

# Limb Loss and Rehabilitation - Insights from the POLAR Programme at the NRH

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Dr Jacqui Stow, Rehabilitation Consultant, NRH Prosthetic, Orthotic and Limb Absence Rehabilitation (POLAR) Programme

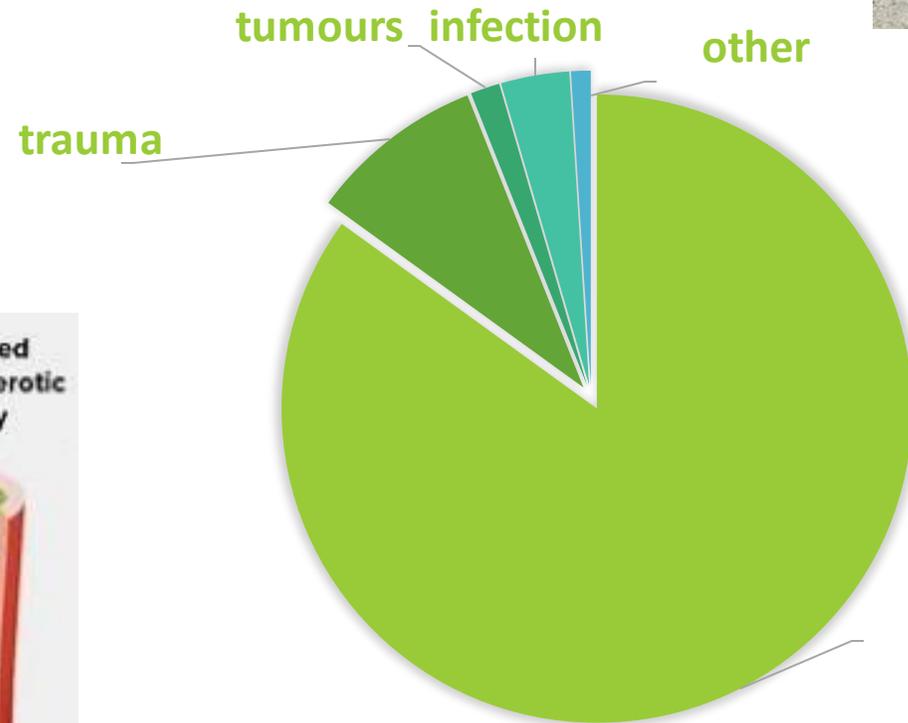
***National Grand Rounds 28<sup>th</sup> January 2026***

# Overview of Presentation

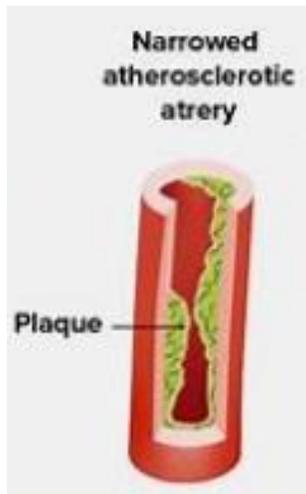
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1. Which patients benefit from prosthetic rehabilitation
2. How to optimise your patient to ensure best outcome from rehabilitation
3. Evidence base and benchmarks for limb absence rehabilitation
4. Information about the NRH rehabilitation programme
5. Common problems encountered in limb absence population

# Aetiology



vascular disease  
(diabetes)



