

Immediate post-operative treatment

+

Compression therapy



Early Prosthetic Fitting



Mean age for amputees are about 78 years in Scandinavia. It is very important to fit this group of patients with a prosthesis as soon as possible after the surgery, trying to avoid further complications.

This can be achieved through

**early appropriate post-operative treatment
combined with effective compression
therapy**

Clinical Issues

post-operatively day 1-21



Day 1-7

- **Oedema**
- **Wound healing**
- **Prevent contractures**
- **Infection**
- Stabilize stump volume
- Stump shaping

Day 7-21

- Oedema
- Wound healing
- Prevent contractures
- Infection
- Stabilize stump volume
- Stump shaping

Post Operative treatment



Day 1-7, Primary objectives:

- Control of oedema
- Effective wound healing
- Prevent contractures
- Avoid infection



Oedema



Control of oedema is very important for the healing process and can be achieved through rigid dressing

- **Control of oedema reduces the pain**
- **Control of oedema supports wound healing**
- **Control of oedema empowers correct shape and stabilize volume**
- **Control of oedema improves compression therapy**
- **Control of oedema makes early prosthetic fitting possible**

van Velzen, A. D. et al. (2005). "Early treatment of trans-tibial amputees: retrospective analysis of early fitting and elastic bandaging." Prosthet Orthot Int **29**(1): 3-12.

Controls of oedema

- Rigid dressing
- Semi-rigid dressing
- Soft dressing



The literature says...



Scientific studies shows that rigid dressing gives the best results!

- Reduced pain.
- Improved control of oedema.
- Faster healing.

van Velzen, A. D. et al. (2005). "Early treatment of trans-tibial amputees: retrospective analysis of early fitting and elastic bandaging." Prosthet Orthot Int **29**(1): 3-12.

Deutsch, A., R. D. English, et al. (2005). "Removable rigid dressings versus soft dressings: a randomized, controlled study with dysvascular, trans-tibial amputees." Prosthet Orthot Int **29**(2): 193-200.

Rigid Dressing



Wound Healing

Important parameters to achieve effective wound healing

- **Proper circulation**
 - Early mobilization
- **Reduced pain**
 - Control of oedema
- **Optimal bandage**
 - Occlusive wound treatment
- Nutrition
- Smoking
- General condition
-



Risk for contracture



Contracture might obstruct prosthetic fitting.

Contracture prophylaxis is achieved through the use of rigid dressing.



Risk of infection



Infection might delay the wound healing and compression therapy.

Minimize the risk of infection through occlusive wound treatment and reduce the numbers of wound inspection.

Field CK, Kerstein, MD, (1994) Overview of wound healing in a moist environment, The American journal of surgery, January 167(1A suppl): 1S-6S.

Ossur Rigid Dressing (ORD)

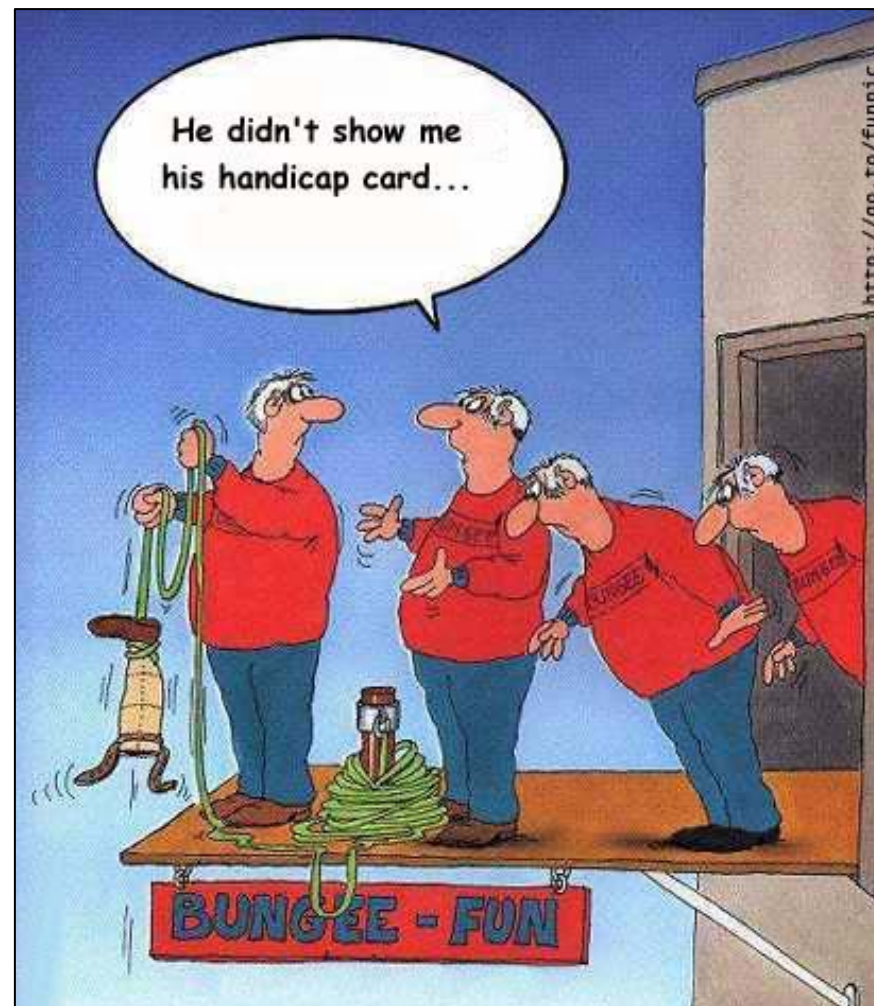


Ossur Rigid Dressing



- Simple and fast to apply.
- Light weight that supports early mobilization.





