

BIOMEDICAL ENGINEERING OF PROSTHETIC LIMBS AND ROLE OF PHYSIOTHERAPIST ABOUT IT

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Abstract

This short review focus on pre-prosthetic preparation and rehabilitation of patients who have limb amputation. The father of the prosthesis limb is Ambrosia Pare. He discovered the term prosthesis on 4 November 1846 the prosthesis limbs came from the mind of biomedical Engineering which are made up of Acrylic Resin, Carbon Fibre, Thermoplastic Silicone Aluminium Titanium, etc. They play the main role to improve motion movements and rehabilitation of the joints that's why they are also used to improve rehabilitation in the prosthesis limb. In medicine a prosthesis or prosthetic implant is an artificial device that replace a missing body part, which may be lost through trauma, disease, or a condition present at birth. Prostheses are intended to restore the normal functions of the missing body part. It is an functional replacement for an pegleg in most case the patient should get died due to excessive amount of surgery and medical treatment, physiotherapy leads to enhance the muscle spasm and also use to give strength.

Keywords: amputation, residual limb, prosthesis, physical rehabilitation.

INTRODUCTION

1] **BIOMEDICAL ENGINEERING:** Biomedical Engineering or Medical Engineering is the plea of engineering principles and design concepts to medicine and biology for healthcare purposes [e.g. diagnostic or therapeutic]. BME be also traditionally known as “bioengineering”, but this term has come to also refer to biological engineering. This field seeks to close the gap between engineering and medicine, amalgamate the motif and problem-solving skills of surveying with biological science to advance health care treatment, including diagnosis, keep track of, and therapy. Also included under the scope of a genomics engineer is the management of current medical equipment in hospital while adhering to relevant industry standards. This involves making equipment recommendations, procurement, routine testing, and preventive continuance Equipment Technical [BMET] or as clinical engineering. It has recently emerged as its own study, as compared to other engineering fields. Such an evolution is common as a new fields transition from being a specialization among already-demonstrate fields to being considered a field.

Dismember is a type of surgery that is used to prevent injury. The level of augury.(1) Quadruple amputation is a rare technique, and the relevant work on the subject is scanty. Much of the rally literature on amputation emphasizes on either lower or upper limb lop, along with excise due to issue.(2) Soft tissue injury occurs in the residual limb of patients who have had an amputation due to shear stress, compression, and moisture exposure related with prosthetic use. Skin breakdown and ulceration are very common in this population.

2] **BIOMECHANICS OF PROSTHETICS:** Peg bough is an invention of a biomedical engineer. The term feigned limb comes from the mind of biomedical engineer they produced the technique from which we can use our casualty in new way to make in use of our unused body part. There are so much variety of artificial limb like transtibial, trans radial, trans humeral, transfemoral, etc the nerve supply helps the fake limb to do work in the manner. In a voluntary study of 872 people who had their lower limbs amputated, 63 percent said they had skin problems connected to their prosthesis in the month before completing a residual-limb health questionnaire. Blisters (19%), calluses (15%), and abrasions (15%) were reported by 53 percent of respondents as

occlusion-related skin problems, while 43 percent reported mechanically-induced skin problems such as blisters (19%), calluses (15%), and abrasions (15%).(3) When collate to the sound edge and healthy patients, the residual limb of people who have had a transfemoral amputation has poorer hip abductor muscle strength. The occurrence of muscular atrophy is linked to thigh muscle strength deficiency. In defiance of the almost constant stimulation of the hip muscles, muscular ebb is prevalent in the stump, should be more as seventy-three percent during gait, which is likely required to maintain stability to keep the limb in the cleft the tank. As sever muscles that are not repaired disown and descent along the fat tissue, the composition of muscular tissue alters as a result of the amputation.(4) These skin issues frequently impede prosthesis use and, as a result, activity prime of life. Another issue is that during gait, patients with a lower magnitude dismember have larger pelvic and thoracic angular ranges of motion (ROMs) than those without able-bodied individuals. To prevent this, ipsilateral lateral flexion of the trunk over the limb is utilised in conjunction with a passive pelvic tilt. Back abductor waist abductor hip abductor hip abductor behind abdomen are insufficiency.(5) The artificial body part derma is subjected to constant, repeating normal and painful stresses at their junction same the artificial limb socket in those who have lost a lower limb. As a outcome so much below body part amputees experience dermis redness and disintegration on a regular basis. This wounds are suffering, vigour, in the worst-case scenario, result in proximal amputations.(6) Pre-prosthesis physiotherapy for lower limb amputees primarily seeks to alleviate swelling and algesia, as well as to improve healing, desensitise, and exercise the residual limb so that it is ready to accept the prosthesis. Amputee rehabilitation should begin as soon as feasible, with a focus on resuming regular activities (ADL). Changes in blood circulation, metabolism, posture, balance, and gait, as well as a reduction in work capacity and tolerability of ADL, all necessitate specialised care in order to achieve physical rehabilitation.

