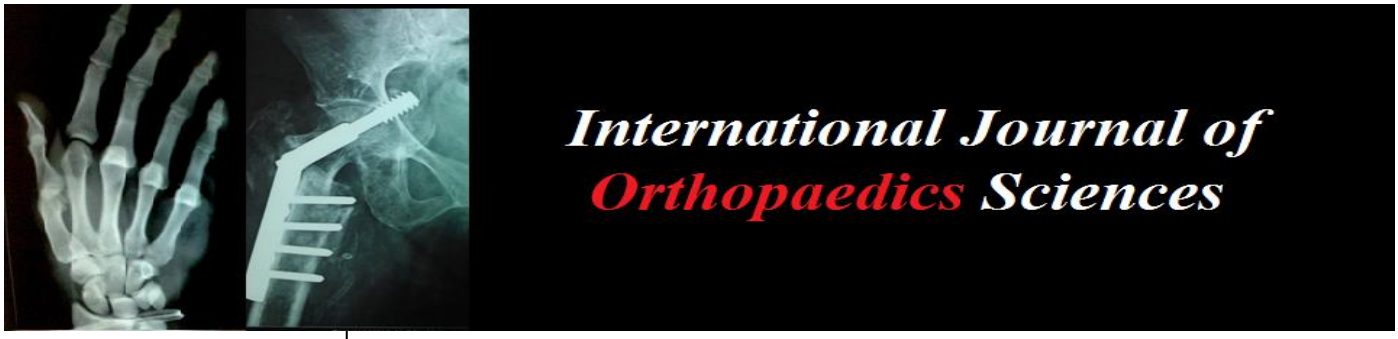

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Coimbatore model: A role model for other medical colleges in India to start modern light weight artificial limb production centre without expenditure to government under Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana

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Abstract
Introduction: The Common locomotor disability in modern India is due to loss of limb. In India, Most of the people who have lost their limbs are from below poverty line. The primary aim is to start a modern lightweight artificial limb production centre with the available resources without expenditure to the government.
Materials and Methods: The lightweight artificial limb production centre was established during Covid-19 pandemic in July 2020 at the Institute of Orthopaedics and Traumatology, Government Coimbatore medical College Hospital, Coimbatore without expenditure to the government.
Result: The first transtibial light weight artificial limb prosthesis was fitted to a lady who had lost her limb due to diabetes mellitus on 15th august 2020 under AB PMJAY-TN CMCHIS.
The modern light weight artificial limb production centre work was initiated and completed within 60 days during the Covid pandemic. Even during Covid pandemic, 45 beneficiaries enjoyed freedom of living on their own by the dedicated team work under AB-PMJAY. the Coimbatore model is profitable to the government institution
Discussion: Coimbatore is the first lightweight artificial limb production centre without expenditure to the government. The light weight artificial limb prosthesis package is available in AB-PMJAY. Hence the money is generated through their AB-PMJAY package. The generated money is not only useful for recurring expenditure but also used for infrastructure developments and repaying the money to start light weight artificial limb production centre.
Conclusion: In Coimbatore model, the so-called expenditure concept is converted into money generation concept which is useful for infrastructure development of Government Coimbatore Medical College Hospital. Hence this model can be taken up as a profitable role model to start light weight artificial limb production centre in other government medical college hospitals in India without expenditure to the government.

Keywords: AB-PMJAY, Coimbatore model, light weight artificial limb production, locomotor disability

1. Introduction
In India, according to 2011 census the prevalence of locomotor disability is 54.3 lakhs [1]. Among them,33.7 lakhs are males and 20 lakhs are females [1]. The Common locomotor disability in modern India is due to loss of limb. The most common causes leading to loss of limb are trauma, complications of diabetes mellitus like diabetic foot, peripheral vascular disease, neuropathy, and cancer [2, 3]
In India, Most of the people who have lost their limbs are from below poverty line. At times, they are the only breadwinner of the family. Hence the whole family will be under physical, mental and financial agony. This situation warrants drop out of their children from the school and colleges. The persons who have lost their limbs will be under severe mental agony because even for their activities of daily living they have to depend on others. Hence negative thoughts are extremely common which may vary from temporary frustration to suicidal tendencies [4].

