Extension Prosthesis

(Types and Indications)

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Congenital deformities existed since the beginning of mankind, and the prosthetic replacement of these missing limbs has been relatively recent. The Medical Professionalists found it difficult to rehabilitate these patients, because the prosthetic development was slow, due to small number of patients effected.

An analysis of 50 patients seen at Institute of Rehabilitation Medicine, Madras, indicated the possible causes in our country as consanguineous marriage and drugs like analgesics and sedatives, taken by pregnant mothers during first trimester.

Since these patients have gross deformities and limb length discrepancy, they need to be fitted with a special type of prosthesis called Extension Prosthesis.

The recorded incidence of prosthesis started from our country from Rig Vedas, which is believed to have been written between 3500 and 1800 B.C. It recorded that the leg of Queen Visphala was amputated in battle and an Iron leg was fitted to enable the Queen to walk and return to the battle field. In Tamil Nadu the King Porkai Pandian (meaning the King with the golden arm) was fitted with a golden arm.

The prosthesis for normal classical amputations in order to replace the missing limb, is called as replacement prosthesis. Apart from this, there is another category of prosthesis given for gross shortening of the limb, by providing a special type of prosthesis termed, as Extension Prosthesis. This has some additional components to accommodate any abnormal shape, curvature or to correct a gross limb length discrepancy, in cases where surgery is not desired or indicated, as in Pseudoarthrosis.

We broadly classify the Extension Prosthesis as :

1. Caliper Type
2. Limb Type

Caliper Type Extension Prosthesis

It contains aluminium straight bars for both medial and lateral sides of limb from the level of ischial seat. A separate platform is provided for foot, below this a wooden shin and foot piece are given to compensate the shortening.

Limb Type Extesnsion Prothesis

The socket for the foot is made of plastic resin, and is fixed on a wooden shin piece and foot piece. The whole prosthesis is covered with plastic resin, and the weight bearing is at the level of foot itself. It is suspended by cuff suspension.

In this paper we propose to discuss the various types of Extension Prosthesis, fitted to cases of limb deficiencies.

An analysis of five cases is presented. The causes for shortening of lower limbs in pa-

tients discussed here are :

1. Congenital Fibular Hemimelia ... 1
2. Congenital Femoral Phocomelia ... 2
3. Congenital Tibial Hemimelia ... 1
4. Congenital B. K. Amputation ... 1

LIST OF THE PATIENTS

1. Baby Kanniammal : 8 years.
   (Fibular Hemimelia)
   (a) Absence of Fibula
   (b) Absence of lateral 2 toes
   (c) Forward curvature of Tibia
   (d) Gross shortening
2. Seethalakshmi : 22 years.
   (Femoral Phocomelia)
   Absence of Proximal half of Femur.
3. Usha : 7 years.
   (Tibial Hemimelia)
   (a) Absence of Tibia and Medial 2 toes
   (b) Gross shortening
4. Vedanaygama : 18 years.
   (Femoral Phocomelia)
   Shortening
5. Karuppuswamy : 23 years.
   (Congenital B. K. Amputation)
   With flexion contracture of knee.

DISCUSSION

Although the anamolies existed since the beginning of the mankind, the prosthetic replacement of these missing limbs has been relatively recent. (Hall, C. B. et al., 1962, Neff, G. 1978, Agarwal, A. K. et al., 1984.)

Systematic research has been carried on in many countries however the progress has been slow, because the number affected was rather small and the cultural considerations in many areas have also delayed the application of prosthesis.

An analysis of 50 patients seen, indicates probable causes, as consanguineous marriage, and taking of drugs like analgesics and sedatives by pregnant mothers during the first trimester. There is no evidence of hereditary playing a role in these cases. The girls are more affected than boys, and lower limbs are commonly involved.

The medical professionalists found it difficult to treat and rehabilitate these patients, as they posed a number of psychological, medical and social problems.

The amputation surgery is not contemplated in these patients because of the problems with a small surgically provided stump, regarding weight bearing, balance and later training. Although some workers like Kruger & Talbort (1961) are of the view to undertake radical surgery followed by the prosthesis.

The Extension Prosthesis is the choice, which could be useful to the patient and avoid the risk of psychological trauma to the patient and the parent.

The retention of foot is of considerable importance and advantage, as these patients gain early balance and mobility, because of the better proprioceptive feed back from their intact feet. The natural foot though deformed and small in size is sometimes useful for purposes of squatting especially over Indian type of toilet, while child gets up during night.

One must consider very strongly, the parent cooperation and consent, the home and school situation and accessibility of a good prosthetic care. The recommendation to amputate is never an easy one. The parent sees the limb as an essential, normal appendage and would prefer that it remains. It is difficult with words, diagrams, X-rays and photographs to explain to a parent, as how the philosophy of amputation surgery will benefit the patient.

Lack of normal joint connections, between the extremities and the pelvis is one of the main factors contributing to the difficulties in the production of functional lower limb prosthesis. Other factors which make the fitting difficult are severe deformities of limb and of-

ten severely reduced muscle strength. It is of great importance to utilize the existing function of the deformed limb, improved by training and not to inhibit the development of the muscular capacity as well as the growth of the limb.

CONCLUSION

In early stage of childhood, splints are necessary to prevent deforimties and to maintain limb buds in anatomical functional position, and prosthesis should be prescribed as the child reaches stage of walking (about one year).

The lower limb deficient patients should be fitted with Extension Prosthesis, which help to compensate the limb length, shape and make the child stand erect and walk normally. It also improves their psychological status and gives them a normal look. The personality of these patients also changes and enhances their function and social acceptance.

REFERENCES

Agarwal, A. K., Sharma, R. K., Sharma, V. P., Jain, U. K., Kackar, J. N. and Goel, M. K., "A clinical study of Congenital limb Deficiencies", J. of Rehab. in Asia, Ap. 84.

Hall, C. B. et al., "Congenital skeletal deficiencies of the extremities", J. Am. Med. Ass., Vol. 181, 7, 590-599, 1962.

Kruger, L. M, and Talbott, R. D., "Amputation and prosthesis as definitive treatment in Congenital absence of Fibula". J. Bone and Joint Surg., 43-A, 625-642, 1961.

Neff, G., "Prosthetic principles in bilateral shoulder disarticulation", Prosth. and Ortho. Intern. 2, 143-147, 1978.