursen RW, Lewis JE, Caravaggi CF, Cavanagh PR. International working group on the diabetic foot. IWGDF guidance on footwear and offloading interventions to prevent and heal foot ulcers in patients with diabetes. Diabetes Metab Res Rev. 2016;32(Suppl 1):25–36.

- Only when knee-high devices are contraindicated or not tolerated should other offloading devices (such as forefoot offloading shoes and cast shoes), and lastly custom-made temporary footwear be considered.

Bus SA, Armstrong DG, van Deursen RW, Lewis JE, Caravaggi CF, Cavanagh PR. International working group on the diabetic foot. IWGDF guidance on footwear and offloading interventions to prevent and heal foot ulcers in patients with diabetes. Diabetes Metab Res Rev. 2016;32(Suppl 1):25–36.



Biomechanical Treatment: Shoes

- The use of specially designed shoes is effective in preventing relapses in diabetic patients with previous ulceration. After 1 year, the foot ulcer relapses were significantly lower (27.7 vs. 58.3%);

Uccioli, Luigi, Faglia, E, Monticone, G, Favales, F, Durola, L, Aldeghi, A, Quarantiello, Calia, P, Menzinger, G, Manufactured Shoes in the Prevention of Diabetic Foot Ulcers, vol.18, 10.2337/diacare.18.10.1376

- It's recommended that people with diabetes wear appropriate footwear designed to reduce repetitive stresses at all times, to help prevent diabetic foot ulceration

Bus SA, van Netten JJ, Lavery LA, Monteiro-Soares M, Rasmussen A, Jubiz Y, Price PE. International working group on the diabetic foot. IWGDF guidance on the prevention of foot ulcers in at-risk patients with diabetes. Diabetes Metab Res Rev. 2016;32(Suppl 1):16-24.



Improving Footwear Compliance

- Footwear has been described as a “visible representation of the disease”; people with diabetes at-risk of foot ulceration may choose to moderate their adherence to align with functional requirements and societal norms

Van Netten JJ, Dijkstra PU, Geertzen JH, Postema K. What influences a patient's decision to use custom-made orthopaedic shoes? BMC Musculoskelet Disord. 2012;13:92.

- The importance of cosmetic appearance and ease of use varies greatly between people

Van Netten JJ, Jannink MJA, Hijmans JM, Geertzen JHB, Postema K. Use and usability of custom-made orthopedic shoes. J Rehabil Res Dev. 2010;47(1):73–82.



Problem of Non-Compliance

- People tend to wear their offloading devices, such as walkers, half-shoes, & therapeutic shoes, less than would be advisable.

Knowles EA, Boulton AJ. Do people with diabetes wear their prescribed footwear? Diabet Med. 1996;13(12):1064–1068.

Bus SA, Waaijman R, Arts M, et al. Effect of custom-made footwear on foot ulcer recurrence in diabetes: a multicenter randomized controlled trial. Diabetes Care. 2013;36(12):4109–4116.

Chantelau E, Haage P. An audit of cushioned diabetic footwear: relation to patient compliance. Diabet Med. 1994;11(1):114–116.

Waaijman R, Keukenkamp R, de Haart M, Polomski WP, Nollet F, Bus SA. Adherence to wearing prescription custom-made footwear in patients with diabetes at high risk for plantar foot ulceration. Diabetes Care. 2013;36(6):1613–1618.

Armstrong DG, Lavery LA, Kimbriel HR, Nixon BP, Boulton AJ. Activity patterns of patients with diabetic foot ulceration: patients with active ulceration may not adhere to a standard pressure off-loading regimen. Diabetes Care. 2003;26(9):2595–2597.

- People at risk of foot ulceration perform the majority of their total daily steps indoors; their adherence to wearing their footwear is significantly lower indoors compared to outdoors

Waaijman R, Keukenkamp R, de Haart M, Polomski WP, Nollet F, Bus SA. Adherence to wearing prescription custom-made footwear in patients with diabetes at high risk for plantar foot ulceration. Diabetes Care. 2013;Jun;36(6):1613–8.