Estimated 5000 people in Ireland with major limb amputation



[Home](#) > [Irish Journal of Medical Science \(1971 -\)](#) > Article

# Lower extremity amputations in Ireland: a registry-based study

Original Article | Published: 23 March 2021



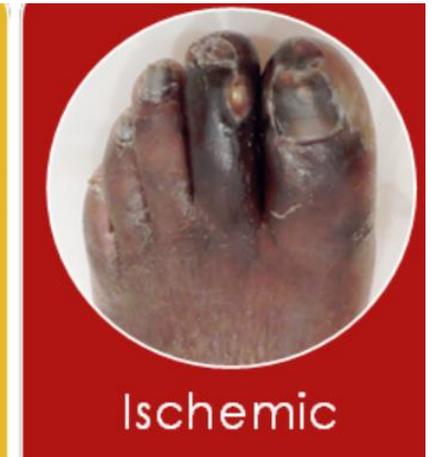
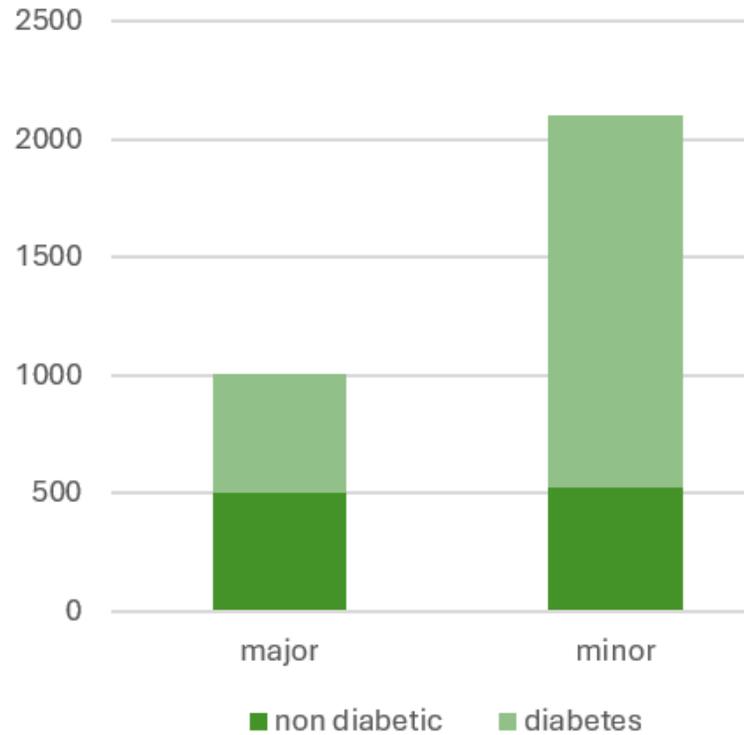
2016-2019 (4 years) – Anna Mealy, Sean Tierney et al  
(National Hospital Inpatient Enquiry (HIPE) system)

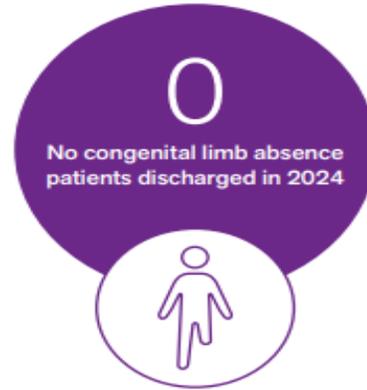
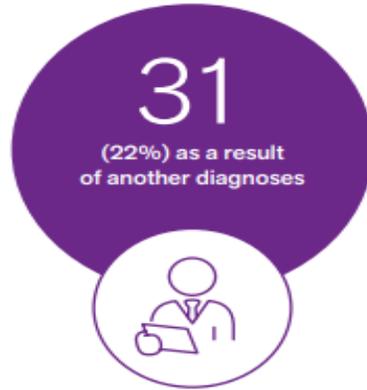
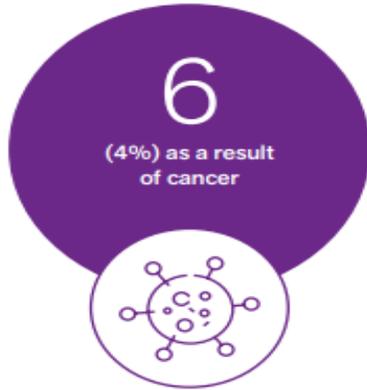
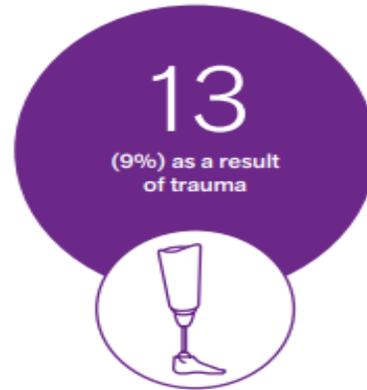
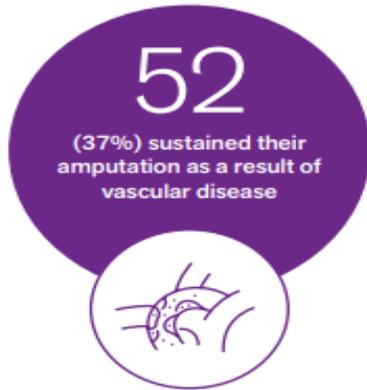
**3104** lower limb amputations (public hospital)

