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ADVANCES IN UPPER LIMB LOSS AND RESTORATIVE MOBILITY



PEER REVIEWED EXCELLENCE IN NURSE LIFE CARE PLANNING SINCE 2006

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AUTUMN 2026

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TABLE OF CONTENTS

9 **Setting Your Partial Hand Patients up for Success: We Do Not Know What We Do Not Know**
By: Jeff Soelberg

14 **There Is No Such Thing as a Minor Upper Limb Amputation: Prioritizing Bimanual Function in the Life Care Plan**
By: Chris Baschuk, MPO, CPO, FAAOP(D)

20 **The Wrong Tool for the Job: Rethinking Prosthetic Assumptions in Upper Limb Life Care Plans**
By: Victoria Powell, RN, CCM, LNCC, CNLCP®, CLCP, MSCC, CBIS, CEASII

29 **Psychosocial Impact of Upper Body Disfigurement**
By: Anne Gallenstein, MS, PMHNP-BC, FIG LCP-C

35 **AALNC: Legal Nurse Voice - Parsonage-Turner Syndrome**
By: Pamela L. Borello, BSN, BS, RN, CNOR, CSSM(e), CNAMB

37 **New Surgical Advancements in Reconstructive Surgery for Spastic Paralysis**
By: Hari Iyer, MD, FAAOS

43 **Bilateral and Multiple Limb Loss Considerations for Life Care Planners**
By: Lynsay Emmrich, OTR/L, and Shawn Swanson Johnson, OTR

54 **Partial Hand Amputations: Prosthetics, Rehabilitation, and Life Care Planning Considerations**
By: Lisa Smurr Walters, CHT, OTR/L

DEPARTMENTS

3 **A Message from the President**
4 **From the Editor**
5 **Information for Authors**
6-8 **Contributors to this Issue**

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A Message from the President



Dear Colleagues,

My hope is that you are all enjoying the change of seasons. I am still trying to believe that it is already the 4th quarter. Many of us are already seeing the push to get cases in before the end of the holidays and end of the year.

Welcome to the fall issue of the Journal of Nurse Life Care Planning. This issue is devoted to a population many of us who encountered either in clinical practice or who have completed life care plans for: people living with amputations and the associated upper limb restorative mobility.

Limb loss is never just the loss of a limb. It changes how a person moves through a kitchen, climbs into a truck, returns to work, sleeps through phantom pain, and imagines the next forty years. It is one of the clearest examples of why our specialty exists. A well-built life care plan turns a sudden, life-altering event into a reasoned, nursing-driven roadmap of future needs.

This is where the nurse life care planner brings something no one else on the team can. We apply the nursing process to the whole person: assessment, nursing diagnoses, outcomes, and the interventions and resources needed to reach them. We coordinate the voices of the providers, the client, and family, and we translate them into a plan that is clear, complete, and grounded in evidence.

My sincere thanks to the authors, peer reviewers, and journal committee who made this issue possible. Your generosity in sharing expertise is what keeps our specialty growing.

As you read, I encourage you to remember to connect with colleagues through our webinars, committees, and annual conference. The strength of AANLCP has always been its members, and I am proud to serve alongside you.

My sincere thanks for all of you,

Craig
President, AANLCP



Craig Felty, RN, BSN, MBA, FACHE, FIG LCP-C, FIG MCP-C

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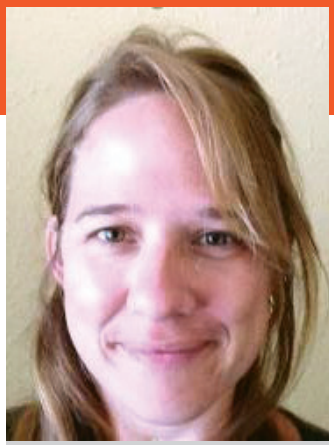
From the Editor



Vanessa Richie
JNLCP Editor
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We are in the home stretch of 2026 and enjoying a bit of downtime after a hectic year and before the busy holidays begin. As the days get shorter and the weather a little gloomier, it's the time of year to spend a bit more time relaxing. Take a day every week to enjoy a nice hot cup of your favorite beverage and some sedentary activity to really get the most out of what remains of 2026.

This issue covers a subject that doesn't get as much attention as the companion issue from Fall 2025. There is a lot of literature about support for the lower limbs; there is a lot less published on the much more specialized requirements for the upper limbs. Yet, the arms, hands, and fingers are more highly specialized, completing tasks that are much more refined and difficult than getting from point A to point B.

That's why this issue provides a look at the many considerations for caring for clients with upper limb issues.

It starts with the outlook from an actual client, providing a look at how life has changed from someone who has experienced all of the ways that life changes after serious trauma to the upper limbs. From there, the articles cover a wide range of specializations and considerations when working on a life care plan for someone who has suffered injury or limb loss to their upper extremities.

A special thanks to Victoria Powell, who was instrumental in getting so many experts to cover the many different perspectives. With her expertise in this area, she was able to recruit a lot of people who understand the gaps in knowledge of this highly specialized area.

Have a safe and merry holiday season.

Cheers,

Vanessa Richie, Editor

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.

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)
- AI should not be used to write any part of the article. It can be used for edits and cleaning up a finished article. Beyond AI hallucinations causing significant risks to each article's integrity, we want to maintain the individual tone of each author. We greatly appreciate the unique phrasing and descriptions our authors use.

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.
- Any AI images used require notation that AI was used. Caution should be used if images used an actual patient/client was used to ensure correct permissions are acquired the use of their images

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.

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Contributors to this Issue



Jeff Soelberg

Jeff Soelberg is a father, grandfather, international author, writer, speaker, educator, and passionate advocate for finger amputees—one of the most overlooked and least recognized groups within the amputee community.

On July 6, 2016, Jeff's life changed forever when an industrial accident resulted in the traumatic amputation of three fingers on his dominant right hand. Rather than allowing his injury to define his future, Jeff turned his lemons into lemonade, transforming his personal experiences into a mission of education, awareness, advocacy, and service.

His story isn't about what he lost. It's about what he has gained—and how he uses those experiences to give others a hand.



Chris Baschuk, MPO, CPO, FAAOP(D)

Chris Baschuk, MPO, CPO, FAAOP(D), is a certified prosthetist-orthotist and principal of Baschuk, LLC, an independent consultancy providing subject matter expertise in prosthetics and orthotics. He holds a BS in Biomedical Engineering from the University of Utah and a Master of Prosthetics and Orthotics from UT Southwestern. Chris serves on the Board of Directors of the American Academy of Orthotists and Prosthetists (AAOP), where he chairs the Academy's Scientific Societies Committee, and he previously chaired the AAOP Upper Limb Prosthetics Society from 2017 to 2025.

He is an active advocate for the prosthetics and orthotics profession, working to expand patient access to appropriate care, and his clinical and research work includes the application of additive manufacturing to prosthetic design and fabrication. He is an international lecturer and peer-reviewed author whose work centers on upper limb differences and partial hand prosthetic rehabilitation. Chris is also the Director of Clinical Services at Point Designs, a manufacturer of partial hand prosthetic technology.

This article was prepared independently through Baschuk, LLC and may not represent the views of any other organizations that Chris is affiliated with. Above all, Chris is grateful to his wife, Shannon, and their five children for their constant love and support.



Victoria Powell, RN, CCM, LNCC, CNLCP®, CLCP, MSCC, CBIS, CEASII

Victoria Powell is a registered nurse and the current President of VP Medical Consulting, LLC. VP Medical Consulting offers a variety of services for catastrophically injured or chronically ill individuals such as case management, patient advocacy, life care planning, bill review and more.

Ms. Powell is an active member of the American Association of Nurse Life Care Planners (previously serving as President), American Association of Legal Nurse Consultants, Case Management Society of America, International Academy of Rehab Professionals, and is a lifetime Hall of Fame Recipient for her contributions to the National Nurses in Business Association. Ms. Powell provides expert witness testimony in the area of life care planning. Powell has a lifelong dedication to learning and holds specialty certifications in Case Management, Legal Nurse Consulting, Life Care Planning, Medicare Set Aside, and Ergonomic Assessments.

Powell's company, VP Medical Consulting, is made up of experienced nurses, board certified patient advocates, and support staff working together. The team is focused on comprehensive care to improve the lives of those with injuries or illness and to support the family caregivers. Sge is also the founder of Remington Publishing, which produces books, tools, and resources for medical-legal professionals. Ms. Powell has been published in numerous professional journals, and has authored and contributed to textbooks in the field.

Ms. Powell is a nationally recognized speaker and regularly presents on a variety of nursing-related subjects. Interested parties may contact Powell by emailing Victoria@vp-medical.com.

Contributors to this Issue



Anne Gallenstein, MS, PMHNP-BC, FIG LCP-C

Anne Gallenstein, MS, PMHNP-BC, FIG LCP-C, is a psychiatric nurse practitioner, psychotherapist, and certified nurse life care planner with extensive experience in mental health care, psychotherapy, and nursing education. Her clinical practice has included psychiatric assessment, psychopharmacology, and psychotherapy with adults, adolescents, couples, and families. She has also served as nursing faculty at Nassau Community College. Her specialized training includes psychoanalytic and psychodynamic psychotherapy, Dialectical Behavior Therapy, Internal Family Systems, and ketamine-assisted psychotherapy. Her multidisciplinary background informs her interest in the psychosocial dimensions of physical injury and disfigurement and their implications for long-term health, functioning, and quality of life.



Pamela L. Borello, BSN, BS, RN, CNOR, CSSM(e), CNAMB

Pamela is a native Michigander and continues to reside in the state when she is not on a travel contract elsewhere in the country or US territory. After graduating from Valparaiso University with a BS in Biology, she began her healthcare career as a surgical technologist at a Florida hospital, later earning an AS in Nursing from Palm Beach State College and, more recently, a BSN from Aspen University. Pamela has worked at hospitals, critical access facilities, and ambulatory surgery centers at all trauma levels as a circulating RN, scrub RN, and Clinical Nurse Manager of Perioperative Services, including Preop, OR, PACU, Endoscopy, Outpatient, and Sterile Processing. She is an active member of Mercy Missions and has participated in 14 international surgical missions. She currently works part-time at an ophthalmic surgery center. After decades in perioperative nursing, Pam expanded her practice by becoming a Mobile Clinician and visiting clinical study participants in their homes. Pam is Treasurer in her local AORN chapter. She also volunteers on the Certification Committee and the Reconsiderations and Ethics Committee for CCI.

She began her LNC career in 2021 when she established Pamela L. Borello Nurse Consulting, LLC. Pam works as an expert witness and, as a subcontractor, creates chronologies. Pam is a member of AALNC and its chapters, and serves as DAL for the Pittsburgh and Greater Orlando chapters. Pam also volunteers on the AALNC Forum Education Committee and takes pride in helping develop the Forum's educational agenda for attendees.

Pam has three adult children who live across the country and a 3-year-old granddaughter, Giovanna, a spicy redhead, who is the light of her life. As a result, Pam can combine her passions: family, travel, nursing, and legal nurse consulting.



Hari Iyer, MD, FAAOS

Hari Iyer, MD, FAAOS, earned his undergraduate degree in engineering from the University of Illinois at Urbana-Champaign and went on to attend medical school at the University of Illinois at Chicago. He completed his orthopaedic surgery residency at Stony Brook University Hospital in New York, followed by a focused fellowship in hand and upper extremity surgery at Jackson Memorial Hospital in Miami, where he concentrated on trauma care and complex reconstruction.

Dr. Iyer is double board-certified in Orthopaedic Surgery and Surgery of the Hand. In addition to his clinical practice, Dr. Iyer contributes to ongoing research and has published in peer-reviewed medical journals. His interests include surgery for treatment of flaccid and spastic paralysis, thoracic outlet syndrome, pectoral outlet syndrome, bone regeneration, reconstruction, and targeted muscle reinnervation (TMR). Dr. Iyer is also an Active Member of the American Society for Surgery of the Hand (ASSH).

Contributors to this Issue



Lynsay Emmrich, OTR/L

Lynsay Emmrich graduated from Duquesne University in Pittsburgh, PA with a Master of Science degree in Occupational Therapy. She then went on to serve as an Army Occupational Therapist at locations including Walter Reed Army Medical Center, Ft. Riley, Ft. Knox, and at a combat support hospital in Iraq. She is employed by Ossur and currently works as a Global Product Manager. Lynsay has presented at various local, state, and national conferences on research and clinical experience. She has published multiple articles on research and therapy considerations focused on individuals with upper limb loss and deficiency.



Shawn Swanson Johnson

Shawn Swanson Johnson is an occupational therapist, independent consultant, and founder and Executive Director of Enhancing Skills for Life (ESFL), a 501(c)(3) nonprofit dedicated to educating, empowering, and connecting individuals living without both hands, both arms, or all four limbs.

With more than 27 years of experience in upper limb difference rehabilitation, Shawn has worked in clinical practice, prosthetic rehabilitation, and professional education. Her experience includes working with the rehabilitation teams at Walter Reed and Brooke Army Medical Centers, serving as a National Director of Occupational Therapy for an upper limb prosthetic provider, presenting at national and international conferences, publishing articles and chapters, and lecturing to healthcare professionals as well as orthotic and prosthetic students.

Shawn currently serves on the Sepsis Alliance Advisory Committee and the Amputee Coalition's Scientific and Medical Advisory Committee, and previously served on the US-ISPO Board of Directors for more than 12 years. She is also a recipient of the 2022 Honorary Membership Award from the American Academy of Orthotists and Prosthetists.

Since 2008, Shawn has helped lead the Skills for Life: Bilateral Upper Limb Difference Workshops, bringing individuals and families together to share knowledge, build independence, and create lasting connections. Through ESFL, which she founded in 2017, Shawn has dedicated her work to ensuring that individuals living with bilateral upper limb differences have access to the resources, experiences, and community they need to thrive.



Lisa Smurr Walters, CHT, OTR/L

Lisa Smurr Walters, OTR/L, CHT, is a certified occupational therapist and hand therapist specializing in upper limb amputation rehabilitation, prosthetic management, and related research. She is a subject matter expert for the Amputee Coalition's Upper Limb Loss Advisory Council and has presented at scientific symposiums for over 15 years on topics such as upper limb trauma, amputation rehabilitation, and prosthetic performance.

Dr. Walters has authored and co-authored numerous peer-reviewed articles and textbook chapters on amputation rehabilitation, prosthetic use, and functional assessment. Her career spans military service, clinical practice, prosthetic rehabilitation, and academic leadership, with ongoing contributions to both clinical care and prosthetic technology innovation.

SETTING YOUR PARTIAL HAND PATIENTS UP FOR SUCCESS

We Do Not Know What We Do Not Know

By: Jeff Soelberg



Keywords: Amputee Peer Support, Functional Adaptation and Finger Amputation, Lived Experience Perspective, Traumatic Finger Amputation

NURSING DIAGNOSES TO CONSIDER
NANDA-I 2024-2026

1. Domain 12: Phantom Limb Pain 2. Domain 4: Activity/ Rest. Class: Impaired Self-Care 3. Domain 6: Disturbed Body Image

In July 2016, my life changed in seconds.

I was working at an oil refinery in Salt Lake City, Utah, after spending more than three decades working with my hands as a machinist, mechanic, and welder. My glove became caught between emery paper and a rotating pump shaft in a lathe, pulling my dominant right hand into the equipment and resulting in the traumatic amputation of three fingers.

What followed was not one surgery, one round of therapy, and then moving on. Over the years, I underwent nine surgeries, three skin grafts, and two revision surgeries, along with thousands of hours of hand therapy, physical therapy, occupational therapy, trauma counseling, and pain management.

But those medical facts tell only part of my story. Life continued. There was marriage, divorce, dating, returning to work, changes in self-image, prosthetic trials, successes, failures, grief, acceptance, retirement, and eventually a new purpose—helping others navigate finger and partial hand amputation.

After more than ten years of living this life, one statement guides much of my advocacy:

We do not know what we do not know.

That applies to patients, families, insurance companies, and medical professionals. Until you are living with an amputation, parts of what you believe that experience will be like are assumptions. Professional education and lived experience provide different pieces of the same puzzle. We need both.

The Most Used, Least Recognized

I describe our fingers as the "most used, least recognized" parts of our bodies. Think about how many times you use your hands during an ordinary day. Depending on how hand activity is measured, our hands and fingers are involved in thousands of movements and interactions every day. In repetitive occupations, that number can increase dramatically.

Yet we don't think about picking up a phone, buttoning our pants, tying shoes, signing our name, holding a fork, typing, shaving, washing our hair, fastening a seat belt, or reaching into a pocket for our keys. We simply do it.

Until we can't.

After a finger amputation, I have heard versions of:

"It's only a couple of fingers."

Only?

What does "only" mean when those fingers participated in thousands of daily movements?

Finger amputations may be classified medically as relatively minor compared with larger limb loss, but the word minor can influence how we view the needs of the person living with that injury. The physical size of an amputation does not determine the size of its impact.

MMI Is Not the Finish Line

One of the most important things I want nurse life care planners and rehabilitation professionals to understand is:

Maximum Medical Improvement does not mean the patient's needs have ended.

MMI is a milestone—not necessarily the finish line. After thousands of hours of rehabilitation, I learned that achieving a level of function and maintaining that function are two different things.

When you lose part of your hand, your body compensates. You grip, lift, and move differently. Remaining fingers take on different workloads. The opposite hand does more. Your wrist, elbow, shoulder, neck, and even back can become part of your compensation strategy.

Those adaptations do not disappear because a medical record says MMI.

For some partial hand amputees, ongoing exercise, stretching, strengthening, therapy, pain management, prosthetic follow-up, counseling, and periodic reassessment may be needed to maintain function and address secondary problems.

Without maintenance, decline may happen more quickly because we are already operating with physical limitations. Life care planning should therefore ask not only:

"How much function did we restore?"

But also:

"What will it take to preserve that function for the rest of this person's life?"

The Patient Doesn't Live in Slices

Most medical professionals I have encountered are excellent at what they do. The challenge is that healthcare can become a collection of specialists, each looking at one slice of the patient. The surgeon looks at surgery. The therapist looks at strength and range of motion. The prosthetist looks at prosthetic options. Pain management looks at pain. Mental health professionals look at trauma.

But the patient doesn't live in slices. We live with the whole pie.

For a complex partial hand patient, I believe successful care should include a multidisciplinary team:

- Hand surgeon — surgical reconstruction, healing, revisions, and preservation of usable structures.
- Hand therapist — range of motion, strength, dexterity, scar management, and functional use.
- Physical therapist — whole-body mechanics, compensatory movement, and secondary musculoskeletal concerns.
- Occupational therapist — real-world function, adaptive strategies, work, home, recreation, and independence.
- Trauma counselor/mental health professional — trauma, grief, body image, relationships, identity, and adjustment.
- Pain management team — acute and chronic pain and neuropathic symptoms.
- Prosthetist — technology, candidacy, fitting, training, adjustments, repairs, and future prosthetic needs.
- Nurse advocate/life care planner — connecting disciplines, coordinating resources, and anticipating future needs.
- Social worker — helping navigate resources, employment, insurance, family, financial, and social challenges.
- Amputee peer support mentor — bringing lived experience and the patient's perspective to both the patient and the professional team.



No single person has the entire answer. Every person brings expertise.

The Perspective of Lived Experience

The amputee peer support mentor brings something unique:

They have lived it.

A peer understands why something that appears insignificant clinically may feel enormous to a patient. They understand walking into a workplace, restaurant, church, gym, or first date wondering whether someone will notice your hand before they notice you. They understand trying to perform a simple task exactly as you have performed it thousands of times before—and suddenly realizing your hand doesn't work that way anymore.

They understand why appearance matters even when the medical team is focused on healing. They also understand that performing a task successfully once in therapy is different from doing it repeatedly at work or home. Peer mentors can also help the medical team ask questions they may never have considered.

During my recovery, there were things I couldn't explain because I didn't have words for what I was experiencing. Then I talked with other amputees. They described the same feelings and struggles.

They gave words to things I didn't yet know how to say.

A peer mentor does not replace the surgeon, therapist, prosthetist, counselor, nurse, or social worker and should not provide medical advice. They provide another kind of expertise—lived experience—and can help bridge the gap between what the medical team is trying to accomplish and what the patient is experiencing every day.

Everyone Has a Role

Each member of the team has a specialty.

Let them be great at that specialty.

Problems can arise when one discipline makes decisions within another discipline's area without bringing that professional into the conversation. The surgeon shouldn't be expected to know everything about prosthetic technology. The prosthetist shouldn't make surgical decisions. The therapist shouldn't replace trauma counseling. The peer mentor shouldn't provide medical advice.

But they should all be talking to each other—and to the patient.

The patient should be at the center of the team, not simply the person everyone discusses after they leave the room.

Prosthetics Should Be Discussed Before Surgery

A surgeon may perform an excellent surgery anatomically yet have limited knowledge of the evolving world of partial hand prosthetics. That matters. Residual finger length, joint motion, web-space anatomy, sensitivity, scar location, and range of motion can affect future prosthetic options.

I learned this through my own revision surgeries. Initially, preserving as much of my fingers as possible seemed like the obvious definition of success. More must be better. Right?

Not necessarily.

Some remaining anatomy was not providing useful function and could interfere with movement or prosthetic options. Eventually, I learned one of the most important lessons of my journey:

Less has given me more.

More mobility. More function. More options. More independence.

That is why I believe a prosthetist experienced in partial hand prosthetics should be included before certain surgical and revision decisions whenever possible. The surgeon does not need to become the prosthetist, and the prosthetist does not need to become the surgeon. They need to communicate.

Instead of only asking how much anatomy can be preserved, we should also ask:

What will give this patient the greatest long-term function, mobility, and future options?



Function Over Appearance—But Appearance Matters

I strongly advocate for function over appearance. For me, mobility and function have become some of the most important measures of success. But that doesn't mean appearance doesn't matter.

We live in a society with size and appearance biases. We notice physical differences, and medical professionals are not automatically immune from those biases. Someone may compare losing several fingers with losing an entire hand and think:

At least it wasn't worse.

But that tells us very little about what the individual is experiencing. Imagine looking at your hand one way for decades and suddenly seeing something completely different. Then imagine reaching for something and your brain still expecting fingers that aren't there.

Your brain remembers what natural movement felt like. Now you are trying to perform familiar activities in familiar ways with less. Your brain is constantly negotiating between what once felt natural and what now feels different or unnatural. That can be mentally exhausting.

Living in a Two-Handed World

Our world is largely designed around two hands and ten fingers. Partial hand amputees instinctively try to do things the way we always did them—except now we are doing them with less. That struggle follows you everywhere: work, home, restaurants, the gym, church, social events, relationships, intimacy, photographs, shaking hands, and dating.

Dating after my amputation brought an entirely different awareness of appearance.

- Did she notice my hand?
- Should I explain it?
- What is she thinking?
- Does she see me first—or my missing fingers?

