Contralateral Total Knee Replacement for Post Traumatic Osteoarthritis of the Knee in an above the Knee Amputee: A Case Report

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ABSTRACT

Complex limb injuries are common in our environment. The functional outcome in an above knee amputee with a destroyed, unstable and chronically subluxed contralateral knee is a challenge to the patient and the Surgeon. This is a case report of a contralateral Total Knee Replacement in a twenty-four year old male Nigerian above the left knee amputee, following bilateral lower limb trauma from road traffic injuries. There was a chronically painful, subluxed, unstable and osteoarthritic right knee in this above the left knee amputee. He had a cruciate substituting right total knee replacement two years after his initial injuries. At six month of follow-up he had no knee pain. He ambulated in the immediate community without a walker and the right knee was stable with good range of movement (5-110 degrees).

Keywords: Above knee amputee, Contralateral unstable osteoarthritic knee, Total knee replacement

Introduction

It is not easy to adapt to any amputation, but the transfemoral amputation certainly offers more challenges to the patient than amputation in the calf or foot. Studies have shown that the higher the level of amputation, the more the energy needed for walking. Patients who present with symptomatic knee osteoarthritis after previously undergoing above-the-knee amputation of the contralateral limb even offer a more unique challenge to the Orthopedic Surgeons. Despite the large variation in health status of patients and types of prosthesis implanted, total knee replacement has proven to be a relatively low risk and successful operation. In patients with transtibial amputations, there are variations in the postoperative protocol, specifically the time to full weight bearing, following total knee replacement. The outcome in this group of patients is good. However, similar experience among above-the knee amputees are limited and scarcely documented in the literature. To the best of our knowledge, there has been no reported case of total knee replacement and rehabilitation in patients with contralateral transfemoral amputation in the literature.

We present the case of a patient from a low resource environment, with above-the-knee amputation that successfully
underwent contralateral total knee replacement and rehabilitation for a post-traumatic osteoarthritis of the knee.

**Case Report**

A twenty-four year old male Nigerian undergraduate presented to us 14 hours after he was struck by an automobile while crossing the road. He sustained an open (Gustilo-IIIC) proximal tibia metaphyseal fracture of the left leg (AO/OTA 41-C3) with marked loss of the soft-tissue envelope over the medial, anterior and posterior aspects of the left leg. He also sustained subluxation of the right knee from the same accident with medial, lateral collateral, anterior and posterior cruciate ligaments disruption (Figure 1). Patient was offered above-the-knee amputation of the left lower limb but declined and then took a discharge against medical advice. He subsequently sought treatment with a traditional bonesetter.

He, however, re-presented to us with a gangrenous left leg two months after leaving our hospital. For this reason, he underwent an above-the-knee amputation in our facility. He then had knee bracing for the neglected chronically subluxed right knee, along with physiotherapy and analgesics. He was subsequently rehabilitated with the aid of an above-the-knee prosthesis of the left lower limb supported with a walking frame (Figure 2). The patient, however, had difficulty ambulating because of the chronically subluxed right knee with associated severe right knee pain affecting activities of daily living. Pre-operative clinical radiographs showed laterally subluxed tibio-femoral joint, collapsed knee joint and marginal osteophytes (Figure 3).

A diagnosis of secondary osteoarthritis of the right knee with neglected chronic subluxation of the knee in a contralateral above knee amputee was made. At 2 years post initial injuries, he underwent a cruciate substituting right total knee replacement via the anterior midline longitudinal approach to the knee with medial parapatellar arthrotomy to the internal structures of the knee.

The intra-operative findings were torn anterior and posterior cruciate ligaments, as well as the lateral collateral ligament. Other findings were marginal osteophytes, articular loss and lateral subluxation of the knee.

Size 2 modular tibial tray with size 28 mm tibial insert along with size 3 femoral component were implanted after making bone cuts, balancing soft tissues and ensuring that the patella tracked.

The wound was closed in layers over a subfascial redivac drain. Post operative radiographs were satisfactory (Figure 4). The post operative period was uneventful with the patient undergoing intensive, supervised physiotherapy rehabilitation regimen. He

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**Figure 1a**: The subluxed and unstable right knee with above knee amputation stump on the left (Side View)

**Figure 1b**: The subluxed and unstable right knee with above knee amputation stump on the left (Front View)

**Figure 2**: Difficulty ambulating post above knee amputation on the left because of the chronically subluxed right knee

**Figure 3**: Pre-operative radiographs showing laterally subluxed and collapsed knee joint with marginal osteophytes
was mobilized out of bed on the third day postoperatively with full weight bearing on the right lower limb and left above knee prosthesis in situ and supported with the aid of a walker. The right knee was stable with good range of movement at 5-110 degrees.

Discussion

The management of above knee amputee with contralateral knee osteoarthritis associated with joint destruction and instability is a challenge. The literature has described many techniques of TKR and rehabilitation regimens for below the knee amputees with contralateral or ipsilateral amputations. However, our extensive literature review did not come across the management and rehabilitation of an above-the-knee amputee with contralateral knee osteoarthritis who underwent total knee replacement. Total Knee Replacement (TKR) is reserved for patients with severe and disabling arthritis that is non-responsive to conservative measures. Based on existing data, total knee replacement is a safe and cost effective treatment for alleviating pain and improving physical function in patients who do not respond to conservative therapy.

Despite the large variation in health status of patients and types of prosthesis implanted, total knee replacement has proven to be a relatively low risk and successful operation.

The index patient is young and the possibility of multiple revision surgeries is very high. The above-the-knee prosthesis made locally for this patient has a defective knee hinge mechanism which occasionally locks and thus predispose patient to falls. This makes the left knee less stable than the right knee with TKR. Therefore, the patient is likely to shift more weight to the right lower limb during weight bearing and ambulation. This is likely to result in early right TKR component failure requiring early revision surgery. The patient requires a more specific above-the-knee prosthesis with a good knee mechanism to allow the prosthesis to bend and also assists in proper gait pattern, but this prosthesis is very expensive and not readily available in our environment.

Another challenge that this patient has is that he has deferred his tertiary education for a while now, because of his injuries, multiple surgeries and rehabilitation programs. It may be challenging for him to cope with the rigorous tertiary education programs in our country, where support system for physically impaired persons is largely lacking. Also, future job opportunities for the physically impaired are less compared to the general population because there is a subtle and hidden discrimination against physically impaired persons in our environment.

We could not do a gait analysis for this patient. Gait analysis is very important in this case, because it would have helped us with a better understanding of the effect of abnormal gait on the patient’s above-knee prosthesis-TKR implant construct. Gait analysis programs are unavailable in this environment and besides, the patient may also not be able to afford it considering his low socio-economic background.

Conclusion

Total knee replacement has proven to be a successful procedure in alleviating pain and improving physical function in patients with debilitating arthritis. Total knee replacement can be safely performed in an above-the-knee amputee and rehabilitation can also be successfully carried out with good functional outcome.

References


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