

THE AMERICAN ASSOCIATION OF NURSE LIFE CARE PLANNERS

JOURNAL OF
**NURSE LIFE CARE
PLANNING**

AANCP

WINTER 2024

vol XXIV, no. 1

Assistive & Durable Medical Equipment



PEER-REVIEWED EXCELLENCE IN NURSE LIFE CARE PLANNING SINCE 2006



WINTER 2024

JOURNAL OF NURSE LIFE CARE PLANNING

TABLE OF CONTENTS

- 9 Complex Environmental Modifications: An Occupational Therapy Perspective**
Victoria (Tori) Goldhammer MS, OTR/L, ATP, ECHM, CAPS, CEAC, CLCP
- 15 Kinesiology Tape in Outpatient Settings**
Jacqueline Kaiser, DNP, APRN, CRNA; Carrie Huntsman-Jones, DNP, APRN, FNP-BC, CPN and Lauren Woods, DNP, APRN, FNP-C
- 20 Pediatric Assistive Technology**
Kristin Clarkson DNP, CPNP-AC, CRRN, CNLCP
- 23 Durable Medical Equipment and Diabetes: A summary of educational interventions for providers and patients.**
Natalie Coccoziello, MSN, FNP-C
- 28 Prosthetic Reasonable Use Life**
Dale Berry, CP, FAAOP, LP

DEPARTMENTS

- 3 From the Editor**
- 5 Information for Authors**
- 6 A Message from the President**
- 7 Contributors to this Issue**

AMERICAN ASSOCIATION OF NURSE LIFE CARE PLANNERS

299 S. Main Street #1300-91732
Salt Lake City, UT 94111
PH & FAX: 801.274.1184
aanlcp.org

BOARD OF DIRECTORS

PRESIDENT

Jessica Urie, RN, BSN, CLCP, LCP-C, CNLCP

PRESIDENT-ELECT

Anne Gowing, RN, CCRRN, CNLCP, MSCC

PAST PRESIDENT

Misty Coffman, RN, MSCC, CNLCP

SECRETARY

Shelly Kinney, MSN, RN, CCM, CNLCP

TREASURER

Kimberly Reen, SN, BS, RN, CLCP, LCP-C, CNLCP®, MCP-C

JOURNAL OF NURSE LIFE CARE PLANNING EDITOR

Stephen Axtell

COMMITTEE FOR THIS ISSUE:

Dana Penilton RN, BSN, CLCP, FIALCP

Dawn Cook RN, CNLCP, CLCP

Kate Smith BSN, RN, CNLCP, LCP-C

Kellie Polisenio RN, CNLCP

Kelly Reilly, BSN, RN, LCP-C, MCP-C

Louvenia Ringuette

Megha Rownd, MSN, BSN, RN, CNLCP, LCP-C, MCP-C

Melinda Pearson LMSW, CLCP

Misty Coffman, RN, CLNC, MSCC, CNLCP

Patti Mazurkiewicz, MS, RN, CLCP, CNLCP, CRC, LCPC, NCC

Nellie Kriemer

Rachel Kauffman BSN, MSN, RN, CNOR

Shaun Marie Sever, RN, BSN, MACJ, ALNC, LCP-C

Stacey White, RN, BSN, CCM, CNLCP



Stephen Axtell
JNLCP Editor
journal@aanlcp.org

From the Editor

The holidays have loosened their grip, and now the world is swinging back into our energetic normal. (Not a “new normal.” That phrase is something that cannot fade fast enough.) It is important to take stock of what you realized during the holiday season and apply it to your practice moving forward. In guiding, and surviving, my own family holiday celebrations, I spent a great deal of time thinking about how to more effectively use what long-term resources I have access to. Especially while investing the least effort possible in needlessly wasting these resources. In that spirit, we are proud to present our first issue of the 2024 year: Assistive and Durable Equipment Revisited.

Herein you’ll find advice for a variety of applications of non-disposable implements. The costs of such equipment can vary wildly from cheap and replaceable finger sticks to the kinds of structural changes that can change the nature of a home. But regardless of price and purpose, learning to more effectively and intentionally use such equipment can do wonders for the quality of life that your life care plans prompt. Hopefully, some of the information in this issue will help you to do exactly that.. I’ll admit, I was surprised by some of the information that our fantastic authors collected for us. I hope you reading this issue will bring you as much fascination as I experienced in editing it.

As the editor, I pride myself on taking the time to consider the thoughts and impressions of our readers, but I rarely get to speak with you. This is why I am looking forward to meeting more of you at our upcoming annual conference “Nuts and Bolts of Life Care Planning” in Peachtree, Georgia! I would love to meet you and help you to develop your ideas on writing. We have many upcoming exciting journal subjects that will become an excellent platform from which to share your expertise and reputation.

If you haven’t registered to join us, you can register at <https://aanlcpconference.com/>

Please, take the time to check our upcoming issues schedule at the end of this issue to see if there is something that sounds like an opportunity for you. I will be available at the conference to discuss all of your ideas. If you don’t want to wait that long, I want to formally invite you to reach out to me at Journal@AANLCP.org.

If you do have an idea, please be advised that our advice for authors and submission standards (which can always be conveniently found here: <https://www.aanlcp.org/wp-content/uploads/2022/03/AANLCP-Journal-Info-for-Authors.pdf>) are likely to be undergoing some revision in line with creating a better, stronger resource for the life care planning profession.

I am honored to once again give a presentation on writing for scholarly and medical applications at our conference. It aims to help you make the process of publication easier and more authoritative. After all, professional growth should always be as authoritative as possible while resolving, instead of causing, anxiety. I hope it will be almost as informative as the articles we have herein.

See you there!

Sincerely,
Stephen Axtell



You are invited to attend!
AANLCP® 2024 Conference
Nuts and Bolts of Life Care Planning



High Quality Speakers
 In 2023, attendees rated all speakers an average of 9.3 out of 10.



Earn Education Credits
 Learn how to add value to your cases and obtain up to 15 Education Credits.



Build Your Network
 Meet industry experts at our Welcome Reception and make new friends at our New Life Care Planner breakfast.

EVENT DETAILS

April 5 - 7, 2024
 Crowne Plaza Peachtree City Hotel and
 Conference Center (\$149 per night)
 Peachtree City (Atlanta), Georgia

AANLCPCONFERENCE.COM



Information for Authors

Information for Authors

AANLCP® invites interested nurses and allied professionals to submit article queries or manuscripts that educate and inform the Nurse Life Care Planner about current clinical practice methods, professional development, and the promotion of Nurse Life Care Planning. Submitted material must be original. Manuscripts and queries may be addressed to the Editor. Authors should use the following guidelines for articles to be considered for publication. Please note capitalization of Nurse Life Care Plan, Planning, etc.

Text

- Manuscript length: 1500 – 3000 words
- Use Word® format (.doc, .docx) or Pages (.pages)
- Submit only original manuscript not under consideration by other publications
- Put the title and page number in a header on each page (using the Header feature in Word)
- Place author name, contact information, and article title on a separate title page
- Use APA style (Publication Manual of the American Psychological Assoc. current edition)

Art, Figures, Links

- All photos, figures, and artwork must be in JPG or PDF format (JPG preferred for photos).
- Line art must have a minimum resolution of 1000 dpi, halftone art (photos) a minimum of 300 dpi, and combination art (line/tone) a minimum of 500 dpi.
- Each table, figure, photo, or art must be submitted as a separate file, labeled to match its reference in text, with credits if needed (e.g., Table 1, Common nursing diagnoses in SCI; Figure 3, Time to endpoints by intervention, American Cancer Society, 2019). Graphic elements embedded in a word processing document cannot be used.
- Live links are encouraged. Please include the full URL for each.

Editing and Permissions

- The author must accompany the submission with written release from:
- Any recognizable identified facility for the use of name or image
- Any recognizable person in a photograph, for unrestricted use of the image
- Any copyright holder, for copyrighted materials including illustrations, photographs, tables, etc. Note that images harvested online may be copyrighted.

- All authors must disclose any relationship with facilities, institutions, organizations, or companies mentioned in their work.
- All accepted manuscripts are subject to editing, which may involve only minor changes of grammar, punctuation, paragraphing, etc. However, some editing may involve condensing or restructuring the narrative. Authors will be notified of extensive editing. Authors will approve the final revision for submission. The author, not the Journal, is responsible for the views and conclusions of a published manuscript.
- Submit your article as an email attachment, with document title articlename.doc, e.g., wheelchairs.doc

All manuscripts published become the property of the Journal. Submission indicates that the author accepts these terms. Queries may be addressed to the care of the Editor at: journal@aanlcp.org

Manuscript Review Process

Submitted articles are peer reviewed by Nurse Life Care Planners with diverse backgrounds in life care planning, case management, rehabilitation, and nursing. Acceptance is based on manuscript content, originality, suitability for the intended audience, relevance to Nurse Life Care Planning, and quality of the submitted material. If you would like to review articles for this journal, please contact the Editor.

Journal of Nurse Life Care Planning is the official peer-reviewed publication of the American Association of Nurse Life Care Planners. Articles, statements, and opinions contained herein are those of the author(s) and are not necessarily the official policy of the AANLCP® or the editors, unless expressly stated as such. The Association reserves the right to accept, reject, or alter manuscripts or advertising material submitted for publication. The Journal of Nurse Life Care Planning is published quarterly in spring, summer, fall and winter. Members of AANLCP® receive the Journal subscription electronically as a membership benefit. Back issues are available in electronic (PDF) format on the association website. Journal contents are also indexed at the Cumulative Index of Nursing and Allied Health Literature (CINAHL) at ebscohost.com. Please forward all email address changes to AANLCP® marked "Journal-Notice of Address Update." Contents and format copyright by the American Association of Nurse Life Care Planners. All rights reserved. For permission to reprint articles, graphics, or charts from this journal, please request to AANLCP® headed "Journal-Reprint Permissions" citing the volume number, article title, author and intended reprinting purpose. Neither the Journal nor the Association guarantees, warrants, or endorses any product or service advertised in this publication nor do they guarantee any claims made by any product or service representative. In order to make safe and effective judgments using NANDA-I nursing diagnoses it is essential that nurses refer to the definitions and defining characteristics of the diagnoses listed in this work.

A Message from the President

Dear Members, Colleagues and Fellow Nurse Life Care Planners,



It is a pleasure and honor to be sending this message. I want to thank Misty Coffman and Andrea Nebel for their guidance and leadership within the AANLCP.

I joined the AANLCP in late 2019 as a brand new life care planner. I attended the 2020 AANLCP Conference. Wanting to learn as much as possible, I joined the journal and conference

committees. I made valuable connections at the conference and in the committees that have helped me grow in my nurse life care planning career.

As a former nurse in the emergency department, I was very familiar with the phrase “nurses eat our young.” I think we all have experienced this at some time in our careers; I know I have. Since I became a nurse life care planner and joined this association, I am pleased to say that I have not seen this once. This group of nurses and other professionals is welcoming and collaborative. The activity on the ListServ is a testament to how we support each other.

The members have been hard at work, and there are many exciting things on the horizon! The Newsletter will continue to be sent out every other month to share updates on the Association and Committees. Please let us know if you have news to share!

The 2nd Edition of A Core Curriculum for Nurse Life Care Planners is in its final stages and should be available for purchase in the next few months. Work has begun on updating the AANLCP Scope and Standards of Practice; this should be available by the end of the year.

Our Committees have taken off over the last year, with many projects to improve and grow our association. Thank you to all our volunteers! I cannot stress enough how important our volunteer members are to our organization’s success. Our Educational Scholarship provides an opportunity for an active member of the AANLCP to pursue further education in nurse life care planning by attending the AANLCP’s Annual Educational Conference. Applications are now being accepted. To be considered for this scholarship, please complete the AANLCP Educational Scholarship application which can be accessed at <https://aanlcp.org/educationscholarship/>

The AANLCP annual conference “Nuts and Bolts of Life Care Planning” will be held April 5-7, 2024 in Peachtree City (Atlanta), Georgia at the Crowne Plaza Atlanta SW Peachtree City Hotel and Conference Center. The Conference kicks off with a meet and greet on Thursday night and Friday night features a networking happy hour. New this year is a breakfast on Friday morning for new life care planners and first time attendees. We invite you to come to the 2024 AANLCP Conference to unwind, have fun, learn, collaborate, and begin, expand, or network your services to other life care planners and professionals. You can register at <https://aanlcpconference.com/> We hope to see you there!

Thank you, members, for your continued participation, enthusiasm, and support! Please reach out to me to share your ideas, suggestions, and comments. Let me know if you would like to get more involved with the association; there is an opportunity for everyone, and our committees are excited to welcome you!

Many thanks,

Jessica

Jessica Urie, RN, BSN, CLCP, LCP-C, CNLCP

President, AANLCP | president@aanlcp.org

Contributors to this Issue



Victoria (Tori) Goldhammer MS, OTR/L, ATP, ECHM, CAPS, CEAC, CLCP

Tori earned a BS degree from Cornell University and her MS degree in Occupational Therapy from the University of Illinois at Chicago in 1999. She specializes in fall risk management, home accessibility, and memory concerns by creating comprehensive plans which include home modifications and assistive technology. Tori has created and managed fall prevention, home modification and advocacy programming for non-profit organizations. As a result of Tori's advocacy, the DC Council passed "The Safe at Home Act of 2015". As of 2023, the Safe at Home Program has completed over 6000 jobs in the District of Columbia. Currently, Tori sits on several national expert panels regarding implementation of fall prevention and home modification programs.