In India, there are two types of artificial limb prosthesis available in the market. One is heavy weight prosthesis where the patients have to lift the heavy weight prosthesis while walking. Hence it is not patient friendly and patient loses his self-confidence to work on his own as well as to look after his activities of daily living. The second one is the modern light weight prosthesis [Figure 1]. With this lightweight prosthesis, the patient can take care of himself and work on his own without depending on others. Hence the lightweight prosthesis helps the person to work and act independently like a near normal individual.

The primary aim is to start a modern lightweight artificial limb production centre with the available resources without expenditure to the government, so that the common man in the below poverty line can enjoy the benefits of the latest advancements in healthcare facility nearer to their living place.

Fig 1: Varieties of custom made light weight artificial limb

Materials and Methods

The lightweight artificial limb production centre was established during Covid-19 pandemic in July 2020 at the Institute of Orthopaedics and Traumatology, Government Coimbatore medical College Hospital, Coimbatore. The objective of the project is to produce and provide modern light weight artificial limb with complete rehabilitation using multidisciplinary approach to the persons who have lost their limbs without expenditure to government.

During Covid pandemic in May 2020 Prof. S. Vetrivel Chezian, Director, Institute of Orthopaedics and Traumatology, Coimbatore medical College Hospital, Coimbatore discussed the need to start modern lightweight artificial limb production centre with the then dean Prof. Kalidas, where the entire amount for the project will be taken care by orthopaedic AB PMJAY- TN CMCHIS fund [Figure 2] generated by operating orthopaedic patients. since the manpower is already available. A team headed by Prof. S. Vetrivel Chezian was constituted to complete the project under AB-PMJAY.

To provide a comfortable stay, 10 beds will be utilized in the AB PMJAY- TN CMCHIS orthopaedic ward [Figure 3] for the persons who have lost the limbs admitted for light weight artificial limb prosthesis since the orthopaedic bed strength is more than the National Medical Commission norms.

To understand the need for a multidisciplinary approach, a joint meeting was conducted and chaired by Prof. S. Vetrivel Chezian. Orthopaedic doctors including post graduates, Orthotist, Physiotherapist and Occupational therapist were asked to give their views about this project. After a brainstorming discussion, responsibilities were allocated to them [Table 1] and a protocol [Table 2] was formulated.

Table 1: Job functions for various categories in Coimbatore model

Faculties/Technicians	Job function
Orthopaedic faculties	• Admitting the patients • Informing the orthotist • Processing under Ayushmann Bharat Pradhan Mantri Jan Arogya Yojana (AB PMJAY)
Orthotist	• To take Custom made Measurement • Manufacturing of light weight artificial limb prosthesis • Fitting and modification of prosthesis
Psychiatrist	Counseling and motivating the differently abled person to work on their own
Occupational therapist	Counseling about suitable occupation with the light weight limb fitting
Physiotherapist (Physiatrist if available)	Walking training and Exercise program

