Informed consent is the keystone of modern surgical practice, and must be based on acceptable ethical standards, coupled with a complete, accurate and unbridged explanation of the patient's disease, the diagnosis, the range of treatments currently available, their prognosis, and the treatment methodology recommended by the institution. This information must be given in as much detail as possible to the medically lay, but usually mentally healthy patient, and the patient's family.

13.1: Introduction
One of the greatest problems when trying to explain about a disease, the various medical and surgical interventions available for it, and the postoperative course to patients and their families is the preservation of patient confidentiality: the doctor/patient relationship is firmly based on the trust that the patient has in the doctor's being obliged to maintain this confidentiality, based on the Hippocratic Oath which used to be sworn by practicing physicians worldwide: "All that may come to my knowledge in the exercise of my profession I will keep secret and will never reveal."

The easiest way to give a patient the fullest possible information is to use previous successful cases as examples, but in doing so, especially in plastic surgical circles, where the face is one of the main targets for the surgeon, we often come close to revealing patient identity. Blacking out the main points of recognition, such as the eyes and the mouth, will often cover the very areas which the surgeon wishes to show to the interested patient and his or her family as part of the informed consent educational procedure.

13.2: Role of CASS in the Informed Consent Process
Instead of the traditional, conventional explanation which depends on pictorial information backed up with an oral explanation, computer aided simulation surgery can provide an excellent and concrete medium for explaining disease conditions and demonstrating the postoperative course, including presenting a highly visual 3 dimensional representation either on-screen, or as a tactile solid 3D model, or a combination of these methods. This offers a totally accurate representational medium for the medically lay patient, to allow thorough education of the patient and his or her family as part of the informed consent procedure (Figure 13.1).

In the fully multimedia capable desk-top computer, readily available today, an audio track can be laid down over the 3D visuals. Full rotation of actual patient 3D images based on MRI and CT scan data, and viewing from any angle can increase the clarity of the explanation, especially for lay persons, and animated schematics are easily added to express in more simple
terms the state of the disease, its anatomical implications, the surgical procedure and the possible outcomes for different procedures, if required. A full simulation of the surgical procedure of choice can be previously recorded, edited if required, and then played back with pauses to allow for a fuller explanation. This enhances the educational value of the presentation to the patient and family, and is surely a clear advantage in giving the patient all possible information, as lucidly and comprehensively as possible, as part of the important informed consent process.

13.3: Availability of Anatomical Data

A vast data base of cross-linked anatomical information is now available, and with the increasing capabilities of the internet, coupled with the faster transmissions rates of ISDN and the so-called ‘broad band’ capabilities, complex and memory-intensive images can be browsed and downloaded from these sites, such as the National Library of Medicine’s Visual Human Project. This project has made available complete data sets for a male and a female cadaver, with extremely comprehensive anatomical CT slice and cryoslice data in all three axial, coronal and saggital planes.

From these basic data sets, extremely realistic 3D reconstructions have been made, and an interactive series of atlases is now in preparation. Using these data as a base, 3D virtual reality-based ‘surgeries’ have been designed, where endoscopic examination can be simulated, tissue can be realistically ‘cut’ and ‘deformed’, and ‘bleeding’ occurs if ‘mistakes’ are made. The realism of these simulated surgeries improves rapidly. Because these are data available in the public domain, there are no problems with breaching patient confidentiality dieing an informed consent session. Data are capable of manipulation, and thus disease entities can be simulated accurately, as can the treatment for them.
13.4: CASS Today and in the Future

Computer aided simulation surgery can be applied to patient education in all surgical specialties. In the practice of dental and oral surgery, for example, the application of computer graphics has been used now for some time to simulate the cosmetic changes for presentation to the patient to show the preoperative morphology and the possible postoperative prognoses.\(^2\)

More recently, reports have appeared on the use of interactive informed consent videodiscs (IVDs) for patients undergoing colonoscopy, polypectomy and endoscopy.\(^3\) The videodiscs were designed to illustrate graphically, with minimal reading requirements, all aspects of the procedures, and were aimed at marginally literate patients. After having seen the appropriate IVD, the patient could then discuss any aspects still unclear with a physician, and it also enabled the physician to gauge how completely the patient had in fact understood the content of the disc, in a non-threatening manner. The patient could then see and sign a printed-out form of informed consent.

It has always been said that physicians belong to one of the most conservative of professions, and that new ideas and change are not particularly welcomed. We feel that, as practicing medical specialists of the newly born twenty-first century and beyond, we must fully explore all avenues which appear in front of us, new or not. Especially if the avenue offers superior care and support for the patient, we should never be afraid to risk the approbation of our more conservative colleagues, and boldly take that avenue. The field of computer simulation of surgical procedures is most certainly one of these new avenues, and even as the authors write now, the avenue is getting wider and more important. As a new subset of simulation surgery, the important and fast-growing field of computer-based virtual reality will add another facet to the well-developed simulation surgical procedures, and assist us to bring all possible knowledge of any procedure to both the patient and his or her family.

The medical application of computer-aided simulation surgery with all its facets and multipotency is especially well-adaptable to patient education, and in particular to maintaining patient confidentiality when explaining a disease or condition, its surgical procedures and its possible prognosis as part of the mandatory preoperative informed consent procedure, and should become the norm rather than the exception, as we advance into the New Millennium.

References