Jacqueline Kaiser, DNP, APRN, CRNA

Dr. Jacqueline Kaiser has been an RN since 2003 and a Certified Registered Nurse Anesthetist since 2010. She received a BSN from the University of New Mexico, a Master of Science in Nurse Anesthesia from Central Connecticut University, and a DNP from New Mexico State University. She currently works as a 1099 employee of Kaiser Anesthesia and covers the anesthesia needs of multiple facilities. Jackie has worked in a variety of settings; however, she is particularly passionate about anesthesia for women's health, mental health, and nursing education. She has been an assistant nursing professor for the last year and loves education.



Carrie Huntsman-Jones, DNP, APRN, FNP-BC, CPN

Dr. Carrie Huntsman-Jones has been an RN since 1995 and a Family Nurse Practitioner since 2020. She currently works for the College of Nursing at the University of Utah in their RedMed Employee Health Clinic. Carrie has worked in a variety of settings, however, she is particularly passionate about women's health, mental health, occupational medicine, pediatrics, and nursing education. She is a certified pediatric nurse as well as having worked as a sexual assault nurse examiner. She has been a nursing professor for a variety of colleges and universities for more than 15 years and loves education. Dr. Huntsman-Jones received a BSN from Oregon Health Sciences University, an MSN from the University of Utah, an FNP certificate from University of Massachusetts in Boston, and a DNP from New Mexico State University.



Lauren Woods, DNP, APRN, FNP-C

Dr. Lauren Wood has been an RN since 2009 and a Family Nurse Practitioner since 2015. She received a Bachelor of Science in Nursing from Our Lady of the Elms College in 2009, a Master of Science in Nursing from Massachusetts College of Pharmacy and Health Sciences University in 2015, and a Doctor of Nursing Practice from New Mexico State University in 2023. She currently works as a Medical Science Liaison, and has experience working in acute care diagnostics, regenerative medicine, orthopedic surgery, and emergency medicine.

Contributors to this Issue



Kristin Clarkson DNP, CPNP-AC, CRRN, CNLCP

Kristin Clarkson DNP, CPNP-AC, CRRN, CNLCP is a Pediatric Rehabilitation Medicine Nurse Practitioner and Certified Nurse Life Care Planner with clinical interest in cerebral palsy, spinal cord injury, acquired brain injury, heart failure, transplantation, and neurodevelopmental disabilities. She earned her bachelor's degree in nursing from Seton Hall University, master of science in nursing from the University of Pennsylvania, and doctor of nursing practice from the University of Pittsburgh



Natalie Cozozello, MSN, FNP-C

Natalie Cozozello, MSN, FNP-C, is a practicing family nurse practitioner in Kansas City, Michigan. Her background in nursing includes pediatrics, geriatrics, and public health. She is an advocate for increasing diversity in all areas of health care to provide optimal patient care and is currently working on completing a doctorate as a nurse practitioner at Wichita State University.



Dale Berry, CP, FAAOP, LP

Dale Berry, CP, FAAOP, LP has practiced prosthetics in Canada, Europe, the Middle East, Haiti and in the U.S.A. Dale is a board-certified prosthetist, a Fellow of the American Academy of Orthotists and Prosthetist and licensed in multiple states. Dale's clinical experiences include 20 years as Vice President of Clinical Operations of the nation's largest provider of prosthetics with over 800 clinics. Dale was also selected to serve as Chairman of the National Academy Microprocessor Forum at Walter Reed Army Medical Center, Team Leader to establish a prosthetic clinic in Kabul Afghanistan to treat landmine victims and Clinical Coordinator to establish a prosthetic clinic at the Albert Schweitzer hospital in Haiti to treat individuals injured with amputation from the 2010 Port-au-Prince earthquake. With over 40 years of experience, Dale has provided care to individuals in numerous countries and settings and is well versed in adapting and applying new technology and techniques to meet the ever-changing demands of patients, referrals and the O&P industry. Dale currently is the owner of Prosthetic Xpert Consultation.

Complex Environmental Modifications: An Occupational Therapy Perspective

By: Victoria (Tori) Goldhammer MS, OTR/L, ATP, ECHM, CAPS, CEAC, CLCP



Keywords: 1. Modification, 2. ADL (activities of daily living), 3. Accessibility

NURSING DIAGNOSES TO CONSIDER NANDA-I 2021-2023

Impaired comfort. Perceived lack of ease, relief, and transcendence in physical, psychospiritual, environmental, cultural, and/or social dimensions.

Acute confusion. Reversible disturbances of consciousness, attention, cognition and perception that develop over a short period of time, and which last less than three months.

Deficient knowledge. Absence of cognitive information related to a specific topic, or its acquisition.

Impaired Physical Mobility: Limitation in independent, purposeful movement of the body or of one or more extremities

Introduction

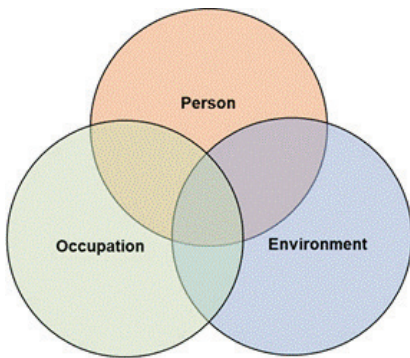
Creating an accessible home is essential for maximizing an individual's functional status. The World Health Organization (2018) stated that "among physical environments, there is little doubt that the accessible domestic home is fundamental to enabling independent living for persons with disabilities." (p. 1). Retrofitting an existing home for accessibility often requires modification of the space that can range from simple to complex. The American Occupational Therapy Association (AOTA) issued a position paper in which it defined Complex Environmental Modifications (CEMs) as:

"alterations, modifications, or creations of new spaces to meet the needs of an individual, family, group, or community to preserve or facilitate optimal participation in daily life. CEM interventions can include, but are not limited to, a combination of structural changes, assistive technologies (AT), and services." (Render, et al., 2015, p.1).

This article will discuss the complex nature of managing environmental barriers as they relate to differing abilities and the variety of solutions that can be implemented to facilitate independence in the home.

Background

Occupational therapists (OTs) are broadly trained to assist individuals with improving their performance in important occupations, commonly called occupational performance (Law, et al., 1996). Occupations, in this context, are defined as are the activities that people do every day to give their life meaning and purpose (AOTA, 2020). Through standardized assessments, the OT determines how the interaction of the environment, the person’s abilities and their desired occupations are affected by an impairment or change in health status. The Person-Environment-Occupation framework within occupational therapy practice focuses on this interaction and what barriers exist that hinder occupational performance (Law, et al., 1996).



This then dictates the treatment protocol of rehabilitation for the physical impairment, the adaptation of the activity, and/or modification of the environment.

Modifying the environment can be as simple as removing an area rug or moving

frequently used items to the kitchen countertop. However, the situation and relevant factors may require more complex modifications, such as remodeling a bathroom or installing a complete smart home system.

The decision of when to simply adapt an environment by using a shower chair vs remodeling a bathroom depends on many factors, for example, the budget, the length of time the individual and family plan to live in the home, their goals, and tolerance for the disruption of the space during a remodel. OTs have many standardized assessments that can assist in creating a plan for CEMs. The Canadian Occupational Performance Measure (COPM) is a tool that drives client-centered practice (Law, et al., 1990) and is often used to determine client goals. The iHOPE assesses client-centered concerns within the context of their home (Stark, et al., 2010). Activities of Daily Living (ADLs) are assessed with clinical tools such as the Functional Independence Measure (Keith, et al., 1987) or the Barthel Index (Mahoney & Barthel, 1965). These measures determine the level of independence with each task and can inform on areas of the home to focus on to increase a person’s level of independence. These are just a

few examples of standard OT assessments that help create a client-centered CEM plan.

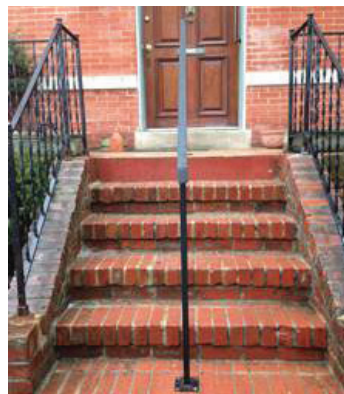
Once the assessment is complete and goals determined, the specific modification plan is created. The balance of the article presents examples of modifications for key areas of concern, with a focus on how they fit within a Life Care Plan.

Examples of Complex Environmental Modifications

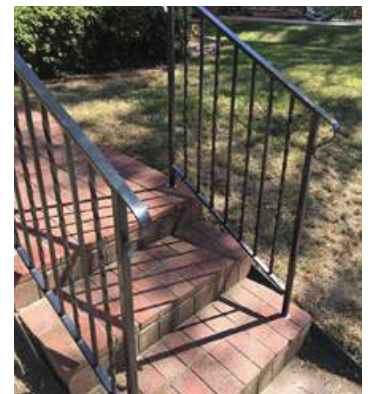
Home modifications. Environmental barriers may exist in any style of home, including a stick-built house, prefab home, or an apartment, depending on the functional status of the individual. Whichever type of home they live in, the typical areas of concern often include exterior entrances, interior stairs, and bathrooms. Solutions are presented in order of complexity. Most photographs are from actual jobs completed in the Metro Washington DC area and permission to use the photos for educational purposes was granted by the homeowner at the time of completion. Where actual photos were not available, credit will be given.

Exterior Entrance

The simplest modification is to add a railing. Railings on both sides of the stairs for bilateral hand use provide support to address impaired balance, vision, and strength issues for people who are ambulatory. Typically, metal railing is used on the exterior, however, pressure-treated wood is an option. From a costing perspective, both are priced by foot, with metal approximately twice as much as wood. Both require regular maintenance of paint/finish to maintain integrity. Wood railing, regardless of maintenance, is likely to need to be replaced more frequently than metal railing.



Adding a center rail provides bilateral access on wide stairs



Vertical pickets are required by code for rises above 30"

If the individual is ambulatory but unable to navigate stairs due to pain, decreased endurance, or severely compromised balance, an exterior stairlift is an option. This is only recommended if the person is able to transfer on/off with no more than hands-on assistance to be safe, particularly



A wood platform at the top creates a zero-step entry at the doorway

at the top of the stairs. Stairlifts are not appropriate for anyone requiring max assist or a mechanical lift to transfer. Exterior stairlifts are more expensive than interior lifts and will also require an outlet. Maintenance should be performed annually and batteries replaced every 2-3 years. As with any mechanical device, with proper maintenance a stairlift can last many years, however, most manufacturers recommend replacement every 10 years.

The covers require more frequent replacement depending on exposure to sun and weather, similar to grill covers.



This ramp was for three stairs, approximately 21" in rise.

For an individual relying on a wheelchair for mobility, ramps are a good option but are not always feasible depending on the available space. Ramps require a 1:12 ratio to ensure a safe slope. This means that every inch of rise requires 12 inches of ramp. Typical stair risers are 7 inches, so two stairs would require 14 feet of ramp. This is not always possible at the front of the house, particularly in urban settings. The rear

entrance may be an option in some scenarios. If a ramp fits, there is a choice between concrete, aluminum, and wood. A sloped concrete path is often preferred for aesthetics. The cost will vary significantly based on the amount of preparation, but they are relatively maintenance-free. Concrete may crack and require replacement, particularly if there are trees surrounding the path. Although aluminum as a material is expensive, a ramp made of aluminum is typically less expensive because it does not require a permit and the installation is relatively easy. To maintain an aluminum ramp, it needs to be kept clear of debris and checked regularly to ensure the bolts are in place and to manage any issues with settling. These ramps should last up to 15 years or longer. Another advantage of aluminum is the modular construction which makes it easy to move to another location if necessary. However, many people decline these ramps due to aesthetics. Finally, wood ramps can be constructed and finished to match the decor of the home. They do require frequent maintenance to maintain the wood integrity and will require replacement. Replacement is dependent on how well it is maintained. If they are not maintained, wood ramps will rot, crack, warp, etc.

For homes where a ramp will not fit, a Vertical Platform Lift (VPL) is the next option. These are more expensive than a ramp and include not only the cost of the lift itself but also the preparation of the area (excavation and concrete landing pad), a permit, an exterior outlet, modifying the porch or upper landing, and installation. These lifts require annual maintenance and battery replacement every 2-3 years and need to be replaced every 10 years according to the manufacturers. Although they are more expensive, the smaller footprint and ease of use make them a good alternative to ramps for individuals who use wheelchairs. Disadvantages of VPLs are that the button needs constant pressure, which may be an issue for some users, and most have a weight limit of 750 pounds. That weight limit may sound high, but if a bariatric client is in a custom power wheelchair and an aide needs to use the lift, it may be an issue.