Ossur Rigid Dressing



- **Control of oedema**
Effective and adjustable to have continuously control.
- **Wound healing/infection**
ORD can be combined with occlusive bandage. ORD supports needed wound inspections.
- **Contracture prophylaxis**
ORD becomes stiff when air is evacuated and it keeps the knee in extension.



Ossur Rigid Dressing



Technical specifications

- PVC shell with Polystyrene balls.
- Becomes stiff when air is evacuated.
- Vacuum is attained through evacuator
- Two sizes.
- One patient use.



Ossur Rigid Dressing



Technical specifications

- Easy to open for wound and stump inspection.
- Control of oedema together with volume control.
- Immobilize the knee joint and prevent knee contractures.
- Protects the amputation stump.
- Easy to clean.



ORD vs. Plaster of Paris



ORD

- Adjustable and supports continuously volume control.
- Lightweight 680g, supports mobilization.
- Time to apply approx. 5 min.
- Supports inspection.

Plaster of Paris

- No adjustments possible.
- Heavy and ungainly, difficult to mobilize the patient.
- Time to apply approx. 10-15 min + need of H₂O.
- Restricts inspections and tools are needed.

Ossur Rigid Dressing



Instructions for use

- Apply immediately after surgery.
- Recommended use, 5-7 days. 3-4 weeks during night.



Ossur Rigid Dressing



Application

- Apply an absorbing wound dressing and wrap the residual limb thoroughly with synthetic under cast padding for cushioning and moisture absorption.



Ossur Rigid Dressing



Application

- The distal shell holds close to the residual limb, while the posterior shell folds up. The anterior shell is now folded over the residual limb.



Ossur Rigid Dressing



Applicering

- Evacuate the air by pumping, the more vacuum pulled the stiffer the dressing becomes.



Ossur Rigid Dressing



Applicering

- The ORD should generally be opened once in the morning and once in the evening and left open for 15-20 minutes to air the residual limb.



Ossur Rigid Dressing



Volume matching

1. Open the valve to let air into the dressing.
2. Shape the dressing.
3. Tighten the straps.
4. Evacuate air.



A volume matching has now been performed.

Ossur Rigid Dressing



Contraindications

- Infection?
- Pain?



Studies



Faster wound healing

RRD

SSD

71.2 days

96.8 days

Vigier S, Casillas JM, et al. (1999). Healing of open stump wounds after vascular below-knee amputation: plaster cast socket with silicon sleeve versus elastic compression. Arch Phys Med Rehabil. 80:1327-1330.

Studies



Faster wound healing

RRD

SSD

51.2 days

64.7 days

Deutsch, A, English, RD et al. (2005). Removable rigid dressings versus soft dressings: a randomized, controlled study with dysvascular, trans-tibial amputees. *Prosthet Orthot Int* 29(2): 193-200.

Studies



Stump damage due to fall (falls/damage)

RRD

SSD

4/0

6/3

(2 revised to TF)

Deutsch, A, English, RD et al. (2005). Removable rigid dressings versus soft dressings: a randomized, controlled study with dysvascular, trans-tibial amputees. *Prosthet Orthot Int* 29(2): 193-200.

Studies



Time to prosthetic casting

RRD

36 days

(n=78)

SSD

42 days

(n=76)

Woodburn, KR Sockalingham, S et al. (2004). A randomised trial of rigid stump dressing following trans-tibial amputation for peripheral arterial insufficiency. *Prosthet Orthot Int* 28(1): 22-7.

Clinical Issues

post-operatively day 1-21



Day 1-7

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- Wound healing
- Prevent contractures
- Infection
- Stabilize stump volume
- Stump shaping