**1005** major amputation (32% )



# Diabetes

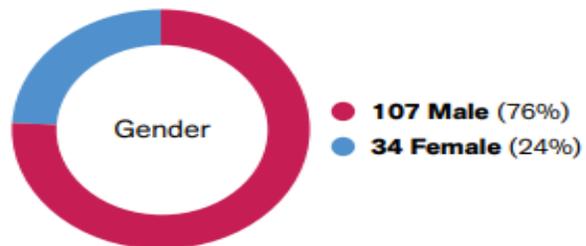




# NRH 2024 Patient Demographics

Based on 141 Discharges

**GENDER OF PATIENTS DISCHARGED FROM THE POLAR PROGRAMME IN 2024**



**AGE PROFILE OF PATIENTS DISCHARGED FROM THE POLAR PROGRAMME IN 2024**



# Who does and does not benefit from prosthetic rehabilitation

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## *Red flags*

Inability to stand up on remaining leg

Poor condition of remaining leg

Severe joint contractures

Cognitive impairment

Lack of motivation

BLARt score >17



# BLARt

## (Blatchford Leicester Allman Russell Tool)

0-12 : independent unaided mobility

13-16 : Walking with gait aids indoors and outdoors

17+ : Walking with help, transfers only, not using a prosthesis

(Bowrey et al, 2019)

<b>Gender</b>		<b>BMI</b>	
Male	0	Average (18.5 – 25)	0
Female	1	Above average (25-30)	1
		Obese (>30)	3
<b>Age</b>		Below average (<18.5)	2
14-49	0		
50-64	1		
65-74	2		
75-80	5		
80+	6		

<b>Pre-amp mobility</b>	
Wheelchair bound for 12 mths +	5
Wheelchair bound for < 12 mths	4
Indoor mobility only	3
Outdoor mobility with aids	2
Unaided outdoor mobility	1
Walking 3m+	0

<b>Special risks</b>	
CVA / Neurological	3
On dialysis	4
Severe respiratory problems	5
Contralateral limb issues	2-4
Recent MI / Angina	2

Score for special risks should be a total of all relevant conditions  
Clinical judgement required on severity of contralateral limb issues



<b>Cause of amputation</b>		<b>Cognitive Capacity</b>	
Trauma	0	Confused	5
Congenital	0	Limited carry over	3
Cancer	1	Alert/aware	0
Orthopaedic	2		
Vascular	3		

<b>Level of Amputation</b>	
Above / through knee	3
Below knee	1
Hip disarticulation	5
Bilateral	4-6

Score bilateral on scale of combination of amputations

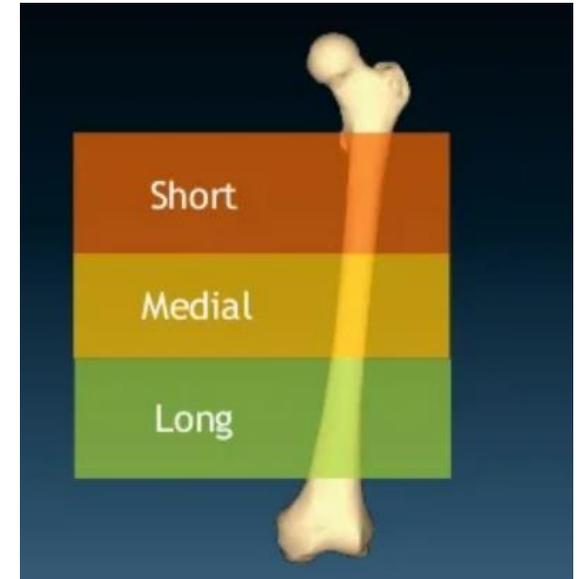
## BLARt SCORE FOR AMPUTEE OUTCOMES

(Blatchford Leicester Allman Russell tool)

# How to optimise your patient for prosthetic rehabilitation

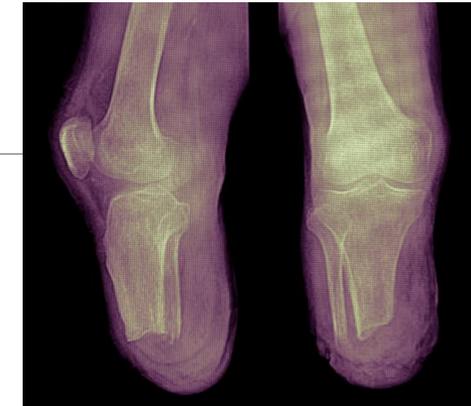
## 1.) Optimal reconstruction of the residuum to provide best possible interface for the prosthesis