In situations where exterior and interior stairs present an environmental barrier, building a small extension onto a house for an elevator shaft solves both problems. This is the costliest option, but if the budget permits, it can solve



Photo courtesy of Accessible Systems

most access issues because it can be entered from outside and stop at each interior level of the house. When deciding on an elevator, it is important to factor in the wheelchair and an aide, as there are a wide variety of elevator options and weight capacities. Also, where the buttons are located, how to close the gate, and how to manage the doors, are all factors that need to be planned to meet the individual's needs. Consideration must

be made for backup in case of a power outage. Elevators require annual maintenance checks and if there is a battery backup, the batteries will need to be replaced. Elevators are recommended to be replaced every 20 years.



Lake house, Ithaca New York. The elevator shaft on the left created access from top parking to the entire house.

Interior stairs

Interior stairs typically have the same progression of recommendations, from railings on both sides to stairlifts to platform lifts and eventually elevators, again, depending on the space in the house and the user's needs.

As with exterior stairs, the interior stair railing should be on both sides of the stairs for bilateral support. Railing can be made of wood, typically oak, pine, or metal depending on the budget and decor of the house. The interior railing should last many years and will only require periodic maintenance. However, if the individual is a heavy user, the hardware attaching the rail to the wall should be monitored for stability.

Interior stairlifts have the same criteria as exterior lifts: the person must be able to transfer on/off the lift with minimal assistance. As with the exterior lifts, interior lifts are typically recommended in situations when someone has impaired balance, pain, or decreased endurance. Stairlifts are mass manufactured with straight rails and costs are relatively the same across manufacturers. However, for a curved staircase, the lift is custom made and the cost increases significantly, a minimum of 2 to 3 times the cost of a straight lift or more depending on the number of turns.



Photo courtesy of Savaria

Railing and interior stairlifts are common solutions to challenges with interior stairs. When a person relies on a wheelchair for mobility, however, these are no longer appropriate solutions. One option is an incline platform lift. These are installed on stairs that are typically a minimum of 40" wide, though smaller models are available.

The advantage of these lifts is that the person is able to remain in their chair while riding up/down the stairs and there is no structural change made to the house. When they are not in the lift, it is folded up to prevent interference for those walking the stairs. However, the weight limit capacity of these lifts generally prohibits use with a power wheelchair. These lifts require annual maintenance and battery replacement every 2-3 years. Replacement is recommended every 10 years according to manufacturers.

If the resident is using a power wheelchair that cannot be accommodated by an incline lift, elevators are the only other option for full access to their multi-story house. Similar to exterior lifts, there are two types of interior lifts: shaftless (similar to a vertical platform lift) or in a shaft. Shaftless elevators are available in a variety of styles, weight capacities and price points. These elevators have the advantages of



Photo courtesy of Stiltz Homelifts

lower cost and flexibility of location. The disadvantages, as with the exterior lifts, are the need to constantly hold the button and limited weight capacities vs. residential elevators built into shafts. Selection of this style must be carefully considered if an individual is using a custom power wheelchair and requires an attendant. As with the exterior lifts, the shaftless elevators require annual maintenance and should be replaced every 20 years.

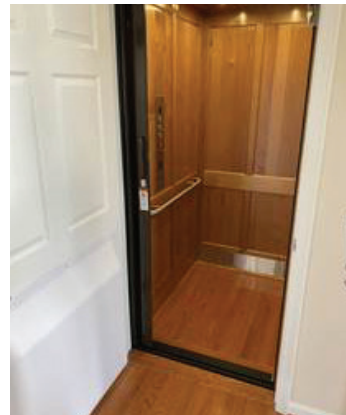


Photo courtesy of Atlantic Elevator Services, Inc.

The costliest elevators for interior residential use are built into shafts. These elevators can accommodate a heavier weight, multiple floors and the buttons do not require constant pressure. Additionally, they are typically concealed and therefore may be more aesthetically pleasing. Aside from the price, disadvantages include finding an appropriate location and the construction required for installation. These require annual maintenance and it is

recommended by the manufacturer that they be replaced every 20-25 years depending on the manufacturer.

All of the above solutions for negotiating stairs for people who rely on wheelchairs require installation and significant costs. In situations where a person is renting, in temporary housing, or when budget is a factor, these solutions may not be appropriate. However, there are devices that can be operated by a caregiver to navigate stairs when this situation arises. The Scalamobil (Alber USA/Invacare) and the LiftKar PT (Sano) are two examples of chairs that have motors to climb stairs. Both are operated by a caregiver. The advantages are the cost, no need for installation, and portability. Disadvantages include caregiver and client willingness and the configuration of the staircase. It will be more difficult to use on curved stairs and

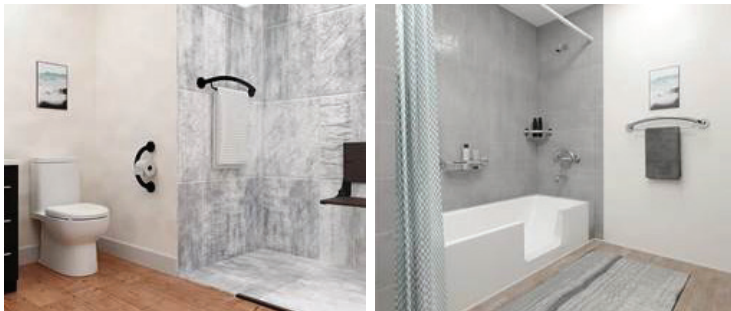


Photo courtesy of Invacare

any staircase that does not have a consistent run and rise. Both require periodic maintenance and battery replacement every 3-5 years depending on use. Scalamobil's useful life is expected to be approximately 5 years.

Bathrooms

An essential element in any bathroom is grab bars, regardless of age or ability. If people are reluctant to install grab bars due to concerns of looking institutional, several manufacturers offer concealed and designer bars. Grab bars should not need maintenance or replacement as long as they are properly installed.



The Invisia PLUS series of grab bars installed in these photos are examples of concealed grab bars. Photo courtesy of Health Craft.



Ponte Giulio grab bars are available in a variety of colors which can be used to match decors and/or assist people who need color contrast due to a visual or cognitive impairment. The company also has a line of ashwood grab bars.



Often tubs create a barrier. There are several options, besides removing the tub, that can address a variety of needs. The easiest option

is to use durable medical equipment, such as a tub transfer bench, for transfers. These are available in standard models



The Platinum Carousel transfer bench. Photo courtesy of Platinum Health.

that require the individual to have the upper body strength and balance to negotiate to ones that have swivel and slide seats operated by a caregiver.

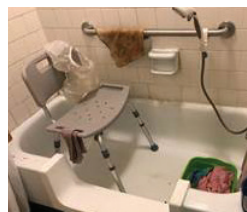
However, if someone requires a lift to transfer, it is optimal to perform that transfer in a dry, open, space and then be rolled into the bathroom. There are several systems on the market that enable this transfer for bathing, such as the Tub Buddy or NuProdx systems. Utilizing these systems provides barrier-free showering without remodeling. As with most durable medical equipment, the transfer benches and these transfer systems are recommended to be replaced every 5 years.



Tub Buddy



NuProdx



There are occasions wherein a person can stand to transfer, but due to limited hip or knee flexion, they cannot clear the side of the tub. Although removing the tub is an option, a simpler option is a tub cut. These can be performed in several

hours and convert a tub to a shower for less than half the cost of remodeling. Maintenance of the caulking is required to prevent leaks, and replacement every 10-15 years is recommended by most contractors. However, care must be taken not to step on the installed sleeve or cut while transferring as it is not meant to bear weight and may limit the life of the cut.



Prefab system. Photo courtesy of Freedom Showers

Finally, if a tub is removed to install a shower, it is recommended to install a barrier-free or roll-in shower. These showers meet the needs of individuals who use wheelchairs for mobility, but they also provide flexibility for other users who may have changing needs as they age. There are several options for installing these showers, from prefabricated systems to custom tiled showers. Most

online vendors report that prefabricated showers need to be replaced every 10-15 years with proper cleaning, sooner if abrasive cleaners are used. However, some vendors provide up to 30-year warranties.

Comfort height toilets, which are typically 17" but are also available at 19" high, are often more comfortable than standard height toilets which are 15" high. To avoid changing toilets, there are several toilet risers on the market that bolt onto the toilet as a toilet seat.



The Bemis toilet riser seat with handles, that are removable, provides 3" of height. Photo courtesy of Bemis.



Kohler created a toilet riser seat that provides height in a concealed fashion. Photo courtesy of Kohler.

The above modifications address physical barriers imposed by stairs and inaccessible bathrooms. However, to fully meet the needs of an individual, additional modifications or devices may be required such as Smart Home Technology to manage the environment by voice or switch, adaptive equipment such as one-handed devices or an automatic feeder, and specific colors or lighting to help people with visual impairments. There are countless combinations of modifications, equipment, and technology that eliminate barriers to function. Partnering with an occupational

therapist, particularly those with specialty training in home modifications, will help determine the modifications required in a specific situation.

Resources

Accessible Systems: <https://www.accessiblemed.com/interior-home-elevator>

Atlantic Elevator Services Inc: <https://deatlanticelevator.com/>

Freedom Showers: <https://www.freedomshowers.com/>

Bemis: <https://www.toiletseats.com/p/clean-shield-elongated-closed-front-plastic-raised-toilet-seat-in-white-with-support-arms-never-loosens-super-grip-bumpers-2/>

Health Craft: <https://healthcraftproducts.com>

Invacare/Scalamobil: <https://rehab.invacare.com/Power-Assist/Alber-scalamobil>

Kohler: <https://www.kohler.com/en/products/toilet-seats-bidet-seats/shop-toilet-seats-bidet-seats/hyten-elevated-quiet-close-elongated-toilet-seat-25875>

Nu Prodx: <https://www.nuprodx.com/>

Platinum Health: <https://www.platinumhealthllc.com/products/carousel-sliding-transfer-bench-with-swivel-seat-free-online-bonus-offer-1>

Ponte Giulio: <https://www.pontegiulio.com/>

Savarria: <https://www.savaria.com/products/delta-straight-ipl>

Stiltz Homelifts: <https://www.stiltzlifts.com/residential-elevator/>

Tub Buddy: <https://shower-buddy.com/>

REFERENCES

American Occupational Therapy Association: Occupational Therapy Practice Framework: Domain and Process—Fourth Edition (2020). American Journal of Occupational Therapy, 74(Suppl. 2). <https://dx.doi.org/10.5014/ajot.2020.74S2001>

Keith, R., Granger, C., Hamilton, B., & Sherwin, F. (1987). The functional independence measure: a new tool for rehabilitation. *Advances in clinical rehabilitation*, 1, 6–18.

Law M, Cooper B, Strong S, Stewart D, Rigby P, Letts L. (1996). The Person-Environment-Occupation Model: A Transactive Approach to Occupational Performance. *Canadian Journal of Occupational Therapy*. 63(1):9-23. [doi:10.1177/000841749606300103](https://doi.org/10.1177/000841749606300103)

Law, M., Baptiste, S., McColl, M., Opzoomer, A., Polatajko, H., & Pollock, N. (1990). The Canadian occupational performance measure: an outcome measure for occupational therapy. *Canadian journal of occupational therapy. Revue canadienne d'ergotherapie*, 57(2), 82–87. <https://doi.org/10.1177/000841749005700207>

Mahoney, F., & Barthel, D. (1965). Functional evaluation: The Barthel Index: A simple index of independence useful in scoring improvement in the rehabilitation of the chronically ill. *Maryland State Medical Journal*, 14, 61–65.

Renda, M., Shamberg, S., Young, D. (2015). Complex Environmental Modifications. *The American Journal of Occupational Therapy*; Vol. 69, (Nov/Dec 2015): 1-7.

Stark, S. L., Somerville, E. K., & Morris, J. C. (2010). In-Home Occupational Performance Evaluation (I-HOPE). *The American journal of occupational therapy : official publication of the American Occupational Therapy Association*, 64(4), 580–589. <https://doi.org/10.5014/ajot.2010.08065>

World Health Organization. (2018). WHO Housing and health guidelines, Web Annex F. [www.who.int. https://www.who.int/publications/item/9789241550376](https://www.who.int/publications/item/9789241550376)

Kinesiology Tape in Outpatient Settings



By Jacqueline Kaiser, DNP, APRN, CRNA • Carrie Huntsman-Jones, DNP, APRN, FNP-BC, CPN
Lauren Woods, DNP, APRN, FNP-C

Keywords: 1. Pain Management, 2. Kinesthetics, 3. Injury stabilizing

NURSING DIAGNOSES TO CONSIDER NANDA-I 2021-2023

Readiness for Enhanced Exercise Management. A pattern of attention to physical activity characterized by planned, structured, repetitive body movements, which can be strengthened.

Decreased Activity Tolerance. Insufficient endurance to complete required or desired daily activities.

Impaired Physical Mobility. Limitation in independent, purposeful movement of the body or of one or more extremities..