Those experiences do not appear on an X-ray or range-of-motion measurement. But they are part of living with an amputation.

"You Just Have to Move On"

During my recovery, I repeatedly heard:

"You just have to move on."

Like it was that easy. I struggled physically, mentally, and emotionally while people around me seemed to believe I should simply accept what happened.

Then I started talking with other amputees. They described the same frustration, grief, appearance concerns, awkward interactions, and mental and physical struggles.

I began asking: What was different?

Many people with ten fingers were telling me moving forward should be easy. The people actually living with amputations were telling me they were experiencing many of the same things I was. Medical training matters. Research matters. Professional experience matters. But lived experience matters too.

Sometimes four words can change someone's outlook:

"I've been there too."

Mental Health Cannot Be an Afterthought

There is a dangerous assumption that the emotional impact of an amputation should correspond with its physical size. Small body part. Small trauma.

That is not how the human brain works. I watched my fingers being traumatically amputated. Then came nine surgeries, three skin grafts, two revision surgeries, pain, rehabilitation, changes in appearance, changes in function, and changes in identity. Then I returned to a world that looked almost exactly as it had before my accident.

Except I wasn't the same.

Trauma counseling and mental health support should not be something we wait to offer until the patient is visibly struggling. Mental health, pain management, family education, peer support, prosthetic education, and long-term maintenance should all be considered as part of the overall rehabilitation plan. We cannot separate the hand from the human being attached to it.

Planning for a Lifetime

This is where nurse life care planners have an incredible opportunity.

- What happens in five years? Ten? Twenty?
- What happens as the patient ages?
- What happens when prostheses need repair, adjustment, or replacement?
- What happens when years of compensation affect the opposite hand, wrist, shoulder, neck, or other parts of the body?
- What happens when strength and flexibility decline?
- What happens when employment or family circumstances change?
- What happens when better prosthetic technology becomes available?

An amputation doesn't expire. It goes home with the patient for life.

Today, more than ten years after my accident, I am an international author and speaker, mental health and trauma advocate and educator, finger amputation educator, patient advocate, storyteller, and peer support mentor.

I co-authored Pointed in the Right Direction: Your Guide Through the Challenges of Finger Amputation because I wanted amputees and their families to have information I wish I had received earlier.

Success after partial hand amputation isn't necessarily returning someone to exactly who they were before their accident. It is helping them discover what is possible now. The patient is the one person who attends every surgery, appointment, therapy session, and prosthetic fitting—and then lives with those outcomes 24 hours a day, seven days a week.

Give that patient a seat at the table. Not after the plan is developed. While it is being developed.

What Does Success Really Look Like?

No surgeon, therapist, prosthetist, nurse, counselor, social worker, peer mentor, or life care planner can know everything. That is exactly the point.

We don't know what we don't know.

Build the team. Bring the specialties together. Include lived experience. Most importantly, listen to the patient.

- **Stop asking only: "Did the wound heal?"**

  Ask: "Can this person live the fullest life possible?"

- **Don't stop at:** "Has the patient reached Maximum Medical Improvement?"

  Ask: "What will this person need to maintain maximum function throughout their lifetime?"

- **And instead of saying:** "It's only a couple of fingers."

  Remember that our fingers are among the most used, least recognized parts of our bodies.

That is how we set partial hand patients up for success. Not simply by saving tissue, completing surgery, reaching MMI, or closing a claim. We do it by helping a human being navigate an entirely new life.

Because the goal shouldn't simply be surviving an amputation. The goal should be maximum function, mobility, independence, connection, purpose, mental well-being, and quality of life—for a lifetime.

RESOURCE

Peer Support: https://amputee-coalition.org/service/find-support-services/

THERE IS NO SUCH THING AS A MINOR UPPER LIMB AMPUTATION:

Prioritizing Bimanual Function in the Life Care Plan

By: Chris Baschuk, MPO, CPO, FAAOP(D)



Keywords: Upper Limb Amputation, Bimanual Symmetry, Prosthetics

NURSING DIAGNOSES TO CONSIDER
NANDA-I 2024-2026

1. Impaired Physical Mobility 2. Ineffective Role Performance
3. Disrupted Personal Identity

Disclaimer: *The views expressed in this article are the author's own, based on his clinical experience and reading of the literature, and do not necessarily reflect the positions of any organization that he is affiliated with.*

1. A 118-Year-Old Mistake

In 1908, A. A. Marks, a maker of artificial limbs whose manual was among the standard references of its day, wrote of finger loss: "The loss of a finger may be lamentable, but it cannot be considered a serious impairment. The remaining fingers as a rule are competent to perform all the labors that are usually demanded of the complete hand" (Marks, 1908). The conclusion is casual, and it has affected access to care for people with finger amputations for more than a century.

Marks was conclusive, but his assertion did not weigh the effects on the rest of the body. By the framework of the AMA Guides to the Evaluation of Permanent Impairment, Sixth Edition, amputation of a single thumb at the metacarpophalangeal (MCP) joint rates as 22% impairment

of the whole person (American Medical Association, 2021). One finger contributes to more than one fifth of a person's function. That is more than "lamentable;" It is a serious impairment.

People with the lived experience of a missing finger or part of the hand report what that number predicts. Using the Disability of the Arm, Shoulder and Hand instrument, Davidson (2004) found that partial hand amputees reported a higher level of disability than people with major, more proximal upper limb amputations. A large military cohort followed for eight years after injury found the two groups statistically indistinguishable, with disability concentrated most heavily where the thumb was involved (Watson et al., 2024). The direction of the finding is what matters; the level routinely dismissed as minor produces disability that equals or exceeds amputations several segments more proximal.

Laypersons are not the only demographic who use the word "minor" to describe the loss of a digit. The epidemiological literature that counts these injuries formally divides limb loss into major and minor, with everything distal to the wrist placed in the minor category. Clinical studies adopt the same line, comparing "major" amputees against a partial hand group defined by exclusion. By that convention, 90% of all upper limb amputations are minor (Ziegler-Graham et al., 2008), which means the level most often dismissed is also, by a wide margin, the most common. The categorization is dismissive of the lived experience of the people it describes, and that has consequences. If we sort amputations into major and minor, we produce treatment plans that are major and minor. A person with a thumb amputation, who has lost one-fifth of their functional capacity, is categorized as minor, and the plan that follows may be diminished in breadth and scope to match.

This article argues a single idea from several directions: that there is no such thing as a minor upper limb amputation. Every level, from a partial finger to a shoulder disarticulation, disrupts the two-handed system the body is designed around, and it is that disruption, not the size of the missing part, that drives the lifelong cost of the injury. Our focus should be on the function we are trying to restore and what it takes to restore it, not on how much of the body is gone. What follows lays out why that is true anatomically, what the evidence shows it costs over a lifetime (both physically and psychosocially), and how it should be projected across the decades of a plan.

2. What the Numbers Actually Say

If Marks were correct, it would show up in how we rate injuries. It clearly does not.

The Guides work through a chain of conversions and understanding that chain is what lets a planner defend a number. Impairment is first rated at the level of the digit, according to where along the finger or thumb the amputation falls. That digit value is converted to an impairment of the hand, weighted by how much that digit contributes to hand function. The thumb counts for the most, the index and middle next, the ring and little least. The hand value converts to an impairment of the upper extremity, and the upper extremity value converts, finally, to an impairment of the whole person (Figure 1). That final figure is the one that drives disability determinations and settlement calculations.

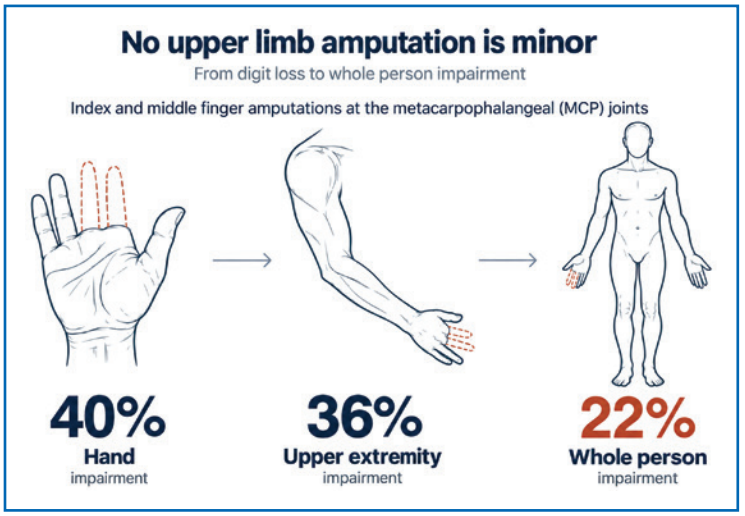

Figure 1. The impairment conversion chain from the hand to the upper extremity and then to the whole person. This is illustrated with the machinist example from Section 5: index and middle finger amputation at the MCP joints. Dashed outlines represent absent digits. Percentages are impairment ratings, not additive values.

Source: AMA Guides, 6th Edition, Section 15.6 (2021).

What does this look like in practice? Amputation of the thumb at the MCP joint is a 40% loss of hand function. That equates to 36% of the upper extremity and 22% of the whole person. Add the index and middle fingers, also at the MCP joint, and the loss is 80% of the hand, 72% of the upper extremity, and 43% of the whole person. This is nearly half of the person's capacity to function.

Of note, someone missing all digits at the MCP joint on one hand has a 54% whole person impairment. Someone with a shoulder disarticulation amputation has a 60% whole person impairment. This is because the fingers make up 90% of the upper extremity function. The mechanics of each conversion, and the values for every amputation level, are laid out in Section 15.6 of the Guides, to which the reader is referred for any specific determination. It is important to note that impairment ratings are a medical-legal convention. They are not outcome measures and should not be confused with them. But they were never on the side of "minor."

3. The Wrong Question, Asked with the Wrong Instrument

Sit a group of prosthetists down and ask them what an upper limb prosthesis is for, and you will get a variety of answers. Most will focus on a task, a tool, or an activity the person wants to do. Some will focus on body image and the psychosocial impact of the missing limb. This is exactly how I was instructed in school. All of these are correct fundamentally, but all of them miss the underlying reality. In years of asking that question clinically, I have almost never heard the actual answer: an upper limb prosthesis should exist to restore symmetrical use of both upper extremities. The ability to complete tasks is the outcome of a prosthesis that restores symmetrical use.

This is not a failing of individual clinicians. It is a failing of the frame. Our focus on tasks was inherited from other parts of rehabilitation, not from amputation care. Its root is the Katz Index of Independence in Activities of Daily Living, published in 1963 and built on aging and chronically ill patients, many recovering from hip fracture (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963). Lawton and Brody (1969) followed with the Instrumental Activities of Daily Living scale, extending the idea to the skills of independent community living. These are careful, valuable instruments. But the question they were built to answer is a specific one: can this aging or chronically ill person continue to care for themselves, or do they require assistance to live?

As an example, a traumatic amputation does not turn an otherwise healthy 34-year-old male machinist into a geriatric patient. Yet, the instruments most often reached for to describe his function were never intended to ask whether a working-age adult can use both hands together well enough to return to a job, a family, and a full life. Defining prosthetics success simply with activities of daily living or instrumental activities of daily living is using the wrong instrument for the population.

The deeper trouble is that these task-based indices cannot see the difference between a bimanual task and a one-handed one, or the compensatory movements a person uses to get the task done. Humans are tenacious. Most people who go through a traumatic upper limb amputation will find some way to do what they need to do, with or without a prosthesis. In my clinical experience, that holds for bilateral amputees as well; they figure it out, using their mouth, their feet, and other parts of the body never designed for the work two intact hands would have done. A task-counting instrument scores all of that as success. It cannot see the substitution, and it cannot see what 20 or 30 years of one-sided use will cost the remnant of the affected limb; the contralateral limb; or the rest of the trunk, neck, and body.

This is why bimanual function must move to the center of the conversation: the symmetrical use of two hands across the ordinary course of a day. That is the true purpose of an upper limb prosthesis, and it is the standard against which a plan should be measured. The question is not whether the patient can complete a given activity. It is whether, over the arc of a day and the arc of a life, they are using both sides of the body in something approaching the balance they had before, and whether we have given them the tools to do so prosthetically or otherwise.

4. What Lost Symmetry Costs, and Why Low Device Use Is Not the Measure

If bimanual symmetry is the goal, the evidence shows how far short of this goal prosthesis users typically fall, and what the shortfall does to the body over time. Chadwell and colleagues (2016) put wrist-worn activity monitors on adults with intact upper limbs and on prosthesis users. Intact adults used both arms in near-symmetrical balance, regardless of hand dominance. Prosthesis users looked nothing like this. They relied heavily on their intact arm and used the prosthetic side a small fraction of the time, a pattern that held across the day. In plain terms, many people with upper limb prostheses are still spending the entire day using one arm. That finding also answers the dismissal of a non-dominant-side amputation. Intact adults do not run their lives on the dominant hand; they run them on both. Losing the non-dominant side removes half of a working pair, not a spare.

That imbalance is not free. The loss of an upper extremity, or a part of one, immediately increases the burden on the intact side. People with upper limb amputation have higher rates of musculoskeletal pain and overuse in the intact limb, neck, and shoulder, and the pain is persistent and reduces quality of life (Østlie et al., 2011; Resnik et al., 2023). At the partial hand level, the signal is quieter in the short term; studies of finger and partial hand amputees have found only modestly elevated musculoskeletal complaints soon after injury (Bouma et al., 2018). That subtlety is precisely the danger. The wear on the intact limb develops slowly, over decades, and it is easy to dismiss in the early years, which is exactly the window in which a life care plan is set. A plan restricted to the period immediately after the injury misses the long-term effects the person will live with, and planning that treats the sound arm as permanently healthy is planning for a best case the evidence says will not hold.

My own clinical experience with people born with differences of the hand or upper extremity says the same thing. The problems show up 20 to 30 years later if a prosthesis was never part of the daily routine. I consistently see people in their late 20s through their 40s, born with a congenital difference, who lived their lives relying on the unaffected side, and who come in saying they absolutely need some form of prosthesis to offload the sound limb. Their joints have worn out prematurely. They are frustrated and fearful, with

a full life ahead of them and are unsure how to keep doing things with both their hands. That is why they are seeking out a prosthesis. The literature bears this out (Burger & Vidmar, 2016; Johansen et al., 2018), and it is the most telling evidence that the use pattern itself is the culprit. These people never had an amputation. If the amputation were the cause, they would not show the damage. The limb difference is the presentation, and the one-sided pattern is the cause.

This is also why a patient who is not wearing a prosthesis, or is wearing it less than expected, cannot be read as a patient who does not need one. Abandonment of upper limb prostheses is well documented, and its drivers are instructive: rejection is associated with a perceived lack of need and with a mismatch between what the person needs and what the device delivers, not with an absence of functional loss (Biddiss & Chau, 2007). A device that is heavy, slow, or wrong for the task will sit in a drawer while the sound arm takes on the extra work and pays for it long term. The clinical response is not to conclude the person is fine without a prosthesis. It is to recognize that no single device performs across the full range of a person's day. The modern options span a spectrum from passive and body-powered to externally powered systems, each suited to different tasks and contexts, and restoring something close to two-handed function requires more than one tool (Graham et al., 2021).

5. What the Plan Should Contain

Let's revisit that 34-year-old machinist mentioned in section 3 with some added details. He is right-hand dominant, with the index and middle fingers amputated at the MCP joint and the thumb intact on his right hand. That is 22% whole person impairment. For work, he needs a low-profile mechanical prosthesis with ratcheting digits that position against the thumb for grasp and fit under a work glove. He is a machinist, so it is reasonable to expect metal filings and cutting fluid in that prosthesis by the end of the day, and they should not come home and be used safely in the kitchen and the bathroom. A second prosthesis of the same type, kept clean for food preparation and self-care, is not a luxury. It is contamination control. And in social settings, he needs a third prosthesis, a silicone restoration, so that his limb difference is not the first thing observed when he interacts with colleagues and friends. Our hands are an enormous part of how we communicate, and a missing digit may be distracting to people who are not accustomed to it. This is why people with upper limb differences so often hide them, whether by putting their hand in a pocket or pull a sleeve down to cover it. A life care plan for this case needs to include three devices, to account for all the needs of his one hand during one ordinary day. A plan that funds one of them is a plan for a third of his life.

The machinist is one case, but the questions that produced his plan are the same at every level of the upper limb.

- What does the person do all day, and where?
- What do those environments demand in durability, cleanliness, and appearance, and can one device meet all of them?
- What will the sound side be asked to carry, and when should someone check on it?
- What training keeps both upper extremities working as the devices, the job, and the body change?

Answer those for a shoulder disarticulation or a lost fingertip, and the plan writes itself at the right size.

This is the shift the plan needs to make: bimanual function becomes the priority the plan is organized around, and the line items follow from it rather than from a list of tasks the person can or cannot do. For the life care planner, that reframes several things from optional to expected. Occupational therapy is not a short, device-specific course. It is the training that builds and protects bimanual use, and it should recur across the plan, at each device change and at the transitions of work and age. Surveillance and treatment of the contralateral limb address a consequence the evidence predicts; a plan that omits periodic evaluation, therapy, and eventual treatment of the sound arm, shoulder, and neck undercounts the real trajectory of care. And a person will often need more than one prosthesis, because the day holds more than one kind of activity. That is not because a manufacturer says so. It is because no single device covers the deficit. With bilateral involvement, there is no sound side to absorb the work and the toolbox becomes the whole means of function; we use the dominant and non-dominant hands differently, so a mixture of prosthesis types across the two limbs is to be expected.

6. Being Careful About Our Language – A Concluding Thought

Return, one last time, to A. A. Marks. His invalidating statement was not a failure of decency. It was a failure of imagination about what a hand is for, and it survived him by more than a century because it is intuitive and because our measures never forced us to correct it. The reader now has what Marks lacked: the impairment arithmetic, the patient reports, the activity data, and the evidence of what the sound limb pays across a lifetime.

Held against all of that, a few small words can do actual harm. One is "just:" it is just a finger; it is just a minor amputation. Another is "only;" she only lost a finger; he only lost the top part of his thumb. Another is the similar word "still:" you still have three other fingers; you still have your dominant hand. They are usually said kindly, and they tell the person their loss is small before they have had the chance to figure out the real impact the loss will have on their daily lives. In one series, a single partial digit amputation produced

psychological symptoms lasting three months or more in nearly every patient, with severity tracking functional scores (Skoff & Skoff, 2022). I tell every prosthetics and orthotics student I teach that we are never entitled to minimize a person's lived experience of their own body, and that "just" does exactly that: it ranks their loss against a more proximal one and tells them where they fall.

Imagine you are the patient. Your provider tells you it is just a finger, that you will go home and figure it out. Then you go home, and you cannot figure it out. You find yourself using that extremity far less than you used to, and you are reminded of the injury every time you look at your hands. The same words appear in the clinical record and in depositions, and every time those words appear, they shrink the plan before anyone has done the arithmetic. The partial hand is not the exception to "no such thing as minor." As this article has shown, it is the proof.

There is no such thing as a minor upper limb amputation. For the life care planner, that means treating a partial finger or partial hand amputation with the same seriousness and rigor as any other level: a plan sized to both hands and to the whole of a day. The word "just" should be retired from the record and the plan, because the language we use to describe an injury quietly becomes the size of the care we are willing to plan. Marks minimized these injuries with a sentence. We should not keep doing it with a word.

Key Concepts:

- There is no such thing as a minor upper limb amputation.
- Fingers make up 90% of upper extremity function.
- A small portion of the body doesn't automatically warrant a small treatment plan.
- Bimanual symmetry is one of the most important goals of prosthetic rehabilitation.
- Upper limb prostheses exist to restore symmetrical use of both upper extremities.
- No single prosthesis can restore symmetrical upper limb function and use in all situations.
- The loss of an upper extremity, or a part of one, increases the burden on the intact side, risking overuse.
- Losing the non-dominant side removes half of a working pair, not a spare.

REFERENCES

American Medical Association. (2021). *AMA Guides to the Evaluation of Permanent Impairment* (6th ed.; R. D. Rondinelli, E. Genovese, & R. T. Katz, Eds.). Chicago, IL: Author.

Biddiss, E. A., & Chau, T. T. (2007). "Upper Limb Prosthesis Use and Abandonment: A Survey of the Last 25 Years," *Prosthetics and Orthotics International*, 31(3), 236–257. https://doi.org/10.1080/03093640600994581

Bouma, S. E., Postema, S. G., Bongers, R. M., Dijkstra, P. U., & van der Sluis, C. K. (2018). "Musculoskeletal Complaints in Individuals with Finger or Partial Hand Amputations in the Netherlands: A Cross-Sectional Study," *Disability and Rehabilitation*, 40(10), 1146–1153. https://doi.org/10.1080/09638288.2017.1289418

Burger, H., & Vidmar, G. (2016). "A Survey of Overuse Problems in Patients with Acquired or Congenital Upper Limb Deficiency," *Prosthetics and Orthotics International*, 40(4), 497–502. https://doi.org/10.1177/0309364615584658

Chadwell, A., Kenney, L., Thies, S., Galpin, A., & Head, J. (2016). "The Reality of Myoelectric Prostheses: Understanding What Makes These Devices Difficult for Some Users to Control," *Frontiers in Neurorobotics*, 10, 7. https://doi.org/10.3389/fnbot.2016.00007

Davidson, J. (2004). "A Comparison of Upper Limb Amputees and Patients with Upper Limb Injuries Using the Disability of the Arm, Shoulder and Hand (DASH)," *Disability and Rehabilitation*, 26(14–15), 917–923. https://doi.org/10.1080/09638280410001708940

Graham, E. M., Hendrycks, R., Baschuk, C. M., Atkins, D. J., Keizer, L., Duncan, C. C., & Mendenhall, S. D. (2021). "Restoring Form and Function to the Partial Hand Amputee: Prosthetic Options from the Fingertip to the Palm," *Hand Clinics*, 37(1), 167–187. https://doi.org/10.1016/j.hcl.2020.09.013

Johansen, H., Bathen, T., Andersen, L. Ø., Rand-Hendriksen, S., & Østlie, K. (2018). "Chronic Pain and Fatigue in Adults with Congenital Unilateral Upper Limb Deficiency in Norway: A Cross-Sectional Study," *PLOS ONE*, 13(1), e0190567. https://doi.org/10.1371/journal.pone.0190567

Katz, S., Ford, A. B., Moskowitz, R. W., Jackson, B. A., & Jaffe, M. W. (1963). "Studies of Illness in the Aged. The Index of ADL: A Standardized Measure of Biological and Psychosocial Function," *JAMA*, 185, 914–919. https://doi.org/10.1001/jama.1963.03060120024016

Lawton, M. P., & Brody, E. M. (1969). "Assessment of Older People: Self-maintaining and Instrumental Activities of Daily Living," *The Gerontologist*, 9(3), 179–186. https://doi.org/10.1093/geront/9.3_Part_1.179

REFERENCES

Marks, A. A. (1908). *Manual of Artificial Limbs: An Exhaustive Exposition of Prosthesis* (p. 194). New York, NY: A. A. Marks.

