

Functional Garments for Men with Lower Amputated Limb

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INTRODUCTION

Millions of people in our country are handicapped in one or the other way. They often suffer from perceptible defects of body and movements which keeps them away from the common sections of the society creating a sense of humiliation, privation, inferiority complex and lack of self confidence. Public and social institutes have come up to rehabilitate and to make them independent in terms of their body functions, education and job opportunities but little attention has been paid to design garments to overcome the problems relating to their clothing. Here an effort has been made to design and construct functional garments for men with lower amputated limb.

METHODOLOGY

In a study conducted on 200 handicapped persons, 25 were men with lower amputated limb. Interview and observation techniques were used to identify the problems encountered by them

while dressing/undressing and other clothing related problems. To solve their problems the designs of garments were developed by incorporating requisite functional features. The developed designs were got evaluated from ten judges. The selected designs were used for garment construction. The constructed garments were given to ten respondents for trial for assessment of suitability and acceptability by the respondents and their caretakers.

RESULTS AND DISCUSSION

Analysis of clothing related problems and dressing ability of the respondents highlighted that lower limb amputees faced problems due to use of prosthesis and crutches. To provide ease in setting or detaching prosthesis and to make the garments long lasting, the designs of commonly used upper and lower garments were sketched by incorporating the required functional features. *Specification of Functional Garments:* The problems encountered by lower limb amputees and the specifications of the functional garments

Table 1: Specifications of functional garments: Men with lower amputated limb

<i>Problems encountered</i>	<i>Design No.</i>	<i>Functional features</i>	
<i>Upper garments</i>			
a. Frequent wear and tear at armpit level	Shirt	a	Reinforcement by single layer of fabric
		b & c	Small armholes
b. Raising of garments	Kurta	a	Reinforcement along panel seam at armpit level by two layer of fabric
		b & c	Small armholes
c. Bunching of garments under armpit			
<i>Lower garments</i>			
a. Difficult to wear and remove plants with narrow <i>pauncha</i> due to prothesis	Parts-1	a	Calf length <i>pauncha</i> placket at outer leg seam with flap fastened with studs.
	Part- 2	a	Calf length <i>pauncha</i> placket along inner leg seam fastened with zipper.
b. Frequent wear and tear by strap buckle of prothesis	Under - wear-1	b, c & d	• One side below knee length • Foam padding from thigh level to bottom • Elastic at bottom
c. Loose garments tangled in brim of prosthesis at thigh level	Under - wear-2	b, c & d	• One side below knee length • Shirring with elastic
	Hoses-1	b, c & d	• Foam padded hoses for affected leg with elastic at the top and bottom
d. Frequent abrasion at thigh level	Hoses-2	b, c & d	Elastic shirring in hoses for affected leg

constructed for trials have been indicated in Table 1.

Suitability Assessment of Functional Garments

Upper Garments: Data regarding assessment of functional garments have been depicted in Table 2. For lower limb amputees frequent wear and tear at arm pit level was the major problems with the upper garments. Reinforcement at armpit level provided durability. It was assessed to be very comfortable ($\chi_w = 2.6$) when done by single layer of fabric. Reinforcement by two layers of fabric was not assessed to be very comfortable ($\chi_w = 2.0$). Small armholes in shirt/kurta were found highly suitable as these prevented rising of garments ($\chi_w = 2.5$) and bunching of garments under the armpit ($\chi_w = 2.7$). Reinforcement in kurta had higher aesthetic appeal ($\chi_w = 2.5$) than that in shirt ($\chi_w = 2.1$). This was due to the fact that in *kalidar kurta*, additional layer of fabric was stitched along the panel seams, which made reinforcement less conspicuous but in shirt the stitching lines were slightly visible. For additional protection of the upper garments at armpit level, foam padded cover was suggested for the head and the handle of crutches. These were highly appreciated by the respondent as they provided comfortability while walking and holding the crutches, along with the protection of garment at armpit level.

Lower Garments: Functional pants constructed for lower limb male amputees were tried on 5 respondents having 'below knee' amputation and 5 'above knee' amputees because of difference in the size of their prosthesis. The suitability score revealed that for 'below knee' amputees both the size of plackets i.e. thigh length as well as calf length were highly suitable ($\chi_w = 3.0$) but for above knee amputees thigh length *puncha* placket was more suitable ($\chi_w = 2.8$). The placket along inner leg seam was found aesthetically ($\chi_w = 2.6$) better than the placket made along outer leg seam ($\chi_w = 2.0$). Data regarding fasteners revealed that zipper could conceal the placket ($\chi_w = 2.8$) better than the studs ($\chi_w = 2.2$), so zippers was suggested for the longer placket.

There were a few respondents who were using only *dhoti*. This was assessed to be highly suitable ($\chi_w = 2.8$) because of its pre set pleats and elastic features. With the help of string, they could hold it securely in its place. Though these respondents

did not have any problem with their upper limbs still functional *dhoti* was found to be very useful because they could wear the *dhoti* easily in sitting position.