- 2.) wound healing
- 3.) volume management
- 4.) maintain fitness, power and prevent contractures
- 5.) prevent injury to remaining leg
- 6.) desensitisation and pain management strategies
- 7.) ensure social supports



# Surgical Considerations

<b>Level of Amputation</b>	<p>— <b>Preserve joints when possible</b> — more control greater energy efficiency —</p> <p><b>Length preservation vs function:</b> longer length better prosthetic leverage vs soft tissue coverage, space for componentry</p>
<b>Flap Design &amp; Soft Tissue Coverage</b>	<p>— Ensure tension-free closure and optimal cushioning for prosthetic interface. —</p> <p>— Myoplasty vs myodesis. —</p>
<b>Condition of skin</b>	<p>— Skin grafting, adherent skin, deep scars —</p>
<b>Peripheral nerve management</b>	<p>— Prevents neuroma formation and residuum pain —</p>
<b>Bone Bevelling</b>	<p>— Smooths bone edges for better prosthetic comfort. —</p>
<b>Correct Level of Bones</b>	<p>— Ensures proper alignment and load transfer with prosthetics. —</p> <p>— Fibula shorter than tibia —</p>



Amput' n level	% Energy above baseline	Speed, m/min	Oxygen cost, mL/kg/m
Long TT	10	70	0.17
Average TT	25	60	0.20
Short TT	40	50	0.20
Bilat TT	60	50	0.20
TF	90	40	0.28
Wh/chair	0-8	70	0.16

# How to optimise your patient for prosthetic rehabilitation?

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1.) Optimal reconstruction of the residuum to provide best possible interface for the prosthesis

**2.) wound healing**

**3.) volume management**

4.) maintain fitness, power and prevent contractures

5.) prevent injury to remaining leg

6.) desensitisation and pain management strategies

7.) ensure social supports



# Volume Management

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Shape the residuum producing a more cylindrical shape/ conical shape

Shorter rehabilitation duration

Shrinker stockings/ compression sock

Use once the wound has begun to knit together all staples and sutures out

Initially Day 1 **1/2 to 1 hour** in the morning and the afternoon

increase wear time by 1 hour each day until you've reached a full day of wear. Be sure to check your skin after each wearing period.

Wear during day

To size measure 4cm from distal end widest part



# How to optimise your patient for prosthetic rehabilitation

- 1.) Optimal reconstruction of the residuum to provide best possible interface for the prosthesis
- 2.) wound healing
- 3.) volume management
- 4.) maintain fitness, power and prevent contractures
- 5.) prevent injury to remaining leg
- 6.) desensitisation and pain management strategies
- 7.) Ensure social supports



*Home Exercise Programme*  
Exercises for the above-knee amputee



# Barriers to Rehabilitation

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Skin issues

Environmental/  
access issues

Housing  
adaptations

Financial

Cognition

Psychosocial  
consequences

Isolation

Lack of support

Pain

Contractures

Mental health

Addiction

# Social Supports

## Home assessment and adaptations

- HAG application
- ramps, grab bars, bed positioning, bathroom modifications.



## Training in daily activities

- self-care, transfers, adaptive equipment use.



## Medical card application & social support

- funding options, entitlements.

## Psychosocial support

- coping with amputation, peer support groups, mental health considerations.



## Community reintegration

- Patient goals and expectations once at home.

