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OPINION ARTICLE

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From Cryostats to Microtomes: The Technical Aspects of Frozen Section Procedure

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Description

Frozen section procedure is a histological technique used to quickly examine tissues during surgical procedures. This technique is used when a quick diagnosis is required, as it can provide a diagnosis within minutes, allowing for immediate intervention if necessary. Frozen section procedure involves the rapid freezing of tissue samples and then sectioning them thinly for examination under a microscope. This procedure has several benefits over traditional histology techniques, including faster processing times and the ability to examine tissues in real-time.

The frozen section procedure begins with the collection of a tissue sample, which is usually taken during a surgical procedure. The tissue sample is then placed in a cryostat, which is a machine that rapidly freezes the tissue sample. The cryostat is set at a specific temperature, which is usually between -20 to -30 degrees Celsius. The temperature of the cryostat is important because it determines the speed of the freezing process. The tissue sample is usually frozen for a few seconds to a minute, depending on its size.

Once the tissue sample has been frozen, it is removed from the cryostat and placed on a microtome. A microtome is a machine that is used to cut thin slices of tissue samples for examination under a microscope. The tissue sample is cut into thin slices, usually between 5-10 microns in thickness. These thin slices are then placed on a glass slide and stained using a standard staining technique, such as Hematoxylin and Eosin (H&E). The staining process is important because it enhances the contrast of the tissue and highlights specific structures, making them easier to identify.

After staining, the tissue sections are examined under a microscope. The microscope is set at a specific magnification, which is usually between 10x to 40x, depending on the size of the tissue sample. The tissue sections are examined for any abnormalities or signs of disease. The results of the frozen section procedure are communicated to the surgeon, who can then use this information to make decisions about the surgical procedure.

Frozen section procedure has several benefits over traditional histology techniques. One of the main benefits is the speed of processing. Frozen section procedure can provide a diagnosis within minutes, allowing for immediate intervention if necessary. This is particularly important in surgical procedures where time is of the essence, such as in cancer surgeries. Frozen section procedure also allows for the examination of tissues in real-time, which can help guide the surgical procedure and reduce the risk of complications. Another benefit of frozen section procedure is the ability to examine tissues in their native state. Traditional histology techniques involve the use of fixatives and other chemicals, which can alter the structure of tissues. Frozen section procedure, on the other hand, involves the rapid freezing of tissues, which preserves the tissue structure and allows for examination in their native state. This can provide valuable information about the tissue architecture and the presence of disease.

Despite its benefits, there are also some limitations to frozen section procedure. One of the main limitations is the quality of the tissue sections. Frozen section procedure can result in tissue sections that are not as high quality as those produced by traditional histology techniques. This is because the rapid freezing process can cause ice crystal formation, which can damage the tissue structure. However, advances in technology and techniques have helped to minimize these issues and improve the quality of frozen section samples.

Another limitation of frozen section procedure is the limited amount of tissue that can be examined. Frozen section procedure is typically used to examine small

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tissue samples, which can limit the amount of information that can be obtained. This can be a disadvantage in cases where a larger tissue sample is required for a more comprehensive analysis. In conclusion, frozen section procedure is a valuable histological technique that provides quick results and allows for the examination of tissues in real-time.