While kinesiology tape (KT) was originally invented in the 1970's by Dr. Kenzo Kase (Kinesio Holding Company, 2022), it was thrown into the spotlight when it was worn by Olympic gold medalist, Kerri Walsh Jennings in 2008 (Rocco, 2016). Since that time, it can be seen being used on many athletes of various levels of competition. Utilization goes even further as the product is stocked on store shelves and now utilized by the public. With this expansion of access for new populations, how do healthcare professionals effectively utilize it and what concerns need to be managed?

Kinesiology tape (KT) is a stretchy cotton tape that has an adhesive acrylic back. KT (also called kinesio tape, elastic therapy tape, and by the brand names of the product) has seemed to replace the old white tape of the past which was used for the prevention of muscle and joint injury and to

support the healing of injuries. KT is water resistant, can be worn for several days, and has varying elasticity to provide different levels of support (Halseth et al., 2004). While it was originally used on athletes, it has started to find its way into healthcare as a useful adjunct for patients who have a variety of health issues.

What do providers need to know about KT and its uses? This can be a confusing topic as a result of the wide breadth of material on the topic. KT is growing in popularity as an adjunct to traditional rehabilitation services (Gibbons, 2019). Initially, the primary population was athletes with a focus on preventing or stabilizing an injury. Now, children have experienced benefits from the use of KT as an adjunct to their therapeutic services as they are more amenable to the comfort, color, and long-lasting qualities of the product (Rives, 2017). Additional areas that have shown promise for the use of KT include pain management (Ortac et al., 2020), lymphedema (Otero et al., 2019; Tsai et al., 2009), post-stroke (Sheng et al., 2019), and post-cesarean section (Uzunkaya-Öztoprak et al., 2023).

It has been proposed that KT can help patients by strengthening weak muscles, improving circulation of blood and lymph, decreasing pain, and relieving abnormal muscle tension (Halseth et al., 2004). KT has been recommended for use in supporting almost any muscle or joint. These recommendations have come with mixed results on whether or not KT is actually helpful to patients. One study found that it was not helpful to older patients with knee osteoarthritis (OA) for reducing pain, swelling, and improving muscle strength (Wageck et al., 2016), while another study found that it did not add any additional benefits to treating low back pain than was obtained from exercise and therapy alone (Nemitala Added et al., 2016). Other studies have shown that it may be helpful in the rehabilitation of post-stroke patients (Sheng et al., 2019), chronic low back pain (Nelson, 2016), and treating ankle pain (Halseth et al., 2004), among other areas of the body. As KT is perceived as being non-harmful and potentially helpful, this has led to the product being used in a wide variety of healthcare settings.

Some studies conclude that KT may have a place in conjunction with proven therapeutic processes for patients. Lee et al. (2016) concluded from their small-sample study that KT is an effective nonsurgical intervention for pain relief, range of motion (ROM), and activities of daily living for patients with OA. Another study by Letafatkar et al. (2021) revealed that KT, in addition to therapeutic exercises, may improve outcomes in patients who have shoulder impingement syndrome.

Araujo et al. (2018) concluded that in the absence of other treatment options, KT may be convenient and beneficial for lower back pain. Chen et al. (2020) found that KT, in conjunction with progressive muscle relaxation therapy, could reduce lower back pain intensity in pregnancy. Uzunkaya-

Öztoprak et al. (2023) determined that post cesarean patients could benefit from KT as it resulted in reduced pain which facilitated increased breastfeeding success and increased the overall comfort level of the mother. They also declared that KT can be used safely in this population.

KT has also been studied in the pediatric population and its success has centered on the comfort and compliance of these patients and their parents. Elbasan et al. (2018) concluded that in conjunction with traditional therapeutic methods, KT usage in children with cerebral palsy (CP) resulted in improved sitting posture, postural control, seating function, and gross motor function. Inamdar et al (2021) followed with the conclusion that KT may be an effective adjunct to physical therapy in improving sitting ability in children with CP. And finally, Aydin et al. (2021) concluded that KT use in children with Duchenne muscular dystrophy had improved performance in their gait and recommended its use in addition to traditional rehabilitation programs.

“When it comes to children, kinesio tape is very safe to use and extremely beneficial. It is a painless application process; they can wear it for days at a time without getting in the way of bath time or play. It is colorful, and fun to wear, and if you are a creative practitioner, you can cut designs into your tape and make it a little bit more personalized” (Rives, 2017).

Stroke patients often face a range of challenges and physical therapy is a key component to their rehabilitation. Sheng et al. (2019) concluded that KT could be recommended for post-stroke foot drop as it showed promise in improving walking functionality. Wang et al. (2022) found that KT could aid post-stroke patients in upper limb function, shoulder subluxation, ROM, and pain intensity.

One area where articles have declared KT was superior to traditional methods is with compression garments utilized for reducing breast cancer-related lymphedema (Otero et al., 2019). They also concluded that KT provided better limb mobility and was more comfortable for the patients' lymphedema (Otero et al., 2019). However, as this is a newly introduced intervention, it should only be recommended after consultation with a healthcare provider or physical therapist experienced with lymphedema management.

After reviewing the research, it is recommended that KT is best utilized in combination with other adjunct treatment strategies such as physical therapy and exercise. Patients find it more comfortable than some traditional options like braces, slings, and compression garments which may be more compliant with its use. Usage in pediatrics is particularly advantageous as the color, water-resistant cloth, and long

application time are acceptable adaptations for this group.

Overall, KT may be recommended to patients experiencing the following categories of concern as there is a likelihood of a positive response. Of course, patients should continue to have access to resources, education material, and knowledgeable providers to supplement their recovery.

Conditions that May Benefit from KT	Resource
1. Preventing or stabilizing an athletic injury	Gibbons, 2019
2. Knee pain, arthritis, swelling	Lee et al., 2016
3. Shoulder pain, impingement	Letafatkar et al., 2021
4. Lower back pain	Araujo et al., 2018
5. Pregnancy-related lower back pain and post-c-section comfort	Chen et al., 2020; Uzunkaya-Öztoprak et al., 2023
6. Pediatrics: CP, DMD	Aydin et al., 2021; Elbasan et al., 2018; Inamdar et al., 2021
7. Post-stroke	Sheng et al., 2019; Wang et al., 2022
8. Lymphedema	Otero et al, 2019

While kinesiology tape is generally considered safe for patients to use when applied correctly, there are specific considerations and cautions that must be followed to ensure safe and effective usage.

Contraindications:

There are seven contraindications to the usage of KT. Allergic reactions to KT: most often the allergic reaction stems from the adhesive as it is acrylic-based (Andrýsková & Lee, 2020). These reactions can be avoided by clarifying a history of allergic reactions to acrylic or adhesives or by testing a small area of skin away from the application area (Wu et al., 2015). KT should also not be used on any compromised skin areas including: cuts, incisions, scrapes, burns, rashes, sunburns, or areas that may be infected (Gibbons, 2019 & Wu et al., 2015). KT is not sterile and can absorb moisture since it has a cotton base. This moisture can promote the growth of bacteria and increase the risk and spread of infection (Wu et al., 2015).

Deep Vein Thrombosis: Kinesiology tape should not be used when deep vein thrombosis (DVT) is known or suspected (Bailey, 2023; Gibbons, 2019; Wu et al., 2015).

Taping around or near a clot can be dangerous and should be avoided as clots can dislodge and travel to the heart or lungs and may become fatal (Bailey, 2023; Gibbons, 2019; Wu et al., 2015). These patients need to seek a specialist for a diagnostic exam before an application is considered. It could also be concluded that patients diagnosed with a clotting disorder have the same contraindication and should be fully evaluated before recommending KT application.

Cancer: KT is not recommended to be applied near any malignancy (Bailey, 2023; Gibbons, 2019; Wu et al., 2015). One of the theories explaining how KT is so effective is that it promotes circulation. Increasing blood flow to a malignant area is not recommended so as to avoid stimulating growth, or increasing the possibility of the circulation of these cancerous cells (Bailey, 2023). As KT increases circulation, caution is also recommended when using KT on patients who are sensitive to increased intravascular volume (Bailey, 2023; Cheatham et al., 2021). These sensitivities may result from conditions such as congestive heart failure (CHF) and renal failure (Bailey, 2023; Cheatham et al., 2021). Increased intravascular volume in patients with CHF or renal failure can result in fluid pooling which may require hospitalization.

Peripheral neuropathy: the use of KT in connection with peripheral neuropathy is problematic as the neurological feedback from the area is compromised which will further limit warning signs in the area and possibly increase the uncomfortable sensation of "pins and needles." (Cheatham et al., 2021).

Thin or fragile skin: removing KT can become problematic with patients with thin or sensitive skin as it may cause skin tears, bruising, and abrasions (Cheatham et al., 2021).

Contraindications to KT Use	Reference
1. Allergy to KT	Andrýsková & Lee, 2020
2. Open or infected skin at the application site	Gibbons, 2019; Wu et al., 2015
3. Suspected or known deep vein thrombosis (DVT)	Bailey, 2023; Gibbons, 2019; Wu et al., 2015
4. Cancer	Bailey, 2023; Gibbons, 2019; Wu et al., 2015
5. Peripheral neuropathy	Cheatham et al., 2021
6. Patients that are sensitive to increased intravascular volume, i.e. CHF and renal failure	Bailey, 2023; Cheatham et al., 2021
7. Thin skin	Cheatham et al., 2021

Educating patients is crucial to the successful use of KT. Patients need to understand that KT is not a long-term solution. It can be an excellent adjunct to a recovery plan or for temporary relief of pain but has not been shown to be a permanent solution to any underlying ailment (Gibbons, 2019; Sun & Lou, 2021 & Wu et al., 2015).

Final Considerations: Even though KT is supportive and comfortable, it is important to communicate with the patient that it is never a substitute for professional advice (Gibbons, 2019). KT can be expensive as it is a single use item and oftentimes requires professional application to achieve the desired result (Gibbons, 2019, Wu et al., 2015.) Further, it may not be covered by the patient's insurance plan (Cigna healthcare, 2023). Patient self-application may be difficult due to limited knowledge, lack of experience, and, in

some cases, the need for additional help (Wu et al., 2015). Soliciting additional assistance when applying the KT at home requires additional education for a caregiver to assure correct application. Incorrect application or removal of KT can result in increased swelling, bruising, blisters, skin tears, lymphedema, or further tissue injury (Andrýsková & Lee, 2020; Bailey, 2023; Gibbons, 2019).

Providing patients with vetted and accurate information is essential for their correct usage of KT. Many published books review the accurate application of KT and there are subsequent videos that can be referenced or reviewed at home to ensure correct self-application. Using Kinesio tape as a part of life care plans allows the patient to engage with effective secondary solutions that are well within the grasp of well-educated patients.

REFERENCES

- Andrýsková, A., & Lee, J.-H. (2020). The Guidelines for Application of Kinesiology Tape for Prevention and Treatment of Sports Injuries. *Healthcare*, 8(2), 144. <https://doi.org/10.3390/healthcare8020144>
- Araújo, A. C., Parreira, P. D. C. S., Hespanhol, L., Da Silva, T. M., Da Luz, M. A., Da Cunha Menezes Costa, L., & Costa, L. O. P. (2018). Medium term effects of kinesio taping in patients with chronic non-specific low back pain: a randomized controlled trial. *Physiotherapy*, 104(1), 149–151. <https://doi.org/10.1016/j.physio.2016.12.001>
- Aydin Yağcıoğlu, G., Alemardoğlu Gürbüz, İ., Karaduman, A., Bulut, N., & Yılmaz, Ö. (2021). Kinesiology Taping in Duchenne Muscular Dystrophy: Acute Effects on Performance, Gait Characteristics, and Balance. *Developmental neurorehabilitation*, 24(3), 199–204. <https://doi.org/10.1080/17518423.2020.1839805>
- Bailey, C. (2023, September 29). 5 conditions when you should not use KT tape. KT Tape. <https://www.kttape.com/blogs/products/5-conditions-when-you-should-not-use-kt-tape#:~:text=Cancer%20%2D%20if%20cancerous%20cells%20are,never%20be%20used%20with%20malignancies>.
- Cheatham, S. W., Baker, R. T., & Abdenour, T. E. (2021). Kinesiology Tape: A descriptive survey of healthcare professionals in the United States. *The International Journal of Sports Physical Therapy*, 16(3). <https://doi.org/10.26603/001c.22136>
- Chen, L., Ferreira, M. L., Beckenkamp, P. R., Caputo, E. L., Feng, S., & Ferreira, P. H. (2020). Comparative Efficacy and Safety of Conservative Care for Pregnancy-Related Low Back Pain: A Systematic Review and Network Meta-analysis. *Physical Therapy*, 101(2). <https://doi.org/10.1093/ptj/pzaa200>
- Cigna healthcare. (2023). Cigna medical coverage policy- therapy services strapping and taping. https://static.cigna.com/assets/chcp/pdf/coveragePolicies/medical/cpg143_strapping_taping.pdf
- Elbasan, B., Akaya, K. U., Akyüz, M., & Oskay, D. (2018). Effects of neuromuscular electrical stimulation and Kinesio Taping applications in children with cerebral palsy on postural control and sitting balance. *Journal of Back and Musculoskeletal Rehabilitation*, 31(1), 49–55. <https://doi.org/10.3233/bmr-169656>
- Gibbons, J. (2019). *A practical guide to kinesiology taping for injury prevention and common medical conditions: second addition*. Nutbourne, United Kingdom. Lotus Publishing.
- Halseth, T., McChesney, J. W., DeBeliso, M., Vaughn, R., & Lien, J. (2004). The Effects of Kinesio™ Taping on Proprioception at the Ankle. *Journal of Sports Science & Medicine*, 3(1), 1–7.
- Inamdar, K., Molinini, R. M., Panibatla, S. T., Chow, J. C., & Dusing, S. C. (2020). Physical therapy interventions to improve sitting ability in children with or at-risk for cerebral palsy: a systematic review and meta-analysis. *Developmental Medicine & Child Neurology*, 63(4), 396–406. <https://doi.org/10.1111/dmnc.14772>