Østlie, K., Franklin, R. J., Skjeldal, O. H., Skrondal, A., & Magnus, P. (2011). "Musculoskeletal Pain and Overuse Syndromes in Adult Acquired Major Upper-Limb Amputees," *Archives of Physical Medicine and Rehabilitation*, 92(12), 1967–1973.e1. https://doi.org/10.1016/j.apmr.2011.06.026

Resnik, L. J., Borgia, M. L., & Clark, M. A. (2023). "Contralateral Limb Pain is Prevalent, Persistent, and Impacts Quality of Life of Veterans with Unilateral Upper-Limb Amputation," *Journal of Prosthetics and Orthotics*, 35(1), 3–11.

Skoff, H., & Skoff, H. (2022). "The Psychological and Somatic Consequences of Digital Amputation," *Plastic and Reconstructive Surgery – Global Open*, 10(6), e4387. https://doi.org/10.1097/GOX.0000000000004387

Watson, F. C. E., Kedgley, A. E., Schofield, S., Behan, F. P., Boos, C. J., Fear, N. T., Bull, A. M. J. (2024). "Upper Limb Function in People with Upper and Lower Limb Loss 8 Years Postinjury: The Armed Services Trauma Outcome Study (ADVANCE) Cohort Study," *Physical Therapy*, 104(10), pzae082. https://doi.org/10.1093/ptj/pzae082

Ziegler-Graham, K., MacKenzie, E. J., Ephraim, P. L., Travison, T. G., & Brookmeyer, R. (2008). "Estimating the Prevalence of Limb Loss in the United States: 2005 to 2050," *Archives of Physical Medicine and Rehabilitation*, 89(3), 422–429. https://doi.org/10.1016/j.apmr.2007.11.005

THE WRONG TOOL FOR THE JOB:

Rethinking Prosthetic Assumptions in Upper Limb Life Care Plans

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Keywords: Upper Limb Amputation, Limb Loss, Limb Difference, Life Care Planning, Prosthetic Abandonment, Bilateral Hand Loss, Hands-Free Technology, Residual Limb Length

NURSING DIAGNOSES TO CONSIDER
NANDA-I 2024-2026

1 Decreased self-care ability syndrome
2 Impaired physical comfort
3 Disrupted body image

Abstract

Life care planners tend to bring well-developed behaviors to the courtroom when addressing lower limb amputation: functional classification levels, gait training, and predictable replacement cycles. Those habits fail in addressing upper limb loss, and the resulting plans are vulnerable both clinically and on cross-examination. This article argues that a prosthesis is a tool rather than a replacement for a missing hand, and that the most consequential determinants of prosthetic use are residual limb length, occupational demand, and access to qualified providers rather than based on technology. It treats the structural scarcity of prosthetists and therapists experienced in upper limb (particularly bilateral upper limb) care as a finding associated with cost rather than a professional complaint. It corrects the assumption that upper limb loss means major limb loss, when most cases occur at the digit and metacarpal levels. It distinguishes one-handed from hands-free adaptation, a distinction that reorganizes the equipment section of any plan for an individual without both hands. Finally, it catalogs predictable costs that plans routinely omit, including overuse pathology in the contralateral limb and psychological sequelae that bear no direct relationship to the level of loss.

The Arm in the Closet

A thirty-eight-year-old equipment operator loses his dominant hand and distal forearm in a machinery incident. He is fitted with a multi-articulating myoelectric hand; the most sophisticated device his prosthetist has ever ordered, and the one that photographs best in the settlement brochure. Two years later it is in a closet.

He works in a body-powered arm with a voluntary-opening hook, because that device survives grease, water, and impact, and because the harness tells him what the terminal device is doing without the level of concentration required in the myoelectric device. He completes the first one to two hours of each day showering, grooming, dressing, having his coffee, and getting his daughter out the door, all while wearing nothing at all.

His life care plan funded the "closet arm", on a replacement cycle, for life. It did not fund the arm he actually uses. It did not fund the task-specific terminal devices his job requires. It did not fund a single item that addresses those first two hours of his day.

The plan was not wrong because the technology was bad. The technology was excellent. The plan was wrong because the planner projected a device instead of a life.

This is the central failure in life care planning for upper limb loss. Unfortunately, it is not an occasional lapse. It is systematic, and it results from the fact that most life care planners learned amputation care planning on lower limb cases. The lower limb model is a good model. It is simply the wrong tool for this job.

Who We Are Actually Planning For

Upper limb loss is the minority of limb loss in the United States, and within that minority, the cases that reach a life care planner cluster tightly: acquired rather than congenital, traumatic rather than dysvascular, working age, and predominantly male, with most series reporting peak incidence in the twenties through forties (Pomares et al., 2018). Trauma dominates the etiology — machinery, crush, electrical, thermal, and combat injury.

But there is a second pathway with disproportionate frequency relative to its share of the epidemiologic literature: **sepsis**. Septic shock complicated by disseminated intravascular coagulation and purpura fulminans produces symmetric distal ischemic necrosis, and the surgical result is frequently multi-limb amputation that includes both hands (Shapiro & Huang, 2009; Bhatti et al., 2019). These cases surface in medical malpractice and delayed-diagnosis litigation.

The two etiologies produce fundamentally different planning problems. The traumatic unilateral amputee retains an intact hand, and every adaptive strategy available to him is built on that fact. The sepsis survivor typically presents with bilateral upper limb loss, often with concurrent lower limb loss, a critical-illness recovery trajectory that includes deconditioning and cognitive effects, and no intact hand around which to construct alternative workarounds. Treating the second as a doubled version of the first is the most common conceptual error in life care planning.

A third correction is needed before any of this becomes actionable, and it concerns who the upper limb population actually is. Planners picture the transhumeral or transradial amputee, because that is the case that generates the large prosthetic number. But the overwhelming majority of upper limb amputations occur distally: as Treadwell and colleagues (2020) report, roughly 94% of upper limb amputations occur at the digit and metacarpal levels, and finger loss is the most common traumatic amputation in the United States. In the study they cite, 75% of men in heavy manual labor could not return to their trade after finger loss, and 26% left the workforce altogether.

Partial hand loss is not a lesser version of upper limb amputation. It is the ordinary case, it is chronically underserved by prosthetic technology, and it produces consequences planners underestimate precisely because the anatomic loss looks small.

A candid word about the evidence base for upper limb loss is warranted. Population-level data on bilateral upper limb loss in the United States essentially does not exist; the literature is case reports, small series, and surveys, the largest of which enrolled twenty-eight participants (Sears et al., 2022). This journal published a bilateral upper extremity rehabilitation case study in 2009 (Steven, 2009), and that single case report still stands among the more useful accounts available to planners, which says something about how little has been added to the literature since. The appropriate response to a thin evidence base is not to overstate one's sources but to say so, and to rely more heavily on clinical reasoning, individualized assessment, and the treating team. This is considerably more defensible in deposition than a citation that will not bear weight.

Ten Questions to Ask Before You Fund a Prosthesis

1. What is the amputation level, and how long is the residual limb?
2. What did this person do for work and recreation before the injury, and what do they intend to do now?
3. How many hours per day is the current device actually worn, and during which activities?
4. What devices has this person been given, which are in use, which are not, and why?
5. Which specific tasks fail with the current device?
6. What terminal devices or task-specific attachments would address those tasks?
7. How much upper limb experience does the treating prosthetist have, and where is the nearest provider with bilateral experience?
8. What prosthetic training was actually delivered, by whom, and for how long?
9. What is the repair and downtime history, and what does this person do while the device is out?
10. What has this person stopped doing since the amputation?

Why the Lower Limb Model Breaks

A different job to do. Lower limb prosthetics restore one repetitive, weight-bearing, largely predictable task: locomotion. Progress is observable, and success is measurable in gait. Upper limb prosthetics address an unbounded set of variable, bimanual, fine-motor, sensate tasks that differ by person, occupation, household, and even hour of the day. There is no gait of the hand to train toward, and no equivalent endpoint against which to declare rehabilitation complete.

No functional classification, no scaffolding. Life care planners inherit Medicare's K0 through K4 functional levels as a ready-made architecture for justification in lower limb loss. The level does substantial argumentative work by connecting demonstrated function to a component category, and it does so in a language payers and the courts already accept. There is no true upper limb equivalent. The planner making recommendations for upper limb loss must build the rationale from first principles in every case. This is precisely why using a template in upper limb amputation fails, and precisely where cross-examinations land hard.

Lower limb prosthetic use tolerates the absence of sensation reasonably well, because the ground provides feedback. The hand's core function is sensation. The loss of tactile input, proprioception, and graded grip force is not a secondary consideration to be noted and moved past, but rather a primary driver of device selection. It also explains a phenomenon that puzzles planners new to upper limb cases, such as why a cable-and-harness system that transmits load through the shoulder girdle continues to outperform sophisticated electronics for many experienced users. The harness gives feedback. The microprocessor, for the most part, does not.

Hands are visible; feet are not. Hands do a great deal of work that is not functional in any economic or transactional sense: gesture, greeting, touch, intimacy, parenting, and self-presentation. A prosthetic foot spends its life inside a shoe. A prosthetic hand is looked at and extended to strangers.

Abandonment is a real issue in addressing the life care plan for these individuals. Rejection and non-use are materially higher in upper limb than lower limb amputation, and the rates have not improved despite three decades of technological advance. Reviewing twenty-five years of literature, Biddiss and Chau (2007) reported mean rejection rates of 45% for body-powered and 35% for electric devices among children, and 26% and 23% respectively among adults. Fifteen years later, in a survey of 68 patients with traumatic upper limb amputation — a cohort in which nearly all continuing users wore myoelectric devices — Salminger and colleagues (2022) found a rejection rate of 44% across amputation levels. Comfort and function, not sophistication, remain the determinants of whether a device is worn (Smail et al., 2021).

The standard-of-care implication deserves stating without hedging: a plan that funds a device the individual will not wear is not a conservative plan. It is an inaccurate one. It overstates damages in one line item while understating them everywhere the individual's real life actually happens.

The Rarest Referral: Why Access Is a Line Item

Seventeen years ago, the AANLCP Journal named the problem. In its 2009 amputation issue, Otto observed that upper-limb prosthetics "is small and comprises only about 10% of the overall amputee population," even as it carries specialized knowledge unique to the field (Otto, 2009). That ratio is the difficulty in a single sentence.

Every practicing prosthetist has fitted lower limb amputations. A meaningfully smaller number have fitted upper limb. Even fewer fit upper limb often enough to be genuinely skilled, to have opinions about terminal devices, to have fitted across device classes, and to know what to do when a socket is right on the bench and wrong on the job site. Rarer again is the prosthetist with real experience fitting bilateral upper limb loss. That is not a local service. It is a small national community.

The same steep pyramid exists in occupational therapy. Most occupational therapists will never treat an upper limb amputation; very few will ever treat bilateral hand loss. Prosthetic training delivered by a therapist without upper limb experience is, functionally, not training at all — and inadequate training is among the best-documented predictors of abandonment (Biddiss & Chau, 2007; Smail et al., 2021). Upper limb rehabilitation progresses from controlled training and repetitive drills to bimanual functional application (Johnson & Mansfield, 2014; Smurr et al., 2008), a specialized skill set, not a generalist competency.

For the life care planner, this scarcity is a set of costable findings:

- **Care is geographically concentrated.** The appropriate prosthetist and therapist may not be in the individual's city, and for bilateral loss they may not be in the individual's region.
- **Travel, lodging, per diem, and companion travel** for evaluation, fitting, refitting, and training become recurring line items across the life expectancy. An individual who cannot don a prosthesis independently cannot travel for a fitting alone; the companion is a clinical necessity, not a convenience.
- **Evaluation at a center with genuine upper limb expertise** is a fundable event, repeated at each device change and at intervals as the individual ages or changes work.
- **Telehealth offsets some of this, but not all of it.** A socket cannot be fitted over video.

Timing compounds scarcity. A delay between amputation and the appropriate fitting and training is associated with materially worse prosthetic and vocational outcomes. When the nearest qualified provider is states away that delay is structural rather than incidental.

During the assessment, it is important to identify a qualified provider by name and location and then build the plan around the access the individual actually has. That specificity is what survives deposition. "Prosthetic care" is a category. "Quarterly visits to the upper limb program at a named facility four hundred miles away, with associated travel is a finding.

The Wrong Tool for the Job

Passive, body-powered, myoelectric, hybrid, and activity-specific devices are tools in a toolkit, not a hierarchy. No tradesman owns a single hammer and calls it a workshop. The questions a planner must answer is "which job, how often, and under what conditions," and for most amputees the answer involves more than one device.

Of all the variables predicting how much a prosthesis will be worn and for which tasks, the remaining residual limb is among the most powerful and more reliable than the device's sophistication. The longer transradial residual limb offers better leverage, better suspension, more wear hours, and greater bimanual utility. As the level rises through transhumeral to elbow and shoulder disarticulation, the device gains weight and components, requires more control sites, demands more energy per task, and delivers a narrower range of useful function; wear hours fall accordingly, and use narrows to specific tasks rather than general function (Fitzgibbons & Medvedev, 2015).

Reported prosthetic use across the upper limb literature spans roughly 27 to 56% (Wright et al., 1995; Raichle et al., 2008). This spread argues against the full-time wear assumed in many cost projections. Wear-time assumptions must be built from level, residual limb length, occupational demand, and documented history.

Componentry belongs to the prosthetist and is treated expertly elsewhere in this issue. What concerns the planner is fit to purpose.

Body-powered devices offer durability, tolerance of water and particulate, proprioceptive feedback through the harness, faster donning, field repair, and less downtime. A systematic review found advantages for body-powered systems in durability, training time, and sensory feedback, with no statistically significant difference in rejection rates between the two classes (Carey et al., 2015). For trades, agriculture, mechanical work, and outdoor labor, body-powered remains the working device, and a plan that treats body-powered devices as an obsolete, cheap alternative has misunderstood the evidence.

Myoelectric devices offer grip variety, cosmesis, and capability in low-force, office, and light bimanual tasks, at the cost of greater weight, vulnerability to moisture and dust, longer repair downtime, and dependence on charging.

Passive and cosmetic devices provide opposition, stabilization, carrying assistance, and professional presentation at a fraction of the cost. Planners routinely dismiss them as "just cosmetic," which is both a clinical error and, for some individuals, a dismissal of the highest-value device they own.

Activity-specific terminal devices are the most underappreciated category in the field: kitchen tools, hand tools, fishing, firearms, musical instruments, swimming, weightlifting, infant care, and keyboarding. They are inexpensive relative to their functional yield and are rarely in the plan. Radocy (2009) argued that general-purpose devices cannot deliver the performance rigorous activity demands, and that purpose-built terminal devices are what return people to what they did before. Sixteen years later, and most plans still fund the advanced hand and omit the inexpensive attachment that gets someone back on a bicycle.

Spill (2016) argued that body-powered prostheses represent a sensible initial choice for bilateral upper-limb loss, absent contraindications. Upon transitioning to externally powered devices, the original body-powered prostheses serve as reliable backups during repairs any many individuals switch back and forth within the same da. In unilateral upper-limb loss, however, this sequence is not always recommended. Some practitioners advocate starting with a myoelectric prosthesis, as the control mechanisms differ from those of body-powered devices. Although body-powered prostheses are easier to use, myoelectric devices require more extensive training and therapy. Prioritizing myoelectric prostheses from the outset may reduce user rejection.

Harnessing, cabling, and suspension are all consumable with real wear cycles, and the replacement will depend on the frequency and severity of use. Beyond replacement costs, harness loading creates downstream pathology through axillary irritation, contralateral shoulder loading, and cervical and thoracic strain. Harness burden is a predictable future medical cost for supplies and surveillance of potential complications.

Plans often omit other upper-extremity supplies and services beyond the devices.

- Cosmetic gloves
- Socks and liners
- Batteries, chargers, and cables
- Wrist units and quick-disconnects
- Repair labor, shipping, and downtime
- Warranty gaps and what falls outside them (Ebersbach, 2009)
- Backup device.

A lower limb individual whose prosthesis is in the shop (often in another country) has a wheelchair, crutches, or a walker; the fallback is understood and typically funded because the items exist in the records before the prosthetic device was ever delivered. A bilateral upper limb individual whose prosthesis is in the shop has nothing scheduled, because no

one funded the second arm. They did not have such devices or supplies prior to the prosthetic device but now rely on such things.

A three-to-five-year replacement projection remains a useful planning assumption, but it should not be treated as a default. In bilateral upper-limb loss, the person generally cannot function without prosthetic tools. Most individuals also use different devices for different tasks, so replacement timing varies widely by device type, intensity of use, and occupational demand.

The replacement interval depends on device class, work demand, wear pattern, growth, limb-volume change, and documented history. It should be based on the prosthetist's input and how often the individual requires repairs, rather than a reflexive cycle. As one prosthetist put it, a prosthesis may last three to five years or as long as twenty while an active person will simply wear it out (Otto, 2009). An unsupported replacement interval is often the single most common point of impeachment in upper-limb plans, and it is entirely avoidable.

ONE-HANDED IS NOT HANDS-FREE

Task	Unilateral solution (one intact hand)	Bilateral solution (no hands)
Cutting food	Rocker knife, spiked cutting board	Adapted utensil holder or universal cuff; prepared-food strategy; assistance
Fastening clothing	Button hook, elastic laces, one-handed zipper pull	Magnetic and modified closures; adapted garments; dressing tree frame
Opening containers	Under-counter jar opener, one-handed can opener	Touchless or automated dispensing; decanting strategy; assistance
Personal hygiene	Long-handled aids, soap mitt	Bidet or washlet systems; hygiene wands; touchless fixtures
Using a phone or computer	One-handed keyboard, word prediction	Voice control, dictation, switch and stylus access, smart-home integration
Turning on a faucet	Lever handle	Touchless or foot-operated fixture

The test: does the solution require a hand the individual does not have?

What Happens When the Prosthesis Comes Off

The unworn hours matter. Nearly every upper-limb prosthesis user spends significant, predictable time without the device: the morning routine before donning, bathing, sleeping, heat, perspiration, skin breakdown, and repair. Even a satisfied full-time user is without the prosthesis for hours each day, and those hours can determine whether attendant care is required.

Some plans must fund two versions of the same person: the one wearing the device and the one who is not. Most plans fund only the first. That is how a document can project $200,000 in prosthetic care and still leave the individual unable to use the bathroom independently.

One-handed is not hands-free. That distinction reorganizes an entire plan, and it is the point a planner new to these cases should take away. The existing assistive technology literature for upper limb difference, including this journal's own technology column on the subject (Sofka & Caragonne, 2012), is overwhelmingly one-handed. For example, it covered rocker knives, button hooks, jar openers, spiked cutting boards, and bra fasteners. Every one of those solutions is excellent, and every one of them presumes an intact hand to operate it.

For an individual with bilateral hand loss, that entire life care plan table fails. Instead, you need hands-free equipment such as touchless fixtures, foot and knee controls, voice control and smart-home integration, adapted hygiene systems, magnetic and modified closures, and tools operated by the mouth or residual limb. The rule is simple enough to hand to any planner. Before funding a solution, ask whether it requires a hand the individual does not have.

A large share of the most functionally valuable equipment for bilateral hand loss has no HCPCS code, no mainstream vendor listing, and no line on any fee schedule. Much of it is homemade, adapted, or produced in small quantities by people who need it themselves. The devices exist outside any coding system.

The dressing tree is one example. It is a simple upright frame that allows a person without hands to don and doff a prosthesis and manage clothing independently. It costs very little to make. Wood, PVC, and some hardware can be the difference between needing paid assistance to dress and not needing it. Pricing attendant care over a life expectancy is among the highest-leverage line items a planner will ever write.

The Hands Free catalog maintained by Enhancing Skills for Life organizes roughly 200 such items by activity of daily living and is available as a digital download or in print (see Resources). People missing both hands have tried and tested each item. The catalog is free for people living without both hands. Healthcare professionals are asked to donate to obtain a copy so the nonprofit can continue their work.

Most of the people who need that help do not know the organization exists. That includes many prosthetists, surgeons, and rehabilitation physicians. No medical record will mention the catalog. The prosthetist's chart notes will not list it. The life care planner must know this category exists to ask about it and obtain it to fund the items within it. That funding includes custom fabrication and adaptation, replacement and adjustment across the lifespan, and placement within the home.

Home and vehicle modification considerations must be reframed. Upper limb home modification is hardware, controls, and interfaces, like lever or touchless faucets, door hardware, appliance controls, closures, storage heights, and voice or application control of the physical environment. Driving requires adapted controls, steps to regain licensure, and a driver rehabilitation evaluation.

Bilateral Loss Is a Different Plan, Not a Doubled One

A thirty-one-year-old mother of a nine-month-old survives septic shock with purpura fulminans and undergoes bilateral transradial amputation. At discharge, her question is not about grip patterns or terminal devices. It is whether she will be able to lift, feed, change, and comfort her own small child. Her plan needs an infant-care strategy, adapted equipment, hands-free systems throughout the home, a period of intensive assistance that tapers rather than continuing at a flat rate, and most importantly access to other people who have already solved these problems without hands.

Unilateral planning depends on the sound side doing the work, and the entire adaptive-equipment industry is built on this assumption. Bilateral loss removes that assumption. Independence then fails at the expected points: toileting and perineal hygiene, feeding, medication management, phone and computer access, grooming, and, for parents, the whole architecture of caregiving.

In the sepsis survivor with concurrent lower limb amputation, the interactions between the upper and lower limb loss are not obvious to most and must be planned explicitly. Multi-limb loss compounds need. Spill (2016) observes that a patient with bilateral upper limb involvement who also has lower limb loss must be able to use upper limb prostheses to don lower limb prostheses. Sequence matters: an upper limb device that is slow to don, or unavailable during repair, does not merely cost hand function that day; it also costs mobility. A planner who has not thought through the order of operations in that person's morning will under-fund both.

Attendant care after bilateral upper-limb loss is clustered around tasks. Need concentrates in the morning and evening, and at specific recurring events, rather than running continuously through the day. In practice, plans often overstate attendant care overall and understate it at the moments that matter. A plan that assigns sixteen undifferentiated hours a day is easier to write—and far easier to attack—than one that assigns ninety minutes each morning, sixty each evening, and named help for particular weekly tasks. Match hours to tasks and defend each one individually.

Technology is an attendant-care offset. In this population, voice control and smart-home tools provide hours of free or low-cost help. That is how they should be framed. The cost argument is unusually strong here, and most plans do not use it well enough.

