We present a case study of a 17-yr-old male patient with no significant past medical history that presented with an aggressive bone lesion of the distal tibia on MRI, which was confirmed via bone biopsy as an osteosarcoma.

A bone scan was also completed at this time, which was negative except showing increased uptake at the site of the primary tumor.

Upon the patient’s initial presentation and diagnosis, treatment consisted of several rounds of chemotherapy.

Results

• Post-operatively, the patient was kept non-weight-bearing in a posterior splint and CAM boot until fusion was confirmed on a CT scan at 3 months post-operatively.
• Afterwards, the patient was treated with a 6 week antibiotic course, and was found to completely heal at the surgical site without clinical evidence of recurrent infection.

Analysis & Discussion

• Following resection of osteosarcoma of the distal tibia there is often a large residual defect with many reconstructive techniques described in the literature yielding medium-term morbidity, as well as deterioration of function with time.
• To our knowledge, no cases have been described in the literature for fixation of distal tibia defects utilizing a custom endoprosthetic tibial fusion device,

Case Study Continued

Three months later the patient had surgery, including wide en bloc resection of the tumor with an outside surgeon that resulted in a 19 cm deficit of the tibia and fibula with pathology revealing a tumor free proximal margin.

In order to address this deficit, the patient underwent an attempted tibiotalocalcaneal fusion utilizing a combination of allograft and iliac crest autograft placed in the tibial defect.

Fixation consisted of a humeral blade plate and intramedullary tibial nail as seen in Image #1 below.

Unfortunately, the allograft became infected with associated dehiscence of the surgical site.

Over the course of one year, the patient underwent multiple attempts of surgical debridement and use of antibiotics, but the hardware eventually became exposed and had to be removed.

Afterwards, the patient was treated with a 6 week antibiotic course, and was found to completely heal at the surgical site without clinical evidence of recurrent infection.

Analysis & Discussion

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Case Study

The large remaining defect in the distal tibia presents a surgical dilemma, with many surgical treatment options described in the literature including custom made endoprostheses, allografts, iliac crest and tibiotalar arthrodesis.

However, despite various surgical options for reconstruction, many of these treatments still result in medium-term morbidity, as well as deterioration of function with time.

This has led to a lack of consensus amongst surgeons when faced with determining definitive treatment in this patient population.

Afterwards, the patient was treated with a 6 week antibiotic course, and was found to completely heal at the surgical site without clinical evidence of recurrent infection.

After being offered a prophylactic amputation as treatment from the outside surgeon, the patient presented to Dr. Wodajo for a final attempt at limb salvage.

Initial surgical management included washout and debridement of the surgical site with temporary insertion of an antibiotic infused cement spacer as noted in Image #2 above.

Six months later, definitive surgical treatment included a 2-part procedure including:
• Removal of the cement spacer
• Complex Reconstruction of left distal tibia with segmental implants and custom endoprosthetic trabecular metal tibial fusion device

Analysis & Discussion

• Following resection of osteosarcoma of the distal tibia there is often a large residual defect with many reconstructive techniques described in the literature yielding medium-term morbidity, as well as deterioration of function with time due to construct failure.
• To our knowledge, no cases have been described in the literature for fixation of distal tibia defects utilizing a custom endoprosthetic tibial fusion device,

Results

• Post-operatively, the patient was kept non-weight-bearing in a posterior splint and CAM boot until fusion was confirmed on a CT scan at 3 months post-operatively.
• Afterwards, the patient was transitioned to full weight-bearing with the use of a custom ankle foot orthosis at this time to assist with foot clearance during gait.
• The patient was noted to be pain free with ambulation, and was able to participate in recreational sporting activities with friends, including pick-up basketball games.

Analysis & Discussion

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This case study demonstrates the use of a custom made, 3D printed endoprosthetic tibial fusion device as an alternative to below-knee amputations in patients with distal tibial osteosarcomas.