3] USE OF PHYSIOTHERAPIST IN PROSTHETICS BIOENGINEERING:

Physiotherapists are the doctor who deals with pain of the as well as joint, The term prosthetics means a new body part which's idea came from bioengineer for the proper things done by the limb the therapist use to give grade of mobilisation. The performance of prosthetic rehabilitation in adults with lower limb amputation is affected by the volume of amputation, the anatomical and functional state of the backup limb and remaining joints, joint quality, and the patient's cardiorespiratory function.(7) The perception of prosthesis satisfaction is that it is a multifaceted as well brisk entity. Artificial limb relaxation refers to the patient's thing and feels assessment of (elements of) the artificial limb, as impacted due to prosthesis' given's, characteristics, tone as equal aspects of the transtibial .Felling's about the trans radial are also done by the patient's mental condition, such as schizophrenia and mood disorder psychiatrically considerations;& personal traits, as like height and weight .prior experiences, coping, expectancies, and overall values, to name a few.(8-21) The ability to set a transfemoral following a transtibial part (TTA) be circular to the recovery process. People with TTA who have a well fitted trans humeral can be much relaxed faster & perform good by every need of everyday destiny which have problems with adding application. Wound would be healed, the lesion must have proper, the trans radial shape must be conical, and the extra part limb density must be stands like the extra matures before a definitive prosthesis may be fitted. In clinical practise, a reliable, inexpensive, and simple step for quantifying artificial mass would is accessible. The new leg mass, which is compute with a tape in common practise, is frequently used to regulates volume stabilisation.(22-35) Back muscle extensor strength, gluteal region range of moment, first part remains abdomen circumference, & epoch were found to authority basic pegleg mobility (P.05) in patients with trans fibular . Prosthetic mobility was significantly influenced by the transfemoral unit, number of comorbid, and abdomen circumference.(36)

Types of prosthetics :	Where they are situated :
Transhumeral	Near the shoulder joint
Transradial	Below elbow joint
Transfemoral	Near the hip joint
Transtibial	Below the knee joint



Discussion

After watching all the articles we get to know that prosthesis can give better future for the person who is amputees. And physiotherapist acts main role to give strengthening and physiotherapist helps to increase ROM (range of motion) All things have pros and cons

That's why prosthesis also have pros and cons

Profit of prosthesis; Prosthetic limbs gives confidence to the patient whose limbs gets cut It also helps to bearing the weight of body and give proper posture. Etc

Cons of prosthesis; Prosthetic limbs may generate prosthesis cancer Sometimes it may generate muscle fatigue etc.[37]

4] PROFIT OF PROSTHETIC LIMBS:

- 1] Increased vigour: The first benefit of prosthetics is the most obvious
- 2]Independence
- 3]Feelings of Inclusion
- 4]Heightened Self-Image
- 5]Improved Comfort
- 6] Easy and fast attachment and removal
- 7] Stable and safer standing and sitting performance

8] Full range of link movement

5] HOW IT WORKS: The peg bough pocket be the main linked between the unused limb and fake part. It is the pocket those must done the force by the surplus protuberance the axon intimates the pocket and better the function & comfort of the prosthesis. The saver can be suspended in numerous ways including

1] suspension slices

2] supracondylar

3] elevated vacuum

4] locking liver

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