Peer learning is also a fundable need. Skills for living without hands transmit person to person far more efficiently than through therapy alone, within a small, specialized ecosystem. Enhancing Skills for Life serves people living without both hands or all four limbs for this very reason. The nonprofit convenes a triennial skills workshop in the Houston area for exactly this population. Attendance, travel, and lodging are legitimate, costable line items, and the skills acquired reduce downstream care hours. This is defensible on economic and clinical grounds.

The Costs Nobody Projects

A forty-six-year-old woman loses the distal segment of the index finger of her non-dominant hand. She has kept a standing manicure appointment every two weeks for nearly twenty years. She develops depressive symptoms, withdraws

from social settings, keeps her hand often hidden in her pocket, and stops allowing her hands in photographs. In the same practice, a man with a transhumeral amputation returns to work in four months and describes himself as fine.

Psychological impact is not necessarily proportional to the extent of loss. Experienced upper-limb planners know this, even when it runs against ordinary expectation. Digital and partial-hand amputation produces documented new-onset depression, anxiety, anger, and post-traumatic symptoms wholly out of proportion to the tissue lost (Skoff & Skoff, 2022). Psychiatric comorbidity after traumatic amputation is generally high and under-identified. In a consecutive series of fifty-nine patients at a tertiary amputation clinic, major depressive disorder was identified in 71.2%, suicidality in 30.5%, and post-traumatic stress disorder in 20.3% (Sahu et al., 2017).

What governs the response is not centimeters of tissue but what that hand did for the person's identity, work, and self-presentation. The vocational impact is no more proportionate, given that three-quarters of men in heavy manual work did not return to their trade after finger loss (Treadwell et al., 2020). This author previously described a partial hand case in which the surgical instinct to preserve every possible digit produced a hand the patient could not use and did not want. Further revision improved function and satisfaction (Powell, 2009).

Never scale psychological services to the level of amputation. Assess the person and be prepared to justify substantial psychological and vocational support in an individual whose anatomic loss looks minor on paper.

The most predictable and most frequently omitted future cost in unilateral plans is contralateral and sound-side overuse. In a population-based comparison of adults with acquired major upper limb amputation against controls, shoulder pain was reported by 58.9% (odds ratio 4.00) and neck and upper back pain by 57.0% (odds ratio 2.56) — and prosthesis use did not prevent it (Østlie et al., 2011). A recent military cohort confirms the pattern (Cancio et al., 2023). Predictable is not speculative, and the report narrative should make this distinction explicitly.

Skin and residual limb care are required. Heat, perspiration, folliculitis, socket and harness pressure areas, volume fluctuation with weight change, and recurring dermatologic care can be expected.

Phantom limb pain and residual limb pain should be distinguished rather than collapsed into one line, and symptomatic neuroma is common and treatable. Targeted muscle reinnervation and regenerative peripheral nerve interface procedures reduce both phantom and residual limb pain relative to standard management (Yuan et al., 2024; Kubiak et al., 2018) while altering prosthetic candidacy and control strategy (Cheesborough et al., 2015; Powell, 2020). For the life care planner, they represent surgical cost, potential revision cost, and, easily forgotten, a full course of retraining on a changed control scheme. A plan that omits them when indicated is already out of date.

A device delivered is not a device learned. Many individuals were handed sophisticated hardware with grossly inadequate occupational therapy, and their non-use is then recorded in the chart as though it reflected the device rather than the instruction. Training must be funded at initial fitting and re-funded at every device change. Currently, no validated evidence establishes a specific number of training hours; the figures circulating in practice are payer utilization benchmarks, not research.

After upper limb loss, every task takes longer and costs more energy. This is why assistance hours are appropriate even for individuals who are functionally independent, and it is defensible when documented through observation rather than asserted. Vocational reality also exists beyond "can they work." Tools of the trade and their adaptation, worksite modification, licensure and certification barriers, employer accommodation limits, and self-employment supports for individuals whose return to a prior trade is not realistic.

Building the Plan You Can Defend

Request the prosthetist's file, not just the physician's. Chart notes, fabrication invoices, L-code detail, warranty terms, and repair history are the most under-requested records in these cases. The repair history in particular tells you what the individual actually uses.

Interview the day, not the checklist. Walk an actual twenty-four hours from waking to sleep and observe wherever possible rather than just asking. Individuals underreport. This is not done to minimize, but because they have normalized their own workarounds and stopped noticing them.

Ask what they have stopped doing. The list of abandoned activities is more diagnostic than any ADL/IADL inventory, and it surfaces the losses that matter to the individual rather than the ones that appear on forms. For example, did she cut her long luxurious hair because she can no longer fix her hair?

Take the closet inventory. The life care planner should know every device ever provided, which are used, which are not, and why. This single line of questioning predicts the shape of the plan more reliably than any other, and it is the one most often left unasked.

Justified redundancy is not duplication. State the task each device performs, the conditions under which it is used, and why the alternative cannot perform it. Duplication is funding two devices to do the same job. Redundancy is funding the second arm that keeps a bilateral individual from losing all function for three weeks while the first is repaired.

Anchor to standards. The VA/DoD Clinical Practice Guideline for the Management of Upper Limb Amputation Rehabilitation (2022) and the AANLCP Standards of Practice for Life Care Planner (in progress) should both appear in the methodology, and costing should never rest on a single source.

Red flags that invite impeachment. Technology-tier bias can result when the most expensive device is assumed to be the most appropriate. Reflexive replacement intervals. Planning as though abandonment does not occur. Psychological services scaled to amputation level. Upper-limb sections visibly lifted from lower-limb templates are also red flags and should be avoided.

Fund the Life, Not the Hand

Return to the closet, and to the three example situations: the operator whose plan funded the wrong arm, the mother whose question was about her daughter rather than her grip, the woman whose fingertip cost her more than anyone expected. The measure of an upper limb life care plan is not the sophistication of the device it funds. It is whether the person can dress, eat, work, drive, parent, and be touched — both with and without the prosthesis.

Our profession has built genuine rigor around lower limb amputation. Upper limb loss has not received the same attention, and the people who need it most — those living without both hands — sit at the thinnest point of both the evidence base and the provider network. This journal devoted issues to amputation in 2009 and again in 2020, and much of what was written then still reads as current, which is less a compliment to those authors than an indictment of the intervening years. Improving that is well within our reach. It begins with setting down the lower limb model and picking up the right tool for this particular job.

Resources for Upper Limb Individuals

Amputee Coalition — Certified Peer Visitor Program; peer support matched by amputation level and etiology. amputee-coalition.org

Association of Children's Prosthetic-Orthotic Clinics (ACPOC) — Professional network for pediatric limb loss and limb difference care; useful for locating experienced pediatric teams. acpoc.org

Enhancing Skills for Life — 501(c)(3) organization serving individuals living without both hands or all four limbs. Convenes the triennial Skills for Life workshop in the Houston area, and publishes the ***Hands Free*** catalog — approximately 200 items organized by activity of daily living, available as a free digital download or as a printed copy. enhancingskillsforlife.org

REFERENCES

Bhatti, U. F., Williams, A. M., Raghavendran, K., & Georgoff, P. E. (2019). Four-extremity amputation following disseminated intravascular coagulation and purpura fulminans. *BMJ Case Reports*, 12, e228028. https://doi.org/10.1136/bcr-2018-228028

Biddiss, E. A., & Chau, T. T. (2007). Upper limb prosthesis use and abandonment: A survey of the last 25 years. *Prosthetics and Orthotics International*, 31(3), 236–257. https://doi.org/10.1080/03093640600994581

Cancio, J. M., Eskridge, S., Shannon, K., Orr, A., Mazzone, B., & Farrokhi, S. (2023). Development of overuse musculoskeletal conditions after combat-related upper limb amputation: A retrospective cohort study. *Journal of Hand Therapy*, 36(1), 66–73. https://doi.org/10.1016/j.jht.2021.05.003

Carey, S. L., Lura, D. J., & Highsmith, M. J. (2015). Differences in myoelectric and body-powered upper-limb prostheses: Systematic literature review. *Journal of Rehabilitation Research and Development*, 52(3), 247–262. https://doi.org/10.1682/JRRD.2014.08.0192

Cheesborough, J. E., Smith, L. H., Kuiken, T. A., & Dumanian, G. A. (2015). Targeted muscle reinnervation and advanced prosthetic arms. *Seminars in Plastic Surgery*, 29(1), 62–72. https://doi.org/10.1055/s-0035-1544166

Ebersbach, S. (2009). Life care planning for UE iLimb aftercare: Maintenance, repair, and replacement. *Journal of Nurse Life Care Planning*, 9(4), 140–141.

Fitzgibbons, P. G., & Medvedev, G. (2015). Functional and clinical outcomes of upper extremity amputation. *Journal of the American Academy of Orthopaedic Surgeons*, 23(12), 751–761. https://doi.org/10.5435/JAAOS-D-14-00302

Johnson, S. S., & Mansfield, E. (2014). Prosthetic training: Upper limb. *Physical Medicine and Rehabilitation Clinics of North America*, 25(1), 133–151. https://doi.org/10.1016/j.pmr.2013.09.012

Kubiak, C. A., Kemp, S. W. P., & Cederna, P. S. (2018). Regenerative peripheral nerve interface for management of postamputation neuroma. *JAMA Surgery*, 153(7), 681–682. https://doi.org/10.1001/jamasurg.2018.0864

REFERENCES

Østlie, K., Franklin, R. J., Skjeldal, O. H., Skrondal, A., & Magnus, P. (2011). Musculoskeletal pain and overuse syndromes in adult acquired major upper-limb amputees. *Archives of Physical Medicine and Rehabilitation*, 92(12), 1967–1973.e1. https://doi.org/10.1016/j.apmr.2011.06.026

Otto, J. P. (2009). Caring for the upper extremity prosthetic patient. *Journal of Nurse Life Care Planning*, 9(4), 124–131.

Pomares, G., Coudane, H., Dap, F., & Dautel, G. (2018). Epidemiology of traumatic upper limb amputations. *Orthopaedics & Traumatology: Surgery & Research*, 104(2), 273–276. https://doi.org/10.1016/j.otsr.2017.12.014

Powell, V. (2009). Partial hand amputation: A case study. *Journal of Nurse Life Care Planning*, 9(4), 132–134.

Powell, V. (2020). Targeted muscle reinnervation and case study. *Journal of Nurse Life Care Planning*, 20(2), 47–52.

Radocy, R. (2009). Advances in upper limb prostheses for sports and recreation. *Journal of Nurse Life Care Planning*, 9(4), 147–151.

Raichle, K. A., Hanley, M. A., Molton, I., Kadel, N. J., Campbell, K., Phelps, E., Ehde, D., & Smith, D. G. (2008). Prosthesis use in persons with lower- and upper-limb amputation. *Journal of Rehabilitation Research and Development*, 45(7), 961–972. https://doi.org/10.1682/JRRD.2007.09.0151

Sahu, A., Gupta, R., Sagar, S., Kumar, M., & Sagar, R. (2017). A study of psychiatric comorbidity after traumatic limb amputation: A neglected entity. *Industrial Psychiatry Journal*, 26(2), 228–232. https://doi.org/10.4103/ipj.ipj_80_16

Salminger, S., Stino, H., Pichler, L. H., Gstoettner, C., Sturma, A., Mayer, J. A., Szivak, M., & Aszmann, O. C. (2022). Current rates of prosthetic usage in upper-limb amputees — Have innovations had an impact on device acceptance? *Disability and Rehabilitation*, 44(14), 3708–3713. https://doi.org/10.1080/09638288.2020.1866684

Sears, H. H., Doolan, K., & Keenan, D. D. (2022). A small-scale survey of bilateral upper-limb loss individuals. *Journal of Prosthetics and Orthotics*, 34(2), 95–107.

Shapiro, S. A., & Huang, M. E. (2009). Inpatient rehabilitation of survivors of purpura fulminans with multiple limb amputations: A case series. *Archives of Physical Medicine and Rehabilitation*, 90(4), 696–700. https://doi.org/10.1016/j.apmr.2008.09.573

Skoff, H., & Skoff, H. (2022). The psychological and somatic consequences of digital amputation. *Plastic and Reconstructive Surgery — Global Open*, 10, e4387. https://doi.org/10.1097/GOX.0000000000004387

Smail, L. C., Neal, C., Wilkins, C., & Packham, T. L. (2021). Comfort and function remain key factors in upper limb prosthetic abandonment: Findings of a scoping review. *Disability and Rehabilitation: Assistive Technology*, 16(8), 821–830. https://doi.org/10.1080/17483107.2020.1738567

Smurr, L. M., Gulick, K., Yancosek, K., & Ganz, O. (2008). Managing the upper extremity amputee: A protocol for success. *Journal of Hand Therapy*, 21(2), 160–176. https://doi.org/10.1197/j.jht.2007.09.006

Sofka, K., & Caragonne, P. (2012). Assistive technology for the one-handed [Technology Corner]. *Journal of Nurse Life Care Planning*, 12(1), 572–580.

Spill, R. (2016, March). Considerations when treating people with bilateral upper-limb amputations [Perspective]. *The O&P EDGE*, 112.

Steven, S. (2009). Acute rehabilitation for bilateral upper extremity amputee: Anna, a case study. *Journal of Nurse Life Care Planning*, 9(4), 142–143.

Treadwell, K. T., Rock, D., & Wyatt, A. (2020). Novel mechanical finger prostheses. *Journal of Nurse Life Care Planning*, 20(2), 53–57.

U.S. Department of Veterans Affairs & U.S. Department of Defense. (2022). *VA/DoD clinical practice guideline for the management of upper limb amputation rehabilitation*. https://www.healthquality.va.gov/guidelines/Rehab/ULA/

Wright, T. W., Hagen, A. D., & Wood, M. B. (1995). Prosthetic usage in major upper extremity amputations. *Journal of Hand Surgery*, 20(4), 619–622. https://doi.org/10.1016/S0363-5023(05)80278-3

Yuan, M., Gallo, M., Gallo, L., Huynh, M. H. Q., McRae, M., McRae, M. C., Thoma, A., Coroneos, C. J., & Voineskos, S. H. (2024). Targeted muscle reinnervation and regenerative peripheral nerve interfaces versus standard management in the treatment of limb amputation: A systematic review and meta-analysis. *Plastic Surgery*, 32(2), 253–264. https://doi.org/10.1177/22925503221107462

Note

The three case descriptions in this article are composites drawn from multiple cases. Identifying details have been altered, and no specific individual is depicted.

PSYCHOSOCIAL IMPACT OF UPPER BODY DISFIGUREMENT

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Keywords: Upper-Limb Amputation, Upper-Body Disfigurement, Psychological Distress, Depression, Post-Traumatic Stress Disorder, Life Care Planning, Caregiver Mental Health

Introduction

Upper-body disfigurement — including scarring, traumatic injury, amputation, and other acquired changes in appearance or function — can profoundly affect a person's mental and emotional well-being. Rehabilitation after these injuries tends to emphasize physical restoration, yet attention to the client's psychological needs is equally critical to approximating pre-disfigurement quality of life. In a multisite study of 307 people with upper-limb loss, more than half screened positive for depression, post-traumatic stress disorder (PTSD), or both (Armstrong et al., 2019), and in a national database study, approximately one in six patients developed a newly coded psychiatric condition within three years of upper-extremity amputation (Dussik et al., 2025). Anticipating, identifying, and proactively addressing these psychological needs is an essential component of comprehensive care.

Studies indicate that upper-body disfigurement can alter how a person views themselves, resulting in several diagnoses and issues:

- Body image changes
- Identity diffusion
- Chronic pain
- Mood changes
- Relationship challenges
- Trauma-related symptoms
- Vocational incapacity
- Caregiver role difficulties
- Affected community engagement

In addition to learning and adapting to physical changes such as wearing a prosthetic, the individual must adjust to changes in how people socialize with them. They may be questioned about what happened to them, receive unwanted attention, feel uncomfortable in social, recreational, occupational, or intimate situations, or encounter biases about their capabilities.

The upper body and hands are central to communication and to occupational, recreational, home-management, and caregiving tasks. Visible upper-body differences may therefore carry particular psychosocial and appearance-related implications.

Individuals who experience these conditions may face immediate and ongoing psychological sequelae that can be anticipated, identified, and proactively addressed. Integrating regular psychological assessment and adequate mental-health care can help prevent or alleviate a possible psychological crisis.

The Department of Veterans Affairs and Department of Defense (VA/DoD, 2022) upper-limb amputation rehabilitation guideline recommends assessment for cognition, pain, and mental-health conditions such as depression and PTSD during initial evaluation and throughout the continuum of care (VA/DoD, 2022).

Prevalence

The evidence summarized here draws heavily on psychological screening assessments, which do not by themselves establish DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, 5th edition) diagnoses such as PTSD, major depressive disorder, or anxiety disorders (American Psychiatric Association, 2022). The distinction matters: a positive screen indicates clinically significant symptom burden and the need for further evaluation, not a formal diagnosis. Nonetheless, the screening data are significant.

Table 1. Key Studies of Psychological Outcomes after Limb Loss And Amputation

Study	Population And Design	Measure	Key Findings
Armstrong et al. (2019)	307 adults with upper-extremity limb loss; multisite cross-sectional survey at six U.S. prosthetic rehabilitation centers	Screening instruments (depression, PTSD)	34.5% depression only; 2.6% PTSD only; 20.8% both; more than half screened positive overall
Kearns et al. (2019)	Adults with upper-limb amputation from traumatic injury	Screening (PTSD symptoms)	26% screened positive for PTSD symptoms
Singh et al. (2024)	61 studies; 9,852 upper- and lower-limb amputees; systematic review and meta-analysis	Pooled prevalence (depression)	33.85% pooled depression prevalence
Dussik et al. (2025)	More than 25,000 patients with upper-extremity amputation; national database (2010–2022)	Coded psychiatric diagnoses (ICD)	Approximately 1 in 6 developed a psychiatric condition within 3 years; higher for amputations at or proximal to the wrist
Nedder et al. (2026)	Matched cohorts with major vs. minor upper-extremity amputation; national claims database	Coded diagnoses, antidepressant and psychotherapy claims	New mental-health diagnosis at 90 days: 18.5% (major) vs. 6.9% (minor); higher antidepressant and psychotherapy use through 1 year
Jung et al. (2023)	Adults with amputation vs. matched controls; nationwide Korean cohort (mean 4.9-year follow-up)	Coded depression diagnoses	20% higher risk of incident depression (adjusted HR 1.20); risk increased with disability severity (adjusted HR 2.13 for severe disability)

Dussik et al. (2025) tracked a national sample of more than 25,000 patients who underwent upper-extremity amputation and found that approximately one in six developed a newly coded psychiatric condition within three years. Psychiatric outcomes were worse for amputations at or proximal to the wrist than for those confined to the hand, and, with the exception of generalized anxiety disorder, incidence exceeded general-population rates (Dussik et al., 2025).

Screening instruments measure current symptom burden rather than formal diagnosis. In a multisite study of 307 people with upper-extremity limb loss, 34.5% screened positive for depression alone, 2.6% for PTSD alone, and 20.8% for both — more than half of the sample overall (Armstrong et al., 2019). Kearns et al. (2019) found that 26% of individuals who lost an upper limb through traumatic injury screened positive for PTSD symptoms. A systematic review and meta-analysis of 61 studies involving 9,852 upper- and lower-limb amputees reported a pooled depression prevalence of 33.85% (Singh et al., 2024).

Two recent database studies further delineate how diagnosis rates vary with injury severity and timing. In a national claims analysis, major upper-extremity amputation was associated with a higher risk of a new mental-health diagnosis than minor amputation in the first 90 days (18.5% vs. 6.9%), along with higher rates of antidepressant initiation at 90 days and one year and greater psychotherapy utilization at both time points (Nedder et al., 2026). In a nationwide Korean cohort of more than 21,000 adults with amputation followed for a mean of 4.9 years, individuals with amputation had a 20% higher risk of incident depression than matched controls (adjusted hazard ratio 1.20), with risk increasing with disability severity (adjusted hazard ratios of 1.46 for mild and 2.13 for severe registered disability; Jung et al., 2023).

Table 1 summarizes these key studies and distinguishes screening-based findings from coded diagnoses.

A defensible point-of-care statement is that screening studies of individuals with upper-limb loss consistently find that a substantial share report clinically significant symptoms of depression, PTSD, or both, while studies of coded psychiatric diagnoses record lower rates. Screening-based and diagnosis-based estimates answer different questions in different populations and should not be directly compared; both lines of evidence, however, support routine screening and reassessment.

Nursing Assessment and Diagnoses

Nursing assessment after upper-body disfigurement or upper-limb loss may identify NANDA-I (Herdman et al., 2024) diagnoses including disrupted body image, excessive anxiety, post-trauma responses, maladaptive coping, impaired resilience, situational inadequate self-esteem, maladaptive grieving, impaired social interaction, ineffective role performance, chronic pain, ineffective sleep pattern, and excessive caregiving burden or risk for excessive caregiving burden.

Implications for Life Care Planning

As a nurse life care planner, the awareness that psychological symptoms may emerge months to years post injury is critical to comprehensive care planning. Dussik et al. (2025) found that coded psychiatric conditions could arise post-hospitalization well into the recovery phase of upper-body injury. The Nedder et al. (2026) study further supports longitudinal monitoring, noting increased rates of antidepressant prescriptions, psychotherapy initiation, and clinically coded psychiatric diagnoses.

Jung et al. (2023) found that individuals after amputation (not specifically upper limb) had a higher risk of incident depression than a matched control group over a mean follow-up of 4.9 years. The more severe the registered disability, the greater the risk of depressive illness, supporting the possibility of a long-term psychological vulnerability.

Therefore, a life care plan should build in periodic behavioral-health reassessment and provision for clinically indicated treatment over the projected lifespan rather than funding only acute-phase mental-health care. Studies with follow-up from 90 days to three years, and cohort follow-up of nearly five years, document new and continuing mental-health needs well beyond the acute injury period. Projected behavioral-health services should therefore be treated as a recurring, phase-based consideration grounded in individualized findings and professional recommendations, not as a single up-front cost.

For clinical follow-up and life care planning, behavioral-health needs may be considered across recovery phases. Table 2 presents an illustrative planning framework for behavioral-health needs across recovery phases.

Treatment recommendations are not universal but should be individualized based on the individual's upper-body injury. The type, intensity, and duration of treatment will depend on the following factors:

- Cause of the injury
- Presence of pain
- Prior psychiatric history
- Functional limitation
- Traumatic brain injury or polytrauma
- Family and social support
- Vocational situation
- Clinical course

A psychiatrist or psychiatric nurse practitioner may contribute to an interdisciplinary life care planning process within their education, licensure, professional scope, and the purpose of the evaluation. Relevant contributions may include assessment of psychiatric history, injury-related psychiatric conditions, medication needs, psychosocial and family functioning, anticipated treatment requirements, prognosis, and treatment costs. The analysis should distinguish among recommendations directly supported by upper-limb-amputation research, those informed by analogous rehabilitation evidence, and those based on individualized clinical judgment (Missner & Cohen, 2019).

