Functional Evaluation Following Rotationplasty

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Abstract

Background: rotationplasty is a procedure hoping that the patients function will approximate the function of a transtibial (below-knee) amputee with a fully functional "knee joint.

Objective: this study was designed to evaluate the functional outcome of rotationplasty.

Methods: we used the musculoskeletal tumour society (MSTS) score including analysis of pain, function, emotion acceptance, need of support, walking and gait components in 28 children who had rotationplasty operations after one year of wearing the prosthesis.

Results: our results revealed a good MSTS score with an average of 24.6/30.

Conclusion: rotationplasty in children is physically and psychologically a good procedure in children having malignant lower limb tumours.

Keywords: Rotationplasty- Malignant tumours- Lower limb- MSTS score.

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List of abbreviations

ANOVA	: Analysis of variance
AO	: Arbeitsgemeinschaft für Osteosynthesefragen (AO), known in English-speaking countries as the Association for the Study of Internal Fixation (ASIF)
AP	: Anteroposterior
CBC	: Complete blood count
CT	: Computed tomography
DCP	: Dynamic compression plate
EORTC	: European Organization for Research and Treatment of Cancer
Hb	: Haemoglobin
ILN	: Interlocking nail
ISOLS	: International Symposium on Limb Salvage
LAT	: Lateral
MCS	: Mental Component Summary
MRI	: Magnetic resonance imaging
MSTS	: Musculoskeletal Tumor Society
OSA	: Osteosarcoma
PFFD	: Proximal femoral focal deficiency
QLQ	: Quality- of –life issues questionnaire
QOL	: Quality of life
SF-36	: Short form thirty six
SPSS	: Statistical package for the social science software
VNR	: Van Nes rotationplasty

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Introduction

The standard treatment for malignant tumors of the limbs has for decades, if not centuries, been an amputation. In the lower limb with the tumor usually situated around the knee, this usually meant transfemoral amputation or a hip disarticulation and, in more proximal lesions, a transpelvic amputation. ***(1)***

With the advent of modern chemotherapy, the surgical science of limb salvage surgery came into being. (2)

The biggest challenge to the surgeons engaged in this practice has been the problem of the loss of the knee joint in a young patient. The early efforts tried to avoid this problem by creating a knee arthrodesis. Although this technique is still quite useful in many patients, it has very significant drawbacks, particularly for a person of relatively tall stature or a person inclined toward physical and athletic activity. In addition, the technique is impractical in young children due to the necessary resection of growth plates around the knee and the resultant leg length discrepancy. ***(3)***

The newer technique of limb salvage using a tumor replacement endoprosthesis is currently quite popular; however, it also has significant limitations". ***(3)***

The technique that appears to address at least some of the problems associated with the above procedures is a modified Van Nes rotationplasty. [4]

Aim of the work

This work was designed to evaluate the functional outcome of rotationplasty performed in children who had lower limb bone sarcomas, after 12 months of wearing the prosthesis. The evaluation was done by using the musculoskeletal tumour society (MSTS) scoring system.

Rotationplasty

Introduction

The above-knee amputation, hip disarticulation (Figure 1) and hemipelvectomy were the earlier treatment strategies for the tumors of the lower limb ***(Borggreve, 1930).*** [(1)]

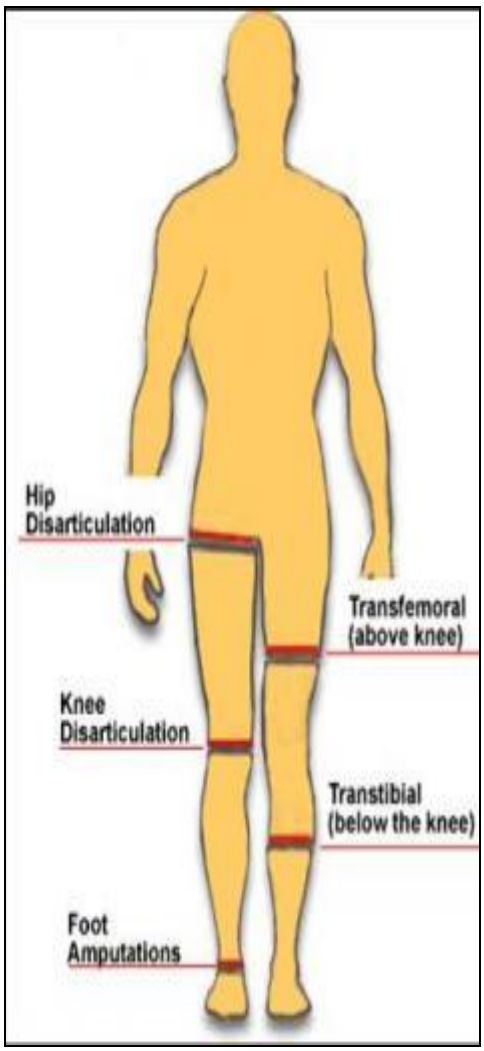

Figure (1): The major categories of lower limb amputations. [(5)]

Afterwards, the concept of limb salvage surgery has been established.

