

**Computer integrated system
for bone cutting surgery**

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日時: 2012年3月6日(火) 9:00-10:00

会場: 東京大学工学部2号館 2F 221 講義室

Precise bone cutting is important in knee replacement surgery because misalignment of artificial joints may cause postoperative severe pain. The required precision for the bone cutting is very high; 2 mm for the position and 2 degrees for the posture. The length of the skin incision is 150 mm in conventional surgery, but a much smaller incision is preferable to shorten hospital stay. However, as the skin incision becomes smaller, it becomes more difficult for the surgeons to perform precise bone cutting using handy instruments. Thus, computer integrated surgical systems are attracting many researchers both in Medicine and Engineering.

In this seminar, I will talk about our bone cutting robot and CAD-CAM system for surgical planning and navigation. We are also studying bone cutting phenomena in both macro and micro scales and designing bone cutting tools with specially-designed cutting edges. By integrating the technologies of computer-aided navigation, surgical robotics, and precision machinery, we have achieved precise bone cutting with high efficiency in a minimal invasive manner.

In addition to the research topics, I will briefly talk about the GMSI educational program designed to foster young researchers.