- Patients failed to wear their ulcer-preventing shoes for 39% of the steps taken at home. Patients took an average of about 4,000 steps inside the home and 2,600 steps outside - where they walked in their protective shoes 87% of the time

bit.ly/WbTnJN Diabetes Care, online January 15, 2013



Reasons for Non-Compliance

Un-Intentional Non-adherence

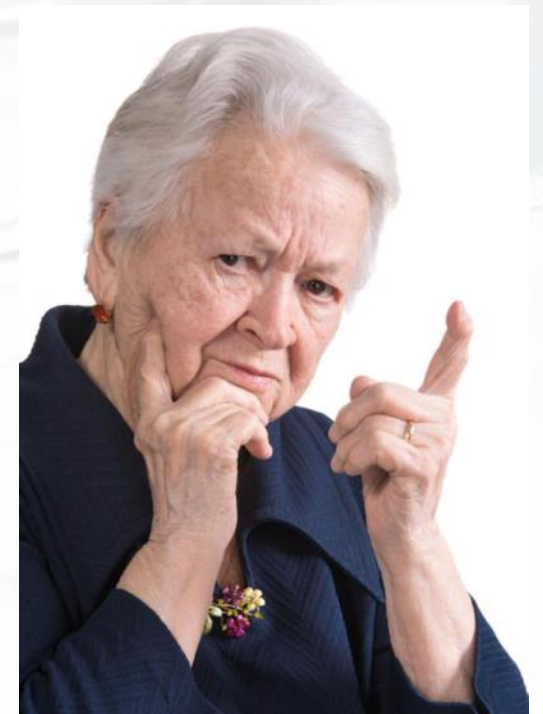
- Inadequate understanding of the disease or treatment regimen to competently complete the given tasks, whether due to poor literacy skills, lack of affordability, poor comprehension, reduced cognitive function, not acknowledging the seriousness of the condition due to lack of pain or other causative factors.

Marseglia A, Xu W, Rizzuto D, et al. Cognitive functioning among patients with diabetic foot. J Diabetes Complications. 2014;28(6):863–868.

Intentional Non-adherence

- A deliberate and purposeful choice of patients to modify or reject treatment regimens for reasons important to themselves. Motivating factors can include:
 - Not taking their condition seriously enough;
 - Feeling the side effects of the treatment outweigh the benefits; and/or
 - The patient may not believe that the treatment is working.

Cameron C. Patient Compliance: recognition of factors involved and suggestions for promoting compliance with therapeutic regimens. J Adv Nurs. 1996;24(2):224–250.



Addressing Un-Intentional Non-adherence

- Failure of patients to appreciate importance of off-weighting on wound healing
- Failure of patients to appreciate significance of small periods of weight-bearing on delayed healing
- Failure of patients to appreciate number of steps taken indoors.

Advice and instructions need to be:

- Clear and unambiguous;
- Use nontechnical, everyday language;
- Limited to three or four major points during each discussion;
- Include written materials to support information;
- And involve the patient's family members and friends.



Addressing Intentional Non-adherence

A shift in our traditional role as an authoritative HP to a more collaborative “health coach”, focusing on interactive communication and partnership with our patients, is one way forward. This can be achieved by applying the skills of:

- Open-ended questions
- Reflective listening/making affirmations
- Summarizing/using reflections.