But the loss of the knee joint in a young patient was highly problematic so, scientists tried to overcome this problem via knee arthrodesis. [2] (Figure 2)

Figure (2): knee arthrodesis with ILN. [6]

But as long as knee arthrodesis was accompanied with significant functional restrictions [7] so, tumor replacement endoprosthesis was settled [3] (Figure 3).

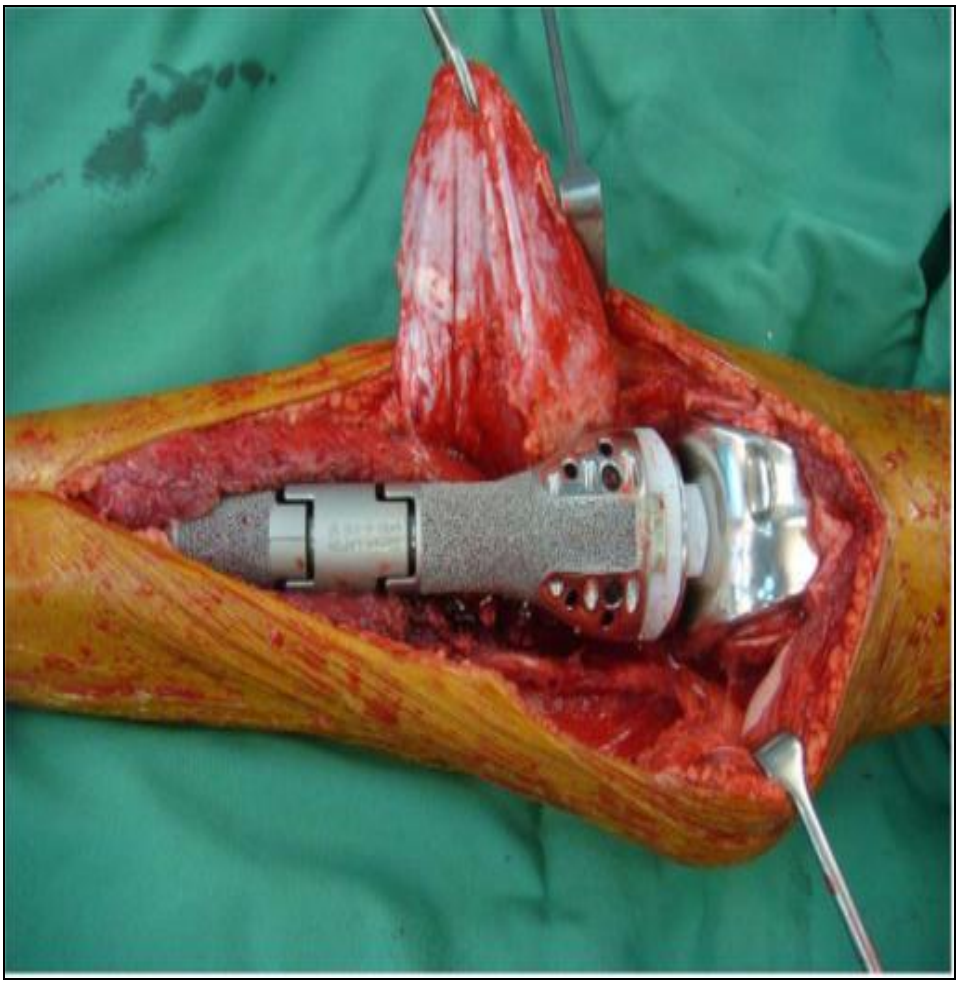

Figure (3): Tumor replacement endoprothesis. *(8)*

A sufficient soft-tissue-muscle envelope must be preservable to stabilize and motorize the new endoprosthetic knee. It must be understood that this metallic-plastic implant has a finite life span due to material fatigue. *(9)* The metal-bone interface also has the potential for long-term problems due to the shear stresses of the two dissimilar, yet intimately apposed materials, such as bone and a metal or plastic. *(9)*

Again, in young children, the loss of the growth centers, with resultant leg length discrepancy, is a significant problem in using an endoprosthesis in this age group. This is inspite of efforts to produce a satisfactory version of a "growing endoprosthesis." *(3)*