Table 2. Illustrative Planning Framework: Behavioral-Health Needs Across Recovery Phases

Time Period	Potential Behavioral-Health Needs
Acute and perioperative period	Screening for depression, anxiety, PTSD, suicidality, substance misuse, pain interference, and acute adjustment difficulty; crisis intervention or urgent psychiatric evaluation when indicated
First 1–3 years	Repeat screening, individual psychotherapy, medication management, peer support (Magasi & Papadimitriou, 2022; VA/DoD, 2022), pain-focused behavioral treatment, vocational counseling, and family or couples' intervention at major role transitions
Long-term maintenance	Periodic reassessment: treatment for delayed, persistent, or recurrent mood and trauma symptoms; medication monitoring; booster psychotherapy; and services during functional, vocational, relationship, or caregiving changes

Recommended Interventions

As previously stated, treatment should be individualized, disability-affirmative, and trauma-informed. It should address depression, anxiety, PTSD, pain-related distress, sleep disturbance, body-image concerns, avoidance, grief, and barriers to meaningful participation if and when they occur, while supporting the client's autonomy, identity, and return to meaningful participation.

The American Psychological Association (2022) recommends disability-affirmative assessment and intervention across theoretical orientations and cautions against selecting a therapeutic approach solely on the basis of disability type. The guidelines also recognize group intervention and peer-support networks as potentially useful resources (American Psychological Association, 2022).

The VA/DoD (2022) guideline identifies cognitive behavioral therapy, acceptance and commitment therapy, and mindfulness-based approaches as nonpharmacologic options for pain and psychosocial concerns in upper-limb amputation rehabilitation. It also identifies family and caregiver support, changes in support systems, vocational issues, leisure participation, psychosocial stressors, and peer support as domains requiring continuing assessment (VA/DoD, 2022).

Srivastava and Chaudhury (2014) conducted a randomized study of people with post-traumatic upper- and/or lower-limb amputation using a brief structured psychotherapy module targeting depression, anxiety, body image, and trauma-related symptoms. The module was associated with improved psychological outcomes relative to usual care (Srivastava & Chaudhury, 2014).

Based on the patient's presentation, preferences, and clinical needs, individualized care services may include the following:

- Cognitive behavioral therapy for depression, anxiety, avoidance, insomnia, maladaptive beliefs, and pain coping.
- Acceptance and commitment therapy to support psychological flexibility and value-consistent participation despite pain, grief, self-consciousness, or uncertainty.
- Trauma-focused psychotherapy for clinically significant PTSD, intrusive memories, nightmares, avoidance, hypervigilance, or persistent injury-related fear.
- Mindfulness-based approaches for stress regulation, chronic pain, sleep disturbance, and emotional reactivity.
- Body-image-focused therapy, self-compassion interventions, and graded social exposure for appearance-related shame or avoidance.
- Psychiatric diagnostic evaluation and medication management by a psychiatrist or psychiatric nurse practitioner when symptoms warrant pharmacotherapy, diagnostic clarification, or specialized treatment planning.

Family, Couples, and Caregiver Considerations

Not only the injured person but also spouses, children, extended family members, and caregivers can be significantly affected during rehabilitation and over the long-term

psychological vulnerability that may follow. Uncertainty about recovery, changes in roles, financial pressure, intimacy issues, fears about the future, and strain on the relationship can occur.

Family responses can influence both physical and psychological rehabilitation prospects for the patient (Mitchell et al., 2022). Qualitative research by Ohenewa et al. (2025) has described work restrictions, financial hardship, emotional burden, fear, and caregiving stress among people with amputation and their caregivers.

An individualized family systems approach may include a course of couples, family, or caregiver-focused therapy during early community reintegration. The situation should be reassessed at significant stress points. Common stress points include return-to-work difficulty, increased pain, prosthetic milestones, increased caregiving demands, parenting transitions, changes in family roles, or recurrence of psychiatric symptoms.

No randomized trial defines the optimal dose, format, or timing of family or couples therapy specifically following upper-limb amputation, but there is indirect evidence from other chronic physical-disease populations. A systematic review and meta-analysis of 13 randomized controlled trials found that family-based interventions for adults with chronic physical diseases improved several patient outcomes, including distress, coping, self-efficacy, and social, emotional, and sexual functioning (Sousa et al., 2021). Separately, a multiple-family group treatment program developed for people with brain or spinal cord injury and their caregivers reported improvements in survivor depressive symptoms and anger and reductions in caregiver burden (Rodgers et al., 2007). However, these findings should not be interpreted as establishing an upper-limb-amputation-specific family-treatment protocol.

Clients who are single or unpartnered, geographically distant from family, or otherwise without strong natural supports also warrant explicit attention in the life care plan. Lacking a spouse or involved family does not by itself mean a client needs more psychotherapy, and being single should not be treated as a deficit. It does mean the planner should assess the adequacy of the client's existing support network and consider structured supports such as peer-support programs and community integration services (Magasi & Papadimitriou, 2022), group intervention formats (American Psychological Association, 2022), vocational rehabilitation networks, and case management to coordinate services across the recovery trajectory.

Conclusion

For life care planners, the primary focus tends to be related to the physical fallout post catastrophic illness or injury. However, upper-body disfigurement and upper-limb loss can produce a substantial, visible, and evolving psychological burden. Depression, PTSD, anxiety, body-image distress, chronic pain-related emotional burden, stigma, vocational disruption, relationship strain, and caregiver stress may coexist and may become evident at different stages of recovery.

The ideal response is proactive, multidisciplinary, and individualized. Routine screening, access to evidence-based psychotherapy and psychiatric care when indicated, peer support, family involvement, vocational rehabilitation, pain management, and repeated reassessment may address both acute and delayed needs. Care does not treat disability as a personal failure or pathology, but as a long-term plan to establish a return to normalcy as much as possible. The life care plan should include treatment for the emotional, social, and practical effects of serious injury and support recovery of autonomy, identity, connection, and meaningful participation in life.

Use of Artificial Intelligence

Generative artificial intelligence tools were used to assist with preliminary organization, language refinement, and locating references for this manuscript. These tools included Perplexity, developed by Perplexity AI, and OpenEvidence, developed by OpenEvidence. Both tools were used between July and October 2026. Model or version information was not publicly available or was not disclosed by the respective manufacturers at the time of use.

The author independently reviewed and substantively revised the final manuscript. The author verified all factual statements, numerical estimates, citations, and bibliographic information against the original primary source materials. OpenEvidence was used as an aid in locating, organizing, and cross-checking those source materials. Artificial intelligence is not listed as an author. The author accepts full responsibility for the manuscript's accuracy, content, clinical interpretations, and conclusions.

REFERENCES

American Psychiatric Association. (2022). Diagnostic and statistical manual of mental disorders (5th ed., text rev.). https://doi.org/10.1176/appi.books.9780890425787

American Psychological Association. (2022). Guidelines for assessment and intervention with persons with disabilities. https://www.apa.org/about/policy/guidelines-assessment-intervention-disabilities.pdf

Armstrong, T. W., Williamson, M. L. C., Elliott, T. R., Jackson, W. T., Kearns, N. T., & Ryan, T. (2019). Psychological distress among persons with upper extremity limb loss. British Journal of Health Psychology, 24(4), 746–763. https://doi.org/10.1111/bjhp.12360

Department of Veterans Affairs & Department of Defense. (2022). VA/DoD clinical practice guideline for the management of upper limb amputation rehabilitation (Version 2.0). https://www.healthquality.va.gov/guidelines/Rehab/ULA/

Dussik, C. M., Phan, A., Coombs, J., Chang-Sing, E., Park, A. J.-M., & Wilbur, D. (2025). Postoperative psychiatric outcomes after upper-extremity amputations. Journal of Hand Surgery, 50(6), 703–710. https://doi.org/10.1016/j.jhsa.2025.03.008

Herdman, T. H., Kamitsuru, S., & Lopes, C. T. (Eds.). (2024). NANDA International nursing diagnoses: Definitions and classification, 2024–2026 (13th ed.). Thieme Medical Publishers.

Jung, W., Kim, M., Jeon, H. J., Chang, W. H., Yoo, J. E., Han, K., & Shin, D. W. (2023). Assessment of disability and depression following amputation among adults in Korea. JAMA Network Open, 6(6), e2320873. https://doi.org/10.1001/jamanetworkopen.2023.20873

Kearns, N. T., Powers, M. B., Jackson, W. T., Elliott, T. R., & Ryan, T. (2019). Posttraumatic stress disorder symptom clusters and substance use among patients with upper limb amputations due to traumatic injury. Disability and Rehabilitation, 41(26), 3157–3164. https://doi.org/10.1080/09638288.2018.1485180

Magasi, S., & Papadimitriou, C. (2022). Peer support interventions in physical medicine and rehabilitation: A framework to advance the field. Archives of Physical Medicine and Rehabilitation, 103(7 Suppl), S222–S229. https://doi.org/10.1016/j.apmr.2020.09.400

Missner, S. C., & Cohen, Z. E. (2019). The impact of the psychiatrist on the life care plan. Journal of the American Academy of Psychiatry and the Law, 47(2), 208–216. https://doi.org/10.29158/JAAPL.003837-19

Mitchell, S., Andrews, L., & Engward, H. (2022). Examining the effects of acquired limb loss on the family network: A grounded theory study. Disability and Rehabilitation, 44(5), 745–753. https://doi.org/10.1080/09638288.2020.1780480

Nedder, V., Wang, J., & Peek, K. (2026). Analysis of mental health outcomes in major versus minor upper extremity amputations: A retrospective national database study. Archives of Orthopaedic and Trauma Surgery, 146(1), 158. https://doi.org/10.1007/s00402-026-06319-y

Ohenewa, E., Yendork, J. S., Amponsah, B., & Owusu-Ansah, F. E. (2025). "After cutting it, things have never remained the same": A qualitative study of the perspectives of amputees and their caregivers. Health Expectations, 28(1), e70148. https://doi.org/10.1111/hex.70148

Rodgers, M. L., Strode, A. D., Norell, D. M., Short, R. A., Dyck, D. G., & Becker, B. (2007). Adapting multiple-family group treatment for brain and spinal cord injury: Intervention development and preliminary outcomes. American Journal of Physical Medicine & Rehabilitation, 86(6), 482–492. https://doi.org/10.1097/PHM.0b013e31805c00a1

Singh, S., Saini, R., Mathur, R., Sarkar, S., & Sagar, R. (2024). The prevalence of depression in people following limb amputation: A systematic review and meta-analysis. Journal of Psychosomatic Research, 181, 111677. https://doi.org/10.1016/j.jpsychores.2024.111677

Sousa, H., Ribeiro, O., Afreixo, V., Costa, E., Paúl, C., Ribeiro, F., et al. (2021). "Should we stand together?" A systematic review and meta-analysis of the effectiveness of family-based interventions for adults with chronic physical diseases. Family Process, 60(4), 1098–1116. https://doi.org/10.1111/famp.12707

Srivastava, K., & Chaudhury, S. (2014). Rehabilitation after amputation: Psychotherapeutic intervention module in Indian scenario. The Scientific World Journal, 2014, Article 469385. https://doi.org/10.1155/2014/469385

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LEGAL NURSE VOICE:
Insights from a Legal Nurse Consultant

PARSONAGE-TURNER SYNDROME

By: Pamela L. Borello, BSN, BS, RN, CNOR, CSSM(e), CNAMB

Keywords: Parsonage-Turner Syndrome (PTS), Neuralgic amyotrophy (NA), Hereditary neuralgic amyotrophy (HNA)

NURSING DIAGNOSES TO CONSIDER
NANDA-I 2024-2026

1. Impaired physical mobility 2. Acute pain 3. Impaired tissue integrity or risk for peripheral neurovascular dysfunction 4. Self-care deficit (bathing, dressing, feeding, and/or toileting).

While injuries to major nerves like the radial, ulnar, or median nerves are common, Parsonage-Turner Syndrome (PTS) (Neuralgic Amyotrophy) is an unusual and often misdiagnosed upper extremity nerve condition. Unlike typical traumatic nerve injuries (like tears or crush injuries), PTS is an idiopathic brachial plexus neuropathy—an abrupt, autoimmune-driven inflammation of the nerve network controlling the shoulder and arm. PTS frequently presents following triggers such as viral infections, surgery, trauma, or vaccinations. In some cases, healthcare providers can't determine a triggering event. In rare cases, PTS happens due to a genetic condition called hereditary neuralgic amyotrophy (Carmenate, et al., 2025).

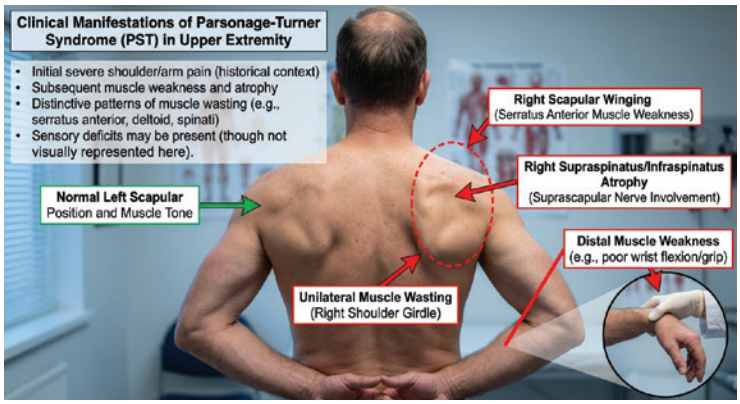

Figure 1.
Disclaimer: AI was used to generate the image.

PTS is characterized by the sudden onset of severe, unrelenting shoulder and upper extremity pain followed by localized muscle weakness and rapid atrophy. For legal nurse consultants (LNCs) and life care planners, PTS presents unique challenges in causation analysis, disability evaluation, and long-term cost projections.

The following are the key features of PTS:

- Sudden, Severe Pain: It starts out of nowhere with excruciating, sharp, or burning pain deep in the shoulder or upper arm, often waking people up at night.
- Rapid Muscle Weakness: As the initial severe pain fades, severe localized muscle weakness and rapid atrophy set in.
- Unpredictable Target Nerves: It frequently singles out specific peripheral branches like the long thoracic nerve (causing scapular winging) or the anterior interosseous nerve (causing an inability to make an "OK" sign with the thumb and index finger).

The classic presentation of PTS occurs in two distinct phases:

1. Acute Algic Phase: Patients experience intense, sharp, or burning pain deep within the shoulder girdle or arm. This pain typically peaks within hours and can persist for days to several weeks.
2. Paralytic and Atrophic Phase: As the severe pain abates, marked motor weakness and rapid muscle atrophy set in. The suprascapular, long thoracic, and axillary nerves are commonly involved, often leading to scapular winging or impaired arm abduction.

Diagnosis relies primarily on clinical history, electrodiagnostic studies showing denervation changes, and high-resolution nerve MRI demonstrating plexus hyperintensity or fascicular constrictions (Carmenate et al., 2025). Post-vaccination PTS is very rare. PTS onset occurs within 28 days after vaccination in an estimated 4.3%–15.5% of cases (Queler et al., 2022).

Considerations for Legal Nurse Consultants

When reviewing medical records in personal injury, medical malpractice, or vaccine injury compensation program claims, LNCs must evaluate key clinical elements:

- Causation and Timeline Analysis: LNCs must establish a precise timeline relative to the antecedent trigger (e.g., surgical positioning, regional anesthesia, or vaccination). PTS typically manifests within days to a few weeks post-trigger.
- Differential Diagnosis Verification: PTS is frequently misdiagnosed as cervical radiculopathy, rotator cuff tear, or subacromial bursitis. LNCs should verify whether appropriate imaging (cervical MRI) and electrodiagnostic testing were performed to rule out structural compressions before attributing deficits to PTS.
- Mitigation and Standard of Care: Screen medical records for early administration of oral corticosteroids, which may attenuate acute nerve inflammation if introduced early, and timely referral to PT to prevent secondary joint contractures (Kraner, 2021).

Considerations for Life Care Planners

While PTS was historically viewed as a self-limiting condition, up to 70% of patients suffer persistent chronic pain, fatigue, and residual motor deficits years after onset. Life care plans for affected individuals must account for several long-term products and services:

- Therapies: Physical therapy, occupational therapy, hand therapy
- Medical Care: Physiatry, neurology, multidisciplinary pain management
- Assistive Technology: Custom dynamic orthoses (e.g., shoulder slings, scapular braces)
- Household Support: Assistance with heavy lifting, repetitive overhead tasks, home maintenance

Cost Factors & Considerations: Maintenance visits to preserve ROM and compensate for motor loss. Periodic evaluations, diagnostic reassessments, interventional pain procedures. Orthotic replacements every 1 to 3 years. Household support varies depending on dominant hand involvement and residual upper-limb capacity. The life care planner uses a consistent, valid, and reliable approach to determining the evaluee's needs and costs. (Preston, 2025).

Prognosis

The prognosis for PTS can vary. Some people only experience one episode of PTS and fully recover their strength in the affected areas. Other people have persistent weakness and pain. Some people develop recurring PTS.

REFERENCES

Carmenate, G., Mittal, R., Gebhard, R. E., et al. (October 06, 2025) Parsonage-Turner Syndrome: An Unusual Cause of Postoperative Complications. *Cureus*, 17(10): e93931. DOI 10.7759/cureus.93931. Retrieved on 18 September 2026.

Kraner, I. (2021, February 22). *Legal Nursing Consultant: 5 Reasons Why They Are Your Best Secret Weapon*. Expert Institute. https://www.expertinstitute.com/resources/insights/legal-nurse-consultant-5-reasons-best-secret-weapon/#1. Retrieved on 17 September 2026.

Mitry, M. A. , Collins, L. K., Kazam, J. J., Kaicker, S., and Kovanlikay, A. (April 2021). Parsonage-Turner Syndrome Associated With SARS-CoV2 (COVID-19) Infection. *Clinical Imaging*, 72. , 8-10. https://doi.org/10.1016/j.clinimag.2020.11.017

Preston, K. (2025). Practitioner's Toolkit: Applying Practice Standards in Life Care Plans. *Journal of Life Care Planning*, 23(1), 32–38. https://doi.org/10.70385/001c.128039. Retrieved on 18 September 2026.

Queler, S. C., Towbin, A. J., Milani, C., Whang, J., Sneag, D. B. (2022). "Parsonage-Turner Syndrome Following COVID-19 Vaccination: MR Neurography," *Radiology*, 302(1):84-87. https://doi.org/10.1148/radiol.2021211374.

New Surgical Advancements in Reconstructive Surgery for Spastic Paralysis

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Cameron Santoro is a contributing editor.



Keywords: Surgical Treatment Spasticity, Stroke, Spasticity

NURSING DIAGNOSES TO CONSIDER
NANDA-I 2024-2026

1. Impaired Physical Mobility 2. Decreased Self-Care Ability
3. Disrupted Body Image

Spastic paralysis is one of the most common and debilitating consequences of injury to the brain or spinal cord. It affects a remarkably diverse group of patients. Survivors of stroke, the single largest population, frequently develop spasticity in the weeks and months following their event (Bandela et al., 2026). Whether from hemorrhage, anoxia, infection, or tumor, patients who suffer traumatic brain injury (TBI) or acquired brain injury (ABI) are similarly at risk (Emamhadi et al., 2023). Individuals with spinal cord injuries often develop severe and disabling spasticity below the level of their injury (Aslami et al., 2025). Children and adults with cerebral palsy live with spasticity as a lifelong challenge that shapes nearly every aspect of their daily function (Bekteshi et al., 2023). All of these conditions involve damage to a critical component of the nervous system and the upper motor neurons, and understanding the consequences of that damage is essential to understanding spastic paralysis.

Understanding the Nervous System: Upper and Lower Motor Neurons

The body's voluntary movement system works through a two-neuron chain. The first neuron in the motor chain is the upper motor neuron, which is located in the brain. It sends its axon down the spinal cord, where it relays motor commands to lower motor neurons. It acts like a command center, sending instructions for movement downward. The final link in the motor pathway is the lower motor neuron, which receives input from the upper motor neuron in the spinal cord and transmits signals to the muscle, initiating contraction. When a lower motor neuron is damaged (as in polio or a peripheral nerve injury), the muscle goes limp and floppy because it has lost its direct connection to the nervous system. However, when an upper motor neuron is damaged (as in stroke, traumatic brain injury [TBI], or spinal cord injury] the effects are far more complex than simple muscle weakness (Trompetto et al., 2014).

How Upper Motor Neuron Injury Leads to Spasticity

Under normal conditions, upper motor neurons do far more than signal muscles to move. They also deliver essential inhibitory signals to the spinal cord, preventing reflexes from becoming overactive (Bandela et al., 2026; Trompetto et al., 2014). One of the most important reflexes they regulate is the stretch reflex. When a muscle is stretched, specialized sensors inside the muscle called muscle spindles detect that stretch and send a signal through sensory nerves back to the spinal cord. The spinal cord then reflexively sends a signal back to the muscle telling it to contract; this is known as the familiar "knee-jerk" response (Figure 1). In a healthy nervous system, the brain constantly modulates this reflex, keeping it from firing too aggressively (Howard and Patel, 2023; Trompetto et al., 2014).

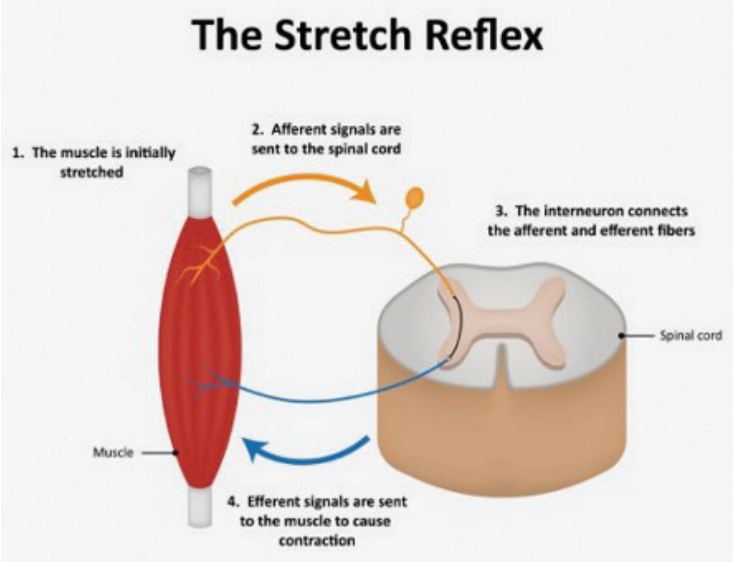

Figure 1.