Fig 2: AB-PMJAY and TN-CMCHIS logo

Table 2: Multidisciplinary approach protocol

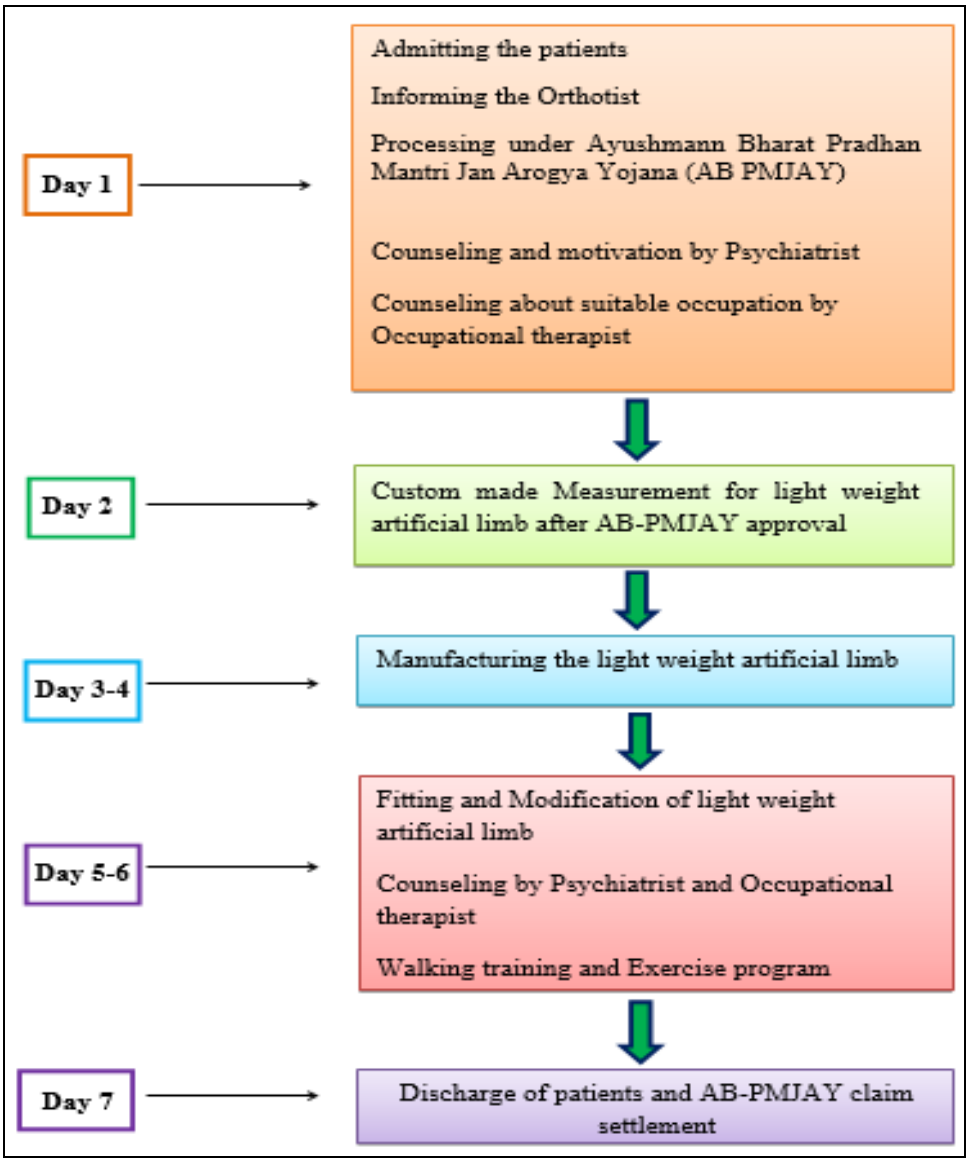

Fig 3: State of Art Orthopaedic AB-PMJAY-TNCMHIS ward in Coimbatore medical college Hospital

Result

The first transtibial light weight artificial limb prosthesis was fitted [Figure 4]

to a lady who had lost her limb due to diabetes mellitus on 15th august 2020 under AB PMJAY-TN CMCHIS.

The modern light weight artificial limb production centre work was initiated and completed within 60 days during the Covid pandemic [Figure 5] and was appreciated by then Chief Minister of Tamil Nadu in his social media.

Since Prof. S. Vetrivel chezian was in charge for department of Physical Medicine and Rehabilitation, it was easy to coordinate Orthopaedic and Physical Medicine department and to work efficiently to help the patient from below poverty line.

Even during Covid pandemic, 45 beneficiaries enjoyed freedom of living on their own by the dedicated team work under AB-PMJAY. Seven females and 38 males were among them. Transtibial prosthesis was fitted more than other prosthesis. In Coimbatore model Rs.15 lakhs was used for modification of infrastructure and procurement accessories for modern light weight artificial limbs. since the man power was already available.

As per government order, 25% of AB PMJAY-TN CMCHIS claim amount will go to institutional infrastructure account. In this way, the total claim amount was 18.6 lakhs for 45 beneficiaries. Hence the infrastructure amount generated was 4.6 lakhs. This amount is a profit to the government at the institutional level and will be used to repay the money used to start modern light weight artificial Limb production centre under AB-PMJAY. Earlier the entire claim amount was given to private sectors and were enjoying the profit utilizing AB-PMJAY. Hence, in Coimbatore model, the artificial limb production became a source for generation of money and is useful for the infrastructure development of the institution. In this way the expenditure concept is converted to money generation concept in the government side.

