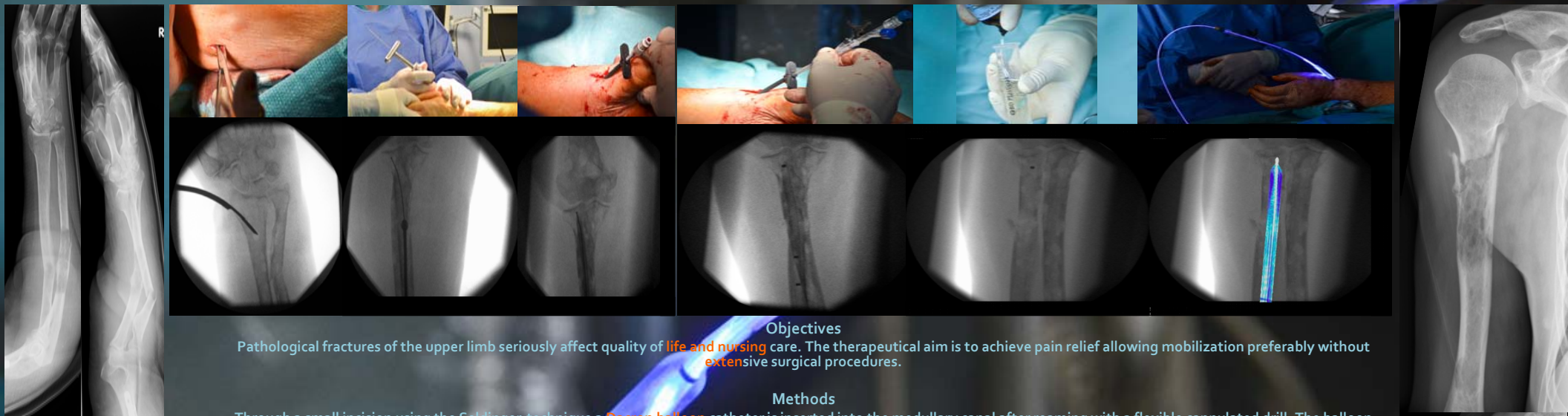


Minimally Invasive Stabilization of Upper Limb Pathological Fractures with an Intramedullary Polymer

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Objectives

Pathological fractures of the upper limb seriously affect quality of **life and nursing** care. The therapeutical aim is to achieve pain relief allowing mobilization preferably without **extensive surgical procedures**.

Methods

Through a small incision using the Seldinger-technique a **Dacron balloon** catheter is inserted into the medullary canal after reaming with a flexible cannulated drill. The balloon is filled with a liquid non-toxic plastic monomer. After **confirmation of the correct positioning** of the intramedullary device with image intensification curing of the monomer using a visible blue light (wavelength 436 nm) through a **fiberoptic cable** is achieved within 400-600 seconds creating a customized intramedullary rod comparable in strength to steel or titanium. The Dacron balloon contains the **entire monomer** during the hardening process. The balloon adapts to the often irregular shape of the medullary cavity. After the curing process and **polymer formation** a locking screw may be inserted through implant and bone to increase rotational stability.

Results

Thirteen long bone pathological **fractures of the** upper limb were treated in 10 patients (humerus 8x, radius 3x, ulna 2x). There were 7 female and 3 male patients with an average age of 76,2 years. In all cases the pathological fracture occurred in a compromised bone segment with a minimum length of 3 cm. Primary pathologies consisted of breast cancer, prostate cancer, plasmocytoma and lung cancer.

The average operating time was 49 minutes and all implants were inserted through incisions of 15 mm or less. Stabilization allowed immediate post-operative physiotherapy and use of the upper limb in all patients. No revision had to be carried out during the survival period of the patient which was influenced by the primary pathology.

Conclusion

Minimally invasive treatment of pathological fractures using an intramedullary polymer implant is suitable to manage pathological fractures affecting one or more sections of long bones in the upper limb. The radiolucent polymer allows radiological visualization of the entire bone and facilitates radiation therapy in select cases. Stability may be increased with transverse locking screws placed at any position of the implant as determined by anatomical safe zones.



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