The suitability score of underwear revealed that in case of above knee amputees, foam padded underwear ($\chi_w = 2.8$) could protect tangling of the lower garments better than elastic shirred underwear ($\chi_w = 2.4$). Regarding comfortability, shirred underwear ($\chi_w = 2.8$) was found to be better than the sponge padded underwear ($\chi_w = 1.6$) because sponge padding was bulky. As a result it could not be worn under the pants. Respondents' views about the hoses were almost the same as for the underwear.

From the suitability scores, it has been observed that whether underwear or hoses, these must be made without foam padding because of comfortability factor. Abrasion, being a very slow process, could not be assessed. However the respondents and their caretakers were of the view that use of underwear or hoses would act as buffer between the garments and the hard surface of the prosthesis to protect the garments against abrasion.

Aggarwal (1993) made some modifications in the pants to protect it from abrasion and frequent wear tear at vulnerable areas. Such type of modifications are required to be incorporated in every lower garment whereas modified underwear or hoses will protect every garment worn over it.

If prosthesis is with knee drop locks like those of calipers, for such persons, knee plackets should be made in pants.

From the findings it can be concluded that upper garments should be made with small armholes and the garments must be reinforced by a layer of fabric or fusing interlining. Reinforcement under the armpit with a layer of fabric had also been reported to be appropriate by Baettke (1963), Tavawala (1982), Ratna (1988), Aggarwal (1993). Foam padding at armpit level to provide comfortability recommended by Aggarwal (1993) and Brat (1994) has not been recommended in the present study instead of that foam padded covers have been suggested.

Assessment of functional garments indicated that *pauncha* placket should preferably be made along inner leg seam. Length of the placket must vary with size of the prosthesis and width of the *pauncha*. Longer plackets should be fastened with zipper but shorter plackets can be fastened with

Table 2: Suitability assessment of functional garments

Functional features of the garments	Functional characteristics	Suitability score
<i>Upper Garment</i>		
Shirt and kurta		
A. Small armholes	- Prevent rising of garment - Prevent bunching of garment under armpit	2.5*** 2.7***
B. Reinforcement under Armpit		
I. By single layer of fabric under the armpit	Comfortable▲	2.6***
II. By two layers of fabric	Comfortable▲	2.0**
• Kalidar kurta	Aesthetic appeal	2.5***
• Shirt	Aesthetic appeal	2.1**
<i>Lower Garments</i>		
Pants		
A. Pauncha Placket :		
I. Calf length along outer leg seam	a) Easy to set and remove prosthesis when jeans/pants with narrow pauncha are worn	
	i) Below knee amputees	3.0***
	ii) Above knee amputees	1.5*
	iii) Aesthetic appeal	2.0**
II. Thigh length along inner leg seam	a) Easy to set and remove prosthesis when jeans/pant with narrow pauncha are worn	
	i) Below knee amputees	3.0***
	ii) Above knee amputees	2.8***
	iii) Aesthetic appeal	2.6***
B. Placket Fasteners		
I. Studs for small placket	a) Conceal opening	2.2**
II. Zipper for longer placket	a) Conceal opening	2.8***
<i>Underwear</i>		
(for above knee amputees only)		
I. Padded with foam	a) Prevents tangling of lower garments in the brim and knee joint of prosthesis	2.8***
	b) Comfortable▲	1.6*
II. Shirred with elastic	a) Prevents tangling of lower garment in the brim and knee joint prosthesis	2.4***
	b) Comfortable▲	2.8***
<i>Hoses</i>		
I. Padded with foam	a) Prevents tangling of lower garment in the brim and knee joint of above knee prosthesis	2.8***
	b) Comfortable▲	1.8**
II. Shirred with elastic	a) Prevents tangling of lower garment in the brim and knee joint of above knee prosthesis	2.5**
	b) Comfortable▲	2.6***
<i>Pre-set Dhoti</i>		
I. Elastic at waist	a) Easy to set at waist	2.8***
II. String along elastic	a) To hold dhoti securely	2.8***
<i>Utility articles</i>		
Foam padded covers for head and handle of crutches	a) Comfortable▲	2.2**
	b) Prevent pain in hands	2.6***

Suitability level : *Low (1.00 to 1.66); **Medium (1.67 to 2.33); ***High (2.34 to 3.00)

▲ = Observations of the respondents only

studs and placket can be concealed with a decorative flap. Placket along leg seam for rapid and easy access to prosthesis designed in the present study was in conformity with the recommendation of Suderberg (1991) and Aggarwal (1993).

KEYWORDS Functions. Garments. Disabilities.

ABSTRACT Lower limb amputees encountered problems related to clothing because of supportive devices and they were : rising of upper garments, bunching of garments under armpit, frequent wear and tear at armpit level due to crutches, wearing pants with narrow *pauncha* because of prosthesis, frequent wear and tear due to tangling of garments in prosthesis at thigh level or knee joint, abrasion at thigh level. Reinforcement provided to increase the serviceability of upper garments was highly appreciated. *Pauncha* placket fastened with zipper provided ease at the time of setting/ detaching prosthesis. Underwears or hoses shirred with elastic were found useful to prevent frequent wear and tear as well as abrasion in lower garments.

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