# Pathway of Care

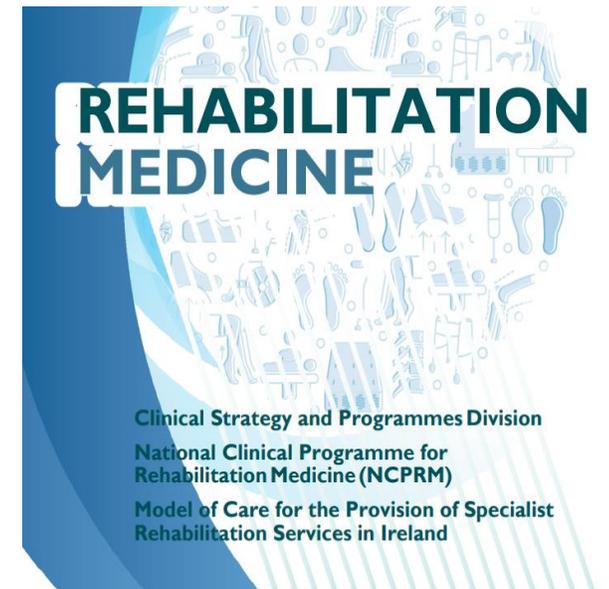
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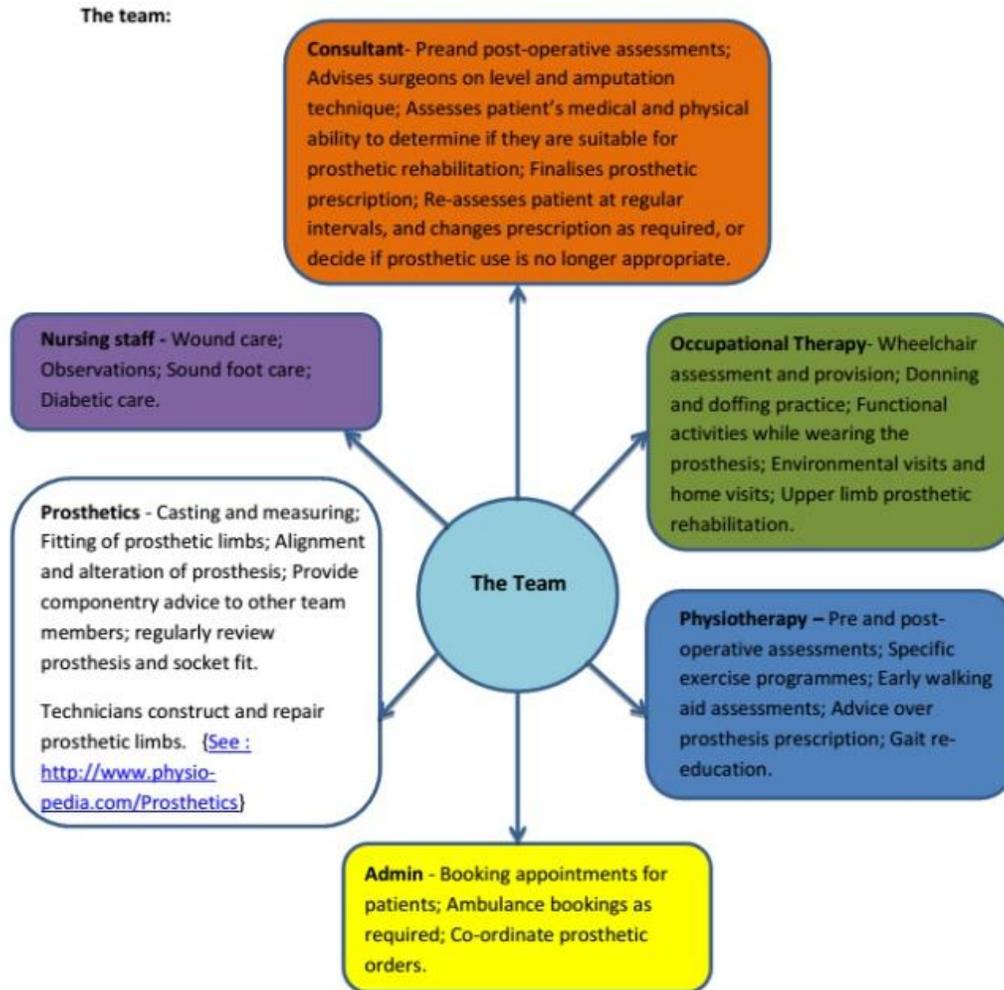
## Model of care for Specialist Rehabilitation Services in Ireland

Within this framework of specialized rehabilitation care the main premise underpinning all rehabilitation service delivery is

- Person centred approach to patient care
- Development of appropriately resourced interdisciplinary inpatient, outpatient and community based specialist rehabilitation teams across Ireland supported by education and training
- Case management of patients
- Managed Clinical Rehabilitation Networks(MCRN)

NRH recognises that the pathway of care for individuals with limb absence is largely dependant on the referrer





# IDT approach to prosthetic rehabilitation

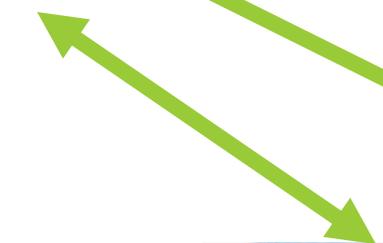
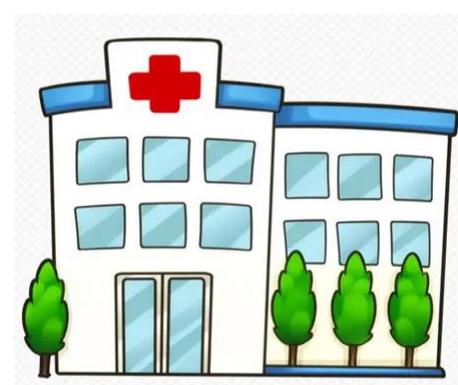
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# Services Provision