The stretch reflex occurs when muscle stretch triggers a sensory signal to the spinal cord, which reflexively sends a signal back to the muscle to contract, producing the familiar "knee-jerk" response. In spastic paralysis, this reflex pathway becomes exaggerated, contributing to increased muscle tone and involuntary contractions. Illustration by joshya. (n.d.). The stretch reflex [Vector illustration]. Shutterstock. shutterstock.com

When upper motor neurons are damaged, those inhibitory signals are lost. Without the normal inhibitory control of the upper motor neurons, the stretch reflex becomes hyperexcitable, amplifying ordinary muscle stretch into exaggerated reflex contractions (Bandela et al., 2026). Even a small stretch or movement of a muscle can trigger an exaggerated, involuntary contraction. Clinically, this hyperexcitability manifests as spasticity, characterized by increased muscle tone, exaggerated resistance to movement, and involuntary posturing that can pull limbs into persistent flexed or extended positions. A hallmark of spasticity is velocity-dependent hypertonicity (Howard & Patel, 2023; Bandela et al., 2026). The faster a clinician attempts to move a spastic limb, the more resistance they encounter.

From Spasticity to Contracture

Left untreated, spasticity initiates a progressive cycle of musculoskeletal impairment (Bandela et al., 2026). Chronic muscle overactivity pulls the affected limb into abnormal positions, such as an elbow tightly flexed against the chest, a wrist and fingers clenched into a fist, or an ankle persistently pointed downward. Over weeks and months, the muscles and tendons that are held in this shortened position begin to undergo structural changes. As spasticity persists, the affected muscles gradually shorten and stiffen. Collagen and fibrotic tissue accumulate throughout the muscle and joint capsule, and the tissues lose their normal elasticity. Eventually, the joint becomes rigidly fixed in its abnormal position, resulting in a contracture that can severely limit function and be exceedingly difficult to reverse (Bandela et al., 2026). By this stage, even if the spasticity were somehow eliminated, the limb could not restore normal joint position because the soft tissues have become permanently shortened. Contractures cause pain, interfere with hygiene, prevent functional use of the limb, and make caregiving extraordinarily difficult. Preventing and treating contractures should be one of the central goals of spasticity management.

Established Non-Operative Treatments

Before discussing surgical advancements, it is important to understand the traditional non-operative treatments that form the foundation of spasticity management.

Botulinum toxin (onabotulinumtoxinA, commonly known as Botox) is the most extensively studied focal treatment for spasticity (Noritz et al., 2022; Bandela et al., 2026). It works by blocking the release of acetylcholine at the neuromuscular junction, essentially weakening the overactive muscle. It is injected directly into the spastic muscle and typically takes effect within days. However, its effects are temporary, typically lasting only three to four months, requiring patients to undergo repeated injections for ongoing symptom control. Dosing limitations and insurance restrictions can also limit its usefulness, particularly when multiple muscle groups are involved (Verduzco-Gutierrez et al., 2024).

Phenol and alcohol nerve blocks offer an alternative form of chemical denervation (Verduzco-Gutierrez et al., 2024). Phenol (typically at 3–6% concentration) or ethyl alcohol is injected near the motor nerve supplying a spastic muscle, causing destruction of the nerve fibers and reducing the spastic signal. The effects can persist for three to nine months, often outlasting botulinum toxin, making these agents particularly valuable for treating larger, more proximal muscle groups (Verduzco-Gutierrez et al., 2024). The primary

risk is dysesthesia, an abnormal and often painful sensation that can occur if a nearby sensory nerve is inadvertently affected during treatment.

Cryoablation is a newer neuroablative technique that uses extreme cold to disrupt nerve function and temporarily shut down the pathological signals driving spasticity (Muradia and Prasad, 2026). Similar to phenol, its effects gradually wear off, but meaningful improvements can persist for several months.

Physical therapy, stretching, splinting, and serial casting remain cornerstones of spasticity management (Noritz et al., 2022). Regular stretching helps maintain muscle length and prevent contracture formation. Splints and orthoses hold joints in functional positions and provide sustained stretch. Serial casting, where a limb is progressively cast into improved positions over several weeks, can be particularly effective when combined with botulinum toxin injections (Noritz et al., 2022; Xu et al., 2025). Oral medications, like baclofen and benzodiazepines, are used for generalized spasticity, though their use is often limited by sedation and other side effects (Noritz et al., 2022).

While these interventions remain essential components of spasticity management, they are ultimately limited. Patients with permanent neurological injuries undergo a lifetime of recurrent procedures simply to maintain function and control symptoms. Surgical innovation represents a paradigm shift, moving beyond temporary management toward more durable solutions.

Cutting-Edge Surgical Solutions: Hyperselective Neurectomy

Among the most exciting recent developments in the surgical treatment of spastic paralysis is the hyperselective neurectomy (HSN). This technique represents a true advancement in how surgeons can address the root cause of spasticity at the peripheral nerve level, offering durable results where temporary treatments fall short (Bajaj et al., 2026; Mahan et al., 2021; Leclercq et al., 2021).

The concept behind HSN is both elegant and precise. Instead of temporarily blocking signal transmission at the neuromuscular junction (as with Botox) or disrupting an entire nerve trunk (as with phenol neurolysis), HSN targets the terminal motor nerve branches at the exact point where they enter the spastic muscle (Leclercq et al., 2021; Emamhadi et al., 2023). Using meticulous microsurgical techniques, the surgeon identifies the individual motor rami, the small nerve branches responsible for delivering the abnormal signals that drive muscle overactivity. A schematic of this dissection and selective resection of terminal nerve branches is illustrated in Figure 2.

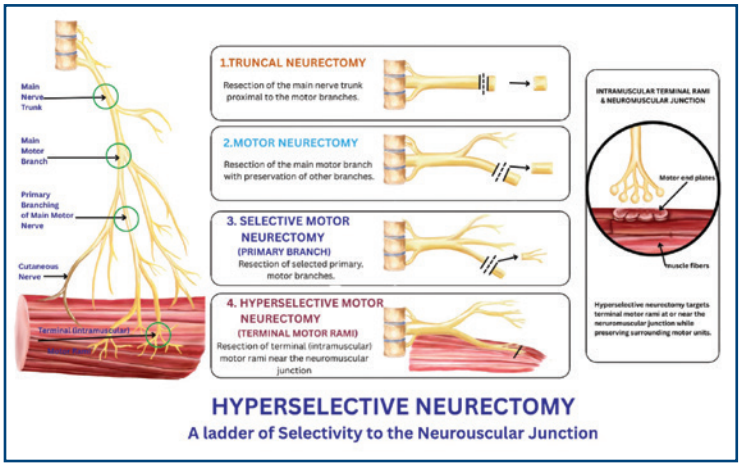

Figure 2.

Schematic illustration of hyperselective neurectomy demonstrating microsurgical identification and selective resection of terminal motor nerve branches responsible for transmitting abnormal signals that drive muscle overactivity. By reducing pathologic neural input while preserving overall muscle function, this procedure aims to decrease spasticity and improve voluntary movement. Illustration by Jeannine Sico, RN, Medical Illustrator, Research Department, Advanced Reconstructive Surgery Alliance.

Figure 3 shows an intraoperative surgical photograph of the musculocutaneous nerve as it inserts into the biceps muscle, with all of its nerve branches and terminal rami meticulously dissected out, demonstrating the real-world anatomy encountered during this procedure. Approximately three-quarters of these branches are carefully excised, while the remaining quarter is preserved (Emamhadi et al., 2023). This selective removal reduces the excessive nerve input that drives the overactive stretch reflex, while preserving enough innervation to maintain useful voluntary muscle strength (Leclercq et al., 2021).

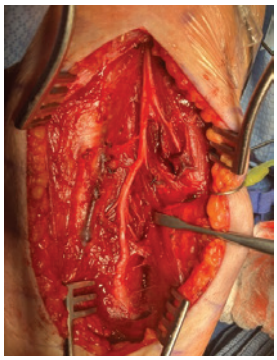

Figure 3.

Intraoperative photograph demonstrating the musculocutaneous nerve at its insertion into the biceps muscle, with its motor branches and terminal rami meticulously dissected to expose the detailed anatomy encountered during hyperselective neurectomy. This dissection facilitates identification of target nerve branches for selective denervation while preserving overall muscle function. Photo credit by The Institute for Advanced Reconstruction.

The evolution of HSN into a highly effective surgical treatment for upper extremity spasticity has been driven in large part by the groundbreaking work of Caroline Leclercq and colleagues in Paris (Leclercq et al., 2021). In a prospective study of 42 patients, Leclercq demonstrated that HSN could achieve meaningful and sustained reductions in spasticity involving elbow flexion, forearm pronation, and wrist flexion, all while preserving muscle strength. Remarkably, these benefits persisted at an average follow-up of 31 months, underscoring the durability of the intervention (Leclercq et al., 2021). Building on these foundational contributions, Peter Rhee has further advanced the application of these techniques in clinical practice, contributing to the growing body of surgical expertise in this field.

A landmark randomized controlled trial published in 2026 compared HSN to best medical therapy in patients with post-stroke spasticity (Bajaj et al., 2026). The surgical group demonstrated a significantly greater reduction in spasticity at 12 months, with 96% of surgical patients achieving a clinically meaningful improvement compared to only 8% in the medical therapy group (Bajaj et al., 2026). Functional independence improved within the surgical group, and complications were limited to transient neuropathic pain in a small number of patients that resolved within two to three months (Bajaj et al., 2026). A North American series of 88 procedures reported a 91% patient satisfaction rate, with mean spasticity scores dropping from severe to mild following surgery (Mahan et al., 2021).

Combining HSN with Tendon and Muscle Lengthening

For patients with chronic spasticity and established contractures, HSN alone is often insufficient because the muscles, tendons, and surrounding connective tissues have become structurally shortened and fibrotic. In these cases, HSN can be powerfully combined with lengthening of the contracted tendons and muscles (Tranchida & Van Heest, 2019; Leclercq & Mertens, 2024). HSN targets the neural component of spasticity by reducing pathological motor nerve activity, whereas tendon or muscle lengthening addresses the secondary musculoskeletal changes that result from prolonged muscle overactivity and tissue shortening. This combined approach allows surgeons to both reduce the abnormal tone and restore range of motion in a single operative session, giving patients the best chance at a meaningful improvement in limb position and function (Tranchida & Van Heest, 2019; Leclercq & Mertens, 2024).

Tendon Transfers and Joint Fusions

Beyond spasticity reduction and contracture correction, tendon transfers and joint fusions, also known as arthrodesis, remain highly effective surgical options for patients with spastic paralysis, particularly in the hand and upper extremity (Tranchida & Van Heest, 2019; Howard & Patel, 2023). In a tendon transfer procedure, a functioning tendon is detached from its original insertion and repositioned to a new attachment site, allowing it to assume a different mechanical role. For instance, a wrist flexor tendon can be transferred to the finger extensors, allowing a patient who cannot open their hand to regain active finger extension. Joint fusions permanently stabilize a joint in a functional position, such as fusing the thumb in a position of opposition so that the patient can grasp objects (Tranchida & Van Heest, 2019; Howard & Patel, 2023).

In appropriate candidates, these procedures can reestablish active motor function. In cases where active function remains unattainable, tendon transfers and fusions can optimize limb positioning by maintaining the hand and fingers in a more functional and anatomically favorable posture (Tranchida & Van Heest, 2019). This goal may appear modest, but its impact on social functioning can be profound. A hand that rests in a natural, open position rather than a tightly clenched fist often changes how others perceive and engage with the patient. It can reduce the visible manifestations of disability, enhance self-confidence, and help patients navigate daily life with greater comfort, confidence, and dignity. For many patients and families, this improvement in social functioning is as meaningful as any measurable change on a clinical scale.

Functional Versus Nonfunctional Patients: Tailoring the Surgical Approach

An important distinction in surgical planning is whether a patient is classified as functional or nonfunctional. Functional patients are those who have some voluntary motor control and the potential to use their limb for purposeful activities with appropriate surgical intervention. For these patients, HSN, tendon transfers, and tendon lengthening procedures offer a highly effective treatment strategy that reduces spasticity, restores range of motion, and may improve meaningful functional use of the affected limb (Leclercq et al., 2021; Tranchida & Van Heest, 2019).

Nonfunctional patients represent a distinct and often more severely affected population. Many have profound, generalized spasticity, are confined to a wheelchair or bed, and have developed extensive contractures that limit mobility and daily care. For these patients, the primary goal of surgery is not to restore function but to reduce the physical consequences of chronic spasticity, improve hygiene and comfort, facilitate caregiving, and enhance overall quality of life for both the patient and those who care for them (Koman et al., 2004). Straight tenotomy can be highly effective in patients with fixed contractures, releasing the shortened musculotendinous unit and restoring a more functional and manageable limb position. Tenotomies can improve limb positioning by opening tightly contracted armpits, releasing elbows locked in flexion, and restoring a more natural posture to fingers that have been tightly clenched into the

palm for prolonged periods. For caregivers who struggle daily to clean, dress, and care for these patients, such releases can be transformative (Koman et al., 2004).

Selective Dorsal Rhizotomy Versus Hyperselective Neurectomy

Selective dorsal rhizotomy (SDR) is another well-established nerve-targeted surgery for spasticity, most commonly used in children with cerebral palsy (Ran et al., 2024; Howard & Patel, 2023; Sitthinamsuwa et al., 2017). In SDR, the surgeon accesses the spinal cord through the back and selectively cuts sensory nerve rootlets that are contributing to the overactive stretch reflex. While SDR can effectively reduce widespread spasticity in the lower extremities, it is a significantly more invasive procedure that requires a laminectomy, carries risks such as sensory deficits and temporary weakness, and does not offer the muscle-specific precision achievable with HSN (Ran et al., 2024; Politikou and Aszmann, 2026; Sitthinamsuwa et al., 2017). HSN, by contrast, is performed in the periphery at the level of the individual muscle, requires no spinal surgery, provides highly targeted tone reduction to specific muscles, and preserves voluntary strength (Leclercq et al., 2021; Politikou and Aszmann, 2026). For these reasons, HSN is increasingly favored as a more precise and less invasive alternative, particularly for focal upper and lower extremity spasticity (Politikou and Aszmann, 2026).

Vagus Nerve Stimulation: A Promising Adjunct

An exciting complementary technology is vagus nerve stimulation (VNS), available as an implantable device marketed as Vivistim (Abdullahi et al., 2023; Schambra & Hays, 2024). VNS delivers electrical stimulation to the vagus nerve, which has been shown to enhance neuroplasticity and motor recovery when paired with rehabilitation exercises (Schambra & Hays, 2024). A pivotal Phase III trial (VNS-REHAB) demonstrated that implanted VNS combined with rehabilitation led to significantly greater improvements in upper limb motor function in stroke patients compared to rehabilitation alone (Emerick et al., 2026). VNS can serve as a valuable adjunct to surgical and rehabilitative treatments, helping patients relax their musculature and engage more effectively with their therapy programs (Abdullahi et al., 2023; Fu et al., 2026). However, a crucial caveat for life planners is that Vivistim is not a treatment for the late consequences of chronic spasticity. Its greatest potential lies in early intervention, before contractures, fibrosis, and fixed joint deformities become established. Once these structural changes develop, the opportunity to achieve maximal benefit may be substantially reduced (Abdullahi et al., 2023; Schambra & Hays, 2024).

Surgical Intervention in Life Care Planning

Surgical reconstruction is becoming increasingly available to patients with upper motor neuron injuries, including stroke, spinal cord injury, and TBI. When developing a life care plan, all appropriate treatment options should be considered, including the potential for future surgical intervention when indicated by ongoing clinical assessments. The need for surgery may evolve over time based on the patient's functional status, progression of symptoms, and response to conservative treatment. For appropriately selected patients, surgical reconstruction may improve function and quality of life, but the necessity and timing of intervention should be determined individually.

The potential benefit of surgical reconstruction varies according to a patient's functional status, available motor function, goals, and rehabilitation potential. Patients with greater baseline mobility and residual upper extremity function may have more reconstructive options, such as nerve or tendon transfers. However, candidacy for surgery may evolve over time and should be determined through regular clinical assessments of the patient's function, treatment response, and changing care needs.

Access to an upper extremity peripheral nerve specialist may be limited, as these reconstructive procedures are not offered by all hand and upper extremity surgeons. For this reason, a life care plan may account for the potential need for future specialty consultation and surgical intervention when indicated by ongoing assessments. Incorporating these possibilities into the plan allows treatment recommendations to evolve with the patient's condition and ensures that appropriate interventions can be considered if and when they become clinically appropriate.

REFERENCES

Bandela, S., McPherson, L., Harvey, R. L., Awosika, O., Aggarwal, D., Liu, C. Y., Raghavan, P., & Goldberg, M. P. (2026). "Early Recognition and Intervention for Poststroke Spasticity: A Scientific Statement From the American Heart Association," *Stroke*, 57(4). https://doi.org/10.1161/str.0000000000000515

Emamhadi, M., Alijani, B., Haghani Dogahe, M., & Emamhadi, A. (2023). "Hyper-selective Neurectomy for Knee Flexion Spasticity: Anatomic Bases and Surgical Technique," *Surgical and Radiologic Anatomy*, 45(2), 201–205. https://doi.org/10.1007/s00276-022-03074-8

Aslami, Z. V., Weitzner, A. S., Padovano, W., Rowley, E. K., Lowe, A., Ghergherehchi, C., Suresh, R., Sim, D. J., Zamore, Z. H., Lee, E. B., Elrick, M. J., & Tuffaha, S. H. (2025). "Evaluating Mechanisms and Surgical Alternatives to Hyperselective Neurectomy for Treatment of Spasticity in a Rat Model of Spinal Cord Injury," *Plastic & Reconstructive Surgery*, 157(5), 853–865. https://doi.org/10.1097/prs.0000000000012487

REFERENCES

Bekteshi, S., Monbaliu, E., McIntyre, S., Saloojee, G., Hilberink, S. R., Tatishvili, N., & Dan, B. (2023). "Towards Functional Improvement of Motor Disorders Associated with Cerebral Palsy," The Lancet Neurology, 22(3). https://doi.org/10.1016/S1474-4422(23)00004-2

Trompetto, C., Marinelli, L., Mori, L., Pelosin, E., Currà, A., Molfetta, L., & Abbruzzese, G. (2014). "Pathophysiology of Spasticity: Implications for Neurorehabilitation," *BioMed Research International*, 2014(354906), 1–8. https://doi.org/10.1155/2014/354906

Howard, I. M., & Patel, A. T. (2023). "Spasticity Evaluation and Management Tools," *Muscle & Nerve*, 67(4), 272–283. https://doi.org/10.1002/mus.27792

Noritz, G., Davidson, L., Steingass, K., Noritz, G., Agrawal, R., Ellerbeck, K. A., Foster, J. E. A., Fremion, E., Frierson, S., Leppert, M. O. C., Saunders, B. S., Stille, C., Vargus-Adams, J., Zuckerman, K., Davidson, L., Norwood, K., Yin, L., Kuo, D. Z., Ware, A., Wagester, T. (2022). "Providing a Primary Care Medical Home for Children and Youth With Cerebral Palsy," *Pediatrics*, 150(6). https://doi.org/10.1542/peds.2022-060055

Verduzco-Gutierrez, M., Raghavan, P., Pruente, J., Moon, D., List, C. M., Joseph Edward Hornyak, Gul, F., Deshpande, S., Biffl, S., Zainab Al Lawati, & Alfaro, A. (2024). "AAPM&R Consensus Guidance on Spasticity Assessment and Management," *PM & R*. https://doi.org/10.1002/pmrj.13211

Muradia, S., & Prasad, R. (2026). "Indications, Trends, and Outcomes of Nerve Blocks for Spasticity Management: A Systematic Review," NeuroRehabilitation, 58(2), 175–187. https://doi.org/10.1177/10538135251413672

Xu, Y., Zhuang, D., Chen, F., Ma, L., Du, H., Jin, A., He, J., Chen, W., Jin, L., Hu, Y., Gu, H., Zhu, J., & Li, X. (2025). „Nonsurgical Therapies for Spastic Cerebral Palsy: A Network Meta-Analysis," *Pediatrics*, 156(1). https://doi.org/10.1542/peds.2024-070402

Bajaj, J., Banawal, L. K., Jain, A., Khandelwal, N., Kumar, A., Patidar, J., Lemos, C. L., Dhurwe, R., Singh, M., Sinha, M., Sharma, M., Ratre, S., Parihar, V. S., Swamy, N. M., & Yadav, Y. R. (2026). "Hyperselective Peripheral Neurectomy Versus Medical Therapy for Refractory Poststroke Spasticity: A Randomized Controlled Trial," *Neurosurgery*. https://doi.org/10.1227/neu.0000000000004145

Mahan, M. A., Eli, I., Hamrick, F., Abou-Al-Shaar, H., Shingleton, R., Tucker Balun, K., & Edgley, S. R. (2021). "Highly Selective Partial Neurectomies for Spasticity: A Single-Center Experience," *Neurosurgery*, 89(5), 827–835. https://doi.org/10.1093/neuros/nyab303

Leclercq, C., Perruisseau-Carrier, A., Gras, M., Panciera, P., Fulchignoni, C., & Fulchignoni, M. (2021). Hyperselective Neurectomy for the Treatment of Upper Limb Spasticity in Adults and Children: A Prospective Study. *Journal of Hand Surgery (European Volume)*, 46(7), 708–716. https://doi.org/10.1177/17531934211027499

Tranchida, G. V., & Van Heest, A. (2019). "Preferred Options and Evidence for Upper Limb Surgery for Spasticity in Cerebral Palsy, Stroke, and Brain Injury," *Journal of Hand Surgery (European Volume)*, 45(1), 34–42. https://doi.org/10.1177/1753193419878973

Leclercq, C., & Mertens, P. (2024). "Trends and Insights Review. Nerve Procedures in the Management of Upper Limb Spasticity," *Journal of Hand Surgery (European Volume)*, 49(6), 802–811. https://doi.org/10.1177/17531934241238885

Koman, L. A., Smith, B. P., & Shilt, J. S. (2004). "Cerebral Palsy," *The Lancet*, 363(9421), 1619–1631. https://doi.org/10.1016/s0140-6736(04)16207-7

Ran, K. R., Das, O., Johnston, D. T., Vutakuri, N., Ranganathan, S., Broachwala, M., Chopra, H., Long Azad, C., Azad, T. D., Robinson, S., Belzberg, A. J., Tuffaha, S. H., & Lubelski, D. (2024). "Nerve-Targeted Surgical Treatments for Spasticity: A Narrative Review," World Neurosurgery, 187, 104–113. https://doi.org/10.1016/j.wneu.2024.04.084

Sitthinamsuwan, B., Phonwijit, L., Khampalikit, I., Nitising, A., Nunta-aree, S., & Suksompong, S. (2017). "Comparison of Efficacy between Dorsal Root Entry Zone Lesioning and Selective Dorsal Rhizotomy for Spasticity of Cerebral Origin," *Acta Neurochirurgica*, 159(12), 2421–2430. https://doi.org/10.1007/s00701-017-3322-x

Politikou, O. & Aszmann, O. C. (2026). „Current Concepts for Nerve-Based Procedures to Treat Upper Limb Spasticity,". *Physical Medicine and Rehabilitation Clinics of North America*, 37(2), 311–327. https://doi.org/10.1016/j.pmr.2026.01.010

Abdullahi, A., Thomson, W. L., & Shamay, M. (2023). "Effects and Safety of Vagus Nerve Stimulation on Upper Limb Function in Patients with Stroke: A Systematic Review and Meta-analysis," *Scientific Reports*, 13(1). https://doi.org/10.1038/s41598-023-42077-2

Schambra, H. M., & Hays, S. A. (2024). "Vagus Nerve Stimulation for Stroke Rehabilitation: Neural Substrates, Neuromodulatory Effects and Therapeutic Implications," *The Journal of Physiology*. https://doi.org/10.1113/jp285566

Emerick, T., Vorenkamp, K. E., Francio, V. T., Srinivasan, S., Singla, P., Castellanos, J., Ahadian, F. M., Chen, Z., Gianlorenco, A. L., Sarno, D., Sehgal, N., Murthy, N., & Barreveld, A. M. (2026). "American Academy of Pain Medicine Consensus Guidelines on neuromodulation Technologies and Neurocomputer Interfaces for Pain Management and Functional Recovery," *Pain Medicine*. https://doi.org/10.1093/pm/pnag076

Fu, T., Zhang, H., Ma, H., Liu, Z., Li, Y., Zhang, T., Li, N., Zhang, J., Hu, X., & Chen, Z. (2026). „Multimodal Therapeutic Efficacy Assessment of Vagus Nerve Stimulation in Stroke: Integrated Application of Imaging, Electrophysiological, and Behavioral Indicators," *Frontiers in Neurology*, 17. https://doi.org/10.3389/fneur.2026.1788506

BILATERAL AND MULTIPLE LIMB LOSS CONSIDERATIONS

FOR LIFE CARE PLANNERS

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Keywords: Multiple Limb Loss, Adaptive Equipment, Amputation

NURSING DIAGNOSES TO CONSIDER
NANDA-I 2024-2026

1 Impaired physical mobility
2 Impaired physical comfort
3 Maladaptive coping, maladaptive grieving

Abstract

Bilateral upper limb loss and multiple limb loss are uncommon but highly complex presentations that require individualized, interdisciplinary rehabilitation and long-term life care planning. This article summarizes priorities for people with acquired bilateral upper limb loss and quadrimembral involvement, with emphasis on functional independence, adaptive equipment, environmental modification, prosthetic prescription, staged prosthetic training, psychosocial support, community reintegration, outcome measurement, and documentation considerations. For life care planners, the central task is to identify the services, devices, supports, and reassessments needed across the duration of the life care plan rather than only during the initial rehabilitation episode.

