

OSSEOINTEGRATION – REHABILITATION PERSPECTIVES

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DISCLOSURES

I have no financial conflicts of interest to declare.

Non-financial conflicts of interest include:

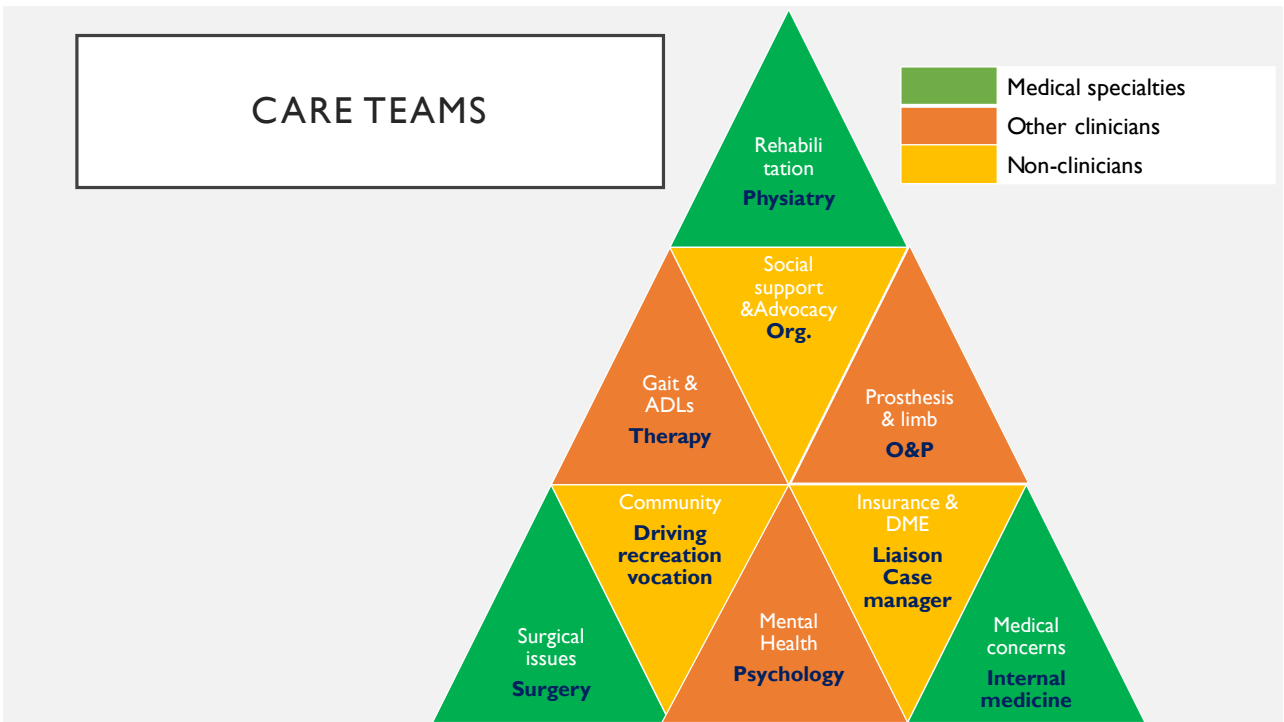
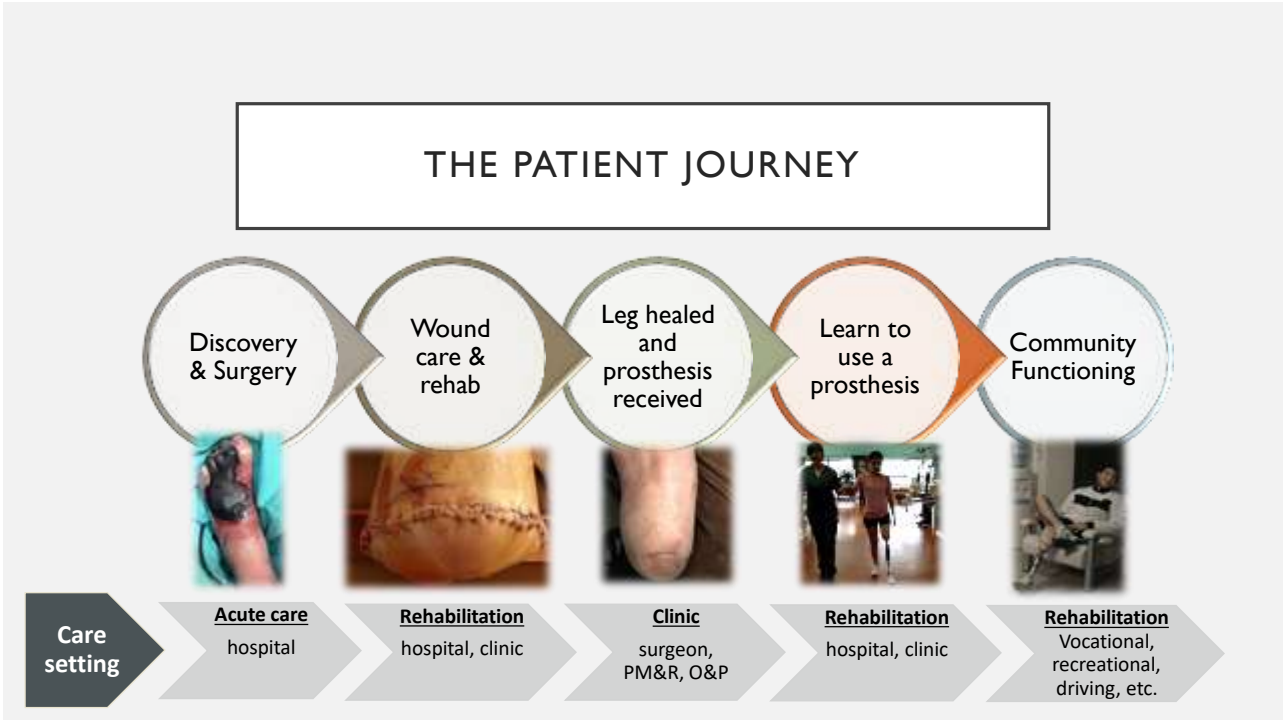
- Employment:** Assistant Professor, Washington University School of Medicine
- Administrative work:** Medical Director, The Rehabilitation Institute of St Louis
- Volunteer work**
 - Chair, Limb care Networking Group, American Congress of Rehabilitation Medicine
 - Member, Scientific and Medical Advisory Committee, Amputee Coalition