REFERENCES

- Kinesio Holding Company. (2022). Our History. *Kinesio*. <https://kinesiotaping.com/about/our-history/>
- Lee, K., Yi, C., & Lee, S. (2016). The effects of kinesiology taping therapy on degenerative knee arthritis patients' pain, function, and joint range of motion. *Journal of Physical Therapy Science*, 28(1), 63–66. <https://doi.org/10.1589/jpts.28.63>
- Letafatkar, A., Rabiei, P., Kazempour, S., & Alaei-Parapari, S. (2020). Comparing the effects of no intervention with therapeutic exercise, and exercise with additional Kinesio tape in patients with shoulder impingement syndrome. A three-arm randomized controlled trial. *Clinical Rehabilitation*, 35(4), 558–567. <https://doi.org/10.1177/0269215520971764>
- Nelson, N. L. (2016). Kinesio taping for chronic low back pain: A systematic review. *Journal of Bodywork and Movement Therapies*, 20(3), 672–681. <https://doi.org/10.1016/j.jbmt.2016.04.018>
- Nemitalla Added, M. A., Pena Costa, L. O., De Freitas, D. G., Thiago Yukio Fukuda, Monteiro, R. L., Salomão, E. C., De Medeiros, F. C., & Menezes Costa, L. D. C. (2016). Kinesio Taping Does Not Provide Additional Benefits in Patients With Chronic Low Back Pain Who Receive Exercise and Manual Therapy: A Randomized Controlled Trial. *Journal of Orthopaedic & Sports Physical Therapy*, 46(7), 506–513.
- Ortaç, E. A., Sarpel, T., & Benlidayı, İ. C. (2020). Effects of Kinesio Taping on pain, paresthesia, functional status, and overall health status in patients with symptomatic thoracic outlet syndrome: A single-blind, randomized, placebo-controlled study. *Acta Orthopaedica Et Traumatologica Turcica*, 54(4), 394–401. <https://doi.org/10.5152/j.aott.2020.19042>
- Otero, V. P., Delgado, E. G., Cortijo, C. M., Romay-Barrero, H., De Carlos Iriarte, E., & Avendaño-Coy, J. (2019). Kinesio taping versus compression garments for treating breast cancer-related lymphedema: a randomized, cross-over, controlled trial. *Clinical Rehabilitation*, 33(12), 1887–1897. <https://doi.org/10.1177/0269215519874107>
- Rives, K. (2017). Kinesiotaping case studies. Occupational therapy neurological and physical disabilities. <https://www.occupationaltherapy.com/articles/kinesiotaping-case-studies-3819>
- Rocco, M. (2016, May 12). *Meet KT Tape, One of 2016's Big Olympic Sponsors* [Text.Article]. FOXBusiness; Fox Business. <https://www.foxbusiness.com/features/meet-kt-tape-one-of-2016s-big-olympic-sponsors>
- Sheng, Y., Kan, S., Wen, Z., Wen-Hua, C., Qi, Q., Qu, Q., & Yu, B. (2019). Effect of Kinesio Taping on the Walking Ability of Patients with Foot Drop after Stroke. *Evidence-based Complementary and Alternative Medicine*, 2019, 1–7. <https://doi.org/10.1155/2019/2459852>
- Sun, G., & Lou, Q. (2021). The efficacy of kinesio taping as an adjunct to physical therapy for chronic low back pain for at least two weeks: A systematic review and meta-analysis of randomized controlled trials. *Medicine*, 100(49), e28170. <https://doi.org/10.1097/MD.00000000000028170>
- Tsai, H., Hung, H., Yang, J., Huang, C., & Tsao, J. (2009). Could Kinesio tape replace the bandage in decongestive lymphatic therapy for breast-cancer-related lymphedema? A pilot study. *Supportive Care in Cancer*, 17(11), 1353–1360. <https://doi.org/10.1007/s00520-009-0592-8>
- Uzunkaya-Öztoprak, P., Koç, G., & Özyüncü, Ö. (2023). The Effect of Kinesio Taping on Acute Pain, Breastfeeding behavior and Comfort Level in Women with Cesarean Section: A Randomized Controlled Trial. *Nigerian Journal of Clinical Practice*, 26(8), 1075–1084. https://doi.org/10.4103/njcp.njcp_459_22
- Wageck, B., Nunes, G. S., Bohlen, N. B., Santos, G. M., & de Noronha, M. (2016). Kinesio Taping does not improve the symptoms or function of older people with knee osteoarthritis: A randomized trial. *Journal of Physiotherapy*, 62(3), 153–158. <https://doi.org/10.1016/j.jphys.2016.05.012>
- Wang, M., Pei, Z., Xiong, B., Meng, X., Chen, X., & Liao, W. (2019). Use of Kinesio taping in lower-extremity rehabilitation of post-stroke patients: A systematic review and meta-analysis. *Complementary Therapies in Clinical Practice*, 35, 22–32. <https://doi.org/10.1016/j.ctcp.2019.01.008>
- Wang, Y., Li, X., Sun, C., & Xu, R. (2022). Effectiveness of kinesiology taping on the functions of upper limbs in patients with stroke: a meta-analysis of randomized trials. *Neurological Sciences*, 43(7), 4145–4156. <https://doi.org/10.1007/s10072-022-06010-1>
- Wu, W., Hong, C., & Chou, L. (2015). The kinesio taping method for myofascial pain control. *Evidence-based Complementary and Alternative Medicine*, 2015, 1–9. <https://doi.org/10.1155/2015/950519>



Pediatric Assistive Technology

By: Kristin Clarkson DNP, CPNP-AC, CRRN, CNLCP

Keywords: 1. Prosthesis, 2. Mobility, 3. Pediatrics

NURSING DIAGNOSES TO CONSIDER NANDA-I 2021-2023

Readiness for Enhanced Family Coping. A pattern of management of adaptive tasks by primary person (family member, significant other, or close friend)

Decreased Activity Tolerance. Insufficient endurance to complete required or desired daily activities.

Readiness for Enhanced Health Self-management. A pattern of satisfactory management of symptoms, treatment regimen, physical, psychosocial, and spiritual consequences and lifestyle changes inherent in living with a chronic condition, which can be strengthened.

Pediatric assistive technology encompasses equipment, software, or devices that improve a disabled child's function and quality of life. For children, assistive technology can help them progress through developmental milestones, succeed in their educational setting, and eliminate barriers. When considering assistive technology, the clinician should explore the patient's and family's goals, how the device will improve function, and what equipment can meet the child's needs. Other factors to consider with larger equipment are physical space, transportation options, future growth, and duration of need.

Assistive Technology Evaluations

A child should be evaluated in a multidisciplinary clinic encompassing a prescribing provider, an assistive technology professional, a skilled therapist (physical therapy, occupational therapy, or speech-language pathologist), and a durable medical equipment vendor. Depending on the service area, some clinics may have various treating providers. Clinics may require a prescription for an equipment clinic evaluation, skilled therapy evaluation, or dedicated prescription for the equipment.

Clinicians will typically use AMA's Current Procedural Terminology during evaluation and training with assistive technology. CPT code 97542 represents "wheelchair management and should be used for assessment, fitting, training" per each 15 minutes (Centers for Medicare & Medicaid Services, 2023). Training can include education on pressure relief, repositioning, wheelchair navigation, and safe transfers. CPT code 97755 represents "assistive technology assessment and should be used for the assessment of the patient's need for assistive technology (Centers for Medicare & Medicaid Services, 2023). Assistive technology can include power mobility, functional electrical stimulation, prosthetic limb control, and exoskeleton" (Centers for Medicare & Medicaid Services, 2023). CPT Code 97755 should be used to capture time spent evaluating a patient's function and ability to engage with devices. For time spent training a patient on assistive technology, CPT code 97535 represents self-care/home management training, and 97537 represents community/work reintegration training per each 15 minutes (Centers for Medicare & Medicaid Services, 2023).

Mobility Aids

Mobility aids enhance a patient's ability to navigate their environment. Devices may include gait aids, seating systems, transfer aids, and recreational devices. Gait aids, such as walkers, canes, and crutches, can ensure safety for ambulatory children with gait deviations. For children with balance impairments and lower extremity weakness, posterior walkers are commonly utilized as this improves the center of gravity. Forearm crutches are also common for children who require less stability in the stance phase of gait.

Standers are utilized to facilitate standing activities for children who are not able to stand independently. Standing can positively affect range of motion, bone mineral density, spasticity, and hip stability (Paleg et al., 2013). Stander options include supine, prone, multi-position, sit-to-stand, or mobile stander. Standers should be selected based on the level of support required. For children who can advance their lower extremities, gait trainers and walkers should be explored. Gait trainers can provide additional support at the trunk and upper body.

Seating systems include manual wheelchairs, adaptive strollers, and powered mobility. As children grow, seating systems should be custom to the child's measurements and have the ability to adjust for growth. Manual wheelchairs can be designed for the child to propel independently, dependently be pushed, or have an additional power-assist feature. When selecting an appropriate seating device, the child's ability to navigate the device, postural control, and goals should be incorporated. For children with poor head or trunk control, a tilt in space frame should be considered to allow for adequate repositioning and pressure relief (Lusty & Modrcin, 2023). Power assist features can be utilized for a child who can propel a manual wheelchair but may need assistance propelling longer distances. Children with upper extremity impairments who cannot propel a manual wheelchair should be evaluated for power mobility. For children with power mobility, a backup wheelchair should be considered in case of power malfunction or difficulty transporting a power wheelchair. Due to the weight of power wheelchairs, consideration should also be given to wheelchair-accessible vans.

An adaptive stroller is a dependent system that typically includes fabric support and can collapse. Families will opt for strollers for short-distance navigation, as they can easily collapse for transportation. Strollers can also be considered for children who are at an increased risk for elopement. Additional seating options can include activity chairs or other stationary seating devices to allow for improved posture during feeding or educational activities. These devices can also provide time out of the primary seating system. Younger children may benefit from floor sitter devices or positioning pillows to encourage different positions on the floor.

Lifts should be considered when a child reaches 35 pounds to prevent caregiver musculoskeletal injury (Waters et al., 1994).

Many skilled agencies require their staff to lift no more than 35 pounds independently and may require a family to obtain a lift. Crank or electric lifts, such as a Hoyer lift, are common and allow different-sized slings for the growing child. Additional lifts that may be considered are a stand pivot lift, transfer and mobility device, and ceiling lift. When exploring options, one must consider the layout of the home and storage capabilities.

Adaptive Bathing Equipment

Children who do not have postural control to sit or transfer safely into a bathtub should be evaluated for adaptive bathing equipment. Adaptive bathing equipment can include toileting chairs, shower chairs, lifts, and multi-use adaptive bathing systems. When selecting bathing equipment, considerations should include whether the family has a tub, standing shower, and bathroom layout. A life care plan may also consider bathroom modifications such as grab bars, shower heads, low/wide toilets, and structural modifications.

Enclosure Beds

Children who require assistance in turning and mobility should be evaluated for specialty equipment to sleep in. Mattress overlays and specialty mattresses should be considered for a child who cannot turn independently, as pressure relief is necessary to maintain skin integrity. Children may be evaluated for an enclosure bed if they are at risk for malpositioning on a standard mattress, risk for elopement, or present with safety concerns.

Augmentative and Alternative Communication

Augmentative and alternative communication (AAC) can include gestures, signs, and devices. AAC can be considered for children as young as 12 months of age (Davidoff, 2017). When exploring aided AAC, children may start with low-tech options such as a switch, paper card, or communication board and then transition to a high-tech option. High-tech options include communication devices such as a dedicated device or a tablet with installed software. Skilled therapy evaluations can assist in identifying the most appropriate device for a child. Children who do not have upper extremity control to touch a device can be evaluated for a device that operates with selection by visual gaze.

Common Pediatric Equipment

Children with impaired postural control should be considered for adaptive support in transit. Supports can include a tether system, reverse seat belts, or adaptive car seats. Children with complex seating requirements may not be able to be accommodated in an adaptive car seat and require transportation in a wheelchair-accessible vehicle. Adolescents of driving age should also be evaluated for adaptive driving aids through an adapted driver's assessment. The adolescent's cognition, vision, and reaction time should be considered before the evaluation (Ward et al., 2021).

