INSTRON
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TechNotes

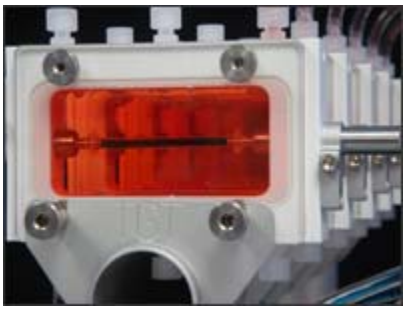
Getting the most up-to-date information on materials testing

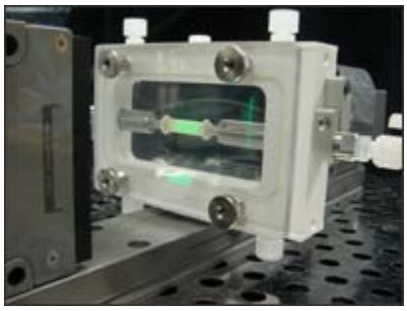
Issue 61

In This Issue

A New Long-Term Bypass Solution

Today, heart disease is so common that it's a fair statement to make that you or someone you know has been affected by the illness. It's estimated that more than 17 million people around the world lose their lives to heart disease every year, according to the World Health Organization. And in the US alone, more than 500,000 of those patients undergo bypass surgery. Most surgeons will "borrow" blood vessels from another part of the patient, such as the mammary artery or saphenous vein; another option is to use a prosthetic graft material. Tissue Engineering will soon provide the superior option, replacement parts made from the patient's own cells.





While prosthetic and "borrowing" the patient's veins are popular and familiar choices amongst bypass patients, there is risk involved. The prosthetic grafts have the chance of rejection by the body because they are not natural and are foreign to the body. Also, the plastic material has been shown to increasing clotting and/or become infected, resulting in additional hospitalization. Using existing veins/arteries is limiting as the supply is not endless, as many as 40% of bypass patients are unable to choose this option due to disease or previous use.

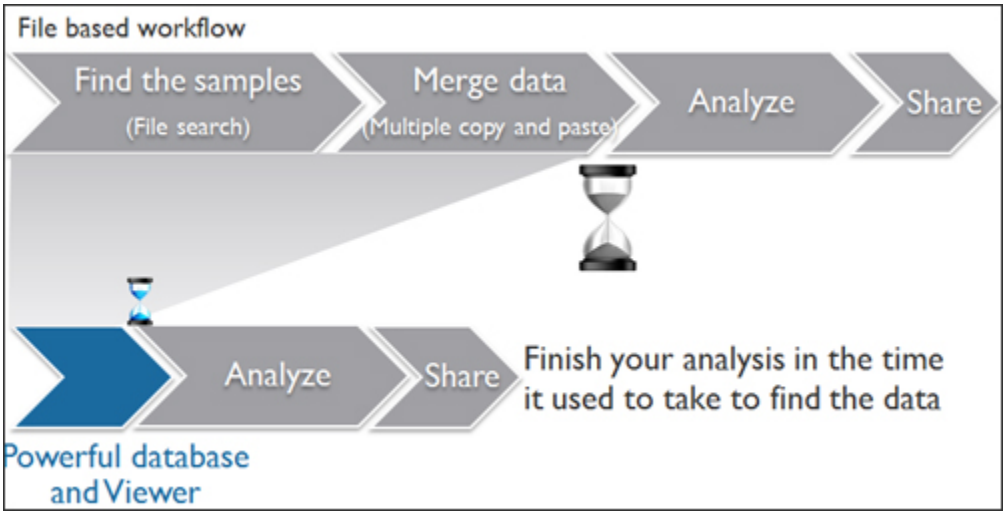
Tissue engineering – a process that makes replacement blood vessels, in vitro, a reality – allows for a long-term solution for bypass patients. A patient's cells are grown on a 3D scaffold, which could be natural or a manufactured material, in an environment that is similar to the body. The resulting tissue is then implanted in the patient. With tissue engineered parts, you are not "borrowing" from other areas of your body reducing the concern about availability and because the concern for rejection is obsolete, because the patient's body recognizes the cells as its own.

To be successful, tissue engineered implants must be both biologically and mechanically similar to native tissue. This means that the scaffold material and the end products are tested and characterized using tension, compression, and other forces to make sure that they can endure the physical strains of implantation. Research has also shown that growing tissues under these same mechanical forces (exercising the tissue) results in a tissue similar to native tissue.