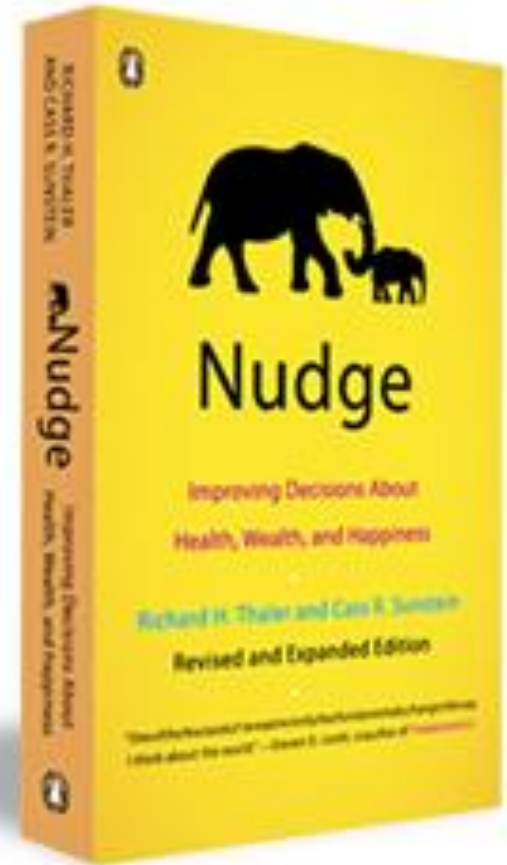


Cameron C. Patient Compliance: recognition of factors involved and suggestions for promoting compliance with therapeutic regimens. J Adv Nurs. 1996;24(2):224–250.

Nudge Theory: Thaler & Sunstein

Nudge is a concept which proposes positive reinforcement and indirect suggestions as a way to influence the behavior and decision making of individuals.

- Nudging should be transparent and never misleading.
- It should be easy to opt out of the nudge,
- There should be good reason to believe that the behavior being encouraged will improve the welfare of those being nudged.



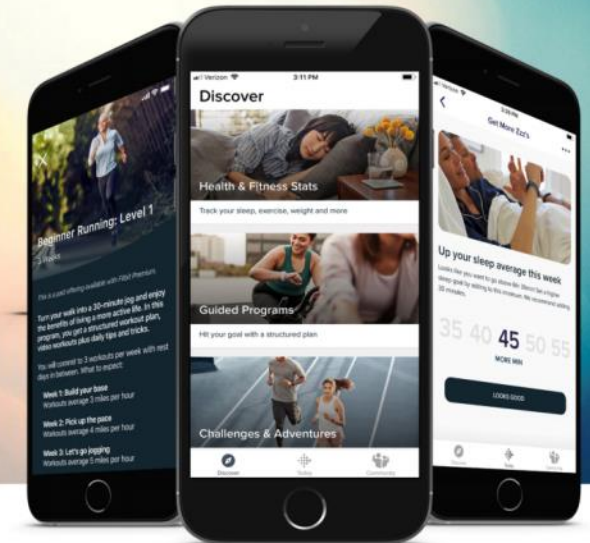


walk WITH a DOC
educate. exercise. empower.

FITBIT PREMIUM™



Fitbit's new health and wellness membership that turns data into personalized, actionable guidance.



Google Fit

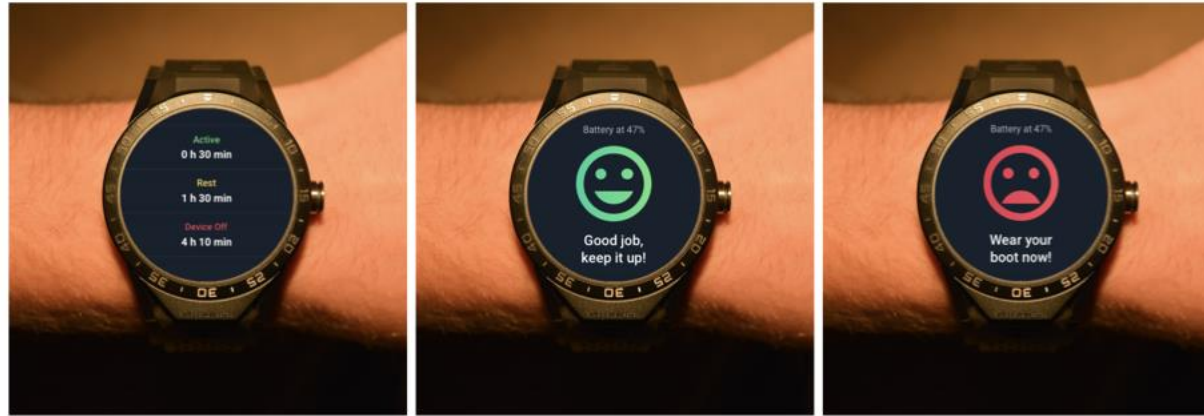
Coaching you to a healthier and more active life