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- Pre-amputation Consultation
- Consultant led IDT initial outpatient assessment
- Primary Patient in/day rehabilitation
- Established Patient in/day rehabilitation
- Ongoing outpatient prosthetic and nursing review clinics
- Established outpatient therapy appointments
- Established and complex outpatient consultant led IDT clinics





POLAR

Referral

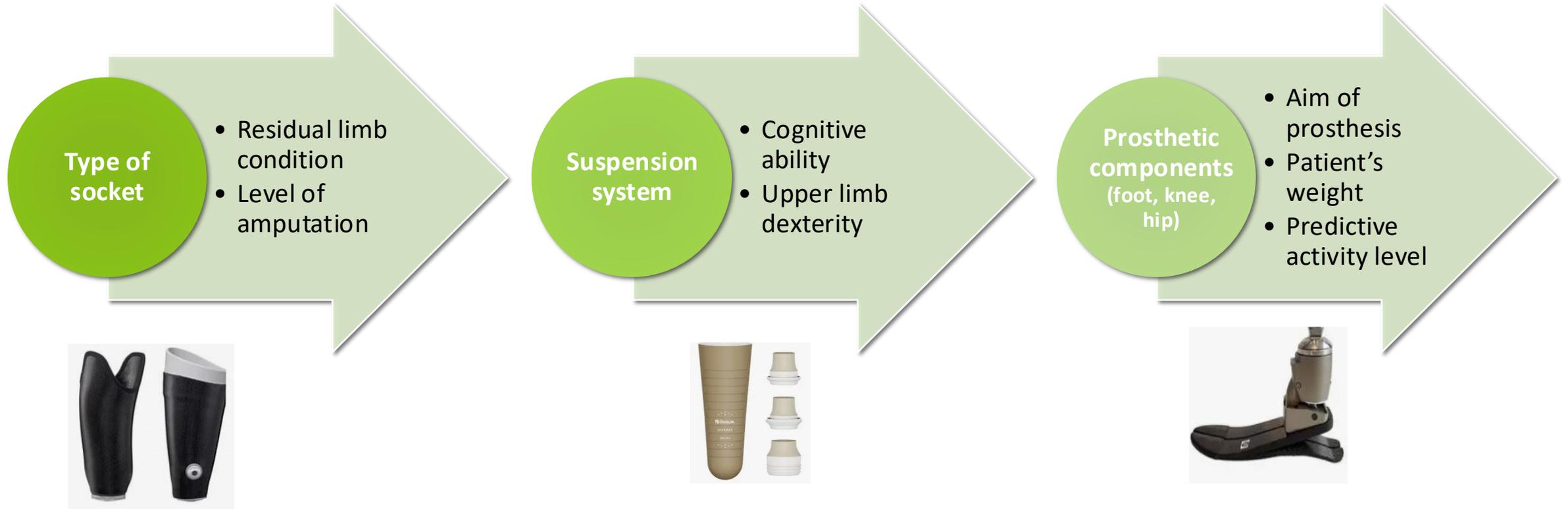
Rehabilitation Coordinator

IDT Initial Pathway Assessment

NRH

OPD Clinics  
OPD Treatment

# Prosthetic prescription



# Rehabilitation Programme

- Independence with ADLs
- Education and Self-Management
- Prosthetic fitting & alignment adjustments as needed.
- Gait training & advanced mobility (use of assistive devices, balance training).
- Preventing complications in the intact limb (skin care, preventing falls, care of remaining foot, lifestyle and health management).

