

Eye Model

Tessella has developed a computer model of the human eye for Stoke Mandeville Hospital. The model is believed to be the first of its kind and will offer students and surgeons new insights into the coordinated movements of the eyes.

The motion of each eye is controlled by six muscles. To model the movements of a single eye, some complex mathematics must be performed since the actions of the six muscles are all inter-related. For example, when one muscle contracts another will react so that it does not exert an opposing force on the eye.

The situation is even more complex when two eyes are involved as the action of one eye is affected by the movements of the other. It is because the mechanisms controlling the eyes' movements are so complex that Tessella was asked to develop the computer model.

In order to correct a squint the surgeon must alter the action of one or more of the muscles controlling the eye. This is done by changing the length of the muscle or by moving the anchoring points. At present, crucial decisions such as which muscle to move and by how much cannot be verified before the operation and the success of the operation relies heavily on the surgeon's experience and judgement.

It is hoped that the computer model will provide a means of checking the surgeon's diagnosis before the operation begins. The screen will display a picture of the eyes and their controlling muscles and the surgeon will be able to lengthen, shorten or even move muscles on the screen. The program will show the effect this will have on the overall movement of the eyes and assist the surgeon in planning operations.

Another important use for the model will be as a teaching aid. The model will help with visualizing the eye's movements as the muscles act on it and also give the opportunity for students to simulate operations on screen. This is seen as offering huge cost savings to medical schools by reducing teaching time while maintaining a high, consistent level of instruction.

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