Validating Cleanliness of Loaned Surgical Instruments Using Adenosine Triphosphate (ATP) Technology as Adjunct Tool to Visual Inspection

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BACKGROUND

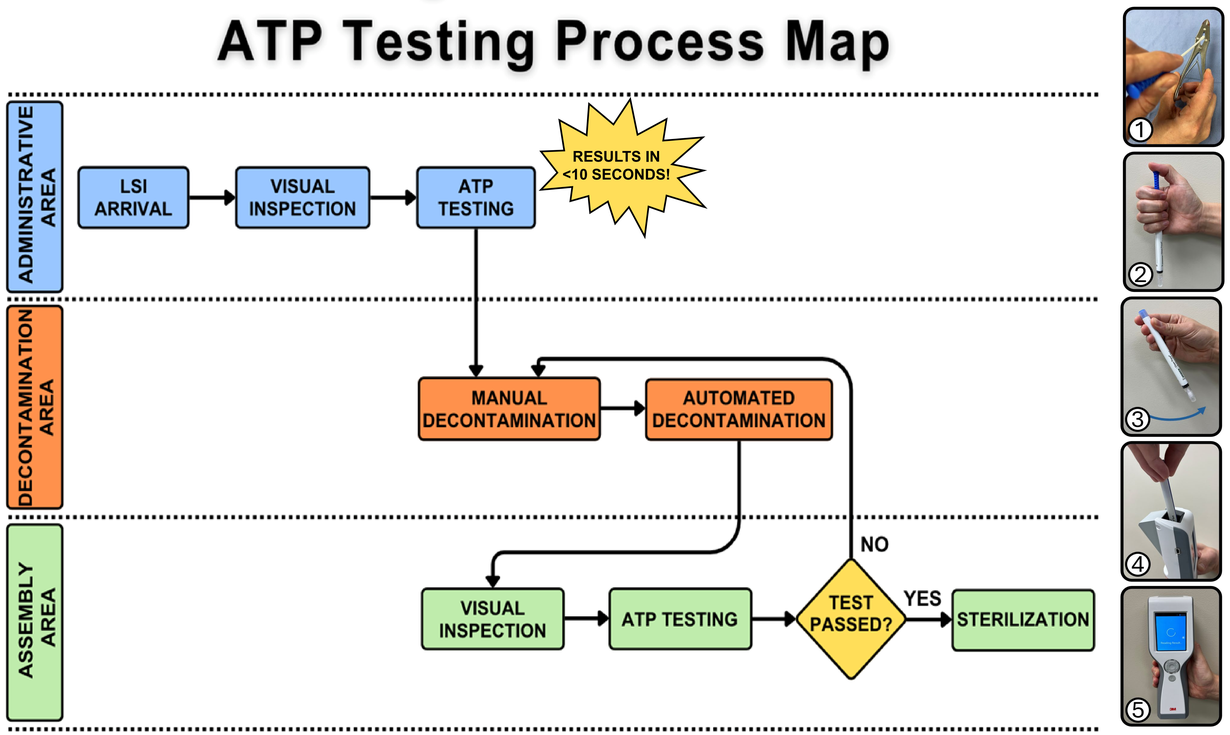
- Loaned surgical instruments (LSIs) are reusable medical devices commonly shared between hospitals as a cost-effective solution for surgery.
  - It is a regulatory requirement that LSIs are decontaminated before transport from one hospital to another.
- LSIs are often complex in design, difficult to clean, and prone to bioburden retention even after decontamination.
  - The presence of retained bioburden on surgical instruments prevents proper sterilization.
- Although Sterile Processing Departments have historically used visual inspection as a primary method to verify instrument cleanliness, this alone is not enough.
  - Bioburden can be found in lumens, cannulas, crevices, and other areas not easily observed by the naked eye.
- Adenosine Triphosphate (ATP) bioluminescence technology can be an adjunct to quantifiably verify surgical instrumentation cleanliness after decontamination.
- As ATP is the main energy source of all living organisms, its presence on LSIs indicates residual organic matter and potentially inadequate decontamination processes.

PURPOSE

- The purpose of this evidence-based project was to determine if the use of ATP bioluminescence technology, in addition to visual inspection, impacted the detection of contaminated LSI sets upon arrival to our hospital.

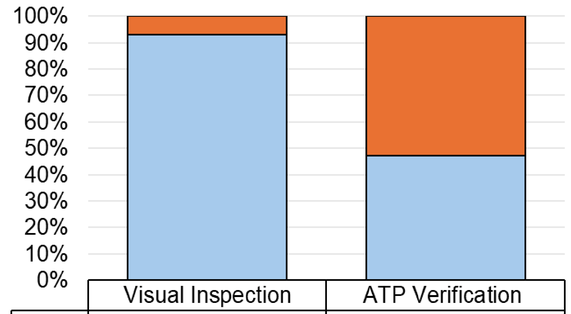
METHODS

ATP Testing Process Map



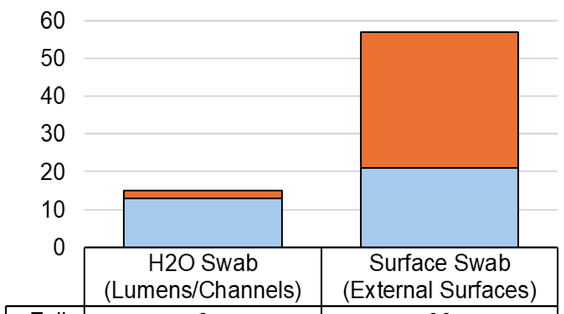
RESULTS

LSI PASS/FAIL RATES BY VERIFICATION METHOD



	Visual Inspection	ATP Verification
Fail	5	38
Pass	67	34

ATP PASS/FAIL RATES BY TEST SWAB TYPE



	H2O Swab (Lumens/Channels)	Surface Swab (External Surfaces)
Fail	2	36
Pass	13	21

DISCUSSION

- Upon arrival to our hospital, ATP technology identified **46%** more contaminated LSIs than visual inspection alone.
  - Surface swabs failed at a rate **4x** greater than H2O swabs.
- LSIs delivered in contaminated conditions increases the risk of buildup biofilm, making decontamination more difficult.
- Medical staff and transport personnel are unknowingly handling and transporting biohazardous material.
- Improper handling and transport of biohazardous material violates both Occupational Safety & Health Administration and U.S. Department of Transportation Code of Federal Regulations.

IMPLICATIONS FOR PRACTICE

- ATP technology is a rapid, objective, and dependable tool that, when combined with visual inspection, enhances the detection of contaminated LSI.
- Enforcement of a strict LSI drop-off policy supports adequate time for thorough decontamination practices.
- Industry representatives should perform ATP verification of LSIs before transport to prevent cross-facility contamination and promote shared accountability for patient safety.
- Improved communication and coordination with other facilities ensures items arrive properly decontaminated.
- Routine ATP testing and documentation of LSI reinforces accountability, traceability, and enhances safe sterilization practices.

REFERENCES

- Use the QR code to view a list of the references used for this project.