## Adjunct services:

- Driving service
- Complex seating
- Aquatic physiotherapy
- Gym
- Vocational occupational therapy
- Assistive technology



JOE BLOGGS						
	Monday 12th	Tuesday 13th	Wednesday 14th	Thursday 15th	Friday 16th	Saturday 17th
07:00	Breakfast, Shower, Dress	Breakfast, Shower, Dress	Breakfast, Shower, Dress	Breakfast, Shower, Dress	Breakfast, Shower, Dress	Breakfast, Shower, Dress
08:00						
08:15						
08:30						
08:45	7am - 9am	7am - 9am	7am - 9am	7am - 9am	7am - 9am	7am - 9am
09:00			OT Shower Assessment 9:00 - 9:30		Aquatics 9:00 - 9:45	
09:15	Word Round					
09:30						
09:45			Physio 9:45 - 10:30	Wheelchair rugby - 1 sports hall 10:00 - 10:45		Independent Scar Massage
10:00		Strengthening 10:00 - 10:30				
10:15						
10:30	Functionality Mobility Group Wear Prosthesis Gym Level - 1 10:30 - 11:30					Gym level -1 10:30 - 11:30
10:45		Garden Group Wear Prosthesis 11:00 - 12:00	Prosthesis Review 11:15 - 12:00	Psychology 11:30 - 12:15	OT Community Outing 11:15 - 12:15	
11:00						
11:15	OT 11:30 - 12:15					
11:30						
11:45						
12:00						
12:15	Luntime MEDS	Luntime MEDS	Luntime MEDS	Luntime MEDS	Luntime MEDS	Luntime MEDS
12:30	Lunch	Lunch	Lunch	Lunch	Lunch	Lunch
12:45						
13:00	12:30 - 13:30	12:30 - 13:31	12:30 - 13:32	12:30 - 13:33	12:30 - 13:34	12:30 - 13:30
13:15						
13:30	Physio 13:30 - 14:15		Scar Massage			
13:45						Family visit 13:30 - 14:45
14:00		Knowing Your Prosthesis talk 14:00 - 14:45	Physio 14:00 - 14:45	Standing Balance Wear prosthesis 14:00 - 15:00		
14:15						
14:30	Social Work 14:30 - 15:15	Car Transfers 14:45 - 15:15			Physio 14:30 - 15:15	
14:45						
15:00						
15:15						
15:30			OT Relaxation Group CEDARS day room 15:30 - 16:30			
15:45	Independent Gym - Level 1 15:30 - 16:30	Gym level -1 15:45 - 16:30				
16:00						
16:15						
16:30						
16:45	Teatime MEDS	Teatime MEDS	Teatime MEDS	Teatime MEDS	Teatime MEDS	Teatime MEDS
17:00						

# Psychological Reaction to Amputation

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Psychological adjustment to amputation is a dynamic, non-linear process

While some patients exhibit resilience and adaptive functioning, others face prolonged psychological distress and difficulty in re-establishing daily routines

For many the predominant experience is one of loss

Depression and Anxiety common

(Senra, et al. 2025). (Calabrese, et al. 2023). (Cavanagh, et al. 2006).





# Psychological Reaction to Amputation

Evidence based psychological interventions include cognitive behavioural therapy (CBT) and eye movement desensitization and reprocessing (EMDR) (NICE NG222, 2022; NICE CG113, 2020; NICE NG116, 2018).

Rehabilitation after amputation is inherently reparative (Malouta et al., 2025).

Healthcare professionals should reassure people that short-term stress responses (e.g. anxiety, low mood, sleep disturbance) are common and normal after major injury or amputation (National Institute for Health and Care Excellence [NICE], 2022).



# Peer support on the POLAR programme

Peer support is the emotional, social and practical support exchanged between individuals who share a lived experience of a similar health condition or life event. Within limb absence rehabilitation, peer support can promote feelings of hope, adjustment, connectedness, and community through shared understanding.

