

Abstract

INTRODUCTION: The reconstruction of the femoral diaphysis following bone tumor resection is challenging. While massive bone allografts are traditional, they carry risks due to avitality, leading to issues like infection and structural failure. Combining these with a vascularized fibula was proposed to solve these issues. However multiple complications including fibular graft necrosis exist. Currently, there's no reliable early postoperative technique to assess viability of the fibula, which is essential in management of complications. Also the superiority of this complex method compared to others is uncertain.

STUDY OBJECTIVE: This study aims to introduce a noninvasive technique to determine fibula viability based on CT densitometry. Correlation of clinical outcomes with imaging studies is used to define predictive factors of fibular vitality. Results of combined grafts is tested against other reconstruction methods.

MATERIAL AND METHODS: We prospectively collected data from 41 patients over ten years, all undergoing femoral diaphysis reconstruction post-tumor resection. Ten patients received a combined graft and underwent regular CT scans, which were then analyzed densitometrically to find objective signs of fibula vitality related to clinical outcomes.

RESULTS: Our analysis confirmed that increasing bone density between the fibula and allograft and decreasing fibula density indicated vital fibular graft and active bone remodeling. These patients experienced quicker healing and improved function compared to alternative forms of reconstruction. Fibula transplantation was successful in 70% of patients.

CONCLUSION: CT densitometry is a reliable tool to measure fibular graft viability, and successful transport provides the best functional outcomes to alternatives.

KEYWORDS: bone tumors, intercalary reconstruction, vascularized fibula, combined graft, Capanna, allograft, diaphyseal prosthesis, cement spacer, CT densitometry