LEARNING OBJECTIVES

At the conclusion of this activity, the participant will be able to:

1. Conceptualize the **patient journey from limb loss to community independence**
2. Understand the latest **principles of osseointegration rehabilitation**
3. Incorporate **teamwork thinking** into your practice

THE JOURNEY FROM LIMB LOSS TO INDEPENDENCE



The Physiatry perspective: Phases Of Limb Loss Rehabilitation

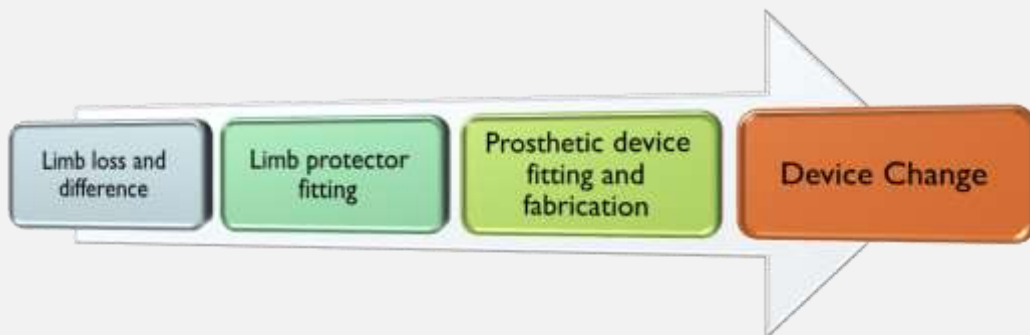
Table 1 Phases of amputee rehabilitation

