

Publication

Automatic Fracture Reduction

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We present a method to automatically reposition the fragments of a broken bone based on surface meshes segmented from CT scans. The result of this virtual fracture reduction is intended to be used as an operation plan for a medical procedure. Particularly in minimally invasive surgery like intramedullary nailing, the correct repositioning of bone fragments is not always apparent or visible without an operation plan. We propose to achieve automatic fracture reduction by fitting the bone fragments to an intact reference bone mesh with a modified Iterative Closest Point (ICP) algorithm. A suitable reference could be the same patient's contra-lateral bone. In the absence of a CT scan of this bone, we propose to use a statistical shape model as a reference. The shape model is automatically adapted to match the anatomy of the broken bone, apart from the bone's length, which has to be correctly initialized. Our experiments show that we can limit the rotational alignment error to below 5 degrees, compared to 15 degrees in current medical practice.

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