Throughout life, the human body continues to develop and adapt to an ever-changing environment. The influential growth spurt at puberty causes particularly widespread alteration to the longitudinal and circumferential growth plate. The epiphyseal plate (also known as the growth plate) is a specialised, discoid junction found in long bones and is depicted in Figure 1.

During this time of peak growth, as displayed in Figure 2, the epiphyseal plate is already 2-5 times weaker than the surrounding skeletal structures and it is unclear whether significant shape or volume differences occur during this time of accelerated growth. The consequence of such structural changes may influence the ability of the growth plate to recover if injured through trauma; therefore the importance of being able to visualise the extent of damage is invaluable to clinicians. If the development of bone is inhibited, partial growth arrest could lead to long-term detrimental health risks which would require surgical treatment and this is dependent on the ability to define the precise area, location and appearance of the disrupted region.

**Introduction**

To visualise the morphological nature and calculate the volume of epiphyseal plates from magnetic resonance imaging (MRI) scans.

**Method and Materials**

Twenty adolescent boys approaching the optimal age for the onset of the peak growth spurt (12-14 years), volunteered to have Dual Echo Steady State (DESS) scans of their dominant knee and ankle in a Magnetom Avanto MRI scanner (Siemens, Erlangen, Germany).

Previous studies in the literature (Craig et al., 2004; Sailhan et al., 2004) have noted the clinical importance of being able to discern the extent of ossified bridges of bone which highlight the disrupted region of longitudinal growth as visualised in Figure 3.

**Results**

OsiriX® can be implemented to permit visualisation of the epiphyseal plates in 3D as well as calculate the respective volumes. The functional capabilities are numerous and volumes are generated from the specified regions of interest, Figure 4 demonstrates the importance of applying the correct reconstruction filter. In the case of visualising the undulating surface of a distal tibial growth plate, the power crust filter is essential for morphological accuracy when compared with the delaunay filter.

**Conclusion**

OsiriX® is a free, open source software package that has the additional advantageous ability to access and review MRI DICOM files using mobile devices (e.g. iPhone or iPad) which could significantly aid in the communication between practitioners and clinicians. Figure 5 displays an easy to create, interactive, surface rendered view of the knee that can be exported as a movie.

Advanced, non-invasive imaging techniques may enable us to prevent possible long-term health risks following trauma of the growth plate by providing a better understanding as to how growing bones adapt to changing lifestyles and the influential advancement of surgical techniques.