Phase	Hallmark
Preoperative	Assess body condition, patient education, surgical level discussion, postoperative prosthetic plans
Amputation Surgery/Reconstruction	Length, myoplastic closure, soft tissue coverage, nerve, handling, rigid dressing
Acute Post surgical	Wound healing, pain control, proximal body motion, emotional support
Pre prosthetic	Shaping, shrinking, increase muscle strength, restore patient locus of control
Prosthetic Prescription	Team consensus on prosthetic prescription and fabrication
Prosthetic Training	Increase prosthetic wearing and functional utilization
Community Integration	Resumption of roles in family and community activities. Emotional equilibrium and healthy coping strategies. Recreational activities.
Vocational Rehabilitation	Assess and plan vocational activities for future. May need further education, training or job modification
Follow-up	Life long prosthetic, functional, medical assessment and emotional support

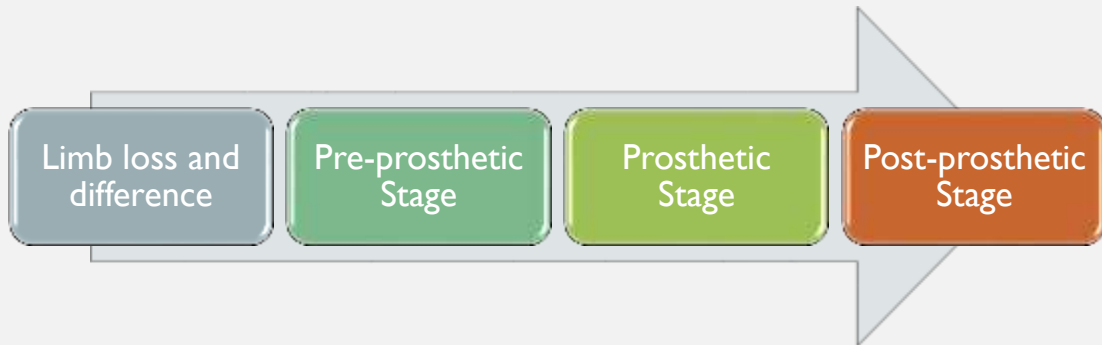
Modified from Esquenazi and Meier.⁷

Alberto Esquenazi (2004) Amputation rehabilitation and prosthetic restoration. From surgery to community reintegration, *Disability and Rehabilitation*, 26:14-15, 831-836, Rehabilitation in limb deficiency. 4. Limb amputation. Esquenazi A, Meier RH 3rd. *Arch Phys Med Rehabil*. 1996 Mar;77(3 Suppl):S18-28.

