PsiF Guard™

DYNAMIC SI GUIDANCE

PsiFGuard improves k-wire placement accuracy as compared to freehand method in cadaveric joints: a one-to-one comparative study

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Exhibitor Booth 208

Purpose: The posterior intra-articular approach for sacroiliac joint fusion involves inserting an implant or allograft into the joint, starting with a pin insertion. This cadaveric study compares the **accuracy of K-wire placement using the Cannulated PsiFGuard** versus the standard freehand technique.

DSG Technology

At every stage of the drilling process with Cannulated PsiFGuard, the surgeon performs **a subjective interpretation of the audible signal emitted by the device (Figure 1).**

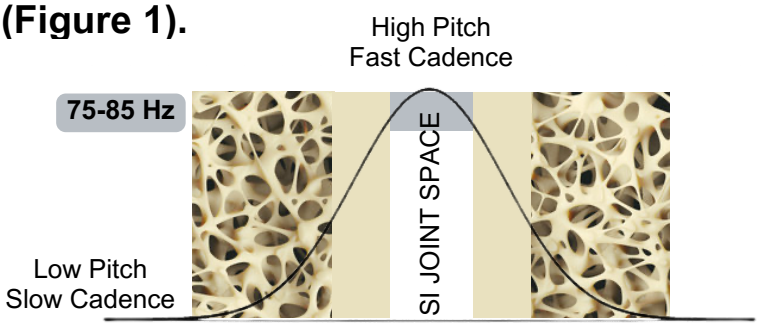


Figure 1. Visualization of audible tone gradient with respect to joint space, cortical bone, and cancellous bone.

In combination with tactile feel and anatomical observation with fluoroscopy, surgeons can adjust and **correct the drilling trajectory in real time**. Therefore, this study predicts improved accuracy with DSG technology.

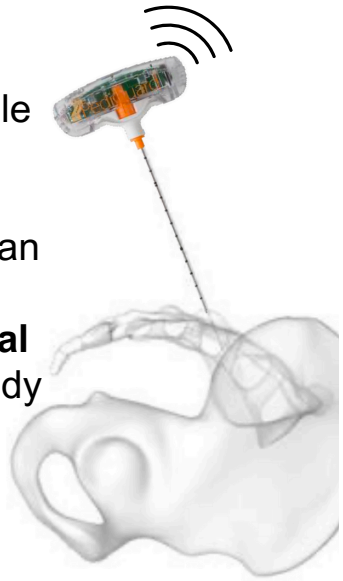
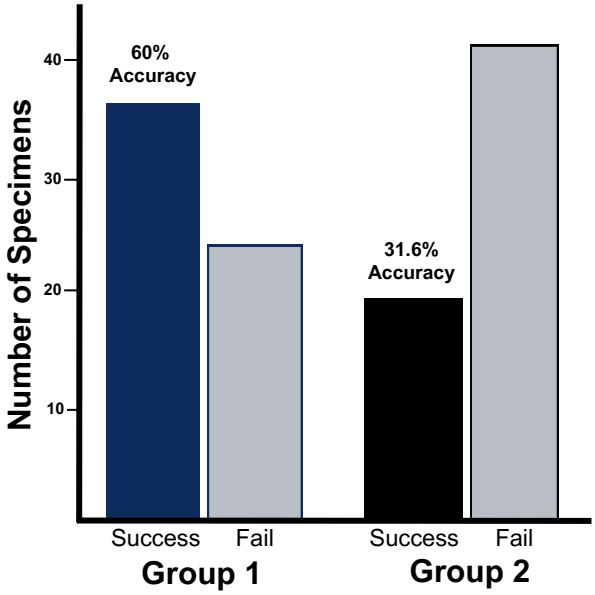


Figure 2. PsiFGuard with respect to the SI joint

PsiFGuard increased K-wire placement accuracy by 89.47%

K-wire placement Is deemed successful if at least 15mm is located inside the SI joint as determined by an independent CT scan reviewer.



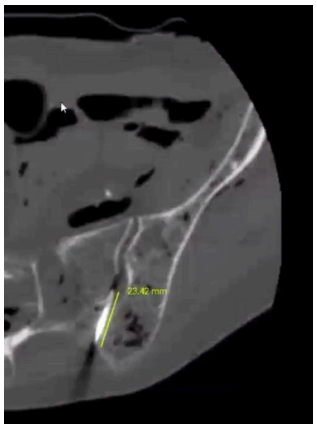


Figure 3 *(above)*. PsiFGuard vs Standard Freehand Technique successful and failed K-wire placement attempts.

Figure 4 *(left).* Example of a correctly placed K-wire.

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Study Methods:

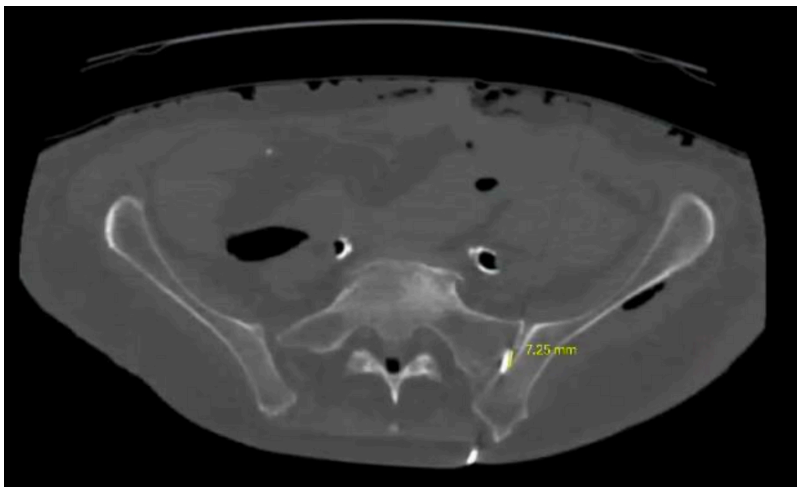
- Place specimen in the prone position utilizing bolster
- Identify key anatomical landmarks
- Locate the PSIS and insert the Cannulated PsifGuard
  - **Group 1:** DSG Handle Feedback & Fluoroscopy
  - **Group 2:** Fluoroscopy Only
- Advance the device until it reaches the anterior part of the SI joint at the desired depth
- Remove the DSG Handle and inner stylet
- Insert K-wire through the cannula
- Remove the cannula
- Cut the K-wire below the skin
- CT Scan assessment

Figure 5A. Without bolster shows lumbar lordosis

Figure 5B. With bolster shows reduced lumbar lordosis

Results:

The device performed as intended, providing auditory signal of varying pitch and cadence representativeof tissue electrical conductivity at the tip. There were no occurrences of the device having critical technical issue during use (e.g., breakage, assembly/disassembly issue, impossibility to perform or finish the surgery, etc.).



Discussion:

This result is considered robust due to the surgeons' unfamiliarity with the posterior sacroiliac fusion procedure and anatomical complexity of the sacroiliac joint. The various geometries within the SI joint differ across joints, allowing each joint to be a novel scenario. Additionally, there were situations where the K-wire was placed in the joint, but did not meet the 15mm criteria and was thus categorized as a failure (see Figure 6). Future studies will aim to replicate these results and investigate qualitative patient outcomes.

Figure 6 *(right)*. Example of a correctly placed K-wire that did not meet the criteria to be deemed a success as it was less than 15 mm in the joint.

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