Orthoses can be obtained to improve function, decrease gait deviations, prevent contracture, or provide comfort. Depending on the indication, an orthosis can be custom molded or provided off the shelf. As children grow, a custom-molded device will need to be replaced depending on growth. For example, an ankle foot orthosis may need to be replaced annually while a child grows. A soft or hard helmet may be indicated for children with head-banging behaviors or at risk for falls due to postural impairments or seizures.

Adaptive Aids should also be considered for impairments in activities of daily living such as eating, dressing, writing, and self-care activities. Adaptive feeding tools include rubber grips, rocker knives, grip pads, weighted utensils, universal cuffs, raised dishes, long straws, and adaptive feeding systems (Ward et al., 2021). Writing instruments can help with writing efficiency through rubber grips, slant boards, keyboards, or dictation devices. Aids to help with dressing can include a shoe horn, sock aid, button/zipper hook, long-handed grabber, leg lifter, and a dressing stick (Ward et al., 2021). Children with medical technology may benefit from adaptive clothing with magnets, Velcro, or openings to assist in accessing devices and foster independence in dressing. For children with hearing impairments, hearing aids, amplifiers, FM systems, alerting devices, or AAC devices can be utilized (National Institute on Deafness and Other Communication Disorders, 2019). Assistive technology for visual impairments can include eyeglasses, magnifiers, large print books, brailled materials, and walking sticks. Patients with low vision should be referred to a low-vision specialist to identify specialized equipment.

Recreation

A child's vocation is to attend school and have fun! Many pieces of equipment put the fun in function and help children reach their developmental potential. For outdoor recreation, equipment such as an adaptive tricycle, water wheelchair, or all-terrain wheelchair wheels can be considered. Recreational activities such as archery, bowling, canoeing, rock climbing, rowing, and swimming all have equipment or modifications that can be used for children with disabilities. Assistive technology considerations can also focus on the child's occupation as a student. The life care plan can also include equipment that may enhance a student's education, such as seating, desks, and technology.

Lifecare Plan Considerations

When preparing to include assistive technology in the pediatric life care plan, the life care planner should review the child's current equipment and explore what the child and family will likely benefit from in the future. Replacement intervals depend on the child's growth, use of frequency, and wear on the equipment. Standard replacement intervals can be found in the 5th Edition of Life Care Planning and Case Management (Marini & Villarreal, 2023), as well as consideration of replacement in Replacement Intervals in Life Care Planning (Cook, 2020). When including equipment, the life care plan should also allocate the associated evaluations to order and deliver the equipment.

REFERENCES

- Centers for Medicare & Medicaid Services (2023, October 1). Billing and Coding: Outpatient Physical and Occupational Therapy Services. Retrieved December 8, 2023, from <https://www.cms.gov/medicare-coverage-database/view/article.aspx?LCDId=33631&articleId=56566&NCSelection=NCD&Keyword=negative+pressure&KeywordLookUp=Doc&KeywordSearchType=Exact&kq=true>
- Cook, D. (2020). Replacement Intervals in Life Care Planning. *Journal of Nurse Life Care Planning*, 20(4), 17–20.
- Davidoff, B. E. (2017). AAC With Energy—Earlier: Research shows that children with communication challenges do best when introduced to augmentative and alternative communication as early as 12 months. *The ASHA leader*, 22(1), 48–53.
- National Institute on Deafness and Other Communication Disorders. (2019, November 12). Assistive Devices for People with Hearing, Voice, Speech, or Language Disorders. Retrieved December 8, 2023, from <https://www.nidcd.nih.gov/health/assistive-devices-people-hearing-voice-speech-or-language-disorders>
- Lusty, D. and Modrcin, A. "Seating Evaluations," in Rinaldi, R. J., & Srinivasan, R. (Eds.). (2022). *Handbook of Pediatric Rehabilitation Medicine*. New York, NY: Springer Publishing Company, LLC, pp. 219–230.
- Marini, I., & Villarreal, L. "Assistive Technology, Durable Medical Equipment, and Transportation in Life Care Planning," in Rutherford-Owen, T., Barros-Bailey, M., & Weed, R. O. (Eds.) *Life care planning and case management cross the lifespan*. New York, NY: Routledge, pp. 897–912.
- Paleg, G. S., Smith, B. A., & Glickman, L. B. (2013). Systematic review and evidence-based clinical recommendations for dosing of pediatric supported standing programs. *Pediatric physical therapy*, 25(3), 232–247.
- Ward, M., Johnson, C., Klein, J., McGeary Farber, J., Nolin, W., Peterson, M.J. (2021). "Orthotics and Assistive Devices," in K.P. Murphy, M.A. McMahon, and A. Houtrow (eds) *Pediatric rehabilitation: Principles and practice*. 6th ed. New York, NY: Springer Publishing Company, LLC, pp. 319–347.
- Waters, T. R., Putz-Anderson, V., & Garg, A. (1994). *Applications manual for the revised NIOSH lifting equation*.
- World Health Organization. (2008). *Guidelines on the provision of manual wheelchairs in less resourced settings*. World Health Organization.

Durable Medical Equipment and Diabetes: A Summary of Interventions for Providers and Patients.

By: Natalie Cozoziello, MSN, FNP-C



Keywords: 1. Diabetes resources, 2. Blood glucose level, 3. DME

NURSING DIAGNOSES TO CONSIDER NANDA-I 2021-2023

Risk for Infection. Susceptible to invasion and multiplication of pathogenic organisms, which may compromise health.

Risk for Unstable Blood Glucose Level. Susceptible to variation in serum levels of glucose from the normal range, which may compromise health.

Readiness for Enhanced Health Self-management. A pattern of satisfactory management of symptoms, treatment regimen, physical, psychosocial, and spiritual consequences and lifestyle changes inherent in living with a chronic condition, which can be strengthened.

When treating Diabetes, an ounce of prevention is worth pounds of acute care. If prevention fails, the complications become severe and irreversible quite quickly. When introducing DME to the situation, sometimes a solution can become a problem in and of itself. In order to effectively use DME with diabetic patients, practitioners should first consider preparing the patient for the usage of the DME, the most current diabetic care guidance, and diabetic care beyond the equipment.

Getting the patient involved with and educated about their care.

Some diabetic patients will be starting their lives with the condition for the first time when practitioners fit them for DME. It is important to prepare the patient for the condition and the experience of living with it. Without understanding the disorder, the patient may not respect the treatment plan

attached to it. Much of the management is done by the patient themselves, rather than by the practitioner, so it can be helpful to discuss some of the complications associated with inadequate control of Diabetes, including kidney disease, nerve damage, foot problems, dental problems, heart disease, visual problems, hearing, and mental health, to name a few.

The American Diabetes Association Standards of Medical care in Diabetes uses the Chronic Care Model (CCM) “an effective framework for improving the quality of diabetes care and includes six core elements:

1. Delivery system design (moving from a reactive to a proactive care delivery system where planned visits are coordinated through a team-based approach)
2. Self-management support
3. Decision support (basing care on evidence-based, effective care guidelines)
4. Clinical information systems (using registries that can provide patient-specific and population-based support to the care team)
5. Community resources and policies (identifying or developing resources to support healthy lifestyles)
6. Health systems (to create a quality-oriented culture)
Redefining the roles of the health care delivery team and empowering patient self-management are fundamental to the successful implementation of the CCM. Collaborative, multidisciplinary teams are best suited to provide care for people with chronic conditions such as diabetes and to facilitate patients’ self-management.

Of all the DME involved in managing diabetes mellitus, the importance with of an easy-to-use glucometer that is cost efficient for the patient is difficult to overstate (American Diabetic Association, 2023). Different insurance companies cover a variety of glucometers and it’s important for the provider to check what is covered by insurance for the patient.

Reducing the number of glucose checks throughout the day based on patient need is helpful as patients tire easily from finger pokes. So, it can be helpful to start with this concern in mind, Retrieval of data from the glucometer is also necessary for the provider and adds ease to the diabetic care providers. Retaining and comparing this data over time will create a deeper understanding of the needs of a patient.

Tighter glucose control can lead to delays in complications of Diabetes and improve the patient’s overall health and the need for Durable Medical Equipment and additional complications that arise from inadequately controlled glucose and nerve damage (Centers for Disease Control, 2022).

Teaching patients to manage glucose levels between 80 – 130, maintaining HGB A1C 7 equal to or less than 7, tight control of diabetic diet, exercise, and managing weight will all lead to a healthier lifestyle and less need for health-related interventions that can lead to lifelong problems with Diabetes.

Using ketone test strips to document ketones in the urine in connection with hyperglycemia is both informative and embarrassing for patients. Reminders for patients to wash their hands may seem like an obvious thing, but it is critical for both patient and caregiver health. It is also important to remind patients that nothing that is exposed to the bloodstream should ever be shared, whether that is a glucometer or a lancing device,

Tips for providers in providing patient education when managing diabetes:

When interacting with patients, remember that education is a conversation between an expert and an invested learner. Lecturing only works if the audience has the understanding needed to be a silent partner in the conversation. To help facilitate this:

- The American Diabetes Association has a healthy lifestyle e-newsletter patients can register for that discusses blood glucose monitoring, nutrition, fitness, self-care, blood glucose monitoring, additional resources for the patient, treatments and technology resources (American Diabetes Association, 2023). Website for patients: <https://diabetes.org/health-wellness/newsletter-signup>
- The American Diabetes Association is a good resource for patients and providers to stay current on the cutting edge for diabetic care along with the latest guidelines for physicians, nurses, educators, or other health professionals (American Diabetes Association, 2023). Encourage patients to bookmark the site as a source of discussion topics during sessions.
- Patients and providers alike can ask questions via email or phone for patients or providers: email asada@diabetes.org and phone 1800-342-2383 or 1-800-DIABETES (American Diabetes Association, 2023).

National Standards for DSMES

It is important to work as a part of an effective care team as well as remain current on accreditation standards in care. The Centers for Disease Control has a website available featuring guidelines for standards of care for the Diabetes Self-Management Education and Support (DSMES) Toolkit that provides a summary of benefits, background, terms and services that are both traditional and nontraditional (Centers for Disease Control and Prevention, 2023). The toolkit optimizes diabetes self-management as well as offering resources for the provider to enhance staffing and delivery

models, National Standards for the services regarding DSMES, Accreditation as well as recognition process, how to increase referrals and overcome barriers, reimbursement tools and sustainability, building a good business case for the use of DSMES, and promotion plans for DSMES services (Centers for Disease Control and Prevention, 2023).

Diabetes and DMEs for provider and patient education using a team approach.

In the case of Diabetes, much of the usage of DME is to assist in independent living for the patient while improving quality of life. Durable Medical Equipment for Diabetes can be dizzyingly varied, including glucometers, test strips, insulin pumps, insulin syringes, lancets, glucose tablets, glucagon, ketone monitors, insulin pumps, nebulizers, oxygen concentrators, wheelchairs, hospital beds, a variety of continuous glucose monitors, canes, walkers, scooters, CPAP machines, Prosthetics, Orthotics, and incontinence supplies, and arm blood pressure cuffs. However, there are resources both for finding and using this equipment that will make usage easier.

Diabetes DME Resources

- Medicare also has a website for faulty Durable Medical Equipment. The provider or patient can call 1-800-633-4227 or users can call 1-877-486-2048 (Medicare.gov, n.d.). The Website is: <https://www.medicare.gov/claims-appeals/file-a-complaint-grievance/complaints-about-durable-medical-equipment-dme>
- Medicare also has a website that lists all the supplies, services and different programs covered by Medicare and Medicaid for the patient. The Toll-free Medicare coverage number for the patient or provider is 1-800-633-4227 and for the Marketplace 1-800-318-2596. The Website can be found at: <https://www.medicare.gov/publications/11022-medicare-coverage-of-diabetes-supplies.pdf>.
- Frequent daily use of walkers with handles, wheelchairs, canes, shoes, and any additional daily wear and tear on skin contact with DME's can impair skin integrity. It's important for both the provider and the patient to monitor for impaired skin integrity and poorly fitted DME's and replace poorly fitting equipment by checking with the insurance company to see when replacement of worn or poorly fitted DME's is approved (American Diabetes Association, 2023).
- A prescription for diabetic shoes will often be covered by insurance for severe diabetic foot disease and Diabetes. Coverage can include: two pairs of custom inserts per calendar year for custom molded shoes and three pairs of inserts per calendar year for extra-depth shoes (Medicare.gov, n.d.). Medical supply stores and specialty shoe stores in the local area will need a provider prescription and approval through Medicare to purchase the footwear.