The Prosthetist Perspective

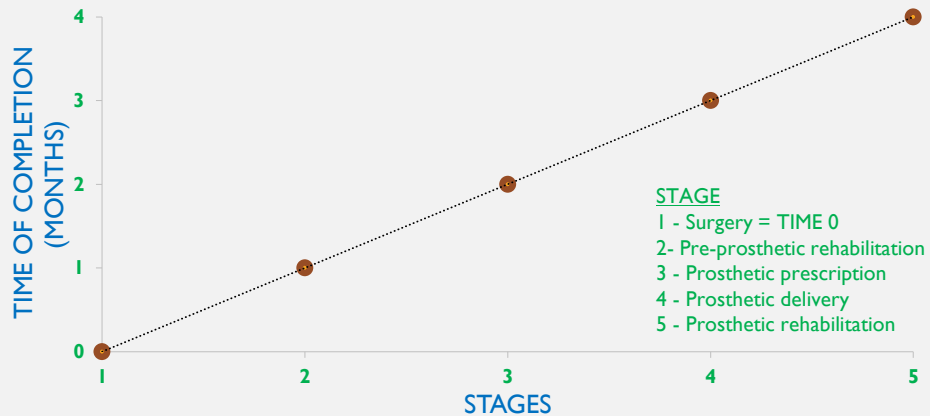


The Combined Perspective: Stages of limb loss



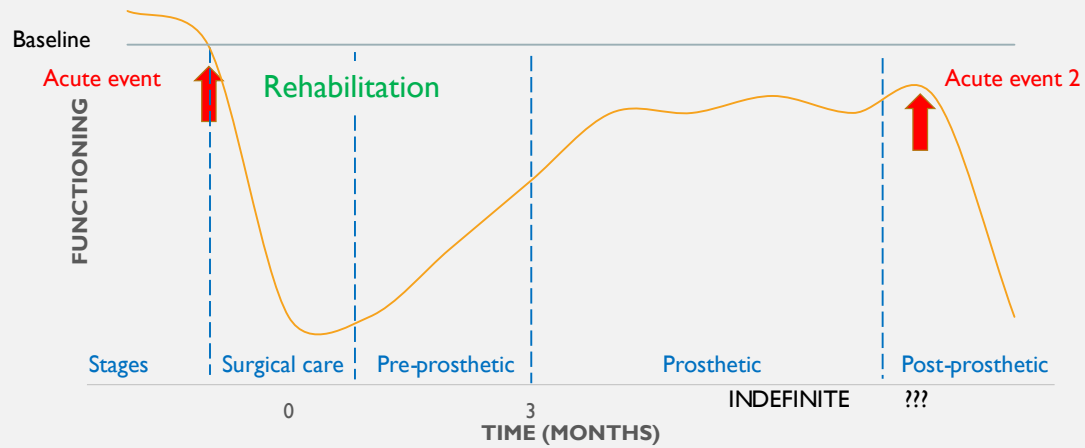
PROGRESS OVER TIME

“IDEAL” TIMELINE FOR PROGRESS FROM LIMB LOSS TO INDEPENDENCE



PROGRESS IN FUNCTION

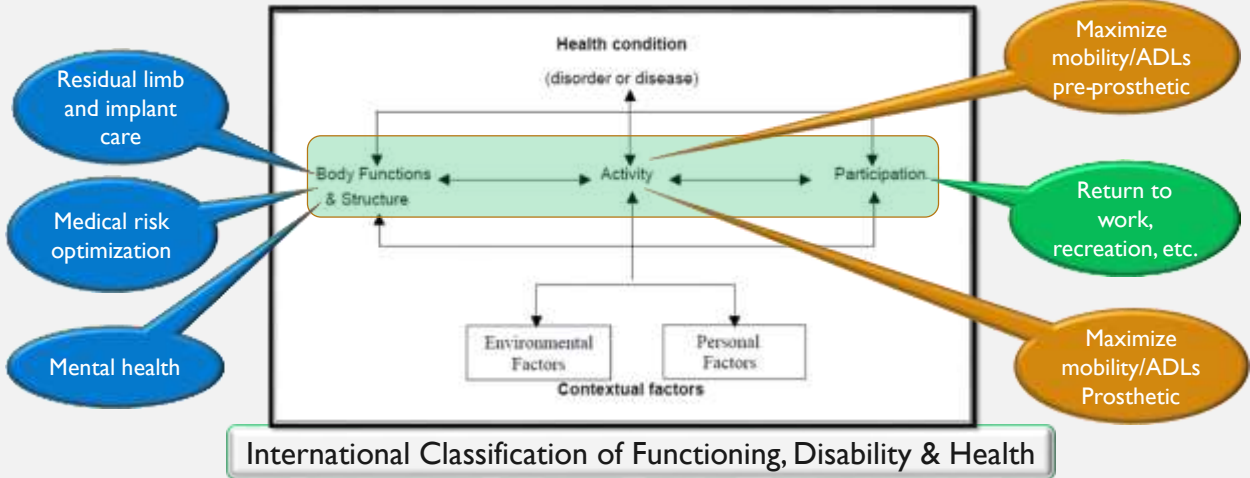
FUNCTIONAL PROGRESS FROM LIMB LOSS TO INDEPENDENCE



