The Fang-Kulper Anti-Migration Tip
Department of Orthopaedics & Traumatology
The University of Hong Kong
There are **many small holes** inside of large bones in our body, like the hip, shoulder, spine.

Above: X-ray of a healthy bone from the spine
People with **Osteoporosis**, which effects **elderly women** in large numbers, have so many small holes that the bone becomes **structurally weak**.

Above Left: X-ray of a healthy bone from the spine
Above Right: X-ray of a bone from the spine of a person with **osteoporosis**
Implants used to repair fractures, like a broken hip, sometimes break through osteoporotic bone, as it is so weak and soft.

250M people w osteoporosis
9M new osteoporotic fx/year

Progressive screw cutout: between 1/5 and 1/20 patients with osteoporotic fractures of proximal femur using common internal fixation implants*


Marek Szpalski MD and Robert Gunzburg MD
Prevention of Hip Lag Screw Cut-Out in Osteoporotic Patients: Rationale and Review of the Literature

Above left: Illustration of a typical hip fracture repair implant
Above right: X-ray of an implant that broke through the hip
Implants breaking through the bone, called **implant cutout**, can happen from **walking, climbing stairs**, or just **standing up**.

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*Above left: Illustration of a typical hip fracture repair implant
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Above: Members of the project team
At the HKU Department of Orthopaedics & Traumatology, and Mechanical Engineering, we are working on new solutions to this problem.
By using a soft, expandable biocompatible rubber, we create implants that are more gentle and less damaging to bone.

Above: Image of an implant using our FK-Tip
In this example, the tip is attached to the end of the metal implant to maximize its expansion when placed under load.

Above: Cutaway section image of an implant using our FK-Tip
This way, when a person takes a step, climbs a stair, or just stands up, the implant expands to resist breaking through the bone.

Above Left: How the implant is inserted into the hip
Above Right: How the implant expands to resist breaking through bone
Our team has been using advanced computer simulation methods to test and improve the design of the implant.

Hertzian DEM Bone Simulator

Experimental Results

Flat 5mm

Above Left: Computer simulation representation of bone compaction

Above Right: Empirical (real) image of bone compaction by implant
Today, we are pursuing US FDA clearance for manufacture and sale of our bone screw in 2017, with China and Europe clearance in the future.
Our dream is to bring **safer, more effective, and more affordable** medical technology to the **elderly, everywhere.**
Thank you and feel free to contact us!

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