Wound Healing Psychological Pathways to Change

- Failure of patients to appreciate importance of off-weighting on wound healing
- Failure of patients to appreciate significance of small periods of weight-bearing on delayed healing
- Failure of patients to appreciate number of steps taken indoors.



Wound Healing Psychological Pathways to Change



Simple UX Focused on Patient's Adherence



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Ways to Nudge:

- Inform patients about time wearing boot and time not wearing.

Wound Healing Psychological Pathways to Change



Clinician Dashboard: PATIENT ADHERENCE HOLISTIC VIEW

DEMO

Status	Name	Status	Foot	Exercises	Last
Not Done	John Smith	Knee	Right	Not Done	2017-05-12 18:34
Not Done	Alex Brown	HP	Right	Not Done	2017-05-12 18:34
Not Done	Katy White	Knee	Left	Not Done	2017-05-12 18:34
Not Done	Bob Wilson	Knee	Right	Not Done	2017-05-12 18:34
Not Done	John Doe	HP	Left	Not Done	2017-05-12 18:34
Not Done	Shanez Garcia	Ankle	Right	Not Done	2017-05-12 18:34
Not Done	John Doe	Ankle	Right	Out of Range	2017-05-12 18:34
Not Done	Tony Kover	HP	Left	Out of Range	2017-05-12 18:34
Not Done	Lee Wong	HP	Right	Out of Range	2017-05-12 18:34
Not Done	John Smith	Knee	Right	Not Done	2017-05-12 18:34
Not Done	Wesley Huffy	Ankle	Right	Not Done	2017-05-12 18:34
Not Done	Yongyi Huachenzi	Ankle	Right	Out of Range	2017-05-12 18:34
Not Done	Mike Red	Knee	Left	OK, 3 left	2017-05-12 18:34
Not Done	Rich Black	Ankle	Left	OK, complete	2017-05-12 18:34
Not Done	Richard Blue	Ankle	Left	OK, 3 left	2017-05-12 18:34

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Ways to Nudge:

- Communicate with clinicians about patient compliance
- Communicate about weight inside of boots
- Restrict patient ability to remove cast during day.

Recommendations How to Improve Patient Compliance w/ Wearing Off-Loading Devices / Shoes

- Rather than focusing on footwear characteristics, it is suggested that personal perceptions, values and experiences are more important factors to improve adherence

Arts ML, de Haart M, Bus SA, Bakker JP, Hacking HG, Nollet F. Perceived usability and use of custom-made footwear in diabetic patients at high risk for foot ulceration. J Rehabil Med. 2014;46:357–62.

- Adequate communication between healthcare professionals and patients is needed to assess these perceptions

Johnson M, Newton P, Jiwa M, Goyder E. Meeting the educational needs of people at risk of diabetes-related amputation: a vignette study with patients and professionals. Health Expect. 2005;8(4):324–33.

- Communication should be person-centered, not footwear-centered

Johnson M, Newton P, Jiwa M, Goyder E. Meeting the educational needs of people at risk of diabetes-related amputation: a vignette study with patients and professionals. Health Expect. 2005;8(4):324–33.