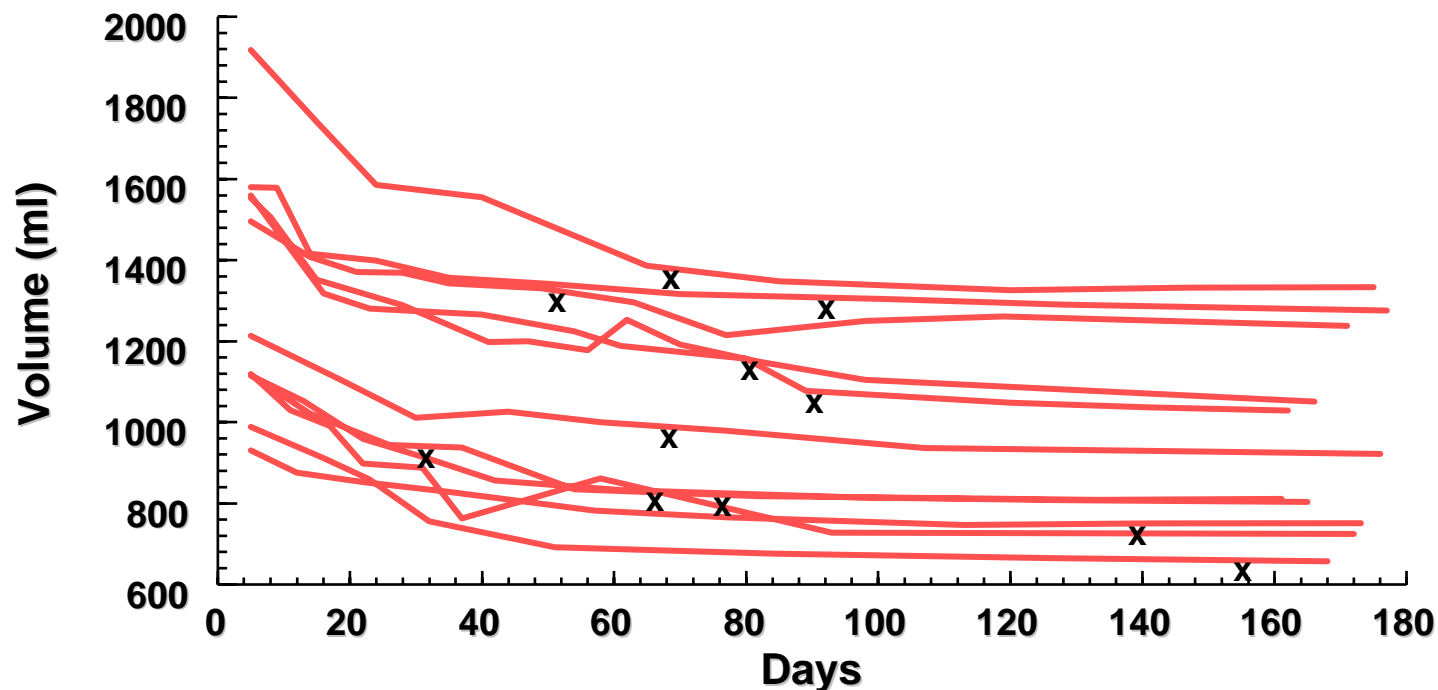
Day 7-21

- **Oedema**
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- **Stump shaping**

