Literature Review of the Possible Advantages of Silicon Liner Socket Use in Trans-Tibial Prostheses

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Background: The silicon liner socket has been used in the trans-tibial prosthesis since the 1980s. Silicon liner sockets are sleeves of silicon material that are rolled onto the stump and fix the prosthesis to it. The producers of the liners propagate many advantages in their use i.e. better suspension of the prosthesis, protection of the stump skin and improved cosmetic appearance.

Objectives: This review was performed to find objective documentation in the literature in support of the advantages in prosthetic fitting and use of silicon liners.

Criteria for selecting studies for this review:
Types of studies: Six articles remained after application of the selection criteria. In two studies clinical examination was done while in the rest questionnaires were used to collect data
Types of participants: Patient group size ranged from from 20 (Yigˇiter et al. 2002) to 83 (Hachisuka et al. 2001).There were different indications for amputation including trauma, vascular insufficiency, diabetes, infection, tumor, congenital limb defects and spina bifida (Table II). The age of the included patients ranged from 15 (Yigˇiter et al. 2002) to 80 years (Datta et al. 1996).The duration of prosthetic use varied from 10 days (Yigˇiter et al. 2002) to 19 years (Dasgupta et al. 1997) per group of individuals.
Types of interventions: Silicon liners vs. KBM, total surface bearing socket vs. the PTB, Icelandic Roll On Silicon Socket (ICEROSS), shuttle lock mechanism and cord lock mechanism,
Types of outcome measures: walking function, comfort, stump skin problems, pain in the stump or phantom pain, suspension, cosmesis and donning and doffing.

Search strategy for identification of studies: Medline, Embase, Amed, Cochrane, and Cinahl databases were checked.

Conclusion: There is little clinical evidence in the literature to support the positive qualities of the silicon liner socket use in the trans-tibial prosthesis. This is to a large extent related to low quality in study designs. However, there is a good indication to believe that the suspension of the prosthesis is improved when using a liner. Also the walking performance with the prosthesis is positively affected which results in increased walking distance outdoors and less dependence on walking aids. It seems that skin problems are not generally solved by liner use and are sometimes caused by this. Further research with an adequate study design, homogenous population and objective study parameters is needed to show objectively the advantages of silicon liner socket use in the trans-tibial amputees.

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Table II. Study population.

Study	Patient age (years)	Amputation indication (%)	Duration of prosthetic use
Cluitmans et al. (1994)	largest group 60–70	Vascular (67.4), trauma (18.6), other (14)	Group a (5.2 years) Group b (16.9 years)
Dasgupta et al. (1997)	Group A {40.8} Group B {59}	Trauma (77.8), infection (3.7), spina bifida (3.7) diabetes (3.7), vascular (11.1)	employ + (14.4 years) employ – (19 years)
Datta et al. (1996)	22–80 {48.4}	Trauma (50), vascular/diabetes (20.4), congenital (11.1), other (18.5)	U
Hachisuka et al. (1998)	{44.5}	Trauma (65.6), diabetes (12.5), vascular (9.4), other (12.5)	U
Hachisuka et al. (2001)	{53.4}	Trauma (59), tumor (12), vascular (13.3), congenital (1.2), diabetes (14.5)	2.9 years
Yiğiter et al. (2002)	15–37 {27.8}	Trauma (100)	10 days

{}: mean age
U: unknown
employ +: employed with paying job
employ -: unemployed