PRINCIPLES OF OSSEOINTEGRATION REHABILITATION



SCOPE OF REHABILITATION



PROTOCOL FOR OSSEOINTEGRATION (TIMED FROM DEFINITIVE SURGERY)

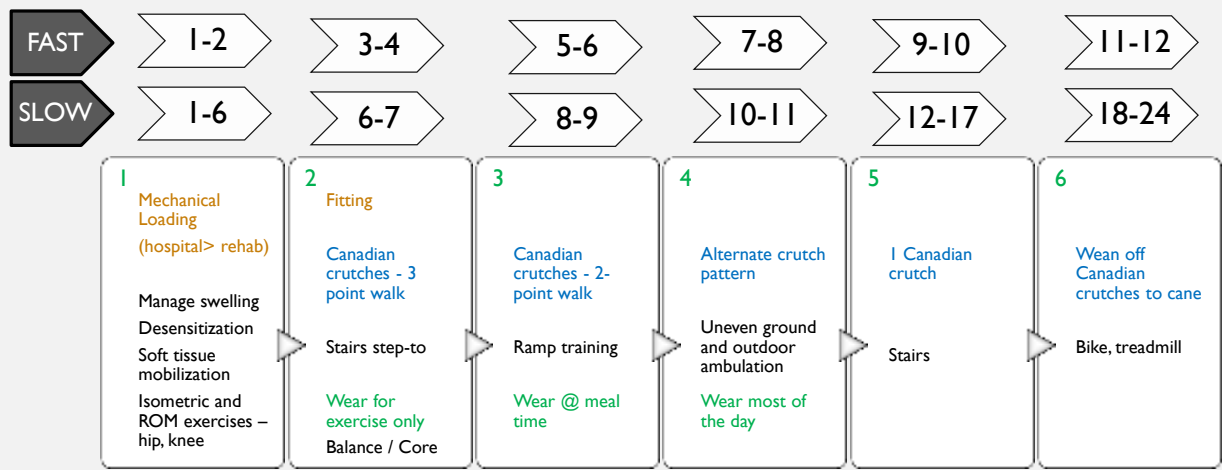
STANDARD PROTOCOL (FAST LOADING)		SLOW	Complementary Exercise Modalities
↓		Week 1-6	<ul style="list-style-type: none"> • Range of motion • Resistance • Core stability • Endurance
Day 3-10			
Progressive axial weight bearing	TID, 30 minute duration - scale		
↓			
Day 10-35		Week 6-12	
50% weight bearing	Parallel bars, then walking aid		
↓			
Day 35-42			
Full-weight bearing	Progress with walking aid		

<https://www.osseointegration.eu/fr/rehabilitation>

BMJ Open Osseointegrated reconstruction and rehabilitation of transtibial amputation: The Osseointegration Group of Australia surgical technique and protocol for a prospective cohort study

David J. Reardon, Michael D. Schallenger, Andrew C. Williams, Joseph J. Lynch, Andrew G. Young, Peter C. Cavanagh, Scott M. Litchford, Stephen J. Lord, and Peter J. Reardon

AUSTRALIAN PROTOCOL : TRANSTIBIAL



Osseointegrated prostheses for rehabilitation following amputation
The pioneering Swedish model

The U21° **Reardon Biomechanics™**
Osseointegrated prostheses for rehabilitation following amputation: The Osseointegration Group of Australia surgical technique and protocol for a prospective cohort study

Department of Rehabilitation Medicine, Royal Victoria Infirmary, Glasgow, UK; The Osseointegration Group of Australia; The Australian Centre for Bone and Joint Research, Monash University, Victoria, Australia; The Australian Centre for Bone and Joint Research, Monash University, Victoria, Australia; The Australian Centre for Bone and Joint Research, Monash University, Victoria, Australia; The Australian Centre for Bone and Joint Research, Monash University, Victoria, Australia

SIMILAR PROTOCOLS FOR VARIOUS LONG BONES

FEMUR

- ROM: month 1
- Loading with short training prosthesis: month 2-3
- Standard length prosthesis – month 4