Volume changes

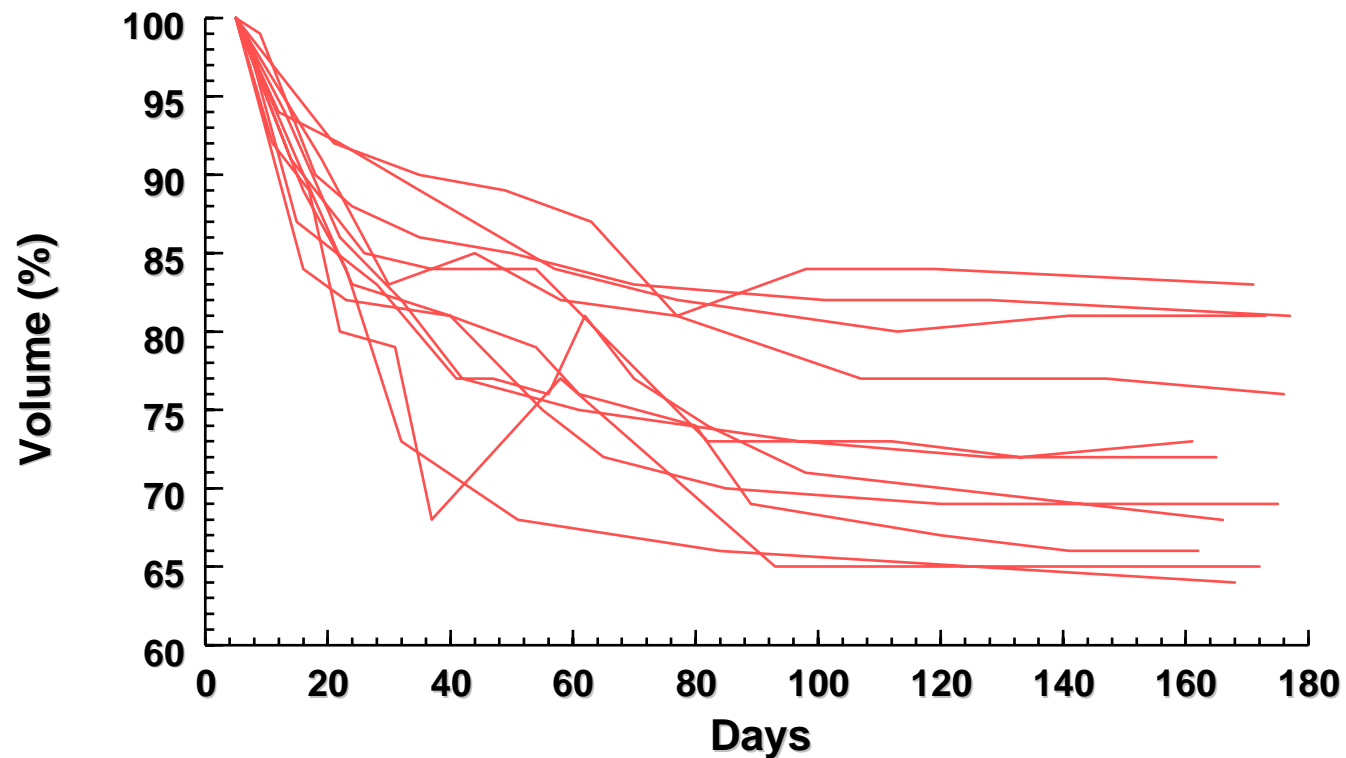


Soft dressing will result in slow volume stabilization.



Lilja, M. and T. Öberg (1997). "Proper time for definitive transtibial prosthetic fitting." J Prosthet Orthot 9(2): 90-5.

Volume in per cent related to 5 days post op.



Lilja, M. and T. Öberg (1997). "Proper time for definitive transtibial prosthetic fitting." J Prosthet Orthot 9(2): 90-5.

Oedema/Volume stabilization



- It is preferable to achieve stabilized stump volume before the first prosthetic socket is produced.
- An early start of compression therapy with Iceross Post-op liners, results in a stable stump volume.

Johannesson, A., G. U. Larsson, et al. (2004). "From major amputation to prosthetic outcome: a prospective study of 190 patients in a defined population." *Prosthet Orthot Int* 28(1): 9-21.

Wound treatment



- Wound treatment should be effective and painless.
- A occlusive bandage that can absorb and keep fluid during pressure.

Field CK, Kerstein, MD, Overview of wound healing in a moist environment, The American journal of surgery, 1994 January 167(1A suppl): 1S-6S.

Contracture prophylaxis



- Mobilization
- ORD during nights, if needed
- Correct support while in wheel chair.



Shaping the stump



- The Iceross post-op liner is used for edema and volume control and for shaping of the residual limb allowing the prosthetic treatment to start earlier.
- It is desirable to avoid bulbous shaped stumps that might prevent/prolong a successful prosthetic fitting.

Johannesson, A., G. U. Larsson, et al. (2004). "From major amputation to prosthetic outcome: a prospective study of 190 patients in a defined population." *Prosthet Orthot Int* 28(1): 9-21.

Possible solutions

- Stump shrinkers
- Iceross post-op liner
- Soft dressing



Possible solutions



Stump shrinkers

- No graded compression.
- Low effect of compression.

Soft dressing

- Result depends on experience of the personnel and dressing material.
- Time-consuming.

Iceross post-op liner

- Equal compression independent of personnel
- Decreasing compression proximally.
- Simple to disinfect.



Early Prosthetic Fitting



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Iceross Post operative compression treatment



Iceross Post-op liner



Clinical issues

Compression treatment

Post-op liner minimizes oedema and supports an effective wound healing

Stabilization of volume and stump shaping

Silicone liners allows a faster process for shaping and preparing the residual limbs.

Classification of compression



Class 1: 18 - 21 mmHg (Mild)

Class 2: 23 - 32 mmHg (Medium)

Class 3: 34 - 46 mmHg (High)

Class 4: > 49 mmHg

- Medical staff should always take following circumstances into consideration:
 - peripheral blood circulation
 - general health condition
 - individual tolerance of compression

Iceross Post-op liner



Technical specifications

- **The same compression is obtained independent of who applies the liner.**
- **Early residual limb adaptation to a “liner environment”.**
- **A safe and effective compression that decreases gradually from the distal to the proximal end.**
- **Easy and quick donning and doffing for personnel as well as patient.**

Iceross Post-op liner



Technical specifications

- **An earlier stabilization of residual limb shape and volume is obtained.**
- **Gives the residual limb a favorable shape for prosthetic fitting.**
- **Clinics using the post-op liner are experiencing dramatically decreased problems with scarring and adherences.**
- **Can give the patient an early active role in the rehab process.**

Iceross post-op liner



- Distal part with “umbrella”
 - Protects the limb
 - Facilitates donning
- Matrix
 - Stabilizes the soft tissue and ensures a compression that is highest at the distal end.
- Profile
 - Supplies a safe compression that decreases proximally.
- Re-usable
 - Can be disinfectated and sterilized.



