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**Background:** IlluminOss is a new technology enabling percutaneous, customized, intramedullary stabilization via a Dacron balloon and a light curable monomer. The implant enables patients to use their arm from day one following surgery for actual/ impending pathological humeral fractures due to metastatic cancer. Metastases from cancer are the most common malignancy involving the skeletal system. The skeleton is the third most common target of distant metastases, following the lungs and liver. Prophylactic fixation of impending pathological fractures from metastatic bone disease has demonstrated significant clinical benefit, including less blood loss, faster procedure time, shorter length of hospitalization, reduction of pain, improvement in activities of daily living, and better quality of life.

**Questions/ Purpose:** To evaluate the use of a new percutaneous introduced intramedullary implant formed from a light curable monomer and a Dacron balloon for the treatment of actual/ impending pathological fractures due to metastatic cancer in the humerus.

**Patients and Methods:** From July 2012 till May 2015, over 100 actual/impending pathological humeral fractures have been treated using IlluminOss internationally. We report on the first use of the product at our institution. During the procedure, the fracture is reduced and stabilized with the implant. After the humerus is reamed, the Dacron balloon is inserted through a ~8mm incision and positioned across the fracture inside the canal. The balloon is infused and expanded with a biocompatible liquid monomer. Radiopaque markers on the circumference of the implant provide a 3D representation of the implant and its position within the canal. A visible light curing system is used to quickly polymerize the monomer in the balloon to form a customized bone stabilization nail. Postoperative treatment consists of a bandage or a soft cast brace depending of the type of lesion.

**Results:** From the over 100 patients treated with the device internationally with actual/ impending pathological fractures there were no device related complications. The procedure performed at our institution experienced no intra-operative complications. Attached figures demonstrate the implant, fluoroscopic images displaying expansion of the implant inside the humeral canal, and curing of the monomer inside the balloon (Figures 1-3).

**Conclusions:** While other types of humeral fractures have been treated with IlluminOss, treatment of actual/impending pathological fractures of the humerus due to metastatic cancer provides patients with a minimally invasive bone stabilization system. This implant and procedure results in minimal soft tissue damage and faster recovery for final stages of life. While this device has so far demonstrated excellent outcomes, more testing on the device is warranted.

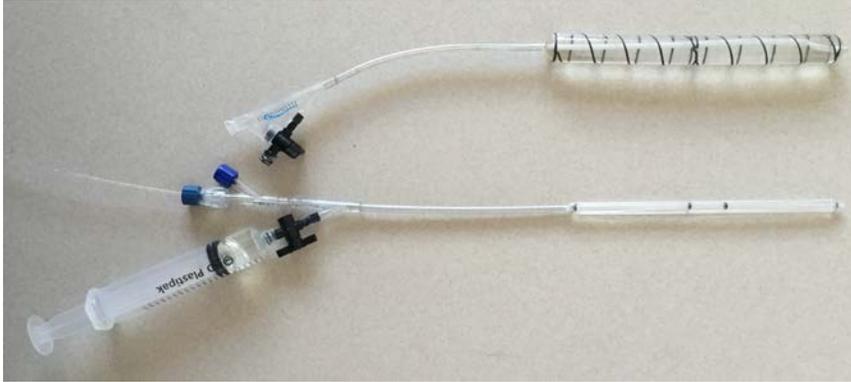


Fig. 1: Image of the IlluminOss Photodynamic Bone Stabilization System. The implant, a Dacron balloon, is inserted into the intramedullary canal of the humerus and then expanded with a light curable monomer.



Fig. 2: Intra-operative fluoroscopic AP XR of the expanded implant inside the humeral canal. The radiopaque markers around the circumference of the balloon help provide a 3D representation of the position of the implant inside the canal.



Fig. 3: Intra-operative image demonstrating the light fixation of the monomer within the balloon inside the intramedullary canal of the humerus.