DIAGNOSTIC PATHOLOGY

ORAL PRESENTATION

Standards in virtual microscopy: from tissue processing to image acquisition and visualization

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With the development of a new generation of slide scanner fort he generation of whole digital slides this technique is on its verge into routine histopathological diagnostics. Therefore the demand for standardized image acquisition and display needs to be fulfilled. Upon a physical and physiological basis the maximum performance are to be the cornerstones of this demand. Since with virtual slides huge data amounts have to be handled image compression is also an important issue. Therefore we analyzed the impact on jpeg image compression in 50 cases on 1) highest usable magnification, 2) security of diagnosis, 3) scan time and 4) data compression. The slides were digitized using a Zeiss MiraxScan in 11 different available qualitysteps (100%, 90%, 85%, 80%, 70%, 60%, 50%, 40%, 30%, 20%, 10%) and diagnosis was made for each case by three different pathologists. Throughout no misdiagnoses were made, but diagnostic security was rated as "good" only in qualitysteps of 40% and higher in all cases. From this qualitystep upwards magnifications of 40x were also rated as "good". Concerning scanning times a significant decrease in time was already observed by compression in qualitystep 90% and decreased further with decreased dataamount indicating a dependency on networkspeed. Furthermore, compressionrates of approximately 20% already in the 90% qualitystep were obtained and decreased

further to 8% in the 10% qualitystep. In conclusion the following standards for acquisition of virtual slides are required to 1) a pixel resolution of 0,2 x 0,2 μm^2, 2) for the Mirax scan compression with qualitysteps of 40 to 80% are acceptable for routine histologic diagnosis. For display of virtual slides we propose the successive technical requirements: 1) monitor resolution of > 4 megapixel, 2) contrast ratio of > 3000 : 1. As jpg-compression is a flexible compression standard, standardized compression modes for all slide scanners should be implemented.

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