Table 3: Expenditure and Money generation in Coimbatore model

Prosthesis	Beneficiaries	Claim Amount (Rs.)	Actual cost (Rs.)	Consumable (Rs.)	Infrastructure (Rs)
Transfemoral prosthesis	14	9,66,000	3,86,400	5,79,600	2,41,500
Transtibial prosthesis	28	7,14,000	2,85,600	4,28,400	1,78,500
Transhumeral prosthesis	2	1,48,000	78,780	88,800	37,000
Transradial prosthesis	1	39,000	15,600	23,400	9,750
Total	45	18,67,000	7,66,380	11,20,200	4,66,750

Fig 4: Producing and Fitting the first Modern light weight artificial limb in Coimbatore model during Covid 19 pandemic

Fig 5: Modification of infrastructure in artificial limb centre

As per Government order, 60% of the claim amount will go to consumable account of the concerned department. In our Coimbatore model, to produce 45 lightweight artificial limb prosthesis the actual cost was 7.6 lakhs, whereas the consumable amount generated was 11.2 lakhs due to the transparency in the selection of proper vendor by Prof. S. Vetrivel Chezian and the administration. In this way the profit was 3.5 lakhs which will be useful for recurrent expenditure. In this way the Coimbatore model is profitable to the government institution. Hence this project will be sustainable and profitable forever under AB-PMJAY.

Discussion

In India, modern light weight artificial limb production is dominated by private sector. Hence, in most of the places even though the artificial limb is given free of cost under Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana-Tamil Nadu Chief Minister's Comprehensive Health Insurance Scheme (AB PMJAY-TN CMCHIS) by the private suppliers, it is profitable only to the suppliers, and the institution or the department is not generating money from insurance scheme. At present the demand for artificial limb is more than the supply available.

Coimbatore is the first lightweight artificial limb production centre without expenditure to the government. The light weight artificial limb prosthesis package is available in AB-PMJAY. Hence the money is generated through their AB-PMJAY package. The generated money is not only useful for recurring expenditure but also used for infrastructure developments and repaying the money to start light weight artificial limb production centre.

In government Coimbatore Medical College Hospital the artificial limb sub-centre was present for more than 50 years without production of lightweight artificial limb prosthesis even though infrastructure and man power are available. The problems are infrastructure needs a slight modifications and procurement of accessories to produce light weight artificial limb. In Coimbatore model the entire amount for the project was taken care by Orthopaedic AB PMJAY- TN CMCHIS fund generated by operating orthopaedic patients.

For better utilization of light weight artificial limb by the person below poverty line, Prof. S. Vetrivel Chezian co-ordinated with the Coimbatore district differently abled welfare office, regarding the data of waiting list for artificial limbs. Those persons were contacted individually and modern light weight artificial limb was fitted to all waiting list persons free of cost under AB PMJAY-TN CMCHIS. Because of our Coimbatore model, Coimbatore district may be the first district in India free of waiting list for artificial limbs.

As per National Medical Commission, department of Physical medicine and Rehabilitation is mandatory in all the medical colleges in India. Hence the infrastructure and man power are already available in most of the government medical colleges in India. The only issue is the financial part to procure the accessories to produce light weight artificial limb. In India, Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) scheme is available and the fund is generated in all government medical college hospitals. A part of generated fund, about Rs.5 lakhs can be utilized and recycled to establish lightweight artificial limb production centre without expenditure to the government at the institutional level by proper utilization of available resources like Coimbatore model. So that people who have lost their limbs can get modern light weight artificial limb free of cost without financial and mental agony at the district level itself [Figure 6] rather than travelling for a long distance to metro cities.

Fig 6: Freedom of walking on their own with light weight artificial limbin Coimbatore model

Conclusion

The modern light weight artificial limb centre at Coimbatore Medical College Hospital is an example, that modern light weight artificial limb production centre can be established without expenditure to government by recycling AB-PMJAY fund.

In Coimbatore model, the so-called expenditure concept is converted into money generation concept which is useful for infrastructure development of Government Coimbatore Medical College Hospital. Hence this model can be taken up as a profitable role model to start light weight artificial limb production centre without expenditure to the government in other government medical college hospitals in India

References

1. Annual Report of the Department of Empowerment of Persons with Disabilities for the year 2020-21
2. Cesar S Molina, Jim Bob Faulk. Lower Extremity Amputation Last Update, 2020.
3. Carmona GA, Hoffmeyer P *et al*. Major lower limb amputations in the elderly observed over ten years: the role of diabetes and peripheral arterial disease
4. Life After Amputation: What to Expect for the New Amputee
5. https://postacutemedical.com/company/company-updates/life-after-amputation-what-to-expect-for-the-new-amputee