Virtual Frontier: A New Reality

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A software generated three dimensional simulated image or an environment which apparently allows for physical interaction is virtual reality. In virtual reality environment, an individual interacts with the help of specialized input and output devices. Use of virtual reality in healthcare settings is widespread. It includes facilitation in medical education i.e. surgical training, therapeutic effects i.e. pain management and rehabilitation, and lastly patient engagement with regards to planning personalized medical and surgical treatment in addition to remote access for patients.

Likewise in ophthalmology, virtual reality has an enormous impact in facilitation and speeding up surgical training of residents in addition to screening and diagnosis of some macular disorders. A three dimensional monitor (LG CINEMA 3D monitor, 23MD53D, Seoul, South Korea) is being used for diagnosis and assessment of metamorphopsia. Polarizing glasses are used to create a stereoscopic effect to each eye followed by six picture test which included three pictures each for vertical and horizontal metamorphopsia.[1]

Virtual reality devices are routinely being used to train residents in cataract and Vitreo-Retinal surgeries. Eyesi is a virtual reality based surgical simulator equipped with platform for training in basic surgical steps and complication management as well. During simulation, original instruments are inserted into model eye and different surgical steps are performed. For Vitreo retinal surgical simulation, integrated BIOM functions just like original BIOM. In the end detailed assessment of surgical performance is given. Archives allow access to previous simulations serving as a tool for constructive reflection.[2] Another simulator, "Helpmesee" developed to train surgeons in manual small incision cataract surgery. Many surgeons are trained at the same time with unlimited demonstrations for each individual.[3]

In a meta-analysis, Comparison between resident training in wet lab versus virtual reality was done. Some studies showed residents with wet lab training had shorter surgical time as compared to those of virtual reality ($P = 0.038$); while another research concluded similar surgery time between both modalities ($P = 0.14$). Another study reported that virtual reality-trained residents relative to those without supplementary training had fewer intraoperative complications ($P < 0.001$); in another study, virtual reality and conventionally trained trainees had similar intraoperative complication rates (MD -8.31, 95% CI -22.78 to 6.16; 1 study, n = 19; very low-certainty evidence).[4]

Like any other advancement or technology, use of virtual reality in ophthalmology is not free of pitfalls. In under developed countries like ours, a high initial cost is a major barrier in implementation. Limitation of trainers and medical faculty with regards to familiarity with equipment and software is another issue. Devices or software which use real patient data also pose a challenge of data privacy and its ethical handling. Nevertheless, virtual reality is an avenue to explore for times to come and it will be an invaluable tool in revolutionizing surgical training, medical education and patientcare in ophthalmology.

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