# Case Report

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## First admission 2020

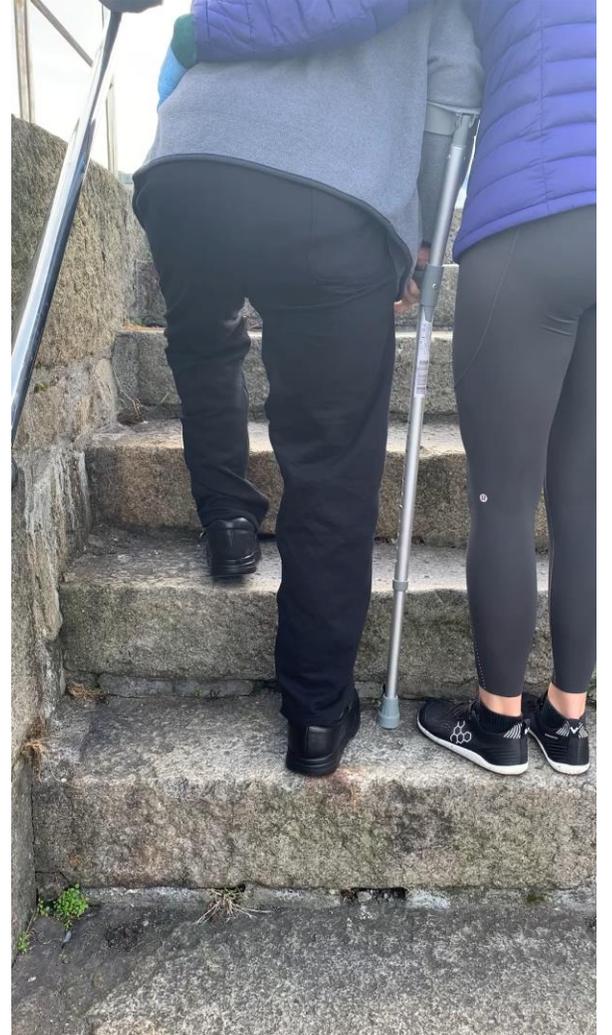
- 66 year old gentleman - a left below knee amputation
- **Comorbidities** – Diabetes Mellitus Type 2
- **Social History** – retired, enjoys walking dog and fishing. Lives with his brother in 2 storey house with their small dog in a small town in Co. Kildare.
- **Patient goals** – walk to the shops, walk his dog
- **Inpatient rehabilitation with POLAR team** – Just over 5 weeks, closely monitoring wound while fitting prosthesis and gait re-education, education on care of wound and remaining foot.
- **At discharge**, walking independently with 2 sticks indoors and walking independently with 4 wheeled walker outdoors. Wound monitoring and dressing handed over to PHN,
- referred to community physio with long-term goal walking with 1 stick.

# Case Report

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## Second admission 2022

- Right above knee – 2years later
- **Assessed** by POLAR team in June 2022
- slight hip flexion contracture at his right hip of minus 12° but otherwise good ROM and strength. Encouraged hip flexor stretching
  
- **Patient goals** – walk to the shops, walk his dog, remain the same
- Inpatient rehabilitation with POLAR team July 2022– 9 weeks
  
- **At discharge**, can walk indoors and outdoors idependently with the use of two crutches, or a 4-wheel walker for longer distances and on more uneven terrain.



# Why was he so successful?

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## FACILITATORS

- Family support
- Excellent support from community health care professionals
- Accessible home environment
- No cognitive changes
- Highly motivated gentleman
- Accessible community, living close to amenities
- Proximity to prosthetic centre
- Good ROM, strength
- Only 1 comorbidity (Diabetes)
- No pain

## BARRIERS

- Non-healing wound left BK residuum
- Bilateral lower limb amputations



# Longer term durable outcomes 6 years post

110 patients were discharged from the NRH in or day patient programme;

- 31% patients had died
- 42% were not contactable/declined to participate
- (of these 1/3 were still attending and were using their prosthesis
- 1/3 had ceased to attend within 1-2 years amputation
- 27% participated

Of the 27%

- 70% had continued to use their prosthesis daily and of those 80% of had improved their prosthetic usage
- Only 3% had further limb loss
- In total 41% were still prosthesis users after 6 years



# What supports ensure ongoing prosthesis use

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- Younger age
- Fewer co-morbidities
- Social supports
  - supportive family
  - transport
- Psychological adaptation
- High level of motivation and goal driven
- Functionality
- Prosthesis comfort and ease of use



# Common Problems

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- Skin damage
- Pain: Residuum pain and phantom limb pain
- Falls
- Difficulties with prosthesis suspension
- Back pain
- Impact of changing health and aging
- Anxiety and depression







***Any Questions?***

Dr. Jacqui Stow

Rehabilitation Consultant



[Jacqui.stow@nrh.ie](mailto:Jacqui.stow@nrh.ie)

Margaret Jensen

POLAR Rehabilitation coordinator



[Margaret.jensen@nrh.ie](mailto:Margaret.jensen@nrh.ie)

Aoife Langton

POLAR Programme Manager



[Aoife.langton@nrh.ie](mailto:Aoife.langton@nrh.ie)

# National Grand Rounds



Our next **National Grand Rounds** will be on **Wednesday 22nd April 2026**

**Title tbc:** NRH Paediatric Programme presentation

**Presented by:** NRH Paediatric Team



To join our mailing list for future National Grand Rounds please scan the QR Code or

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