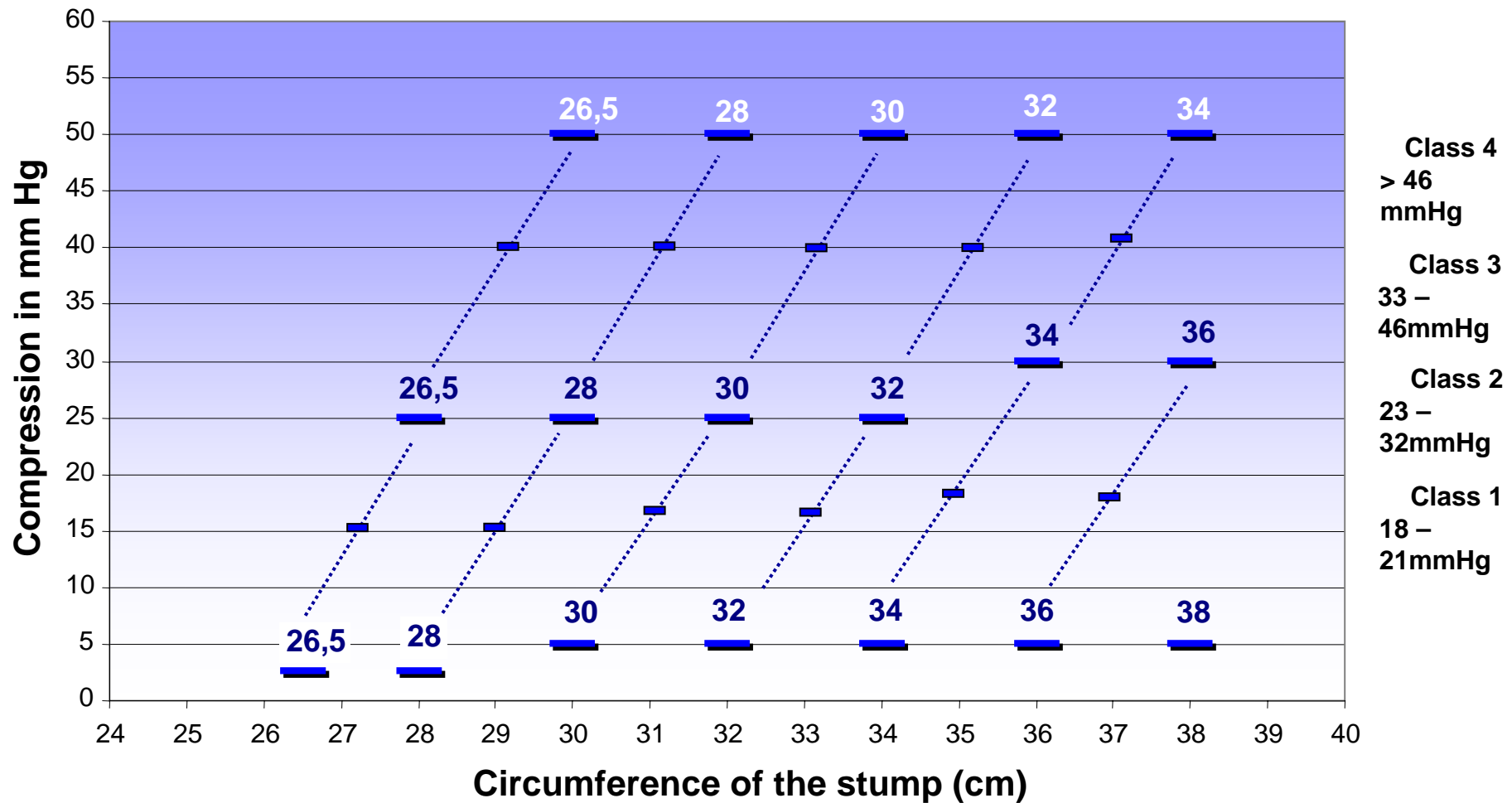
Iceross “compression kit”



- 10 sizes, 26.5 – 45
- Sterile packaging
- 5 clean & simple spray
- Cd-rom instruction for
- Instructions for use



Pressure Guidance Chart



Contra indications



- In case of infection the compression treatment must be discontinued until the infection is under control, than the treatment can start again.
- Any patient who cannot communicate should be excluded as it is crucial to have a dialogue with the patient regarding any discomfort or pain the treatment might cause.

Prior to the compression therapy



- This method works after a well performed amputation.
- A circular rigid dressing for edema control during the first 5-7 days is crucial to achieve a good result when using the post-op liner.
- The treatment should begin as soon as the rigid dressing has been removed.

Size selection and donning



- Measure the circumference of the residual limb 4 cm from the distal and choose correct liner.
- Always apply the clean and simple spray to the outside of the liner before donning and doffing.
- Turn the liner inside out thoroughly to avoid any air pockets from forming + making the donning easier.

Applying the liner



- Place a suitable wound dressing over the wound.
- Turn the liner inside out and apply it to the distal end of the residual limb and roll it on.
- When needed the liner may be shortened to facilitate knee flexion.



Treatment protocol



- Daily use is documented.
- The protocol states guidelines for time of use.
- Measure the residual limb daily and change size of the liner when needed (as volume reduces).

This to ensure a continuously effective compression treatment.

Treatment protocol



F3-3.2 version 2.21 (01)



ICEROSS Post Op Treatment Chart

Name of amputee _____

Date of amputation _____

Day	Date	Residual limb size	ICEROSS Post Op Size *	No. of hours per session	SESSION I		SESSION II		Comments
					Time of		Time of		
					Application	Removal	Application	Removal	
1				1					
2				2					
3				3					
4				4					
5				4					
6				4					
7				4					
8				4					
9				4					
10				4					
11				4					
12				4					
13				4					
14				4					
15				4					
16				4					
17				4					
18				4					
19				4					
20				4					
21				4					
22				4					
23				4					

Resting periods and during night time



A tubigrip bandage or similar is recommended during periods when the liner is not in use.