Introduction

For individuals with traumatic limb loss, multiple limb involvement represents a small but clinically significant subset. An estimated 7.3% of traumatic limb loss cases involve multiple limbs, and only a minority of those include the upper limbs (Barmparas et al., 2010). Dysvascular limb loss may also progress over time and more commonly involve the lower extremities (Dillingham et al., 2005). Although bilateral and multiple limb loss involving the upper extremities is rare, its impact on independence, self-identity, family roles, work, leisure, and community participation is profound. The loss or absence of both hands or arms creates immediate dependence for tasks that are usually automatic, including eating, toileting, bathing, dressing, communicating, and environmental access. Long-term rehabilitation can, however, help many individuals regain confidence, the ability to do self-care, pursue hobbies, drive, return to work, and participate in family and community life.

The rehabilitation team must be prepared to build solutions around the individual rather than around a single device. Occupational therapists and prosthetists with upper limb expertise are central members of the team. Other members of the team may include: physical therapists, rehabilitation medicine doctors, psychologists, nurses, social workers, driving rehabilitation specialists, and lower limb prosthetists depending on the case presentation.

Life care planners must consider more than just the devices as they draft and maintain life care plans. Successful outcomes are influenced by wound healing, residual limb length and sensitivity, cognitive status, family support, motivation, funding, home environment, transportation, and access to experienced clinicians. These elements are important to document over years or decades, and the life care plan will need to be revisited periodically to ensure the client's needs continue to be met. The most effective care plans recognize that independence may be achieved through residual limb use, prosthetic use, adaptive equipment, environmental modification, caregiver training, use of feet, voice control, service animals, and community supports.

Clinical Challenges and Early Rehabilitation Priorities

Clinical challenges can be broken down into two categories: immediate priorities that must be addressed early after limb loss and longer-term needs that emerge as the person returns to home, work, school, family roles, and community participation. Being able to prioritize these challenges

helps the rehabilitation team and life care planner identify which interventions are urgent, which supports should be introduced early, and which services or equipment may need to be reassessed over time.

Acute Pre-Prosthetic Intervention

The acute phase often begins with a dramatic transition from independence to dependence. Early occupational therapy should focus on restoring control over priority activities rather than waiting for definitive prosthetic fitting (Smurr, et al., 2008).

Table 1 organizes early functional goals by life area so clinicians and life care planners can connect daily activities with practical assessment considerations.

Table 1. Initial Goals for Daily Activities

Area of Life	Daily Activity	Common Considerations
Personal Activities		
Hospital Environment	Call-light access	Assess ability to summon help using residual limbs, lower limbs, mouth, voice control, switch access, or environmental positioning.
	Bed mobility and repositioning	Evaluate blanket management, pressure relief, reach, trunk control, and ability to adjust position without caregiver assistance.
Meals	Eating and drinking	Assess use of residual limbs, trunk movement, mouth, universal cuffs, adaptive utensils, cup positioning, dish stabilization, and set-up needs.
	Meal preparation	Assess simple food access, opening containers, cutting, appliance safety, counter height, adaptive cutting boards, non-slip material, and caregiver set-up.
Grooming and Hygiene	Bathing, grooming, and dressing	Assess washing, hair care, oral care, clothing fasteners, shower set-up, suction-mounted tools, dressing aids, and privacy needs.
	Toileting	Assess clothing management, hygiene, transfer safety, bidet or toilet aid use, privacy, and whether caregiver assistance can be reduced.
Communication	Mobile phone use	Assess phone access, charging, unlocking, texting, calling, emergency communication, voice control, mounts, stylus options, and hands-free devices.
	Communication with family and providers	Evaluate access to video calls, messaging, alarms, medication reminders, patient portals, and reliable back-up communication methods.
Leisure	Hobbies and recreation	Identify meaningful leisure goals early and assess whether adaptive equipment, prosthetic terminal devices, or activity-specific strategies are needed.
	Family and community participation	Assess roles involving parenting, social activities, peer support, transportation, outings, and participation outside the home.

Table 1. Initial Goals for Daily Activities (Continued)

Area of Life	Daily Activity	Common Considerations
Work Activities		
Commuting	Transportation and driving access	Assess public transportation, rides, vehicle access, driving evaluation, vehicle modification, charging or device storage, and safe community mobility.
Work Activities	Computer, phone, and task access	Assess job demands, workstation set-up, dictation, keyboard or mouse access, adaptive stylus use, documentation needs, and fatigue management.
School or vocational roles	Learning, documentation, and accommodations	Assess notetaking, testing, equipment transport, digital access, schedule demands, accommodations, and support needed for return to school or work.
Home management	Household routines and safety	Assess laundry, cleaning, door and appliance access, medication management, smart home supports, and caregiver assistance requirements.

After initial daily activity goals are identified, the rehabilitation team can use Table 2 to prioritize acute pre-prosthetic interventions that support safety, healing, mobility, and early independence.

Table 2. Acute Pre-Prosthetic Rehabilitation Priorities

Priority Area	Clinical Focus	Planning Considerations
Residual limb care	Skin protection, hygiene, edema management, scar management when appropriate, and desensitization.	Document supplies, caregiver instruction, prosthetic readiness, and need for reassessment as healing progresses.
Posture, strength, and mobility	Postural training, core strengthening, balance, safe transfers, fall recovery, and lower-extremity stretching.	Needs increase when upper limb loss is accompanied by lower limb involvement, impaired balance, or transfer limitations.
Adaptive strategies	Introduce repeatable methods for feeding, toileting, dressing, hygiene, phone access, emergency communication, and medication management.	Plan for independence when prostheses are unavailable, being repaired, or not appropriate for a specific task.

Home evaluation should begin early because environmental barriers can determine whether the person can safely carry over hospital-based gains into daily routines as outlined in Table 3.

Table 3. Home Evaluation and Environmental Barriers

Home Area	Barriers to Assess	Potential Supports
Bathroom access	Toilet access, bathing set-up, faucets, hygiene supplies, and privacy needs.	Bidet, toilet aid, shower bench, suction-mounted bathing tools, lever-style fixtures, and caregiver training.
Kitchen and nutrition	Food storage, meal access, counter height, dish stabilization, and ability to prepare simple meals.	Adaptive utensils, non-slip materials, adapted cutting boards, automatic openers, and environmental set-up.
Communication and safety	Phone access, phone charging, lighting, emergency communication, bed height, doors, and call systems.	Hands-free communication, charging mats, smart home technology, automatic locks, lighting controls, and backup access plans.

Table 4 includes considerations for long-term planning including backup strategies to preserve independence.

Table 4. Life Care Planning Supports for Independence

Planning Need	Purpose	Examples to Consider
Backup methods for essential tasks	Reduce reliance on a single prosthesis, device, or caregiver.	Alternative strategies for toileting, feeding, dressing, hygiene, phone access, emergency communication, and medication management.
Technology and environmental supports	Increase access, privacy, and independence across home routines.	Smart home technology, adaptive equipment, backup assistive devices, and service animal referral when appropriate.
Caregiver and community support	Provide safe assistance while preserving autonomy and participation.	Caregiver instruction, planned assistance, community resources, service coordination, and reassessment as roles change.

Adaptive Equipment and Environmental Modification

Adaptive equipment is most effective when selected around several factors:

- The person's goals
- Residual limb anatomy
- Prosthetic plan
- Home routines

Table 5 shares commonly used adaptive equipment that can support independence.

Table 5. Adaptive Equipment Considerations

Category	Device	Description
Eating	Universal Cuff	The universal cuff slips around the residual limb and can hold a fork or spoon. For individuals with wrist disarticulation up to transhumeral levels of amputation, this often provides independence in feeding. This can also be used to hold a stylus, writing utensil, or toothbrush.
	Swivel or angled Forks and spoons	Eating utensils that swivel can be easier to grip when used with both residual limbs and a prosthesis. They also can provide the appropriate angle to bring food to the mouth
	Rocker Knife	With both residual limbs and the prosthesis may allow easier cutting of food. Pizza cutter may be a good option as well.
	Dycem	Excellent for stabilizing plate, also helpful in food preparation
Toileting	Bidet	Bidets remove the need for toilet paper management. As there are many different styles, care should be taken to select one with buttons that are easy to operate with the residual limbs. Additional features such as an automatic lid can also be beneficial.
	Toilet aids	Various toilet aids can be purchased online to allow for use of toilet paper or wipes either between residual limbs or with the prosthesis if proper angles are still a challenge. As there are many styles, ensuring a complex button is not difficult to press is critical.
Grooming	Clamps from a hardware store	Devices such as gooseneck clamps can be used to hold personal grooming items hair dryers, razors, and toothbrushes
Bathing	Suction cups	Suction cups can be used to hold items in the shower such as shampoo brush allowing the individual to rub their head against the brush to distribute shampoo or conditioner. Can be mounted at multiple heights to distribute over body.
	Adapted long-handled sponge	The long-handled sponge may be adapted to be able to be used on the residual limb to allow independent bathing.
	Wall mounted soap dispenser	Allow push button or automatic dispenser to access shampoo, conditioner, and soap.
	Levers instead of knobs	Knobs can be more challenging to manipulate instead of levers. Modifying or changing hardware can allow increased independence.
	Towel sewn to create pockets	Allows the individual to stabilize towel with residual limbs for drying.
	Shower arms	Additional prostheses for showering can be made to increase independence.
	Shower bench or chair	When the individual also has lower limb involvement, they can use the bench or chair when in the shower. Additional sponges can be mounted to the bench to assist in washing the back and bottom.

Table 5. Adaptive Equipment Considerations (Continued)

Category	Device	Description
Dressing	Dressing tree	A system of hooks placed in strategic places on a wooden or PVC stand can be used to assist in donning the prosthesis and dressing.
	Button Hook	Utilizing the prosthesis to hold at the proper angle, button hooks can assist in buttoning shirts or pants.
	Elastic Shoelaces	Allows tie shoes to remain permanently tied and shoe to be slipped on
Communication	Mouth stick	A mouth stick that enables a person to flip switches and press buttons or keyboards
	Bluetooth Hands-free Headset	Allows individual to make and receive calls, listen to device for entertainment
	Dictation software or apps	Various options available for computer or phone to allow voice to text or various functions to be completely hands-free
	Charging mats	Induction charging options allow charging of phone and other devices to be done without needing to manage cables and plugs.
Environmental Controls	Smart Home	Multiple options from door locks to thermostat control to full home automation.
Meal Prep	Automatic jar and can openers	Push button allows easy opening
	One-handed cutting board	Allows stabilizing in the corner or with the prongs to assist in cutting and spreading.

Tools should be trialed in context so that the person learns not only how to use them, but also when they are preferable to prosthetic use or caregiver assistance. For planning purposes, equipment should be reassessed as prosthetic use, individual roles such as becoming a parent or starting a new job, and living arrangements change. Additional information on adaptive equipment can be found in the Hands Free Catalog and Hands Free Resources.

Prosthetic Prescription and Training

Prosthetic prescription for bilateral upper limb loss is best approached as an iterative process. The team should begin with the individual's highest-priority goals, anticipated environments, residual limb presentation, tolerance for device weight, funding, ability to attend therapy, and willingness to practice. When limb lengths differ, the longer residual limb is often trained as the dominant functional side. Body-powered, externally powered, passive, hybrid, and activity-specific options may all be appropriate depending on the task. Many individuals ultimately require more than one prosthetic solution, because no single device provides optimal performance for all daily activities.

The diagnostic fitting stage is especially important for this population. Small changes in prosthesis length, wrist flexion, forearm alignment, humeral rotation, terminal device selection, and socket interface may significantly affect a person's abilities (Brenner & Brenner, 2008). For example, it could shift how they feed themselves or have a shorter reach midline. The individual's feedback must guide decision-making. Whenever possible, the prosthetist and therapist should observe functional trials together so that component choices are evaluated according to real task performance rather than isolated mechanical capability.

Training Sequence

Training generally begins with the dominant or more functional side, then progresses to the opposite side, and finally to bilateral tasks. Control drills, component training, and repetitive practice remain important, particularly when each side uses different control strategies or includes

multiple components (Johnson, & Mansfield, 2014). For life care planners, therapy projections should account for initial training, later prosthetic upgrades, replacement devices, new terminal devices, change in living situation, return to work or school, parenting demands, and periodic refresher therapy.

Once bilateral activities begin, the therapist should confirm control of all components in multiple planes before progressing to activities of daily living. Pre-positioning, task planning, and reduction of inefficient compensatory movements become especially important. Training should include the following activities:

- Gross motor and fine motor tasks
- Bimanual function
- Reaching to midline
- Object stabilization
- Meal preparation and feeding
- Dressing, grooming, and toileting
- Communication and community tasks.

Independent donning and doffing should be addressed because dependence on another person to apply prostheses can limit a person's abilities. Individuals may need hooks, a chair, a dressing tree, lanyards, or other set-up modifications to manage body-powered or myoelectric systems. These supports should be included in projected equipment and therapy needs when they are necessary for daily prosthetic use.

A critical planning issue is the need for multiple prosthetic options. Because there is no sound limb available to compensate for planned maintenance or unplanned issues, the plan may need to include backup prostheses, replacement schedules, service and repair, batteries and chargers, socket/interface revisions, consumables, and activity-specific terminal devices. Regular activities, like driving and leisure, may require different components than basic self-care.

Participation, Identity, and Community Reintegration

Life care planning should account for the fact that therapy needs to extend beyond basic self-care. Environmental modifications may include lever handles, accessible faucets, automatic door locks, smart lighting, voice-activated controls, bidets, modified bathing systems, and clothing or fastener adaptations. These are not conveniences; they may be essential to reducing the need for a caregiver, while supporting privacy and maintaining safe independent living.

Community Reintegration

Community reintegration is critical and should be addressed through practical trials, such as shopping, paying for items, dining out, handling doors, using public restrooms, managing fuel or other transportation requirements, carrying items, medication access, phone use, and emergency communication. Driving evaluation and vehicle modification may be a major long-term cost category. Life care plans should also consider the following:

- Vocational evaluation
- School accommodations
- Home management supports
- Adaptive recreation
- Re-engagement in therapy.

Peer Support and Psychosocial Care

Peer support and psychosocial care should be integrated into the life care plan because bilateral or multiple limb loss can affect identity, roles, and long-term independence. Table 6 outlines some considerations in this area.

Table 6. Psychosocial Considerations

Psychosocial Domain	Potential Impact	Life Care Planning Considerations
Identity and adjustment	Body image, self-identity, grief, trauma symptoms, depression, anxiety, and changes in independence.	Include counseling or psychological services when needed and plan for reassessment during major life transitions.
Family, parenting, and relationships	Changes in family roles, parenting responsibilities, relationships, and caregiver dependence.	Document family education, caregiver training, and role-specific adaptive strategies.
Peer support and social confidence	Peer contact can support motivation, problem-solving, social participation, and confidence after limb loss.	Include access to peer mentors, community programs, support groups, and recurring psychosocial support as needs evolve.

Outcome Measures

Outcome measurement should combine patient-reported priorities with performance-based assessment. In bilateral and multiple limb loss, standardized tools may not fully capture the complexity of real-life function. The following clients are more likely to need additional considerations:

- Congenital limb difference
- People many years post-amputation
- Individuals who have developed highly individualized compensatory methods.

For this reason, clinicians should select measures that align with the person's goals, prosthetic control needs, psychosocial adjustment, and participation demands, and should repeat the same measures over time to document meaningful change.

Subjective Measures

The Patient-Specific Functional Scale is especially useful when goals are highly individualized. The patient identifies personally meaningful activities and rates performance over time, making it well suited for tracking progress when standard tools do not reflect the person's priorities. The Disabilities of the Arm, Shoulder, and Hand questionnaire (https://dash.iwh.on.ca/dash) may be useful in more acute rehabilitation, but it may be less sensitive for congenital users or individuals who are far removed from amputation and have already established compensatory routines. The Trinity Amputation and Prosthesis Experience Scales-Revised can add valuable psychosocial information, including the person's experience of prosthesis use and adjustment.

Objective Measures

Performance-based measures help demonstrate skill acquisition, prosthetic control, efficiency, and task completion (Hill, et al., 2009).

- The Assessment of Capacity for Myoelectric Control (https://www.oru.se/english/schools/health-sciences/research/acmc/) is particularly helpful for documenting progression in myoelectric prosthesis control during functional activity.
- The Jebsen-Taylor Test of Hand Function has been used in upper limb prosthetic studies.
- The Box and Block Test can show progress in gross manual dexterity, but results should be interpreted cautiously because scores in this population should not be compared directly with standard norms.
- The Activities Measure for Upper Limb Amputees and the Brief Activity Measure for Upper Limb Amputees are prosthesis-specific performance measures that may provide clinically relevant information about activity performance in adults with upper limb amputation.

Commonly Used CPT Codes for Occupational Therapy and Prosthetic Rehabilitation

CPT coding should reflect the skilled service provided, payer rules, state requirements, documentation standards, and current CPT guidance. Table 7 summarizes commonly used occupational therapy and prosthetic rehabilitation codes for this population.

Table 7. Therapy CPT Codes

Category	CPT Code	Service Description
Occupational therapy evaluation	97166	Moderate-complexity occupational therapy evaluation.
Occupational therapy evaluation	97167	High-complexity occupational therapy evaluation.
Occupational therapy re-evaluation	97168	Occupational therapy re-evaluation.
Therapeutic intervention	97110 ea 15 min	Therapeutic exercise
Therapeutic intervention	97530 ea 15 min	Therapeutic activities using dynamic functional tasks.
Self-care training	97535 ea 15 min	Self-care and home management training, including ADLs, compensatory strategies, meal preparation, safety procedures, assistive technology, and adaptive equipment instruction.

Table 7. Therapy CPT Codes (Continued)

Category	CPT Code	Service Description
Community / work training	97537 ea 15 min	Community and work reintegration training.
Prosthetic training	97761 ea 15 min	Initial prosthetic training for upper and/or lower extremity prostheses.
Prosthetic training	97763 ea 15 min	Subsequent orthotic or prosthetic management and training.

For individuals with bilateral or multiple limb loss, documentation should connect the billed service to functional goals and skilled clinical reasoning. The following are some examples of training that many amputees benefit from having included in their life care plans:

- Training a person to safely use a bidet or toilet aid
- Practicing meal preparation with adaptive equipment
- Teaching donning and doffing of bilateral prostheses
- Grading bimanual prosthetic control tasks
- Assessing environmental barriers
- Training use of assistive technology
- Practicing community tasks such as shopping, payment, transportation, and restaurant participation.

Case Example: Bilateral Upper Limb

J was a 29-year-old young father working in construction when a downed power line during an ATV ride resulted in bilateral transradial level amputations. He benefited from having an extremely supportive family and was motivated by his young children (a 21-month-old toddler and a 3-month-old infant). He was discharged from the hospital and drove himself using his residual limbs only 12 days after amputation. Early in the rehabilitation process, his number one goal was to use the bathroom independently, and he found a bidet most helpful in giving him independence. He also wanted to eat and dress independently as quickly as possible. His home was modified to replace doorknobs with handles. He utilized an earpiece for ease of communication on his cell phone. He was creative in finding solutions, including making a homemade version of a universal cuff to eat independently until he was fit for prostheses. He even modified a gun to go turkey hunting, pulling the trigger with a string in his mouth just 1 month after his amputations, giving him the ability to return to one of his favorite leisure activities.

Previously he was right-hand dominant, the delayed healing on his right arm skin grafts resulted in fitting his left arm first with a prosthesis. He was fit with a body-powered prosthesis along with 5X terminal devices and the Texas Assistive Devices 5-function wrist. This was mirrored on the right side after full healing. He was also fit bilaterally with myoelectric prostheses with i-Limb and Greifer (Otto Bock) terminal devices.

