Emerging Spinecare Trends

Future Invasive Care (Spine Surgery)

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Spine surgery represents intervention into a complex and intricate 3D space surrounded by vital and delicate structures. Future breakthroughs in surgical planning will lead to better surgical outcomes. Computers will increasingly being utilized to help surgeons plan and participate in preparatory virtual sessions before spine surgery. Preoperative imaging data will be reformatted to digitally recreate internal spine environments in multiple dimensions. Computer generated models will be used to predict morphological characteristics after surgery and will also be used to predict spinal tissue function and mechanical stability.

Integrated data from imaging procedures will continue to be used to guide delicate stereotactic procedures. They will simply become more controlled and precise. The surgical field is relatively small and structurally complex therefore a digitally reconstructed landscape using both endoscopic and macroscopic views will be used to help plan and guide procedures. Increasingly powerfull hardware and software will be used in the future to fuse datasets from multimodality imaging sources such as CT, MRI and PET. The datasets will be used to develop computer simulated perspectives and assist neuronavigation systems. Advanced surgical planning is and will remain one of the most important steps for improving the outcome of spine surgery. The future operating suite will include robotic options, real-time virtual imaging of the surgial field and advanced stereotactic navigation equipment.

Prior to entering the operating room spine surgeons will be able to use a virtual system to explore and plan their surgical approach using imaging datasets. It will incorporate seamless integration of multimodality images such as CT, CTA, PET, MRI, and MRA. The operating room of the future will be integrated, offering customized connectivity to imaging derived datasets and navigation methods. The operating room staff will be able to access and display information whenever the surgeon needs it. Sophisticated hardware and software will be integrated to provide a detailed real and/or virtual view of the operative landscape and defined regions of interest. The spine surgeon will be able to look at the spine from any angle in multiple dimensions. The efficiency of the surgial workflow will improve dramatically.

Spine surgeons of the future will be able to access imaging derived biochemical maps of spine tissues matched with tissue segments. This information may be used to evaluate histoanatomic integrity and the biochemical basis of structural stability, process which will help guide the placement of stabilizing devices and /or arthrodesis.