Recommendations How to Improve Patient Compliance w/ Wearing Off-Loading Devices / Shoes

- Educate people with diabetes, their relatives and caregivers on the importance of wearing appropriate footwear to prevent foot ulceration.
- Instruct people with diabetes at intermediate-or high-risk of foot ulceration to obtain footwear from an appropriately trained professional to ensure it fits, protects and accommodates the shape of their feet.
- If the person is convinced that wearing therapeutic shoes substantially reduces ulceration risks compared with other shoes, this will give a stronger motivation for adherence

Use of computed tomography and plantar pressure measurement for management of neuropathic ulcers in patients with diabetes.

Mueller MJ, Smith KE, Commean PK, Robertson DD, Johnson JE Phys Ther. 1999 Mar; 79(3):296-307.



Recommendations How to Improve Patient Compliance w/ Wearing Off-Loading Devices / Shoes

- Motivate people with diabetes at intermediate or high-risk of foot ulceration to wear their footwear at all times, both indoors and outdoors. Check:
 - a. footwear, each time before wearing, to ensure that there are no foreign objects in the footwear or penetrating the soles.
 - b. feet, each time their footwear is removed, to ensure that there are no signs of abnormal pressure, trauma or ulceration.
- To improve adherence, people may need to be made aware of the greater repetitive stresses on their feet when at home resulting from the greater number of steps.
- It has also been suggested to provide separate footwear for indoor and outdoor use.

Waaijman R, Keukenkamp R, de Haart M, Polomski WP, Nollet F, Bus SA. Adherence to wearing prescription custom-made footwear in patients with diabetes at high risk of plantar foot ulceration. Diabetes Care. 2013;Jun;36(6):1613-8.



Temperature Detecting Socks

How it works

Wear Your Socks Daily

They're so comfortable you won't realize they're equipped with sensors that continuously monitor foot temperature at six key points.

Get Notifications

Should signs of inflammation be detected, you and your doctor will receive notifications via the Siren companion app and/or text message.

New Socks Ship Every 6 Mos.

To ensure accuracy, you'll receive a new shipment of socks to replace your current supply every six months.



FREQUENTLY ASKED QUESTIONS

Studies have demonstrated the benefit of daily monitoring of foot skin temperature

Lavery LA, Armstrong DG. Temperature monitoring to assess, predict, and prevent diabetic foot complications. Curr Diab Rep 2007;7:416-419



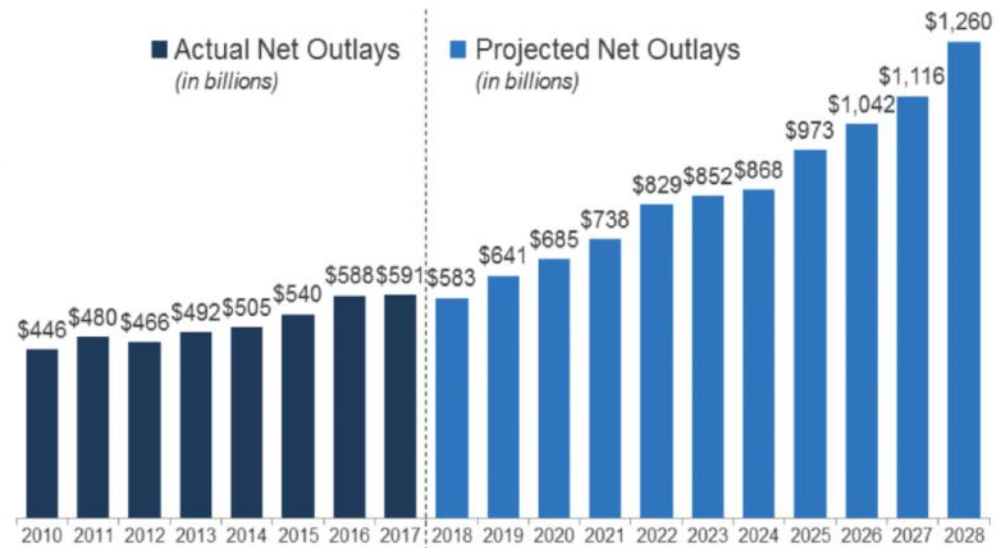
Remote Patient Monitoring and Nudge Theory

“This rule focuses on patient needs and not on the volume of care. This rule also innovates and modernizes health care by allowing remote patient monitoring”

-CMS Administrator Seema Verma, November 2018



Actual and Projected Net Medicare Spending, 2010-2028



CMS is investing in technology they believe will reduce their long-term costs.