In addition to heart disease treatment, tissue engineering has the ability to change modern medicine in many different areas. Pediatrics is a special case. Current mechanical medical devices are able to "cure" pediatric disease and defects; however because the patients are babies and their bodies are growing quickly, the surgery must be repeated many times to correct the size of the device. Tissue engineering offers a solution that can grow with the patient and minimize the number of invasive surgeries necessary.

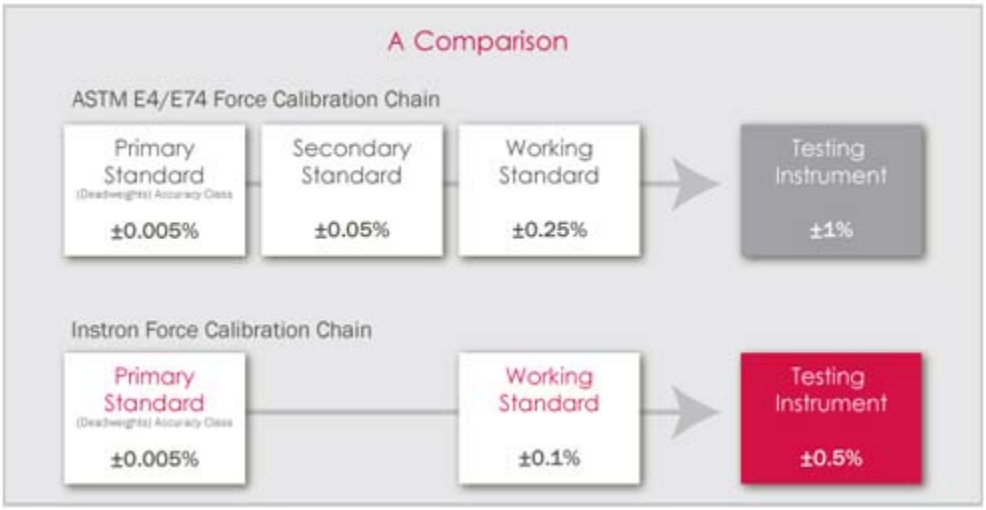
Google for Test Results

There are many situations where we need to analyze test results, not just from one sample file, but results that are spread across different sample files that were tested at different times with slight differences in setup or calculations. Are you ever in a situation where you would like to have all the relevant data together without spending a lot of time going through multiple files and copy-pasting the results? The answer to this lies in storing your results in a database. Unlike a file-based system, database storage is optimized for search and retrieval of information. It allows you to quickly narrow down to the right data set within seconds and it saves your search criteria for future use. This decreases the amount of time lab operators spend on moving and organizing data, while increasing the productivity and throughput of the lab.

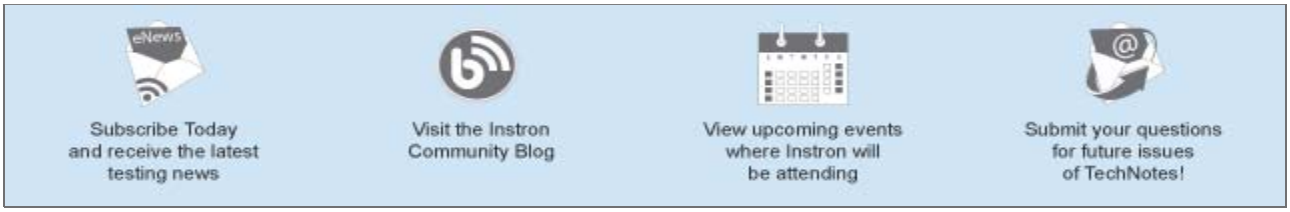


Q. Do you have the necessary equipment and expertise to adjust and verify Instron equipment to accuracy levels demanded by national and international standards such as ISO and ASTM? Do your verification/calibration certificates report measurement uncertainty for each measurement taken?

A. Our verification certificates report calculated measurement uncertainty for each measurement taken and are in compliance with the International Laboratory Accreditation Cooperative (ILAC) Policy for Uncertainty in Calibration. Instron Service personnel are factory trained to setup Instron equipment to meet and exceed these standards.



It should be noted that most Instron equipment can operate to specifications that exceed international standards. Our staff is equipped with calibration standards having the low uncertainties of measurement required to verify performance of Instron systems beyond levels found in many international standards. Many calibration suppliers do not have standards with the accuracy required to verify to these levels. For example: Instron maintains a primary force standard that is transferred to our deployed working standards – the need for a secondary standard is eliminated, the “chain of calibration” shortened, and measurement uncertainty is reduced.



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