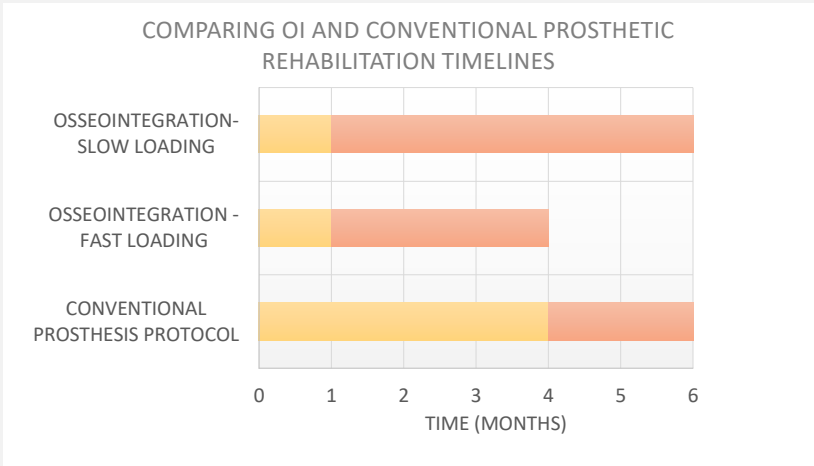
HUMERUS

- ROM: weeks 1-3
- Fitting with short training prosthesis : week 4-12
- Standard length prosthesis – month 4

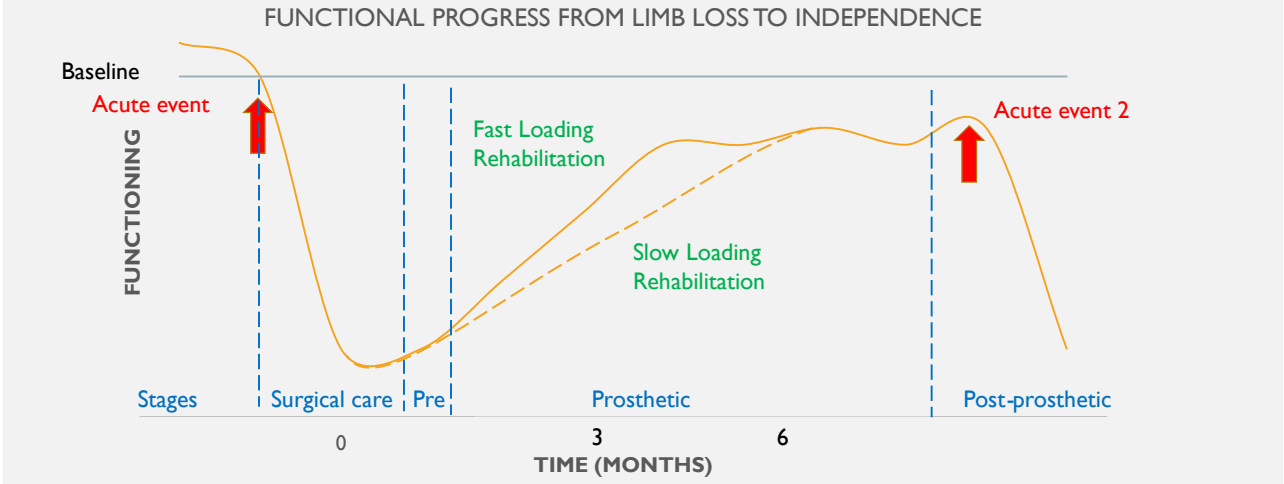
FOREARM

- ROM: month 1
- Standard length prosthesis – week 4+

TIMEFRAME: OSSEOINTEGRATION VS CONVENTIONAL SURGERY



PROGRESS IN FUNCTION



ACRM Archives of Physical Medicine and Rehabilitation
 ORIGINAL ARTICLE
Walking Ability and Quality of Life in Subjects With Transfemoral Amputation: A Comparison of Osseointegration With Socket Prostheses
 Hendrik van der Beek, MS, PhD,* Maria T. Hoogman, PhD,† Jan Paul Fildes, MD, PhD†
 From the Department of Rehabilitation Medicine, The Hague, the Hague, The Netherlands (van der Beek); Department of Physical Medicine and Rehabilitation, University of Groningen, Groningen, The Netherlands (Hoogman); and the Department of Physical Medicine and Rehabilitation, University of Groningen, Groningen, The Netherlands (Fildes).