- The American Diabetes Association also has a website aid for costs associated with DME's and additional financial assistance that may be available to the patient for purchasing supplies through different supply companies and pharmaceutical companies (American Diabetes Association, 2023).
- Any prosthetics must be fitted for the individual if it is to be prescribed and not every individual is a candidate for a prosthetic leg (John Hopkins Medicine, 2023). There needs to be enough soft tissue to cushion the bone remaining. If the individual is in pain, they may not be a good fit for the prosthetic. It is particularly important to observe the skin integrity and condition of the limb surgical site post wound healing. A prosthetic and orthotic professional will help the patient look at different options post amputation. (Le Tourneau Prosthetics, n.d.). Other resources for walkers, canes, diabetic shoes, diabetic orthotics, and additional Durable Medical Equipment are also available with a prescription if needed for the patient. Each patient needs to have their own prescribed Durable Medical Equipment that functions well to prevent complications such as skin breakdown related to patients with a diagnosis of peripheral neuropathy or peripheral vascular disease.
- Several websites offer a variety of Durable Medical Equipment for patients and providers. One example is DME Supply USA: Instructions for sanitation and cleaning, professional disposables, education and resources, sleep therapy, patient aids, mobility, bedroom supplies, and respiratory supplies are all listed on the website with a 1-855-974-4220 number to call for questions (DME Supply USA, 2023).

General care tips for patient safety in Diabetes:

Some things about diabetes care can be less than obvious upon initial consideration, even for practitioners. The following tips will help your diabetes patient be safer and more comfortable:

- Decreasing fall risk: removing loose rugs, putting away and/or organizing electrical cords, removing clutter, and applying and maintaining rubber tips on canes, walkers, and crutches, which need to be cleaned regularly. Patients should maintain a well-lit house, especially stairways, porches, and outside. Use clap responsive switches for lighting and install sturdy handrails in the halls to make moving at night easier.
- Keep a cordless phone and flashlight near the bed to help navigate the dark and get help at night.
- Patients should wear a medical alert bracelet ID such as a necklace, ID card, or bracelet that says they have Diabetes and patient allergies (WebMD, n.d.).

- Keep emergency preparedness supplies on hand when traveling, such as a glucometer, test strips, extra batteries, insulin supplies, quick-acting sources of glucose, extra food that does not spoil, and water, and store them together where they are easy to locate in a car or travel bag.
 - Dental care is critical, including using a soft toothbrush, floss, fluoride toothpaste, and rinse with antiseptic mouthwash daily.
 - Proper foot care supplies including toenail scissors, an emery board, and a mirror to inspect feet daily for cuts and blisters ensure.
 - Seamless, padded socks are better if the diabetic patient has any nerve damage.
 - To prevent dry skin and cracked skin, use a mild moisturizing soap, skin moisturizer, antibiotic cream (of a type recommended by a doctor), sterile gauze, and paper tape for mild cuts and scrapes.
- While Diabetes is a serious health concern that introduces many complications, effective patient care can be thoroughly achieved through a team approach, including a multidisciplinary consultation roster, consideration of advancing standards, and active, well-informed patient participation.

REFERENCES

- American Diabetes Association (2023). *Diabetic Shoes*. <https://diabetes.org/search?keywords=diabetic+shoes#gsc.tab=0&gsc.q=diabetic%20shoes&gsc.page=1>
- American Diabetes Association (2023) *Devices & Technology: Better blood glucose meters and more*. <https://diabetes.org/about-diabetes/devices-technology>
- American Diabetes Association (2023). *Diabetes and Skin Complications*. <https://diabetes.org/about-diabetes/complications/skin-complications>
- American Diabetes Association (2023). *Durable Medical Equipment*. <https://diabetes.org/search?keywords=durable+medical+equipment#gsc.tab=0&gsc.q=durable%20medical%20equipment&gsc.page=1>
- American Diabetes Association (2023). *Health insurance aid*. <https://diabetes.org/tools-resources/health-insurance-support>
- American Diabetes Association (2023). *Hypoglycemia*. <https://diabetes.org/living-with-diabetes/treatment-care/hyperglycemia>
- American Diabetes Association (2023). *Hyperglycemia*. <https://diabetes.org/living-with-diabetes/treatment-care/hyperglycemia>
- American Diabetes Association (2023). *Medical Practitioners: Stay on the cutting edge of diabetes care*. <https://diabetes.org/tools-resources/for-professionals/medical-practitioners>
- American Diabetes Association (2023). *Peripheral Neuropathy*. <https://diabetes.org/search?keywords=peripheral+neuropathy#gsc.tab=0&gsc.q=peripheral%20neuropathy&gsc.page=1>
- American Diabetes Association (2023). *Tips for eating well: Eat well to feel well*. <https://diabetes.org/food-nutrition/eating-healthy>
- American Diabetes Association (2023). *Healthy living e-newsletter sign-up*. <https://diabetes.org/health-wellness/newsletter-signup>
- American Diabetes Association Professional Practice Committee; 1. Improving Care and Promoting Health in Populations: *Standards of Medical Care in Diabetes—2022*. *Diabetes Care* 1 January 2022; 45 (Supplement_1): S8–S16. <https://doi.org/10.2337/dc22-S001>
- American Diabetic Association (2023). *Types of Carbohydrates*. <https://diabetes.org/food-nutrition/understanding-carbs/types-carbohydrates>
- Anguiano-Hernandez, J.G., Harrington, J.W., & Kingston, D.C (2023). Hand loading, rates of perceived exertion, and usability during assisted walking in patients with type 2 diabetes mellitus. *Clinical Biomechanics*, 110 (106124). <https://doi.org/10.1016/j.clinbiomech.2023.106124>

REFERENCES

- Centers for Disease Control and Prevention (2023, July 18). *Diabetes Self-Management Education and Support (DSMES) Toolkit*. <https://www.cdc.gov/diabetes/dsmes-toolkit/index.html>
- Center for Disease Control (2022, November 3). *Prevent diabetes complications*. <https://www.cdc.gov/diabetes/managing/problems.html>
- Center for Medicare and Medicaid Services (n.d.). *Medicare coverage of diabetes supplies, services and prevention programs*. <https://www.medicare.gov/publications/11022-medicare-coverage-of-diabetes-supplies.pdf>
- DME Supply USA (2023). <https://dmesupplyusa.com/mobility.html>
- Endocrine Society (n.d.). *Diabetes complications*. <https://www.endocrine.org/patient-engagement/endocrine-library/diabetes-complications#:~:text=Diabetes%20is%20the%20most%20common,flow%2C%20which%20could%20cause%20amputation.>
- Guideline Central (2023, December 11). *Diabetes Standards of Care 2024*. <https://www.guidelinecentral.com/guideline/14119/#section-anchor-1226463>
- HealthCare.Gov (n.d.). *Durable Medical Equipment*. <https://www.healthcare.gov/glossary/durable-medical-equipment-dme/>
- Health Match (2023). *The link between sleep apnea and diabetes*. <https://healthmatch.io/diabetes/does-sleep-apnea-cause-diabetes>
- Inzucchi, S.E. & Lupsa, B. (2023, November 8). *Clinical presentation, diagnosis, and initial evaluation of diabetes mellitus*. *UpToDate*.
- John Hopkins Medicine (2023). *What you should know before getting a prosthetic leg*. <https://www.hopkinsmedicine.org/health/wellness-and-prevention/what-to-know-before-getting-prosthetic-leg>
- LeTourneau Prosthetics (2017, March 2). *Prosthetics and diabetes-Keeping patients on their own two feet*. <https://www.llop.com/prosthetics-diabetes/>
- Medicare.gov (n.d.). *Durable Medical Equipment (DME) coverage*. <https://www.medicare.gov/coverage/durable-medical-equipment-dme-coverage>
- Medicare.gov (n.d.). *Therapeutic shoes and inserts*. <https://www.medicare.gov/coverage/therapeutic-shoes-inserts>
- MyHealth.Alberta.ca (2023). *Diabetes and preventing falls: Care instructions*. <https://myhealth.alberta.ca/Health/aftercareinformation/pages/conditions.aspx?hwid=zp4296>
- Oapl Updates (nd). *How orthotists and prosthetics are involved in treating diabetic patients*. <https://oapl.com.au/how-orthotists-and-prosthetists-are-involved-in-treating-diabetic-patients/#:~:text=Prosthetic%20Management%20for%20Diabetics&text=After%20an%20amputation%20it%20is,%2C%20rubs%2C%20dryness%20or%20breakdowns.>
- Robertson, B., Lane, R., Lannin, N., Laver, K. & Barr, C. (2023). *A systematic review of outcomes measured following new wheelchair and seating-prescription interventions in adults*. *Archives of Rehabilitation Research and Clinical Translation*, 5, (100249), pp. 1-20. <https://doi.org/10.1016/j.arrct.2022.100249>
- Taking Control of Your Diabetes (2023). *A Nonprofit Diabetes Edutainment Organization*. <https://tcoyd.org/>
- WebMD (n.d.). *What Diabetic Supplies and Devices do I need?* <https://www.webmd.com/diabetes/what-diabetes-supplies-will-i-need>
- Wexler, D.J. (2023, October 16). *Overview of general medical care in nonpregnant adults with diabetes mellitus*. *UpToDate*.



Prosthetic Reasonable Use Life Replacement Cycle for Lower Limb Prosthetic Life Care Plans

By Dale Berry, CP, FAAOP



Keywords: 1. Prosthesis, 2. Life expectancy, 3. Component replacement

NURSING DIAGNOSES TO CONSIDER NANDA-I 2021-2023

Risk for Disuse Syndrome. Susceptible to deterioration of body systems as the result of prescribed or unavoidable musculoskeletal inactivity, which may compromise health.

Risk for Infection. Susceptible to invasion and multiplication of pathogenic organisms, which may compromise health.

Impaired Physical Mobility: Limitation in independent, purposeful movement of the body or of one or more extremities.

A key factor for accurately calculating a Life Care Plan for an individual who has undergone amputation is the frequency of receiving a prosthesis; as the replacement cycle of lower limb prosthetics is an essential aspect for calculating an accurate Life Care Plan (Pomeranz et al, 2010). The challenge in identifying an accurate replacement cycle for lower limb prosthetics is a lack of current empirical and reliable evidence to validate and verify the reasonable useful life (RUL) of lower limb prosthetics.

An internet search provides wide-ranging anecdotal suggestions that a lower limb prosthesis can last anywhere from a few months to a few years (georgiaprosthetics.com),

between 3-5 years (Hopkinsmedicine.org), or several months to several years (amputee-coalition.org). It is imperative to establish whether online sources are void of identifying supporting evidence, references, or details to verify or validate these projected hypotheses for the life expectancy of a prosthesis.

Of greater significance, online references commonly provide a range of replacement, most commonly identified as 3-5 years, resulting in Life Care Planners then presuming a replacement cycle of 4 years. While there is no evidence provided or referenced to substantiate the projected range of 3-5 years, if it was assumed to be true, it is unknown what percentage are replaced in what year. For example, if 1% of prostheses were replaced at 3 years and 99% were replaced at 5 years, the average replacement cycle for a prosthesis would not be 4 years, it would be 4.98 years. This complete lack of transparency and detailed reference data, therefore, makes these online average replacement ranges unreliable and ineffective sources.

There are a limited number of peer-reviewed published studies addressing the topic of prosthetic replacement. The available studies are, however, outdated, do not relate to current prosthetic technology and techniques, and have contradictory conclusions. The largest study from 1982 followed 14,400 patients in India over 25 years (1954 to 1978) and concluded that "the average life of a prosthesis is about 5 years". (Narang). A 1999 study (Datta) followed 104 transtibial amputees in the United Kingdom between

the ages of 16-60 over a 10-year period and concluded that “results cannot be accurately applied universally.” A third study published in 2008 (Nair) analyzed 173 patients from the United Kingdom over a 10-year period and concluded that, on average, trans-femoral prosthetic wearers need one new prosthesis every 10 years and the trans-tibial prosthetic wearer needed one every 7 years, while acknowledging the study measured “provision” rather than “need”. A 2019 publication opined “A prosthesis may last for 5 to 7 years” without providing any data or reference as to how this projection was established. (O’Keefe)

For prosthetic care in the United States, a prosthesis is classified by Centers of Medicare and Medicare Services (CMS) as Durable Medical Equipment, Prosthetics, Orthotics, and Supplies (DMEPOS). Regulatory standards for the replacement of a prosthetic device stipulate that a prosthesis that has been in continuous use has a Reasonable Useful Lifetime (RUL) of no less than 5 years.(CFR 414.210)

There are two exceptions to the CFR 414.210 RUL guidance. Benefits Improvement and Protection Act of 2000 amended §1834(h)(1) of the Social Security Act added provision (1834 (h)(1)(G)(i)) that requires benefit coverage for the replacement of prosthetic devices or any part of such devices, without regard to continuous use or useful lifetime restrictions, if an ordering physician determines that the replacement device, or replacement part of such a device, is necessary because of any of the following:

- (I) A change in the physiological condition of the patient.
- (II) An irreparable change in the condition of the device, or in a part of the device.
- (III) The condition of the device, or the part of the device, requires repairs and the cost of such repairs would be more than 60 percent of the cost of a replacement device.

Although these regulatory guidelines provide insight as to the criteria to justify and validate the replacement of a prosthesis, they do not provide any guidance as to a defined timeline when a replacement can, should, or might be expected.

Replacement Data Collection

To obtain an accurate and detailed insight into the RUL and/or replacement cycle for current technology lower limb prostheses, non-HIPPA protected data was collected during the prior authorization process for individuals seeking prosthetic replacement services through Worker’s Compensation from 2021 to 2022.

