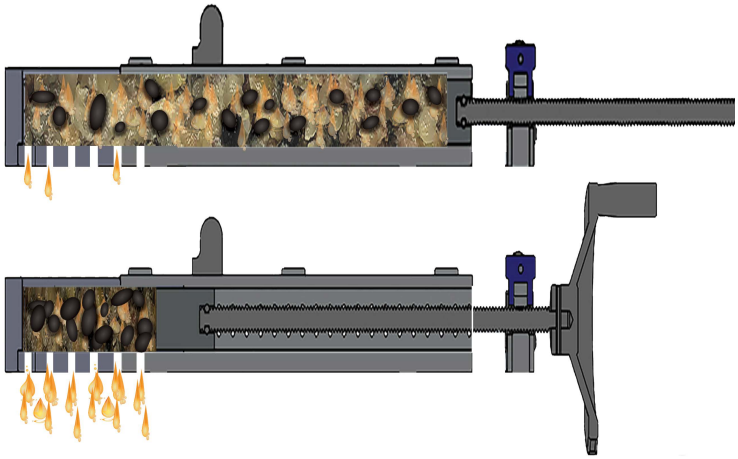
No morphological alteration of lymph nodes following LNL processing

A justifiable question asked by pathologists and PAs is: ''after fat dissolving solvents and application of pressure, isn't there histologic distortion of the tissue?''

The short answer is NO

Carnoy's solution, acetone, and 95% ethanol are not only fixatives. These solutions are fat dissolving solvents as well. Using these ''fixatives'' as fat solvents became practical in 2010. Basten was the first to describe a new process of elution (dissolving adipose tissue in a solvent) and fat extraction (''acetone compression''). Since 2010 nearly 800 cases using elution and fat extraction have been reported in the pathology literature (Basten, Scheel,Reinke and Flynn). No morphologic alteration of lymph node architecture or lymphocyte cytology was reported. How is this possible?



The answer is found in a principle first described by Karl von Terzaghi (1883-1963)
Tissue samples represent a mixture of solid particles (the tissue itself) and the liquid filling the interstices of the particles. A mixture like this is known as ''fully saturated porous media (FSPM)”. There are many FSPM theories. However, most of them are based on Terzaghi’s principle of effective stresses originally formulated for soil mechanics. Terzaghi’s principle states: as long as liquid fills the interstices of solid particles, external pressure is exerted on the fluid in the interstices and not the particles (the tissue in our case). We observed that throughout the process of fat extraction with the LNL, the fat/fluid (but not tissue) was flowing through the exit points (the peripheral holes in the LNL). This confirms the removal of fluid from the interstices. That is why compression of tissue samples in the LNL does not alter tissue morphology.