Cleaning and re-use



- The liner is to be cleaned daily according to the IFU using soap and water.
- If the liner is to be used for an “additional” patient it has to be sterilized according to hospital regulations.



Conclusions



- Ensures a proximally decreasing compression.
- Contributes to effective wound healing.
- Early stabilization of shape and volume.
- Time saving.
- Early patient involvement.



Studie från Kristianstad



Gert-Uno Larsson MD, Anton Johannesson CPO

Anette Holmquist PT, Brita Larsson PT

Amputee information

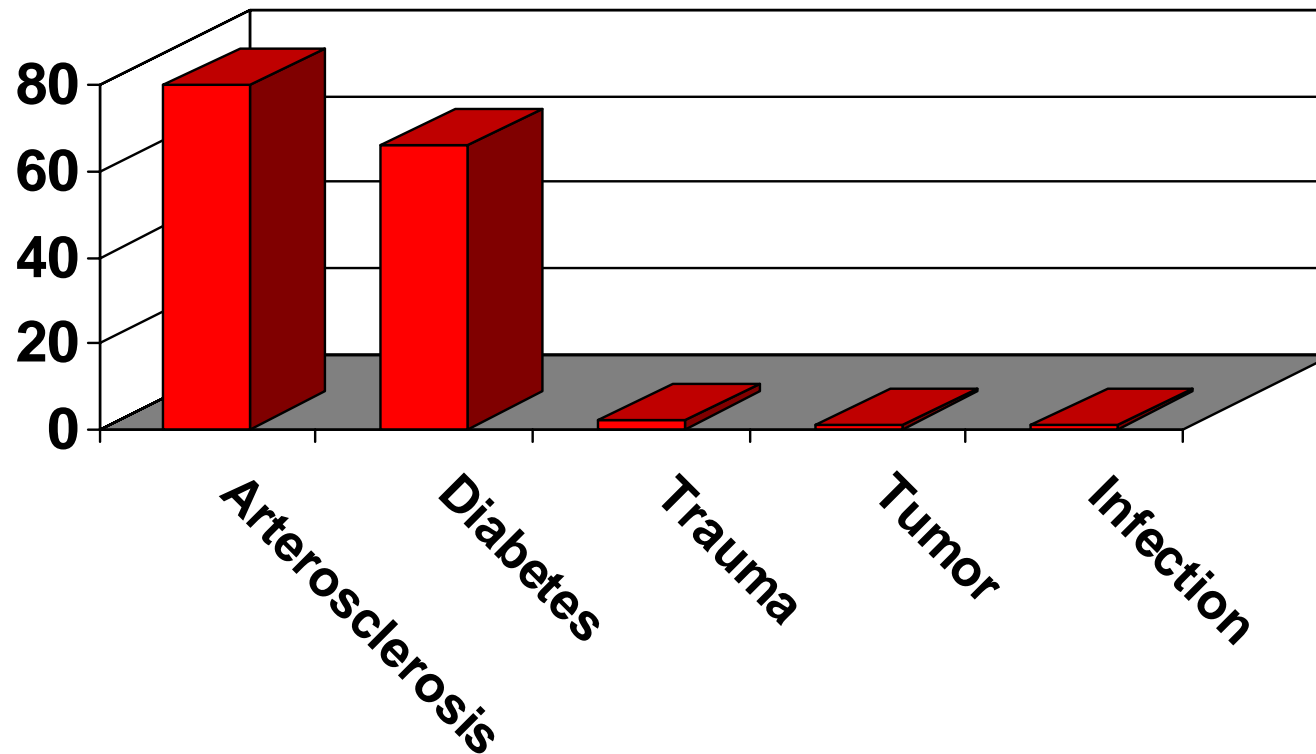


- 150 patients amputated between 1995 and 1997.
- 27 amputees per 100,000 people.
- 34 patients bilaterally amputated.
- Mean age of 78 years.
- 83 years old for women, 67 years old for men.
- 29% died within 3 months of Surgery

