

Bone Defect of the Tibia: A Case Report

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Abstract: Defects in long bones including tibia are still difficult problems in orthopaedic field for both the physician and the patient. We reported a case of a 56-year-old woman who came to the hospital with the chief complaint of being unable to walk since she was nine years old after getting a motorcycle accident. The patient complained that her leg did not grow since then. The patient was fully conscious and hemodynamically stable. Physical examination revealed that there was a deformity of the left lower leg with shortening of the lower leg and absence of the tibial bone. The patient was diagnosed with left tibia bone defect, therefore, above-the-knee amputation was performed. The amputation must be viewed as an opportunity to re-establish or enhance the patient's functional level and facilitate a return to near normal locomotion using a prosthesis after amputation. Soft tissue and muscle quality, bone condition, neurovascular conditions and function of the limb can be considered in the selection of therapy in bone defect. The level of amputation can be determined by assessing the bone condition, neurovascular condition, and the ability of muscle and skin flaps to close the wound. In conclusion, amputation can be the treatment of choice for patient with bone defect. Improving lower limb function is proven to maximize the patient quality of life.

Keywords: bone defect tibia; above-the-knee amputation; transfemoral amputation

INTRODUCTION

Bone defects represent a difficult problem for the clinician. Trauma is the most common cause of bone defects.¹ Bone defects associated with nonunion occur as a result of the initial insult or as a consequence of bone excision following nonunion development. Historically management of this clinical scenario consists mainly of amputation, which provided a short recovery period but a significant loss of limb function.²

The observed mortality rate in the population after lower extremity amputation is 48% at one year and 71% at three years post-operatively. The rate of lower extremity amputation in the population is around 4 per 1000. For the general population, the lower extremity amputation rate through 2005 was 2.4 per 10,000. Amputation of the contralateral limb is necessary within 5 years in 30% to 50% of patients who have an amputation of a dysvascular lower limb. Twenty percent of below-the-knee amputations are converted to above-the-knee amputations.³

Above-the-knee amputation demonstrates the importance of muscle reconstruction and balance between residual muscle groups. The goal of surgery is to try to regain muscle balance and to properly position the femur for weight bearing and ambulation.⁴

Although prosthetic devices will never truly replace a missing limb, certain clinical considerations must be addressed irrespectively of which socket or suspension design is chosen. The above-the-knee prosthetic system must balance the function, comfort, and appearance both dynamically and statically.⁵

CASE REPORT

A 56-years-old woman came to the hospital with the chief complaint of being unable to walk since she was 9 years old after a motorcycle accident. The patient complained that her left leg did not grow since then. There was no history of hypertension and diabetes mellitus. There were no common complaints in the family. The patient was fully conscious and hemodynamically stable. Physical examination revealed a deformity of the left lower leg with shortening of the lower leg and absence of the tibial bone (Fig. 1 A-B).



Figure 1 A, B. Left tibia, preoperation



Figure 2. X-ray left cruris AP/Lateral

Radiologic examination AP/lateral cruris showed a bone deformity with narrowing of the femorotibial joint space and defect from proximal to 1/3 distal end of tibia of the syncytial fibula, suspected fusion of the distal bone segment of the tibia with the distal diaphysis of the

left fibula bone, bowing of the fibula, fusion of the proximal left fibula with the proximal tibia and distal fusion of the fibula with the bones of the hind foot (Fig. 2). The patient was diagnosed with left tibia bone defect. Above-the-knee amputation was performed on the patient. The patient was administered in the inpatient room for four days. During the treatment, the patient was given empiric antibiotic, analgesic drug for three days, and H2 blockers for two days.

On the first and second days after surgery the patient only felt pain at the surgical incision (Fig. 3). The patient was discharged after four days of treatment with fully conscious and hemodynamically stable. The patient was followed up regularly at the outpatient clinic, and had no complaint.



Figure 3. Postoperative (Day 2)

DISCUSSION

Bone defects are a serious illness as a result after a pathological process destroying the vital components of the bone. Most commonly the causative event is extensive trauma and subsequent infection.⁶ In the planning of treatment, several factors have to be considered: the quality of the soft tissue envelope, the quality of vascular supply, and the presence or absence of an infection. In terms of treatment there is a wide variety of options.⁷

The amputation must be viewed as an opportunity to re-establish or enhance a patient functional level and facilitate a return to near normal locomotion.⁸ Soft tissue and muscle quality, bone condition, neurovascular conditions and function of the limb can be considered in the selection of therapy in bone defect. The level of amputation can be determined by assessing the bone condition, neurovascular condition, and the ability of muscle and skin flaps to close the wound.

The major choice is between an above or below knee operation. A below knee amputation preserves the knee joint and gives the best chance of walking again with a prosthesis. However, an above knee amputation is more likely to heal and may be appropriate if the patient has no prospect of walking again. In this case, we chose above-the-knee amputation because the conditions of bone and its neurovascularity were not good which could be evaluated on physical and radiologic examinations. Meanwhile, there was a surgery scar which was not feasible for performing skin flaps to close the wound.

Apley, in characteristic style, encapsulated the indications for amputation in three Ds': (1) Dead, peripheral vascular disease accounted for almost 90 percent of all amputations. Other causes of limb death are severe trauma, burns and frostbite; (2) Dangerous, disorders

were malignant tumors, potentially lethal sepsis and crush injury; and (3) Damned nuisance: Retaining the limb may be worse than having no limb at all. This may be because of pain, gross malformation, and recurrent sepsis or severe loss of function. The combination of deformity and loss of sensation is particularly trying, and in the lower limb is likely to result in pressure ulceration.⁹

Most lower limb amputations are for ischaemic disease and performed through the site of election below the most distal palpable pulse. The selection of amputation level can be aided by Doppler indices; if the ankle/brachial index is greater than 0.5, or if the occlusion pressure at the calf and thigh are greater than 65 mmHg and 50 mmHg respectively, then there is a greater likelihood the below-knee amputation will succeed.^{10,11} An alternative means is by using transcutaneous oxygen tension as a guide, but the level that assures wound healing and avoids unnecessary above knee amputations has not been confidently determined.¹²⁻¹⁵

The sites of election are determined also by the demands of prosthetic design and local function.¹⁶ If too short, a stump may tend to slip out of the prosthesis. Too long a stump may have inadequate circulation and can become painful, or ulcerate; moreover, it complicates the incorporation of a joint in the prosthesis. For all of that, the skill of the modern prosthetist has made it possible to amputate at almost any site.¹⁷

CONCLUSION

Long bone defect is still difficult to treat in orthopaedic field. There are several applicable methods considering the condition of bone loss. Amputation is one of the chosen techniques for patients with bone defect. Improving lower limb function is proven to maximize the patient quality of life.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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