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## **Tracking moving organs in real time.**

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In an ideal radiotherapy procedure, the treatment system would continuously adapt the radiation beam delivery to changes in the tumor position. The development of such a tracking capability has been underway for more than 10 years, beginning with the CyberKnife image-guided radiosurgery system. In that time, much has been learned about the nature of tumor motion and the technical issues that it presents to a practical real-time tracking system. In this article, I will review the basic concepts behind existing and proposed radiotherapy beam-tracking systems, show clinical evidence of the types of movement that are encountered in real-time tracking situations, describe the corresponding technical problems and solutions, and discuss the unresolved issues in making real-time tumor tracking a practical response to tumor motion.

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