Data collection criteria were restricted to individuals with a Trans-tibial or Trans-femoral amputation with a prior authorization request to receive medically necessary services to replace an existing definitive prosthesis or socket. Data collected was limited to:

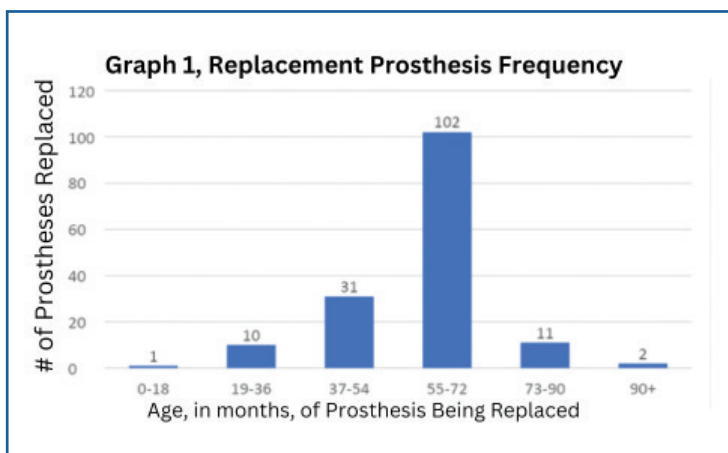
Table 1			
	Male	Female	Total
Prosthetic Wears	216	15	231
Age 18-40 in Years	32	0	32
Age 41-65	133	14	147
Age 66+	49	3	52
Trans Tibial Amputation	130	2	132
Trans Femoral Amputation	86	13	99
Replace Prosthesis	148	9	157
Replace Socket	68	6	74

- Patient Age at time of service (Range 23-87)
- Age of Current Prosthesis (Range 6-144 months)
- Service Provided:
 - Replacement Prosthesis
 - Socket Replacement

Replacement Prosthesis

Complete prosthetic replacement is deemed medically necessary when the prosthetic socket no longer accommodates the wearers’ residual limb and the prosthetic components are deemed irreparable, or the repairs would exceed 60 percent of the cost of a replacement device. A total of 157 of the prostheses in the study required a medically necessary replacement of the entire lower limb prosthesis.

Age of the prostheses being replaced ranged from 18 to 144 months with an overall average of 55.8 months. The majority (65%) of lower limb prostheses were replaced when they were between 55-72 months of age. (Graph 1).



For the transfemoral prostheses, 72% were replaced after an average of 62 months (Table 2) and for the transtibial prosthesis 61% were replaced on average at 63 months. (Table 3).

Table 2: Trans Femoral Replacement Prosthesis

Device Age in Months	# of Replacements	Average Months to Replace	%
0-18	0	0	0%
19-36	0	0	0%
37-54	14	48	23%
55-72	43	62	72%
73-90	2	74	3%
90+	1	144	2%
	60	61	

Table 3: Trans Tibial Replacement Prosthesis

Device Age in Months	# of Replacements	Average Months to Replace	%
0-18	1	18	1%
19-36	10	30	10%
37-54	17	47	18%
55-72	59	63	61%
73-90	9	79	9%
90+	1	98	1%
	97	58	

Replacement Socket

Due to normal and expected changes in the residual limb, the prosthetic socket may lose appropriate fit and function while the prosthetic components (knee, foot, ankle) are still functional and appropriate. In this event that the prosthetic socket is replaced and secured to the existing prosthetic components. (Graph 2)

A total of 74 individuals were wearing sockets that required replacement ranging in age of socket from 6 to 121 months for an overall average replacement cycle of 32.3 months. For the transfemoral prosthesis, 39% of individuals required a socket replacement after 31 months on average (Table 4), and for the transtibial prosthesis, 61% required a replacement at 29.4 months on average. (Table 5) .

Table 4: Trans Femoral Socket Replacement

Device Age in Months	# of Replacements	Average Months to Replace	%
0-12	1	6	4%
13-24	4	21	14%
25-36	11	31	39%
37-48	5	42	18%
49-60	1	59	4%
61+	6	79	21%
	28	42	

Table 5: Trans Tibial Socket Replacement

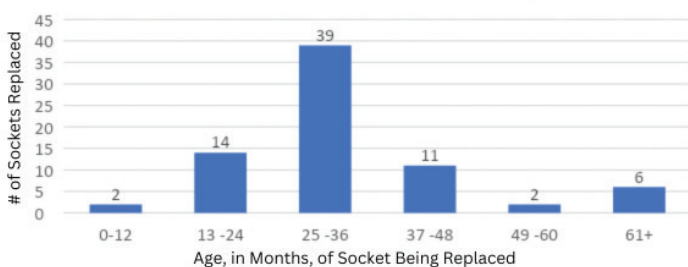
Device Age in Months	# of Replacements	Average Months to Replace	%
0-12	1	10	2%
13-24	10	19	22%
25-36	28	29	61%
37-48	6	39	13%
49-60	1	53	2%
61+	0	0	0%
	46	28	

Patient Age Influence on RUL

The age of the patient was determined to have a nominal influence on the replacement cycle for both the entire prosthesis and the socket. Prosthetic data was correlated in three age categories, ages 18 to 40, 41 to 65 and 66 years and above.

Prosthetic replacement of the 18-40 category was at a rate of 8 months sooner as compared to replacement prosthesis for prosthesis for wearers ages 66 years and over. The prosthetic replacement rate for the prosthesis was every 56 months from ages 18 to 40 as compared to a slower replacement rate of every 64 months after the age of 66. (Table 6).

Graph 2, Replacement Socket Frequency



The same relative calculations hold true for a replacement socket. The younger and assumed to be more active 18–40-year-olds required a socket replacement at 26 months on average while individuals the ages of 66 and older required a socket replacement on average every 30 months.

Considering that the average life expectancy for an 18-year-old male is 63.4 years (CDC Report), the accelerated replacement rates for both prostheses and sockets for the 22 years from age 18 to 40 are offset by the slower replacement rate of the 41 years from age 41 to 81.4 years. This establishes a lifetime average replacement rate of 59 months for the prosthesis and 29 months for the replacement socket.

Discussion

Although it can be accurately stated that a prosthesis can last anywhere from a few months to many years, this generic and generalized statement does not express nor represent an accurate or realistic insight for the reasonable useful life of a prosthesis. In addition, this indiscriminate range does not provide a foundation to establish or predict an accurate replacement cycle for a prosthesis.

Data collection identified that the younger age group (18-40) had a replacement rate faster than that of the old age group (66 years and older). However, over the prosthetic wearers' predicted life span, the higher rate during the younger years would be offset by the slower replacement rate in the later years as the prosthetic wearers age. The net result is that the calculated lifespan average would be 59 months for a replacement prosthesis and 29 months for a replacement socket as shown on Table 6.

It is important to note that a new prosthesis includes a new socket, thus the replacement cycle for a replacement socket is, on average, 29 months after the individual receives a new prosthesis.

Conclusion

1. Majority of transfemoral (72%) and transtibial (61%) prosthesis are replaced between 55-72 months after the individual receives delivery of the device with an overall average of replacement of the prosthesis at 61 months and an patient-age influence prosthesis replacement average of 59 months.
2. Majority of transfemoral (39%) and transtibial (61%) sockets are replaced between 35-36 months after receiving the prosthesis with an overall average of 34 months with a patient-age influence socket replacement average of 29 months.
3. For a lower limb prosthesis, application of a lifetime replacement cycle of once every 60 months (5-years) is applicable.
4. For a lower limb replacement socket, application of a lifetime replacement cycle of one replacement socket at the half-life of the prosthesis is applicable.
5. For purpose of life care planning, a 5-year prosthetic life cycle for prostheses would include one (1) Prosthesis, one (1) Replacement Socket and three (3) incidents for Supplies and Maintenance. (Table 7)

Table 6		
	Replacement Prosthesis	Replacement Socket
Patient Age in Years	Average Age in Months	Average Age in Months
18-40	56	26
41-65	58	31
66+	64	30
Patient-Age Influence	59	29

Table 7				
Year 1: Months 0-12	Year 2: Months 13-24	Year 3: Months 25-36	Year 4: Months 37-48	Year 5: Months 49-60
				
New Prosthesis	Supplies & Maintenance	Replacement Socket	Supplies & Maintenance	Supplies & Maintenance

REFERENCES

Code of Federal Regulations, Title 42. Public Health, Chapter IV, Section § 414.210 (f) (i)

Datta D, Vaidya SP, Alsindi Z. Analyses of prosthetic episodes in trans-tibial amputees. *Prosthet Orthot Int.* 1999 Apr;23(1):9-12

Nair, A. Hanspal. R. Zahedi, M. Saif, M. Fisher, K. (2008) Analysis of prosthetic episodes in lower limb amputees, *Prosthetics and Orthotics International*, March 2008; 32(1): 42-49

Narang I C, Jape V S. Retrospective study of 14,400 civilian disabled (new) treated over 25 years at an Artificial Limb Centre. *Prosthet Orthot Int* 1982; 6: 10–16

O’Keeffe, B, Rout, S. (2019) Prosthetic rehabilitation in the lower limb, *Indian Journal of Plastic Surgery*, 2019 Jan; 52(1): 134–143.

Pmeranz, J. Yu, N. Reid (2010) C. Role and Function Study of Life Care Planners. *Journal of Life Care Planning*, Special Edition 2010, Volume 9, Number 3 (57-106)

RUL Clarification, Revision Effective Date: 11/01/2013: <https://med.noridianmedicare.com/web/jadme/article-detail/-/view/2230703/reasonable-useful-lifetime-clarification>

U.S. Health & Human Services, Centers for Disease Control & Prevention, National Vital Statistics Reports, Vol. 71, No. 1, August 2, 2022

FIND-A-CODE®

subscription features

Create A Life Care Planner Package to Fit your Needs

Facility Base plus	LCP Expert	LCP Elite
OUTPATIENT REIMBURSEMENT TOOLS		
Pro Fee Calculator	✓	✓
APC Packages	✓	✓
Medicare LCDs/NCDs, MIPS & more	✓	✓
CPT® Common Language Descriptions	✓	✓
ICD-10-CM Common Language Descriptions	✓	✓
CPT® & HCPCS	✓	✓
NCCI Edits Validators™ Tool	✓	✓
UCR and Workers Comp Fees	✓	✓
ASA Crosswalks	✓	✓
Lab Test	✓	✓
Commercial Payer Policy		✓
WK Drug Database		✓
Medical Lab Test with CLD Ranks		✓
Inpatient Reimbursement Tools	Available add-on	Available add-on
ASC (Surgical) Reimbursement Tools	Available add-on	Available add-on
	\$109/mo	\$139/mo



"Switching to FindACode.com not only saved us money, it turned out to be something our entire staff loved!" -OhioHealth

Need help customizing? Email us at alan.crop@findacode.com or call us at 801.679.4728



Comprehensive



Trusted



Affordable



LookUp

All the information you need, when you need it.

Efficiently and confidently access accurate and reliable fee schedule, Medicare, and reasonable rates.

Instantly

Search Medical Reimbursement Values.

Want to Learn More?

Visit Medatalookup.com



The premier provider of end-to-end solutions for cost management in the workers' compensation and auto liability industries



AANLCP
CRASH CART

Research and Tools for the LCP Expert

INCLUDED WITH
PREMIER
MEMBERSHIP

UPGRADE
NOW

CRASH CART
TOOLS TO REVIVE
YOUR PRACTICE

www.aanlcp.org

LOOKING AHEAD

2024

- Spring: Spinal and Nervous Injury and Care
- Summer: Ethics
- Fall: Orthotics
- Winter: Ostomy and Wound Care



Index of Past Issues

all past issues from 2009-present area available as PDFs for free download at www.aanlcp.org

2015

- XV.1 Topics in Translation
- XV.2 Updates in Spinal Cord Injury
- XV.3 Burns
- XV.4 Perinatal / Childhood

2016

- XVI.1 Pain
- XVI.2 GI Issues
- XVI.3 International LCP
- XVI.4 Home Care

2017

- XVII.1 Brain Injury
- XVII.2 The Business of Life Care Planning
- XVII.3 Back and Spine
- XVII.4 Mobility and Extemity Function

2018

- XVIII.1 Costing and Coding

2019

- XIX.1 Presidents Issue
- XIX.2 Licensure I Qualifications I Certifications
- XIX.3 New Directions in Pain Management
- XIX.4 Technology Updates

2020

- XX.1 Spinal Cord Injury Updates
- XX.2 Advances in Amputation
- XX.3 Evidence Based Practice
- XX.4 Durable Medical Equipment and NLCP

2021

- XXI.1 Therapeutic Modalities
- XXI.2 The Business of NLCP
- XXI.3 Ages and Stages in Life Care Planning

2022

- XXII.1 Expert Witnessing and Testimony
- XXII.2 Pain Management Revisited
- XXII.3 Orthopedics, Pain, and Research

2023

- XXIII.1 Pediatrics
- XXIII.2 Business of Life Care Planning
- XXIII.3 Mental Health
- XXIII.4 Interacting with Other Disciplines

2024

- XXIV.1 Assistive & Durable Medical Equipment