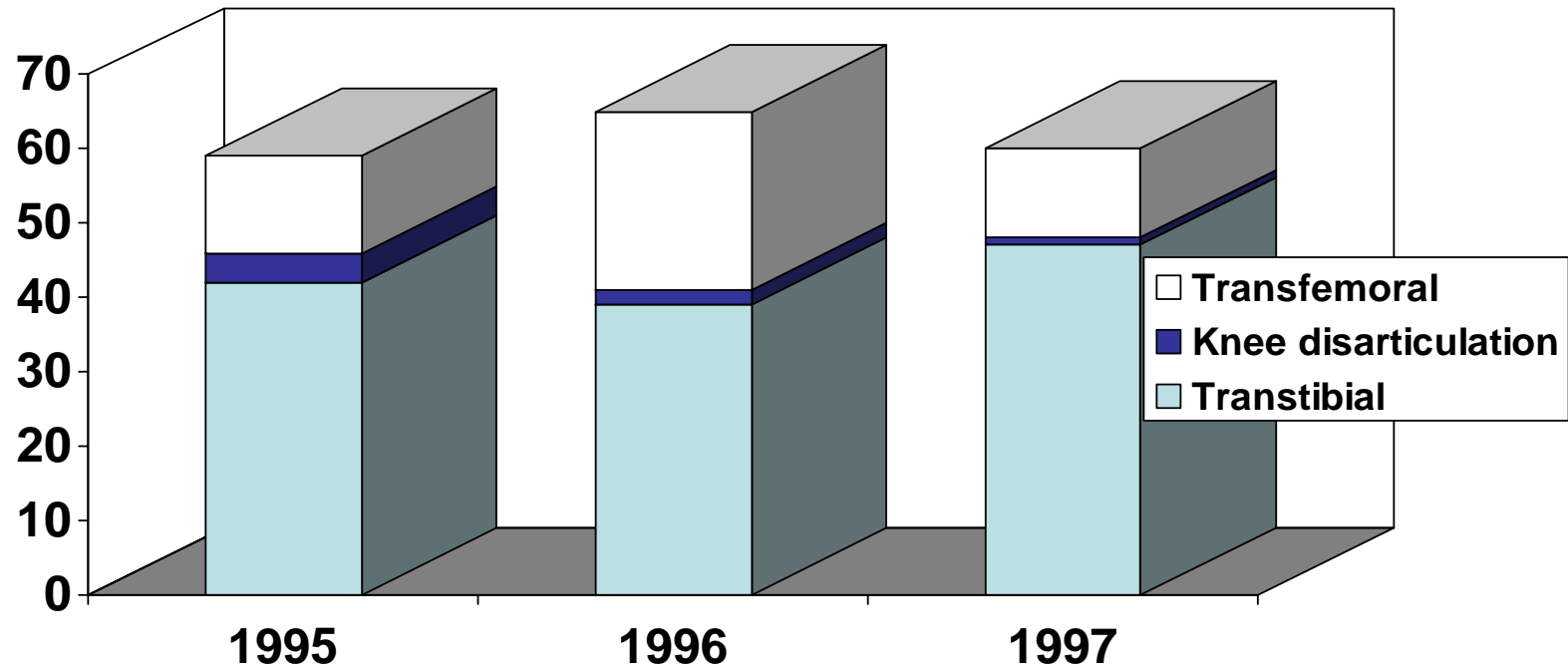
Diagnosis



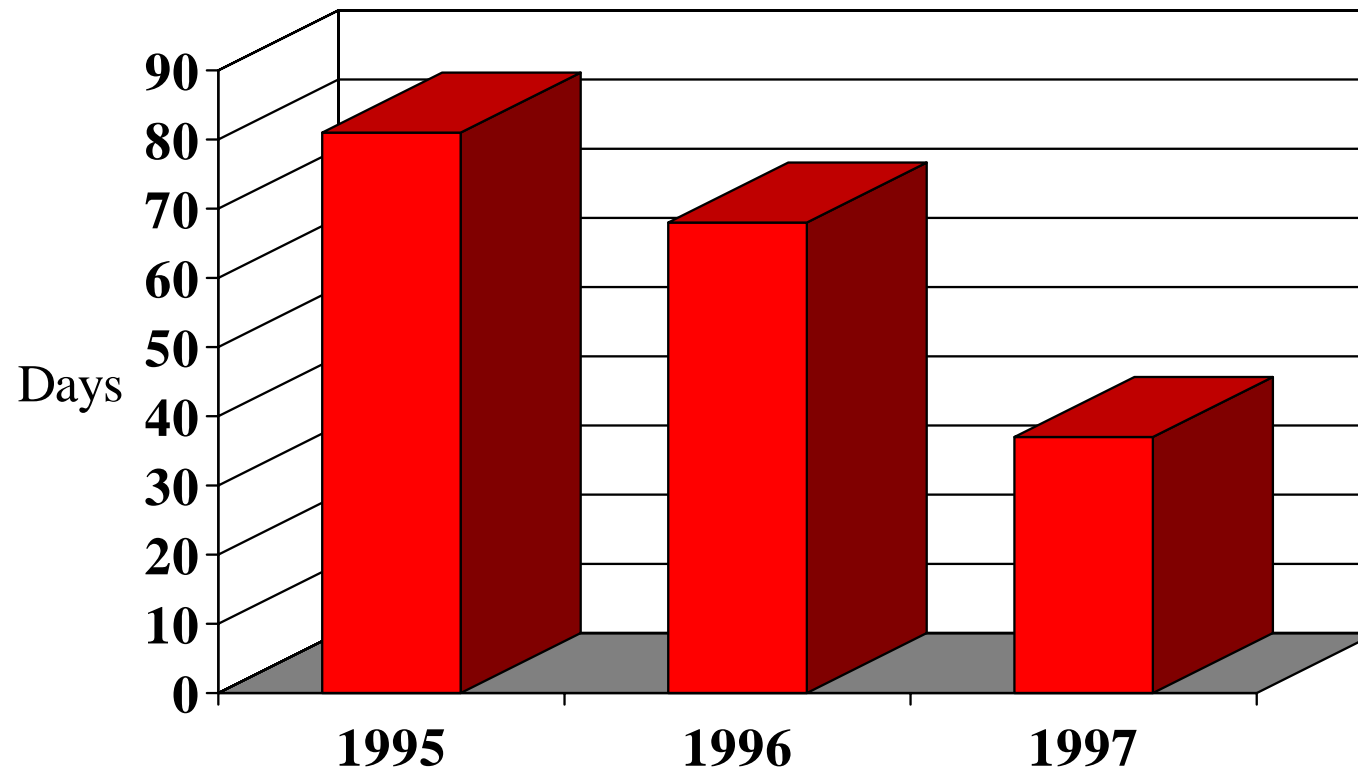
Number



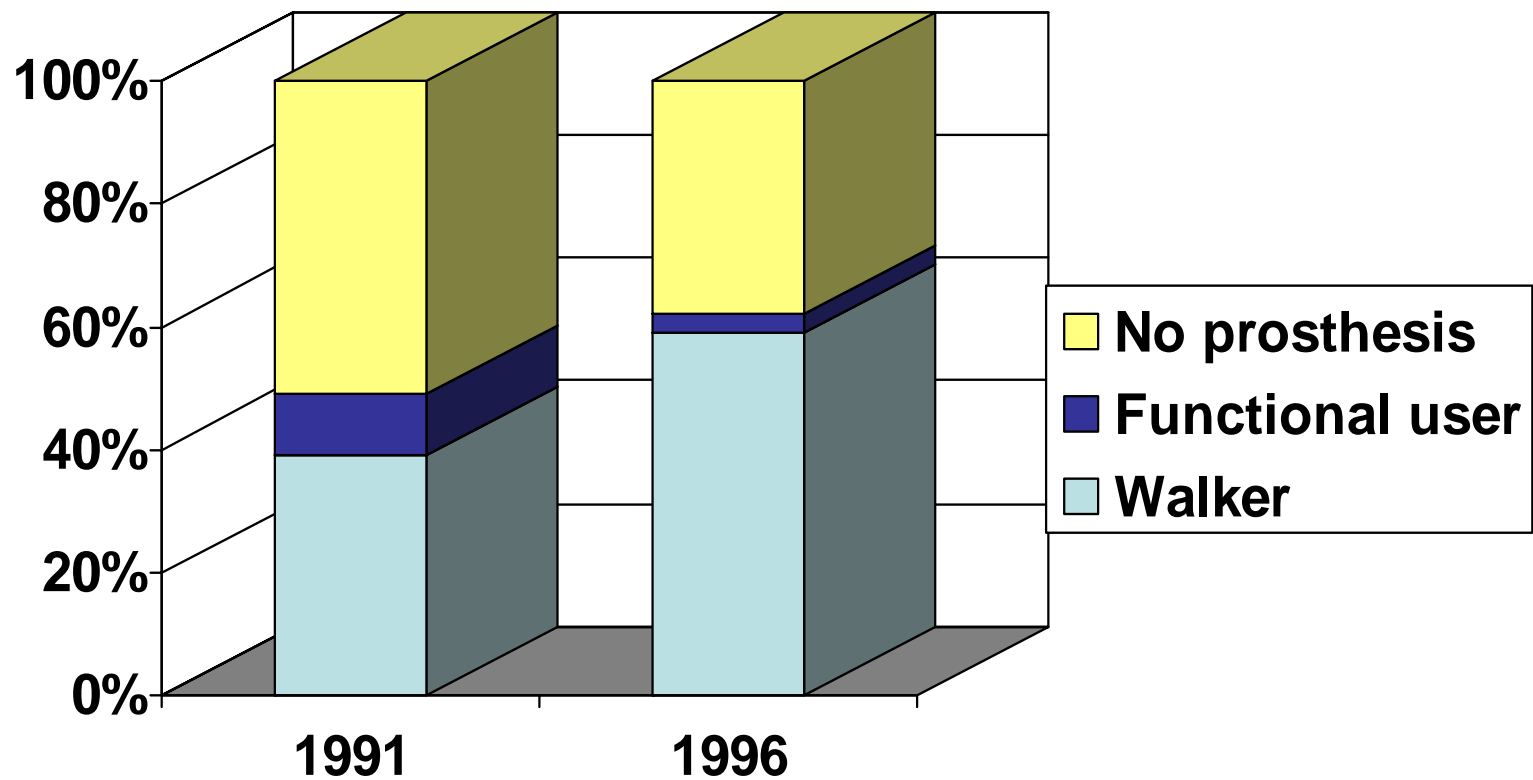
Level of Amputation



Mean stay in Hospital



Prosthetic Fitting 1991-96



Findings



- 70% of the prosthetic users were able to independently don and doff the silicone liners
- 64% were able to apply and care for the prosthesis independently
- 18% increase in prosthetic users since the technique adopted
- Mean time between surgery & prosthetic delivery has been reduced by over 40%
- Less overall complications in rehabilitation of transtibial amputees