Stump Management after Trans-Tibial Amputation: A Systematic Review

S. E. Nawijn, H. van der Linde, C. H. Emmelot, and C. J. Hofstad

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Background: In post-amputation management, achieving optimal stump healing is one of the primary objectives. In order to achieve stump healing after trans-tibial amputation, various methods are applied, such as soft dressings followed by elastic wrapping of the stump, rigid dressings, semi-rigid dressings, and more recently the application of silicon or gel-liners.
Objectives: A systematic literature search was performed to identify the optimal post-amputation management.
Criteria for selecting studies for this review:

- **Types of studies:** 11 controlled studies, RCTs and case control studies
- **Types of participants:** NA
- **Types of interventions:** Table 2
- **Types of outcome measures:** Table 2

Search strategy for identification of studies: systematic search in Medline (from 1970), Current Contents (from 1996), and the Cochrane Database (2003 Issue) until May 2003.
Conclusion: The results from the reviewed studies show a trend in favor of the application of rigid and semi-rigid dressings compared to the application of soft dressings to achieve stump healing and reduction of stump volume following trans-tibial amputation in vascular patients. More research is needed to confirm these results. An RCT is considered to be the preferable study design. Main clinical findings can be found on table 2.

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Table II. Characteristics of included B and C studies.

		Intervention				
		Dressing		Weight bearing		
First author and publication date	Timing	Experimental	Control		Primary outcome measures	Main clinical findings
Vigier 1999	< 3 months PO (open wound by design)	EC, Sil + PC (0.5 – 5 h/day)	EC	Use of ischial weight bearing Prosthesis. After sufficient stump Healing TP is used in both groups.	Time to achieve epithelialization	Sil + PCl shortens the healing time
					Initial success in walking with TP	No significant difference in time to ability to walk
Mueller 1982	< 2 months PO	RRD	EB		Stump volume	Greater stump shrinkage in the RRD group
Baker 1977	Immediate PO	RD	SD + splint	Pylon added to RD after 2 – 6 weeks; then gait training is started	Healing rate (prim-/sec-/non-healing)	No difference in healing rates
					Rehabilitation time	In the RD group gait training started earlier[a]
MacLean 1994	Immediate PO until incision healing	SRD	SD		Readiness for prosthetic fitting	SRD found to be more effective in decreasing time to readiness for prosthetic fitting[b]
Wong 2000	< 30 days PO	SRD	ED		Readiness for prosthetic fitting	Patients with SRD more likely to become fitted and to become ambulatory[b]
					Functional abilities	
Manella 1981	Incision healed	SS	EB		Stump volume	SS better in reducing residual limb volume
Liedberg 1983	Average 3 weeks PO			Training with Tulip TP twice a day, versus no use or use of other TP	Healing rate (prim-/sec-healing/ sec-ulceration)	No difference in healing rates
					Stump volume	No difference in shrinking rate

Table II. (*continued*).

		Intervention				
		Dressing		Weight bearing		
					Walking ability	No difference in walking ability after 3 months
Mooney 1971	Immediate PO	RD	SD	RD + pylon started gait training several days PO.	Healing rate (success/ failure)	RD ± pylon improved healing rate
		RD + pylon		All used TP after incision healing		RD healed more rapidly than RD + pylon
Golbranson 1988	Recent amputation	EW, PC + pylon	EW	PC and PL used during gait training	Stump volume	PL and PC decreased the average volume in contrast to EW, which did not decrease volume
	Incision healed	EW, PL + pylon		Weight bearing to tolerance		
Barber 1983	Immediate PO	RD	SD	TP after 2 weeks if incision healing is satisfactory in both groups	Healing rate (prim-/sec-/ non-healing)	No difference in healing and ambulation level
					Level of ambulation	
Nicholas 1976	Immediate PO	RD	SD	In a number of the RD groups, a pylon was added after 10 – 14 days	Healing rate (% primary healing)	RD showed a higher percentage primary healing
					Rehabilitation status	No difference in long-term rehabilitation

Abbreviations: PO: post-operative; (R)RD: (removable) rigid dressing; SD: soft dressing; EB: elastic bandage; EC: elastic compression; EW: elastic wrapping; PC: plaster cast; PS: plaster shell; SS: shrinker sock; Sil: silicon liner; SRD: semi-rigid dressing; TP: temporary prosthesis; prim-/sec-/non-healing: primary-/secondary and non-healing.
[a]Result from a selected population within the study.
[b]Interpretation of Kaplan – Meier curves.