Today, J would consider himself ambidextrous, although he always eats with his left arm and drinks with his right. He continues to use bilateral body-powered prostheses with the same set-up but has transitioned to using an i-Limb Quantum (Ossur) on his right arm and ETD (Motion Control) on his left. The length of his residual limbs allowed him to have both wrist flexion and powered rotation on both sides. He no longer needs the adaptive equipment he utilized early in his rehabilitation. He does utilize a massage brush with a suction cup affixed to his shower wall to assist in applying shampoo. He also has a Driving Ring (Fillauer) for ease of driving. He is independent with both his body-powered and myoelectric prostheses. He prefers the myoelectric for comfort and increased movement but prefers the body-powered for his many outdoor activities. He is a hunter, softball coach, and enjoys farming, fishing, bowling, and boating. He does have a bowling activity-specific terminal device. He is passionate about helping others and involved in a number of peer support activities living a full and active life.

This bilateral transradial case illustrates how life care needs can evolve from early self-care priorities to multiple prosthetic options and activity-specific adaptations. For life care planners, this type of presentation requires:

- Staged prosthetic fitting and training that account for healing differences and changes in functional dominance.
- Multiple prosthetic options, including body-powered, myoelectric, backup, and activity-specific devices, with ongoing replacement and maintenance planning.
- Adaptive equipment and home modifications for early self-care, with reassessment as prosthetic skills and daily routines evolve.
- Transportation adaptations and support for parenting, outdoor activities, and recreation.
- Access to peer support and opportunities for community participation.

Case Example: Quadramembral Involvement

E was finishing her freshman year in college when she began feeling ill during finals week. She ended up in the emergency room, diagnosed with bacterial meningitis. She spent several months in the hospital and ultimately her hands and feet had to be amputated because of damage from the disease. She underwent months of OT/PT learning how to use body-powered prosthetic arms and prosthetic legs. She was determined to return to college and graduate. To go back to school, she would need to learn new ways to do basic daily tasks like feed herself, prepare meals, use the toilet, shower, drive a car and get dressed. Just 15 months after she was hospitalized, E returned to campus and graduated with her classmates. She went on to obtain a graduate degree in Occupational Therapy. A few years after college E got married and is now a mom of 2 young ones. She is independent in all activities of daily living (ADLs), childcare, driving, home management and also works as an OT.

This quadrimembral case demonstrates the planning implications when both upper and lower limbs are involved. The individual required prolonged inpatient and outpatient rehabilitation, upper and lower limb prosthetic training, adaptive strategies for self-care, driving, meal preparation, dressing, toilet use, school participation, and later parenting and employment. For life care planners, this type of presentation requires:

- Coordinated projections for upper and lower limb prostheses.
- Mobility equipment planning.
- Home and vehicle modifications.
- Therapy across developmental or role transitions.
- Supports that preserve autonomy in family, vocational, and community roles.

Conclusion

Bilateral and multiple limb loss require rehabilitation and life care planning that are practical, individualized, and sustained across the lifespan. For the life care planner, the clinical record should not end with initial prosthetic fitting or discharge from therapy; it should anticipate evolving needs. Table 8 summarizes this information.

Table 8. Key Implications for Life Care Planners

Planning Area	Key Focus	Life Care Planning Implication
Early intervention	Immediate independence, safety, communication, and self-care.	Document supports required to maintain early gains over time.
Prosthetic training and plan	Progression from unilateral control to bilateral function, with attention to component selection, device length, socket fit, and technology changes.	Plan for multiple device options as no sound limb is available to assist. Plan for future technology changes and needs for regular device updates.
Equipment and environment	Durable medical equipment, smart home controls, environmental controls, transportation, and driving rehabilitation.	Include equipment, home access, and vehicle-related needs in long-term projections.
Participation and roles	Vocational or educational participation, leisure adaptations, family and parenting roles, peer support, and outcome measurement.	Plan for future role changes and the need to support additional therapy and devices to supported projected plans.

ADDITIONAL RESOURCES:

Enhancing Skills for Life — Main site: https://www.enhancingskillsforlife.org

Hands Free Catalog, Version 2 — free digital catalog of approximately 200 adaptive items: https://www.enhancingskillsforlife.org/hands-free-catalog

Hands Free Resources — videos, peer channels, newcomer guide, parent resources, clinical resources, and more: https://www.enhancingskillsforlife.org/hands-free-resources

Skills for Life Workshop: https://www.enhancingskillsforlife.org/skills-for-life-workshop

ESFL Contact / referral for resources and connections: https://www.enhancingskillsforlife.org/contactus

Amputee Coalition: https://www.amputee-coalition.org

No Limits Foundation: https://nolimitsfoundation.org

DASH Outcome Measure: https://dash.iwh.on.ca/dash

Assessment of Capacity for Myoelectric Control: https://www.oru.se/english/schools/health-sciences/research/acmc

REFERENCES

Barmparas, G., Inaba, K., Teixeira, P. G., Dubose, J.J., Criscuoli, M. Talving, P., Plurad, D., Green, D., and Demetriades, D. (2010). "Epidemiology of Posttraumatic Limb Amputation: A National Trauma Databank Analysis," *The American Surgeon*, 76(11), 1214–1222.

Brenner, C. D., & Brenner, J. K. (2008). "The Use of Preparatory/Evaluation/Training Prostheses in Developing Evidenced Based Practice in Upper Limb Prosthetics," *Journal of Prosthetics and Orthotics*, 20, 70–82.

Dillingham, T. R., Pezzin, L. E., & Shore, A. D. (2005). "Reamputation, Mortality, and Health Care Costs Among Persons with Dysvascular Lower-Limb Amputations," *Archives of Physical Medicine and Rehabilitation*, 86(3), 480–486.

Hill, W., Kyberd, P. J., Hermansson, L., Hubbard, S., Stavdahl, O., & Swanson, S. (2009). "Upper Limb Prosthetic Outcome Measures (ULPOM): A Working Group and Their Findings," *Journal of Prosthetics and Orthotics*, 21(Suppl. 9), P69–P82.

Johnson, S. S., & Mansfield, E. (2014). "Prosthetic Training: Upper Limb," *Physical Medicine and Rehabilitation Clinics of North America*, 25(1), 133–151.

Smurr, L. M., Gulick, K., Yancosek, K., Ganz, O. (2008). Managing the Upper Extremity Amputee: A Protocol for Success. *Journal of Hand Therapy*, 21(2), 160–175.



PARTIAL HAND AMPUTATIONS:

Prosthetics, Rehabilitation, and Life Care Planning Considerations

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Keywords: Finger Amputations, Prosthetic Devices, Functional Disability and Partial Hand Amputation

Introduction

Partial hand amputation is a highly individualized injury: the loss of a fingertip, thumb, multiple digits, or the hand through the metacarpals can produce varying degrees of different functional consequences beyond the neuromusculoskeletal system. The life care planner has the daunting challenge of assessing the injury, identifying impairments and needs, establishing expected outcomes, and defining a defensible projection of long-term services and necessities for the individual with partial hand amputation (AANLCP, 2026). The plan must account for the immediate and projected surgical, medical, rehabilitation, pain management, prosthetic, mental health, and vocational services indicated while maintaining awareness that long-term disablement is of concern for this population (Darter et al., 2018). Consideration of current and future device maintenance and replacement, assistive devices, durable medical equipment, and adaptive equipment to maximize functional independence in vocational, as well as avocational interests, is necessary. Additionally, a person with partial hand amputation will likely use different types of prostheses for different tasks or activities since one device cannot restore all functions of the lost hand (VA/DoD Clinical Practice Guideline, 2022). This is all balanced against resource utilization considerations and awareness that with time, the client will establish a new threshold of what is considered a "normal" life (American Association of Nurse Life Care Planners, 2026; Smurr Walters, manuscript in progress).

Clinical Significance of Partial Hand Amputation

Partial hand amputations encompass limb loss distal to the wrist, including one or more digits, thumb loss, ray resection, and partial or complete trans metacarpal loss. Although these injuries may preserve more anatomical aspects of a hand than a proximal level amputation, they can be deceptively disabling. Hand function occurs from a complex interplay of intention, sensation, movement, and strength. The thumb is particularly important because it permits opposition for effective prehension. The functional impact after the loss of any digit is also heavily influenced by the individual's psychological and emotional factors, social and lifestyle factors, and physical and health factors.

As a consequence of partial hand amputation, individuals may experience hypersensitivity, cold intolerance, scar adherence, residual hand stiffness, residual limb or neuroma-related pain, phantom pain or sensation, and altered body image. A study published in 2018 reported that individuals with partial hand amputation experience a higher rate of post-traumatic stress disorder (PTSD) and pain interference than those with proximal upper limb amputations (Kearns et al., 2018). Even a relatively distal amputation can interfere with keyboarding, tool handling, fasteners, food preparation, personal care, childcare, driving, sports, and safe performance of job tasks. Additionally, long-term physical and psychological disablement has been reported 7 years after a partial hand amputation (Darter et al., 2018).

Prosthetic Options: Matching Available Technology to Function

A prosthesis is considered a tool to aid function after limb loss. Prosthetic prescription for partial hand loss should be individualized and begin with functional goals rather than with a specific device. Current options are commonly grouped as passive or passive-functional, body-powered, externally powered, and activity or task-specific prostheses (Graham et al., 2021; Kim et al., 2023). A person may reasonably require more than one device because a prosthesis optimized for appearance and light stabilization is not appropriate for heavy or dirty work, while a durable work device may not provide the appearance, grip strength, or dexterity desired for daily and social activities.

- Passive devices can restore length, provide an opposition post or stable surface, protect sensitive tissue, and improve appearance.
- Body-powered partial-finger systems use residual joint or hand motion to drive a mechanical digit or grasp.
- Externally powered systems use motors and electronic controls to create powered movement.
- Activity-specific devices may be designed around a tool, bicycle handlebar, gym equipment, musical instrument, sporting implement, or other task.

Selection should also consider socket or interface design, suspension, skin tolerance, device weight, ease of donning and doffing, hygiene, environmental exposure, repairability, and whether the patient can reliably operate and maintain the system. The 2022 VA/DoD upper limb amputation guideline similarly frames prosthetic prescription as a comprehensive process that includes design, control strategy, amputation level, interface, suspension, and components (VA/DoD Clinical Practice Guideline, 2022). Table 1 provides information about device types, strengths, limitations, and considerations.

Table 1: Prosthesis Options, Characteristics, and Considerations

Study	Population And Design	Measure	Key Findings
Prosthetic Class	• Allows for tactile sensation and proprioception through the residuum	• No or limited active prehension • Increased potential for overuse injuries	• No or limited active prehension • Increased potential for overuse injuries
Passive functional (appropriate for amputation levels through and proximal to the distal phalanx)	• Lightweight • Protects the residuum • Restores length and hand / finger shape • Conceals the affected hand to reduce unwanted attention • May support psychological wellbeing(Maat et al., 2018)	• Diminished sensation • Not durable and may stain easily • Not meant for high-force or dexterous tasks	• Replacement of liners/interfaces, as applicable • Potential device adjustments • Periodic repairs • Cost of hi-definition vs. low-definition passive prostheses • Device replacements
Passive – positional (appropriate for amputations through or proximal to the proximal interphalangeal joint)	• Protects the residuum • Restores length • Operated with one hand • Restores multiple positions of passive digit flexion • Durable and withstands heavy duty and bimanual activities • Provides passive functional support	• No active finger flexion • Requires prepositioning to "grip"	• Replacement of liners/interfaces, as applicable • Potential device adjustments • Periodic repairs • Device replacements
Body-powered (appropriate for amputations through or proximal to the distal interphalangeal joint or the middle phalanx)	• Allows sensory and proprioceptive feedback while protecting the residuum • Lower maintenance costs • Durability • Easily integrated into activity with little fatigue during use • Durable and can be used in any environment • Moves harmoniously with residual hand decreasing proximal compensatory motions during grasp • Restores mechanical grasp and finger positioning • Useful force for selected tasks	• Not as aesthetically pleasing • Requires sufficient residual length and motion to operate • Device maybe wider than adjacent digits.	• Consider quality of life • Assess work demands • Consider repetitive loading • Training needs • Maintenance and repair of components • Device replacement

Table 1: Prosthesis Options, Characteristics, and Considerations (Continued)

Study	Population And Design	Measure	Key Findings
Externally powered (appropriate for amputations through or proximal to metacarpal phalangeal joint)	• Powered digit motion • Multiple grip patterns and independent digit control • More aesthetically appealing • May improve phantom limb pain	• Increased weight • Requires charging • Costly maintenance and repairs • Not appropriate for moderate or heavy work environments that are dirty or wet	• Requires expertise for precise fitting • Device training is essential and lengthy • Consider batteries / chargers, repairs, software / component updates and replacement cycles
Task or Activity - specific	• Optimized for specific activity such as sports, tool use, recreation, work or a particular ADL • Durable	• Narrow purpose	• Document the activity goal and why a general-use device does not adequately address need

Pain, Sensory Symptoms, and Secondary Complications

Pain can be a major determinant of function and prosthetic tolerance. Potential sources include the surgical site, scar, neuroma, residual joint or tendon pathology, neuropathic pain, phantom pain, pressure from a prosthetic interface, and overuse of the remaining hand or proximal limb. Cold sensitivity and abnormal sensations are also recognized after hand amputation (Magistroni et al., 2020). A life care plan may therefore need to project periodic evaluation by hand surgery, physical medicine and rehabilitation, pain medicine, occupational or hand therapy, and prosthetics, depending on the documented clinical course.

Persistent focal neuroma pain or severe prosthetic intolerance may prompt additional surgical evaluation. Conversely, not every symptom requires an invasive intervention. Conservative management can include desensitization, protective interfaces, activity modification, medication management, therapeutic exercise, and other modalities. The planner should distinguish between established current needs, reasonably anticipated future care supported by the record, and contingent services that would only be appropriate if a defined clinical problem develops.

Rehabilitation Across the Continuum

Rehabilitation should begin in the acute and post-operative phases to facilitate wound healing, edema management, protect healing tissue, maintain motion in uninjured joints, pain control, and prevention of avoidable stiffness. Scar management and desensitization become important as tissues heal. The therapist also evaluates one-handed or modified techniques for self-care and household activities so that independence is not delayed while prosthetic decisions are being made.

Pre-prosthetic rehabilitation should establish baseline function and identify realistic goals. Assessment may include the following tasks:

- Range of motion
- Strength
- Sensibility
- Pain behavior
- Scar mobility
- Residual digit length and joint control
- Bilateral hand use
- ADLs
- Instrumental ADLs
- Work simulation
- Leisure tasks
- Psychosocial factors.

When a prosthesis is planned, therapy prepares the residual hand for the interface and teaches skin inspection, wear schedules, donning and doffing, care of components, and strategies to prevent overuse of the contralateral upper extremity.

After device delivery, training progresses from basic control to purposeful activity. A patient may first learn to position or activate the device, regulate grasp force, and release objects, then integrate the prosthesis into bilateral tasks. Training should occur in meaningful contexts: opening containers, handling utensils, cooking, managing clothing fasteners, carrying objects, typing, manipulating work tools, or completing job-specific simulations. Occupational therapists are particularly positioned to integrate device operation with the patient's actual roles and routines. A 2026 review describes upper-limb prosthetic rehabilitation as a patient-

centered process spanning presurgical/postsurgical care, pre-prosthetic fitting, prosthetic training, and long-term wellness, with interprofessional collaboration as a key feature (Latour & Atkins, 2026).

Rehabilitation does not end when a patient demonstrates initial proficiency. Residual-limb volume, scars, skin tolerance, work demands, aging, comorbidities, technology, and personal goals change over time. The VA/DoD guideline describes upper-limb amputation care as a lifelong continuum requiring ongoing medical and therapy assessment of physical, functional, and psychosocial limitations (VA/DoD Clinical Practice Guideline, 2022). Some patients may ultimately prefer limited prosthetic use or no prosthesis for selected activities; a life care plan should not assume continuous use merely because a device can be prescribed.

How Many Therapy Visits Are Necessary?

This is a common question asked, and the answer is not fixed, but multi-factorial (VA/DoD Clinical Practice Guideline, 2022). Since many partial hand amputations are the result of trauma, patient presentation is heterogeneous, and needs are individualized. Factors that influence duration of therapy include the following:

- Severity of injury and associated injuries
- Surgical course
- Wound healing
- Range of motion deficits and stiffness
- Persistent edema
- Problematic scars
- Residual limb or phantom limb pain interference
- Hypersensitivity
- Prosthetic fit, comfort, and access to training
- Functional deficits and vocational demands
- Psychosocial factors
- Cognitive impairments
- Access to care
- Payor factors.

As a result, rehabilitation may not follow traditional treatment frequency and duration (i.e., 2-3 times/week x 12 weeks). To effectively maintain forward momentum in rehabilitation, open communication between the rehabilitation provider and prosthetist is essential to address device fit and operation as it relates to function.

Implications for the Nurse Life Care Planner

A partial hand amputation life care plan should be built from the individual's functional profile rather than from the diagnostic label alone. American Association of Nurse Life Care Planners standards call for comprehensive data collection and individualized planning, including physical, functional, psychosocial, environmental, and economic considerations (American Association of Nurse Life Care Planners, 2026). For this population, the assessment should reconcile the operative record and current anatomy with therapy findings, prosthetic recommendations, vocational evidence, and the patient's reported goals.

- Specialty follow-up: Hand or plastic surgery, physiatry, primary care, pain management, behavioral health, and other specialists as supported by the clinical record.
- Therapy: Certified hand therapy and/or occupational therapy for residual-hand management, desensitization, strengthening, adaptive techniques, prosthetic training, work simulation, and episodic re-evaluation after device changes.
- Prosthetic care: Initial evaluation and fitting, test or preparatory devices when used, definitive devices, alternate/activity-specific devices when justified, sockets/interfaces, liners, consumables, batteries/chargers, repairs, adjustments, and future replacement.
- Durable medical equipment and adaptive aids: Task-specific aids for dressing, bathing, toileting, grooming, meal preparation, driving, work, recreation, or home management when they improve safety or independence.
- Pain and skin management: Medications and supplies, skin care, scar or neuroma management, and specialty reassessment when symptoms affect function or prosthetic tolerance.
- Vocational and environmental needs: Ergonomic assessment, work hardening, functional capacity evaluation, job-site modification, retraining, assistive technology, and documentation of occupational exposure to vibration, moisture, dust, heat, impact, or repetitive force.
- Psychosocial support: Counseling, peer support, adjustment-to-disability resources, and treatment of documented mood, trauma-related, or body-image concerns.
- Long-term reassessment: A review as anatomy, occupation, aging, health status, technology, and patient preferences evolve (VA/DoD Clinical Practice Guideline, 2022).

Replacement frequency deserves careful handling. Prosthetic components have finite service lives, but actual replacement depends on wear, growth or anatomical change, component failure, changes in function, and payer requirements. A defensible plan should avoid presenting a universal replacement interval as a biological fact. Instead, the planner can identify the expected need for lifelong prosthetic follow-up and periodic replacement, then support any specific frequency with the treating prosthetist's recommendation, manufacturer information, utilization history, or other case-specific evidence. The same principle applies to future surgery, intensive therapy, or advanced prosthetic upgrades.

Conclusion

Partial hand amputation is not a minor form of limb loss simply because the wrist and forearm remain intact. The hand's dense concentration of sensory and motor functions means that loss of one or more digits can alter dexterity, force production, bilateral task performance, vocational capacity, appearance, and quality of life. Modern prosthetic options provide meaningful choices, but no single device reproduces the full versatility of the human hand. Successful rehabilitation therefore depends on individualized goal setting, skilled therapy, appropriate prosthetic selection, and long-term reassessment.

For life care planners, the most defensible approach is function-centered and longitudinal: identify what the person cannot safely or efficiently do, determine which clinical and technological interventions address those limitations, and project the reasonable services and resources required over time. When the plan is grounded in the medical record, patient goals, interdisciplinary recommendations, and current evidence, it can more accurately represent the true lifetime implications of partial hand loss.

REFERENCES

American Association of Nurse Life Care Planners, A. (2026). *Nurse Life Care Planning Standards of Practice* Retrieved September 15, 2026 from

Darter, B. J., Hawley, C. E., Armstrong, A. J., Avellone, L., & Wehman, P. (2018). Factors Influencing Functional Outcomes and Return-to-Work After Amputation: A Review of the Literature. *Journal of occupational rehabilitation*, 28(4), 656–665. https://doi.org/10.1007/s10926-018-9757-y

Graham, E. M., Hendrycks, R., Baschuk, C. M., Atkins, D. J., Keizer, L., Duncan, C. C., & Mendenhall, S. D. (2021). Restoring Form and Function to the Partial Hand Amputee: Prosthetic Options from the Fingertip to the Palm. *Hand Clinics*, 37(1), 167–187.

Kearns, N. T., Jackson, W. T., Elliott, T. R., Ryan, T., & Armstrong, T. W. (2018). Differences in level of upper limb loss on functional impairment, psychological well-being, and substance use. *Rehabilitation psychology*, 63(1), 141.

Kim, G. M., Powell, J. E., Lacey, S. A., Butkus, J. A., & Smith, D. G. (2023). Current and emerging prostheses for partial hand amputation: A narrative review. *PM&R*, 15(3), 392–401. https://doi.org/https://doi.org/10.1002/pmrj.12764

Latour, D. A., & Atkins, D. J. (2026). Occupational Therapist Perspectives in Upper Limb Prosthetic Rehabilitation. *Hand Clinics*, 42(3), 337–348. https://doi.org/10.1016/j.hcl.2026.03.013

Maat, B., Smit, G., Plettenburg, D., & Breedveld, P. (2018). Passive prosthetic hands and tools: A literature review. *Prosthetics and orthotics international*, 42(1), 66–74. https://doi.org/10.1177/0309364617691622

Magistroni, E., Parodi, G., Fop, F., Battiston, B., & Dahlin, L. B. (2020). Cold intolerance and neuropathic pain after peripheral nerve injury in upper extremity. *J Peripher Nerv Syst*, 25(2), 184–190. https://doi.org/10.1111/jns.12376

Smurr Walters, L. (manuscript in progress). Engaging in Life Activities After Partial Hand Amputation: A Qualitative Descriptive Study

VA/DoD Clinical Practice Guideline. (2022). *The Management of Upper Limb Amputation Rehabilitation*. Washington, D.C.: U.S. Government Printing Office





LOOKING AHEAD

2027

Winter:	Deposition and Trial Testimony
Spring:	TBI Intervention and Guidelines
Summer:	Sensory Diagnoses and Interventions
Autumn:	Gastrointestinal and Genitourinary Diagnoses, Treatment, and Guidelines

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Index of Past Issues

All past issues from 2009 to present are available for free download for members at www.aanlcp.org

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
XXIV.2 Nervous and Spinal Injury Considerations
XXIV.3 Ethics
XXIV.4 Delegation of Care and Caregivers

2025

XXV.1 Foundations in Life Care Planning
XXV.2 New Directions in Homecare
XXV.3 Psychological Complications
XXV.4 Orthoses – Lower Extremities

2026

XXVI.1 Building Confidence and Collaboration
XXVI.2 Elder Care
XXVI.3 Technological Advances and Costing
XXVI.4 Advances in Upper Limb Loss and Restorative Mobility