“Remote monitoring of physiologic parameter(s)

(e.g., weight, blood pressure, pulse oximetry, respiratory flow rate)”...



CPT code 99453

“initial; set-up and patient education on use of equipment.”

~\$21 (one-time)

CPT code 99454

“device(s) supply with daily recording(s) or programmed alert(s) transmission, each 30 days.”

~\$69 (monthly)

CPT code 99457/99091

“treatment management services, 20 (30) minutes or more of clinical staff/physician/other qualified healthcare professional time in a calendar month requiring interactive communication with the patient/caregiver during the month.”

~\$53/\$59 (monthly)

16 Day Requirement

Yearly Revenue per Patient

CPT Code	Purpose	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Yearly Total
99453	Setup	\$21												\$21
99454	Equipment + Data Transmission	\$69	\$69	\$69	\$69	\$69	\$69	\$69	\$69	\$69	\$69	\$69	\$69	\$828
99457	Treatment Management (20 mins)	\$53	\$53	\$53	\$53	\$53	\$53	\$53	\$53	\$53	\$53	\$53	\$53	\$636
		\$143	\$122	\$122	\$122	\$122	\$122	\$122	\$122	\$122	\$122	\$122	\$122	\$1,485

What is Needed to Bill for RPM?

Patient Must Consent

Must be ordered by qualified healthcare provider (QHP)

Data must be wirelessly synced

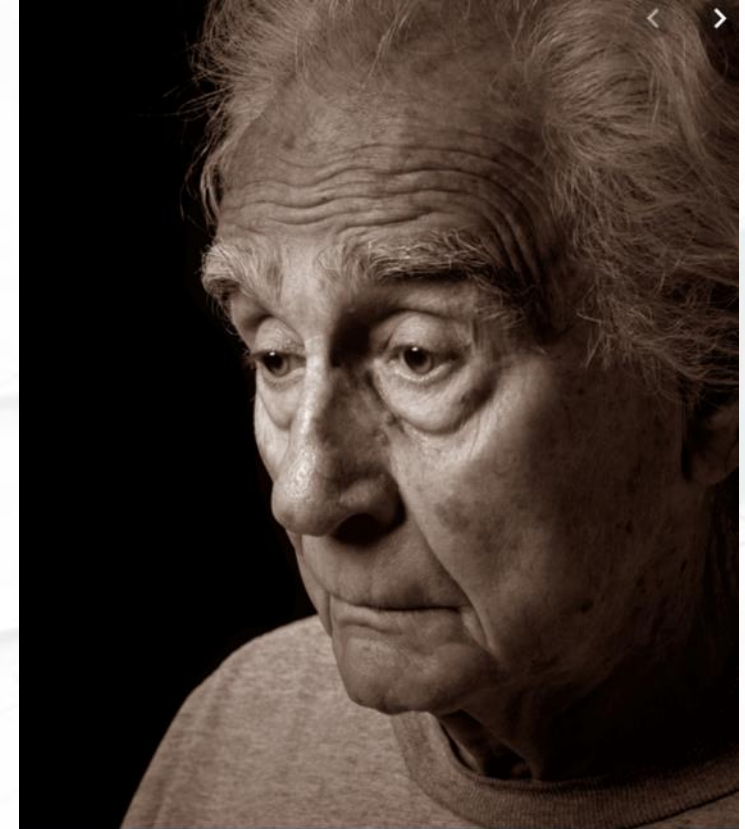
The data-monitoring services may be performed by the physician, by a qualified healthcare professional, or by clinical staff ¹

Depression, Foot Self-Care, and Incident DFUs

- Patient cognitive and emotional appraisals of DFU risk are important predictors of foot self-care. Addressing neuropathy and DFU-specific cognitions and emotions may therefore be more meaningful and effective than initiating treatments specifically directed at clinical depression, especially as there is evidence to suggest that depression in those at high DFU risk is largely a function of the neuropathy/DFU-specific physical and emotional burden.