REAL WORLD OUTCOMES NETHERLANDS

Table 1 Inclusion criteria for OIP

Current socket prosthesis

1. Reviewed by a rehabilitation physician and approved (fitting and alignment) Yes

Prosthetic use and walking distance with socket prosthesis

2. Prosthetic use >50h/wk Yes

3. Walking distance >20m (can do, with or without walking aids) Yes

Influence on quality of life

4. Have you been considerably unable to rely on the prosthesis being securely fastened? Yes

5. Has the prosthesis made it considerably uncomfortable to sit down? Yes

6. Has the prosthesis considerably given rise to sores, chafing, or skin irritation? Yes

7. During last summer, have you been considerably troubled by heat/sweating when wearing the prosthesis? Yes

8. Would you summarize the problems you experience with your current prosthesis as considerable? Yes

OIP is indicated if question 1 is answered yes and if at least 4 other questions are answered yes.

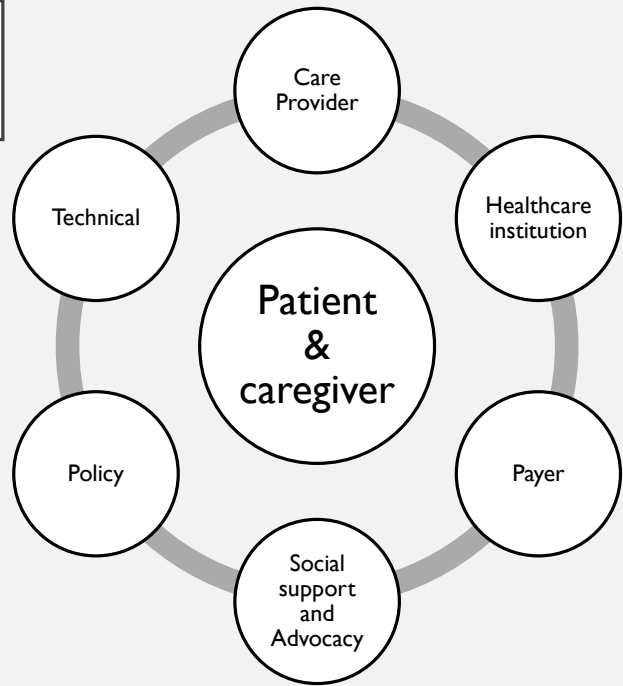
Table 2 Walking ability and prosthesis-related quality of life

Measure	Socket		OIP		P
	Mean ± SD	Median (Min–Max)	Mean ± SD	Median (Min–Max)	
Q-TFA global score (0–100)	39±4.7	42 (8–75)	63±5.3	75 (42–100)	.001
Prosthesis use (h)	56±7.9	56 (1.5–108.5)	101±2.4	88 (56–108.5)	<.001
GMWT (m)	321±28	325 (230–470)	423±21	427 (323–613)	.002
TUG (s)	15.1±2.1	11 (6.3–29.3)	8.1±0.7	7.3 (4.9–15.3)	.002
Oxygen PWS (mL/min)	1330±310	1306 (801–1991)	1093±361	1084 (300–1774)	.001

NOTE: Q-TFA, prosthesis use, and locomotion parameters of subjects using socket prostheses (preoperative assessment) compared with OIP prosthesis (postoperative assessment). The Q-TFA score and prosthesis use were pre- and postoperatively assessed in 22 subjects. The GMWT, TUG, and oxygen consumption test were preoperatively assessed in 20 subjects and postoperatively in 22 subjects.
 Abbreviations: Max, maximum; Min, minimum.

TEAMWORK THINKING

The Rehabilitation Approach



FACILITATING RESOURCES



THANK YOU