

Sharp tools reduce infection risk in bone surgeries

February 3 2022



Credit: cottonbro studio from Pexels

Researchers at Auckland University of Technology's BioDesign Lab and the University of Auckland's Department of Surgery have uncovered a link between the sharpness of surgical implements and the risk of post-

surgery infection.

The study, published today in *PLOS ONE*, determines that keeping tools sharp is essential to avoiding cross-contamination.

"Bone surgeries are some of the most common surgeries, with approximately 9,000 hip replacements and more than 8,000 knee replacements happening in New Zealand every year," says Lecturer Lorenzo Garcia.

"Post-surgery infection not only reduces the patient's quality of life; it also significantly increases healthcare costs. Reducing cross-contamination and possible infection will improve patient outcomes."

The osteotome is a [surgical tool](#) commonly used to chip, cut, and sculpt [bone](#) during various surgical procedures such as orthopedic, plastic, and dental surgeries. This [tool](#) resembles a chisel, beveled on both sides of the cutting edge and is like many bone-cutting surgical tools usually manufactured from either heat-treated Martensite, Austenite, or Martensitic Stainless Steel.

These materials allow surgical tools to withstand impact forces without fracturing. They also possess excellent properties of corrosion resistance, biocompatibility, and cost-effectiveness. Osteotomes are re-used in surgical procedures however lack of regular maintenance can lead to a dull or damaged cutting edge being used.

The research performed at AUT showed that dull osteotomes, used in surgical procedures including common operations like knee or hip replacements, retain bone contaminants even after sterilization.

The BioDesign Lab's study tested three different commercially available osteotomes with different surface coatings. After four cutting and

sterilization cycles, contaminants including calcium and phosphorous (evidence of bone contaminants), chromium, magnesium, silicon, aluminum, carbon, and nickel (base material of stainless steel) and traces of chlorine (used in autoclave sterilization water) were found.

"Thanks to our commercial partner Sheffmed we were able to test a range of different commercially available osteotomes with different coating treatments, to measure what affect the different coatings had on reducing cross-contamination.

"Our testing detected bone contaminants in each osteotome," says Dr. Garcia. "However, the PVD ([physical vapor deposition](#)) coated osteotome demonstrated significantly less bone contamination than either the as-supplied or electroless nickel coated tool. According to the results, there is an association between blade sharpness and post-sterilization bone contamination, so if hospitals can maintain sharp tools, it follows the risk of cross-contamination will be reduced. Or alternatively, the use of disposable osteotomes could be recommended."

More information: David E. White et al, Pilot study: Post-surgical infections could be related with lack of sharpness in surgical tools, *PLOS ONE* (2022). [DOI: 10.1371/journal.pone.0261322](https://doi.org/10.1371/journal.pone.0261322)

Provided by AUT University

Citation: Sharp tools reduce infection risk in bone surgeries (2022, February 3) retrieved 21 June 2024 from <https://medicalxpress.com/news/2022-02-sharp-tools-infection-bone-surgeries.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--