Vileikyte L, Gonzalez JS, Leventhal H, et al. Patient Interpretation of Neuropathy (PIN) questionnaire: an instrument for assessment of cognitive and emotional factors associated with foot self-care. Diabetes Care 2006;29:2617–2624=

Vileikyte L, Peyrot M, Gonzalez JS, et al. Predictors of depressive symptoms in persons with diabetic peripheral neuropathy: a longitudinal study. Diabetologia 2009;52:1265–1273





Program Overview



Mission

Walk with a Doc *Inspiring communities through movement and conversation.*

Our mission is to:

Encourage

Healthy physical activity in people of all ages.

Reverse

The consequences of a sedentary lifestyle.

Improve

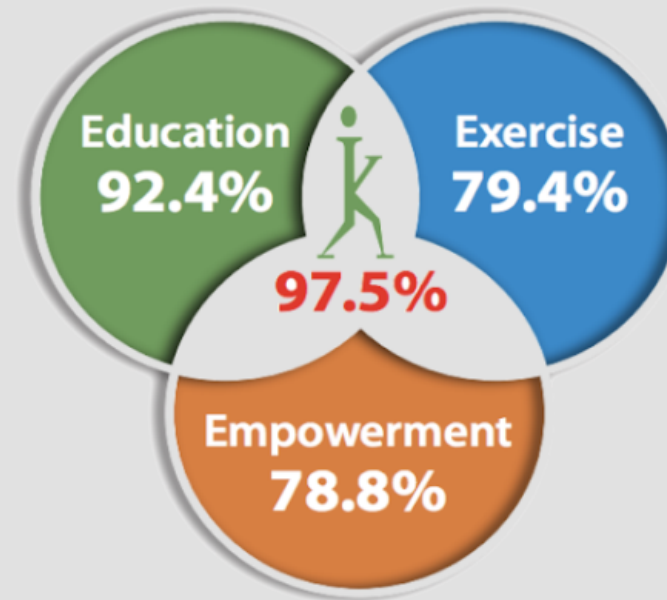
The health and well-being of the world.



Benefits for Walkers

Survey says!

Additional benefits of the walks include: high levels of camaraderie, safer communities, increased energy, and much more!



- **92.4%** of participants feel they are **MORE EDUCATED** since starting Walk with a Doc
- **79.4%** of participants get **MORE EXERCISE** since starting Walk with a Doc.
- **78.8%** of participants feel **MORE EMPOWERED** in their interactions with healthcare providers.
- **97.5%** enjoy the refreshing concept of pairing physicians with communities outside the traditional setting.

A simple walk has the power to totally transform nearly every aspect of your health- strengthen your heart, lower your cholesterol, improve your memory, give you energy, relieve stress, you name it!

Summary

- Biomechanical solutions to prevent DFUs and to keep in remission are well understood
- Success is variable highly dependent on patient compliance.
- Motivational techniques have demonstrated ability to improve patient outcomes
- Technological advances and reimbursement models offer the promise improving patient longevity, quality of life and reducing health care costs.



Thank You!

Join us #TalarTuesday, June 30, 2020 at
5 PM PST/8PM EST for “How To Not Get Turned
Upside Down When Using Skin Substitutes In Your
Practice” with guest speaker

**Ira Kraus, DPM, Director of Business
Development, Extremity Healthcare Inc.**



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